Valuing American Options under ARMA Processes

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Abstract
Motivated by the empirical findings that asset returns are autocorrelated, this paper provides the pricing algorithm for American options on the stocks, the returns of which depend on an autoregressive moving average (ARMA) process, by incorporating with the least squares Monte Carlo approach of Longstaff and Schwartz (2001) and the local risk-neutralization principle of Duan (1995). Based on the results of numerical analyses, the ARMA effect has significant impacts on values of American options. Specifically, the AR effect is more significant than the MA effect. Keywords: ARMA Process, American Option Pricing, Least Squares Monte Carlo Simulation

A Study on Performance Measurement of High-tech Industry: An Application of Panel Threshold Effect Model

Abstract
This research discusses that, under the fluctuation of the debt ratio, how the financial ratios affect the operational performance, such as rate of return on assets (ROA). The study applies panel data threshold effect model (Hansen, 1999, 2000). The sample is gathered from the annual data of the listed companies in the high-tech industry in America from 1999 to 2004. In order to make different threshold models objectively, this study uses debt ratio as the threshold variable. The study adopts the debt ratio to determine the threshold models for ROA of high-tech industry. In the end, the empirical result gets one threshold and also shows that compared with the traditional linear regression, the threshold model, which is determined by the debt ratio, can get higher coefficient of determination.
Keywords: panel threshold effect model; debt ratio; operational performance

Design Variables Optimization of Mechanical Problems

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Abstract

An improved genetic algorithm (IGA) is presente
to solve the mixed-discrete-continuous design optimization problems. The IGA approach combine the traditional genetic algorithm with the experimental design method. The experimental design method is incorporated in the crossover operations to systematically select the better genes to tailor the crossover operations in order to find the representative chromosomes to be the new potential offspring, so that the IGA approach possesses the merit of global exploration and obtains better solutions.

The Use of Term Structure Information in the Hedging of Japanese Government Bonds

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Abstract

This paper employs the Kalman filter procedure to explore the impact of yield curve factors on the hedging of Japanese government bond (JGB) using treasury futures. Three parameters (i.e., level parameter, slope parameter, and curvature parameter) embedded in Nelson and Siegel (1987)[5] are used to be the proxies of interest rate risk. The out-of-sample hedging performance is also provided by moving window technology. The empirical results indicate that there is a significant relationship between the optimal hedge ratio and the yield curve factors. However, the time varying hedge ratio that includes the yield curve variables from the information set would not provide good out-of-sample hedging effectiveness. But the out-of-sample results also demonstrate that the performance of the time varying hedge ratio with yield curve factors is better than hedge ratio with naïve hedge or OLS model.

Keyword: Kalman Filter,Yield Curve,Hedge Ratio.

An Estimate of Deposit Insurance Premium Considering Liquidity Risk

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Abstract

The purpose of this article is to employ a deposit insurance pricing model to estimate the costs of deposit insurance considering liquidity risk. We use Monte Carlo simulation method for the premium evaluation and analysis. Our empirical results find that the premiums levied by the Central Deposit Insurance Corporation (CDIC) are lower for those listed institutions over the sample period. The technical insolvency does have its role in the deposit insurance premium. Even it is much lower than the cost of real insolvency.

Keywords: technical insolvency, Monte Carlo simulation, bank run, deposit insurance

Apply Genetic Algorithm to Explore Fund of Funds on Efficient Frontier and Product Design

Abstract

This paper employs Genetic Algorithm (GA） to construct the efficient frontier for the Fund of Funds (FoF) based on The Administration Acts of Security Investment and Trust Fund in Taiwan. The model proposed in this paper can be used to examine the effects of efficient frontier on different FoF and to verify the profit prediction power of alternative FoF constructed by GA. Our conclusions show that the current FoF based on The Administration Act of Security Investment and Trust Fund in Taiwan exhibits less efficiency. In particular, based on the optimal asset allocation principles of profit maximization and risk minimization, this paper employs three market indexes and fund's asset net value as benchmark indexes for the constructions of FoF by applying GA. Compared to the performance of Taiwan Stock Exchange Corporation (TSEC) weighted price index, the average performance of domestic FoF and stock funds within the same period, the performance of the FoF constructed in this paper is more efficient across the test sample. In addition, this paper also shows that a FoF combined with the concepts of profit maximization and risk minimization as well as the order of Sharp index will offer a better and stable prediction power.

Keywords: Fund of Funds, Genetic Algorithm, Efficient frontier

A Nonmonotone MBFGS Method for Solving Nonconvex Minimization Problems

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Abstract
A nonmonotone MBFGS trust region method is presented for solving nonconvex minimization problems in the paper. Under mild conditions, the global convergence is proved. This may enlarge the applications of nonmonotone trust region methods.

New Multi-Objective Constrained Optimization Evolutionary Algorithm

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Abstract
In this paper, a new evolutionary algorithm (EA) to solve multi-objective constrained optimization problem (MCOP) is proposed. First, the rank of the individual and the scalar constraint violation of the individual are defined. Then, based on the rank and the scalar constraint violation of the individual, a new fitness function and a switch selection operator are presented. Accordingly, when the individuals are evaluated or ranked, it doesn't need to care about the feasibility of individuals, therefore it is a penalty-parameterless constraint-handling approach for multi-objective constrained optimization problem. Finally, the computer simulations demonstrate the effectiveness of the proposed algorithm.

Precipitation state forecasting based on unascertained C-means and Markov chain model with gray relevancy weights

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Abstract

At present, in the field of hydrology and meteorological science, precipitation state forecasting is an extremely important problem. In this paper, the problem of precipitation state forecasting was studied, and a new forecasting method based unascertained c-means and Markov chain model with gray relevancy weights was presented. The method included the unascertained characteristic of precipitation state comprehensively, thus its forecasting outcomes are more scientific. Firstly, the unascertained C-means method is applied to divide time series of precipitation state, and the unascertained classification standard of precipitation state is established based on the fact that there are a lot of unascertained characteristics in the precipitation. Secondly, a forecasting method, called Markov chain model with gray relevancy weights, is applied to predict the future precipitation state by regarding the gray relevancy weights based on the special characteristics of precipitation being a dependent stochastic variable. Finally, the correction and feasibility of this model is identified by a case study.

The Study of VMI Inventory Decision Support System using Neural Network Technology

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Abstract

Supply chain management includes four major elements; namely, manufacturers, suppliers, distributors and retailers. Inventory control plays a very important role in each of the four modules in the supply chain. In this paper, a decision surface modeling tool is developed using neural networks. It is capable of capturing the essential features of the retail simulation model in multidimensional, mathematical relationships between performance (e.g., service level and lost sales) and key decision parameters (e.g., SKU mix and season length). The simulation model is used to generate the training data. Once trained, the neural network is able to predict performance for new sets of inputs in real-time and can be used to build an interactive, graphical representation of the inputperformance relationships.

A Figure Extraction and Synthesis System by Learning Vector Quantization Neural Networks

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Abstract

Extracting complete figures from videos with complicated environments is difficult. A new figure extraction and synthesis system with capability of extracting figures from consecutive frames in a messy environment is proposed in this paper. A figure template is constructed based on the face detection results and some image processing techniques. Figural and non-figural features are extracted from the figure images. By means of these features, a learning vector quantization neural network (LVQNN) is applied to classify the uncertain regions into figural and nonfigural objects. The extracted figure can be further synthesized into an optional cinestrip. Experimental results showed the proposed method successfully extract the figure object from a complex background environment.

Mining Frequent Patterns with Item, Aggregation, and Cardinality Constraints

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Abstract

Recently, the topic of constraint-based association mining has received increasing attention within the data mining research community. By allowing more user-specified constraints other than traditional rule measurements, e.g., minimum support and confidence, research work on this topic endeavor to reflect real interest of analysts and relief them from the overabundance of rules, and ultimately, fulfill an interactive environment for association analysis. So far most work on constraint-based frequent patterns (itemsets) mining has been single-constraint oriented, i.e., only one specific type of constraint is considered. Surprisingly little research has been conducted to deal with multiple types of constraints. This paper is an investigation on this problem. Specifically, three types of constraints are considered, including item constraint, aggregation constraint, and cardinality constraint. We propose an efficient algorithm, MCFP (Multi-Constrained Frequent Pattern mining) to accomplish the task of discovering frequent itemsets satisfying all three types of constraints. Experimental results show that our algorithm is significantly faster than the intuitive approach, post processing the generated frequent patterns against user-specified constraints.

Hierarchical Document Clustering Using Fuzzy Association Rule Mining

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Abstract

In this paper, we will present an effective Fuzzy Frequent Itemset-Based Hierarchical Clustering (F_2IHC) approach, which uses fuzzy frequent itemsets discovered by fuzzy association rule mining to improve the clustering accuracy of FIHC (Frequent Itemset-Based Hierarchical Clustering) method. Our approach can alleviate the deficiencies of most of the traditional document clustering methods in dealing with the problems of high dimensionality, large data size, and meaningful cluster labels. We have conducted experiments to evaluate our approach on Reuters-21578 dataset. The experimental results show that our approach not only absolutely retains the merits of FIHC, but also improves the document clustering accuracy quality as compared with the FIHC method.

An AI-Agent-based Trapezoidal Fuzzy Ensemble Forecasting Model for Crude Oil Price Prediction

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Abstract

In this study, a AI-agent-based trapezoidal fuzzy ensemble forecasting model is proposed for crude oil price prediction. In the proposed ensemble model, some single AI models are first used as predictors for crude oil price prediction. Then these single prediction results produced by the single AI-based predictors are fuzzified into some fuzzy prediction representations. Subsequently, these fuzzified representations are fused into a fuzzy consensus, i.e., aggregated fuzzy prediction. Finally, the aggregated prediction is defuzzified into a crisp value as the final prediction results. For testing purposes, two typical crude oil price prediction experiments are presented.

Mining with Prelarge Trees for Record Modification

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Abstract

In this paper, the structure of the prelarge tree is proposed to maintain association rules for record modification based on the concept of pre-large itemsets. Due to the properties of the pre-large concept, the proposed algorithm can achieve a good execution time for tree maintenance especially when each time a small number of records are modified. Experimental results show that the proposed prelarge-tree maintenance algorithm has a good performance for handling updated records.

A High Performance Frequent Itemset Mining Algorithm Using Confidence Frequent Pattern Tree

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Abstract

Various processing methods for association data mining are presently being looked into. Most of them focus on data structure and computation improvement. The data structures usually have a high degree of data compression ratio and can express the original information from the database with integrity. There is also no need to obtain information from the database again. However, not many studies concentrate on using known frequent item sets to increase system performance. In order to avoid repeating the calculation of known frequent items to speed up the data mining process, a new tree structure to store all known frequent item sets and a header table to create a frequent item linking list are proposed. The experimental results showed that the proposed procedure performs better compared with existing data mining procedures.

A Novel Recommendation Method based on Rough Set and Integrated Feature Mining

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Abstract

The explosive growth of information makes people confused in making a choice among a huge amount of products, like movies, books, etc. To help people clarify what they want easily, in this study, we present an intelligent recommendation approach named RSCF (Recommendation by Rough-Set and Collaborative Filtering) that integrates collaborative information and content features to predict user preferences on the basis of rough-set theory. The contribution of this paper is that our proposed approach can completely solve the traditional problems occurring in recent studies, such as cold-star, first-rater, sparsity and scalability problems. The empirical evaluation results reveal that our proposed approach can reduce the gap between user's interest and recommended items more effectively than other existing approaches in terms of accuracy of recommendations.

Multi-Kernel Support Vector Clustering for Multi-Class Classification

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Abstract

Support vector clustering (SVC) has been successfully applied to solve multi-class classification problems. However, it is usually hard to determine the hyper-parameters of RBF kernel functions. A multiple kernel learning (MKL) algorithm is developed to solve this problem, by which the kernel matrix weights and Lagrange multipliers can be simultaneously obtained with semidefinite programming. However, the amount of time and space required is very demanding. We develop a two stage multiple kernel learning algorithm by incorporating sequential minimal optimization (SMO) with the gradient projection method. Experimental results on data sets from UCI and Statlog show that the proposed approach outperforms single-kernel support vector clustering.

New Algorithm of Maximum Frequent Itemsets for Mining

Multiple-level Association Rules

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Abstract

Discovering maximum frequent itemsets is a keyissue in data mining applications. Most of the previous studies adopt an Apriori-like candidate itemsetsgeneration-and-test approach, however, candidateitemsets generation is costly. In this study, we propose a new algorithm named ML_Pincer for discovering maximum frequent itemsets in multiple-level association rules. ML_Pincer algorithm combines the top-down and the bottom-up directions progressive deepening searching ideas, moreover, it uses two-way pruning tactic: the information which gathered in one direction can prune more candidate itemsets during the search in the other direction. It decreases candidate itemsets greatly and avoids making multiple passes over database, consequently, it reduces CPU time and I/O time remarkably. Experiments prove that ML_Pincer algorithm is more efficient than PMAM algorithm, especially when some maximum frequent itemsets are long.

The Extremal Sampling Technique

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Abstract

The transcription technique of the acoustic structure has been studied. The maximum and minimum data of the filtered waveform plays a key role in the abstraction of the 3-dementional acoustic structure of time, energy and frequency. The technique has ascertained that the whole recordings collected from various radio programs comprised not only 6,769 extrema in average but also the remaining 43,250 (86.5 %) of noise level per second. The traditional sampling data with a fixed rate of 44.1 kHz included the approximated extrema within a spectral bandwidth of 40-5,120 Hz. The conversion from a wav-formatted file to the extremal data was realized with 16.0 % reduction of the file size, preserving the semantic information.

Effect of HIV on Japanese Population

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Abstract

The Japan population decrease since 2005. In particular, the working population has begun to decrease in 1995. In our former study, the death toll of the three major causes of deaths in Japan was estimated until in 2060. These three major causes of deaths are malignant neoplasms, heart diseases and cerebro-vascular diseases. These have more influences on a senior population. However, an effect of HIV is greater on the working population than senior population. In present Japan, influence from HIV carrier / AIDS to give total population is small. However, the reported number increases every year, and it is considered that the influence will grow in the future. We estimate an effect of HIV on Japanese population. In these calculations of the simulated population, the total fertility rate is used 1.29, therefore the Japanese population decreases simply.

Effects of High-Frequency Repetitive Transcranial Magnetic Stimulation on the Treatment-resistant Depression and Its Mechanism

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Abstract

Transcranial magnetic stimulation (TMS) is a technique for noninvasively and almost painlessly stimulating the central nervous system. Following the development of repetitive TMS (rTMS), many studies about the antidepressant effect of rTMS have been performed and it has now been licensed in many countries for the treatment of depression. Nevertheless, it has not been completely confirmed that rTMS is conclusively effective in treating depression. This might be the reason why it has not yet become common tool for the treatment of depressive disorder in Japan. In the present study, we performed clinical trials of high-frequency rTMS (20 Hz) for the treatment of treatment-resistant depression. We also measured plasma levels of catecholamine metabolites and brain-derived neurotrophic factor (BDNF) to clarify the mechanism of the action of rTMS in the treatment of depression. Twenty-six depressed patients who met the DSM-IV criteria for major depressive disorder participated in this study. Eleven were male, 15 female. The ages of the subjects ranged from 19 to 78 years old (mean ± SD = 52.9 ± 17.8). All patients were given left prefrontal 20 Hz rTMS at 80% MT (total 800 pulses a day) over ten daily sessions. The mean 17-item Hamilton Rating Scale for Depression (Ham-D) score of 20.5±5.2 before rTMS decreased significantly to 15.6±7.3 after rTMS. Nine of 26 patients demonstrated some improvement (Ham-D≥25%) after rTMS. The levels of plasma MHPG were significantly reduced after rTMS treatment, and it was observed that the change in plasma MHPG levels had a negative correlation with the change in scores of agitation. Furthermore the plasma levels of BDNF were significantly increased in responders and partial responders, but not in

nonresponders, after rTMS treatment. These results suggest that rTMS treatment brings about some improvement in refractory depression, especially in depression with symptoms such as agitation. rTMS might have an antidepressant action by altering MHPG and BDNF levels in the central nervous system.

Medical Radiograph of Nano-Magnetic Fluid Used by Spring-8 Synchrotron Radiation X-Ray

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Abstract

Nano Drug Delivery System (nano-DDS) is a new medical technology. We studied medical use used by
about 7 [nm] ferromagnetic fluids. We searched good energy condition of ferrofluid contrast medium radiograph image used by SPring-8 synchrotron radiation X-ray. As results, in case of low photon energy 15.0 [KeV] (λ = 0.8 Å). We showed ferrofluid in Acryl amid gel and taro leaf and mugwort. #1. We found Low photon energy could show vascular tissue and ferrofluid distribution respectively. In case of medium photon energy 20.0 [KeV] (λ = 0.6 Å). We observed ferrofluid in rat ear lobe and rat stomach and rat foot. #2. We found medium photon energy could see several organizations by changing exposure. In case of high photon energy 25.0 [KeV] (λ = 0.5 Å). We showed ferrofluid in chicken egg and pork. #3. We found high proton energy was suitable for observing ferrofluid distribution in plain organization, but was not suitable for observing ferrofluid distribution in complicate organization.

Drug Delivery System Using Nano-magnetic Fluid

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Abstract

Nano-size magnetic magnetide is considered important for various medical applications. Dynamic motion of the magnetic particle is investigated in two essential models from a theoretical point of view. One is a drag model of the magnetic particle in an artery. The second is a pull model towards the surface of artery. Threshold conditions of external variables are obtained by dimensional analysis. On the basis of all these results, it is concluded that the movement of magnetic fluids can be controlled by external magnetic fields in blood vessels.

Molecular Structure and Information Complexity of Social Organization DNA

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Abstract

A molecular biology perspective on DNA- genetic information relations is proposed as an alternative perspective to study hereditary problems about social organization. Three topics are analyzed and discussed including the definition and comparisons about the DNA between nature biology and social organization the information structure from the Social Organization DNA (SO DNA) by bionics technology, the estimation of information complexity about the SO DNA.

A Genetic Programming Ensemble Approach to Cancer Microarray Data Classification

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Abstract

This paper presents a method for building an ensemble of classifiers for cancer microarray data. The proposed method exploits the advantage of a clustering technique, namely K-means clustering, combined with a feature selection technique, namely SNR feature selection. An evolutionary algorithm, namely Genetic Programming, is used to construct a number of classifiers which are assembled into an ensemble. The performance of the proposed method was tested on six cancer microarray data sets. The experimental results indicate that the proposed method yields a good prediction accuracy with a small standard deviation.

Combination of KNN-Based Feature Selection and KNN-Based Missing-Value Imputation of Microarray Data

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Abstract

Microarrays are useful biological resource to study living forms at the molecule level. Microarrays usually have only few samples but high dimensionality with many missing values. The consequent downstream analysis becomes less efficiency. This paper proposes a methodology to impute missing values in microarray data. The proposed methodology is a combination of KNN-Based Feature Selection and KNN-based imputation (KNNFS Impute). The KNNFS Impute comprises of two main ideas: feature selection and estimation of new values. A comparative study of the proposed method with traditional KNN and Row average methods has been presented for the estimation of the missing values on three microarray data sets: Lung Tumor, Colon Cancer, and ALL-AML Leukemia dataset. The best estimation results are measured by the minimum Normalized Root Mean Squared Error (NRMSE). The results show that the proposed method has powerful estimation ability on the three data sets with smaller NRMSE than the compared methods.

New Results on H¥ Control of Input Delay Systems

Huijun Gao and Zhiguang Feng

Abstract—The problem of delay-dependent H¥ control for systems with state and input delays is considered in this paper. By using the idea of delay fractioning, an improved H¥ performance criterion is proposed. Moreover, based on this criterion, a new procedure for designing delay-dependent H¥ state feedback controllers is obtained, which ensures that the closed-loop system is asymptotically stable with an H¥ disturbance attenuation level g : These results are shown, via extensive numerical examples, to be much less conservative than most of the existing ones in the literature.

Robust Adaptive Control for a Class of Uncertain Switched Delay Systems with Actuator Failures

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Science Foundation under Grant 20070411070 and 20060400287.

Abstract

The problem of the reliable control for a class of uncertain switched delay systems containing actuator failures is addressed in this paper. The upper bounds of uncertainties are assumed to be unknown. When actuators suffer "serious failure"—— the never failed actuators can not stabilize the given system, based on multiple-Lyapunov function method, the adaptive feedback controllers being able to estimate the upper bounds of uncertainties are derived in terms of linear matrix inequalities (LMIs) such that the resulting closed-loop system is uniform ultimate boundedness.

Adaptive Observer Based Actuator Fault Diagnosis for ASV

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Abstract

This paper deals with the actuator fault diagnosis and accommodation problem for the aero space vehicle (ASV). A novel nonlinear robust adaptive observer is developed for estimation of the actuator fault under the lipschitz condition on the nonlinear part of such systems, which is used to continuously accommodate the control signal, so as to ensure the stability of faulty system. Finally, simulation results about ASV are presented to illustrate the feasibility and effectiveness of the proposed methods.

Decoupling Double-loop Control System with ADRC

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Abstract

An active disturbance rejection controller (ADRC) is proposed for decoupling double-loop control system. The ADRC consists of the tracking differentiator, the extended state observer and the nonlinear state error feedback. With this approach, the double-loop system with time delay is treated as two correlated control loops according to the best variable pairs selection, the interactions of two control loops can be estimated by the extended state observers, and the nonlinear state error feedback compensates the interactions. Finally, an experiment is designed to show the effectiveness of the proposed scheme.

Controllability, Observability and Stabilization of A Class of Matrix Linear Systems_

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Guang-Ren Duan, Zheng Zhong

Abstract

In this paper we consider the controllability and observability properties of the matrix linear system ˙X = AX + XA + BU,Y = CX where A,A ,B and C are some known matrices. It is shown that such system is controllable and observable if and only if the corresponding linear system ˙X = AX + BU,Y = CX is controllable and observable, respectively. Some explicit conditions are established. Furthermore, stabilization of such matrix linear system by state feedback is considered.

Keywords: Matrix linear systems, controllability, observability, stabilization by state feedback.

Fault Detection of Networked Control Systems Based on Kalman Filter

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Abstract

The fault detection for networked control systems with network-induced time delay is discussed in this paper. The Kalman filter is designed to compensate the time delay. The residue is only related to fault and random disturbance. By computing the residue between the output of the practical system and the output of the Kalman filter, the fault detection scheme of NCS is given. The simulation results illustrate effectiveness of the proposed delay compensation method and fault detection method.

Non-Fragile Fault Tolerant Control of the Linear Discrete-Time Systems with Multi-indices Constraints

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Abstract

For linear discrete-time systems with normbounded parameter uncertainties and actuator failures, a method of non-fragile fault tolerant control with multi-indices constraints is proposed. With the nonfragility of the controller taken into consideration, the consistency theory about circular pole index, steady variance index and H-infinity constraints is presented. The problem addressed is to design a controller such that the above three objectives are simultaneously achieved for all admissible parameter uncertainties and actuator failures, while the robustness of the controller is ensured. An illustrative example is given to demonstrate the validity of the proposed design approach.

Observer-Based H_1 Control for Discrete-Time Fuzzy Systems Using Fuzzy Lyapunov Functions

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Abstract

The problem of observer-based H_1 fuzzy control designs for discrete-time T-S fuzzy systems is considered in this paper. A sufficient LMI condition is proposed to guarantee the existence of theH_1 controllers based on fuzzy observers for the discrete-time T-S fuzzy systems. It is shown that the controller and observer parameters can be obtained by solving a set of linear matrix inequalities that are numerically feasible with commercially available software. Finally, the validity and applicability of the approach are demonstrated by examples.

Adaptive Sliding Mode-Like Fuzzy Logic Control for Nonlinear

Systems

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Abstract

Sliding mode-like fuzzy logic control (SMFC) algorithm for nonlinear systems is presented in this paper. Firstly dead zone parameters of sliding mode control (SMC) are selftuned by proper adaptive laws and then combined into fuzzy logic system (FLS) to compose the opportune fuzzy logic control (FLC), which is equivalent to the pre-designed SMC controller with self-tuning parameters. Robustness and invariance to the uncertainties of the closed-loop systems are improved and chattering of the SMC is eliminated. Finally simulation results of numerical examples show that the proposed control algorithm is efficient and feasible.

A "Decision and Re-solving" Beamformer for the PAM Communication System

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Abstract

Minimum variance distortionless response (MVDR) beamforming is known to degrade due to effects of
imprecise knowledge about the steering vector and finite sample size. However, the theoretical reasons for these have not been well investigated yet. In this paper, we propose a new mathematical model about beamforming. In the new model, beamforming is posed as ill-conditioned linear equations. The new model can clearly explain why the MVDR method suffers significant performance degradation when the knowledge about the steering vector is imprecise and the sample size is finite. Using the new model, we also propose a new beamformer for the PAM communication, which is termed as "Decision and Resolving Beamformer". Numerical experiments have shown the robustness of the proposed beamformer against imprecise knowledge on the steering vector and/or against the finite signal length

effect.

The Image Compression Method Based On Adaptive Segment and Adaptive Quantified

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Abstract

An image compression method based on adaptivesegment and adaptive quantified is presented in this paper.The image is divided into smooth and detail areas using the multi-threshold-segmentation method based on the potential function.The quantization table varied with the different image.The 2-D DCT is decomposed into 1-D fast DCT based on base-2 FFT.The Compression-to-PSNR Rate can evaluate the image compression result more effectively than that of the compression rate or PSNR respectively.The experiment shows that the algorithm gives the superior performance compared with traditional JPEG.

Wavelet Digital Watermark Based on Chaotic Sequence

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Abstract

In this paper, a new version of wavelet digital watermark based on chaotic sequence is presented. In satisfying the constraint conditions of distortion, the intensity of watermark is self-adaptive, adjusted with the PSNR and the length of watermark. The existence of watermark can be detected by public key without the original image. The experiment shows that the proposed algorithm is robust for common signal processing and geometric distortion.

The Properties of FLOC and Its Application in Evoked Potential Latency Change Detection

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Abstract

Based on the concept of the Fractional Lower Order Stationary Process, this paper provides and proves the properties of the Fractional Lower Order Covariance (FLOC) systematically, and presents the applications of the FLOC in the latency change detection of evoked potentials. The analysis and experiments demonstrate that the FLOC based algorithm has better performances than those of the second order statistics based algorithms in Alpha-stable noise conditions.

Coding Efficiency Improvement with Adaptive GOP Size Selection for H.264/SVC

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Abstract

In this paper, we present a novel adaptive GOP struc-mture(AGS) for H.264/SVC. Proposed method adaptively de- fines the GOP structure by analyzing the input sequence characters. The accumulated difference of luminance pixel components is utilized to set a threshold for adaptive GOP size definition. Another scene change detection method is also proposed to reorganize the GOP structure. Different from previous AGS methods, the proposed method concen- trates on the coding efficiency improvement on the basis of the Hierarchical B-picture structure. The simulation results show that proposed AGS method can improve up to 0.2dB of PSNR compared with fixed size GOP methods.

Head Detection and Tracking by Mean-shift and Kalman Filter

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Abstract
In this paper, we proposed an enhanced kernelbased algorithm for visual tracking based on the video sequences captured from a fixed camera on the top of the scene. The technique presented here employs the image color intensity information and the Local Binary Pattern (LBP) to construct a fourdimensional histogram representative of the color intensity values and the texture of the target under study. The new location is then determined by Mean Shift iteration after the predict location is confirmed by Kalman filter. Color, texture, and motion features are integrated to track objects. Large numbers of experiments on video sequences in different scenes has demonstrated its accuracy and robustness.

A New Audio Watermarking Method for Copyright Protection and Tampering Localization

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Abstract
The rapid growth of Internet and digital multimedia has made the authority and integrity of audio information more and more important issues. To protect digital works against illegal use and tampering, the digital audio watermarking technique has been presented and widely researched. In this paper, a new multipurpose audio watermarking method is proposed. The region of interest (ROI) audio and one binary watermark image are two robust watermark signals which achieve the purpose of protecting the crucial part of the host signal and copyright simultaneously. In the extracting procedure, fast fixed-point independent component analysis (FastICA) algorithm is adopted to extract the two robust watermarks, and detect tampering areas automatically without embedding a fragile watermark. Experimental results show the effectiveness and reliability of the proposed method.

A Speech Separation Method Combining Time-Frequency Masking and Independent Component Analysis

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Abstract
The anechoic mixing model, the number of sources is larger than the number of mixtures, and sources have different amplifications and time delays in different mixtures, was effectively solved by the speech

separation method based on time-frequency masking. As the binary winner-take-all masks were created to extract the sources, the constructed masks contain a large number of zeros, and bring in music noise or result in speech distortion. Meanwhile, in some applications, there is no need to extract all the sources. Considering these two issues above, a speech separation method combining time-frequency masking and independent component analysis (ICA) is proposed in this paper. The time-frequency masking technique is used to remove the sources rather than extract them. The ICA algorithm is exploited to separate the needed sources that are useful to us. Experimental results show the effectiveness of the proposed method.

Baseball Playfield Segmentation Using Adaptive Gaussian Mixture Models

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Abstract

Playfield is one of main parts appearing in typical scenes of sports video. Generally, the playfield always has very distinctive attributes. For baseball, the playfield is composed of grass and soil. The colors of grass and soil are selected as a feature to segment the playfield in our work. However, Playfield colors demonstrate significant variations, which may cause a large amount of segmentation errors for color-based segmentation. In this paper, we present a new method of grass-soil playfield segmentation for baseball videos based on an adaptive Gaussian Mixture Model. To improve segmentation accuracy, a particular GMM model is obtained by automatic training directly from sample data for each baseball game. The simulation results indicate that it can achieve very low error rates.

Keywords: Adaptive Gaussian mixture model, playfield Segmentation

Detecting Human in Still Images by Learning Multi-scale Mid-level Features

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Abstract

Detecting human in still images is one of the most challenging object detection problems. In this paper we apply the scale theory to human detection. By integrating Gaussian Pyramids multi-scale object representation approach we present a Learned Multi-scale Mid-level Feature (LMMF) based human detection algorithm. Firstly multiscale low-level features are extracted by Gaussian Pyramid decomposition and gradient computation. Then LMMFs are learned from multi-scale low-level features

using AdaBoost algorithm. The final human/non-human decision is made by classification on the LMMFs. Using LMMF descriptors, our method attempts to harvest more information than using uni-scale feature descriptors. Experiments on INRIA person dataset demonstrate that our method outperforms the previous state of the art detector.

Retrieve Scalable Image Contents over Image Contents Network by Efficient Caching Algorithms

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Abstract

Recently how to retrieve Web contents efficiently over the Internet has been an important issue, because large-sized contents (such as image and video) always take heavy load to the end users. Scalable (layered) format is considered as one of appropriate solutions for the above problem because of its better flexibility and functionality. However, the corresponding caching method for scalable format has not been resolved. Therefore, this paper is to talk about the caching algorithms to retrieve and deliver scalable Web image contents over the Internet. We compare several caching methods and give a conclusion on how to further improve the Web performance by assigning efficient caching algorithms.

Knowledge Representation and Object Modeling based on Design Space for Knowledge-based Design Support Systems

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Abstract

The improvement of intellectual productivity of the design business is a pressing need of manufacturing. Many general-purposed CAD systems are good to support the works like drawing but not effective to processing and support of design knowledge. Thus, there has been a considerable growth of interest in knowledge-based design support systems. Based on object-oriented methodologies and attribute-oriented modeling paradigms, we have proposed the assembly structure as a design object model and design space for design problem representation. This paper focuses the discussion on the modeling and the knowledge representation about machine elements for knowledgebased design support systems. We also verify the effectiveness of the proposed method through the application examples.

Enhancing Pie-menu Selection with Pen Pressure

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Abstract

Pie-menu, a very effective item-selection widget, has been proposed to enhance item-selection tasks in pen-based devices such as PDAs (personal digital assistants) and Tablet PCs. The significant advantage of Pie-menu is that it enables users to select items within a menu with only a short distance for the pen-tip to move. However, as the number of items to be selected increases, the architecture of Pie-menu becomes more complex, and this makes such tasks more dif- ficult. Therefore, with a view to overcoming this problem, we developed a novel menu widget called Layer-Pie-Menu which is designed to reduce the architectural complexity by layering numbers of Pie-menus and using pressure as the switch mode to differentiate between the layers. An exper- iment was conducted to examine the functional efficiency of Layer-Pie-Menu. Experimental results showed that the most suitable number of layers that can be controlled by pressure is two.

Attribute Division Algorithm Based on Entropy

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Abstract

In order to preprocess data for Data mining algorithms, an attribute division algorithm based on entropy is given through analyzing the Physical Meaning of Information Entropy. The algorithm measures the relativity among the different attributes based on entropy qualitatively and quantitatively. The original attribute set is divided into several subsets which are conditional independence by K-Means Clustering Algorithm. Experimental results show that this algorithm can be used for Data Preprocessing.
Key Words: Information Entropy , K-Means Clustering Algorithm , Data Preprocessing

Research on SIP and H.323 Protocol Conversion

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Abstract
Both of SIP and H.323 are widely used in VoIP. H.323 has wonderful structure. With H.323, it is easy to establish and control a call. SIP is a text based protocol. Although it is simpler than H.323 in structure, its power is as great as H.323. These two protocols offer the same services and functions with different mechanism. So, it is important and significant to achieve their conversion.

A User-friendly Web Content Management System

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Abstract

This study applies two open source projects, namely PHP and MySQL, to create a powerful, userfriendly web-based system for creating, maintaining and publishing a database comprising news information in the form of text and graphical images. The proposed system is specifically designed to enable non-technical users with no knowledge of computer programming, graphic imaging tools, or markup languages such as HTML to add new material to a website or to modify the existing contents as and when required in an intuitive and real-time fashion. As a result, a technically competent website management team is not required, and thus the cost and flexibility of the website management process is significantly improved.

Automatic Landing System Using Adaptive Resource Allocating Network

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Abstract

This paper presents an adaptive resource allocating network (ARAN) deign to improve the performance of conventional automatic landing system (ALS) and guide the aircraft to a safe landing. Real-time learning is applied to train the ARAN that uses gradient-descent of the error function with respect to the weights to perform the weights updates. Adaptive learning rates are obtained through the Lyapunov stability analysis. Convergence of learning is guaranteed. Simulations show that the proposed scheme has better performance than the conventional ALS.

Research on Xml Multi-Signature base on subtle granularity

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Abstract

This paper proposes a transformation algorithm of abstracting information based on the semantic path, by constructing xml index tree. The signature information of more subtle granularity and significance can be found quickly in the xml document according to the tree and transformation algorithm. Through

signing multi-semantic path and information, Xml multi-signature can be realized, data security and well formation of document can be guaranteed; the efficiency and flexibility of multi-signature can be enhanced.

Automatic Selection of Fuzzy Models based on User's Data

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Abstract

There have been different fuzzy models and inference methods developed for various applications, how to choose a suitable one for specific problem solving is an issue for the development of intelligent systems. In this article, an algorithm is proposed for automatic selection of fuzzy model and method based on user's data.

A Satisfactory-oriented Approach to Multi-evaluator Single-layer Evaluation System with Linguistic Truth-value

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Abstract

In this paper, a general satisfaction-based approach with linguistic truth-value to multi-evaluator single-layer evaluation system is presented. In this approach, user can give evaluation value for every criterion in natural language. And all evaluation value given by evaluator will be transformed to linguistic truth-value based on satisfaction. In the final aggregation process, different important coefficient which comes from both evaluation criteria and evaluators will be included in the final evaluation results.

Measurement of the Knowledge-Sharing Efficacy ofWeb2.0

Site Constructed on the Basis of Knowledge-based Systems by Applying the Model of UTAUT: Evidence of the early adopters

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Abstract

Many websites have gradually constructed the sharing mechanism of web2.0 through knowledgebased Systems. We use the Unified Theory of Acceptance and Use of Technology and the theory of knowledge-sharing self-efficacy to show that the performance expectancy, effort expectancy and social influence have significant impact on the knowledgesharing self-efficacy of an individual and that facilitating conditions have no conspicuous impact. The contributions of the research include providing a reference from which the managers of the Web2.0 sites constructed on the basis of knowledge-based systems cam make decisions for development, and demonstrating the feasibility of applying concepts from the field off information activity in social sciences to the field of knowledge-based systems to study problems from different viewpoints and form new research directions.

The Development of Children's Learning Software In Web3D Technology

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Abstract

A method of developing Web3d-based children's education software is presented, on the basis of constructivism for learning, children like to learn knowledge in entertainment manner, and 3D virtual environment is suitable for children's exploration. Themethod is illustrated with three examples, the first is a virtual observation experiment for sun, users can handle a virtual telescope to watch a virtual sun's images and learning sun knowledge in an interactive manner; the second is a virtual park, users can roam in a virtual natural landscape; the third is a virtual aquarium, users can watch a lot of fishes from different viewpoints. These examples show that Web3d technology has powerful functions in developing children's e-learning software.

Avoidance of Redundant Retransmission in Vertical Handover by Modified Stream Control Transmission Protocol

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Abstract

A heterogeneous wireless network integrating IEEE 802.11 WLAN and 3G/UMTS mobile phone system will be a common scenario in future mobile networking. The multi-homing feature of SCTP and the dynamic address configuration extension had made seamless vertical handover possible in heterogeneous mobile wireless networks. However, due to the switching of radio interfaces and the attenuation of radio signal, the SACK could get lost during the handover process. This will result in unnecessary retransmission after the handover and lead to degradation in network utilization. A solution to this problem will be presented in this article. The proposed approach introduces a new parameter, named Received Last TSN (RLT), to the standard ASCONF control message. The RLT keeps track the sequence number of lastly received packet from the old interface. The mobile node reports the RLT to its corresponding node right after the handover. With this information, the corresponding node can then proceed with effective transmission and avoid the unnecessary retransmission caused by the loss of SACK. Simulation results reveal that the proposed scheme is a feasible and effective measure for the reduction of redundant retransmission during vertical handover in heterogeneous mobile wireless networks.

Evaluating the Latency of Clients by Player Behaviors in Client-Server Based Network Games

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Abstract

Network games are becoming more and more important in the last years. Latency on the Internet is a well-known problem for interactive network games. In client-server (C/S) based network games, players only know their own network delay. Though latency of other clients can be easily got from game servers, most of game servers do not provide these ‘useless’ information for players because of no benefits to game providers. In network games, because of network delay, two players can hardly see each other at the same time, though they have the same range of visual scope. From the view of local client, The movement of a nearby player looks like to be made sooner or later, and so is the nearby player. So, reaction of the nearby player to the movement of the local player will occur at different time from local view, when he is under different network condition. We can evaluate the latency of clients by the distinction of reaction time. In this paper, we propose a method to evaluate latency of players from local client according to reaction of players

and rules of the game system. To gain a better understanding of reaction of players, we analyze a trace of Crazy Tank, a modified 2D C/S based tank game. Then we use PopKart, a popular network game, to verify feasibility of our method in real network games. Simulation shows that our method achieves significant accuracy in latency evaluation.

Ripple: Toward a Substrate Middleware for Peer-to-Peer Applications*

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Abstract

Peers in multiple P2P applications execute overlapped operations with different implementation, like neighbour management, resource publish/lookup, delay investigation, which leads to poor interoperability and unnecessary network load. Peers contribute their resources only when they stay in same application. We propose a P2P middleware, called Ripple, to accomplish common functions in a layered architecture. Ripple manages all peers running various applications in a uniform substrate overlay network. The substrate overlay is designed with a hybrid topology. This hybrid topology does not aim at only a particular type of applications, but also enables the flexibility for various applications. Our work is an attempt to address common needs of P2P applications, which may simplify the development and improve the performance of P2P networks, as well as mitigate the sampling stress to physical networks.

A Network Traffic Supervision System Based on Feature Parameters Distribution

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Abstract

At the present time, most existing network traffic supervision systems just focus on the traffic volume, which leads to a wealth of information contained in this data source being not mined well. In view of this situation, this paper utilizes entropy to capture the distribution change of network traffic feature

parameters such as source IP, destination IP and destination port, and analyses the network traffic from this point of view. The method which adopts the change of the network traffic feature parameters distribution to discover anomalies is different from previous methods which pay more attention to the volume of the traffic. By using this method, we can capture the microscopical anomalies. Finally, we use this method to implement such a supervision system and the experimental result shows that the system pattern which analyzes both volume and feature parameters distribution of traffic has a higher detecting rate and lower false rate.

A Routing Based on Dynamic Tree Algorithm inWSNs

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Abstract

Wireless sensor networks are widely used in different fields. Because of its distinguished characteristics, we must take account of a factor of energy consumed when designing routing protocol. The routing protocols of the wireless sensor networks have mainly two types: Flat routing protocol such as Directed Diffusion and SPIN, and Hierarchical routing protocol such as LEACH and its variations. In this paper, we present a routing based on dynamic tree for solving LEACH problems of both scalability and uneven distribution of cluster-heads. The simulation proves that the algorithm is able to solve these problems.

The Development of Monitoring Software for Local Area Network

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Abstract

In this paper, a monitoring software for LAN (local area network) was developed by using the Socket components of Delphi, Winsock and TCP/IP (Transfer Control Protocol /Internet Protocol) techniques. It realizes the monitoring and controlling the client computers through a host computer in LAN. Functions such as obtaining the information of the client computers, alerting the illegal operations of the operators, and controlling the client computers are implemented.

The Framed Pipeline Cyclic Service for Mixed-Media PON Access Networks

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Abstract

The Passive optical network (PON) is thought to be the best candidate for fiber to the home (FTTH) to solve the access network bandwidth problem. A key problem in transporting mixed-media across PON access networks is to avoid data collisions in the upstream traffic and a sharing of the link by different data traffic sent by ONUs (Optical Network Units). This paper presents performance analysis on PON MAC Protocol called framed pipeline cyclic service with dynamic allocation. Due to the contention-free in the available slot in this protocol which different from the contention-based access. Compared with contention-based protocol, this type of protocol has better performance for real-time data traffic.

Hybrid ARQ Based on Accumulated Reliabilities and Error Hamming- Weights

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Abstract

Based on accumulated reliabilities and error Hamming-weights, this paper proposes an error control scheme of hybrid ARQ for binary linear block codes over AWGN channel. The proposed scheme accumulates reliabilities of received word at each retransmission. As a consequence, errors are gradually corrected one after another. Retransmissions continue until the accumulated reliabilities result in a code word after hard decision. Simulation results show that the proposed scheme outperforms ARQ scheme by 30% of throughput efficiency at 4dB of E_b/N_o and 1dB coding gain in error-correcting performance. Theoretically, the proposed scheme corrects errors beyond minimum Hamming distance between code words. Ideally, the proposed scheme corrects errors as many as code word length in sense of probability.

Spatial Stability of Content Response in File Sharing P2P Networks

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Abstract

Understanding of the content response spatial stability in a peer-to-peer network is desired to control the content dissemination. We propose metrics to represent the spatial stability of content response with both a fine and a large granularity respectively. 0ur theoretical modeling and numerical analysis reveal the content response spatial stability and its dependency on the content popularity distribution.

Modeling and Analysis Traffic Flows of Peer-to-Peer Application

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Abstract

Recently, peer-to-peer (P2P) applications have generated the majority of Internet traffic. In this study, we model and analyze characteristics of P2P traffic flows by measuring real P2P application data captured from operational network. With lognormal mixture distribution and lognormal distribution, we get accurate statistical models for flow size and flow duration of Maze application traffic. We also find that moderate correlation exists between flow size and flow duration. With scatter plots, we analyze the reason for correlation formed.

Design and Research of a Large-scale Network Access Control System with Hybrid Router Configuration

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Abstract

This paper presents a new automatic hybrid router configuration (HRC) approach to access control, which combine the advantages of direct configuration (DC) method and routing diffusion configuration (RDC) method to simplify access control configuration in large-scale networks. The proposed HRC is a flexible, adaptable and affordable approach to block /unblock the harmful IP address. A comprehensive network access control system (NACS) for large-scale with the hybrid approach is designed and

implemented. Experimental results of the system are given to verify the theoretical analysis and to confirm its high efficiency.

Drifting Clock Model for Network Simulation in Time Synchronization

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Abstract

OPNET Modeler is an important network simulation tool, which can be used for designing and analyzing of time synchronization protocol. Local clock is necessary to time synchronization protocols such as NTP, SNTP while OPENT Modeler only provides a precise clock that recording simulation time. This paper presents a design model of drifting clock that can be used by client node in time synchronization protocol simulation while using OPENT Modeler as simulation tools.

New Multi-modulus Algorithms for Blind Decision- Feedback Equalization of High-order QAM Signals

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Abstract

Two new multi-modulus algorithms (MMA) —the dual-mode MMA and the stop-and-go dual-mode MMA for blind decision-feedback equalization of highorder quadrature amplitude modulation (QAM) signals are proposed. Simulations using a fractionallyspaced decision-feedback equalization (DFE) setting are used to compare the proposed scheme with the recently introduced multi-modulus algorithm. The proposed blind equalizers are shown to have faster convergence speed and improved steady-state mean square error, compared with the MMA.

Wavelet Transform and Its Application to Laser Pulse Detection

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Abstract

Due to the problem of detecting weak signal in strong noise, a method of pulse signal detection was put forward which is based on multiresolution wavelet analysis. According to Parserval theorem, the frame of signal space decomposition and energy distributing was established by this method, and a complete orthogonal multi-resolution description is defined, the design of floating threshold of multiresolution wavelet analysis was discussed, and the removing noise algorithm has been given. The result of experiment and emulation shows that multi-band wavelet analysis is able to extract the weak and unclear pulse signal from white noise. This method is applied to laser pulse exploration system, and which has better effect.

Intra Refreshment Algorithm for ROI over Packet Loss Networks*

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* This work was supported by National Science Foundation of China (60772106).

Abstract

The subjective quality requirement of ROI is not the same as non-ROI. There are very many researches on ROI, but they are little research which jointed the overall RDO theory, the rate control, intra macroblock refreshment and ROI. So the paper proposes the RDO intra refreshment algorithm based ROI, and it uses the end-to-end overall distortion theory to analysis and compute the distortion of ROI and non-ROI, and it makes the marcoblock in ROI obtain more intra refreshment chances. As the bit rate is constrained, so the bit rate of the ROI and non-ROI must be reallocated. At last, the algorithm is implemented in reference software JM12.2 of JVT. The simulation results show that the proposed intra refreshment algorithm based ROI obtained a better subjective quality of the reconstructed video than the traditional algorithm in ROI at the decoder.

A New Shape Error Concealment Method

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Abstract

Based on the rotation invariant properties of both OurHarris interest point detector and local pseudo- Zernike moments, a rotation robust shape error concealment scheme is proposed. Firstly, the best matching pairs of interest points between two objects are computed by comparing the Euclidean distance of local pseudo-Zernike moments defined on the interest point neighborhood. Then, the global motion parameters are determined and the previous boundary is motion compensated. Finally, the missing boundary pieces are reconstructed using boundary matching and compensation method. Comparisons with traditional scheme are

presented and the results demonstrating the performance of the proposed method.

Image Fusion Based on Segmentation and Iterative Strategies

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Abstract

In this paper, a feature-level image fusion scheme is proposed that is based on minimal cut segmentation and an iterative strategy on the measurement of energy level of regions. Herein an energy model is defined and applied to evaluate the detail level of a region, and the more details in a region larger energy the region will have. Based on this idea, the fusion quality in a region segmented can be measured through the energy values. To achieve efficient fusion, an iterative procedure that selects different fusion methods is respectively used to perform fusion on each of regions of the image, and followed by an evaluation process until best fusion quality is evaluated. The proposed algorithm has been demonstrated by numerical experiment, and has shown many advantages like sensitive to error of registration and reduction of contrast over the pixel-based fusion algorithms.

On Nonuniform Sampling of Bandlimited Signals Associated with the Fractional Fourier Transform

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Abstract

The uniform sampling theorem and the reconstruction formulae associated with the fractional Fourier transform (FrFT) have been deduced in the literature, but the nonuniform sampling is yet to receive attention in the fractional Fourier domain. This paper focus on a special kind of non-uniform sampling process associated with the fractional Fourier transform. A nonuniform sampling model is first

introduced and then, based on a useful lemma, the reconstruction formula for the nonuniform sampled signal points associated with the fractional Fourier transform is deduced. In addition, the classical results in the Fourier domain can be seen as a special case of our work.

Down-sampling face images and low-resolution face recognition

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Abstract

Though linear discriminant analysis (LDA) is popular in the field of feature extraction, they usually encounter two problems when applied to face images. The first problem is that the between-class and within-class scatter matrices of LDA cannot be evaluated accurately because their dimensions are usually much larger than the number of available image samples. The second problem is the small sample size (SSS) problem. However, if the face image can be resized into a small dimension, these difficulties may be overcome. With this paper, we analyze possible means to make LDA more feasible and effective for face recognition. Analysis and experiments show that down-sampling is very helpful for LDA to be performed with ease for face recognition. We compare a number of schemes that are used to exploit and combine information of the multi-level down-sampling results of the face images. We find that resizing conventional face images into smaller sizes may allow discriminant performance of LDA to be improved. There are two underlying reasons. The first one is that the face image of a lower dimension is very effective in helping LDA evaluate the between-class and within-class matrices more accurately. The second one is that LDA incline to obtain their best performance in an appropriate low resolution whereas the quantity of discriminant information what human beings can obtain is directly proportional to the resolution.

AWavelet-domain Bayesian Image Enhancement Approach In Distributed Video Sensor Network

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Abstract

The aim of image enhancement over distributed video sensor network (DVSN) is to fuse multiple

images acquired y a set of video sensors to produce a single image ith more visual information. For that, a wavelet-domain ayesian approach is proposed in this paper. The proposed pproach estimates the wavelet coefficients of the desired image by exploiting both the information provided by multiple images observed in DVSN as well as the prior image information that is imposed by the proposed three-component exponential mixture (TCEM) model. Extensive experiments are conducted to demonstrate the superior performance of the proposed approach.

Adaptive Filter by using Hartley Transform Extended Correlation LMS Algorithm in the Double-Talk Condition

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Abstract

Echo path estimation in echo canceling for teleconference system is a problem in double-talk condition. The correlation-processing algorithms were defined by the authors to solve this problem. In this paper we propose a new algorithm with very low computational complex, which is called Hartley transform extended correlation LMS algorithm (HECLMS). The computer simulation results support the theoretical findings and verify the robustness of the proposed HECLMS algorithm in the double-talk situation.

A compression algorithm of hyperspectral image based on the eight-fork tree division and three-dimensional fractal coding

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Abstract

In order to achieve a high compression ratio on hyperspectrum image, in this paper, an algorithm about 3-D fractal coding is proposed. This algorithm is based on fractal theory and eight fork tree division. We expand the eight kinds of fractal transform to nineteen in the 3-D space, which improves the matching accuracy, and accelerate the encoding process by using the eight-fork tree division and the cube block classification. A simulation was done on MATLAB 7.1, the experimental results demonstrate this algorithm has some practical sense.

Characterizations of Prime Filter of Fuzzy Implication Algebra*)

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Abstract

Fuzzy implication algebra is a kind of algebraic abstraction of implicative connection of logical system which takes values in [0,1]. The concept of prime MP filter and prime fuzzy prime filter of fuzzy implication algebra are introduced in this paper. Then some properties are discussed and some

characterizations of fuzzy prime filter are obtained.

Keywords: Fuzzy Logic, (Regular) Fuzzy Implication Algebra, MP (Fuzzy) Filter, Prime MP(Fuzzy) Filter

T-Fuzzy Subalgebras and T-fuzzy Ideals of BCH-algebras

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Abstract

The aim of this paper is to introduce the notions of Tfuzzy subalgebras and T-fuzzy ideals of BCH-algebras and to investigate their properties. We give several characterizations of T-fuzzy subalgebras and T-fuzzy ideals. The relations among various fuzzy subalgebras and ideals are discussed as well. Finally, we characterize well BCH-algebras via T-fuzzy subalgebras.

Entropy of intuitionistic fuzzy set based on similarity measure

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Abstract

In this paper, we introduce the concept of similarity measure of intuitionistic fuzzy sets, propose a kind

of new method to describe entropy of intuitionistic fuzzy set based on similarity measure of intuitionistic fuzzy sets and put forward some formulas to calculate entropy of intuitionistic fuzzy set.
keywords Intuitionistic fuzzy set; entropy; similarity measure; fuzzy set

Variable Precision Fuzzy Rough Set Model Based on Fuzzy Covering

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Abstract

The theory of rough sets is a powerful tool for data analysis and knowledge discovery from imprecise andambiguous data. A variable precision fuzzy rough set model based on fuzzy covering is proposed in this study. Some properties of rough approximation operators of the variable precision fuzzy rough set model based on fuzzy covering are discussed. It is a further and important generalization of rough set model.

Weighting Mining and Empirical Analyses on Region Sustainable Development Survival Supporting Systems[1]

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Abstract

Using fuzzy set and rough set theory, we investigate the problems of weighting in evaluation and forecast and give a method to mine the weighting of judged factors from original statistic data, without experts' weighting evaluation and survey statistic. Simultaneously, we process weighting mining on the judgment of the region sustainable development survival supporting systems of China basing on the judge index system and involved data supported by the research group of continuous development in the Institute of China Science, and present new judged results.

Detecting Irregularities by image contour Based on Fuzzy Neural Network

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Abstract

Visual analysis of human motion in video sequences has attached more and more attention to computer

visions in recent years. In order to indicate pedestrian movement in Intelligent Monitoring System, a Euclidean distance based on centroid method is proposed. And then according to the movement of body a set of standard images contour are made. All matrixes which represent human silhouette are normalized using affine transformation, which cuts computational cost. The difference between two matrixes is regard as fuzzy function. Fuzzy neural network is proposed to infer abnormal behavior of the walker. First of all, a four layer fuzzy neural network is presented. And then Fuzzy C-means clustering algorithm is used to calculate the number of hidden layer nodes. Finally the degree of the anomaly is resulted from the fuzzy membership of the two matrixes difference. Fuzzy discriminant can detect irregularities and implements initiative analysis to body behavior. The results show that the new algorithm has better performance.

Study on Intelligent Shift Control Strategy of Automobile Based on Genetic-fuzzy Algorithm*

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* This work is supported by fund of State Key Laboratory of Vehicle Transmission(51457070105JW12)

Abstract

In order to improve automobile transfer efficiency, we design a fuzzy control strategy based on genetic algorithm. Acceleration is taken as a control parameter of automatic transmission upshifting or downshifting, namely that only when acceleration is positive, automobile can be upshifted, only when acceleration is negative or zero, automobile can be downshifted. Two different fuzzy controllers are respectively used to control upshifting and downshifting. Fuzzy controllers are designed according shift maps obtained from experimental. Genetic algorithm is used to optimize the fuzzy controllers and the simulation model is built to achieve the control strategy. The results of simulation show: automobile with this shift strategy can effectively avoid shift cycle even if it is running in complicated driving conditions, this shift strategy improves automobile power and economy performance and the optimization by genetic algorithm improves the design efficiency of controllers and the shift quality.

Elliptical fuzzy number and The method of circular fuzzy structured element

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Abstract

For the need of studing the fuzzy plane or space geometry, under the background of plane or space fuzzy points, this paper presents the definition of the fuzzy number in $_2R$ based on the definition of fuzzy piont which is introduced by Buckley[1], and define two-dimensional fuzzy number. In order to realize the expression of two-dimensional fuzzy number's membership function, the paper defines elliptical fuzzy number that is a special fuzzy set in $_2R$. What's more, we provide the circular structured element representation theorem of elliptical fuzzy number and study some of its fundamental properties. The operations of fuzzy sets is easier with the new represented theorem than that based on the extension principle. The method of circular fuzzy structured element not only provides a tool for the fuzzy calculations, but also paves a new way for studying the fuzzy number in $_2R$. Keywords: elliptical fuzzy number; circular fuzzy structured element ; fuzzy geometry.

An Underdetermined Blind Separation Algorithm Based on Fuzzy Clustering

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Abstract

In underdetermined blind separation, the 'Two-step Approach' is often adopted, which depends on source signals' sparse representation. The first step is to estimate the mixture matrix by K-mean clustering algorithm using the sensor signals; and in the second step, the shortest-path algorithm is used to recover source signals. Generally, people suppose that the number of source signals is known when they estimate the mixture matrix by the K-mean clustering algorithm. In fact, the number of source signals is unknown or blind, so it is very important to estimate the number of source signals. In this paper, it gives a novel underdetermined blind separation algorithm based on fuzzy clustering, which can accurately estimate the number of sources and the mixture matrix respectively, by which source signals can be reconstructed. The last simulations show the good performance of the paper's algorithm.

On the Number of Equivalent Classes of Fuzzy Subgroups of Finite Nilpotent Groups

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Abstract

In this paper, we define an equivalent relation of fuzzy subgroups. That is, two F-subgroups are equivalent if they have the level sets with the same order.By means of studying synthesizseries and the chain of quotient group of a group as well as the chain of factors and the chain of quotient of a group'order, we obtain the formulas to find the number of equivalent classes of maximal fuzzy subgroups and fuzzy groups of a nilpotent group, at last we founded the relationships characterization of them.
Key word: Order of level set; Equivalent relationship; Maximal fuzzy subgroup; Compostion series of a group; Chain of quotient group; Chain of factor; Chain of maximal factor.

Meshfree Radial Point Interpolation Method and Its Application for Twodimensional Elastic Problem

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Abstract

Meshfreee Method is a new numerical analysis method. It has excellent accuracy and rapid convergence. Radial Point Interpolation Method (RPIM) is a new meshfree method among them. It has not only all the advantages of meshfree method but also the Kronecker delta function property. Its shape function is constructed by the combination of radial and polynomial basis the combination of radial and polynomial basis functions, so it is convenient to implement the boundary conditions as the traditional FEM. This article introduced the basic theory of the radial basis function , the radial point interpolation (RPIM), and used use this method to construct the interpolation function, solve a two-dimensional static elastic problem and have a good performance.

Temperature Compensation for Gain of Avalanche Photodiode in Laser Gyro

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Abstract

In order to ensure Avalanche Photodiode (APD) in its optimal state in Laser Gyro when temperature varies, the effect of temperature on avalanche gain is analyzed based on APD's multiplication principle,

a mathematical model of false alarm ratio (FAR) and multiplication factor of APD has been established, and an actual temperature coefficient of breakdown voltage of the device is obtained by monitoring FAR for avalanche noise. The stability of APD's gain can be enhanced by temperature compensation according to actual temperature coefficient.

Shallow Parsing Based on Maximum Matching Method and Scoring Model

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Abstract

Shallow Parsing is a very important task in Natural Language Processing or Text Mining, and the partial syntactical information can help to solve many other natural language processing tasks. In this paper, we split the task of shallow parsing into two subtasks: (1) Seeking all the Break Points to divide a Part-of-Speech(POS) sequence into some groups; (2) Tagging a phrase type for each POS group. In the first, we present the Break Point Seeking (BPS) algorithm, which is combination of Scoring Model (SM) and Maximum Matching Method (MM), to solve the first subtask. Then,we used the Bayes classifier to tag the phrase structure type for each POS group. The result shows that although our method did not apply any syntactic rules, the BPS algorithm, which combined the MM with SM algorithm, exerted the strongpoint of the MM and SM algorithm, obtained a favorable performance.

A New Algorithm for Solving Multiple Kernel Problem as SILP

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Abstract

The need to consider multiple kernels being emphasized in recent development in the literature on the support vector machines has lead to the development of Multiple Kernel Learning (MKL) problems. Lanckriet et al. (2004) considered conic combinations of kernel matrices for support vector machines; latterly quadratically-constrained quadratic program is developed to solve the Multiple Kernel Learning problem. Sonnenburg et al. (2006) rewrote multiple kernel problem as a semi-infinite linear program that be solved by recycling the standard SVM implementations. In this paper we follow the new way in which MKL problem is reformulated as a semiinfinite linear program, compute parameters of the MKL dual using a globally convergent method. Our experiments show that the new algorithm has good scaling ability and could be more efficient solving multiple kernel problems.

E-Connections Based Ontology Integration Framework Design _

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Abstract

Ontologies are at the heart of the semantic web, which define the concepts and relationships and make global semantic interoperability possible. However, ontology integration becomes more and more difficult as the number and scale of ontologies grow up. A framework for Ontology Integration based on E-Connections theory(EBOIF) is proposed and the relevant algorithm(OIBE) is presented in this paper. The experimental results reveal that the framework and algorithm are effective and valid.

An Intelligence Processing Method related to Efficacy Messages of Traditional Chinese Medicine Prescriptions[1]

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[1] This work is supported by National Natural Science Foundation of China (No.60672141)

Abstract

This paper takes the rationale of Traditional Chinese Medicine (TCM for short) as basis of study prescriptions, and proposes a new analysis method of TCM prescriptions. This method can explain several relations existed in prescriptions, such as relation between dosage and efficacy, relation between herb and efficacies, etc.. Both of quantitative description and qualitative forecast of efficacies have been achieved. This method can quantify analysis of prescriptions and deduce its efficacies. Furthermore, valuable knowledge of TCM which implicated in a prescription cases could be discovered objectively

New Approach for Rigid Body Guidance of Spherical Four-Bar Linkages

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Abstract

An approximate spherical circle-point of the moving rigid body in spherical motion is defined, and the approach of adaptive cone fitting is presented with respect to spherical curves. Then, the optimum synthesis of spherical four-bar linkages can be converted into an adaptive curve fitting. Thus, the mathematical model of saddle-point programming for this problem is established with the corresponding optimum algorithms proposed. Theoretically, it is provided that the existence of the best solution and the convergence of the optimum algorithms to optimum synthesis of spherical four-bar linkages. Finally, two numerical examples are given to show the feasibility and the validity for the approach.

Research on Telecommunication Switching System Survivability Based on Stochastic Petri Net

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Abstract

Survivability of network system is a very important issue in security field. Based on analyzing existing methods and defining the system attributes about survivability evaluation, the paper adopts Stochastic Petri Net (SPN) to analyze the survivability characteristics of the telecommunication switching system. The performance and fault-repair models are depicted by SPN and the quantitative evaluation approach of main survivability attributes are presented in the paper. At last, the simulation results show that the approach is correct and efficient.

Attributes in Representation of Adjectival Modification in Chinese And Their Extraction from a Machine Readable Dictionary

Abstract

In Modern Chinese Standard Dictionary, adjectival modification is represented as a set of synonyms or antonyms which are tagged by attributes. Through a method based on rough pattern, we can extract automatically these widely-accepted attributes from its machine readable dictionary. This work provides a new method to construct a common attribute database for NLP in Chinese.

The Design and Artificiality of Tracking Synchronization Controller in Chaotic Systems with Diverse Structures

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Abstract

The tracking synchronization controller is designed to synchronize chaotic systems with diverse structures. The state variables of the Genesio system track an arbitrary reference signal of the Liu system at an exponential rate by choosing appropriate Lyapunov function. The designed controller is of unique structure, and synchronization between any chaotic systems can be achieved. The Liu system and the Genesio system are taken for examples to demonstrate the method to be effective and feasible, and the influence on the synchronization rate by the control intensity is discussed.

Stabilization Control of Double Inverted Pendulum System

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Abstract

The work deal with the stabilization control of double inverted Pendulum system .Inverted Pendulum system is a complicated, nonlinear, unstable system of high order. Fuzzy control research for stabilization a double inverted pendulum at an upright position successfully is proposed based on weight variable fuzzy inputs. The

weight variable fuzzy inputs is gained by combining the fuzzy control theory with the optimal control theory. The fuzzy control rules of a double inverted pendulum are given. In order to consider cart, the lower pendulum, the upper pendulum error information, three different fuzzy controller were designed in this paper. Simulation results show that the controller, which the upper pendulum is considered as main control variable, has higher accuracy and quicker convergence speed and higher precision, and simulation result is promising. The control result can be expanded the control of multilevel inverted Pendulum, and have a guiding meaning in the control of other unstable system.

The Multi.objective Optimal Control for Electronic Hydraulic Pressure Servo System

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Abstract

This paper gives some new non.linear controller and CAD method for the Multi.objective Control Systems. Then discusses how to use the new nonlinear controller to Perform it. Finally, In this paper , an example of the electronic hydraulic pressure servo control system designed with CAD of multi.objective optimal design method is given. The performance index checked by computer simulation way shows that the performance index of multi.objective optimal system is better than that of linear optimal system. The design method is simple and easy, universal and suitable for engineering design.

Robust Stabilization for a Class of Neutral Systems with Time-Varying Delays via Delta Operators

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Abstract

In this paper, the problem of robust stability of timevarying delay neutral system using delta operator is investigated. As is well known, neutral system has been investigated by some academician, there are a lot of academician who investigates the delta operator,the delta operator model also has the advantage of better numerical properties at high sampling rates, so we can combine neutral system with delta

operator. Based on the Lyapunov-Krasovskii functional in delta domain, a new delay-dependent stability criteria is presented in terms of LMIs. We can gained robust stability of time-varying delay neutral system using delta operator. A numerical example is given to illustrate the effectiveness of the developed method.

Delay-dependent Stability and Robust H_∞ Control for Discrete-time Markovian Jump Linear Systems with Mode-dependent Delays

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Abstract

In this paper, the stability, stabilization and H_∞ control problems for a class of uncertain discrete-time Markovian jump linear systems with mode-dependent time-delays are investigated. The key features of the approach include the introduction of a new stochastic Lyapunov functional and some free weighting matrices involved in a special inequality. New Delay-dependent sufficient conditions for the problems are developed in terms of linear matrix inequalities. Numerical examples are provided to demonstrate the reduced conservatism of the proposed approach.

Stability of Model-based Networked Control System with Quantized Feedback

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Abstract

Stability of model-based networked control systems is considered in view of the quantization effect which exists generally in networked setting. It is to be noted that the stability rests with the quantization errors at every transmission time. For different initial quantization errors, necessary and sufficient conditions for system to be globally exponentially stable or the stable regions of the system are presented. The results provide a way to establish the relationship between quantization, update time, modeling error and system stability. Simulation examples are used to illustrate the main results.

Robust Adaptive Control for Robot Manipulators with Friction

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Abstract

A composite tracking control scheme, consisting of an adaptive friction estimation and a robust controller, is proposed for a robot manipulator to achieve a tracking control objective under the influence of unknown friction and uncertainty. The adaptive friction estimation is used to estimate the extent of friction, which includes Coulomb friction, viscous friction and the Stribeck effect, and then a robust controller is designed to enhance the overall stability and robustness. It is shown that the design of the friction estimator and the design of the robust control gain can be conducted separately. The effect of the robust adaptive friction controller is verified by the simulation results for a two-degree-of-freedom planar robot manipulator.

Adaptive Feedback Control for a Class of Uncertain Nonlinear Systems with Dead-zone

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Abstract

In this paper, a robust adaptive feedback controller is proposed based on backstepping method and neural network for a class of uncertain nonlinear systems with deadzone. The subsystem uncertainty is approximated using radial basis function (RBF) neural network and weight value update law is given for approximating the subsystem uncertainty. Based on the output of the neural network, the robust adaptive control scheme is presented with backstepping method. The designed controller can not only

guarantee robust stability of the uncertain nonlinear system, but also make it has L_2-gain performance index which less than or equal to $\circ > 0$.

Stability Analysis of a New Delays Dependent system

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Abstract: The stability problem of multiple additive time-delay system is considered using Lyapunov-Krasovskii stability theory. Based on the LMI (Linear Matrix Inequality), the robust stability criterion and robust state-feedback controller design are derived for systems which may contain non-parameter uncertainties. Finally, a numerical example illustrates the validity and the lower conservation of the proposed method.

Key words : multiple additive delays; Lyapunov-Krasovskii; time-delay dependent; LMI

Modeling and Simulation of Telescopic Damper Outer Characteristic

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Abstract

According to the thickness and the pre-deformation of throttle slice, and the throttle hole area, the velocity points of valve opening were analyzed by the relation of flux to the velocity, and pressure to the deformation of throttle slice, then the analytic formulas of telescopic damper velocity at which valve opening were given. The outer characteristic model of telescopic damper was established by piecewise linear function. A practical example of simulation oftelescopic damper outer characteristic was given, and the performance test was conducted. The results show that the model of outer simulation is correct, and the simulation values coincide with test values.

Inverted Pendulum System Control by Using Modified PID Neural Network

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Abstract

An improved PID neural network-based controller is designed and analyzed for the inverted pendulum system. In order to deal with the local minimum problem in training neural network with backpropagation algorithm and to enhance controlling precision, neural network's weights are adjusted by optimization algorithm. The controller employs a PID neural network instead of estimating the unknown plant nonlinearities on-line. The simulation results show that the proposed controller with improved PID neural network is flexible and efficient in the control of inverted pendulum system.

The Neural network Control Technique In Matching-Stuff System Of Nucleus Steelyard

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Abstract
The problem of large lag existed in matching-stuff system of nucleus steelyard is researched in this paper. A new control scheme is presented, which is favor of accomplishment of prompt closed-loop control and controller parameter adjustment, so the stability and accuracy of the control system is developed.

New Global Asymptotic Stability for Neural Networks with Time-varying Discrete and Distributed Delays

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Abstract
In this paper, the global asymptotic stability problem is considered for a class of neural networks with time-varying discrete and distributed delays. Based on the Lyapunov functional method, and by using the new technique for estimating the upper bound of the derivative of Lyapunov functional, the novel asymptotic stability criterion is derived in terms of linear matrix inequalities(LMIs). Two numerical examples are presented to show the less conservativeness of the proposed method.

Fault Diagnose Technology of Power Electronic Based on Neural Network

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Abstract

A new method of fault diagnose distinguishing based on neural network is raised. Fault diagnose method of power electronic has been studied based on the wavy curve and neural network. Take the threephase bridge-type controllable thyristor circuit disconnection fault as the example, The results of power electronic circuit experiment show that this method is simple, is direct-viewing, may enhance the neural network model the study efficiency and the diagnosis accuracy. The way has very good fault distinguishing ability and vast prospect.

Neural Network Application to Multi-step Prediction for Generalized Heave Displacement of Shipborne Helicopter Platform

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Abstract

A back propagation algorithm is a supervised learning algorithm applied to train a neural network off line. This paper introduces a modified learning algorithm. The training algorithm, which is composed of a temporal difference (TD) method and a dynamic BP algorithm (DBP), can train an Elman network online. A gradient descent momentum and adaptive learning rate algorithm is applied to the TD-DBP algorithm. The modified TD-DBP training algorithm increases training speed and stability effectively. Using the collected real time data, the simulation suggests the modified TD-DBP learning algorithm is able to generate multi-step prediction for generalized heave displacements of a shipborne helicopter platform.

Research on Jet Loom Data Analysis System Based on Neural Networks

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Abstract

To forecast quickly the operation condition of loom, optimizing operation parameters of loom, and improve the production efficiency of loom. The paper studied operation prediction of loom production based on neural network. Because traditional network method had the defects of slow convergence velocity and low prediction accuracy, BP algorithm was improved by combined algorithms by the merging of impulse item and adaptation of learning rate, network structure and parameters adjustment were used to optimize neural network, and to predict the operation condition of the loom. Research showed that improved BP network has good rate of convergence, the number of training was less and improved the reliability of the algorithm.

Research on Fan Machinery Fault Diagnosis System Based on Fusional Neural Network

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Abstract

Fusional neural network which is founded on information fusion and artificial neural network is proposed in this paper. With this novel algorithm, the fan machinery fault diagnosis system model is built. Meanwhile, the output diagnosis values are loaded into the sample library of the neural network to form the self adapting system. It is proved that the accuracy of the fault diagnosis conclusion can be improved by using fusional neural network.

Contour Extraction by a neural network approximation*

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Science Foundation (No.20060390728), the Natural Science Fund of Guangdong Province, China (07006490), Application

and innovation Plan of Ministry of Public Security (2007YYCXGDST080).

Abstract

A contour extraction algorithm based on a neural network is proposed in this paper. A series of searching circles are used in obtained feature pixels with discrimination analysis for the final curve function approximation by neural network. Robust back propagation algorithm has been used to control the final curve shape. The simulations also show that the proposed algorithm has a great performance for different kinds of images.

The Fault Diagnosis System with Self-Repair Function for Screw Oil Pump Based on Fuzzy Neural Network

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Abstract

Considering the issues that the relationship between the faults of screw oil pump existent and fault information is a complicated and nonlinear system, and it is very difficult to found the process model to describe it. The fuzzy neural network has the advantages of both fuzzy theory and neural network. In this paper, a fault diagnosis system with self-repair function for screw oil pump based on fuzzy neural network is presented, moreover, we construct the structure of fuzzy neural network that used for the fault diagnosis of screw oil pump, and adopt the Levenberg- Marquart optimizing algorithm to train fuzzy neural network. With the ability of strong self-learning and function approach of fuzzy neural network, the diagnosis system can truly diagnose the fault of screw oil pump by learning the fault information. The real diagnosis results show that this system is feasible and effective.

3D Stereo Imaging Technology From 2D Image Sequence

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Abstract

In this paper, we will analyze the depth factor in general monocular video sequence. We can distinguish foreground from background without additional information and then create the binocular image by shifting foreground pixels. By applying CID method, we will get the strength of the sharpness and contrast from image by evaluating the farness of the region based on property of region color, and then a depth map of the image can be generated. An optical flow method is also applied to search and compare the block motion status between previous and current frame. The motion vector of block can be estimated by calculating the similarity of blocks based on least square error, and hen the farness of block can be estimated by the amount of block motion. Finally, the static and motion depth information are integrated to estimate more accurate depth map. By shifting foreground pixel by depth amount, a binocular image pair can be created. We will perceive 3D stereo feeling without putting glasses on by means of a parallax barrier stereoscopic display.
Keywords: Stereo Vision, Depth Map, Binocular Parallax, Computed Image Depth, Optical Flow

Application of Information Measure in Segmentation of

Hydrophobicity of Insulators

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Abstract

In order to effectively distinguish object from background, three essential characters of edge-points are taken into account, which are consistence, direction and degree information in neighbor pixels. According to these features, firstly, three information measures are proposed to quantitatively depict corresponding characters, which can be represented by gray values, gradient values and similarity degree in neighbor pixels. Secondly, experimental results signify that all the characters have effects on extracting object from background respectively and also show which character has larger influence on extracting droplets (or watermarks) from hydrophobic images. Finally, these three information measures are pieced together to form the feature domain for FCM clustering, which are applied in segmentation of hydrophobic images. Experimental results show that the proposed algorithm has great application in segmentation of hydrophobic images, for it's efficiency of extracting shape information of droplets (or watermarks).

Prediction-based Asymmetric Pattern Search Algorithm for Fast Block-Matching Motion Estimation

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Abstract

In this paper, we proposed a novel fast block-matching algorithm for motion estimation, called Prediction-based Asymmetric Pattern Search (PAPS). The initial pattern of the PAPS is a very compact center-biased pattern, which has smallest search points. The PAPS utilizes the block distortions of search patterns to decide the search direction, and then an asymmetric search patterns are applied to the subsequent steps accordingly. In new method, the search points are greatly reduced to locate a motion vector. Furthermore, a prediction scheme is incorporated to favor larger motion blocks. Experimental results show that the proposed method has the fastest search speedamong all algorithms in the simulation for all test sequences with very close PSNR value.

Vehicle Speed Measurement Based on Video Images

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Abstract

This article presents a new method based on video images to measure the speed of vehicles. The working principle is taking two instantaneous tandem photographs. Then based on the location of the vehicle and CCD, with reference to the advance calibration lines, we can obtain speed of vehicle. Further, this paper analyses two measurement errors, and discusses how to choose the picture filming location. Simulations verify the effectiveness of the given method.

A Covert Communication Scheme for A SPIHT Based Image Multiple Description Coding System

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Abstract

In this paper, a covert communication scheme is proposed for a set partitioning in hierarchical trees (SPIHT) based image multiple description coding (MDC) system. Firstly, the carrier image is subsampled into four subimages. The secret information is embedded among the subimages with a discrete wavelet transform (DWT) and subsampling based method. The information embedding method is also proposed by us, which can resist not only the permutation attack but also some common image processing attacks. After the information having been embedded, the subimages are compressed by the SPIHT algorithm, and one subimage corresponds to one SPIHT stream. Then the SPIHT streams are packed and transmitted through the packet based channels individually. If there are packets lost, the lost packets can be substituted by the packets which reside in the other SPIHT streams. At the receiver side, the inverse procedures are performed to recover the carrier image and the secrete information.

A New Image Fusion Scheme Based on Wavelet Transform

Jingmin Gao, Zhenhui Liu and Tao Ren

Abstract

A new image fusion scheme based on wavelet transform is proposed in this paper. Firstly, the image is decomposed into high-frequency images and lowfrequency images with wavelet transform, then the spatial frequency and the contrast of the low-frequency image are measured to determine the fused lowfrequency image, and to the high-frequency image, we select the high- frequency coefficient based on the absolute value maximum principal and verify the consistency of these coefficients. Finally, the image can be reconstructed with Mallat algorithm. The experimental results show that the scheme can preserve all useful information from primitive images and the clarity and the contrast of the fused image are improved. The presented scheme is verified to be effective for the image fusion.

On-line Vision Recognition of Auto Rack Girders Based on ART2 Neural Network and D-S Evidence Theory

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Abstract

For automatic inspecting kinds of hundreds of camion rack girders, this paper introduces an on-line automatic inspecting method which synthesizes machine vision 、wavelet transform theory、ART2 neural network and D-S evidence theory on auto rack girder. Firstly, for the real-time gathered auto rack girders top image on product line, extracting wavelet decomposed coefficient of image with wavelet transform, energy value of wavelet coefficient is used as a character template; top image of auto rack girders which is partitioned to 16 sub-images (4×4), estimating numbers of edge pixels of each region respectively, which is used as a character template; the primary image is partitioned to 16 sub-images(4×4) in the same way, calculate center of gravity position of each region respectively, which is used as a character template. Secondly, in order to gain basal reliability of auto rack girders image, three character templates data which are energy value of wavelet coefficient numbers of edge pixels and center of gravity position are used as inputs of ART2 neural network. Finally, according to composition rule of D-S evidence theory, to gain recognition results. Experiments indicate online maximal recognition rate meets demands of production, based on combination of art2 neural network with D-S evidence theory to recognize kinds of auto rack girder, and possessed advantage of more

rapid and more precise recognition etc.

Autonomous Craters Detection from Planetary Image

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Abstract

As development of deep space exploration, the Guidance, Navigation and Control (GNC) technology of spacecraft or probe is becoming more important than ever. Vision-based navigation (optical navigation) is a good method to achieve autonomous landing of spacecraft. Therefore, the landmark has to be detected for Vision-based navigation. Craters are commonly found on the surface of planets, satellites, asteroids and other solar system bodies. Currently, the most of optical landmark navigation algorithm are built on the craters detection and tracking. The focus of this paper is to present an algorithm for autonomous crater detection. The whole course of crater detection can be divided into two steps, Multi-resolution feature points extraction and crater detection. The first step can be further divided into Multi-resolution window-based feature points' extraction and crater candidate area choice. The second step can be further divided into region growing, pixels of crater edge extraction, ellipse detection and obtaining craters. Experimental studies demonstrate that the detection rate of this algorithm is higher than 90% for image where the distribution of craters is discrete.

A Modified RHT Method for Ellipse Detection Based on Geometric Constraints and Perceptual Grouping

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Abstract

The useless samplings and accumulations of randomized Hough Transform (RHT) are largely reduced with the help of the ellipse's conic control point constraint and the constraint of the normals at the endpoints of a chord. The fuzzy confidence based on vision perceptual grouping is used to further eliminate false candidate ellipses introduced by the same distorted ellipse. The experimental results show that compared with the other ellipse detection method based on RHT, the method proposed in this paper has the advantage of higher detection speed and accuracy as well as strong resistance to ellipse's partial occlusion and deformation.

The Extraction of playing shots in sport Videos*

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Abstract

The Extraction of playing shots is helpful for video analysis. In this paper, we propose an algorithm: First, the shots are segmented by detecting the shot boundaries (both abrupt cuts and gradual transitions), and wipes are discarded directly; then from the rest shots, playing shots are extracted by shot classification. Experimental results confirm the efficiency of our proposed algorithm.
Keywords: Sport video, Extraction of playing shots, Dominant colors, Shot segmentation

Algorithm for Underdetermined Blind Source Separation Based on Least-Mean-Square Error and Sparse Features

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Abstract

An algorithm based on least-mean-square error and sparse features is presented for underdetermined blind source separation (BSS), i.e., situation when the number of observed signals' is less than that of sources. In this paper, using the sparsity of sources, first, we estimate the mixing matrix using a new potential function based on clustering method. Then use the estimated mixing matrix and the selfcorrelation of sources, by searching the accurate values at the source clustering directions, we can obtain the optimal sub-matrix for separation through least-mean-square error criterion, which overcomes the disadvantages of traditional algorithms in searching the optimal sub-matrix. Simulation results show the separated signals have higher SNR, and compared with the other similar method, the proposed approach has better separation performance.*

Research on the simulation platform and technology for multi-sensor data fusion

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Abstract

In the multi-sensor system, the form of information puts up diversity, the amount of information is enormous, the relation of information is compound, and the requirement of dealing with the information is real-time. Multi-sensor data fusion can integrate the data comes from various sensors, so as to acquire the optimal estimation for the object. In the paper, the multi-sensor data fusion simulation platform is constructed firstly, and the main composing modules in the platform are analyzed. Then, in terms of the process of creating the sensor-level track, some fusion technologies are designed, such as track origination, data track association, track filter, track maintain, track elimination and so on. At last, through simulation, the conclusion can be educed: the simulation platform possesses well dialogue, commonality and real time.
Keywordst: multi-sensor; data fusion; simulation; Track

Sound Radiation from Finite FGM Cylindrical Shell Excited by a Rotating Load

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Abstract

This paper presents to evaluate the vibration and sound radiation of a finite functionally graded material cylindrical shell immersed in light and heavy fluid and excited by a constant point load continuously traveling along the circumferential direction at a rotational speed Ω. Attention is focused on the explanation of radiation phenomena in both fluids and the FGM shell's parameter influence of the power law index. A frequency-domain representation of the rotating load shows that its frequency content is a series of equal amplitude harmonics NΩ. Each harmonics excites exclusively the circumferential mode N. For this rotating excitation, vibration and radiation critical speeds are identified. Extensive numerical results are also presented to illustrate the comparison of vibration and sound radiation ability in two different fluids, which show that the behaviour of the shell in water is very different from that of the one in air.

A Spectrum Effective Adaptive Modulation and Coding Scheme for OFDM System

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Abstract

With variable code, variable power and variable rate, link adaptation has been shown to have significant benefits for high-speed wireless data transmission. In this paper, an adaptive modulation and coding (AMC) scheme applied to variable bit rate services is proposed for orthogonal frequency division multiplexing (OFDM) system. The objective is to maximize the spectral efficiency by adaptively selecting the code and allocating rate and power over the frequency band under the packet error rate constraint. Following analysis on rate-compatible punctured convolutional codes and linking adaptive techniques in OFDM, a sub-optimal AMC scheme with uniform power allocation is investigated. We realize the rate allocation by setting the instantaneous bit error rate to the average bit error rate which varies over different coding schemes. Simulation results indicate that the proposed scheme exhibits 4~8dB signal-noise-ratio gain relative to non-adaptive scheme. Compared to optimal scheme, the proposed scheme shows negligible loss at high SNR scenarios while the implementation complexity can be reduced significantly.

An Efficient Algorithm for Computing $4^M \times 24$-Point DFT

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Abstract

An efficient algorithm for computing $4^M \times 24$ point DFT, called radix-4-24p efficient FFT algorithm (EFFT), is developed. To convert the computation of DFT of length $N=4^M \times 24$ in M steps to the computation of 4^M DFTs of length 24 by radix-4 decimation in time algorithm and from Mth to first , each step converts four DFTs of length $L \times 24$ into one DFT of length $(4 \times L) \times 24$ are the basic mentality, and an efficient algorithm for computing the 24-point DFT, which requires only 24 real multiplications, is the core module of radix-4-24p EFFT algorithm. The total number of computational enquirements for implementing $N=4^M \times 24$-point DFT in the algorithm is $(1+3M)N-16(4^M-1)$ real multiplications, $4^M \times 20-4$ real right-shiftings 1 bit and $4^M \times 376+3MN/2-124$ real additions. The equation and block diagram of performing the radix-4-24p EFFT algorithm and a highly effective algorithm for computing directly 24- point DFT are represented in the text. The computing efficiency and computation amount of the radix-4-24p EFFT algorithm are improved than those of radix-4 FFT algorithm as a result of using effectively $\cos(\pi/3)=\sin(\pi/6)=1/2$ and $\cos(\pi/4)=\sin(\pi/4)= 0.707$.

Encoding and Decoding of LT Codes Based on Chaos

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Abstract

Fountain codes provide an efficient way to transfer information over erasure channels like Internet. LT codes are the first codes fully realizing the digital fountain concept. They are asymptotically optimal rateless erasure codes with highly efficient encoding and decoding algorithms. In theory, for each encoding symbol of LT codes, the neighours used to generate that encoding symbol are chosen uniformly at random. Practical implementations of LT codes usually realize the randomness through pseudo-randomness number generators like linear congruential method. In this paper, we apply the pseudo-randomness of chaotic sequence in the implementation of LT codes. Two Kent chaotic maps are used to determine the degree and neighbour(s) of each encoding symbol. We show that the implemented LT codes based on chaos perform better than the LT codes implemented with the traditional pseudo-randomness number generator.

Blind Source Separation Based on Signal Temporal Predictability

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Abstract

Based on the fact that the temporal predictability of signals is often different, new algorithm using secondorder statistics for blind source separation (BSS) is proposed in this work. The novel measure of signal temporal predictability is developed. Based on which, the proposed method is less time-consuming and requires minimal assumptions regarding the probability density functions of the source signals. Also, the online mode is provided. Simulations show that the proposed algorithm is robust with the best precision for batch mode, and its convergence is quite well for online mode.

Measurement of Harmonics and Inter-harmonics Based on DWFFT

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Abstract

This paper presents a method of measurement of harmonics and interharmonics. Waveform distortions were traditionally regarded as harmonics distortions, fast Fourier transform (FFT) is a basically way to analyses harmonics. However, FFT is just a way to measure waveform distortion in time domain or in frequency. Increasing inter harmonics content in the power system has prompted a need to give them

greater attention. In this paper, a method was proposed on discrete wavelet transform (DWT) improved FFT (DWFFT) The propose algorithm is applied to a case studies considering harmonics and interharmonics distortion and the right results are obtained and proved this algorithm is valid. Index Terms – Wavelet, Multi resolution, FFT, DWT.

Automatic Pronunciation Evaluation Based on Feature Extraction and Combination*

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This work is supported by National High Tech R&D program 863 of
China under contract 2006AA010103

Abstract
This paper presents an effective method for automatic pronunciation evaluation, which is based on feature extraction and combination. The proposed system extracts different kinds of evaluation features and combines them to produce an ultimate machine score, which predicts the overall pronunciation quality of a student. Experiments on a reading speech database show that most of the selected features are distinctive features for pronunciation quality, which have strong correlations with human scores. In addition, the combination of different features using linear regression (LR) can achieve better performance than using individual features and the produced machine scores are comparable to human scores.

A Pitch Estimation Algorithm Based on the Variance Analysis

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Abstract
Pitch period is a key parameter in speech analysis. This paper introduces a novel pitch detection method based on variance analysis(VA). By using the peak location of variance statistical distribution function, accurate and reliable pitch estimation can be obtained with the proposed algorithm. The simulation results prove the effectiveness of the algorithm and the performance of VA outperforms that of circular average magnitude difference function(CAMDF) which has been used successfully in the fields of speech pitch period estimation.

The Novel Seismic Wavelet Estimation Based on ARMA Model and Chaos Genetic Algorithm

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Abstract

On the assumption that the seismic wavelet is noncausal and mixed phase, ARMA (autoregressive moving average) model was utilized to describe the seismic wavelet, the ARMA cumulant matching method was exploited to estimate the wavelet parameters, and the matching error was proposed to feedback as the evaluation of the matching result. This approach could improve the wavelet estimation precision with high computational efficiency by avoiding the use of cumulant matching method under MA (moving average) model description. But this method also leads to a highly nonlinear optimization problem. To provide effective and reliable optimal solutions and overcome the problem of local minima in the optimization stage, the improved chaos genetic algorithm was introduced in this paper. In this algorithm, the high dimensional chaotic-mapping— three-layer feedback neural network was absorbed in genetic algorithm. Theoretic analysis and numerical simulation demonstrate the feasibility of the wavelet extraction approach. Compared with the normal seismic wavelet extraction, this approach can improve parameter estimation precision efficiently and stably.

Common Spatial Pattern and Particle Swarm Optimization for Channel Selection in BCI

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Abstract

Common spatial pattern algorithm (CSP) is famous for extracting ERD/ERS feature from multi-channel BCIs based on motor imagery. However, if channel number is large, CSP will tend to overfitting and it is inconvenient for clinical operation. In this study, CSP filters' discrimination and channel number are integrated under one roof. Then binary particle swarm optimization (BPSO) is employed to select the best channel groups. Experimental results of BCI2003 dataset IV and BCI2005 dataset I show that good classification accuracies can be achieved only with 9- 14 channels.

Study on Convergent Fuzzy Particle Swarm Optimization and Performance Analysis*

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Abstract

Fuzzy Particle Swarm Optimization (FPSO) has shown its great searching ability and high computing precision, while it can not assure the algorithm is convergent. In this paper, a new kind of FPSO is proposed, called Convergent Fuzzy Particle Swarm Optimization (CFPSO), employing the convergent gene. It differs from normal FPSO in that a convergent gene is introduced in the velocity equation. And it differs from Convergent Particle Swarm Optimization (CPSO) in that it employs the fuzzy membership function in the velocity equation. The CFPSO performance is evaluated with four popular benchmark functions, compared with FPSO, CPSO and standard PSO. The experimental results show the model is well built and better performance can be gained with the new optimization algorithm.

A surface-based DNA algorithm for the 0-1 programming problem

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Abstract

Previously, some DNA algorithms are used to solve the 0-1 programming problem which inequalities' coefficients are 0 or 1. In this paper, a DNA encoding method to represent variables with positive integer coefficients and a surface-based DNA algorithm are proposed to solve the 0-1 programming problem which inequalities' coefficients expand to arbitrary positive integers. The algorithm works in O(m) steps for 0-1 programming problem with m constraint inequalities and n variables.

Software Evolution with Feature-Oriented and Aspect-Oriented Programming

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Abstract

Common techniques of Feature-Oriented Programming (FOP) are important for software evolution and appropriate for implementing program families. It is discussed that the shortcomings in the crosscutting modularity cause problems in implementing unanticipated features. The discussed problems of FOP in this regards complicate the evolution of software. The integration of concepts of Aspect- Oriented Programming (AOP) into existing FOP solutions is proposed. Three approaches to solve these problems are presented: Multi Mixins, Aspectual Mixins and Aspectual Mixin Layers. Whereas, the first two approaches are only of conceptual nature, the third approach is implemented and FeatureC++ with the ability to express Aspectual Mixin Layers is enhanced. FeatureC++ supports FOP in C++ and solves several problems regarding the lacking crosscutting modularity by adopting AOP concepts.

Dynamic Diversity Control in Genetic Algorithm for Extended Exploration of Solution Space in Multi-Objective TSP

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Abstract

Premature convergence in the process of genetic algorithm (GA) for searching solution is frequentlyfaced and the evolutionary processes are often trapped in a local but not global optimum. This phenomenonoccurs when the population of a genetic algorithm reaches a suboptimal state that the genetic operatorscan no longer produce offspring with a better performance than their parents. In the literature,plenty of work has been investigated to introduce new methods and operators in order to overcome thisessential problem of genetic algorithms. As these methods and the belonging operators are ratherproblem specific in general. In this research, we observe the progress of theevolutionary process, and when the diversity of thepopulation dropping below a threshold level then artificial chromosomes with high diversity will beintroduced to increase the average diversity level thus to ensure the process can jump out the local optimum. The proposed approach is implemented independently of the problem characteristics and can be applied to improve the global convergence behavior of genetic algorithms. We eventually apply this approach to solve Multi-Objective (MO) Traveling Salesman Problem (TSP) which were combined KroA with KroB, KroC, KroD and KroE to be trade-off problems. The result shows the solution quality to validate the adaptability of DDCGA for solving such problems.

An Improved Gene Expression Programming(GEP) Algorithm Based on Classification

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Abstract

This paper presents an improved Gene Expression Programming (GEP) algorithm, which combines the thought of classification and the original GEP operations. Meanwhile it designs a Heuristic Accelerating Searching Strategy and a Diversity Operator, which imports the thought of greedy algorithm and simulated annealing respectively. Experimental results based on comparisons between the improved GEP algorithm and the original GEP algorithm indicate that the improved GEP algorithm solves the contradiction between population diversity and algorithm convergence which has a faster convergence and better ability of searching optimization.

A Dynamic Byte Encoding Genetic Algorithm for Numerical Optimization

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Abstract
Based on binary encoding and dynamic parameter encoding methods, taking advantages of the binary logical operation characteristic of computer, a dynamic byte encoding genetic algorithm (DBE-GA) is proposed for numerical optimization. The decoding, crossover, mutation and dynamic adjusting of search region are implemented high efficiently in storage mode, gene mode and apparent mode respectively. The measurement of population convergence requires large computational efforts for search with many bits or strings. A look-up technique is developed by using binary logical operation to overcome this bottleneck. The outstanding performance of DBE-GA has been evaluated with numerical tests.
Keywords: genetic algorithm; dynamic byte encoding; binary logical operation; measurement of population convergence.

An Ant Colony Algorithm with Stochastic Local Search for the VRP

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Abstract
In recent years there has been growing interest in algorithms inspired by the observation of natural phenomena to define computational procedures which can solve complex problems. In this paper, through an analysis of the constructive procedure of the solution in the Ant Colony System (ACS), a Vehicle Routing Problem (VRP) is examined and a hybrid ant colony system coupled with a stochastic local search algorithm(SLSACS), is proposed. In SLSACS, only partial customers are randomly chosen to compute the transition probability. Experiments on various aspects of the algorithm and computational results for fourteen benchmark problems are reported. We compare our approach with ACS, some other classic, powerful meta-heuristics and show that our results are competitive.
Keywords: Ant colony system, Combinatorial optimization, Stochastic local search algorithm, Vehicle routing problem.

Pareto and Niche Genetic Algorithm for Storage Location Assignment Optimization Problem*

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Abstract

Class-based storage and storage location assignment implementation decisions have significant impact on the required storage space and product picking efficiency in an automated warehouse. A multiobjective mathematical model was proposed for storage location assignment to capture the above. The rack stability and order picking frequency were incorporated based on the class strategy. A genetic algorithm with Pareto-optimization and niche technique was developed to solve the problem. The algorithm included two arithmetic operators: Pareto solution sets filter and niche technique besides selection, crossover and mutation operators. Computational experience with randomly generated data sets and an industrial case shows that the policies are more effective than class-based storage policy only, and enhance the operational efficiency of an automated storage/retrieval system, as well as a CIMS system. The improved genetic algorithm can be applied to handle large real life problems efficiently.

Simulation and Experiment Research on Hydraulic Control System of Coal Harrow of Material Piling and Taking Machine

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Abstract

In this paper, the mathematic models of the proportional amplifier and the electro-hydraulic proportional valve in a hydraulic control system of material piling and taking machine are built respectively by catalog and then the transfer Function of hydraulic cylinder and Load system is presented. The theory model of speed curve is put forward and several available speed curves are constructed in this thesis. Three control strategies are presented to realize the speed control and then the optimal one is selected as the control input of this system.The dynamical simulation of hydraulic system is completed. The method of dynamic simulation is adopted to find the system optimal parameter matching. The test method and steps of dynamic response is proposed at last.

Orbital and Attitude Cooperative Control of Fly-around Small Satellite

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Abstract

This paper deals with the problem of controlling both orbital and attitude states for a fly-around small satellite during proximity operations. Firstly, We derive the six degree of freedom error dynamics model. Then, for the uncertainties such as mass and inertia moment, we put forward an adaptive output feedback control method that can be used to solve above control problem and design the control law when considering translational and attitude coupling. Finally, the simulation results show that the designed control law is effective and the control method is feasible.

Operator Based Robust Control for MIMO Nonlinear Systems

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Abstract

A multi-input multi-output nonlinear feedback system is considered in this paper by using operator based robust right coprime factorization approach. Robust stabilization and output tracking performance of the MIMO system are studied. That is, some conditions of the robust right coprime factorization for the MIMO nonlinear system are derived. Using the proposed conditions, the MIMO system can be controlled robustly and the desired output tracking performance is realized. Simulation example is given to support the theoretical analysis.

Robust Fault Estimation for Uncertain Networked Control Systems with Random Time-Delays

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Abstract

This paper investigates the problem of robust fault estimation for a class of uncertain networked control systems (NCSs) with random communication network-induced delays, which are to be modeled by the Markov processes. Based on the Lyapunov-Razumikhin method, a delay-dependent fault estimator is obtained in a form of bilinear matrix inequalities, irrespective of the uncertainties and network-induced delays. An iterative algorithm is proposed to change this non-convex problem into quasi-convex

optimization problems, which can be solved effectively by available mathematical tools.

Adaptive Fuzzy CMAC Control for Nonlinear Systems

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Abstract

In this paper, a fuzzy cerebellar model arithmetic controller (FCMAC) is proposed to solve the tracking problem of a class of nonlinear systems. The control law of the proposed controller is employed to approximate an ideal control law for nonlinear systems. In addition to a compensated control law is used to assure the system stability. Both control laws are derived from the Lyapunov stability analysis, so that the system tracking ability and the error convergence can be guaranteed in the closed loop system. Finally, an electric drive system is utilized to show the satisfactory performance of the proposed control scheme.

Adaptation-Based Reconfiguration in the Presence of Actuator Faults with Non-Measurable Rates

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Abstract

In this paper, a direct adaptive control reconfiguration is proposed for flight control with actuator faults characterized by second-order dynamics. Under non-measurable rates, adaptive state feedback control scheme is developed, which ensures that all closed-loop signals are bounded and plant tracking error tends to zero asymptotically, despite the uncertainties in actuator faults and plant parameters. The properties of the proposed algorithms are evaluated through numerical simulations of an aircraft example.

Vision-Based Predictive Path Tracking Control of a Wheeled Mobile Robot

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Abstract

This paper develops methodologies and techniques for control architecture design, path tracking laws and posture estimation of a vision-based wheeled mobile robot (WMR). To solve the problem of position/orientation tracking control of the WMR, two kinematical predictive control laws are developed to manipulate the vehicle to asymptotically follow the desired trajectories. A Kalman filtering scheme is used to reduce the bad effect of the imagine nose, thereby improving the accuracy of pose estimation. Simulation and experimental results are included to illustrate the feasibility and effectiveness of the proposed control laws.

Elevator Group Control System Based on Information Fusion Technology

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Abstract

An elevator group control system based on information fusion is presented in this paper. The control system is consisting of data processing unit and elevator dispatching unit mainly. A fuzzy ANN based on data fusion technology is proposed in the data processing unit to process state signals, and the fusion result is used as the input of elevator dispatching unit. The simulation is in allusion to the data of an office building by MATLAB. Comparing with normal fuzzy ANN, the fuzzy ANN based on data fusion of single elevator reduced the complexity of elevator dispatching unit and improve the response speed. The elevator dispatching pattern is optimized, the service quality of elevator is improved, and the transportation efficiency of elevator is increased by using this control system. The system in this paper can be put in practice to realize automatically optimized dispatching of elevator group and produce enormous economy benefit.

The Modeling and Simulation of a class of hyperchaos

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Abstract

A class of hyperchaos is modeled based on a modified smooth three-dimensional chaotic system by adding a feedback controller. The new hyperchaos has two very large positive Lyapunov exponents in a quite wide parameter region through observing the Lyapunov exponents spectra. Some simulations of the phase portraits of hyperchaotic attractors are made to show the complicated system orbits. The Poincaré section

analysis show that the new system bifurcates and folds in various directions. The frequency spectra are also plotted to show that the system has an extremely broad bandwidth when it is hyperchaotic, which implies that the system has high complexity and randomness, and may have great potential in chaos-needed fields such as secure communication and encryption.

Temperature Distribution Control in Blast Furnace by RNN

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Abstract

In manufacturing industries, reactor furnaces such as blast furnaces have been playing vital roles. Based on the improvements of furnace facilities, the size of a furnace has been enlarged remarkably. Recently, various studies have been undertaken to examine the inner furnace phenomena of a blast furnace. These studies are limited, however, to the evaluation of furnace performance while a design method of furnace control is left be developed. In this paper, a method is proposed to estimate and control the temperature distribution in a reactor furnace by recurrent neural network (RNN) model for shorten the transient time. For the purpose, furnace data only near a furnace wall are used to control inner furnace temperature distribution to its targeted one. Initially, a simplified furnace simulation program for the calculation of inner furnace gas flow, pressure and temperature distribution is developed based on the precise furnace model studied before. Then, the simulator is used to estimate and control the inner furnace temperature distribution. In the estimation, boundary data such as temperatures and pressures, measured near a furnace wall, are used in the furnace simulation. Further, for the control of inner furnace temperature distribution, necessary values for gas blowing at the bottom of the furnace and the burden supply at the top of the furnace are determined. Both for the estimation and the control of the inner furnace temperature distribution, a RNN model for nonlinear dynamic temperature distribution control is proposed.

Keywords: Recurrent Neural Network (RNN), Temperature Distribution Control, Blast Furnace

A Systemic Approach towards Recreating a Unified Semantics of Numbers

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Abstract

This study investigated the method of integrating positive integer number types while keeping the amounts of them being traced. It distinguishes from most current adopted definitions and researches which deal with the two aspects independently. An integrated evolutional cognition model of integer numbers is depicted in

the manner of a number version "cosmos explosion" (NCE). By providing a tunnel to repeat a formation/creation process of numbers, NCE allows not only a new systemic view on semantics/definitions of {numbers, number types, relationships among them}, but also opportunities to retrospect on some of the fundamental/historical issues related to the understanding of numbers. To illustrate the number classification and locating functionalities of NCE, some examples are shown related to the locating of prime numbers, and deduction on the amount and composition relationships among number types, etc, in the “explosion” processes of NCE. NCE is promising to be extended to areas of number theory, semantics, computation, cryptology, modeling, etc.

The Nonlinear matrix Equation$X_m = A$ And its Applications to Graph Theory

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Abstract

Nonlinear matrix equation widely used in the control theory. When restricted to integer rings ,the integer matrix and the finite directed graph is corresponding.This paper made the integer root of matrix equation applied to the graph theory, and get several propositions about existence of the underlying graph(root graph) of special graphs. And we obtained the algebraic approach on how to find the adjacency matrix of the underlying graph(root graph). Finally, we also determine the precise number of solutions in various cases.

Finite Element Analysis of Two-dimensional Metal Cutting process

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Abstract

Based on LS-DYNA software, metal cutting processes are dynamically simulated by using 2D r-adaptive

method. The mechanisms of plastic deformation and chip formation in metal cutting are analyzed. The influences of tool rake angle and friction factor on cutting deformation are analyzed and deformation extent is measured by plastic deformation energy. According to the distribution of stress and strain gotten from the cutting simulation, the generation of compression stress and residual tension stress of the wokpiece is analyzed. The distribution of cutting temperature field is also analyzed. The research method can effectively apply to the study of metal cutting theory. It is helpful for the selection of bit tool and technological design of machining.

The Beneficial Analysis Between the Four Test Equating Strategies of Separate Estimate and Concurrent Equating Estimate

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Abstract

The purpose of this study was to compare the four test equating strategies of separate estimate, including Haebara, Stocking-Lord, Mean/Mean, Mean/Sigma. Meanwhile, the testing information function of concurrent equating estimate was compared. The researcher hoped this study could offer some suggestions for establishing and enlarging item-bank in applying test equating.

A DSP-based Active Power Filter Rooted on Energy Balance Concept

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Abstract

The object of this paper is to design a single phase digital active power filter, which adopts an energy balance concept to simplify the control method. Only one current sensor and two voltage sensors are needed to detect the input current, the input voltage and the DC bus voltage. The digital signal processor controller is used to implement the simple PI control method. The proposed method provides both harmonic suppression and power factor correction. Finally, the feasibility of the proposed control method is verified from PSPICE simulation and experimental results.

Proposal of Group Decision Support System Using SOM for Purchase of Automobiles

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Abstract

This paper describes a group decision support system (a negotiation support system) based on Kansei of group members using SOM for automobile purchase for family. Firstly, we evaluate Kansei scores of automobiles existed in real world using Kansei Engineering. Secondly, we make a SOM map based on both the Kansei scores of the real automobiles and ideal automobiles of the group members. If Kansei scores of the ideal automobiles of members are far away from each other on the SOM map, the system shows some compromise proposals to the members for negotiation. Where, the compromise proposals are made by small changes of Kansei scores of members. Finally, the Kansei scores of their ideal automobiles gather into a small area on the SOM map, then the system decides some real automobiles nearest to the area as an negotiation result of members.

Using Two-Stage Method to Solve 1.5-Dimensional Cutting Stock Problem

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Abstract

Cutting stock problems can be found in various industries. They arise,for examples,With machining, timber processing, paper-making, etc. 1.5-dimensional cutting stock problem is a problem between onedimensional cutting and two-dimensional cutting.In this study, a two-stage approach is developed for 1.5 - dimensional cutting problem. 1.5-dimensional cutting problem is changed into one-dimensional cutting problem in the first step. An initial solution is obtained by using heuristics algorithm and then optimizes the solution by using particle swarm algorithm in the second stage.

Keywords: 1.5-dimensional cutting stock problems; Two-stage method; Heuristics algorithms; Particle swarm algorithm.

Quadrupedal Gait Generation Based on Human Feeling for Robot Assisted Therapy

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Abstract

In the field of pet robots and robot assisted therapy (RAT), animal motion is important for robots resembling various animals. This paper presents a method for the generation of animal gait in quadrupedal robots. In this study, we employ AIBO as an experimental quadrupedal robot and generate the AIBO's gait on the basis of an animal's gait. First, we optimize the orbit of mono-leg, which can efficiently output a propulsive force, by imitating a dog's gait and using a genetic algorithm. Moreover, we generate the quadrupedal gait of AIBO using both the optimum orbit of the mono-leg and an animal's gait, which is classified the gait of walking dog based on the zoology. Furthermore, we have performed questionnaires to include the human feeling, and choose the best gait for AIBO from among the various abovementioned gaits.

A Development of View_Aid System for Low-Vision

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Abstract

We have been developing a portable system to verify the life environment without support of other people. We call this View-aid system. View-aid system is used when low-vision wants to verify the surroundings environment with the small wireless CMOS camera. The image that is taken with this camera is transmitted to the PDA with the analogue signal of 1.2GHz band. It is received by the receiver, and the analogue signal is converted into digital and it sends to the PDA with a USB connection. We have developed the function of reading out headline in life space with View-aid system. The system has a function of detecting headline-block in the taken image. The target is headline in newspaper. The success rate of detecting headline algorithm is 77%, and the success rate of the headline character recognition is 45%. Moreover, to aim at further miniaturization of system device and at improvement of picture quality, we have examined a Bluetooth transmitting method for digital wireless.

Modeling Fuzzy Belief with Plausibility Degree in Intelligent Systems

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Abstract

Belief plays an imortant part in intelligent systems modeling. On the one hand, in the multi-agent systems community, belief is usually modeled as a mental state of agents by modal logic in the context of BDI (belief – desire - intention). On the other hand, in epistemic logic research, belief and knowledge are often taken into account together, which are main components of knowledge-based systems. However problems such as logical omniscience and several others come along with this one still left unsettled since agents are resource bounded reasoners. In this paper, the construction of fuzzy belief logic based on plausibility degree is considered, three kinds of fuzzy belief operators (individual fuzzy belief, group fuzzy belief, and common fuzzy belief) are investigated, and the associated Kripke semantics is given. Logical omniscience problem of belief modeling is done away with and proved. So that a new powerful tool for intelligent systems modeling is well constructured.

Dynamic Analysis and Model Transformations of Longitudinal Flight of Hypersonic Aircrafts

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Abstract

In this paper, we introduce dynamic analysis and model transformations of longitudinal flight of hypersonic aircrafts. At first, a basic dynamic model of the longitudinal flight is given and its physics is also analyzed. Then the transformations of the basic model are given under some conditions. The analysis and the transformations provide tools for further researches of control problems of the longitudinal flight of hypersonic aircrafts.

The connection of bi-cubic T-Bézier surfaces and its modeling application

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Abstract

T-Bézier curves and surfaces whose basis functions are constructed from the trigonometric polynomials,

have properties similar to those of Bézier curves and surfaces. But they have more wide representations which can express arcs, cylinders and other transcendental curves and surfaces. In this paper, we discuss one kind of bi-cubic T-Bézier surfaces and provide the sufficient conditions of G_1 continuity and G_2 continuity between two adjacent T-Bézier surfaces. In the end of this paper, we use the bi-cubic T-Beizer surfaces to construct some fabric modelings.

Modeling of a Rope-driven Self-levelling Crane

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Abstract

This paper concerns the fields of the eccentricpayload crane systems. We firstly introduce a fourrope-driven self-levelling crane system, which can adjust the payload to level precisely and safely by changing the lengths of the ropes. Then, the system model is deduced according to force equation, moment equation principles and geometry restrictions, without considering the acceleration items. Finally, a control strategy is proposed to adjust the system.

Uncertainty Modeling and Robustness Analysis of Flight Control Using μ-Analysis Techniques

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Abstract

Flight control systems are often designed in linearization points over a flight envelope and it must be proven to clearance authorities that the system works for different parameter variations and failures all over the envelope. A numerical matrix-based robustness analysis method using μ-analysis techniques is described herein. The method contains three key steps: 1) convert the nonlinear system of aircraft with uncertainty into a linear parameter varying (LPV) system, 2) convert the LPV system into a linear fractional transformation (LFT) system, 3) μ- analysis. Uncertainty modeling methods are presented: include overview of LPV modeling, quasi-LPV modeling by function substitution method and approach to formulation of LPV models near bifurcation points; and then two software tools for computing LFT model from LPV model are introduced. Finally, an example is given to illuminate the sound of this recommended method.

The Application of Levy Process with Stochastic Interest Rate in Structural Model

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Abstract

Levy processes have become cumulatively popular in Finance because they describe financial markets in a more accurate way than models based in Brownian motion. For the purpose of pricing debt value by structural model, we not only assume the interest rate is stochastic and model the dynamics of firm value return as a Levy process by the sum of a Brownian motion and compound Poisson process which is often called a jump-diffusion process. Generally speaking, the jump risk is assumed nonsystematic, and hence diversifiable. In order to describe the effect of nondiversifiable jump risk such as subprime mortgage crisis, we presume the jump risk is a systematic risk.

Midpoint Validation Method for Support Vector Machine with Margin Adjustment Technique

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Abstract

In this paper, we propose a midpoint-validation method and margin adjustment technique which improves the generalization of Support Vector Machine. Margin adjustment technique enables the nearly effect as soft margin Support Vector Machine by adjusting parameter. The midpoint-validation method creates midpoint data, as well as a turning adjustment parameter of Support Vector Machine using midpoint data and previous training data. We compare its performance with the Support Vector Machine, soft margin Support Vector Machine, Multilayer Perceptron, Radial Basis Function Neural Network and also tested our proposed method on fifth benchmark problems. The results obtained from the simulation shows the effectiveness of the proposed method.

A Model and Algorithm for minimum spanning tree problems in uncertain networks

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Abstract

This paper considers the problem of minimum spanning trees in uncertain networks in which the edge weights are random variables. We propose the concept of expected minimum spanning tree and formulate the model according to expected value. In order to solve the model, a hybrid intelligent algorithm combined genetic algorithm and stochastic simulation is given, and the Prüfer encoding schemes represented spanning trees are adopted. The algorithm has been proved to be useful for solving practical problems by a numerical example.

Adaptive MCMC Particle Filter for Nonlinear and Non-Gaussian State Estimation

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Abstract

The particle filter is well known as a state estimation method for nonlinear and non-Gaussian system. However, particle filter has the inherent drawbacks such as samples less of diversity and the computational complexity depends on the number of samples used for state estimation process. In this paper, the adaptive Markov chain Monte Carlo (MCMC) particle filter is proposed in order to overcome these drawbacks. In the new algorithm, the KLD-sampling and MCMC sampling are simultaneously used to improve the performance of particle filter. The computer simulations are performed to compare the adaptive MCMC particle filter algorithm, the MCMC particle filter and particle filter in performance. The simulation results demonstrated that the adaptive MCMC particle filter is very efficient and smaller time consumption compared to MCMC particle filter and particle filter. Therefore, the MCMC adaptive particle is more suitable to the nonlinear and non- Gaussian state estimation.

Index Terms—KLD-Sampling; Adaptive MCMC Particle Filter; Nonlinear and Non-Gaussian; State Estimation

Evolution of Task Switching Behaviors in Real Mobile Robots

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Abstract

In recent years, much research is focused on evolution or learning of different behaviors. Because both algorithms require much computational time, most of these approaches are conducted in simulated environments. When evolution or learning took place in real robot, a single task was considered. In this work, we evolve neural controllers for task switching behavior using e-puck robots. The e-puck robot has to move to the sound source while first reaching the lights distributed in the environment. Experimental results show a good performance of neural controllers evolved in the real hardware of the e-puck robot.

Multirate Input Control for Fuzzy Systems Based on Disk-pole Placement

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Abstract

A new multirate fuzzy control technique for continuous-time nonlinear systems is presented in this paper. First, the lifted Takagi-Sugeno(T-S) fuzzy model of the plant is constructed subject to linear matrix inequalities (LMIs). Then, a multirate input controller for the multiple T-S linear models, based on the design of the local feedback controllers using optimal diskpole (D-pole) placement, is proposed. A sufficient condition for the existence of such a controller is expressed in terms of algebraic Riccati equation. Finally, the stability of the closed-loop control system is derived in the sense of Lyapunov. Simulation results show the effectiveness of the proposed method.

Rough Vague Sets Based on General Binary Relation and Its Method of Similarity Measures

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Abstract

This paper introduces the approximate problem of the common relation Vague sets. Based on our

previously study and analysis the connection among the classical rough sets theory, fuzzy sets theory and vague sets theory, we canonically discuss the conception and correlative properties of rough vague sets under the common relationship and also present the measurement method in measuring the similarity of two rough vague sets. This possesses certain significance in further research of the rough vague set.

Variable Precision Rough Set Model in Incomplete Ordered Decision System

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Abstract

Based on the similarity dominance degree, the incomplete ordered decision system with all values that are "do not care" unknown values is established. The variable precision rough set model based on similarity dominance degree in the incomplete ordered decision system is given, and some properties of rough approximation operators of the variable precision rough set model are discussed.

Method Based on Triangular Fuzzy Number for Multi-sensor Object Recognition

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Abstract

Aimed at the type recognition problem in which the characteristic values of object types and observations of sensors are in the form of triangular fuzzy numbers, a new fusion method from the viewpoint of decision making theory is proposed. The method transforms the triangular fuzzy numbers elements of decision matrix into the expected value elements. After solving the optimization problem of minimizing the maximum deviation between the object types and the unknown object, the weights of the attributes are obtained. The result of recognition for the unknown object is given by the comprehensive attribute expected values. This method can avoid the subjectivity of selecting attributes weights. It is straightforward and can be performed on computer easily. Finally, a simulated example is given to demonstrate the feasibility and practicability of the proposed method.

A New Fuzzy Logic Torque Control Scheme Based on Vector

Control and Direct Torque Control for Induction Machine

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Abstract

It is well understood that Vector control (VC) scheme is very complicated and has slower torque response. Direct torque control (DTC) scheme is easier and has faster torque response, but it ’ ll bring the bigger torque ripples than those under VC. In this paper, a new fuzzy logic VC-DTC torque control scheme based on the common of vector control and direct torque control has been presented. The system uses a current VC scheme together with a DTC type switching table. Theoretical background of these schemes is outlined, and then a simulation test bench has been established for performance evaluation under a variety of control conditions. The comparison of motor performance under the proposed control system with respect to those obtained under DTC and VC confirms a faster dynamics than that of VC and less system variable pulsations than those under DTC and VC, which show the potential of applying fuzzy VCDTC torque control to induction machines.

Robustly Stochastic Stability Criteria for Takagi-Sugeno Fuzzy Markov Jump System

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Abstract

The problem of robustly stochastic stability criterion for Takagi-Sugeno (T-S) uncertain fuzzy Markov jump system is investigated in this paper. First, we define a type of T-S fuzzy Markov jump system, whose membership function depends on the system mode. In order to get less conservative robustly stochastic stability criterions, we introduce a fuzzy Lyapunov functional and its weak infinitesimal operator for fuzzy Markov jump system. The robustly stochastic stability for the T-S fuzzy Markov jump system with time-varying structured uncertainties are presented in the form of strict linear matrix inequalities (LMIs).

Fuzzy Controller Design Subject to Input Constraint

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Abstract

This paper deals with stability analysis and control design for a class of nonlinear systems with input constraint when using the T-S fuzzy model. As a result, it arrives at a feedback controller that is composed of two parts: one is obtained by solving certain linear matrix inequalities (LMIs) (fixed part) to deal with the input constraint, and another one is acquired by an adaptive law (variable part) to deal with the reconstruction error between the real system and its T-S fuzzy model.

Experimental Implementations of Adaptive Self-Organizing Fuzzy Slide Mode Control to a 3-DOF Rehabilitation Robot

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Abstract

Pneumatic muscle actuator has many advantages such as high power/weight ratio, high power/volume ratio, low price, little maintenance needed, great compliance, and inherent safety. Therefore, it can be suitably applied to rehabilitation engineering for persons with neuromuscular or musculoskeletal pathologies affecting extremity functions. However, excellent control performance can hardly be achieved by classical control methods because gas compression and nonlinear elasticity of bladder containers cause parameter variations. An adaptive self-organizing fuzzy sliding mode control (ASOFSMC) is developed in this study to improve control performance. Experimental results show that this control strategy can achieve excellent control performance.

On a Rough Set with Fuzzy Weights in Well-Balanced Menu Planning System

Abstract

We have developed a well-balanced menu planning system to supply dishes to someone's taste. The system implements fuzzy mathematical programming logic and rough set theory. The fuzzy mathematical programming is mainly used to select menu among database, and the rough set theory provides user's selection rule for menu. This paper particularly focuses the method of rough set theory with fuzzy weight. So far we have used an information system with fuzzy weights adopted to only each tuple data. This paper

discusses the method that is evaluated each attribute including both of condition and decision using a fuzzy number, in order to cover all uncertainties and noises in a menu database. On rough set procedure, some invisible elements are visualized i.e., it takes notice of the visualization of nutritional information which hid behind a user's favorite. Each user's characteristic is grasped and well-balanced menus are presented for each user after filling constraints such as the affinity of cooking

Study on Approaching Precision to Standard Fuzzy Systems with Two Different Basic Functions *

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Abstract

The standard fuzzy systems are established with partition of normal quadratic polynomial membership functions and normal trigonometric membership functions. Universal approximation error bounds of these fuzzy systems from SISO to MISO are given and their relations are founded. The error remainder term and auxiliary function are employed for the first time in proving process. Moreover, advantage and shortcoming of the two fuzzy systems are compared and correlative conclusions are obtained. Finally, computing examples are given and the validity of the conclusions is confirmed.

Stability Analysis of a Class of Discrete Switched Fuzzy Systems

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Abstract

This paper introduces a innovated representation model, namely, a discrete-time switched fuzzy system, which differs from existing ones. In this model, a system is a switched system whose subsystems are all discrete-time T-S fuzzy systems. Using switching technique, the single Lyapunov function method and multiple Lyapunov functions method, the state feedback controllers are built to ensure that the relevant closed-loop system is quadratically stable in this paper. Moreover, switching laws of the state– dependent form achieving system quadratic stability of the switched fuzzy system are given. The main conditions are given in form of convex combination and LMI, which are more solvable. The elaborated illustrative examples and the respective simulation experiments demonstrate the effectiveness of the proposed method.

Developing a Practical Car Search System Using Fuzzy Theory

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Abstract

This paper described developing a practical car search system using fuzzy theory. This system aims at supporting car purchasing for a person which is no good with machines as if they ask casually someone who knows more about cars. Unspecific conditions are expressed by the fuzzy set, and the level matching the conditions are expressed by the grade values. To keep more practical use, a GUI form which only selected some menus was developed. In conclusion, it reviews and observes this study, showing its effectiveness, remaining issues, and measures for the issues.

Interval Type-2 Fuzzy Neural Network Controller (IT2FNNC) and Its Application to a Coupled-Tank Liquid-Level Control System

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Abstract

In this paper, an interval type-2 fuzzy neural network controller (IT2FNNC) is proposed. This new controller can combine the merits of neural network and type-2 fuzzy logic controller (T2FLC) which has been shown to be a powerful paradigm to handle the high level of uncertainties in real-world applications. To tune the parameters of IT2FNNC, the update rule is developed based on the backpropagation (BP) algorithm. And, in order to demonstrate the effectiveness of the proposed controller, an application to the coulped-tank liquid-level control system is investigated. Simulation results show that the proposed controller can present satisfactory performance. Moreover, compared with the T1FNN controller, IT2FNNC performs better, particularly in noisy environments.

Local Positioning with Artificial Neural Network and Time of Arrival Technique

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Abstract

In recent years local positioning based on the received radio signals gets more interest. In a local environment, the multipath caused by the obstruction between transmitter and receiver are the main sources of range measurement errors, which result in the deterioration of the positioning performance. Many algorithms have been proposed for the position estimation under various environments. In this paper, an artificial neural network (ANN) based model is introduced to convert the received radio signals into position information. From the simulated results, it is indicated that the positioning precision of the proposed system, applied in a local environment, has been found to be 25% high than other algorithm under various scenarios. The implement of proposed algorithm could save the hardware cost of positioning systems.

Hybrid CPM/CAM Physiotherapy by Use of the Slide-Mode Fuzzy Neural Network Control

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Abstract

Continuous passive motion (CPM) and controllable active motion (CAM) physiotherapy devices are commonly used to promote rehabilitation of damaged joints. A device involving the use of a CPM and CAM combination but without the CAM-type resistance components is presented. While in the CPM mode, the electric motor functions traditionally, but in the CAM mode, the motor exerts an opposing force against the patient's activity, creating the effect of a spring performance. Such motor force is stimulated by the slidingmode adaptive fuzzy neural network controller. For convenient use, the system connects to the Internet or the training data can be accessed by automatic monitoring of research stations, home patients or telemedicine applications.

Automatic Detection of GGO Candidate Regions by Using Artificial Neural Networks from Thoracic MDCT Images

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Abstract

Detection of abnormal areas such as lung nodule, ground glass opacity on multi detector computed tomography images is a difficult task for radiologists. It is because subtle lesions such as small lung nodules tend to be low in contras, and a large number of computed tomography images require a long visual screening times. To detect the abnormalities by use of computer aided diagnosis (CAD) system, some technical method for detecting the abnormalities have been proposed in medical field. Despite of these efforts, their approach did not succeed because of difficulty of image processing in detecting the ground glass opacity (GGO) areas exactly. Thus they did not reach to the stage of automatic detection employing unknown thoracic MDCT data sets. In this paper, we develop a CAD system for automatic detecting of GGO areas from thoracic MDCT images by use of five statistical features which are obtained four density feature and one of shape feature. The proposed technique applied on 31 MDCT image sets. 79.4 [%] of recognition rates and 1.07 of false positive rates was achieved. Some experimental results are shown along with a discussion.

Direct Stable Adaptive Fuzzy Neural Model Reference Control of a Class of Nonlinear Systems

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Abstract

In this study, using a model reference adaptation law, a stable fuzzy neural control system is developed.

Despite the advantages of Model reference control design technique, which is mainly its power to exactly set trajectories of the system under control, this method is designed for linear system. In this study using fuzzy neural systems, a stable model reference controller for nonlinear systems is developed. Lyapunov method is used to guarantee the stability of fuzzy neural training algorithm and model following of the system under control.

Keywords: Fuzzy Neural Control, Model Reference Control, Stable Controller

The Research of Dynamic Change Learning Rate Strategy in BP Neural Network and Application in Network Intrusion Detection

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Abstract

A new strategy of dynamic change learning rate in BP neural network was proposed, it changes the learning rate value according to the change of system error between last iteration and this. The method improves the learning rate in BP network. The validity of dynamic change learning rate strategy in BP neural network has been showed by the experiments. In order to improve the detection efficiency of intrusion detection system, a new intrusion detection model was presented, it applies BP neural network based on dynamic change learning rate strategy and combines with the simulated annealing algorithm aim at optimizing intrusion detection system. Finally, the tests show the intrusion detection model improves the detection efficiency.

Establish Credit Rating System and Apply Back-Propagation Network for Forecasting Insurance Companies

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Abstract

Based on published financial data from Property- Liability Insurance companies, the Factor Analysis was adopted in this paper to screen important variables to establish credit rating perspectives. In addition, the concept of normal distribution was used to establish objective and scientific credit rating model that match the conditions of Property-Liability Insurance companies in Taiwan. Through proper categorization and evaluation standards, the complicated financial and business status of Property-Liability Insurance companies was expressed in a simple manner to let consumers, investors, and others understand insurance companies' operation conditions. Also the Supervisory Institution could take the results as the reference index for supervisory organization systems. Furthermore, the Back-Propagation Network (BPN) was adopted to establish predictive models for forecasting accurate rate, making the guidelines for supervisory organizations to conduct supervisory actions.

Keywords: Credit Rating, Back-Propagation
Network, accurate rate.

Combination of Wavelet Packet Analysis with BPNN Flaw Type Identification in Concrete Ultrasonic Testing

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Abstract

According to the nonstationarity of ultrasonic signals in concrete ultrasonic testing, a method of flaw classification was presented based on the combination of wavelet packet analysis and artificial neural network (ANN). The wavelet packet analysis is used to extract characteristic values reflecting the flaw properties and back propagation neural network(BPNN) is used to classify the characteristic values. An experiment system was used to test the method, in which 5 flaws were processed. The test results show that by this method human effects on qualitative recognition of flaws can be reduced and high accuracy of flaw classification can be obtained.

Research on the Cooperative Quick-response Fire Control System

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Abstract

The complexity and variety of modern architectures bring lots of challenges in fire prevention and control. Advanced technologies and equipment, especially various kinds of establishments of communication, conducting and detection, provide a powerful support for fire control radically, but also bring about new problems in information coordination among dispersed knots of the fire control system, whose job is to make a multi-target decision instantaneously and give an immediate response to different conditions. A cooperative quick-response fire control system orienting multiple targets is researched, its system structure is set up and cooperative targets mechanism analyzed. A network environment integrating wire and wireless communication is built, and the fire control database with a five-layer structure is established, which is critical to resolve the cooperative control problem in the quick-response fire control system. The system is able to make a cooperative decision effectively, and harmonize all resources quickly, so that the work condition is optimized and the fire control task is finished in the shortest time with the lowest damages.

Interaction and controller selection in Decentraliced Control of TITO systems: IMC based PI/PID Approach

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Abstract

Performance of multivariable control systems may be highly degraded because of the existence of interaction terms. It is therefore important to have measures that help in the controller selection procedure. Special attention has to be paid to the potential instability caused by interaction effects generated by the control action on the other loop. This paper provides an analysis by means of an interaction measure defined in terms of the expected interaction to be generated into the control systems in terms of the desired specification for the local control loops, and shows how this can help to select the appropriate controller. Detailled presentation concentrates on the Two-Input Two-Output case and the controller design using the IMC method.

Sliding Mode Control for a Class of Stochastic Systems with Time-Varying Delay

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Abstract

In this paper, the sliding mode control problem for a class of stochastic systems with time-varying delay is investigated. The sliding mode control law is directly designed to ensure that the sliding motion is reachable in finite time. And a sufficient condition for meansquare asymptotical stability of the sliding motion is given. A numerical example is presented to show the effective of the obtained results.

A design method for Smith predictor for non-minimum-phase time-delay plants with multiple time-delays

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Abstract

In this paper, we examine a design method for modified Smith predictor for non-minimum-phase time-delay plants with multiple time-delays. The modified Smith predictor is well known as an effective time-delay compensator for a plant with large time-delay, and several papers on the modified Smith predictor have been published. The parametrization of all stabilizing modified Smith predictors for minimum-phase time-delay plants is obtained by Yamada and Matsushima. Yamada et al. expand the result by Yamada and Matsushima and propose the parametrization of all stabilizing modified Smith predictor for non-minimum-phase systems. In some cases, the plant includes multiple time-delays. For minimum-phase timedelay plants with multiple time-delays, the parametrization of all stabilizing modified Smith predictors is solved by Yamada and Takenaga. However, they do not examine the parametrization of all stabilizing modified Smith predictors for non-minimum-phase time-delay systems with multiple time-delays. The purpose of this paper is to expand the result by Yamada and Takenaga and to propose the parametrization of all stabilizing modified Smith predictors for non-minimum-phase time-delay plants with multiple time-delays.

A Hybrid Neural-PID Control Scheme for Adaptive Visual Tracking

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Abstract

This paper addresses a hybrid neural-PID control scheme to nonlinear system for real-time robotic visual tracking of a moving object. By using the motion rules of the CCD camera and the object, the equations of observation and state-space are given. Then, the system can be represented as an MIMO ARMAX model and an efficient estimation model. The adaptive optimal predictor can process on-line estimation of the 3D related parameters between the camera and the object. The control scheme adopts the hybrid neural- PID controller that can adjust the PID controller parameters. The paper concludes with the simulation results and the computer simulation shows that the proposed method is effective to visual tracking of combining vision and control.

The Control System Between Transformer Tester and Host Computer Based on VC++ and MFC

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Abstract

A proper communication and control principle was chosen according to the system character, based on analyzing the communication and control problem among host computer, transformer tester and transformer. We design the control system of host computer and transformer tester in order to fetch data from transformer and display real time data on host computer. It's very convenient to detect performance index of transformer. This paper mainly introduced the communication system between

transformer tester and host computer using VC++ and MFC to design. And it briefly describes the design of transformer tester by ourselves which can sample field data. The system's communication principle and software design method are given in this paper. We make use of principle of serial communication and write a communications protocol. The host computer software can effectively communicate and control with transformer tester, which is successfully implemented. In practice, the system is reliable and easy to extend and has good application value.

A design method of simple multi-period repetitive controllers for time-delay plants

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Abstract

The multi-period repetitive control system is a type of servomechanism for periodic reference input. Even if the plant does not include time-delay, the transfer function from the reference input to the output and that from the disturbance to the output of the multi-period repetitive control system generally have an infinite number of poles. In order to specify the input-output characteristic and the disturbance attenuation characteristic easily, the concept of simple multi-period repetitive control systems such that the controller works as a stabilizing multi-period repetitive controller and the transfer function from the reference input to the output and that from the disturbance to the output have a finite number of poles is presented by Yamada and Takenaga. However, the method by Yamada and Takenaga cannot apply for time-delay plants. In this paper, we propose a design method for simple multi-period repetitive controllers for time-delay plants.

Optimal Design of a Closed-loop Control Compliant Microgripper

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Abstract

This paper presents recent work on using a theory of topology optimum and PID control theory to design a microgripper system. The driver of microgripper is a piezoelectricity ceramics microactuator. This study uses a PZT microactuator of 5 mm length, 3 mm width and 0.5 mm thickness. The compliant microgripper is the main component of a system developed to grasp and manipulate tiny objects. A PID control of the microgripper has been implemented. The results of the experiments prove that the PID controller can assure performance suitable for the intended applications.

A Power Quality Disturbance Classification Method Based on Park Transform and Clarke Transform Analysis

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Abstract

This paper first analyzes the Park Transform and Clarke Transform of 5 normal power quality disturbances and then proposes 3 characteristic indexes based on the two transforms. The indexes can be used to classify 5 single disturbances and 5 mixed disturbances exactly. The algorithm is simple and easy to be implemented by hardware. It can also be the basis of power quality index evaluation. At last, this paper simulates the disturbance classification method by Matlab, and the result indicates that the classification method proposed by this paper is accurate, effective, and has a good effect on classifying mixed disturbance. The misjudge rate is also low.

Keyword: characteristic; disturbance classification; power quality disturbance;

Speaker Recognition based on LS-SVM

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Abstact

In this paper, a novely method for speaker system is proposed. The Least Square Support Vector Machine(LS-SVM) based on the quadratic equality constraints is analyzed firstly. A speaker recognition system is then designed based on LS-SVM. The Mel Frequency Ceptral Coefficients (MFCCs) are adopted as the speaker speech feature parameters in the system. The MFCC feature

parameters are trained and tested independently using the Gaussian Radius Basis Function. We evaluate the LS-SVM system using the voice sets of similarly pronouncing speakers in the same recording conditions. The training time and equal error rate between LS-SVM and conventional SVM in the experiments are compared. The results show that the speaker recognition based on LS-SVM has less computational complexity, shorter training time than the speaker recognition based on the conventional SVM. In order to test the recognition system, we use the VQ and GMM model. The results show LS-SVM has high right recognition rate and adaptability for speaker recognition.

Tactile Sensor Array Signal and Data Processing Based on Information Fusion

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Abstract

It developed a sort of tactile sensor array system that built in various shapes and provided a wide range of spatial resolution. The sensor system built a demonstration system in lab and developed algorithms to process the large amount of tactile data. The efficient fusion of data from different sensors would enable the robot to respond promptly in dealing with the “real world”. The confidence distance measure was used as fusion measure of information fusion. The useful fused data found by confidence distance matrix and relation matrix. Finally, the optimal fused data was given by maximum principle and maximum likelihood method. Using algorithm based information fusion, the influence of single sensor cell uncertainty errors could be avoid, surface depth data measure and image reconstruction precision of object profile could be improved.

Keywords: tactile sensor array, data processing, information fusion

Separating Reflection Components of Smooth Metallic Surface Using Special Random Sampling Method

Abstract

In smooth metallic surfaces, highlights are very strong and illuminant shapes are often observed as specular reflections. In order to separate specular reflection components and diffuse reflection components on smooth metallic surfaces, a set of real images are taken under various lighting conditions and Special Random Sampling Method is introduced to regenerate diffuse reflection components as well as to obtain specular reflection components. Experimental results show that diffuse reflection components and specular reflection components can be effectively separated in realistic images of smooth metallic surfaces using this technique.

Optimization of Tone Recognition Via Applying Linear Discriminant Analysis In Feature Extraction

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Abstract

F0 is an important tone features in the state-of-art tone recognition system. Traditionally, difference of F0 (Δ F0), subsection slope and intercept, and subsection mean F0 and mean Δ F0, are used to improve the recognition accuracy. In fact, all these features can be expressed as the linear transform of F0. The problem is to find the best coefficients for the transform. Linear discriminant analysis (LDA) is a good methodology in finding an optimal linear feature subspace. This paper introduces the LDA methodology to optimize the tone feature extraction in tone recognition. The critical steps of LDA are deduced and the advantage of LDA is theoretically argued. Experimental results on isolative syllable database confirm that LDA-based features perform much better than other features.

Noise Removal Based on Fourth Order Partial Differential Equation

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Abstract

Noise removal is an important image processing problem which has wide applications in different fields. The noise removal and edge preservation algorithm based on variational method and partial differential equation (PDE) for processing Magnetic Resonance images is proposed. The proposed method can avoid the blocky effects and false edges, compared with other second-order PDE method; moreover, it is realized easily. Experimental results illustrate the effectiveness of the model in the Magnetic Resonance image noise removal.

Comparison between Weighted D-KNN and Other Classifiers for Music Emotion Recognition

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Abstract

Mood classification of music is an emerging field of music information retrieval. In the approach presented here features extracted from an audio file are used to map a song onto a psychologically based emotion space. The motivation behind this system is the lack of intuitive and contextually aware playlist generation tools available to music listeners. The need for such tools is made obvious by the fact that digital music libraries are constantly expanding, thus making it increasingly difficult to recall a particular song in the library or to create a playlist for a specific event. In this paper, we compared the performance of the proposed W-D-KNN classification method with that of other popular classifiers by applying them to a music database consisting of 60 famous popular songs from English albums. Each song annotated by 40 participants. The emotions of these songs distribute roughly uniformly in each quadrant of the emotion plane. The experimental results show that the proposed W-D-KNN classifier achieves a recognition rate of more than 96% and outperforms KNN and SVM classifiers.

Instrumentation Model and Data Processing of Tire Dynamic Balance Using Multi-Sensors

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Abstract

The instrmentation of dynamic balance for automobile tire often uses multi-sensors and requires effective data precessing techniques. In this paper, the mathematical instrumentation model is developed by considering the eccentric force and moment caused by unbalance mass. Furthermore, the data processing techniques based on the least squares are used to reduce the influence of measurement noise and improve the accuracy of unbalance instrumentation. It is shown that the proposed method can provide effective instrumentation for the tire dynamic balance.

Enhancement of Hybrid Concatenated Codes Using A Modified Log-MAP Algorithm

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Abstract

To improve the performance of hybrid concatenated convolutional codes (HCCC); a modified Log-MAP algorithm and an enhanced HCCC are introduced and demonstrated to be efficient and practical by simulation results. The new coding scheme achieves about 1.0 dB additional coding gain, compared to the general turbo coding scheme at a BER = 10^{-6}, with a frame length of 8192-bit. The system complexity and decoding latency of the new scheme is lower than the HCCC proposed by Divsalar and Pollara [6] within acceptable performance degradation. Since the biterror- rate of the proposed HCCC can be dramatically reduced by slightly increasing signal-to-noise ratio, the new hybrid concatenated coding scheme is very suitable for those communication environments in which high reliability is important.

Low-Latency Turbo Decoder Design by Concurrent Decoding of Component Codes

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Abstract

Recently, there has been intensive focus on turbo codes which have low decoding latency. To reduce the iterative delay resulted from (de)interleaver; a new parallel algorithm for turbo decoder is proposed. Different than the previous approaches which use multiple units to process sub-block MAP decoding in parallel, the new parallel turbo decoder immediately passes the extrinsic information of one component decoder to the other decoders bit-by-bit. The decoding processes of component decoders perform concurrently and the (de)interleaver delay is eliminated. Simulation results demonstrate that with this parallel scheme, decoding latency is reduced while the performance in terms of BER is comparable, and in some cases superior, to a general turbo decoder. Furthermore, the proposed parallel algorithm can be used to cooperate with those parallel MAP decoding schemes to reduce more decoding latency.

A Modified LMS Algorithm with Turbo-like Scheme

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Abstract

LMS algorithm has low computation complexity; however, its convergence rate is slow. In this paper, a novel implementation scheme for LMS algorithm is proposed to form a modified LMS algorithm. The scheme is similar to the structure of Turbo decoder, which consists of one feedback module called as converse-speediness module, two LMS algorithm modules, and one speediness module which connects two LMS algorithm modules. Meanwhile, two LMS algorithm modules can be implemented parallel, as well as the speediness module and converse-speediness module. Simulation results show that the scheme makes the convergence rate of the proposed algorithm over 4 times faster than that of LMS algorithm, and almost the same as that of RLS algorithm. Moreover, compared to LMS algorithm and RLS algorithm, the mean square error (MSE) of the proposed algorithm decreases greatly.

Sidelobe Suppression of Phase-coded Radar Based on the Accurate Signal Estimate

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Abstract

Owing to its characteristic of spread spectrum, phase-coded radar has many advantages. So people pay much more attentions to it. However, the reference code is not orthogonal and Doppler frequency exists in radar echoes, as a result, the phase-code radar has higher range sidelobe. This paper will discuss a method of the range sidelobe suppression based on parameter estimation, according to the model of echo signals and observed data. It can be seen from the results of simulation and theoretical analysis that this method is effective and needs less calculation.

A Novel Real-time Commercial Detection Scheme

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Abstract

Nowadays, millions of people's living and work habits are affected by TV commercials. A feature-based real-time TV commercial detection algorithm is proposed in this work. In terms of the combination of the visual and acoustic features, and the temporal information, we detect the end and the start boundary of the commercial separately. Then, in order to refine the detecting result further, we address a set of basic features that is easy to distinguish the commercial from general programs. Based on these features, a finite automation is build simultaneously, which well illustrates our detection method clearly. The experimental results show that our algorithm can yield better recall (96.47%) and precision (97.27%) by comparing with current main approaches.

A New Appearance-Based Facial Expression Recognition System with Expression Transition Matrices

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Abstract

In this study, we propose a novel image-based facial expression recognition method called “expression transition” to identify six kinds of facial expressions (anger, fear, happiness, neutral, sadness, and surprise) at low-resolution images. The boosted tree classifiers and template matching are used to locate and crop the effective face region that may characterize the facial expressions. Then, the expression transformed images via a set of expression transition matrices are matched with the real facial images to identify the facial expressions. The proposed system can recognize the facial expressions with the speed of 0.24 seconds per frame and accuracy above 86%.

The Study and Analysis of Video coding algorithm at low bit rates

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Abstract

This paper study and analysis the video coding algorithms, which are standard for low bit rate communication. The image source format and picture structure and type are introduced at first. Then the coding algorithms employed in H.263+ and H.264 are introduce, which are a hybrid DPCM/transform algorithm, prediction ,DCT, motion estimation, variable run-length coding,. Furthermore, the generally used mode such as advanced prediction, unrestricted motion vectors, advanced intra coding, deblocking filter, improved PB Frames are explained and analyzed. Finally, using example video, we test the image quality and compression efficiency with different mode.

Fusing 2DKPCA and 2D(PC)2A for Image Matrix Based Face Recognition with One Training Sample Per Person

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Abstract

In the face recognition area, a so-called one sample per person problem occurred owing to the difficulties of collecting samples or storage space of systems. In this paper, we present a unified framework for image matrix based face recognition with one training sample per person. Firstly, the nonlinear and linear facial features are using proposed 2DKPCA and 2D(PC)$_2$A method, the face images are directly used for feature extraction, and secondly a parallel fusion method is applied to fuse the facial features to construct the combined features. Experiments are implemented on three face databases to demonstrate the feasibility of proposed algorithm.

Keywords: face recognition, one sample per person problem, kernel method, PCA.

Image Segmentation based on Inhomogeneous Markov Random Field and Dirichlet Process Mixture

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Abstract

A novel graphical model based on inhomogeneous Markov Random Field and Dirichlet Process Mixture is proposed to address the problems encountered by Hidden Markov Random Field. It incorporates the local and global scale information. A sampling method is also devised based on Gibbs sampler. The model is investigated in the context of image segmentation and the performance is evaluated.

A multi modal image registration method by use of optimal retrieval on the VOIs

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Abstract

Image registration is an important problem and a fundamental task in computer vision and image processing field. Especially, CT and MR imaging of the head for diagnosis and surgical planning indicates that physicians and surgeons gain important information from these modalities. In radiotherapy planning, manual registration techniques are performed on MR and CT images of the brain. In general, physicians segment the volumes of interest (VOIs) from each set of slices on the MR and CT images manually. However, manual registration of the object area may require several hours for analysis based on anatomical knowledge. In this paper, we develop a new method for automatic registration of head images by using an optimal retrieval on

neighbor VOIs in several extracted data and maximization of mutual information. The primary objective of this study is to increase accuracy of the registration and reduce the computational processing time.

A Covert Communication Scheme for the DWT and Data Partitioning Based Image Multiple Description Coding System

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Abstract

In this paper, a covert communication scheme is proposed for a discrete wavelet transform (DWT) and packetization based image multiple description coding (MDC) system. Firstly, the secret information is embedded in the DWT domain of the carrier image by the parity modulation based method. And then, the DWT coefficient set is divided into 3 subsets, one is the horizontal subset, another is the vertical subset, the other is the diagonal subset. Each subset is compressed with the SPIHT algorithm, and one subset corresponds to one SPIHT stream. Then the SPIHT streams are packed and transmitted through the packet based channels individually. If there are packets lost, the lost DWT coefficients can be estimated by the ones which arrived at the receiver successfully. At the receiver side, the inverse procedures are performed to recover the carrier image and the secret information.

Content Representation of Video sequences Based on Salient Region

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Abstract

In order to provide more efficient content-based functionalities for video applications, it is necessary to extract meaningful regions from scenes as perceptualoriented representation of video content. We present a novel approach for salient region extraction, and simple visual features bound to salient regions will better represent the video content in perceptual manner. Since perceptual saliency for visual information is a subjective concept, a class-related fuzzy information granulation is constructed for mapping original feature space to concepts space. To detect salient regions, segmented homogenous regions are classified according to their salient importance. The experimental results using different types of video sequences are presented to demonstrate the efficiency and accuracy of our proposed algorithm.

Gray Image Compression Using New Hierarchical Self-Organizing Map Technique

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Abstract

This work presents a new hierarchical self-organizing map (NHSOM) to solve image compression problem. NHSOM uses an estimation function to adjust numbers of maps dynamically, and reflects the distribution of data efficiently. Moreover, NHSOM takes splitting LBG to speed up the convergence of SOM, and reduce the training time. Our experimental results show that the proposed NHSOM has good capability in image compression compared with LBG, SOM, HSOM, Modified ART2 and EEMVQ.

ST-ACO: Image Compression Using A New Adaptive Self-Organizing Tree Approach

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Abstract

This investigation presents an adaptive dynamic path selection algorithm (DPTSVQ) based on a self-organizing tree (S-TREE) using the threshold validity, called **ST-ACO**. ST-ACO employs an ant colony optimization framework (ACO) to adapt the nodes' threshold value incrementally. Furthermore, a fixed number of paths might impede self-organization, and result in searching on trap nodes. Experimental results indicate that the proposed algorithm not only generates better-quality decoded images than the S-TREE DoublePath algorithm, but also produces fewer candidate nodes than the MultiPath algorithm. Thus, the ST-ACO contributes hierarchical clusters, reducing the binary tree search bias by dynamic path searching and the adaptive threshold value in each node.

Feature Extraction for Face Image Retrieval

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Abstract
The aim of this paper is to examine the Eigenpaxel and commonly used Gabor wavelet filter in terms of distinguishing capability and robustness with respect to 12 types of variation of a neutral expression frontal face image for retrieval.

Associating Information Literacy with Regulating Rules in Family by Data Mining

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Abstract
The Internet is filled with opportunities for learning, communicating, and sharing information. It is a valuable resource for children and adults alike. Like any large community, however, the online world presents some underlying risks, especially for children. Parents need to be aware of some of the potential problems their children could encounter, and try to take adequate measures to protect their children from injury. In this paper, research will try to explore the relationship between parent's information literary, the confidence in child's ability of self-defense on the internet, and adequate measures to promote child using the internet more effectively. Association rules, a kind of data mining strategies, will be the main tool to manipulate the dataset. Apriori, a classic algorithm for learning association rules, is designed to operate on databases containing transactions.
Keyword: Information literacy, Data mining, Apriori Algorithm

Mining Frequent Patterns Based on IFP_Stream over Data Stream

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Abstract
Due to the characteristics of data stream, the memory space becomes insufficient at once when a large number of data flow into. Hence, how to reduce the memory consumption is one of the beneficial things. In this paper, we propose a new data structure IFP_Stream and an algorithm MFPBI based on this structure. The structure consists of a prefix tree with embedding a novel logarithmic tilted time window and a header table. Much memory space can be saved by merging the nodes automatically. The algorithm MFPBI could be performed only one-pass and the approximate results that exceed the user-defined support count would be produced. The experimental result shows that the

memory using remains more steady.

Evolving Sequential Patterns Mining Model over Click Stream with Levenshtein-Automata ¤

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Abstract

Sequential pattern mining is an important problem in continuous, fast, dynamic and unlimited stream mining. Recently approximate mining algorithms are proposed which spend too many system resources and can only obtain the partial feature of stream. In this paper, a multi-level evolving sequential pattern mining model ESPMM is presented to address this problem thus the mostly entire stream feature is obtained. Furthermore, because of the smaller support of sequential patterns in each level, a mining method BMLA based on Levenshtein-Automata is proposed which builds state conversion model to compute sequences' similarity in linear time. The experiment results show this model is effective and efficient.

Employment Factor Correlation Analysis Using Self-organizing Data Mining Based on GMDH Principle

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Abstract

A new approach is suggested for designing and developing an employment influence factors correlation analysis application where GMDH principle is used for generating it more easily. This approach uses selforganizing data mining importing the concept of evolution based on principle of GMDH and enables the knowledge extraction process on a highly automated level and generates optimal complex model in an objective way. In correlation analysis of employment considering domestic economic factors, model structure is created automatically using self-organizing data mining technology and the internal correlations between these factors are found.

Fuzzy Ontology Model and Its Application in Semantic Web Service

Description and Discovery

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Abstract

Semantic web service makes service representation and discovery more machine-understandable by adopting ontology semantics. However these representations are inadequate to descript and discover services imprecisely requested by human. Fuzzy ontology is an extension of the domain ontology. It is more suitable to describe the domain knowledge for uncertainty representation and reasoning. In this paper, we first construct a fuzzy ontology model based on domain ontology to facilitate fuzzy computation of web service. Then its application to web service description and discovery is presented. Finally, a framework is given to show how to use fuzzy ontology for web service

Key words: semantic web service, ontology, fuzzy ontology, framework

On Sequential Parameter Estimation Problem of Nonlinear Discrete-Time Stochastic Systems

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Abstract

The parameter estimation problem of partly observed nonlinear discrete-time stochastic system is considered. The unobserved component of the system is a qdimensional stable autoregressive process of the p-th order with random parameters, observed in the presence of multiplicative and additive noises. The distributions of all the noises of the system are supposed to be unknown. In the case of Gaussian noises, autoregressive process with drifting parameters is equivalent to well-known in financial mathematics GARCH model. The problem is to estimate the mean of the drifting parameters of the object and variances of the additive noises of the system. Sequential estimators with given mean square accuracy are obtained on the basis of the correlation method.

A Quantification of Students' Coding Style Utilizing HMM-based Coding Models for In-Class Source Code Plagiarism Detection

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Abstract

Measuring similarity among source codes produced in programming class, hereinafter called 'in-class' source codes, for grading or detecting plagiarisms is a laborious task. A special similarity measuring method for in-class source codes is needed because: (1) they are often too short to extract enough algorithmic features, and (2) they naturally have strong algorithmic similarity since they are made for the same purpose, and it is difficult to distinguish plagiarism and coincidental similarity in them. The contribution of this paper is to quantify the features based on students' coding style instead of algorithmic features. We approximate a student's coding style which is superficial feature of a source code by a stochastic model, called coding model based on Hidden Markov Model and use it for authentification information of an author.

A Approach for Text Classification Feature Dimensionality Reduction and Rule Generation on Rough Set

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Abstract

The high dimensional data are frequently met when we apply Web text classification. Mining in high dimensional data is extraordinarily difficult because of the curse of dimensionality. We must adopt feature dimensionality reduction to solve these problems. A attribute reduction algorithm based on rough set theory is given in this paper to reduce the text feature term and extract rule. First, the weight of feature term is made discrete. Then, the decision table is made with weight as the condition attributes and classes of texts as the decision attributes. Finally, the classification rules are extracted by attribute reduction. The method is simple and feasible. It is advantageous in improving the efficiency of the selected feature subset and suitable for high-volume text classification. The extracted rules are easy understand. The accuracy is higher and the speed of classification is faster than the classification based

on vector space comparison. This paper describes the proposed technique and provides experimental results.

Model Learning and Variance Control in Continuous EDAs Using PCA

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Abstract

Estimation of Distribution Algorithms (EDAs) can be viewed as the outcome of the cooperation between evolutionary computation and probabilistic graphical models. In this paper, we review some continuous EDAs based on Gaussian network model and discuss their some known problems briefly. To prevent premature convergence and repair singular covariance matrix, we propose the PCA-EDA algorithm which integrates Principle Component Analysis (PCA) into continuous EDAs with the help of probabilistic PCA (PPCA), a probabilistic graphical model explaining PCA with latent variables. The model learning of PCAEDA consists of principle components (PCs) selection and variables selection in each PC. Moreover variance control can be employed naturally and reliably. Experimental results support that presented algorithm can effectively avoid premature and singular problems.

An ID-based Blind Multisignature Scheme

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Abstract

This paper presents an identity-based blind multisignature from bilinear pairings with the idea of broadcasting multi-signature. The scheme uses identity-based public key instead of digital certification public key. It can omit the process of getting the public key from the system in verifying phase, which improves efficiency of the system and reduces the storage space. We analyze correctness, undeniability and unforgeability of the proposed scheme. The scheme has both the blind signature's anonymity and the multi-signature's characteristics. It could be applied in electronic cash and electronic election.

A Disaster-Oriented Strong Secure File System

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Abstract

Nowadays, humans have a great dependence on computer and network, and the security of computer related to the whole world and everybody. In that case, we should pay more attention about the security and recovery of the computer system. File system is the manager of data in computer. That's the key point of the security of data. This paper made a brief analysis about the existing secure file system, and in view of the problems of these file systems, we designed a kind of disaster-tolerant oriented strong secure file system. This system based on Linux, and we introduced the technology of virtual storage. According to the rationale of stackable file system, we added the layers of audit and monitor, transparent encryption and disaster tolerant to implement a virtual file system which integrated disaster tolerant and strong security. In this way, it can provide a strong security of data which should be controlled.

Exploiting OLP, ILP and TLP of RCBCP

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Abstract

Reconfigurable Clustered Block Cipher Processor (RCBCP) is a fast and flexible block cipher processor. This paper presents the parallelism exploitation of RCBCP. In this paper, Operation-Level-Parallelism (OLP) is put forward. Based on the characteristics of block cipher processing, OLP, Instruction-Level- Parallelism (ILP) and thread-Level-Parallelism (TLP) of this architecture are systematically exploited. In exploitation of OLP, eight reconfigurable computing cells are designed. In exploitation of ILP, five-stage pipeline is designed, and Bypassing in cluster is adopted to resolve data hazards, and Speculation of Taken-Branch is adopted to resolve branch hazards. In exploitation of TLP, Unsymmetrical-Multi-Thread- Mode is put forward. Finally, the result shows that RCBCP can obtain high performance, which can meet the future demand of crypto application.

Information Security Investment Game with Penalty Parameter

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Abstract

The purpose of this paper is to analyze the strategy to promote the information security investment based on game theory. We use game theory to make the analysis and put forward the fruitful strategy suggestions for the defender organization to invest in information security. We set up the information security game model,

and make the Nash Equilibrium analysis. The Nash Equilibrium analysis results of pure strategy and mixed strategy are consistent. By Nash Equilibrium analysis, we get the cost demand for information security investment. If this demand condition is not satisfied, we introduce the penalty parameter to the investment game. By regulating the value of the penalty parameter, we solve the hard problem of information security investment when it is difficult to reduce the investment cost. It is the first time to analyze information security investment by game theory. Our results provide fruitful strategy suggestions to promote information security investment.

A Compound Video Encryption Algorithm Based on Hyperchaos*

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* This work is supported by the National Nature Science Foundation of China (NOS. 60774088, 60574036), the New Century Education Talents project of China(NCET).

Abstract

A new video encryption algorithm is presented, which uses both stream ciphers to generate pseudorandom numbers and block ciphers to do permutation. The multi-dimensional chaotic function is used for the stream cipher encryption while the expanding Cat map is adopted for block cipher encryption. Among stream encryption some choices, such as encrypting DC, AC or motion vector coefficient, can meet different demands of speed and security classification. Over a number of analysis of Visual C++ programs, the new algorithm in this article exhibits an advantage that it can both support the high communication speed and satisfying security level.

Video Compression and Encryption Based-on Multiple Chaotic System+

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Abstract

Different from most of recent studies or research on encryption algorithms based on chaotic system, the paper schemes out multiple chaotic system as an encryption approach not only after compressing video streams but also during the processing of compression frame by frame. The so-called multiple chaotic system actually consists of three chaotic or hyperchaotic maps, namely Logistics Map[1],2-D Baker Map and a 4-D hyperchaotic Map[2].The three secret key encryptions are carried out as partial

encryption when compressing the video data, and as block permutation and confusion after the video compression respectively. The implemented application fully substantiates the favorable efficiency of the proposed scheme such as speedy compression and encryption, overall high security and small size preservation.

Automatic Design Approach of Security Protocols Based on Evolutionary Computation

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Abstract

Security protocols provide the basic guarantee to open network of secure communications, but practice proved that the analysis and design of a protocol is not easy even it is very simple. The paper describes an automatic design approach of network security protocols based on the evolutionary algorithm and BEN logic and illustrates the approach can automatic design large-scale security protocols, such as three-party key agreement etc.

Analysis of the Reasons why Invisible Web can't be Seen and its Effective Retrieval Strategies

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Abstract

Nowadays, Internet goes deep into human beings' daily routines and brings us many remarkable conflicts between mass digital information and our limited capabilities of acquiring them. Search engine thus becomes an important channel of obtaining information. But conventional search engines can index less than 16% of the publicly indexable webs, and the other 84% are "invisible".[1] Moreover, the public information on the Invisible Web is 400-550 times[2] larger than WWW. Thus users are searching only 0.03% of available pages. Therefore, it's urgent to seek efficient methods to solve the retrieval problem of Invisible Web. This thesis elaborates the reasons why Invisible Web is invisible, puts forward several effective strategies of hunting up invisible resources, and expects to bring human beings enlightenment in network information retrieval and utilization.

Detection of Network Attack and Intrusion Using PCA-ICA

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Abstract

The attack detection and information security for computer network become popular topics for many researchers in recent years. In this paper, the PCAICA method for attack and intrusion detection is proposed. According to the experimental result, the proposed method performs higher correct ratio on recognition than the PCA.

(α, t) − Resolution Principle Based on Lattice-valued Tense Propositional Logic LTP(X)

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Abstract

In this paper, four tense operators E, F, G, H, are introduced into LP(X), then extend a lattice-valued propositional logic system to lattice-valued tense propositional logic system LTP(X). In this system, some definitions including generalized literal, T-skolem standard form, are given out. Based on these work, several conclusions about resolution deduction are got. Finally, α -soundness theorem of resolution principle is proved.

Low-Power Double Edge-Triggered Flip-Flop Circuit Design

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Abstract- In this paper, we compare three previously published static double edge-triggered (DET) flip-flops with a proposed design for their transistor counts and power consumptions. The proposed DET flip-flop uses only 12 transistors in addition to the clock driver, and hence requires a small area. Several HSPICE simulations with different input sequences show that the proposed DET flip-flop reduces power consumption up to 85%, as compared to conventional DET flip-flops.

Research and Application of Middleware Technique in Heterogeneous System and Interoperability Environment*

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ABSTRACT
The management and operation of a modern enterprise demands its EIS should have the characteristics of distributive, expansible and reusable. It causes the complication of structure designation of EIS and the prominence of interoperability and data sharing among the heterogeneous systems. Middleware technique simplifies the development of EIS by its own structure characteristic and effectively solves the problem of interoperability of system. In this paper, the requirement of EIS is analyzed and the middleware is introduced firstly. Then EIS structure based on J2EE middleware technique is designed. Finally, an accessing middleware model based on Java technique is designed and interoperability is realized in heterogeneous database environment.
Index Terms—Middleware, J2EE, Heterogeneous Database, Interoperability, Enterprise Information System (EIS)

Optimal Design of a Parallel-Connected SC DC-DC Converter with Fluctuation of On-Resistances

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Abstract

Concerning a parallel-connected switched-capacitor (SC) DC-DC converter, the optimal setting of the duty factor to achieve the best efficiency and the difference in characteristics caused by the fluctuation of on-resistances are analyzed in this paper. The theoretical analyses and circuit simulations show the following results: 1. The converter block realizing a 2/3 mode of operation can achieve the best efficiency when the duty factor . 2. In the parallel-connected converter with two converter blocks, the increase of 20 % in the total SC resistance causes the decrease of 2.2 % in the efficiency when .

Plagiarism Detection Using the Levenshtein Distance and Smith-Waterman Algorithm

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Abstract

Plagiarism in texts is issues of increasing concern to the academic community. Now most common text plagiarism occurs by making a variety of minor alterations that include the insertion, deletion, or substitution of words. Such simple changes, however, require excessive string comparisons. In this paper, we present a hybrid plagiarism detection method. We investigate the use of a diagonal line, which is derived from Levenshtein distance, and simplified Smith- Waterman algorithm that is a classical tool in the identification and quantification of local similarities in biological sequences, with a view to the application in the plagiarism detection. Our approach avoids globally involved string comparisons and considers psychological factors, which can yield significant speed-up by experiment results. Based on the results, we indicate the practicality of such improvement using Levenshtein distance and Smith-Waterman algorithm and to illustrate the efficiency gains. In the future, it would be interesting to explore appropriate heuristics in the area of text comparison

Gender Differences in Cyberlearning

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Abstract

Even women in technical professional programs in a Taiwan university in 2003 continue to be less receptive than men to uses of instructional computing. The pace of adoption of cyberlearning is influenced by gender factors. Although Taiwan is a semi-conductor world leader, university women in technical universities have not been as receptive as men toward Web-based distance learning. This study used cluster sampling, independent-sample t tests, and stepwise regression analysis to determine differences between males and females in a survey adapted from Davis's Technology Acceptance Model (TAM). Research results in 2003 showed that Taiwanese women in technical programs in the Tajen Institute of Technology were more resistant to computing and Web online distance courses than men.

A CMOS Current Mirror with Enhanced Input Dynamic Range

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Abstract

A novel configuration of CMOS cascode current mirror with enhanced input dynamic range was presented. The proposed mirror circuit combines the advantages of wide input swing, wide output swing and large output resistance capability which makes it attractive for low-voltage application. Based on 0.18um MOS model parameters, HSPICE simulation results show that the input current range of 1uA to 1mA with 723MHz bandwidth for the proposed circuit.

Study of Disaster Information Extraction using C/L-band SAR Interferometry

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Abstract

The object of this study is to consider the ground surface displacements that occurred due to the movement of Philippine Sea Plate movements in the adjacent area of Huatung Valley in eastern Taiwan. We have first performed Differential SAR Interferometry (D-InSAR) to clarify crustal deformation activity and estimated the displacement values by comparing GPS measurements to evaluate. According to the results by ENVISAT/ASAR Interferometry. The calculated displacement values ranged between -1.4 cm and +1.4 cm, which coincide on the active fault area. It was clearly appeared that the northern part of Hualien city seem to sunk approximate 20 mm along to the slant range direction. We have also completed to generate L-band ALOS/PALSAR interferograms successfully. Some topographic It is expect to acquire and more detail processing of. Finally, we plan compare with GPS displacements at the hazardous areas.

A Study in Brain Enhancement by Voice Separation Training

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Abstract

With aging, human's brain function declines, and information processing ability becomes weak correspondingly. In auditory field, a kind of new proposed voice separation ability was measured quantitatively, and its relation to age was also found by measurement experiments of 234 subjects. Based on he results, a method of brain enhancement by voice separation training was proposed in this paper. Through three weeks' training experiments, the brain enhancement effects were indicated in three aspects: improvement of voice separation ability, influence to other brain functions, and blood flow change of brain surface. The experiment results showed the validity of this training method, and it is considered that this training method can be possibly applied to early maintenance and recovery of braining cognition deficit.

Multiple Reciprocity Method for Buckling Eigenvalue Problem and Its Convergence Analysis

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Abstract

The multiple reciprocity method for buckling eigenvalue problem is discussed .Compared with other problems, Laplace operator and biharmonic operator are contained in the control equation of the buckling eigenvalue problem , so we must introduce two series of high-order fundamental solution sequences .Using them we can proceed multiple replacements. Then MRM boundary integral expression and MRM boundary integral equation are obtained, and the error estimates, which is the approximate solution of the equation is given. These works provide wide methods and theoretical basis for studying buckling eigenvalue problem.

The Existence and Uniqueness of the Solution for a kind of Second Order Elliptic Differential Equation of Variable Coefficient

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Abstract

In this paper, we consider a kind of boundary value problem of a second order elliptic differential equation of variable coefficient. First, we give the variation inequality which is equal to this boundary value problem, and prove the existence and uniqueness of the solution of the variation inequality of this kind by using Green formula and variation method lemma. Then we can obtain the existence and uniqueness of the solution of the original boundary value problem. Finally, using regularization method, the variation inequality can be formulated as a differentiable variation equation since it includes an item which can't be differentiable. So we can solve the boundary value problem with variable coefficient by translating it to the corresponding variation form. These works provide wide methods and the theoretical basis for studying elliptic differential equations of variable coefficient.

Retrospect and Prospect on the Network-based English Language Teaching and Learning in China

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Abstract

This paper analyzes the advantages and problems existing in network-based language teaching and learning. The result of the research suggests that although there are many advantages in the networkbased language teaching and learning, several serious problems still exist in this field. Meanwhile, the main purpose of the paper is to put forward some suggestions to deal with the existing problems and further facilitate network-based teaching and learning. The result of the research will benefit teachers, students and network designers as well. It is hoped that this study will throw light on network-based English language teaching and learning and give a hint to Chinese educational reform.

Thermal Conductivity of Frost Formation Theoretical Analysis and Numerical Method

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Abstract

The paper presents a theoretical study on the thermal conductivity of frost formation on cooled flat plate under forced convection. Taking the porous medium as a physical model of frost layer, according to the theories of heat and mass transfer, the formula on heat conductivity of frost formation is derived: According to above equation, numerical computing is applied. The paper compares the numerical result and experiment data and gets conformity.

Modeling Hysteresis of the Piezoactuators with Prandtl-Ishlinskii Model

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Abstract

The proposed approach is to design a feedforward controller for piezoelectric motion platform. A Prandtl-Ishlinskii(PI) hysteresis model is proposed for the hysteresis behavior of piezoelectric actuators. This model is more mathematically simple when compared to Preisach operator. The PI operator is more efficient phenomenological fit as it is a first order gradient, rather than a step change. The weights of main hysteresis loop are identified by using LMS(Least- Mean-Square) algorithm. An inverse feedforward controller is to

cascade the inverse PI operator with the actual hysteresis, which is to linearize the hysteresis response. The effectiveness of the proposed method is demonstrated through experimental.

Keywords—hysteresis, Prandtl-Ishlinskii model, piezoelectric actuator, LMS algorithm

Reliability Assessment of Power Systems Based On Element Time Sequential by Bayesian Networks

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Abstract

Bayesian network can represent probabilistic information flexibly, and to make inference on it . With the time sequential simulation Technique, the Bayesian topological structure and the Bayesian bidirectional inference method used in the distribution systems for the reliability assessment, the influence of each element or several elements to the reliability of the whole system can be gained conveniently, and the correlative data that relate to the time and the fault times can be gotten easily as well. Thus the shortcomings of traditional reliability assessment methods are overcomed . According to verification with the models, the effectiveness and advantage of the reliability assessment with the Bayesian network method used in the distribution systems is better.

Algorithm and Implementation of Direct Closed-Loop Identification via Output Over-Sampling Scheme

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Abstract

Identification algortithm and its implementation are considered for direct closed-loop identification through output over-sampling. It is shown that the plant model can be identified from the input and output data obtained by output over-sampling even though the conventional identifiability conditions are not satisfied. Furthermore, its implementation for the controller and measurement device with fixedpoint number is also investigated. The numerical simulations illustrate the effectiveness of the

proposed algorithm for practical applications.

FE-Based Physical Model of LPMBDCM for Integrated Motor Drive System Analysis

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Abstract

This paper introduces an accurate phase variable model with detailed evaluation of the force ripple for the linear permanent magnet brushless DC motor (LPMBDCM) drive system analysis. The mover position dependent variables of the physical model are obtained from finite element (FE) solutions by the cubic spline interpolation. Considering the effect of the snubber circuits in the power electronic devices, a new M-file S-function based model is proposed, with which the LPMBDCM is directly implemented in Simulink using the state space equations. An integrated LPMBDCM drive system including DC power supply, inverter, LPMBDCM and commutation control is developed. Simulation results show that the FE-based phase variable model is an efficient method to establish an accurate and computationally fast model for the integrated LPMBDCM drive system analysis.

Virtual Tree Model Based on Environment Influence and Its Application

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Abstract

With the development of virtual reality technology, simulation of plant growth is a hotspot in virtual reality area. In order to reflect the characteristic features of a particular kind of tree and the influence of environment during the process of simulating tree, this paper proposed an Virtual Tree Model Based on Environment Influence (VTMEI). In addition, this model is deployed to the dynamic forest growing simulation system and different tree species have been simulated to validate the virtual tree model. The application shows that the simulation result can remain more scientific and the dynamic forest growing simulation system can satisfy the need of real-time walkthrough in the virtual forest.

Using Partial Zero Subspace in Deterministic Blind Channel Identification

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Abstract

A new blind channel identification method is proposed in this work. In single-input multi-output channel system, the outputs of subchannels are related to each other due to the fact that all subchannels are driven by an identical source. The famous leastsquares approach exploits such cross relation to identify channels. It is deterministic and naturally able to identify channels driven by color signal. We study the least-squares approach and find a simplifying method by using partial zero subspaces. The new approach is more computationally efficient, because the number of equations to be solved is much fewer. Correctness of the proposed method is proved as well. As it shows, the simplification is not straightforward and is nontrivial. Simulation results are used for illustrating the performance.

Infinite-Horizon Policy-Gradient Estimation with Variable Discount Factor for Markov Decision Process

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Abstract

A novel infinite-horizon policy-gradient estimation method with variable discount factor is proposed in this paper. This method tackles the normal policy-gradient estimation methods' limitations on unbalance of the bias and variance by using an incremental sequence as the discount factor. Numerical experiments conducted on the Markov decision process have shown its effectiveness.

Modeling of Water Displacing Oil Physical Simulation Based on Radial Basic Function Network

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Abstract

An actual physical simulation model was constructed to simulate the course of water displacing oil. Under certain physical property conditions, we simulated the water injection well and the oil well on the physical simulation model, and continuous measured online the oil and water content of different area of model in three-dimensional space using the 512 routes resistivity measuring circuit, then we can obtain large numbers of simulation samples. Considering the issues that the relationship between the remaining oil and every parameters of water displacing oil is a complicated and nonlinear, the radial basic function network was used to establish the water displacing remaining oil model. We construct the structure of radial basic function network, and adopt the K-Nearest Neighbor algorithm and least square method to train the network. The experimental results show that this method is feasible and effective.

Parameter estimation in an autoregression model with infinite variance

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Abstract

A weighted least squares procedure is proposed for parameter estimation in an autoregression model of first order with infinite variance of the noise. It is assumed that the noise distribution function belongs to the stable domain of attraction with index ®, 0 < ® < 2. The proposed procedure is shown to have higher rate of convergence to true value of the parameter as compared with usual least squares estimate. The limit distribution for weighted least squares estimates has been derived. The results of numerical simulations are given.

Discrete Formulations of the BIE without Singularity for the Elastic FM-BEM

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Abstract

Combined with the fast multiple methods, the boundary element method become quite efficient to deal with

large-scale engineering and scientific problems. In this paper, by applying fast multiple expansions, the boundary integral equation about the elastic problem is discrete. In boundary integral equality, because solutions contain singular term $1/r$, which influences the application of fast multiple expansion method, but by applying Laplace transformation, that can be reduced to exponential series. Then this method avoids the singularity of FMM, gets the new discrete equality and provides a new method for theory analysis of FMM.

Decision Fusion Mechanism of Oceanic Sensor Networks based on Fading Acoustic Communication Channel

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ABSTRACT

Automatic target recognition in the atrocious oceanic situation is one of the most difficult areas in oceanic technology. Underwater target recognition based on oceanic sensor networks has been a brand-new research direction. This paper investigates how to use data fusion function of multi-sensor of oceanic sensor networks, and multiple sensors cooperate to fuse different characters taken by radiation noise signals of underwater objectives. In a clustered oceanic sensor networks, sensor members use their observations of the environment to make local binary decisions (H_0/H_1) about whether an event or object has occurred. Local decisions made by local sensor nodes may be lost or corrupted while transmitted to the cluster head. Therefore, each cluster head makes its intermediate decision based decision error ratio and transmission error ratio, and then transmits the intermediate decision to the decision fusion center. Finally, the paper proposes a novel decision fusion mechanism based on Bayesian estimation to obtain optimal decision, where the decision fusion center provides ultimate decision using local decisions of multi-sensor and multi-cluster cooperatively.

PBADaPCo: An Efficient Algorithm Based on Improved Edge Weighted Voronoi Diagram to Detect and Make-up Potential Blind Areas in Wireless Sensor Network

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Abstract

With widely applying wireless sensor network on the aspects of military category and unfrequented area monitoring, secure resource protection, wireless sensor network also brings problems such as sensor energy sources, region coverage and so on. Aimed at the region coverage, from another profile, the paper analyses and explains that the randomicity of sensors broadcast sowing and the limitation of sensor monitoring lead the existence of potential blind areas in the whole wireless sensor network, and proposes the PBADaPCo algorithm to discover potential blind areas and solve the problem of enemy target crossing. By lots of experiment, the feasibility and the validity of the algorithm are proved, and the potential loophole can be made up by corresponding solution.

Keywords-component; wireless sensor networks; exposure; potential blind area; Voronoi diagram

An Optimal Sensor Localization Technology for WSN

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Abstract

A methodology for generating optimal sensor location design for wireless sensor network(WSN) is presented. Location of sensors, cost of measurement and frequency of sampling are important factors that have been incorporated in the sensor network design formulation. The proposed methodology is based on the beacon-less location discovery scheme between the quality of state estimation and the total measurement cost associated with the sensor network. To accommodate different sampling frequencies and evaluate their effect on state estimation accuracy, a unique method is used. In general, higher accuracies of the state estimates are realizable at expense of higher measurement cost. Incorporation of these conflicting objectives of minimizing measurement cost and maximizing estimation accuracy results in a combinatorial optimization problem. The resulting solutions can be then analyzed by the process designer for determining an appropriate WSN.

Remote Real Time Automatic Meter Reading System Based on Wireless Sensor Networks

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Abstract

A remote real time AMR (Automatic Meter Reading) system based on wireless sensor networks is presented in this paper. The useful remote AMR sensors were analyzed and efficient wireless network was suggested. The remote measurement system for water supply is taken as a typical example in experiments. The structure of system employs distributed structure based on wireless sensor networks, which consists of measure meters, sensor nodes, data collectors, server and wireless communication network. For a short distance transmission, the data collector collects data from the water meter sensors using the RF and ZigBee communication. For a long distance transmission, from the data collector to the server, system uses CDMA cellular network. The water meter data are received at the server through LAN using TCP/IP protocol. The proposed system have abroad application foreground in the real application field.

Monitoring Diffusible Event with Point-sensing Sensors

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Supported by Grant No. 2006AA01Z401 and 60673169.

Abstract

In existing work of wireless sensor networks, sensing models, including disk sensing model and directional sensing model, agree that a sensor can cover a specified region around the sensor. In fact, certain type of sensors can only sense the place where they locate. Based on the observation, this paper proposes the point sensing model, where the sensing range of a sensor is limited to a point which is its location. This paper models sensor networks using point sensing sensors to monitor diffusible events, and proposes a series of new concepts. The coverage is redefined as the overlapping of the sensor and the event. As the detecting sensor cannot determine the position where the event originates, then we propose an algorithm which utilizes multiple sensors to collaboratively determine the event cradleland.

Spatial Data Correlation Based Clustering Algorithms for Wireless Sensor Networks

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Abstract

In this paper, spatial data correlations are exploited to group sensor nodes into clusters of high data aggregation efficiency. The problem of selecting the set of cluster heads is defined as the weighted connected dominating set problem. Then centralized and distributed algorithms are developed to select the cluster heads. Simulation results demonstrate the effectiveness and efficiency of the designed algorithms.

Inside Attacker Detection in Hierarchical Wireless Sensor Network

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This work was supported by the Second Brain Korea 21 Project

Abstract

Though the security of wireless sensor networks (WSNs) has been studied deeply, the inside attacks still are very difficult to defend. The inside attacks are not detectable with only the classic cryptographic techniques and the attacks mainly include two types of attack: exceptional message attack and abnormal behavior attack. In this paper, we present an inside attacker detection approach, which can efficiently defend these two types of attack. On the one hand, we distinguish the exceptional message using spatiotemporal correlation and consistency in some spatial granularity (e.g. in one cluster); on the other hand, we evaluate the node behavior via a frequency mechanism. Simulation results indicate that our approach can efficiently detect and defend the inside attacker.

Applying Investment Satisfied Capability Index and Particle Swarm Optimization to Construct the Stocks Portfolio

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Abstract

Weekly data of stocks from Jan. 2006 to Dec. 2007 was adopted in this experiment. The experiment is divided into two stages. The first stage is to adduce Process Capability Indices (PCI) of quality management to develop a new performance appreciation method. Furthermore, investors can utilize $_{PL}C$ to realize individual stock performance rapidly and select the stocks that can achieve their investment satisfaction

degree. In second stage, the Particle Swarm Optimization algorithm (PSO) was applied to these stocks for finding the optimal investment allocation of this portfolio by using the moving interval windows. The result shows that the Ratio of Return of our research is better than The Weighted Price Index of the Taiwan Stock Exchange (TAIEX).

Parameter Optimization of Job Scheduler Based on NQS Simulator

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Abstract

We propose a scientific approach to optimize the system usage with parameter configuration, mainly by developing simulator software for NQS with which the system usage pattern could be virtually simulated with various parameter configurations, consequently makes us possible to see how optimally the system is used with the current configuration. Furthermore this scientific approach is useful to investigate a property of each parameter.

A Critique of the Revised Central City Activation Law of the Optimal Portfolio Model

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Abstract

This paper is a critical look at the revised Central City Activation Law of the optimal portfolio model for the urban stereotypes matrix model. Until now this has been a reflection on the chaotic manner in which support money has be utilized and the “Choice and Concentration” policy used by the government to plan basic strategic measures and decide which ones to use for cities and towns. “Choice and Concentration” is also a term used in the field of finance and management and includes the meaning to restructure. In this paper, I would like to present various models for a revision of the Central City Activation Law and make a critical analysis of the most suitable portfolio model.

The Relationship between Money Supply and Stock Prices

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Abstract

The purpose of the present paper is to contribute further to the literature on stock market – macroeconomic variable linkages for developing economies and, specifically, for the country for Taiwan , Hong Kong, Singapore and Korean. Our results are broadly consistent with the general economic literature on macroeconomic. Our results suggest that exists a long-run equilibrium relationship between macroeconomic policies and stock prices for these four countries, stock prices do not necessarily adjust quickly and fully to the changes in either monetary or fiscal policy in the short run. This paper also represents an important step in addressing the issue of spillover identification between the macroeconomic and the stock market.

Research on Improved EDF Scheduling Algorithm Based on Error

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Abstract

Schedule plays a significant role in networked controll systems of multi-tasks. So it is an important research on scheduling algorithms of NCS. The class data structure of true-time box is introduced at first. On top of that, it is mainly discussed about the improved EDF algorithms. The EDFE algorithm is put forward. It has considered not only characters of the controlled objects, but also the control capability. Finally the simulation example about the EDFE algorithm is done using the truetime box. It is proved that the EDFE algorithm has a better effect on the NCS.

Extension Genetic Algorithm and its Applications

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Abstract

This paper presents a novel classified method that iscalled Extension Genetic Algorithm (EGA). The new method is a combination of extension theory and genetic algorithm (GA). In the past, we used the extension method in some clustered problems. With the method, we had to rely on experiences to set rules on classical domain and weight, which caused to increase two tedious and complicated steps in clustering process. In order to improve this defect, the paper uses the EGA to find the best parameter of classical domain. Through the simulations, we prove that this new method can eliminate try and error adjustment of modeling parameters and increase accuracy of the classification.

Keywords: Extension Genetic Algorithm, Extension
theory, Genetic Algorithm, Classification.

Adaptable Evolutionary Particle Swarm Optimization

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Abstract

In this study we describe a method for extending particle swarm optimization. We have presented a novel approach for avoiding premature convergence to local minima by the introduction of diversity in the swarm. The swarm is made more diverse and is encouraged to explore by employing a mechanism which allows each particle to use a different equation to update its velocity. This equation is also continuously evolved through the use of genetic programming to ensure adaptability. Results from experimentation show that the modified PSO performs exceptionall

Adaptive Genetic Algorithm Based Optimal PID Controller Design of an Active Magnetic Bearing System

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Abstract

This paper proposes a novel adaptive genetic algorithm (AGA) for the multi-objective optimization design of a PID controller and applies it to the control of a real active magnetic bearing (AMB) system. The performances of the AGA are compared with that of the simple genetic algorithm (SGA) in optimizing dynamic responses of the controlled AMB. It shows that because of the proposed AGA can adjust the parameters adaptively according to the value of individual fitness and dispersion degree of population, this algorithm realizes the goals of maintaining diversity in the population and sustaining the convergence capacity of the genetic algorithm. The problems of convergence and prematurity occurred in SGA are then solved. The dynamic model of AMB system for axial motion is also presented, together with experimental and simulation results to verify its availability and good dynamic response.

Research on the Fuzzy Genetic Algorithm Based on Level Characteristics

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Abstract

Fuzzy optimization is common problem faced in productive practice and economic systems, so dealing with the uncertain information involved in it becomes the key point. Based on the level characteristic function, which describes the confidence degree of information with different levels, suggest a set of metric system for describing uncertain information. We propose a kind of fuzzy genetic algorithm based on the level characteristics and point out the implementation steps as well. Theoretical analysis and simulation tests show that this algorithm is of feasibility, operability and could be widely used in many problems.

Virtual Network Environment for Network Administrator Education

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Abstract

User-mode Linux (UML) is virtual environment software being developed for server integration testing buggy software, and so on. However, we have been applying UML to network administrator education, since it has functions for comprising gnetworks. The Linux Network Simulator (LiNeS) is a system that provides an environment for various network training based on virtual networks realized by UML on one PC. Since LiNeS does not require many network machines, unlike conventional network training, we believe that it can become a new learning method in network administrator education.

Astronomy Teaching Resources Management System for Curators using Information Technology

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Abstract

Curators are always searching for the bes teducational method to exploit new technology in their educational activities. Our research group previousl yproduced teaching materials using 3DCG animation in cooperation with the Nagoya City Science Museum. In this paper, we present a system research and development project that comprehensively supports various kinds of astronomy education by curators who can use information technology based on these activities. As a base system of this project, we built a content management system to support online teaching resources delivery in astronomy education for curators. In astronomy education, the most important thing is seeing real stars outdoors. Therefore curators want to support learning for beginners not only in science museums but also at homes and outdoors. Our system provides teaching materials that can be conducted outdoors and linked to planetarium programs. urators used the system in practice and evaluated it
to clarify its effectiveness.

Design of a Web Community for Female Researchers

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Abstract
The number and percentage of female researchers in Japan is very low than other developed countries. How to give them effective support has becoming a noticeable topic in recently years. We design a web community for female researchers which has a community function to promote their communication, a role model function to encourage them to continue their research work. The study is ongoing and future plans are mentioned.

Sketch RR-tree: a Spatio-Temporal Aggregation Index for Network-constrainedMoving Objects

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Abstract
Traffic aggregate information is important for Intelligent Transportation Systems. There are two issues in obtaining such information, one is how to aggregate traffic data stream efficiently, and another is how to process the ”network-constrained” property of the traffic data. This paper solves

this problem by proposing an index structure for network-constrained data stream, which manages the sketch synopses of the moving objects in road network considering their ”network” positions and supports the effective aggregation on road networks. Evaluation shows the new structure can respond to the aggregate queries on network-constrained data streams within small errors efficiently.

Primary Content Block Detection from Web Page Clusters through Entropy and Semantic Distance

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Abstract

A new method named ENP-DOM Tree is propose din this paper, which extends the Document Object Module Tree by adding two properties, i.e., entropy and relativity, to some nodes. Semantic distance is used to extract the primary content accurately from the same source based on three facts: noise blocks always have high entropy property within a given website; primary content blocks are often made up of few link words and many text words; useful links are contained in a useful content blocks and have a close semantic distance with page titles. The proposed method can identify the primary content blocks with higher precision and recall rate and reduce the storage requirement for search engines; thus, result in smaller indexes, faster search time, and better user satisfaction. Extensive experiments are also conducted to evaluate the proposed method by comparison with existing methods. The experimental results show that the method outperforms existing methods with bette satisfying recall rate and higher precision.

Educational Application and Evaluation of Medical Dialogue Visualization Method

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Abstract

We propose a method that visualizes the topic structure of medical interviews to provide doctors with clues found in the complete narratives. We collected 15 simulated interviews in an education field and conducted the following analysis to evaluate the utility of our proposed method. By applying it to the 15 interviews, we classified the following three topics: core, expansion, and local. In review sessions with interview participants, interview contents and flows were supported by the topic structure.

Frame Registration of In-vehicle Normal Camera with Omni-directional Camera for Self-position Estimation

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Abstract

We propose a method for frame registration between invehicle omni-directional and normal cameras aimed at selfposition estimation of a vehicle. We assume that the position of a vehicle is estimated by frame registration between the inputted normal camera images and the ni-directional ideo database with accurate position information. A DTWbased algorithm is used for nonlinear time-series matching because we consider that time-series information contributes to robustness. According to an evaluation experiment, the proposed method showed precise self-position stimation ability.

The Research of Real-time Database Technique used in Power System Dispatcher Training Simulator

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Abstract

Aiming at the defects exists in tradition relationship database real-time application of power system dispatcher training simulator(DTS), this paper
analyzed the constitution of database system in DTS,brought forward real-time database model that composed by the combination of real-time EMS memory base and off-line ORACLE database. Meantime in order to enhance the access speed between EMS memory and database and reduce the utilization rate of CPU, we adopted DMA technique
based on high-speed PCI bus to transmit datum. This paper applied the manner that combines both software and hardware techniques and designed proper DTS real-time database.

Research on Histogram Algorithm for Low Voltage Electrical Apparatus

Switching Arc's Image Enhancement

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Abstract
It's difficult to find contact from the image that was photographed by high-speed image sampling system because of the light reflectiong characteristic of switching arc, contact and interrupter. It do enhancement process to arc image by image enhancement algorithm of histogram and local istogram. In order to find the arc image and on the same time can find contact and the nterrupupter's detail in the arcing process. The simulation result shows that the contace and arc's relative position can be observed clearly by this method

The Model and Simulation of Enterprise Competition Research Based on CAS

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Abstract
Firstly, aiming at the limitation of research onenterprise competition model, we propose the idea to apply CAS(Complex Adaptive System) theory to the enterprise competition. Secondly, refer to the modeling scheme of Holland's Echo model an applied model of CAS-based enterprise competition was built. Finally, according to develop the program of Object-C based on swarm, simulating the dynamic competitive Behavior and evolvement, the result of the simulation was analyzed.

The Design of Long-distance Steam Turbine Generator Rotor Windings Inter-turn Short Circuit Fault Diagnose System Based on VB.Net

Abstract Jiaomin Liu [1], Yi Sun[2]
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This paper had built inter turn short-circuit fault diagnose system of steam generator rotor windings based on the fault criterion of rotor inter turn shortcir uiton-line identification. The frame of diagnose system is introduced, and then the long-distance rotor nter turn short-circuit diagnose system which based n B/S module is built by combining advanced VB.NET echnique's Web Service and SQL Server.

Integrated Local/Global Traffic Network Analysis in a GIS-based System

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Abstract

This paper reports on our development of a IS-based traffic network analysis system, named GIS-based Transport Decision Support System, hich provides a graphical analysis platform to transportation planners and researchers for ransportation network analysis. The system has the functions of designing traffic networks on digital aps and doing traffic equilibrium analysis, as well s a novel function to integrate local detailed tructures of intersections into global networks. The atter is particularly useful for the analysis of large raffic network where the detailed local network tructures of some intersections have to be taken into ccount.

Ubiquitous Experience Media for Computer-Mediated Communication

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Abstract

Ubiquitous experience media (UEM) is the computational edia for experience-oriented knowledge sharing. In his paper, we address its properties and our research approach, escribing its concept and examples as communication edia.

Abrupt Steering Detection Based on the Road Construction Ordinance and Vehicle Acceleration Captured with Drive Recorders

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Abstract

Risky steering operations are detected based on the elationship between the radius of road curvature and oad design speed defined in the road construction rdinance. Vehicle motion while steering is pproximated as a circular motion, and the vehicle rajectory radius is estimated from lateral acceleration nd vehicle velocity captured with a drive recorder ased on a circular motion equation. Steering peration behaviors are evaluated for 203 drivers. xperimental results show that the percentages of isky steering operations estimated for individual rivers correlate with driver risk evaluation scores iven by a risk consulting expert. We also observed ituations of risky steering by recording video alo

Generating Bird's Eye View Images Depending on

Vehicle Positions by View Interpolation

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Abstract

This paper proposed a method for generating bird's ye view images using multi-cameras set in high points t intersections. As the generated images follows own ehicle's motion and includes the vehicle itself, it nables the driver handing the surrounding situations onveniently. Experiments have shown the

An Information Hiding Scheme Using Sudoku

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Abstract

Steganography is the science of secret message delivery using cover media. A digital image is a flexible medium used to carry a secret message because the slight modification of a cover image is hard to distinguish by human eyes. The proposed method is inspired from Zhang and Wang's method and Sudoku solutions. A selected Sudoku solution is used to guide cover pixels' modification in order to imply secret data. Because the number of possible Sudoku solutions is very large, the proposed method is more secure than Mielikainen'smethod and Zhang ndWang's method. From the experimental results, the visual quality of stego images produced by the proposed method is higher than 44 dB in average, which is slightly less than that of related works; however, the embedding capacity of the proposed method is 1.5 bit per pixel, which is greater than that of the related works.

Feature-Based Image Watermarking Resisting Geometric Attacks

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Abstract

This paper presents a novel robust image watermarking scheme for resisting geometric attacks. In the proposed scheme, watermark synchronization is first achieved by the local circular regions, which can be generated using the scale-invariant feature transform (SIFT). Then the watermark is

embedded into each local region in spatial domain by odd-even quantization. In the decoder, the watermark can be extracted using the proposed odd-even detector. Simulations and comparisons have demonstrated the effectiveness of our scheme.

An Adaptive Implementation for DCT-Based Robust Watermarking with Genetic Algorithm

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Abstract

Application for robust watermarking is one of the major branches in digital rights management (DRM) systems and related researches. Based on existing metrics to evaluate the applicability of robust watermarking, it is generally agreed that three metrics, including the quality of watermarked contents, the survivability of extracted watermark after intentional or unintentional attacks, and the number of bits embedded, need to be considered. However, these three metrics conflict with each other. In this paper, in addition to quality and survivability discussed in literature, we take the number of embedded bits into account, thus adding the flexibility in implementation. With the aid of genetic algorithm, we esigned an applicable implementation that will obtain the reasonable quality, acceptable survivability, and practical capacity after watermarking. Simulation results present the practical implementation and possible application of the proposed algorithm.

DCT-basedWatermarking By Quotient-Embedding Algorithm

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Abstract

A simple watermarking scheme based on the discrete cosine transform (DCT) is proposed. To increase the hidden capacity while maintaining the robustness of the proposed method, the authors use quotient-embedding algorithm to hide the secret message in the selected ow-frequency coefficients of a DCT block. Simulations show that the stego-images generated by the proposed method do robustness against image processing operations, such as JPEG2000, JPEG, cropping, processing the negative, quantization, low-pass filtering, noise additions, and so on. Moreover, the PSNR is not bad while the resultant perceived quality and hiding capability are good.

Improved Particle Swarm Optimization and Its Application

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Abstract

In this article, Particle Swarm Optimization(PSO), a powerful competitor in the field of numerical

optimization, is used to optimize the feedback control parameters of equilibrium point about inverted pendulum. Convertional PSO is easy to be trapped in the local minimums. The improved PSO, which th particles trapped in local minimums are initialized by chaotic series to help them break away from local optimum to find optimal solution rapidly, is proposed in this paper. Pendulum is used to check the effectiveness of the above stratagy. So the stabilization of pendulum with the nonlinear system model is investigated. A nonlinear system control strategy based on dynamic design variable optimization with an improved PSO is used to stabilize the pendulum. The simulation results show the validity.

Practical Stability Analysis of Stochastic Swarms*

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Abstract

This paper considers practical stability of stochastic swarm systems. Taking a simple function of mutual attraction and repulsion between the individuals, a stochastic swarm model with and without perturbations is defined. The practical stability of the system is proved. Then, stochastic swarm models with some kinds of perturbations and their corresponding practical stability are discussed. Finally, numerical simulations are worked out to illustrate our theoretical results

Affine Transformation for Swarm Formations by Generalized Ant Colony Optimization*

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Abstract[1]

Any formation change of swarms in the natural environment is one of basic problems of coordination. A new transformation scheme for a man-made swarm formation is proposed, in this paper, by using the algorithms of affine transformation with respect to generalized ant colony optimization (GACO). The affine transformation algorithm can pre-determine target positions for each member of the swarm, while the GACO algorithm can help swarm members find the shortest paths to the positions. The coordinating action between swarm members is obtained by the sense and communication technology, which is equipped in each member. The technology can help the member perceive its neighbors as well as obstacles in the natural environment including a blind area. Therefore, the man-made swarm can change its formation to the new one without any collision. The simulations show that the proposed scheme is effectively used in a sevenmember swarm transformation by Star-Logo.

A Thermodynamical Selection Rule for the Particle Swarm Optimization

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Abstract

The particle swarm optimization, a stochastic, population-based optimization technique, suffers from a phenomenon called premature convergence. That is, the system often loses diversity of the population at an early stage of searching. In this paper, a novel method called the Thermodynamical Particle Swarm Optimization (TDPSO)is proposed, which adopts the concepts of the temperature and entropy in the selection rule, getting a hint from the method of simulated annealing to maintain diversity of the population. The performance of this algorithm is compared to the standard PSO algorithm and experiments indicate that it has better performance.

A Bee Swarm Genetic Algorithm for the Optimization of DNA Encoding

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Abstract

Bee Swarm Genetic Algorithm (BSGA), a new efficient algorithm is developed for designing DNA sequences that satisfy some combinatorial and thermodynamic constraints. In BSGA, the optimum individual of population selected as a queen bee and a random population is introduced to reinforce the exploitation of Genetic Algorithm (GA) and increase the diversity of population. Based on the algorithm, a computer simulation for DNA encoding is conducted and the sequences are better than the previous known systems that can prove the efficiency and convergence of our algorithm.

A Bee Swarm Genetic Algorithm for the Optimization of DNA Encoding

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Abstract

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to reinforce the exploitation of Genetic Algorithm (GA) and increase the diversity of population. Based on the algorithm, a computer simulation for DNA encoding is conducted and the sequences are better than the previous known systems that can prove the efficiency and convergence of our algorithm.

Invariant Topology Snakes Driven by Particle Swarm Optimizer¤

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Abstract

Active contour modelling (ACM) plays a significant role in boundaries extraction or image segmentation. In this paper, we present a method of invariant topology snakes driven by particle swarm optimizer (ITPSO snakes) and its application in ACM. We use some control points on the contour as particles in ITPSO. To avoid intersections and maintain topology of the active contour in the process of ACM, and consider inhomogeneous boundaries, we design a novel scheme to restrict the velocity updates. So the best discovered positions for next round velocity updates are no more computed as in the traditional method of PSO. The experimental results show that the proposed ITPSO snakes can perform well in homogeneous boundaries extraction.

A Decision Making Approach on Strategic Alliance of Photovoltaic Industry

Based on DEA and GM

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Abstract

Facing the era of micro-profit, business making profit and gaining the competitiveness are getting more difficult. Therefore, the cooperation among businesses is the trend in nowadays. Based on Data Envelopment Analysis (DEA) and Grey Forecasting Model (GM), this study proposes a new decision making approach to resolve the issues of strategic alliance. The objective of this research is to provide an effective search to find the right strategic partner when a corporation implementing strategic alliance. Realistic data are collected from Taiwan published stock market. Total 11 companies of Photovoltaic Industry are collected. This paper tries to help target company M to find the right alliance partners. By our proposed approach, the results show the priority in the next three years. The results are sound for enterprises to find the future candidates of strategic alliance by many industry peoples.

An Approach on Alliance for Online Game Industry

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Abstract

As the gradually competition market of online game, many companies are finding new opportunities in strategy alliance for enhance competition and profits and this has become an

important topic in this industry. Based on data envelopment analysis (DEA) and heuristic technique, this study proposes a new approach with a verification technique to resolve the issues. The objective of this paper is to provide an effective approach to find the right strategic partner when an online corporation implementing strategic lliance, as well as the analysis of efficiency after alliance. Realistic data of 10 companies are collected from published stock market of China and Taiwan. Moreover, the proposed verification is used to adjust the final candidate results. This method can support top managers finding the best candidates of strategic alliance.

The Role of Information Seeking Behavior in Newcomers' Organizational Socialization

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Abstract

The primary goal of this study focuses on exploring the relationship between newcomers' information seeking behaviors and organizational socialization. Organizational socialization is a process that newcomers should experience in their work life. In this process many organizational socialization tactics will be provided to help newcomers learn the organizational culture. However, in recent years many researchers thought that an individual should play a pro-active role during his or her organizational socialization process. This study adopts a pro-active perspective to address the role of information seeking behavior in newcomers' organizational socialization. Therefore, the present study hypothesizes that the information seeking behaviors will be positively related to the organizational socialization. A survey from 239 respondents who serve in several organizations was conducted in this study. The results show that a newcomer who has higher frequency of information seeking behaviors is more likely to have higher degree of organizational socialization.

Applying Orthogonal Arrays Method to Solve Fuzzy Interval for Fuzzy

Weighted Average

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Abstract

Fuzzy weighted average, as functions of fuzzy numbers, happens with the problem of multiple Occurren es of fuzzy parameters (weights). Additional fuzziness may be introduced in the -cut arithmetic. This paper based on an improved algorithm, called IFWA, applies orthogonal arrays

method that is a fractional factorial experiment, to analysis weights adjustment. We will show a numerical example and demonstrate the usefulness of the orthogonal arrays method.

Object-Oriented Case-Based Reasoning System for Collaborative New Product Development

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Abstract

The objective of this research is to develop an object-oriented case-based reasoning system (CBRS) to assist engineers collaboratively developing new roducts in shorter time by providing important levant information about the product under velopment. The framework of the system is built pon the product data management system (PDMS). ost of the product data is stored in the PDMS. Only he relevant information is stored in the CBRS. An bject-oriented framework was used to organize the elevant information of the product. The system can etrieve information of the most relevant design comparing the attributes in the cases with the scope of collaborative partners. The pilot implementation isweb centric and Tomcat of Apache Software Foundation is used as the main server tool. The backlight modules in TFT-LCD display design is used as the examples in the pilot system

Case-Based Reasoning System for Forging Process Design

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Abstract

The objective of this research is to develop a casebased reasoning system (CBRS) to assist engineers in designing the forging processes and dies. Forging products are important parts for automotives and other machinery. However, the designs of forging processes and dies to manufacture forging parts are great challenges for engineers. Although there are some CAE tools, such as DEFORM 3D, can be for simulation before the real tools being made, the usage these CAE tools still pose a challenge for engineers. Case-based reasoning system will provide assistance to the design engineers to retrieve the past successful simulation cases. This paper utilizes the CBR tool, myCBR, to construct a case-based reasoning system. myCBR is built upon the ontology tool: Protégé. The are organized in an object-oriented way, which is inherited from Protégé, for easy organization of theexisting cases. Each class would have its attributes stored in the corresponding frame. Users can easily retrieve the most closed case by selecting the proper class from the menu then specified the corresponding values in the frame. A pilot implementation will show the process of the simulation case retrieval.

Vendor Managed Inventory Dynamics Using the Weakest t-norm Based on Fuzzy Number Arithmetic Operations

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Abstract
This paper develops a vendor managed inventory(VMI) dynamics based on the fuzzy arithmetic. The VMI has been used to reduce the "Bullwhip Effect" in supply chain. This research observes and analyzes the phenomena of VMI by system dynamics based on fuzzy arithmetic of the weakest t-norm (TW). The traditional crisp system dynamics has been widely used. However, it is observable that some variables/parameters may belong to the uncertain factors. Therefore, traditional crisp system dynamics may be necessary to be extended to treat the vague variables or parameters. In this paper the research examines the fuzzy arithmetic of TW in VMI and compares the performance of the traditional crisp system dynamics and system dynamics with fuzzy TW arithmetic. The system dynamics of fuzzy arithmetic can provide the extended information regarding the system behavior uncertainties for the decision-makers.

Analysis on Optimal Ordering Policies in Response to a Temporary Sale

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Abstract
We study the paper of Ardalan that published in IIE Transactions for inventory model dealing a temporarily price deduction during the sale period. Many papers had quoted this paper in their reference. Several papers extended Ardalan's model to more realistic systems. However, some questionable results in this paper had not been discussed and then revised. We will point out those questionable results and then provide improved solution.

Lifetime-Based Supplier Selection for the Exponential Model with Censored and Imprecise Information

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Abstract

Since the censored and imprecise information are ubiquitous in the real world, under this fuzzy environment, the supplier selection based on the lifetime for the exponential model is proposed in this paper. The fuzzy estimates ˆ tp L % of lifetime capability indices Ltp of suppliers are obtained according to the approach taken by Buckley [3][4] and the Zadeh's [14] extension principle in fuzzy sets theory. Some optimization problems are formulated and solved to obtain the . -level sets for the purpose of constructing the membership function of fuzzy estimate of capability index for each supplier. The presented methodology takes into consideration an interval of imprecision in the sample data and leads to a three-decision rule with the FLCB decision chart. Finally, a numerical example is illustrated to present the possible application by incorporating the censored and imprecise information into the problem of supplier selection.

Novel Search Engine:Combination of Link and Popularity Rank for Multimedia Retrieval

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Abstract
In contrast with the current search engines that essentially do page-level ranking and searching, we are exploring a new paradigm to enable Web search at image level by introducing a new concept of Popularity-based Rank (PR). This paper introduces PR, a content-level ranking and searching model for multimedia retrieval. Specifically, we establish a PR Operation which is combined with new link structure analysis. The strategy to decide searching order by taking similarity into consideration is also proposed and proved to be effective and efficient. xperimental results show that the combined analysis can achieve significantly better ranking results than naively applying PageRank on the image model.

Retrieval of Three-Dimensional Image from Compound-Eye Imaging with Defocus Using Ray Tracing

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Abstract
A three-dimensional image retrieval method from a compound-eye image degraded byow-resolution sampling and defocusing is proposed. The threedimensional profile of a target object is acquired from parallax images captured by a compound-eye imaging system. The compound-eye imaging is modeled by ray tracing to relate the pixels on the three-dimensional

surface of the object to the pixels of an image sensor. A high-resolution three-dimensional image can be reconstructed by minimizing the difference between the captured image and the image calculated by ray tracing of the modeled composed-eye imaging. The validity of the proposed method is verified by computer simulations.

Robust Detection and Segmentation of Images with Tolerance

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Abstract

In this paper, we introduce a novel approach to retrieve significant spatial images from a collection of images. The query images of interest in this paper are specified rectangular-shaped and circular-shaped as framed photographs. By incorporating the advantages of adaptive thresholding and tolerant partitioning into peak color regions, the proposed method requires low computational complexity and it is very feasible for image detection and segmentation. Peak image regions are then extracted by using color histograms. Since the number of the peak regions is much smaller than that of the image pixels, this proposed method allows a low dimensional image processing. The effectiveness of the proposed method is confirmed through experiments with various images.

Recognition and Textual Description of Human Activities by Mobile Robot

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Abstract

In this paper, we propose a method for recognizing human actions and objects and translating them into natural language text. First, 3D environmental map is constructed by accumulating range maps captured from a 3D range sensor mounted on a mobile robot. Then, pose of a person in the scene is estimated by fitting articulated cylindrical model and also object is recognized by matching 3D models. On condition that the person handles some objects, interaction with the object is classified. Finally, using conceptual model representing human actions and related objects, a natural language expression which is most suitable to explain the person's action is generated.

Mechanism of Formation of Vision based on Learning of Correlation between Sensation and Motion

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Abstract

In this paper, we aim to support the scheme that visual cognition is organized by natural neural networks based on experiences. In this scheme the networks learn correlation between temporal variation of visual stimulation and selfmotion to organize visual cognition. We propose a neural network that detects temporal variations of visual stimulation and combine them with corresponding self-motion. The network does not use any prior knowledge about an image such as optical process of formation or pixels arranged in two dimensional plane. By experiments, we show that the proposed network can combine sensation and motion correctly and can recall pattern of one side by input pattern of the other side.

Measurement of 3D Distance between Artificial Cement-type Cup and Head after THR

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Abstract

The purpose of our study is a measurement of 3D (three dimensional) distance between an artificial cement-type cup and a artificial femoral head in a living patient's body after THR(total hip replacement) from an AP(anterior-posterior) Roentgen image and a lateral image, when the angle between the two images is unknown. Recently we proposed a measurement method for non-cement-type cup. We modified the 3D measurement method for a non-cement cup with evolutionary computation(EC) and extend the framework for a cement-type cup. Our method needs only two times of shots using an ordinary Roentgen equipment without measurement the angle of the two images. So our method is superior to Martell's Method.And it needs no metal balls in a patient body unlike RSA (Roentgen stereophotogrammetric analysis). We show the result of a computer simulation with CG (computer graphics) image we made and the result in vitro with Roentgen images of artificial cup and head moved by a micro-manipulator.

Hierarchical Attention Focusing and a Display Method for Small Mobile Devices

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Abstract

We propose a model of hierarchical attention focusing and its application to a display method for

small mobile devices. First we point out that the visual resolution is low when the attended area is broad and is high when the attended area is narrow. Then we propose a model to obtain saliency which expresses tendency of attracting human attention. Combining these we construct a model which controls attention movement, especially which predicts how attention is focused to an interest object. Based on the model we propose a method to display a large scale image in a small screen of small mobile devices as mobile phones. In this method a region of interest (ROI) is detected using the saliency model and the region is successively zoomed in as if attention is hierarchically focused into the region.

Flatbed-type Three-dimensional Display System as a Tool for Cooperation Working

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Abstract

We propose a flatbed-type three-dimensional (3D) display system for multiple users as an improved version of our previous thin natural 3D display based on the ray reconstruction method. This is a tool for communication around a 3D image among a small number of people. It is a flatbed-type autostereoscopic 3D display system. It consists of a flat panel display and an improved holographic lens array sheet. Its notable feature is the ability to display natural 3D images which are visible to multiple viewers at the same time. Moreover, 3D real images float over the proposed flatbed-type display. Thus, proposed display allows two or more people surrounding it to simultaneously observe floating 3D images from their own viewpoints. The prototype display can be observed a 3D image from two directions, and it consists of an LCD and an improved bidirectional holographic lens array sheet. The number of the 3D pixels in each direction is 27 x 20. Reconstructed two 3D images are superimposed over the display. The reconstructed 3D image can be displayed from 72 mm in front of the display to 72 mm behind of the display. This paper describes a flatbed-type 3D display system, and also describes the experimental results.

Design and Development of a Tactile Shape Display by Optical Switching

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2) Graduate School of Hiroshima Institute of Technology
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Abstract

We have developed a tactile shape display by optical switching. Conventional tactile shape displays have any problems. For example, complex control system, limit of display resolution, measurable amount of electrical power and so on. Our system resolves these problems by optical switching. This technology comes out to parallel processing, super high- speed processing and

high density. In this paper, we show our test bed system and confirmation of the system performance.

Face Recognition System With Distorted Principal Component Analysis And Fuzzy-Gaussian Neural Network

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Abstract

Human face recognition is one of the relative difficult and important issues in the field of pattern recognition , which is significant both in theoretical research and in practical application. This paper present a method of distorted face recognition based on Fuzzy-Gaussian Neural Network (FGNN). At first, this method extracted the eigenface from the distorted images. Based on these extracted facial features, the face drawing is created, which embodies the individual features that the face looks more likely to be so. Secondly, simulating the real transformation of facial images and making corresponding distortions in advance, a series of eigenvector of the distorted facial images are produced. Then the principal components of faces are extracted with Distorted Principal Component Analysis (DPCA), and introduced to train fuzzy neural network. At last, simulation experiment with this method was made. Numerical experimental results on the facial database of Olivetti Research Laboratory（ORL） have shown the effectiveness of the proposed method.

A Study of Relationships among Social Learning, Social Norms and Pro-environmental Behavior

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Abstract

The purpose of this study is to explore the respective influences of social learning and social norms on pro-environmental behavior. This paper focused on military school cadets who will establish and enact the environmental policy of the military logistics of R.O.C. in the future. Total 172 valid samples will be collected and examined. Results indicated that social learning and social norms are positively related to pro-environmental behavior respectively. Several limitations, directions for future research, and practical implications of environmental management will be discussed.

Evaluating Supply Chain Performance Based on Delivery Performance Analysis Chart Approach

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Abstract

On-time delivery is a primary determinant of customer satisfaction in a supply chain. Measuring and improving delivery performance for a supply chain is always desirable to increase competitiveness in the modern business environment. To assess delivery performance of each stage in a supply chain, in this paper, we integrate the process capability index Cpk and Motorola six-sigma quality levels to present a delivery performance analysis chart (DPAC). Based on the plotting points on the DAPC, practitioners can simultaneously visualize some important information such as the delivery accuracy and precision of each stage and provide improvement directions of delivery performance in a supply chain. The proposed methodology is illustrated by an example of an apparel-industry supply chain.

Feature Extraction of EEG Waves

based on Morphological Multiresolution Analysis

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Abstract

Electroencephalograph (EEG) recordings during right and left hand motor imagery can be used to move a cursor to a target on a computer screen. Such an EEG-based brain-computer interface (BCI) can provide a new communication channel to replace an impaired motor function. It can be used by e.g., handicap users with amyotrophic lateral sclerosis (ALS). In this paper, feature extraction based on morphological multiresolution analysis is introduced to discriminate the EEG signals recorded during left and right hand motor imagery, and oddball task. The mixture features in the brain wave signal of single channel is able to separate to various bands. The structural function to decide the filter characteristic is discussed using the experimental studies Keywords: EEG, AR-model, brain computer interface, motor imagery, morphology, multiresolution signal analysis.

Study on the Visualization of the Impression of Button Sounds

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Abstract

A lot of attention has been directed at designing various sounds that are treated as noise, such as automobile ac-celeration sounds and cleaner sounds. The reason is that the idea of sound being a normal part of product opera- tion has permeated society. We focused on sound design and evaluating it for 11 kinds of button sounds. First, an impression was extracted by the semantic

differential (SD) method, and the relevance with a time frequency analysis was investigated. Next, we confirmed whether or not the impression changed when a sound that generated a bad im- pression was processed using adaptive control into a sound that generated a good impression.

Construction of Speech Support System Using Body-Conducted Speech Recognition for Disorders

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Abstract

The number of disorders associated with cancer of the pharynx has recently increased, and many require surgical removal of the pharynx. Although successful recovery has been reported after surgery, most cases develop speech disabilities. A common solution used to deal with such ommunication disorders is esophagus vocalization. However, esophagus speech sounds are not a clear type of speech as they do not provide a sufficient volume of speech or frequency for use in daily life. Here, we report the development of a speech support system using body-conducted speech recognition for cases with such a disability. The system uses two features: body-conducted speech recognition and a sub-word unit transfer function database. The system retrieves speech from body-conducted speech. We used a healthy subject to demonstrate the feasibility of making body-conducted speech clear using the sub-word unit transfer function.

Inspection of Smooth Metallic Surface Using Complex Discrete Wavelet Transform

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Abstract

Currently one of the most time-consuming, costly and important phases of metal products production is the inspection process, in which automated optical inspection and image processing techniques are used to identify production defects. It is difficult to detect defects occurred on metallic surface, especially on smooth metallic surface. The major problems in inspection process involve complex reflections and noise. Based on 2-D Translation Invariant RI-Spline Wavelet Transform, a novel automated defects detection system is developed for smooth chrome-plated ABS resin surface. From encouraging experimental results, it is confirmed that it is possible for automated inspection system to accurately detect defects on smooth metallic surface.

Neurofuzzy Force-based Control in an Ethernet-based Application. A Case Study on a Drilling Process

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Abstract

One way to compensate for the influence of drilling depth on useful tool life while enhancing productivity is to introduce real-time control of the cutting force .This paper presents the design and implementation of a neurofuzzy system for modeling and control of a high-performance drilling process in an Ethernetbased application. The neurofuzzy system is an Adaptive-Network-based Fuzzy Inference System (ANFIS), where fuzzy rules are obtained from input/output data. The design of the control system is based on the internal model control paradigm. Simulation and experimental results demonstrate the suitability of the proposed approach. An overshoot free transient response and a good settling time are obtained, thereby reducing the risk of rapid drill wear and catastrophic drill breakage.

A Virtual Prototype Design Approach of the Embedded Hybrid System①

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① **Foundation item:** Project supported by Nation Natural Science Foundation of China (60674100)

Abstract

In this study, a novel approach designing irtual prototype (VP) of FCS (namely FCS-VP) for the requirement of rapid and reliable development of CS of UAV based on Statemate technology is roposed. The hierarchical function model of FCS is et up with Activity-Charts after introducing FCS ehaviors, and at the end of this paper, a hardware-inthe- oop simulation testbed for FCS-VP is built. esults of experiments show that a mini-scale, highspeed eal time simulation system can be made with he lowest investment, without any loss of system erformance, and at the same time simulation nvironment can provide both intuitive interface and erification/validation to control system design. It is bviously that the research breaks a practical way for he engineering implementation of complex embedded ystems and the application of VP in control systems, nd is much worthy of applying and generalizing.

3-D Sound Source Detection by Binaural Model using Self Organizing Map

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Abstract

In this study, we propose a novel sound localization ethod, in which the feature differences of observation signals btained from the two microphones are used. The features re learned based on the algorithm of the SOM (Self rganizing Maps) and the SOM of 3-D sound source direction

is made. Furthermore, the five kinds of objects sound rom each direction ere used to conforming experiment and he correct answer rate 98.7% is obtained.

Implementations of Robot Visual Servo by Learning

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Abstract

This paper uses learning methods to acquire image eatures from eigen subspace transform and acquire he nonlinear relation between image features and obot control commands through a wavelet function eural network. The stages include data-sampling, odel-learning, and robot visual servo. The servo tage consists of acquiring an image, transforming it nto image features, omputing robot joints by the rained neural network, communicating and ontrolling the robot to move, until the desired image eatures are achieved. Implementations of related lgorithms are given. Experiments are carried out uccessfully on a real robot-vision system.

A Knowledge Based Video Quality Guarantee Method

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Abstract

DiffServ(Differentiated Service) methods are always sed at the edge of network to guarantee the QoS(Quality f Service) . Current label system of DiffServ is static nd not flexible, it is a distinct drawback. In order to acquire ntelligence and improve the Subjective QoS, knowledge ased video quality guarantee model is provided and a rototype system is built. Different from others, our system s a knowledge-centered one. In our prototype system the ideo adaptation is guided intelligently with the knowledge cquired at different phases of knowledge creation process andm,k) model is applied in label design so as to mapping o knowledge . Testing results have shown this system can atisfy the user preference and ensure video quality effectively.
So it is proved that knowledge play an important role and bring more intelligence to our system1.

Creating Depth Map from 2D Scene Classification

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ABSTRACT

Although the depth information of the scene is not stored while taking a picture, some features about the depth information still exist in the captured image. In this paper, we propose a method that generates the depth map of a single image based on scene classification. At first, it classifies the scene of the image into categories according to the color feature; then it generates the depth map of the image by using the related information of the scene category. Depth map contains the

depth information of 2D image and can be used to generate the stereo-image pairs by left and right shifting the original image. The stereoscopic image with threedimensional visual effect can be viewed through a 3D display. The experiments have shown that the proposed method works well and produces good stereoscopic effect.

On Construction of Chinese Medicine Ontology Concept's Description Architecture[1]

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Abstract

This article makes further study on data needed by automatic construction for Chinese medicine ontology concept description architecture, reconstructs and uses recognized knowledge in Chinese medicine's domain by theory and technology of NLP. Based on realizing Chinese medicine knowledge description architecture's automatic construction and acquiring successfully , this article use experts' knowledge to realize au-learning system of limited text's ontology and try exploring domain ontology' evolution .it revolve bottleneck problems of ontology study effectively to lay the data base for Chinese knowledge's dining and use.

Manuscript Status Control Algorithm in Electronic Periodicals

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Abstract

An important issue for the development of electronic periodicals is the design of workflow engine based on the practical paper process in editorial to accomplish manuscript submitting, editing, reviewing, publishing and subscriptions etc. automatically. In this paper an approach based on status control is proposed and its algorithm is presented. The unified management of whole processes for manuscript is completed by decomposition of operation by summarizing and abstracting the relevant activities. Practical test shows that the electronic periodical system based on this algorithm is very practical and flexible.

The Algorithmic Research on the Acquisition of Multiplex Pulse Period

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Abstract
In view of the need to examine the performance of seeding for corn precise seeder, studied has carried on the interrupt examination with a timer to eight group pulse intervals the assembly language procedure algorithm and the hardware circuit, and realized in MCS-51 monolithic computer systems. Proposed the Absolute-Clock and the Relative-Clock's thought; Has found a special time-constant, has avoided in the data treating processes many bytes multiplication and division operation, has guaranteed the examination timeliness; Has solved the time computation error problem when the multiplex pulses simultaneously arrived. Has carried on the analysis to the examination timeliness and the examination data's storage space demand, eight group examination's most greatly realtime errors are smaller than 1ms, saves eight group examination data (each group 500 gap data) to need 8KB RAM space.

Sequential PatternMining for Chinese E-mail Authorship Identification

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Abstract
With the rapid growth in computer technology and popularization of Internet, e-mail has become one economical and convenient form of communication. But different types of crime and civil action involving e-mail documents appear which do harm to people's life and social's stabilization. So the criminal e-mail's authorship has to be identified automatically for the purpose of computer forensic. To solve the problem, the appropriate feature extraction and selection methods are essential. Unlike English and other Indo- European languages, Chinese text does not have a natural delimiter between words. Word segmentation is a major problem in Chinese text processing. So in this paper, sequential pattern feature mining methods were described without word segmentation. The support vector machine algorithm was adopted as classification algorithm. The experiments on limited samples gained satisfying results, which proved that the sequential pattern feature mining methods were effective.

Mining Rules from Stamping Die Designs

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Abstract
To improve the performance of case based intelligent stamping die design systems, an approach based on Rough Set theory is proposed to mine rules from successful design cases. This approach is based on the mapping relation between stamping features and die designs. The mappings from

the attributes of a feature to the related die design constitute the design knowledge. The method extracts the rules from the mapping relationship by applying fuzzy classification and computing attribute reduct. The mined rules can be integrated into traditional RBR systems to provide assistance for the design of a new part. Furthermore, these rules can also be used to speed up the case retrieval process of CBR systems by restricting thesearch space into a subgroup of cases. **Key words:** Stamping Die design, Rough Set, Fuzzy Classification, Knowledge Discovery

Mining the URLs: An Approach to Measure the Similarities between Named-Entities

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Abstract
Measuring the similarity between named-entities is a foundation work for a number of practical applications, such as information extraction, query expansion, etc. In this paper the authors study the similarity measure between two named-entities. Especially, the authors are interested in fine-grained similarity differences between named-entities in one class, such as ”novelist”. Different from previous works on named-entity associations, this paper suggests a novel Web mining method that solely depends on the URLs returned by a search engine using named-entities as queries. The problem of similarity between two namedentities is converted to that of similarity of two URL sets. Evaluations show that this method achieves good results under two experiments.

A New Multi-classification Method Based on Binary Tree Support Vector Machine

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Abstract
Binary tree support vector machine, which combines support vector machine and binary tree, is an effective way for solving multiclass problems. Classification accuracy and decision speed of the classifier relate closely to the structure of the binary tree. To maintain high generalization ability, most separable classes should be separated at upper nodes of a binary tree. And in order to obtain classification results rapidly, levels of the binary tree should be fewer. In this paper, a new binary tree with fewest levels based on clustering method is established. The efficiency of the improved

binary tree support vector machine multiclassifier is proved by the results of experiment.

A Block-Structured Mining Approach from Audit Logs

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Abstract

Contemporary process management systems (e.g., workflow management systems) are driven by explicit process models, i.e., a completely specified workflow design is required in order to enact a given workflow process. Constructing process models from scratch is a complicated ime-consuming task that often requires high expertise. And there are discrepancies between the actual workflow processes and the processes as perceived by the management. Therefore, techniques for discovering process models have been developed. Process mining just attempts to improve this by automatically generating a process model from sets of systems. executions (audit logs). In this paper, a block structured process mining approach from audit logs to support process modeling is designed. Compare with other algorithms, the result of this approach is more visible and understanding of process model. This approach is used to a widely commercial tool for the visualization and analysis of process model.

Problem Solving with Unstructured Information

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Abstract

Learning is an integral part of intelligent agent's problem-solving ability. Most research works on learning assume that information be provided in a complete and well-structured manner and/or when rules are clearly specified. They have difficulties in handling cases with incomplete and unstructured data. This document presents an information retrieval based approach to deal with this difficulty. Preliminary experimental results show that information retrieval can effectively help an agent to analyze and solve the problems encountered.

Simulation and Implementation of High-Performance Collision Warning System for Motor Vehicle Safety Using Embedded ANFIS Prediction

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Abstract

A good driver-vehicle interface needs two functions: (a) how to effectively prevent traffic crash and (b) how to record event data precisely for facilitating the traffic crash investigation after accident. This study is to explore how to realize high-performance collision warning system (CWS), providing the precaution against traffic crash in transit. An embedded adaptive

network-based fuzzy inference system (ANFIS) built in Scale-NAV270 platform was employed to realize collision warning system and we also installed motor vehicle event data recorder (MVEDR). Finally, simulation and verification of the proposed approach were successfully done to achieve better accuracy and more effectiveness on warning operation and event data record to motor vehicle.

Sophisticated Computation of Hardware-Software Partition for Embedded Multiprocessor FPGA Systems

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Abstract

An embedded multiprocessor FPGA system can provide powerful and more functionalities than single processor system. However, the hardware-software partitioning problem is more complex in system design because the system components become escalation. In this paper, we propose a sophisticated computation method (SCM) to solve hardware-software partitioning issues for embedded multiprocessor FPGA systems. The SCM consists of two levels partition which includes processors-fit level and multi-fit level constraints. In processors-fit level, the partitioning results of unsatisfying processor constraint can be rapidly eliminated. Next, multi-fit level constraints compute various system constraints that based on divide-and-conquer and exhaust methods. Experimental results show that our proposed method can rapidly obtain better partitioning results.

A Fuzzy-Rough Set Based Semantic Similarity Measure Between Cross-Lingual Documents

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Abstract

As cross-lingual information retrieval attracts increasing attention, tools that measure cross-lingual document similarity become desirable. Since the way that people convey thoughts at the abstract concept level makes little, if any, difference in the languages they use, it is possible to measure semantic similarity between different lingual documents based on the concepts conveyed by the documents. In this paper, a novel fuzzy rough set based method for measurement of semantic similarity between cross lingual (Chinese and English) documents is proposed. Aided by a bilingual dictionary and Wordnet, translation is processed like word sense disambiguation and all the distilled senses are used to construct a fuzzy approximation space using a fuzzy partition algorithm. In the fuzzy approximation space documents are approximated by their fuzzy upper and lower approximations and

the similarity measure is defined accordingly. The upper and lower approximations correspond to the slack and tight extent of the concepts in their associated document. This method makes possible to distinguish among the documents whose original texts seem not similar but conveyed concepts are similar.

General Model of Multiple Weights Fuzzy Appraisal System

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Abstract
This paper considers the general model involving fuzzy appraisal system based on multiple weights. In evaluation problems, weight is the key factor that influences the final assessment results. Hence, how to find a more objective and realistic way to suit the different weigh system is an important topic. However, in tradition way, the vagueness of linguistic terms used by decision maker, such as important etc., is not considered when assessment of relative weight results. Therefore, In order to obtain more precise aggregate evaluation results, a general model of fuzzy appraisal system based on multiple weights is proposed, in which the linguistic terms are applied. Furthermore, both in the aspect of experts' weight and evaluation structure, two-stage situation are considered simultaneously. In discussion section, it is shown that this general model is not only suit for the two-stage situation, but also for one-stage situation as well.

Scheduling Sporadic, Hard Real-time Tasks with Resources Sharing via Dynamic Voltage Scaling Approach

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Abstract
A new dynamic voltage scaling (DVS) approach to schedule sporadic, hard real-time tasks with shared resource in a power saving way is proposed. Although DVS algorithms have been recognized as a feasible solution to save energy, the scheduling of such tasks has not been fully explored. Thus, in the paper, the problem of power-saving scheduling for sporadic tasks that share a set of serially reusable, single unit software resources is investigated. To evaluate the performance of DVSSR, a real application, Robotic Highway Safety Marker (RSM), is employed. In this application, DVSSR and other DVS algorithms are simulated and compared. Simulation results show that DVSSR offers reasonable trade-off between cost and power savings. In RSM application, DVSSR achieves 92.03% average power savings while comparing with the classic DVS. **Keywords:** hard real-time and sporadic task, resource-sharing, task scheduling, dynamic voltage scaling, power savings

Multiclass Least Squares Auto-correlation Wavelet Support Vector Machines

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Abstract

In this paper, combining the auto-correlation wavelet kernel with multiclass least squares support vector machine (MLS-SVM), a novel notion of multiclass least squares support vector machine with universal auto-correlation wavelet kernels (MLSAWSVM) is proposed. The translation invariant property of the kernel function enhances the generalization ability of the LS-SVM method and the spiral multiclass classification experimental results show some advantages of MLS-AWSVM over MLSSVM on the classification and the generalization performance

A Lightweight, Fault-tolerant, Load Balancing Service Discovery and Invocation Algorithm for Pervasive Computing Environment

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Abstract

With the development of the related technologies and the increasing applications of ad hoc networks, pervasive computing is becoming more and more powerful. In order to achieve the goal of wide use of computing capability at anytime and everywhere, service discovery service must be used in pervasive computing applications. As a very important problem in pervasive computing, there have been lots of researches on service discovery, but the load balance problem has been ignored. While it is essential that services could be found in pervasive computing environment, it is also important that each device that can provide services is load balancing. In this paper, we present a service discovery and invocation algorithm that is lightweight, fault-tolerant and load balancing. From the simulation results, we can see that the algorithm is reliable and robust enough to adapt to the devices limitation and frequent changes of devices in pervasive computing environment.

Towards Automation for Pervasive Network Security Management Using an Integration of Ontology-based and Policy-based Approaches

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Abstract

With the popularity of heterogeneous network devices and security products, pervasive network security management has been a fashion. However, a chief problem lies in how to characterize various attack scenarios from the viewpoint of both security information and security policies for automation. This paper discusses the potential of applying an integration of ontology-based and policy-based approaches to automate pervasive network security management, and then proposes a model in order to validate the feasibility of this integrated approach.

An Expectation Trust Benefit Driven Algorithm for Resource

Scheduling in

Grid Computing

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Abstract

In traditional Grid resource allocation solutions, the jobs with high-quality required may not be executed when they were allocated to low-quality offered nodes because of the separation of trust mechanism and job schedule mechanisms. Therefore, this paper combines the two mechanisms, proposes Grid job schedule arithmetic driven by the expectation trust benefit. The value of the expectation trust benefit function is the prediction benefit of a certain job which executes iGrid. Simulation experiments prove that expectation trust benefit driven arithmetic is better than conversional min-min arithmetic in benefit and it also has a good performance in trust benefit.

Uplink Spatial Division Multiple Access (SDMA) Optimization of Smart Antennas by Phase-Amplitude Perturbations Based on Memetic Algorithms

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Abstract

A novel method based on the memetic algorithm for uplink Spatial Division Multiple Access (SDMA) optimization technique of smart antennas via the phase-amplitude perturbation method is proposed. The array factor formula is deduced to search the optimal weighting vector of the array factor of a smart antenna. In a smart antenna system, one user's signal must be considered as other users' interfering signal. An optimal radiation pattern of a smart antenna can not only adjustably suppress interferers by placing nulls at the directions of the interfering sources but also provide a maximum main lobe in the direction of the desired signals at the same time so that SDMA can be come true. In order to achieve this goal, a new convergent method referred as the two-way convergent method for memetic algorithms is proposed

The Users' Privacy Protecting Scheme Based on Knapsack Problem

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Abstract
In the e-commerce environment, the protection of users' privacy from a server was not considered feasible until the private information retrieval (PIR) problem was stated and solved. In this paper, we propose a one-server PIR scheme based on a knapsack problem, it is more suitable than other previous PIR schemes in the real e-commerce environment. In addition, a security proof to our scheme and comparisons to other PIR schemes are give*n.*

A Full Connection and Less Memory Usage Scheme for Distributed Sensor Networks

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Abstract
In sensor networks, the rare resources are very important, like the limited computation ability, memory size, energy, and communication bandwidth. In the past, several studies either focus on full connection or reducing the memory usage. In this work, we proposed a novel key management scheme which fulfills power control, less memory usage, and full connection. In our scheme, the sink node first generates a key-generation function, and embeds it into sensor nodes. The sensor nodes are then deployed, and they find their neighboring coordinators to generate a permutation of slice numbers. The permutation is then sent back to the sink node. Based on the permutation, the sink node and the sensor nodes can assemble into a common program for deriving their common key. The proposed scheme is simple, efficient, and secure, if the sensor nodes cannot be compromised within a threshold time bound.

Object Localization Based on Global Structure Constraint Model and Optimal Algorithm

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Abstract
We present a novel object localization approach based on the Global Structure Constraint model (GSC) and Optimal Algorithm. In GSC, Objects are described as constellations of points satisfied

with their specific global structure constraints. The spatial relations among all the patches having stable color information and their representative color information around patches are encoded. Then, the searching algorithm, i.e. genetic algorithm, is used to locate target objects in images by finding out the exactly matched position. In the experiment, we tested the approach on a collection of human face images and the results demonstrated the approach is simple, effective and efficient.

Test paper problem solved by Binary Ant Colony Algorithm

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Abstract

Through analyzing the mathematical model and objective function of the composing test paper, this article abstracts that the composing test paper model is really a multi-objective linear programming model, and the binary ant colony algorithm is introduced to solve the problem. Owning to the adoption of the binary coding, each ant chooses the subject or not only need to according to the strength of the pheromone on every edge, and the requirement for the behavior of every single ant is lower, so the corresponding memory is relatively less. Experimental results demonstrate that the algorithm can solve the test paper problem quickly and effectively, and also has practical value.

Improved minimum-range approach to blind extraction of bounded sources

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Abstract

Although minimum-range approach to blind extraction is proved reliable in theory, it has disadvantages in its optimization algorithm. A new optimization algorithm is proposed by this article. Compared with the original algorithm, the new algorithm needs no parameters, guarantees fast and reliable convergence. Simulations illustrate the efficiencies of the proposed algorithm.

Optimization Matching of Sensor and Weapon System Based on Geometric Programming

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Abstract

The matching of sensor and weapon system is important for the whole combat system. Combat system would have the optimum efficacy only if the indexes of sensor and weapon system attained

to the best matching status. A method of optimization matching of sensor and weapon system based on geometric programming was given. This method means to construct a GP model, the target function of which would be the system entire efficacy calculated by power index method, and the constraints of which would be the transformed matching requirements of key indexes that affect the system entire efficacy. Then a typical application example of a certain naval gun weapon system was presented. The optimization matching of the sensor and weapon system was solved conveniently by this method. It can be a new way for the optimization matching of sensor and weapon system.

The Learning System of Intuitionistic Optimum Based on Hesitancy Set

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Abstract
The paper describes intuitionistic optimum models for attribute selection of optimum and non-optimum and deals the intuitionistic learning system of analyzing sub-optimum with the degree of knowledge understanding and credit degree of intuitionistic feature. Attribute selection of optimum and non-optimum is performed under both supervised and unsupervised learning. The task of non-optimum analysis is done using a knowledge-based system under supervised learning. The methodology for attribute selection involves minimization of hesitancy set evaluation indices, defined in term of hesitancy function, in connectionist framework. Keywords: non-optimum, hesitancy set, intuitionistic optimum, learning system of intuition

Simulation based Analysis of Queueing Property for Continuous Self-similar Traffic

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Abstract
The research for self-similar traffic is classified into four categories; measurement-based traffic modeling, These works for queueing analysis are important in the establishment of basic performance boundaries by investigating queueing behavior with long-range dependent input. The purpose of this research is to explore queueing properties for self-similar traffic using the network simulator with different conditions, and clarify the causes of different features focusing on the bottleneck link. We generated two typical traffics with Pareto distribution on ns-2 simulator and observed queue size, then following properties were extracted. When the On/Off traffic transmissions obeys the Pareto distribution, self-similar traffic consumes more queue resources than short-range dependent traffic. On the other hand, when the transmitted file size obeys the

Pareto distribution, self-similar traffic consumes less queue resources than short-range dependent traffic.

Performance Simulation of Routing Protocols in Ad Hoc Wireless Network

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Abstract

In ad hoc mobile networks (MANET), the mobility of the modes is a complicated factor that significantly affects the effectiveness and performance of ad hoc routing protocols. Mobility and traffic patterns for each node such as intermediate and end nodes are restrained to extract features of each routing protocol. In this paper, we focus on the performance of the routing protocols for stationary end nodes in ad hoc networks using a network simulator (NS-2). Our simulation results explore following four performance features. Firstly, the high speed degrades in terms of AODV RREQ sending packets merely on the density of 10 nodes per 100 square meters. Secondly the high speed exceeding 15 m/s creates more RREP sending packets over dense node conditions. Thirdly, the number of DSR RREQ to send packets increases by 40 % compared to that of AODV. Finally, the DSDV protocol shows the inefficiency in terms of the node speed and the dense node condition.

Entropy based Analysis of Anomaly Access of IP Packets

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Abstract

To defend DoS (Denial of Service) Attacks, the access filtering mechanism is adopted on the end servers or the IDS (Intrusion Detection System). The difficulty to define the filterin rules lies where normal and anomaly packets have to be distinguished in incoming packets. The purpose of

our research is to explore the early detective method for anomaly accesses based on statistic analysis. In this paper, we firstly define the entropy-based analysis, then analyze the amount of incoming packets to our collage. As the results, we were able to extract the following features for the entropy analysis. Firstly, entropy-basedanalysidetect distributed small amount of 80/TCP anomaly accesses compared to the frequency-based analysis. Secondly, one hour window size is most sensitive to find the 80/TCP anomal accesses. Finally, after applying the filter of noisy accesses of ICMP anomaly packets for total amount of data sets, entropy-based analysis detects small amount of ICMP anomaly accesses.

Improving the Shim's AuthA Password-Authenticated Key Agreement Protocol

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Abstract

In 2007, Shim pointed out that AuthA protocol which is in the process of being standardized by IEEE are vulnerable to chosen protocol attacks and then suggested some countermeasures against the attacks. In this paper, we demonstrate another vulnerability of Shim's improved AuthA protocol and then present an improvement to repair the security flaws of the protocol. Keyword: Cryptanalysis, Password-authenticated key agreement protocol, AuthA protocol, Dictionary attacks

DoS Attack Impact Assessment based on 3GPP QoS Indexes

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Abstract

Attack impact assessment is an important research in attack test and evaluation. Focusing on the end users' actual quality of service, a user-centric DoS attack impact assessment model based on 3GPP QoS indexes has been proposed. This model is a threedimensionaldenial of service degree assessment model.Based on the model one arithmetic has been proposed to measure the degradation of one service' QoS. Experiments demonstrate that the threedimensional DoS attack impact assessment is simpleand can capture the quality of service of end user.

The Exchange and Integration of Heterogeneous Data with Uncertainty for Emergency System

Abstract

Aimed at the puzzle to realize exchange and integration for heterogeneous data, this paper proposed a sort of data exchange model of heterogeneous database based on middleware unified platform. Based on the mapping of model drive, the data exchange could be realized by a concrete model. Its thought was to express XML document being a tree composed by data object, in which each element type corresponded to an object in object pattern, namely there was mapping among patterns. The paper gave an example of power emergency processing system, theapplication effect shows that the speed of emergency event processing can enhance five to ten times and it is able to realize the exchange and integration for heterogeneous data easily.

Predicting the Total Workload in Telecommunications by SVMs

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Abstract

As a learning mechanic, support vector machine (SVMs) has been studied and applied in a wide area. This study deals with the special futures of SVM in predicting the total workload in telecommunication. The contributions include: (a) Building a predicted model of the total workload in telecommunications and predicting using it; (b)Analyzing the parameter of support vector regression(SVRs) which influence performance of SVRs. (c) Experiments demonstrate that SVM in this paper outperforms the others methods in this area.

A Real-time Exhaust Monitoring System based on NDIR and ZIGBEE

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Abstract

A real-time exhaust monitoring system that based on NDIR and ZIGBEE is proposed in accordance with the Lambert - beer Law and the fact that gas could absorb infrared ray selectively. There are several characteristics of this system. First, a new non-dispersed infrared gas sensor with electro-modulated infrared photo-source is used, and the mechanical modulator that commonly appears in traditional method is saved. The application of a pyroelectric infrared sensor integrated with high-precision interference filter could be the second feature. The third feature is that a dual-wavelength single-beam technique is applied in the monitoring system. Meanwhile the characteristics and application of ZIGBEE in wireless detecting system is described. The real-time exhaust monitoring system is introduced in detail.

Application of Petri Net Model to Lot Scheduling in SteelWorks

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Abstract

Petri net model is a widely used versatile tool which can represent a discrete event system such as mechanical sys- tem, communication system and production system. A va- riety of optimization problems can be formulated as the optimal firing sequence problem for Petri Nets, because this model is excellent in generality and in expression abil-ity. However, when the size of the targeted model becomes large, the calculation time to solve the optimization prob- lem is remarkably increased. We have already proposed an approximation method that achieves the efficiency improve- ment in the solution procedure by decomposing the Timed Petri Net. In this paper, we apply this proposed method to lot scheduling problem in steel works and the utility of this method is verified.

Research of Plant Domain Knowledge Model Based on Ontology

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Abstract

Simulation of plant growth is a hotspot in virtual reality area. In order to improve the level of knowledge sharing and solve the problem that the shape of plant is difficult to describe, a plant domain knowledge model based on ontology is provided in this paper. After analyzing the knowledge of domain ontology, this paper describes an ontology model of the plants domain knowledge using related botany knowledge. Plant domain ontology is divided into two parts in the model, plant knowledge and environment knowledge. This paper uses Protégé as the tool for the plant domain ontology description and store the plant domain ontology in the form of OWL files The description of the plant domain ontology can be used in the plant growth evaluationsystem.

Supply Center Planning Model Using Fuzzy-AHP and VRP

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Abstract

This research is concerned with a new method of optimizing the design of the supply center for public service considering the locations and service levelbased on Fuzzy-AHP and service level of service facility using VRP (vehicle routing problem) is one of the evident areas of important points in the design of public service facility. This research is concerned with the development of decision method of location number of public service facilities with minimum travel distance (with optimal service level). We developed a 3-step facility planning based on VRP, fuzzy-AHP, and stochastic set-covering method in the view of: 1) optimal decision of service facility types using AHP (analytic hierarchy process) as a multi-attribute structured analysis method, 2) finding the optimal number of service facility and those locations with minimum travel distance using set-covering problem, and 3) these procedures are shown by visual outputs based on visual VRP.

The computer program is developed and demonstrated the computational results. It is known that the proposed method is very effective on a set of test problems.

Make Your Research in Logistics Effective - Research Methods -

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Abstract

This research is concerned with the method of "how to publish papers in good journals?", and "how to find a good research topic?" This paper includes the description of Introduction to research methodology with New Idea – Theoretical Study – Application Development – Results of Research – Reporting. Also it includes the Extension of Habitual Domains, Value Engineering and Analysis, Publishing papers in good journals. For the understanding the journal before submit the paper, we visit the journal website to look for detailed instructions and describe the detail results by journals and its quality mean table with several examples. This research is expected a good tool for the authors and reviewers of papers.

Network Design for Strategic Alliance in Express Courier Services

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Abstract

Recently, the demand for the direct shipment of purchased goods by express couriers has increased as the result of an explosive growth in e-tailing, telemarketing, and TV home-shopping industries. However, since too many express courier companies have been emerging over the last several years, competitiveness for market share is very severe among them. This study suggests a network design model for strategic alliance in order to overcome the circumstances in hot express courier service market. We propose an integer programming model and a solution procedure based on maxmin criterion. To demonstrate practicality and efficiency of the proposed model and solution procedure, a numerical example is derived and tested.

Profit-based Network Design in Express Courier Services

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Abstract

The success of express courier services often depends on both how to assign service centers to consolidation terminals and how to extend their cutoff time (deadline) for direct home deliveries

coordinated by service centers near customers. This study suggests an approach to design express courier service networks with respect to assignment of service centers to consolidation terminals and extension of their cutoff times. We propose an integer programming model and a genetic algorithm based solution procedure that allows express couriers to maximize their incremental profit. To demonstrate the practicality and efficiency of the proposed model and its solution procedure, we performed an example problem with reduced data sets from an express courier in Korea.

An Adaptive Evolutionary Algorithm for the Operation Sequencing with Precedence Constraints

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Abstract

The precedence relationships between the operations are important constraints in planning and scheduling of manufacturing systems and project management. This paper presents a method to obtain a global solution for operation sequencing with precedence constraints which are one of the most influential factors in the performance of planning and scheduling problems. An integer programming model is proposed for the operation sequencing with precedence constraints. And an adaptive evolutionary approach for the problem is developed by employing the adaptive genetic operation functions to obtain a good solution for relatively large problems in a reasonable computational time. Computational experiments for the model are performed and the results are analyzed.

An Improvement of Sui et al's Second ID-based Key Issuing Protocol

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Abstract

In 2005, Sui et al. proposed two separable and anonymous ID-based key issuing protocols, and claimed the key-escrow problem has been solved in their second protocol. However, in this paper, we point out that Sui et al's second protocol dose not solve the key escrow problem either by presenting impersonation attack. Further, we present an improvement to resolve such problems, in which KGC1 (or KGC2) confirms a user's identity by a short signature signed by the user's password key.

Qualitative description and reasoning of topological relation in three-dimensional GIS

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Abstract

Topological relation is invariant under continuous transformations of space, which incarnates the global characteristics of entity. The topological relation is an important spatial relationship in GIS. The three-dimensional space can be described with the simplex model, and a complex entity can be divided into simplexes whose dimensions are equal to or less than the dimension of entity in GIS. The topological relations among 0-simplix (point), 1-simplex (line), 2-simplex (triangle), and 3-simplex (tetrahedron) in the three-dimensional GIS are described with the 9-intersition matrix model. Topological relations that the 9-intersection matrix can classify are 11 topological relations between lines, 13 topological relations between line and triangle, 11 topological relations between line and tetrahedron, 18 topological relations between triangles, 9 topological relations between triangle and tetrahedron, and 8 topological relations between tetrahedron. Base on the set theory, the qualitative reasoning of topological relation is studied, whose results are listed in the composition table.

Robust Control and Stability Analysis of Fuzzy Large-Scale Systems

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Abstract

This paper investigates the stability andstabilization problems for a class of fuzzy large-scale system whose state variables are unavailable. T-S fuzzy model are utilized to approximate the nonlinear system, and an observer-based output-feedback controller is designed, some sufficient conditions of the closed loop system are derived based on Lyapunov function and in terms of a linear matrix inequality

problem (LMIP).

Adaptive Fuzzy Fault-Tolerant Control for Uncertain Nonlinear Systems

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Abstract

A robust fault-tolerant adaptive fuzzy control design scheme for a class of perturbed and strict feedback nonlinear systems with actuators fault is proposed. The design is based on backs tepping and dynamic surface technique. The continuous robust term is adopted to minimize the influence of modeling error or disturbance and the fuzzy logic systems are used to approximate to the nonlinear functions of systems and the fault functions. Meanwhile, we incorporate dynamic surface control technique into the design framework, and the “explosion of complexity” problem is avoided. By theoretical analysis, the closed loop system is proven to be uniformly ultimately bounded, with tracking error converging to a residual set. Simulation results demonstrate the effectiveness of

the approach.

Controller Failure Analysis for T–S Fuzzy Systems with Time-varying Delay via

a Switched Approach

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Abstract

This paper deals with the problem of controller failure analysis for T–S fuzzy systems with time-varying delay. The T–S fuzzy systems can be stabilized by a pre-designed state feedback controller. Our objective is to establish conditions concerning controller failure time and frequency, under which the systems still keep exponentially stable. Based on piecewise Lyapunov functional method, exponential stability of such systems is guaranteed. All the results are presented in terms of linear matrix inequalities (LMIs). An example is provided to demonstrate the effectiveness of the proposed technique.

Fuzzy Controller of Single Intersection based on Video Traffic Detection System

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Abstract

Currently, Intelligent Transportation System has been becoming the focus of the society. The Video Traffic Detection System discussed in the paper plays an important part in the ITS, and the image processing technique is used in this system to obtain all the information that is needed in the traffic signal control. On the basis of a new fuzzy control method, the article analyses the problem of traffic signal control in single intersections, proposes the multiple phase fuzzy control algorithm and designs fuzzy controller which takes motorcade's lengh and the next phase difference of motorcade lengh as the fuzzy control variable, thereby creating a real-time, accurate, highly effective and comprehensive transportation system. The simulation result indicated that this plan approaches human's decision-making process, surpassed the timed control, can effective ly alleviate the jam of intersection.

Traffic Flow Prediction Based on Hierarchical Genetic Optimized Algorithm

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Abstract

The forecast of short-term traffic flow in timely and accurate is one of important contents of intelligent transportation system research. Based on the related knowledge of wavelet analysis and fuzzy neural networks, this paper proposes the fuzzy wavelet neural networks control method. It takes wavelet function as fuzzy membership function, uses neural networks to realize fuzzy reasoning, and finishes the estimate of next cyclical traffic flow. Simultaneously the hierarchical genetic algorithm is used to optimize the network structure and the parameter. After the field data test, this method is high precise, stable and compatible.

Research on the Optimal Assignment of Traffic Signal for Isolated Intersection in Intelligence Transportation System

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Abstract

This article proposed a new method using Genetic Algorithms to optimize Real-time fuzzy control. This model has less input parameters, less rules. And it has advantages in both time and space complexity. It is easy to control, and has no restriction of experience knowledge. This method is applicable to Real-time system applications. The simulation result indicates the Fuzzy-Genetic Algorithms Optimizing control method delays in the time in the vehicles compared with the traditional timed control method greatly is the improvement.

Interval Type-2 Fuzzy Reasoning Models and Algorithms

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Abstract

This paper first gives the definition of interval type- 2 fuzzy sets, then investigates two interval type-2 fuzzy inference models and gives fuzzy reasoning algorithms under the type-1 Mamdani fuzzy reasoning algorithms, respectively.

Studies of Voltage Stability Based on SVC Control

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Abstract

A fast method for determining the static voltage stability of modern power systems with Static Var Compensator (SVC) is proposed in this paper. Static Var Compensator is an important component of flexible AC transmission system, which provides an effective approach to enhance voltage stability and to increase the power transfer capability. This paper discusses the effect of SVC controller on voltage stability Based on Generalized Tellegen's Theorem. Meanwhile a practical criterion for static voltage stability is presented, The method determines the maximum power transfer limit by finding the critical value of equivalent impedance model by the reactive compensation. The application on an IEEE 30 bus system shows that the proposed method is a feasible and effective way to improve voltage stability, it can provide useful information for the operators to analyze

and control voltage stability on line.

Adaptive Fuzzy Robust Control for Nonlinear System with Dynamic Uncertainties Based on Backstepping

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Abstract

In this paper, a fuzzy adaptive backstepping design procedure is proposed for a class of nonlinear systems with three types of uncertainties: (i) unknown nonlinear functions; (ii) uncertain nonlinearitie ; (iii) unmodeled dynamics. The fuzzy logic systems are used to approximate the unknown nonlinear functions, nonlinear damping terms are used to counteract the uncertain nonlinearities. The derived fuzzy adaptive control approach guarantees the global bounded property for all the signals and the states and at the same time, steers the output to a small neighborhood of the origin.

System for Recognition of Chinese Medical Pulse Signal Based on Wavelet Analysis and Back Propagation Neural Network

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Abstract

Presently the system for recognition of Chinese medical pulse condition mainly aims at single pulse signal; the investigation of compound pulse signal is less. Article mainly researches single pulse signal and compound pulse signal. Firstly, we use wavelet analysis to extract character of pulse signal. Secondly, we make use of the nerve network to recognize. It constructs a considerably practical system for recognition of Chinese medical pulse signal based on wavelet analysis. Not only does the system own a good identify rate to single pulse condition, but also it can be more accurately to classify compound pulse condition. The experiment of many samples proves that the method has many advantages, foe example: the recognition rate is high and the speed is fast.

Manufacturer's Return Policy for Two Risk-averse Competing Retailers

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Abstract

This paper studies the manufacturer's return policy and the retailers' decisions in a supply chain consisting of one manufacturer and two competing and risk-averse retailers under a single-period framework. The manufacturer sells her short-life-cycle products through two competing retailers, and the product demand is random and sensitive to the retailers' selling prices. We incorporate the risk measure CVaR into the supply chain model to characterize riskaverse retailers so that the retailers' decisions are based upon risk minimization rather than expected profit maximization. We also model the interaction of the manufacturer and the retailers as a manufacturer-Stackelberg game in which the manufacturer acts as a Stackelberg leader, and the retailers act as followers and engage in a simultaneousmove subgame. We conduct a numerical analysis, focusing on identical retailers and a particular demand distribution, and discusses the effects of risk aversion on the chain members' decisions and profits.

Exponentially Weighed Moving Average Control Chart for Gamma Distribution with Type I Censoring

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Abstract

In this article, an exponentially weighted moving average (EWMA) control chart for monitorin the mean level of the gamma lifetimes under the type I censored test is developedbased on the conditional expected values. Because the control limits are hard to be found analytically, an algorithm is provided such that the control limits can be determined numerically. The use of the proposed method is illustrated by a numerical example.

Progressively Interval-censored Life Test with Acceptance Sampling

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Abstract

Considering the producer and consumer risks, the paper develops acceptance sampling procedures under the progressively interval-censored test with intermittent inspections for the exponential lifetime model. The proposed approach allows removing surviving items during the life test such that some extreme lifetimes can be sought, or the test facilities can be freed up for other tests. A reduction in testing effort and administrative convenience can be achieved by employing the proposed approach. One example is introduced for illustration.

Fuzzy Application on Rule Space Approach and Graphic Knowledge Structure Representation for Equality Axiom Concepts

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Abstract

The purpose of this study is to provide an integrated methodology of fuzzy approach on rule space and graphic knowledge structure analysis. The authors adopt fuzzy c-means based on the information of latent trait and standardized caution index of students, which are from item response theory (IRT) and S-P chart respectively. This method is similar to the utility of rule space, which is provided Tatsuoka, but it is fuzzy clustering in this study. Another characteristic of this study is the graphic representation on knowledge structure by fuzzy structural modeling (FSM) and it is an individualized knowledge structure analysis. The clustering results and individualized knowledge structure analysis could provide important information for remedial instruction.

Simulating Fuzzy Numbers for Solving Fuzzy Equations with Constraints

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Abstract

This paper investigates the possibility of applying genetic algorithms (GAs) to solve fuzzy equations

without defining membership functions for fuzzy numbers, neither using the extension principle, interval arithmetic, and α-cut operations for fuzzy computations, nor using a penalty method for constraint violations. Two famous fuzzy optimization problems are used to illustrate the effectiveness and robustness of the proposed approach. The empirical results show that the GA approach can obtain very good approximate solutions within the given bounds of each uncertain variable of the problems.

A Steering Vector Estimation Algorithm in Uncalibrated Arrays

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Abstract

The projection rotation scaling algorithm has perfect performance for estimating the steering vectors of uncalibrated isotropic sensors. But orders of the estimated steering vectors have randomicity in the algorithm. This paper presents a new steering vector initialization and signal subspace forming method. The method not only improves performance of the projection rotation scaling algorithm especially in low SNR conditions, but also can eliminate the randomicity of the orders. Numerical stimulations are provided to prove the effectiveness.

CF Graphs Category and its Product and upper Product

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Abstract A B

The concept of category came from the research of system science, which not only needed discuss the property of system itself but also the relationship between different systems. So we need to trade the system as an entirety and use the theory of category. Category is a basic concept of homological algebra and is created by Eilenberg and Maclane in 1945, has been applied to many fields of mathematics[1]. They use the language of category to depict elements of theirs and research its property. In this paper, we introduced category into graph and bring out a new concept of CF (classic and fuzzy)graph category based on the concept of homomorphism between two graphs which keeps the connexity of vertexes, and discussed its property of isomorphism and bring out the concept of product and upper product of it.

A New Classification Method for Computational Intelligence _

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Abstract

This paper introduces the Simulation-Mechanism-Based (SMB) classification method for Computational Intelligence (CI) based on computational mechanisms of CI branches and existed classification methods. This SMB classification method divides all CI branches into three categories: organic mechanism simulation class, inorganic mechanism simulation class and artificial mechanism simulation class, which offers a instructional concept for further study on CI.

Reliability Evaluation for Interconnection Planning in North East Asia

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Abstract

This paper proposes reliability evaluation for interconnection planning using a tie line constrained equivalent assisting generator model (TEAG) that considers uncertainties of interconnected transmission systems and tie lines. Development of this model was triggered by the need to perform probabilistic reliability evaluations on the NEAREST (North East Asia Region Electric Systems Tied) interconnection. The TEAG is a basis for the newly developed interconnection systems reliability evaluation computer program, INTEREL. The model is capable of considering uncertainties associated with generators, tie lines, and the tied grids. Reliability evaluations for six interconnection scenarios of the actual power systems of six countries in the Asian north eastern region were performed using the INTEREL.

Insulation Condition Assessment Using Wavelet Analysis and Statistical Techniques

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Abstract

This paper presents wavelet analysis and statistical techniques for insulation condition assessment of equipment. In this study, the specific fault is made and placed on the terminal joint of a 25 kV power cable and the deterioration phenomena is accelerated by the overvoltage method. The deterioration phenomena of the internal insulation material are explained by wavelet analysis and Statistical Techniques using partial discharge (PD) current pulse waveforms. Them aximum PD amount and the rise of the average discharge amount are shown before its breakdown, but the discharge numbers and the equivalent time-length of partial discharge current pulse waveforms are on the decrease, which means the large amplitude of current pulse and the short of equivalent time-length on the final stage of PD. The effectiveness and feasibility of the proposed method have been demonstrated.

Hybrid Intelligent Approach for Load Control and Management

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Abstract

This paper presents a hybrid intelligent approach for load control and management in deregulated power systems, which integrates direct load control (DLC) with interruptible load management (ILM) to provide instantaneous reserves for ancillary services. Fuzzy dynamic programming is used to satisfy customers' requirements and yields a near optimal pre-scheduling of the DLC. Then, the energy payback associated with the DLC is further eliminated by the adaptive control strategy, which exploits interruptible loads to modify the DLC schedule in real-time. The proposed algorithm was practically tested on the Taiwan power (Taipower) 38-unit system with 20 airconditioner loads and 15 interruptible loads. The outcomes reveal that an exact amount of instantaneous reserves can be successfully acquired, and the results are robust against dynamic disturbances of the power system.

A Model for Supply Chain versus Supply Chain Competition¤

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Abstract

In today's global market,where the concept of supernetwork is well accepted, it is quite reasonable to assume that members in a supply chain can form a uniform interest community through appropriate coordination mechanisms. Basing on this assumption, we choose profit-maximization of a supply chain alliance as the criterion to analyze the multi-supply chains competition behaviors, and then establish the equilibrium conditions of this system. Nash negotiation model is used to solve the problem of profit division among members within the supply chain. Finally, a numerical example is given to show the rationality of the model. Keywords: supply chain; supply chain competition; variational inequality problem

Fuzzy Correlation Analysis, With an Application to the Transient Well Test

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Abstract

One purpose of a well test is to get reservoir parameters. The problem is how to analyze the transient well test parameters and find relationship between them. We present an effective method to analyze the correlation between the well test interpretation parameters, which is a combination of grey correlation analysis and fuzzy clustering. In particular, we use grey correlation analysis to describe the correlation between parameters, and use fuzzy clustering method to divide them into different categories according to the degree of the correlation between all parameters. A simple example shows the algorithmic strategies to implementing them. In the example, we consider six parameters and each of them contains 92 data points. The example presented in this paper shows that it's a flexible and cost-effective quantitative analysis method for transient test parameters analysis, it is particularly suitable for analyze relevance of time series data.

A Probabilistic Reliability Evaluation of Korea Power System

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Abstract

Reliability and power quality have been increasingly important in recent years due to a number of black-out events occurring throughout the world. This paper presents a practical method of probabilistic reliability evaluation of Korea Power system by using the Probabilistic Reliability Assessment (PRA) program and Physical and Operational Margins (POM). The case study computes the Probabilistic Reliability Indices (PRI) of Korea Power system as applied PRA and POM. It takes a large number of contingency in load simulations and combines them with a practical method of characterizing the effect of the availabilities of generators, lines and transformers. The effectiveness and future works are illustrated by demonstrations of case study. The case studies of Korea power system are shown that these packages are effective in identifying possible weak points and root causes for likely reliability problems. The potential for these software packages is being explored further for assisting system operators with managing Korea power system.

Creditor's Optimal Contract in Inventory Pledge Loan

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Abstract

This paper examines the optimal interest rate and loan to value (LTV) according to the price risk and liquidity risk of collateral in inventory pledge loan. Under endogenous default probability and symmetric information assumption, solve the value of interest rate and LTV maximizing creditor's expected revenue confined by market structure. The main conclusion is that explicit interest rate and LTV ratio of optimal contract both increase as liquidity risk increases, whereas price risk has reverse effect for normal distribution. Numerical examples prove these conclusions on the whole and fit with reality roughly.

Marketing Risk Evaluation of Supply Chain

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Abstract

The supply chain enterprises are interdependent, and must work in coordination. Any problem that occurred in any link would influence the entire supply chain. Authors summarized the main marketing risk sources in the supply chain and constructed evaluation indicators. In the thesis, the risk causes in supply chain marketing are categorized as quantity causes and fuzzy causes, which are also analyzed and evaluated through AHP(analytical hierarchy process). Finally, authors comprehensively evaluate the whole work. Keywords: Supply Chain; Indicator system; Marketing Risk; Comprehensive Evaluation

SA-RBAC: An Innovative Role-based Access Control Model Introducing Selfauthentication Mechanism

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Abstract

According to the existing problems in access control model: privilege abuse and neglecting high security grade of sensitive information in practical application, an innovative access control model SARBAC is proposed in this paper. It introduces selfauthentication mechanism into the Reference RBAC Model. A theoretical description of self-authentication mechanism is given at first, and the follow is a systematical formal presentation of SA-RBAC on the base of Core RBAC Model. Several key issues on the new model are discussed as well.

A Replenishment Model for Emergency Rescue Systems

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Abstract

This paper aims to develop a decision-making tool that can be used by government agencies in managing emergency rescue supplies and distribution to forge an effective emergency rescue network. Due to geographical differences, there are two kinds of emergency rescue system: with a replenishment source (WS) and without replenishment source (WOS). In this paper, a collaborative replenishment model for coordinating the rescue activities between storage of WS and storage of WOS after the disaster happened by using multi-objective mixed integer programming method is constructed, which features two objectives that minimizing the total costs and the total travel time to improve time-satisfaction during the planning period. The proposed models are solved by using efficiency coefficient method. Finally, results of a numerical simulation are presented and directions are given for future research. Such a collaborative replenishment of emergency rescue network has a better capability to support decision-making of government agencies in both theory and practice. **Keywords:**

Emergency rescue, Replenishment model, Time-satisfaction, Efficiency coefficient method, Collaboration

Application of Plant Growth Simulation Algorithm on Solving Discrete Facility Location Weber Problem

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Abstract

Based on Plant Growth Simulation Algorithm (PGSA), we propose a bionics algorithm for solving facility location problems. We compare the calculating results of PGSA with Genetic Algorithm (GA) for distribution center location problem, and the result approves PGSA is better than GA on accuracy. Further more, selecting 50 customers randomly, we solve Weber location problem with different facility numbers. Differed from other heuristic algorithms, PGSA can find global optimal solutions. Meanwhile, according to the different facility numbers, we combine global and local optimal solutions, set up optimal facility location arrangement as a whole. The algorithm herein shows its accuracy, astringency and generalization. It is an actual application of PGSA on solving location problems.

Knowledge Representation for Disruption Management Problems in Urban Distribution Decisions□

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Abstract

A knowledge representation framework called BIDDGPO representation method, for the disruption management problems in urban distribution decisions is presented, based on the analysis of the real-time problem-solving process. This knowledge representation framework combines four existing knowledge representation method, hierarchical, state space, procedural, and production rule to represent all knowledge that is needed in the process of real-time disruption management. We use a real-world case, unexpected customer's increased demand as a disruption to instantiate the proposed method. The proposed method can support different disruption management problems in the way of real-time reasoning and modeling by different contents. **Keywords**: knowledge representation, disruption management, dynamic vehicle routing problem

An Improvement to CNCP in Large-Scale Muti-Agent System

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Abstract

Contract Net Protocol (CNP) and its extensions (CNCP, ICNP) have been widely applied to task allocation in Muti-Agent System (MAS). However, when being applied to Large-Scale MAS (LSMAS), they expose shortcomings such as low efficiency and large information amounts. To solve this problem, an improvement to CNCP was proposed in this paper, In which a method for deciding the bidding threshold of participant was designed, so does a general definition formula of participant's DoA (Degree of Availability) and its weight coefficient, then a new bids evaluation function was given. At last, three groups of experiments were conducted to simulate the process of task allocation in Large-Scale MAS, each of them run both CNCP and the improved CNCP, results show that the improvement proposed in this paper can enhance the performance of CNCP in LSMAS effectively.

Investment in Collaborative Commerce Chain Systems based on option game

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Abstract

Many companies that seek to jointly build a Collaborative Commerce Chain System (CCCS) with their supply chain partners face a challenge to estimate the investment value while the attitude toward the participation is full of uncertainty. This research provides an option game valuation approach that clarifies the investment uncertainties by analyzing the expected revenue, cost, and time to the market for the au pair and cooperative partners, and the relation between the partners in CCCS is au
pair and cooperative other than traditional IS. This paper analyzed how investment and effort level of partners impact investment occasion based on real-option and principal-agent theory, which found that the success of CCCS is lied on the cooperation between supply chain partners, although, there are some problems like 'ride free' and 'adverse selection' in the process. The research attempted to find what bring the puzzle and how to solve it.

Bottleneck Machine Identification for Shop Scheduling Problems

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Abstract

A bottleneck machine identification algorithm is proposed for the job shop scheduling problem to minimize total tardiness. The scheduling policies for bottleneck machines can have significant impact on the final scheduling performance and therefore need to be optimized with more computational effort. In order to describe the characteristic information concerning bottleneck machines, we devise an optimization-based procedure which reasonably alters the scheduling constraints and use it to compute the bottleneck characteristic values. Finally, a genetic algorithm based on hybrid encoding schemes is used to verify the effectiveness of the proposed method, and it is proved that intensifying the local search operations for bottleneck machines will generally result in higher solution quality for the job shop scheduling problem.

Aggregative Assessment Method for Sampling Survey with the Linear Order Character of Symmetric Fuzzy Linguistics

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[4]

Abstract

Traditional sampling survey via questionnaire is difficult in reflecting interviewee’s incomplete and uncertain thought. Therefore, if we can use fuzzy sense of sampling to express the degree of interviewee’s feelings based on his own concept, the result will be closer to interviewee’s real thought. In this study, we propose a model with the linear order character of symmetric fuzzy linguistics for sampling survey to do aggregated assessment analysis. The proposed fuzzy assessment method on sampling survey analysis is easily to assess the sampling survey and make the

aggregative evaluation.

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Abstract

Traditional sampling survey via questionnaire is difficult in reflecting interviewee’s incomplete and

uncertain thought. Therefore, if we can use fuzzy sense of sampling to express the degree of interviewee's feelings based on his own concept, the result will be closer to interviewee's real thought. In this study, we propose a model with the linear order character of symmetric fuzzy linguistics for sampling survey to do aggregated assessment analysis. The proposed fuzzy assessment method on sampling survey analysis is easily to assess the sampling survey and make the aggregative evaluation.

Using Fuzzy Genetic Algorithms to Solve Fuzzy Inventory Problem

Huey-Ming Lee [1)], Jin-Shieh Su [2)], Teng-San Shih [2)] and Ching-Fen Fuh [2)]

In this paper, we present a fuzzy inventory problem and apply genetic algorithm to solve it. We derive the cost function in the fuzzy sense, and solve the nearly optimal solution by genetic algorithm. In this paper, we present a fuzzy inventory problem and apply genetic algorithm to solve it. We derive the cost function in the fuzzy sense, and solve the nearly optimal solution by genetic algorithm.

Some Analytical Properties of Expected values of Fuzzy Variables with Parameters

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Abstract

In many fuzzy programming problems, the objectives and constraints may consist of some expected values of prescribed fuzzy variables. Therefore, analyzing the properties of those expected values is helpful to solving the problems. The objective of this paper is to deal with some analytical properties of expected values of fuzzy variables with parameters. First, some continuity theorems are derived for the properties of continuity and semicontinuity of the expected values. Then, A differentiation formula of the expected value with respect to the parameter is established. The results obtained in this paper are useful in fuzzy programming models.

Exposure Analysis of RMB Exchange Rate in Business

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Abstract

The objective of the paper is to estimate the impact of asymmetric RMB exchange rate volatility on investment. Since the new policy of RMB exchange rate was executed in 2005, the exchange rate of RMB is

more fluctuant than before and difficult to forecast. The methods of real options and binomial decision trees are introduced in the paper to test the nonlinearity of RMB/USD exchange rate. Monthly data of exchange rate between RMB and US dollar during past 6 years are analyzed as an example. Finally, a real options approach is used to evaluate the exchange rate influence under the hypothetical situation that most of the firms can change the currency composition after a certain adjustment period or with the adjustment costs. The result indicates that options theory can provide useful financial hedges for the economic exposure management by bringing out the adjustment costs.

A New Parallel Session Attack to Khan-Zhang's Authentication Scheme

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Abstract

In this paper we review Lin-Lai's authentication scheme and Khan-Zhang's improvement to Lin-Lai's scheme. We also review Rhee-Kwon-Lee's attack to Khan-Zhang's scheme. We find that Rhee-Kwon-Lee's attack can be realized but has to hazard the attack because the identity of the attacker may finally be recognized. We introduce a parallel session attack, which can also successfully impersonate a legal user, however, without having to hazard the possibility of exposing the attacker's identity. In addition, less information is required to lunch this attack. This illustrates the deeper vulnerability of Khan-Zhang's scheme.

Representative-Based Diversity Retrieval

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Abstract

Recently, case-based reasoning has been widely used in electronic commerce by providing product recommendations that are most similar to user's needs. However in some cases, the most similar recommendations are not necessary the ones most acceptable or useful. There is a growing awareness of the need for providing alternatives to similarity-based retrieval, alternatives that attempt to improve the recommendation diversity. In this paper, we present a new retrieval algorithm which is able to optimize the trade-off between similarity and diversity. Experimental results show that the proposed algorithm can achieve a better overall quality than other approaches.

A New Video Semantic Model Based on 3D C-string Knowledge Representation

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Abstract

Modeling object's semantic knowledge has attracted increasing attention in the area of video content management. In this paper, we propose a video semantic model to get the higher-level semantics of spatial relation changes between the objects in a video represented by a 3D C-string, which represents the lower-level information of spatio-temporal relations, motions and size changes of the objects in a video. We use the concept of finite automata to record the transitions of objects' spatial relations. From the final states of the finite automaton, the higher-level semantics of spatial relation changes between the objects in a video can be inferred. **Keywords**: Video semantic model, Video content management, Spatial relation, 3D C-string

A Profiled Malicious Bidder Behavior Model Based on SOM Algorithm

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Abstract

Since malicious shill bidding behaviors changes frequently, we need a profiling mechanism to profile malicious bidders' behaviors. In this study, we apply the Self-Organizing Map (SOM) based on shilling features to propose a profiled malicious bidder behavior model. Via this model, the auctioneer can realize the changed malicious bidder behaviors and devise detection method for detecting malicious bidder by the profiled malicious behaviors.

A Novel Music Retrieval System with Relevance Feedback

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Abstract

Although various researches have been conducted in the area of content-based music retrieval, however, few works have been done using relevance feedback for improving the retrieval performance. In this paper we introduce a novel content-based music retrieval system with relevance feedback. It enables users to search favorite music files by introducing the user as a part of the retrieval loop. In our system, we used a radial basis function (RBF) based learning algorithm and a method exploited both positive and negative examples to reweight feature components. Experiments evaluate the performance of the proposed approach and prove the effectiveness of our system.

ETX - A language for processing of XML data by ET rules

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Abstract

Recently, following its standardization, utilization of XML has been increasing. As a result, various methods and tools have been proposed and developed for the processing of XML data. We propose to process the XML data using ET (Equivalent Transformation) theory's D-rule. In this paper, using past proposal as a foundation, we will examine simplification, speed-up, and the construction of a new processing system ETX (ET+XML).

Adaptive Control Design of Band-pass Digital Filters by Poleplacement Approach

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Abstract

This research proposes poleplacement approach to achieve adaptive control design of band-pass digital filters. Digital control concept is deployed in the design scheme for practical computer control use. Frequency transformation is current well known skill to transfer low-pass prototype filter into another desired filter. It is a mathematical methodology to have the passband change. Here, poleplacement approach is used to shift poles of the original low-pass prototype filter to the desired poles location so that a new filter which has the desired passband and the desired cut-off frequency can be obtained. This control process provides the filters potentially possessing adaptive performances. The filter responses of frequency transformation and the responses of poleplacement control approach are also compared to show the feasibility of this design. **Key words:** adaptive, digital, band-pass filter, control design, poleplacement.

Unbalanced Analysis of Changing Medium-Voltage Distribution Feeders from Open-Loop to Closed-Loop Arrangement

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Abstract

This paper presents an analysis of the unbalanced operating situations of a medium-voltage distribution

feeder whose arrangement is changed from an open-loop to a closed-loop type. First, asample system involving an open-loop distribution feeder is constructed. Second, the sample system is modeled and simulated by the OrCAD PSpice simulation software. The transformers and feeders in the sample system are all modeled in coupling-free equivalent circuits via the decoupling technique. Finally, unbalanced operating situations of changing medium-voltage distribution feeders from an openloop to a closed-loop arrangement are analyzed.

Implement of a Cascade Integral Sliding Mode Controller for a Water Tank Level Control System

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Abstract

In this paper, a cascade integral sliding mode control for a water tank level control system was proposed to realize level position regulating and tracking control. The key feature of this control scheme is use of cascade back-step design method for the cascade nonlinear water tank level system to improve the control performances. The validity of the proposed control scheme is verified through practical testing on an experimental tank level system device. In the cases of step, multi step, and sinusoidal level position command inputs, the test results show that the proposed control scheme is capable of improving the tracking precision.

Implementation of Wireless Image Tracking for Wheeled Mobile Robots

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Abstract

This paper is concerned with the control of a novel wheeled mobile robot using a FPGA-based proportional-plus-integral-plus-derivative theory and the wireless image tracking technique. The structure of the manipulator contains a wheeled mobile robot, a multi-link robot, several motors, interface circuits, infrared sensors, and drivers. All these components cooperated to make the transport of the refreshments a success in the restaurant building. The main chips of the wheeled mobile robot and the remote control system are Altera EPM1270T144C5 and EPM3064ALC44-10 respectively. We successfully implement an autonomous wheeled mobile robot by the proposed controller. Moreover, to illustrate the effectiveness of the finished product, we set a movement which contains tray-carrying, autonomous movement, and tray-placing. The autonomous movement was executed by PID controller. Furthermore, the image tracking system carried out the actions of tray-carrying and tray-placing. Experimental result validated that the image tracking technique and PID scheme can be used well in the application of wheeled mobile robots. **Keywords** ：A Wheeled Mobile Robot, FPGA, PID Control, Wireless Image Tracking

The Adaptive Control Applied to the Analysis of the Excavator

Dynamics

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Abstract

In this paper, a study of the adaptive control applied to the excavator arm is proposed. Actually, the excavator arm can be considered as a 3-D link arm, which structure is wildly employed in the engineering. Due to the existing of the non-constant parameter term in the dynamic equation when arm is moving, it is important to design a controller to stabilize a system under commands such that the trajectory of the arm can follow the desired path. By proposing the adaptive control law, it is shown our goals can be achieved. Keywords: Non-constant parameter, Adaptive

Three-Phase Line Flows Calculation for Distribution Automation by ZBUS Distribution Factor

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Abstract

A new sensitivity factor which is called ZBUS distribution factor (ZBDF) to calculate active and reactive three-phase line flows for distribution automation is proposed in this paper. This method is associated with both the changes of individual phase-active and-reactive power injection at each bus into the three-phase real and reactive power line flows. Hence, the proposed ZBDF reflects load changes to the line flows, while the loading conditions change from the base case loads. Accordingly, the existing implicit ZBUS Gauss method is applied to solve for the base case three-phase power flow (TPPF). Based on the power flow solutions, the ZBUS matrix, the primitive line impedance, and the changes of the individual phase-active and-reactive power at each bus, the three-phase line flows for distribution automation are determined accurately and rapidly from the presented method without any iteration. Finally, a sample system is used to verify the developed approach. The numerical simulation results demonstrate that the proposed method not only provides high-speed computation, but also can be applied to distribution automation.

Optimal Design of DC-DC converter with LC Snubber by Hybrid Method

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Abstract

In this paper, it is first proposed that genetic algorithm and Taguchi method can be employed in the

optimal design of DC-DC converter with LC snubber. The purpose of this optimal design is to lower the spike voltage of power switch and hence reduce the cost in manufacturing circuit. It is great educational value for students and engineers. For the first step, we investigate the circuit parameters which will affect and subsequently converge the range of circuit parameter value by means of genetic algorithm, and conduct the optimal design of prototype converter with Taguchi method. Compared with spike voltage of non-optimal design circuit, the effect of optimal design is revealed. In suppressing spike voltage, the measured from optimal design circuit is 115V, and is actually 28.1% reduced. Therefore, using genetic algorithm and Taguchi method in the optimal design of converter with LC snubber is a more economic, practical and efficient of circuit design, which meanwhile can be easily applied to other electronic circuits and accomplish the optimal design of various

Digital Control Design of Decentralized Stochastic Singularly-perturbed Large-scale Actuator Type Systems with Multiple Time-varying Delays

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Abstract

This paper develops an optimal robust control algorithm for finding digital computer control of decentralized stochastic singularly-perturbed large-scale actuator type systems with multiple timevarying delays. Due to the derived algorithm concerns at each moment, the found controller is also suitable in the time varying condition. Moreover, this system possesses the fast response characteristics of the subsystems. The system order can be reduced and the analysis process can be simplified. . This noise-disturbed, time varying and multiple delay system can be often seen in practical computer controlled large-scale systems such as electric power systems, communication networks, cyber networks, and aerospace systems. Finally, the optimal cost ialso obtained. **Key words**: control design, decentralized, stochastic, singularly-perturbed, multiple time-varying delays.

Fault Adaptive Control for RUAV Actuator Failure with Unscented Kalman Filter

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Abstract

A new fault adaptive control methodology against the actuator failure is proposed. The actuator failure modeling are introduced to denote the actuator healthy Coefficients (AHCs) and the Unscented Kalman Filter (UKF) is employed for on-line estimation of both the flight states and the AHCs parameters of rotorcraft UAV (RUAV). In this paper, The functionality of the approach has been illustrated through experiments on the Shenyang Institute of Automation RUAV platform SIA-Heli-90 and the results show that the proposed method is an effective tool for actuator fault adaptive control of RUAVs.

A Research on Establishing A Network Structure of International IP Video Conferencing and Evaluating the Multi-site Real-time Interactive Courses with Schools Around the World

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Abstract

The aim of this study is to understand the actual results of the implementation of installing distance video curriculum information network software and hardware, the development of English language distance video teaching curriculum and material based on energy education, and the establishment of synchronous video curriculum teaching activities. Based on the requirement of long distance video curriculum teaching activities, study on quasi-experiments, expert conferences, focused group discussions and surveys with questionnaires were used as methods of study. The students enrolled in NDSHS (hereinafter referred to as NDSHS) English course were selected as subjects for the study. They participated in multiple parties transnational multiple video curriculum teaching activities with schools from the United States of America and Japan. They experienced the beauty of cultural diversity and energy education; applied their creative thinking, problem solving, and the ability for teamwork skills. Hence, they have opened the gate of opportunity for international educational and academic exchange.

Generating Wide FOV Video without Ghost based on Multicamera Setup

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Abstract

This paper proposes a method for generating wide field-of-view (FOV) videos without ghost. Wide FOV videos can be obtained by using multiple cameras in fixed relative positions. First, a sequence of images is synchronously captured from multiple cameras withoutspecially designed lens. Next, perspective transformation, image stitching and image blending are used to generate the seamless frames of wide FOV videos without ghost. Finally, wide FOV videos can be obtained by using frame seriating. Experiments show that the proposed method yields good results of wide FOV videos.

Apply an Adaptive Center Selection Algorithm to Radial Basis

Function

Neural Network for Face Recognition

Abstract

In general, the principal component analysis (PCA) technique is applied to reduce the feature dimensions. In this paper, different from traditional PCAs, the PCA is used to select adequate centers for the classifier of radial basis function neural networks (RBFNN). In addition, a novel weights updating method is also included in the RBFNN for face recognition. The specific design, not only increases the convergent speed, but also retains generalization ability. Experimental results show the proposed method has high recognition rate with a short training time. **Keywords:** principal component analysis, radial basis function neural network, face recognition.

A New Bayesian Classifier for Skin Detection

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Abstract

Skin detection has different applications in computer vision such as face detection, human tracking and adult content filtering. One of the major approaches in pixel based skin detection is using Bayesian classifiers. Bayesian classifiers performance is highly related to their training set. In this paper, we introduce a new Bayesian classifier skin detection method. The main contribution of this paper is creating a huge database to create color probability tables and new method for creating skin pixels data set. Our database consists of about 80000 images containing more than 5 billions pixels. Our tests shows that the performance of Bayesian classifier trained on our data set is better than Compaq data set which is one of the currently greatest data sets.

An Effective Shot Boundary Detection Algorithm for Movies and Sports

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Abstract

The shot change is the _rst step of video segmentation. Therefore, designing an ef_cient and low-complexity shot change detection becomes a signi_cant issue. In this paper, we propose a simple and effective approach to detect abrupt shot changes based on interframe difference

algorithm. Our approach can decrease false/miss caused by fast object motion and abrupt screen _ash effectively. In order to increase the accuracy of shot change detection and decrease the complexity of computation, a novel method are developed to deal with those problems. The experimental result shows the validity of our proposed methods which provide not only a higher detection rate but also a faster computation speed to the shot change scenario.

On the Security of Reversible Data Hiding Based-on Histogram Shift

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Abstract

Recently, Hwang et al. (HKC) proposed a simple improvement reversible data hiding scheme based on the histogram shift. They claim that the read don't send any additional information to the receiver in their scheme. However, it will generate an informal distribution in the histogram when the secret data is embedded into a cover image. In this paper, we will use this defect to propose a method to show that HKC scheme is impractical. In other words, any adversary is also able to trace the embedding secret data position from the stego-image's histogram. Keywords: Reversible data hiding, Histogram, steganography, steganalysis.

A FragileWatermarking with Authentication and Post-compression for Digital Camera

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Abstract

In this paper we propose a novel fragile watermarking for digital camera named compressionwatermarking algorithm (CWA). It bases on modifying the last non-zero coefficient of DCT quantized-block in JPEG image. The proposed algorithm not only can provide the authentication ability but also can increase the compression ratio of the JPEG compressed domain image. Therefore, the CWA can be applied in the DCTbased domain application to provide authentication and bit rate reduction.

A Robust-FragileWatermarking Scheme for Image Authentication

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Abstract

In 2003, Lu et al. developed a novel fragile watermarking scheme for image authentication to against the quantization attack. Unfortunately, their scheme is not secure enough. In 2006, Liao et al. proposed two types of attack on Lu et al.'s scheme. They pointed out that Lu et al.'s scheme is still impractical. To achieve both the copyright protection and tamper detection of stego-image, a robust-fragile watermarking algorithm is proposed in this paper. Our proposed scheme is not only to against the quantization attack ("Modification attack" and "Counterfeit attack"), but also to achieve both the copyright protection and tamper detection of stegoimage. From experimental result, we can show that the performance of our proposed scheme is better than Lu et al.'s method.

Military Targets Endpoint Detection Based on Gray Correlation Analysis

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Abstract

To real-time classify military target signal and noise under non-stationary non-gauss noiseeffectively, an edge detection method based on gray correlation analysis algorithm is proposed through analyzing ZCRLPC feature from military target signal. Simulation results indicate detection rate reached 100% under the clean acoustic signal and more than 80% corresponding the noise level of -5dB. This algorithm is effective under non-stationary non-gauss noise and the detection efficiency and performance are superior to other algorithms.

The Corner Detection Algorithm Based on 2-D Discrete Wavelet Transform

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Abstract

Corner detection is a critical and basic task in computer vision and image processing. By far the existing boundary-based wavelet transform approaches can not directly be utilized in gradient image because the theories are mainly about 1-D wavelet transform. We put forward a novel corner detection technique based on 2-D discrete wavelet transform. The corners are extracted by several preset thresholds. Experimental results indicate that this algorithm is not only easy computation and efficient location but is immune to noise. Comparison with a recently proposed technique is also provided.

Analyse of Accuracy for Passive Estimation of Target Depth in Deep Sea Based on Vertical Linear Array

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Abstract

Firstly, the elementary principle of passive estimation of target depth is studied, which is supported by underwater acoustic detection system of vertical linear array and is conducted in deep sea. Then, error sources of passive estimation of target depth are analysed theoretically from points of view of random error and deployment deviation of vertical linear array, and correlative formulae are deduced. After simulation experimnts, it is concluded that how these error sources impact accuracy of passive estimation of target depth, which is the basis of further research for passive estimation of target depth and improvement of accuracy of passive estimation of target depth.

A New Cycle-Stealing Technique for Pipelined Instruction Decompression System for Microprocessors

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Abstract

A cycle stealing technique has been presented for avoiding the delays for instruction decompression when branching and cache missing occur. However, its cost is relatively high and it can't deal with exceptions. A new cycle-stealing technique is presentet reduce the cost and deal with exception handlings. The simulation results for several benchmarks show that the average benefit, the saving of

area, is about 25%.

A Robust Impedance Control Using Recurrent Fuzzy Neural Networks

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Abstract

This paper presents a new adaptive impedance control based on a recurrent fuzzy neural networks (RFNN). The proposed control scheme includes two elements, a RFNN impedance nominal controller (RFNNINC) and a RFNN robust compensator (RFNNRC). The RFNNINC is developed to allow the linearized system performance to approximate the set impedanc model accurately. The nonlinear term error between the system and linearized model us the RFNNRC to compensate. Furthermore, when the system suffers external load an parameter variances, the RFNNRC can provide comparative force to resist the disturbances, allowing the entire system to be robust. Overall, the system is robust and has the desired impedance response. Some computer simulation results demonstrate the effectiveness othe proposed scheme for impedance control.

An Adaptive Routing Algorithm for Mesh-Tree Architecture in Network-on-Chip Designs

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Abstract

A new architecture for network on chip (NOC)called **Mesh-Tree** and its deterministic algorithm has been presented. In this paper, we present an adaptive deadlock-free router. A Mesh-Tree is a multilayered, 3D, pyramidal architecture. Each layer is a mesh and trees are used to connect adjacent layers. This architecture is good for broadcasting and high speed communications. The simulation results show that the adaptive deadlock-free routing algorithm has a higher performance/cost ratio than the deterministic algorithm and the West-first algorithm used in the mesh architecture.

Developing aWeb based Digital Life System

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Abstract

This paper describes how we develop a digital life system by integrating developed separately Internetappliance applications. A lot of Internet appliances are implemented. The service of these Internet appliances are web enabled. Users can control these appliances by using a web browser. Although we implemented these appliances separately, services of these appliances are integrated seamlessly as a whole on a web platform. Users can access the appliance through Internet at any place and any time.

A Scalable Wavelet Image Coder Based on Zeroblock and Array

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Abstract

We propose a highly scalable image coder based on Zero-blocks and Array structures, called S-EZBA. It achieves not only distortion scalability, resolution scalability, and region of interest (ROI) retrievability, but also much of cost saving. We use a new formation of the final bitstream to realize these properties. Comparing with S-SPECK, S-EZBA omits memory needed on distributing the coding bits in the formation of bitstreams. S-EZBA has been implemented based on TSMC .18 um technology. Experimental results show excellent cost, power consumption and the scalable feature of the reconstructed image.

Hardware Implementation of a Hybrid Intelligent Controller for a Twin Rotor MIMO System

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Abstract

This paper utilizes a fuzzy PID control scheme with a real-valued genetic algorithm (RGA) to a setpoint control problem. The objective of this paper is to control a twin rotor MIMO system (TRMS) to move quickly and accurately to the desired attitudes, both the pitch angle and the azimuth angle in cross-coupled condition. A fuzzy compensator is applied to the PID controller. In order to reduce total error and control energy, all parameters of the controller are obtained by a RGA with system performance index as fitness function. For real-time control, Xilinx Spartan II SP200 FPGA (Field Programmable Gate Array) is employed to construct a hardware-in-the-loop system through coding VHDL on this FPGA.

A Problem-Specific Genetic Algorithm for Multiprocessor Real-time

Task

Scheduling

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Real-time task scheduling for multiprocessor systems is generally a NP-complete problem and thugenetic algorithms (GAs) are extensively used. However, since Gas aim to be one kind of universal algorithm across a variety of problem types, they hardly use problem-specific search techniques which might help speed up the search process or lead to a better solution under certain scenarios. That partly prevents GAs from performing more effectively and efficiently. To overcome this, a problem-specific genetic algorithm is proposed to handle multiprocessor real-time task scheduling in this paper. The simulation results show that the performance of the GA are greatly improved with the assistance certain problem-specific knowledge.

A Dividing Ratio Changeable Digital PLL

with Low Output Phase Noise

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Abstract

In this paper, the dividing ratio changeable digital phase locked loop (DCPLL) which is difficult to receive the effect of the input phase noise is proposed. This circuit can realize the characteristic of a wide lock-in range and a fast pull-in.

Design of Integrated GPS/DR Orientation System Based on Double

CPU

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Abstract

In order to keep pace with the rapid development of the integrated GPS/DR orientation system, the

integrated GPS/DR orientation system based on double CPU is put forward in this paper. Where gives an introduction of the hardware composition of this system. A new federated filter algorithm is proposed in the integrated GPS/DR orientation system, which is made up of the Kalman filter and the Unscent Kalman filter. The simulation results show that the proposed method has better performance than the traditional Federated Kalman filter.

Design of Embedded Electro-hydraulic Servo Control System

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Abstract

The design of embedded electro-hydraulic servo control system was proposed to realize remote control and communication of hydraulic units in industrial field. The specified method was given from the aspects of system structure, communication protocol, and software design, and was verified by a realistic application. The results show the design of embedded electro-hydraulic servo control system can realizeflexibility and numeralization

Simulink-Based Dynamic priority scheduling for optimization in network-on-chip communication

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Abstract

In this paper, dynamic priority scheduling policy is integrated into on-chip communications to improve the communication efficiency in network-on-chips. This approach is more efficient than conventional first-in-first-out (FIFO) policy in the optimization of multimedia applications in real-time. Simulink-based experiments on the Motion-JPEG and H.264 decoding demonstrate the efficiency of our approach on Dynamic Scheduling distributed memory service (DMS).

Real Time Performance Analysis of CAN Bus Based on TimeNET

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Abstract

The real-time parameter is a key point of protocol's performance evaluation. The most important thing is to give an effective and reasonable method to simulation. Based on the analysis of the Data Link layer of CAN Bus protocol, a deterministic stochastic Petri nets model of MAC sub-layer in CAN bus protocol is built , aiming at the real-time performance analysis. Also a calculation formula is given combined with the actual example.

The development and research of intelligent circuit breaker model

based on

ARM7

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Abstract

Based on the ARM7, the intelligent circuit breaker model was designed. As the core of the Samsung S3C44B0X, electrical signal collecting and processing are intelligently controlled. The functions of electrical parameters measurement, on-line detection and longrange communications are realized. The system is designed in modular, divided into data acquisition, switching control, data analysis, forecasting and early warning modules, and each module unit is designed and researched, using proposed breaking algorithm.

Feature Extraction and Recognition for Road Sign

Using Dynamic Image Processing

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Abstract

In the research field of the intelligent transportation system (ITS) and the roving robot, the driver-support system auto-recognizing road sings and the robot control system auto-recognizing behavior-indication signs are variously suggested. Both systems use the dynamic image processing to acquire features such as the shape and design of sings. Artificial sings valid for the machine vision are sometimes used for these researches. However, in this study, the general road sings adopted in public roads are used, because machines such as robots and vehicles are supposed to live together in real environments. In this paper, nine kinds of sings one third in size such as "STOP," "NO ENTRY" and "NO PASSAGE" are prepared, and then some experiments were carried out to recognize these signs under various kinds of measurement

condition.

An Extension of Self-Tuning Two Degree-of-Freedom GPC Based on Polynomial Approach with Computational Savings

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Abstract

This paper proposes an extension of self-tuning two degree-of-freedom generalized predictive control based on polynomial approach with computational savings. When the identified plant parameters converge on true values, the proposed method reveals the effect of the integral compensation only if there exists modeling error or disturbance. And a new design parameter is introduced, which is cho- sen to poles of the controller without changing closed-loop poles.

Two-Degree-of-Freedom Generalized Predictive Control in a Multirate System

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Abstract

This paper proposes a new design method for a multirate control system, where a sampling interval of a plant output is an integer multiple of a hold interval of a control input. To employ the effect of integral compensation only if there is modeling error or disturbance, two-degreeof- freedom (2DOF) Generalized Predictive Control (GPC) in the multirate system is proposed. To this end, one-degreeof-freedom (1DOF) multirate GPC without integral compensation is _rst derived, and next the 1DOF multirate GPC I extended into 2DOF control by using integral compensation. Numerical examples demonstrate the effectiveness of the proposed method.

Positioning Control of a 2-Mass Spring System with Static and

Kinetic Friction

Using Hybrid Controller

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Abstract

This paper proposes a new hybrid controller for a 2-mass spring system with stick-slip motion. The 2-mass spring system is considered as a hybrid system with two states: a static friction state and a kinetic friction state. In controller design, the hybrid system is described as a piecewise affine (PWA) system, which is one of the modeling frameworks of hybrid systems. It is known that the model predictive control method is applicable to PWA systems. The effectiveness of the controller has been evaluated by computer simulations.

Generalized Minimum Variance Control in Sampled-Data Control

Systems

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Abstract

The generalized minimum variance control (GMVC) method is extended into a sampled-data control system, where a continuous-time plant is controlled by using a discrete-time controller. In design of conventional GMVC, sampled behavior is optimized, but intersample behavior is not taken into account. However, intersample behavior aswell as sampled behavior can be improved by using the proposed method. Simulation results are shown to illustrate its

effectiveness.

Affective-Cognitive of Images Based on Complex Feature s

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Abstract

In this paper we propose a new method for affective-cognitive of images. We use 9 images that constitute the Furnham's Shape&Color Test as standard templates. In HSV (Hue, Saturation, and Value) color space, we get a vector that has 48 dimensions by using Part-Division quantifying method. We use Quadratic Distance to compute comparabilities of images. Combined with the

personality of Testers and the results of comparabilities between testing images and template images, we get the like-dislike
modulus of Testers when they see testing images.

An Improved FCM algorithm for Color Image Segmentation

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Abstract

In this paper, An Improved Fuzzy C-means Clustering (IFCM) algorithm for color image segmentation is proposed to solve the problem of heavy calculating burden and the disadvantage that clustering performance is affected by initial cluster centers for FCM, which is simple and easy to implement in color Image segmentation. For one thing, the Quick Subtractive Clustering (QSC) is used for getting initial cluster centers of the image data points. For another, the first component of color feature set discovered by Ohta is chosen as the one-dimensional eigenvector. In order to reduce the computational complexity, the mapping from pixel space to eigenvector space is used for modifying the object function. Furthermore, combined the two problems of cluster centers initialization and cluster validity goes research to find optimizing the number of clusters. Experiments show that the proposed algorithm has better effect and lower computational complexity on color image segmentation.

An Improved Fuzzy C Means and Kathunen-Loeve Transform Method for Face Detection

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Abstract

An new approach based on Kathumem-Loeve(K-L) transform and improved Fuzzy C means algorithm for human face detection is proposed. In the method, the image space is partitioned to primary space and subordinate space by K-L transform, by which the human face can be detected from complex scene coarsely, but how to obtain a reasonable threshold become a key problem. Generally, most scholars adopt the value of experience to distinguish face image. In this paper, in order to estimate human face, an improved Fuzzy C Means method is used toclas sify the Euclidean distance calculated by K-L transform. The result of the experiment shows that this approach can solve the problem of human face detection in scale, location, orientation and pose
from complex scene.

A Fast Mode Decision Algorithm for Inter-frame in H.264/AVC

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Abstract

H.264/AVC the latest international video coding standard achieves higher compression efficiency than previous video coding standards such as MPEG-4 and H.263. However, this performance gain comes at the cost of an increased computational complexity. To achieve a high coding efficiency, H.264/AVC employs complex mode decision techniques based on Rate- Distortion Optimization, the computational complexity is very high[1]. This is a major bottleneck for the H.264/AVC in real-time application. Inter-frame prediction coding is a more important part in H.264/AVC. In order to reduce the computational complexity, a fast mode decision algorithm is proposed for Inter-frame in H.264/AVC video coding standard in this paper. With the new algorithm, the amount of computation involved in the motion estimation and mode decision can be substantially reduced. Simulation results show that the proposed algorithm can reduce 56.52% on average of the total encoding time, with a slight increase in bit rate and a negligible

PSNR drop.

PKI-based E-Business Security System

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Abstract

When e-business changing people's business model, security has also become the focus the people attended increasingly. PKI (Public Key Infrastructure) is the key technology to ensure the network security. In this paper, the composition of the PKI and architecture are minutely analyzed, the PKI-based e-business security system is established from the basic process of ebusiness activities, and the security of the system is analyzed, finally the system is implemented.

Web Service-Based Business Intelligence System Research and Implementation

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Abstract

In this paper, the limitations of the traditional components technology in the development of the business intelligence systems are analyzed. According to the ever-changing characteristic of modern business environment, through analyzing the adaptability and superiority of Web Service technology in the business intelligence system, the business intelligence architecture based on Web Service technology is presented. And then the architecture is achieved with a sales analysis system as example.

Research on the Models to Customize Private UDDI Registry Query

Results

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Abstract

This paper presents three models which enable the customization of Universal Description, Discovery and Integration (UDDI) query results, based on some pre-defined and/or real-time changing parameters. These proposed models detail the requirements, design and techniques which make ranking of Web service discovery results from a service registry possible. Our contribution is two fold: First, we present an extension to the UDDI inquiry capabilities. This enables a private UDDI registry owner to customize or rank the query results, based on its business requirements. Second, our proposal utilizes existing technologies and standards which require minimal changes to existing UDDI interfaces or its data structures. We believe these models will serve as valuable reference for enhancing the service discovery methods within a private UDDI registry environment.

Algorithm for the GME Problem in Real-time Distributed Systems based on Token

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Abstract

The GME problem is an interesting generalization of the mutual exclusion problems. A few solutions of the GME problem have been studied for message passing distributed systems. However, none of these solutions is totally suitable for the real-time distributed systems. In this paper, we propose a new algorithm for the GME problem in the real-time distributed systems based on Token. The algorithm uses the concepts of priority queue, dynamic request set and the process state. The algorithm uses the approach in which first come first serve in selecting the next session type between the same priority levels and satisfies the concurrent occupancy property. The algorithm allows all n processors to be inside their CS provided they request for the same session. The performance analysis and correctness proof of the algorithm has also been included in the paper.

Parallel Design and Implementation of Block Mode Selection in Motion Estimation

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Abstract

To optimize the coding algorithm of H.264/AVC, the paper first analyze the H.264/AVC encoder, then presents the parallel design algorithm of block mode selection. The algorithm is tested on multi-core server, and the testing results show that the encoding speed of the block mode selection with the parallel design improves by an average of 2.73 times without affecting the quality of H.264 coding.

Model and Application of Web-based Intelligent Tutoring System

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Abstract

Intelligent Tutoring System (ITS) is one of the important fields of the current computer application. model is designed, the system function structure, the construction of the student model and teaching model, and the reasoning process of the inference engine ,finally the system is implemented. The aim of this paper is to provide the Internet learning user personalized, intelligent learning content and guidance, and eventually realize individual teaching in the Internet.

Synchronization Model Design and Implementation of Distributed Multimedia System

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Abstract

Multimedia computing has become an important study area in recent years. Multimedia synchronization mechanism is a key issue of the distributed multimedia system. The research of multimedia synchronization technology will greatly promote the popularity and applications of the distributed multimedia systems. In this paper, on the basis of the four layers reference model of multimedia synchronization, a synchronization frame of distributed multimedia system in practical application is presented, and some key contents such as the buffer and its control time are discussed. The frame does not require high network bandwidth and QOS parameters and can obtain good effect in the TCP/IP network environment which is currently widespread used.

D-overlay: A Delay-Aware Overlay for Gaming Services

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Abstract Peer-to-peer (P2P) has become an important computing model because of its adaptation, selforganization and autonomy. But how to organize dynamic nodes in P2P networks efficiently for gaming message passing services is still a challenge. This paper present an approach, named D-overlay, a delay-aware overlay for gaming services, to implement node clustering based on link delay of nodes communications in the P2P network. This approach measures the delays among peers, explores the node connectivity together with the connection quality. Then, it builds a service ring for each peer

according to its latency status, and keeps the low latency among neighbors by periodical adjustments. D-overlay improves the extensibility and reliability. One system, called PKTown, has been deployed based on D-overlay in CERNET of China.

A New Model of Social Network Service Platform

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Abstract

Huge data storage and complex topology computing are the two main problems in Social Network Service (SNS). In order to overcome the premature problems, this paper develops optimized models and algorithms for these two aspects respectively, and also proposes a distributed SNS framework. Some experiments have been done and the results show the new models and algorithms perform well on SNS problems.

Information System and Management Strategy of Customer Relationship Management

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Abstract

This report explores CRM' s implication on information, business strategy, as well as an issue which will influence successful implementation of CRM . Furthermore, this report analyzes factors which will barrier or promote information flow withinorganization. Through facilitating information flow across organization, CRM systems can assist organizations to have better understanding ofcustomers, therefore to increase customer satisfaction, boost customer loyalty and maximize customer lifetime value through delivering tailored products and personalized services. Additionally, organizations can use customer knowledge to support business strategy's implementation. However, in order to effectively manage the generation, dissemination and sharing of customer knowledge, which is very crucial in retaining competitive advantage of organization, organizations cannot solely depend on the technology components of CRM and should integrate CRM with knowledge management tools. Moreover, successful implementation of CRM systems requires change of organizational culture.

An Internet Assessment Service System for Cognition Diagnosis based on Integration of Ordering Theory and S-P Chart

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Abstract

The purpose of this study is to provide an integrated methodology for learning assessment and cognition diagnosis. This integrated method is based on ordering theory (OT) and student problem chart (S-P chart). The authors implement the real-time Internet assessment service system based on this integrated method.

This Internet system could classify students into proper groups according to student problem chart algorithm. Besides, ordering theory is adopted to analyze item hierarchies which imply characteristics of cognition for students. The users of this Internet service system are mainly teachers and they could upload their testing data anytime. Teachers could design proper teaching materials and pedagogy for remedial instruction based on the information of cognition diagnosis from this system.

An Architecture of Intelligent Virtual Avatars For E-business

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Abstract

An intelligent virtual avatar is very useful in an ebusiness website, it can attract users to explore more business information, how to construct the architecture of an intelligent virtual avatar is a very important ttopic for a friendly interface of e-business. Based on current research on cognitive science, architecture of an intelligent virtual avatar is presented, and a computational cognitive model that integrates outer stimuli and inner mental variables (motivation, emotion, personality) is proposed, the result can support a quantitative method to control the behaviors of an intelligent virtual avatar.

Equilibrium in Linear Quadratic Stochastic Games with Unknown Parameters

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Abstract

In this paper we present a linear quadratic stochastic game in which some parameters as well as some game states cannot be determined by any of the players. Such a problem is not solvable using standard approach. Therefore, we develop strategies based on a technique that allows each player to simultaneously estimate both unknown states and parameters. The separation principle, which holds for this problem (see [13]), is then applied to synthesize strategies that ensure the feedback Nash equilibrium Stochastic differential games, Estimations, Nash equilibirum.

Control and Applications of Nanotubes to Nanoelectromechanic Systems (NEMS)

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Abstract

Nanomechanics has been drastically developed last years; in particular, the possibility of objects manipulation at nanometric scale was demonstrated [1], following by

development ofnanoelectromechanic systems (NEMS) allowing control and manipulation of nanoobjects [2]. Novel nanomechanisms, which could be based on the nanotubes with only one energy potential of interaction between layers, are proposed.

Solution of Nonlinear Complementarity Problems with Inexact Newton Methods

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Abstract The paper describes a version of the inexact Newton algorithm to solve nonlinear complementarity problems(NCP). New classes of NCP are specified for which the inexact Newton method globally converges at the superlinear rate. Moreover, an inner step accuracy control technique is developed and applied to the inexact Newton method to optimize the total computational cost. Finally, two forms of implementation of the numerical procedure of the said algorithm are presented.

Numerical Experiments with Theoretical Model of Gas Market

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Abstract

Structural changes in the European natural gas market such as liberalization, increasing domestic demand, and increasing import dependency have triggered new attempts to model these markets accurately. In this paper, we propose an exhaustive model of the European natural gas supply including the possibility of strategic behaviour of the agents along the value-added chain. Using the fact that the most gas importers are strongly dependent from governmental authorities, we apply the theoretical model, obtained in [1], and compare it with case of pure profit maximization [2]. Keywords: natural gas, strategic behaviour, non-linear optimization

Risk-sensitive Approach to Optimal Filtering and Control for Linear Stochastic

Systems

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Abstract

The optimal exponential-quadratic control problem and exponential mean-square filtering problems are considered for stochastic Gaussian systems with polynomial first degree drift terms and intensity parameters multiplying diffusion terms in the state and observations equations. The closed-form optimal control and filtering algorithms are obtained using quadratic value functions as solutions to the corresponding H-J-B PDEs. The performance of the obtained risk-sensitive regulator and filter is verified in a numerical example. The simulation results reveal strong advantages in favor of the designed risk-sensitive algorithms in regard to the final criteria values.

A Penalty Function Approach to Solve the Bilevel Tolls Problem

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Abstract

The paper develops an inexact penalty function method to solve a bi-level multi-commodity optimal tolls problem. After reducing the original problem to a single-level one by solving an auxiliary linear or quadratic programming problem, the said mathematical program's objective function is penalized and treated as an unconstrained minimization problem. Convergence of the proposed algorithm is also established.

Research on the 3D Reconstruction for Ultrasonic Image and Quantitative Identification for Lacuna

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Abstract

Based on reverse engineering (RE) techniques, the 3D model of actual parts is reconstruction. And then, the semitrailer 3D image about the position of lacuna is revealed in the model. According to comparability and incontinuity, the lacuna region on ultrasonic scanning image is plot out, and consequently the characteristics of lacuna are selected according to class. In finally, the rank identification method is adapted to recognize lacuna simply. By the application in real checking and measuring system, which has been developed by us, it is proved that aforementioned method is available and feasible.

Conductor Corrosion Fault Detection & Identification For Grounding Grids

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Abstract

To benefit the fault detection and identification of conductor corrosion fault, a hierarchical simplified model of grounding grids is put forward. Minimum unit dividing is the key process of hierarchical simplification, which can be realized by the proposed algorithm. Branches are classified into clear branch and uncertain branch. A Monte-Carlo based testability evaluation approach is suggested. The resistances of clear branch can be directly determined by the optimum solution of non-linear least square approach A set of uncertain branch related with each other is defined as an uncertain branch group. A novel method based on dichotomy to calculate the maximum and minimum resistances of uncertain branches is presented. An experimental grounding grid with sixty branches is used as an example showing that the proposed methods are feasible.

An Autonomous Iteration-Based Identification of Faulty Links in LEO Satellite Communication Networks

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Abstract

Currently, a lot of studies on network fault management have focused on the terrestrial network, which appears to not easily be applied to satellite networks. An autonomous iteration-based algorithm is proposed to identify faulty links for LEO satellite systems employing intersatellite links (ISL's). A designed network satellite with management responsibilities collects the routing information of communication itself with other satellites, based on which a fault disgnosis model is introduced. Then the most likely faulty link is identified by using an iteration-based probability method, in conjuction with which an autonomuos localization procedure is described to pinpoint the actual faulty links. At last the performance of the algorithm is evaluated through simulation.

Research on Elementary Principals of Complex System Control _

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Abstract

This paper points out the fundamental problems when controlling complex systems, concludes the principles for dealing with the problems in control of complex systems, which begins by reviewing on definitions and general properties of complex systems, and primary concepts of general system control. Furthermore, the relation between elementarycontrol paradigms and general properties of complex systems is discussed, which determines that control goals are tightly dependent on emergence mechanisms, interacting components and interactions among them. Consequently, this paper indicates three kinds of elementary schemes for complex system control. The work presented in this paper provides a basis for further research on complex system control.

An Optimization Model for Apparel Supply Contract with Option

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Abstract

With the dynamic changes of apparel fashion trends, it's becoming difficult to match demand using traditional inventory control models, without stock out or opportunity loss. To treat this problem, supply contract models were proposed in past one decade, arguing that it performs better compared to newsvendor in all condition. However, we found that in some conditions, the supply contract model with options unnecessarily perform better compare to traditional newsvendor model. This provides us an indication that when we introduce new business model, all the possible condition should be considered rather than considering average performance only. In this research, we compared the newsvendor model with our model, generating one byone demand distribution along with the possible parameter settings, and then examined the period of parameters that the option model can provide better performance. Furthermore, we found that the inferior performance is caused by the expense of purchasing options. Finally, we learned the important factors that play a major role in decision-making with the option model for fashion products. Key words: SCM, option, supply contracts, forecast, apparel.

Solving Large Multilevel Lot-sizing Problems with an Effective Heuristic Algorithm Based on Segmentation

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Abstract

We have developed an effective heuristic algorithm based on a soft optimization approach for solving the multilevel lot-sizing problems in a series assembly product structure [1] [2]. The heuristic algorithm segments the solution space and points the search direction in which a better solution may exist, by using the structure information of the multilevel lot-sizing problem, so that better performance can be achieved. In this paper, we extend the heuristic algorithm to the general case of multilevel lot sizing problems with time-invariant cost structures and no restrictive assumption on the product structure. Comparing with the results obtained by the genetic algorithm developed in [3] [4], the effectiveness of the heuristic algorithm is shown in simulation computation experiments.

Research on GA/CPM/MarKov Integrated Programming of Dynamic Risk for Virtual Enterprise

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Abstract

With the emergence of global economy and in order to respond fast to the constantly changing market demand, virtual enterprises arise at this historic moment. Risk management of virtual enterprise draws attentions of researchers. This paper proposes a threelevel model to deal with the dynamic risk of virtual enterprise, based on non-linear integer programming, network analysis, and Markov Process. The model focuses on project organization mode and dynamic features of risk in virtual enterprise. It helps to determine the completion time of each process with the objectives of maximizing the minimum completion probability of all processes under the constraints of project investment, customers' due dates, and process quality. Furthermore, an algorithm of integrated GA/CPM/Markov is designed to solve the problem and its efficiency is shown by instances analysis.

Pricing Participating Policies Using Optimization Techniques

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Abstract

This paper considers the pricing of a life insurance participating policy based on the approach of maximization of the profit of the insurance company. In this type of policies a minimum interest is credited to the policyholder at regular intervals and according to the performance of a particular investment portfolio during the year, an additional interest is credited .Furthermore, the policyholder is given the right to sell back the contract to the insurance company before maturity and receive a surrender value. First we derive a formula to calculate the expected payments of the policy using the notion of fair valuation and the approach proposed by Bacinello (2001). Then, we formalize our optimization model intended to decide the premium, the minimum guarantee and participation rate. Finally, we carry out computational experiments applying the Soft Approach for hard optimization models put forward by Xu (2006).

Optimizing raw materials procurement planning by fuzzy programming with recourse*

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Abstract

Raw materials procurement is very important to most companies, optimizing raw materials procurement planning can reduce a large number of total operating costs, so it is very important to study raw materials procurement planning. Based on credibility theory, this paper reports on the application of fuzzy programming with recourse to strategic planning regarding raw materials procurement problem. To solve the two-stage fuzzy programming problem, a hybrid algorithm which combines approximation approach (AA), neural network (NN) and particle swarm optimization (PSO), is designed. We provide a numerical example to illustrate the feasibility and effectiveness of the design algorithm.

Study of Equipment Management Hierarchy Model in Manufacturing Enterprises

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Abstract

Equipment management promotes, protects, and constrains other management systems in an enterprise and has direct impact on their production and businessactivities. Based on the enterprise management hierarchy model, this paper proposes an equipment management hierarchy model for

manufacturing enterprises. The major function modules of equipment static management, dynamic management, and real-time monitoring are studied, and the Information Interactive Model within these equipment management levels is proposed.

Study on Lot-based Tracking Method of Production Logistics in Iron and Steel Industry

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Abstract

To solve the problem of production logistics control resulted from dynamic material batch in iron and steel industry, a lot-based tracking method is studied to realize the fine control of production logistics. It connects lots with processes by the process-lot-state vector, combined-lot-backward vector and combined -furnace-backward vector, establishing the tracking model of production logistics about process states. Its application of enterprises shows that the method can describe completely of materiel processing information in the whole practical production logistics. Then the ability of tracking orders is increased and accurate information is provided for decision. Finally it is satisfied to track the real-time state of production logistics and reduce the material delay. **Key words:** lot; iron and steel industry; production logistics; process state

Research of Exception Handling in Workflow Management System Based on Agents Group

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Abstract

Along with rapid development of workflow technology, on the market, there are a lot of workflow products. Workflow exception handling study in the exception of workflow, through the appropriate method to deal effectively with the exception to ensure the implementation of the workflow. Most existing research on workflow management systems (WFMS) has been focused on workflow based on wellstructured and well-behaved business processes. But it is devoid of the advisement of flexibility and uncertainty. This paper proposes an Agents group based approach for exception handling. Agents group is dispatched to find out the status of running processes in the system to keep track and troubleshoot them when necessary. This model describes the classification of workflow exception, and the corresponding design of different type of exceptionhanding agents and their cooperation.

The National Logistics City Business and Information Systems Architecture

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Abstract

This paper describes an approach to defining the information systems architecture of the National Logistics City (NLC) concept for Melbourne. Drawing from other major examples in the world, the NLC is a unifying concept and provides an opportunity for sustained economic growth. A major enabler of this concept is the information systems architecture, which is based on the Australian Government Architecture (AGA) and includes the business systems architecture.

Research Infrastructure for Logistics Research Support

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Abstract

This paper describes the development of a Research Infrastructure to support research in the area of logistics. This infrastructure is a computer aided research platform that is based on the Institute's Logistics Paradigm. This infrastructure has been, through a process of model enactment, implemented using a 3-tier architecture using J2EE. The process of model enactment is described, using the survey design application as an example.

Integration of CMOS VCO and Frequency Divider for Ku-Band Low-Power Frequency Synthesizer

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Abstract

This paper presents the integration design and implementation of low-power voltage-controlled oscillator (VCO) and frequency divider for the Kuband frequency synthesizer use. The integrated circuit is implemented by a 0.18 μm CMOS technology. To achieve the low-power consumption, the VCO core and the divider core are constructed in the complementary cross-coupled pair and in the injection-locked configuration, respectively. The experimental resultsshow the VCO and the divider consume 3.1 mW and 4.2 mW at a 1.4 V supply voltage, respectively. The VCO oscillates at 14.33 GHz with a 900-MHz tuning range. The measured phase noise is around -110 dBc/Hz at 1-MHz offset in whole tuning range. The measured locking range of the divider is about 400 MHz with a phase noise level of around -106 dBc/Hz at 1 MHz offset.

A Multi-band Current-reused VCO for 2.5 GHz and 3.4 GHz WiMAX Applications

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Abstract

In this paper, a wide tuning range switched currentreused VCO for 2.5 GHz and 3.4 GHz WiMAX applications is presented. The frequency bands consist of eight switched sub-bands and cover 2.438-2.971 GHz and 3.104-3.786 GHz. The measured phase noise at 100-kHz and 1-MHz offset frequencies are -101.47and -119.28 dBc/Hz at lower band and -103.99 and - 122.28 dBc/Hz at higher band. With 1.5V voltage supply, the power consumption of the VCO is 2.886 mW. This circuit was fabricated by TSMC 0.18 μm CMOS process.

A 60-GHz Millimeter-wave Triangular Monopole Antenna Fabricated Using 0.18-μm CMOS Technology

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Abstract

This paper presents a 60-GHz millimeter-wave RFIC-on-chip triangular monopole antenna fabricated with TSMC 0.18-mm CMOS process. A planar triangular-monopole structure fed by the CPW microstrip line is adopted to design the on-chip antenna. The measured VSWR is less than two from 50 to 65 GHz. The simulated H-plane radiation pattern is nearly omni-directional, and the simulated antenna efficiency is approximately 12% due to the loss of the CMOS substrate. The measured maximum antenna gain is about -9.4 dB.

A 3-5-GHz Low-Voltage High-Isolation Transformer-Based CMOS Mixer for UWB Applications

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Abstract

This paper presents the implementation of a transformer-based 3-5-GHz UWB mixer in 0.18-μm CMOS process. An on-chip transformer being inserted between the transconductance and the switch stages, the proposed mixer satisfies the demands of low supply voltage and low power consumption in UWB applications. The RF transconductance stage of the mixer includes a capacitive cross-coupling to

widen the working frequency to be 3 – 5 GHz. The measured results show that the mixer has a maximum conversion gain of 4.4 dB with a power consumption of 16 mW under a supply voltage of 0.8 V. The measured LO-IF, LO-RF and RF-IF isolations are 36 dB, 44 dB and 40 dB, respectively. The chip size is 1.78 × 1.39 mm^2.

Chip Implementation of a 1.5-GHz Gain-Control Phase Shifter

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Abstract

This paper presents a 1.5-GHz RF gain-control phase-shifter fabricated in TSMC 0.18-μm CMOS process. The vector-synthesis topology is applied in this work to achieve a wide range phase-shift from 0° - 360° for the processed RF signal. A gain-control buffer amplifier is added immediately after the phasesynthesizer to compensate the signal attenuation. The measured maximum attenuation is -21 dB for each of four attenuators which are the core circuits of the phase-synthesizer. The measured gain-control range of the buffer amplifier is around -16 dB at 1.5 GHz. The power consumption of the chip is 14.4mW under 1.8 V power supply. The chip size is 0.74 × 0.68 mm^2.

Wireless Monitoring System of Vehicle Violation of Running Red Led Based on GPRS

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Abstract

Running red led is an important reason for the traffic accident at the intersection and it is helpful and necessary to monitor the violation behavior of running red led. In this paper, design method of the wireless monitoring system for the violation of running red led based on GPRS (General Packet Radio System) is discussed, and the configuration of its hardware and software is introduced. The whole system consists of the subsystems of the vehicle monitoring stations distributed at the road intersections and the remote control center. During the period of the red state of traffic light, the interruption procedures will be activated by the output signal of the magnetic loop sensors and the two the cameras will be triggered to capture three pictures to record the course of running red led. The functions of image compression, number plate recognition and etc are realized subsequently. Then the data of the monitoring station serial number, violation time, compressed image and etc, will be written to the wireless modem of Motorola G20 through the serial interface and sent to the remote monitoring center through the GPRS network and the GGSN gateway. Integrating the technologies of sensor, number plate recognition and GPRS, the whole monitoring system stands up the trend of vehicle violation surveillance for running red led at the road intersection.

A Method for Blind Identification of Uplink Virtual MIMO Signal

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Abstract

This paper discusses system models of three types of signal in wireless communication, i.e. single user single antenna signal, virtual MIMO signal and single user MIMO signal. Based on the model, proposes a method for blind identification of uplink virtual MIMO signal by using the MUSIC algorithm to blindly estimate DOAs of the received signal. Simulation results show the feasibility of this method. This approach has important value in both theory and application for noncooperation communication environment.

Anti-Collision Algorithm of Splitting Tags in RFID Systems

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Abstract

Nowadays, the RFID system has been gradually applied in many fields. The RFID system comprises interrogators and tags. A interrogator communicates with tags through a shared wireless channel. Becausethe tags can not recognize between their each others, when more than one tag transmits their data to the interrogator at the same times, the mixing signals lead to collide and the interrogator can not identify what it received. Therefore the tag collision is a serious problem in the identifying process. Generally the RFID systems implement two kind of anti-collision method, one is binary-tree algorithm and the other is ALOHA algorithm. These two methods are simple and feasible, but spent much time. This paper presents a new method using the information stored in the tags to spl ittags and drop the colliding probability and improve efficiency of identification process.

A Version Management Method for Managing Business Process Changes Based on Version-stamped Business Process Change Patterns

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Abstract

This paper presents an efficient version management method for BPM systems based on business process change patterns and the version-stamp method. In managing business processes in a dynamic business environment, a proper process version management method for handling multiple coexisting versions of a business process is required. However, the traditional delta method for business process version management could not cope with the structural changes of a business process flexibly. The version management method

proposed in this paper enables BPM systems to deal with dynamic situations more flexibly. Also,icontributes to increasing activity reusability by using the concept of activity pool.

Generating a Personalized Clinical Process based on Medical Knowledge Base

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Abstract

In order to provide appropriate decision supports in medical domain, it is required that clinical knowledge should be implemented in a computable form and integrated with hospital information systems. Healthcare organizations are increasingly adopting tools that provide decision support functions to improve patient outcomes and reduce medical errors. This paper proposes a process centric clinical decision support system based on medical knowledge. The proposed system consists of three major parts – CPG (Clinical Practice Guideline) repository, service pool, and decision support module. The decision support module interprets knowledge base generated by both the CPG and service part and then generates a personalized and patient centered clinical process satisfying specific requirements of an individual patient during the entire treatment in hospitals. The proposed system helps health professionals to select appropriate clinical procedures according to the circumstances of each patient resulting in improving the quality of care and reducing medical errors.

Business Process Patterns for Integrated Supply Chain Planning

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Abstract

Today's competitive global market makes most enterprise endeavor to specialize their business areas, and co-operate with trading partners in supply chain by forms of collaboration, information and business process sharing. However, even the supply chain plan generated by co-operation often fails to be execute successfully, because it was generated without capacities of suppliers and more over nested

suppliers. To overcome this limitation, the supply chain plan should be generated truly integrated way. In this paper, we classify business patterns based on scenarios, and present business process models about them. In addition, we describe the types of supply chain planning problem.

Measuring Entropy in Business Process Models

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Abstract

Workflow process models contain information of tasks and the structures among them. Modeling business process reduces uncertainty of executing the process at run-time in that the model designates the set of executable tasks and control flows. In this research, we address the measurement of uncertainty or variability of workflow process models, through the concept of entropy. The entropy of business process models is a measure of quantifying the uncertainty of process execution. The uncertainty measurement of process models can be utilized to expect the difficulty of the resource assignment and workflow scheduling.

Process Improvement Evaluation in Mail Distribution Center by Applying RFID Technology

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Abstract

Though the advantage of RFID (Radio-Frequency Identification) technology has been consistently recognized over the years, there are still doubts about its actual effects on the BP (business process) improvement. In order to facilitate the adoption of RFID technology, it is required to measure RFID's positive effects on the BP. Our research focuses on the evaluation of BP efficiency at the Mail Distribution Center (MDC) in Korea. Via a simulation study that compares two BPs with and without RFID technology applied, we could induce key performance indicators of BP in MDC, which are important to evaluate the degree of improvement by applying RFID technology.

Business Process Debugger for Process Design

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Abstract

Though researches on the BPM are diversifying from interoperability and compatibility problems to various new areas, and even BPM systems are widely accepted in the enterprise IT environment, there still lacks some important issues of verifying business processes. In order to run business process successfully, it is important to verify and debug its process model before deploying to BPM system. In the previous research, a process debugging model which is called request-reply debug model is suggested as a simple and easy to implement framework. Though it was somewhat successful while debugging business processes, it could not handle some exceptional situations like failures of either client or server. In this paper, we incorporate some fault tolerance features in the request-reply debug model, and advanced its architectural design to robustly handle debugging sessions. With this enriched debug model and architecture, it is expected that the debugging of business process can be done in a more robust way.

A Game Model of Tradable Pollution Emission Permits

Based on Bilateral Auction

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Abstract

Pollution emission permits trade is an environment policy to control pollution by using economic means, and it will lead to achieve the optimal allocation for regional environmental funds and the total environment capacity. Based on the bilateral auction under conditions of incomplete information, a game model of tradable emission permits is established. By solving Bayesian Nash equilibrium, the equilibrium bidding strategies of the bargainers are obtained. These results will provide valuable theoretical basis and guidance method for building the pollution emission permits trade system.

Research on Loss Risk under Incomplete Information

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This work has been supported by Shenyang Agricultural University youth scientific research fund (2006114)

Abstract

One of the concepts used to measure risk and uncertainty is the variance or the standard-deviation in finance and insurance market. The simplicity of variance and standard-deviation remain a major attraction. But they have some limitations. In thispaper, we present a new risk measure which combines entropy and variance under the incomplete information. The estimate of maximum entropy loss distribution and the value of entropy function are obtained by the maximum entropy principle which is very important in information theory. The resulting distribution is least committal with respect to unknown or missing information and is, hence, the least prejudiced. The entropy and variance of the distribution are used to measure probability risk and the disparity of the loss from the mean. This new method is more comprehensive forecast to loss riskbe cause entropy is relative to more moment information. Further, we

show an example to illustrate and demonstrate the maximum entropy and variance under various moment constraints.

Application and Construction of General Prediction Model for Drugs Marketing System

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Abstract

Forecasting economic indicators in Drugs Marketing System has been always the important issue which feazes medical dealer. In this paper, through that determining the weighting coefficient in a combining forecasting model is translated into estimating the attributes significance among rough set, we propose construction method of combining forecast based on rough set. Practical application indicates that this method is superior to the single model forecast, and it has a broad application prospect in real medical sale forecast problem.

Extension BPML for Sub-process

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Abstract

Today's focus is tied to the introduction of XML and Web services and Business Process Management. But to design large and complex business processes requires a language that supports modularization and reuse in a portable manner. This paper outlines an extension to BPML that allows for the definition of sub-processes that can be reused by the BPML process. This paper describes the different kinds of

sub-processes and introduces a call activity and a mechanism to be used to call for the sub-process.

An Improved Spatial Scheduling Algorithm for Block Assembly Shop in Shipbuilding Company

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Abstract

Motivated by a software development project in a shipbuilding company, we propose a production scheduling algorithm for the block assembly shop in a shipbuilding company. The problem is very complicated and time consuming because it should consider both scheduling and spatial arrangement of each block simultaneously. To reflect the scheduling dynamics, we propose an improved schedule policy, named the LCA (Largest Contact Area) policy. Using real shipyard data, we showed that the block assembly scheduling system based on the policy made a good performance.

Heuristics for the Access Network Design Problem in 3G Mobile Communication Networks

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Abstract

This study deals with the access network design roblem in universal mobile telecommunication ystems (UMTS) networks. We provide a mathematical ormulation of the problem with constraints on RNCnd node-B capacities, along with a lower bounding ethod. We also develop a heuristic algorithm with wo different initial solution methods designed to trengthen the solution quality, and demonstrate the omputational efficacy of these procedures with everal test problems.

Performance Analysis of a New Work Assignment in Assembly Cells

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Abstract his paper addresses the work assignment roblems in assembly cells. The assembly cells are known to be more flexible and productive than the raditional assembly line. To maximize the utilization of resources in assembly cells, it is important to have he line balanced. This paper presents a dynamic work assignment method where each worker performs ssembly operations on a product until the next worker downstream takes it over. This pull-type assignment ethod balances the assembly cell in an autonomous way. The performance of the new assignment method s examined and compared with existing assignment methods.

Development of Robust Data Computing Methodology (RDCM) for a Multidisciplinary Pharmaceutical Process Design

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Abstract

While data computing and analysis has seen ignificant advance in the type of analytical tools available, there are limitations in the pre-treatment of aw data. In many pharmaceutical industrial situations these often include a number of missing values. In ddition, the quality characteristics of drug products are often multidisciplinary (i.e., not of the same type). n order to address these limitations, the main purpose of this paper is to propose a new robust data computing methodology (RDCM). RDCM can systemically estimate observed missing values by reducing the dimensionality of large pharmaceutical data sets. It can also incorporate multidisciplinary pharmaceutical situations. The primary objectives of this paper are threefold. First, we develop a robust data mining (RDM) procedure using an expectation maximization (EM) algorithm and a correlation-based feature selection (CBFS) method. Second, we propose a multidisciplinary optimization model for the optimal design of a pharmaceutical process by developing a multivariate robust design model using a nonlinear goal programming. Finally, our numerical example clearly shows that the proposed RDCM can efficiently be applied to a pharmaceutical process design.

Driving Strategic Issues as Champion Projects for Six Sigma

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Abstract

The projects identified by the top down project selection process from the strategic goals are usually wider in scope and larger in size than the typical Six Sigma project. Each of these strategic projects may be further divided into a set of more narrowly scoped projects fit for black belts. But the total achievements

of the small projects may not always have a significant business impact as a whole if they are executed separately. We suggest a model for such situation, where the small projects are executed as sub-projects of the strategic project pursuing total optimality. A champion is recommended to be the leader of a strategic project for effective control and coordination of sub-projects. Each sub-project follows the disciplined Six Sigma approach for improvement, and is evaluated by its contribution to the champion project. The champion project is performed by supervising and controlling the sub-projects as an integrated whole. The achievements of a champion project are evaluated by meaningful business metrics. Even when projects are identified by a bottom up process, a cluster of highly correlated projects may be more effectively executed by integrating them into a champion project.

Transporter Scheduling under Dynamic Block Transportation Environment

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Abstract

This paper considers a transporter scheduling problem under dynamic block transportation environment in shipbuilding. In dynamic situations, there exist the addition or cancellation of block transportation requirements. The transportation of the blocks in the shipyard has some distinct characteristics. Some blocks are available to be picked up at a specific time during the planning horizon while some other blocks need to be delivered before a specific time. These requirements cause two penalty times: 1) delay time incurred when a block is picked up after a required start time, and 2) tardy time incurred when a block shipment is completed after the required delivery time. The blocks are located at different areas in the shipyard. The objective of this paper is to propose heuristic algorithms which minimize the weighted sum of empty transporter travel times, delay times, and tardy times. Four heuristic algorithms for transporter scheduling are proposed and their performance is evaluated through computational experiments.

The Implement Approach of Product Optimization for Variant Design Based on the Artificial Immune Algorithm

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Abstract

According to the requirement of rapid variant design for products, it is vital that the complicated problem is transformed into the optimization problem. On the basis of it, an effective product optimization model of variant design is established. An improved artificial immune algorithm is adopted, which simulates the protein polypeptide structure of the antibody, the clone selection principle and the concentration regulation of the immune system, and uses a new analytic approach for the similarity between the antibodies. Finally, an example is given to evaluate the performance of the proposed approach. The simulation results illustrate the effectiveness of the proposed method in variant design of products.

A New Constraint-Preserving Method for Solving Nonconvex Economic Dispatch with Linear Constraints

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Abstract

This paper proposed the use of a new constraint-preserving method (NCPM) to solve the nonconvex economic dispatch (NED) with linear constraint problems. NCPM always generates feasible solutions every time that reduces the search space (exclude the infeasible domain) to enhance the probability of obtaining the global optimum. Based on the benchmark of the same objective function, NCPM was compared with the other methods upon their search performance. Results show that the proposed algorithm outperforms the existing methods, in both global search capability and computation time. Keywords: constraint-preserving method (CPM), Nonconvex economic dispatch (NED), particle swarm optimization (PSO).

Study on Government Micro-control and Port Scale Competition Game

Abstract

This paper aims to investigate how to apply government micro-control means to eliminate evil competition in port scale competition game. First, we analyze ubiquitous evil competition phenomenon in port scale construction in China; Second, we study cost, stratagem and countermeasure equilibrium of port construction scale based on game theory by an actual case; and then, we discuss the influence of power adjustment which is between central government and local government to port scale game,
contrast different results of power adjusting fore-andaft; At last we put forward the conception of decisionmaking function, give decision-making method and actualizing step, and get the conclusion

that central government ought to strengthen the micro-control to
port construction.

Fuzzy production planning problem with credibility service level constraints

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Abstract

In this paper, we consider a multiperiod fuzzy production and sourcing problem that a manufacturer has a number of plants and/or subcontractors. The manufacturer has to meet the products demand according to the service level requirements set by its customers. Based on credibility theory, a new class of fuzzy production planning model is first proposed. Then we deal with the approximation of the fuzzy production planning problem with credibility service level constraints. After that, a hybrid algorithm, which integrates approximation approach and particle swarm optimization algorithm, is designed to solve the proposed production planning problem, and a numerical example is provided to test the effectiveness of the hybrid algorithm.

A New Solution of Concurrent Field Bus

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Abstract

The paper presented a new technology of industrial field concurrent bus communication. Based on Direct Sequence Spread Spectrum, frequency division multiaddress and cross correlation as necessary auxiliary method,it realized a new Concurrent Field Bus Communication. The purpose of this study was overcome common fault existed in communication mode of industrial control field such as 485/232 or CAN field bus,etc. The typical fault was that multiple remote data terminal units(terminals) were not allowed to upload data at the same time or to report the status of themselves initiatively.The technology discussed in the paper allowed the terminals communicate with master PC simultaneously under the new communication mode, when the trouble occurred at monitored equipment, the fault information would be transmitted to control center promptly and actively.

Evaluating RFID System Suppliers under Fuzzy Environment: based on Incomplete Linguistic Preference Relations

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Abstract

RFID (Radio Frequency Identification) can help enterprise to collect information, so as to improve organizational efficiency and competitiveness; before the enterprise installs RFID system, if the enterprise can choose the most suitable RFID system for itself rapidly, then limitless value would be brought to the enterprise. This study adopts the method of Incomplete Linguistic Preference Relations to simplify calculation and speed up the process of comparison and selection of alternative. This method considers only n -1 judgments, whereas the tradition analytic hierarchy approach (AHP) takes n(n -1) / 2 judgments in a preference matrix with n elements to establish a complete preference relation decision making matrix. Experts obtain the matrix by choosing a finite and fixed set of alternatives and perform a pairwise comparison based on their different preferences and knowledge; it is easily led to the reduction of efficiency and the production of inconsistency.

Grey multi-hierarchical model in partner-selecting of knowledge alliances

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Abstract

It has been a crucial issue as how to make the optimal choice from various partner selection of knowledge alliance. In order to make the enterprise select knowledge alliance partners practically and reasonably, a grey optimal choice is put forward for virtual enterprise with multi-objects and multi-layers. This paper tries to construct a performance evaluation process. Firstly, the evaluated indictors are discussed. Secondly, grey relation model is discussed and by means of the grey relational grade, sequence of all schemes is arranged and optimal selection for partner of knowledge alliance. This model was simple and practical for enterprises to get an objective and precise result in partner selection of knowledge alliances.

Applying Investment Satisfied Capability Index and Genetic Algorithms to Construct the Stocks Portfolio

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Abstract

This research adduced Process Capability Indices of quality management to develop a new performance appreciation method. It constructs the capability of a larger-the-better process with

Process Capability Index. Not only do investment satisfied capability index (ISCI) and investment satisfied degree evaluates efficiently when construct lower limit of confidence by investment performance indices, but it also judged whether the stocks achieve the requested standard. Furthermore, investors can utilize C_{SL} to realize individual stocks performance rapidly that helps in achieving their satisfaction on investment. Genetic Algorithms is then utilized to obtain the optimal weights (or investment weights) that allocate the investment capital effectively. This research used moving interval windows on the weekly data of listed stocks in Taiwan from January 2006 to December 2007. The result has shown that the performance constructed by ISCI and GA is better than The Weighted Price Index of the Taiwan Stock Exchange(TAIEX).

A DCC Analysis of Stock Market and Exchange Rates: An Evidence Study of the South Korea Country

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Abstract

This paper studies the relatedness and the model construction of exchange rate volatility and the South Korea stock market returns. Empirical results show that we can construct a bivariate EGARCH(1, 2) model with a dynamic conditional correlation (DCC) to analyze the relationship of exchange rate volatility and Korea stock market returns. The average estimation value of the DCC coefficient for these two markets equals to -0.1961, this result indicates that the exchange rate volatility negatively affects the South Korea stock market. Empirical result also shows that there exists an asymmetrical effect on the South Korea stock market, but the exchange rate volatility does not have the asymmetrical effect. Based on the good news and bad news (Nelson, 1991) of the stock market, the bivariate EGARCH(1, 2) model with a DCC has the better explanation ability compared to the bivariate GARCH(1, 1) model.

Application of Fuzzy time sequence in stock prediction

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Abstract

Nowadays, more and more people take part in the stock-market actively, and the stock prediction has been one of the hot topics .Fuzzy time series are used for forecasting price of the stock as the first time in this paper. According to history data of stock price, we could predict the stock price at next time or at multiple moments, it will provide the theoretical basis for buying or selling time reasonable. At first, it introduces the correlation concepts of the fuzzy time sequence in this paper, and then we use the stock price of a listed company each time of one day as case study, and applythe fuzzy time series to predict the stock price. From mathematics view, we forecast the buying and selling time of stock reasonably. It is of great practical significance.

Overview of the New Types of Intelligent Decision Support System

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Abstract

In this paper, we simply introduce some new types of intelligent decision support system, such as group decision support system, distributed decision support system, intelligent, interactive and integrated decision support system and intelligent decision support system based on knowledge discovery. And then intelligent decision support system based on natural language understanding is discussed in detail. And at the same time, the key techniques and main characteristics of intelligent decision support system are described. At last, the prospects of intelligent decision support system based on natural language understanding is put foreword. Index Terms - Intelligent Decision Support System, Knowledge Discovery, Natural Language Understanding.

An Impact of the Oil Prices' Volatility Rate for the U.S. and the Japan's Stock Markets Return: A DCC and Bivariate Asymmetric-GARCH Model

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Abstract

The empirical results show that the dynamic conditional correlation (DCC) and the bivariate asymmetric-IGARCH (1, 2) model is appropriate in evaluating the relationship of the U.S. and the Japan's stock markets. The empirical result also indicates that the U.S. and the Japan's stock markets is a positive relation. The average estimation value of correlation coefficient equals to 0.179, which implies that the t stock markets is synchronized influence. Besides, the empirical result also shows that the U.S. and the Japan's stock markets have an asymmetrical effect,and the variation risks of the U.S. and the Japan's stock market returns also receives the influence of the positive and negative of the oil prices' volatility rate.

JEL classification: C32, C51, G15

Measuring Fuzzy Risk by Credibilistic Value at Risk

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Abstract

The value at risk (VaR) methodology is a widely used tool in financial market risk management. In this paper, we present a new method for fuzzy risk analysis. First, we present the new concept of the credibilistic value at risk based on credibility theory. Then, we examine some properties of the

proposed credibilistic value at risk. Finally, a kind of fuzzy simulation algorithm is given to show how to calculate the credibilistic value at risk. The proposed credibilistic VaR is suitable for use in many real problems of fuzzy risk analysis.

E-commerce Adoption by Taiwan Entrepreneurs

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Abstract

As one of leading countries in the digital economy, Taiwan has a significantly higher number of Internet hosts per capita. With Taiwan's manufacturing sector as a case study, this paper aims to explore the determinants of e-commerce adoption by manufacturers. Drawing on the database of the recent industrial census, the empirical results show that highquality human capital will benefit firms in engaging in technology-led organizational change, enabling them to further grasp the fruits of e-commerce. This research also confirms the firms with export orientation to have higher incentive to carry out Ecommerce. In addition, e-commerce popularity among incumbents, deeply and positively influence adoption of e-commerce by manufacturers.

Portfolio Selection Problem in Fuzzy Random Decision Systems

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Abstract

Based on equilibrium chance theory, this paper presents a new class of fuzzy random minimum risk portfolio selection problem. In this problem, values of some functions are numerical characteristics of fuzzy random phenomena dependent on decision variables. This feature leads to the main difficulty encountered in solving the proposed portfolio selection problem. Therefore, conventional solution methods can not be applied to solving this problem. In order to solve the proposed portfolio selection problem, we use a sequence of finitely supported primitive fuzzy random variables to approximate a continuous fuzzy random vector, which result in a finite-dimensional fuzzy random minimum risk portfolio selection problem. We also discuss the convergence of the approximation method. After that, we integrate the approximation method and particle swarm optimization (PSO) algorithm to design a hybrid PSO algorithm to solve the proposed portfolio selection problem, and provide a numerical example with four assets to demonstrate the feasibility and effectiveness of the proposed algorithm.

Decision-making Criterions Research on Uncertainty

Decision-making

Problems Based on Belief Functions

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Abstract

The decision-making criterions on uncertain consequence problems are discussed in the paper. The commonly used decision-making criterions include: the maximum expected utility criterion, the max-min criterion, the max-max coefficient criterion, the minimization of maximal regret criterion. The four criterions used to be discussed based on Bayesian decision modeling. In this paper, they are discussed based on belief functions, the procedure based on each criterion is putting forward. Finally, a numerical example is given to illustrate the method of the four criterions based on belief functions.

Exploring Business Opportunities and Development on Patent Engineering in Taiwan

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Abstract

The Taiwanese IT companies started to emerge and gain their world-wide market shares in recent years. Those companies started to make good profits a few years back but also attracted foreign technological companies' attention - claiming for infringements of the patents owned by those companies. For some reasons (such as competitions), Taiwanese companies (e.g., PC and network device manufacturers) do not have a unified way of dealing with foreign attackers. When approached by foreign claimers, these companies have been choosing to respond by their own methods and strategies.

Service Competition for IT Service Outsourcing

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Abstract

With IT outsourcing being a widely adopted business strategy, the objective of this study is to identify the status of competition as a mechanism for the client to induce service quality from the service providers. This paper brings up a game model of service level competition between two vendors with different marginal costs in a two-period framework. We find that there is no pure strategy in the vendors' service levels and derive the explicit form of the mixedstrategy equilibrium for the vendors. Our results show that the vendor with higher marginal cost normally would provide a minimum service level, which is required by the client, and sometimes randomize its service level, whereas the vendor with lower marginal cost is likely to provide a service level higher than the minimum service level, and is more likely to obtain a larger portion of the outsourced IT services.

Empirical analysis on the level of economic development in Ningxia Hui Autonomous Region, Western China

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Abstract

This paper aims to establish a method to demonstrate the disparity of the economic development levels among the counties of Ningxia Hui Autonomous Region. Based on the theory of Information Entropy, eight variables are selected from the statistical database as indicators to measure the economic development of Ningxia from 2002 to 2004. Membership Function is then applied to standardize the fuzzy information of the indicators, which could be categorized into benefit factors and cost factors. A weight set is constructed with the introduction and use of concepts of Ideal and Informational Quantity to describe the quality of these indicators. Finally, the development stages of each county are quantitatively and graphically demonstrated which are categorized into 5 levels. The standardized results are compared and analyzed, according to the differences in natural conditions, locations, resource distribution, as well as economic and political factors.

The Application of Support Vector Machine Improved Method In Analyzing Macroeconomic

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Abstract

This article presents a new SVM (support vector machine) fast learning algorithm which is based on the boundary vector .The speed of this algorithm has been improved considerably than traditional support vector machine,the requirement of memory space has also been obviously reduced. At the same time,because the support vector won't be lost in the process of selecting the boundary vector, So the performance of SVM will not be affected. Based on an instance which proves that this method can achieve the desired results when it is applied to the classification of macroeconomic forecasting.

Risk Management in IT Project's Establishment

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Abstract

As the risk management of information technology is more and more important for enterprises' crisis management, the emphases of the whole course moving from the back to front has become an obvious trend in IT project's development. The IT project's establishment is no longer a simple and single action, but a complicated process which can be taken as system engineering. To effectively control risks from the every start and reduce the failure risk to the greatest degree, the risk management in IT project's establishment is specially studied in this paper. The concept and process of IT development

project's establishment is identified first, and then the risks existing in its course and their corresponding reasons are analyzed in depth. Finally, an integrated approach system is proposed, which aims at providing guidelines to help the IT project managers control their projects' failure risk in the establishment stage.

Case Based Clustering-Based TSK Fuzzy Rule Systems for Stock Price Forecasting

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Abstract

Stock price predictions suffer from two well known difficulties, i.e., the high dimensionality and non-stationary variations within the huge historic price data. This paper presents a new financial time series-forecasting model by a case based clustering TSK fuzzy rule system for stock price predictions in Taiwan Stock Exchange Corporation (TSEC) . This forecasting model integrates a case based reasoning technique, a TSK Fuzzy Rule based system (TSK), and Simulated Annealing (SA) to construct a perdition-system based on historical data and technical indexes. The model is major based on the idea that the historic price data base can be transformed into a smaller case-base together with a group of TSK fuzzy decision rules. As a result, the model can be more accurately react to the current price of the stock from these smaller case based TSK fuzzy rule system .MAPE is applied as a performance measure and the effectiveness of our proposed CBTSK model is demonstrated by experimentally compared with other approaches on various stocks in TSEC. The average MAPE of CBTSK model is 85% the highest among others.

A Study of Information System Reengineering as ERP Is Introduced to Businesses Adapting to the E-Business Era

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Abstract

The advancement of information technology has caused the cost of information equipments to decrease substantially. Consolidation of corporate information into a complete system is a trend for businesses to adapt to the electronic era. Enterprise Resource Planning (ERP) has contributed to greater efficiency for businesses around the world. Corporations in Taiwan are beginning to introduce ERP to satisfy customers' needs. Upon introduction of ERP, data entry occurs at the time of transaction. The collection, calculation, and analysis of data are processed according to handling structure of ERP. Therefore, many routine works are replaced by ERP. Employees should reconsider their position and role under ERP working environment so that they can enhance their value-added contribution.

A Product Mix Problem Based on Maximization of the Total Profit and Reduction of Excessive Inventories Including Uncertainty

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Abstract

This paper considers a product mix problem both maximizing the total future profit and reducing excessive inventories including uncertainty with respect to future profits and customers' demands. Furthermore, since a decision maker has a goal with respect to the total future profit and each inventory of the product, in this paper, aspiration levels for them are also introduced. The proposal product mix problem is formulated as a multi-criteria programming problem considering maximizing all aspiration levels assumed to be fuzzy goals. Then, since each future return and customer's demand are assumed to be random variables, this problem including randomness is basically formulated as a multi-criteria stochastic programming problem. Since it is hard to solve it analytically, the transformations into deterministic equivalent problems are introduced and the efficient solution methods are constructed.

Sensor Soft Failure Diagnostics based on Aero-engine On-board Adaptive Model

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Abstract

It is well known that the physical engine components deteriorate gradually due to wear and tear on blades and the casing as an engine operates over time. In this paper, a steady-state model, which takes the component performance deteriorations into account, is developed. The deterioration can be tracked by one Kalman filter. Then the on-board model could be re-constructer based on the estimated values of Kalman filter. After all of this, the on-board model can match with the actual engine. At last a bank of Kalman filters is applied in fault detection and isolation (FDI) of sensors for aircraft gas turbine engine. The engine output values and Kalman filter estimated were used to fault detection and isolation. The proposed approach is applied to a nonlinear engine in this paper, the simulation results indicate that the proposed FDI system is

promising for reliable diagnostics of aircraft engines.

Design of Turbine Engine Robust Fault Detection with LPV Model

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Abstract

This paper deals with a problem of turbine engine fault detection in dynamic process by using LPV mathematical model to exactly describe turbine engine dynamic characteristics, eliminate the effects of modeling error. Design robust fault detection filter (FDF) with eigenstructure assignment and realizes disturbance de-coupled with model uncertainty. The simulation results of turbine engine control system sensor fault show that this method has good performance in focusing discrimination in fault signal with modeling eror, enhancing the robustness to unknown input, detecting accuracy is high and satisfiying real-time requirement.

Simulation Analysis on Differential Speed Drive of Double BLDCM Based on PID

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Abstract

A BLDCM's PID controller and its system simulation are investigated in this paper. At first, the mathematics model of the motor control system is established, so that the system simulation is carried out respectively. And then, a PID controller is used to control the speeds between the two BLDCM, and the sine wave and triangle wave are selected to validate the effect of simulation. Finally, through adjusting the parameter of P, I and D, a good follow effect is gotten. **Key words** -PID controller; BLDCM; Simulation

Study on Intelligent Measurement Method for Non-linear Parameters*

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Abstract

In order to maintain the equipments in good condit ion, we are looking for a better way to detect Non-line ar parameters on line, but the desire is not fulfilled oft en in actual situations because these parameters are d i-fficult, or even impossible for on line measurement. F irstly, this paper describes a method to compute Non-li near parameters using the theory of functional neural network, and then a mathematics relation between the secondary variable and primary variable of the soft-se nsing mode is established, finally the experiment of thelifting moment of tower crane show the computing met hod is effective and reliable.

Study on Precise Batching System Based on Networked and Intellectual Control

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Abstract

In metallurgy, chemical industry and medicine production, etc plants, batching precision determines final quality of their production. To ensure the high quality of the production and enhance competitive power of these companies, it is very important that a high precise batching control system to fit for an automation producing lines was studied. In this paper, a networked and intellectual precise batching system based on computer controlling was developed after discussing some exited kinds researching results on the question. The system can meet a management of a realtime and visibility with networked communication, and achieve a high batching precision by means of intellectual communication adaptor and closed loop control system, the error of batching can be ensured less than 1 percent. And the overall planning, the layout of circuit diagram and system structure of the system were described in detail. And all kinds of features about the system were tested by the experiments. Key words: Networked

Study on Pump Fault Diagnosis based on Rough Sets Theory

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Abstract

In this paper, a rough classifier based on Rough Sets theory is studied and employed to diagnose and identify five-plunger pump faults. To do so, the spectrum features of vibration signals collected in the flood end of the pump are abstracted as the attributes of the learning samples. Then attribute reduction is carried out to generate the decision rules used to classify technical states of considered object. The diagnostic

investigation is done on data from a fivepump in outdoor conditions on a real industrial object. Results show that the new approach can effectively identify different operating states of the pump, which supplies as the basis for the detection and diagnosis of the pump faults. Key words: Rough Sets; pump; fault diagnosis

Investigation of Knowledge Inclusion Relations in Faults Knowledge Discovery

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Abstract

By means of the essential notions in rough set theory, to partition a special universe U into the different knowledge particles sets is investigated. A novel Granularity Calculation Model is built out. It makes use of the different division rules to partition the same U. The relations reflected in the different knowledge particle sets show as important information. It is that knowledge inclusion relations come forth in knowledge discovery naturally. And the correlative researches with regard to knowledge discovery must aim at the idiographic problem and make use of the special data set to progress. If to look forward to extract out the knowledge rules from a data set with the experts' level, the experts' knowledge should be save into original data beforehand and the saved manner should be scientific. It is that the data to describe the experts' knowledge must satisfy the demands of knowledge discovery tool. The characteristics of rub-impact faults taken place on a rotor show the validity of investigation.

Experiment Method Study on the Dynamic Response of Multilayer Flexible Pavement

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Abstract

The study on dynamic response of pavement under real transportation load is one international thermal topic. In view of the characteristics of the construction process of asphalt pavement and the dynamic response under heavy truck, one strain sensor was built up which can detect the dynamic strain of pavement under moving load. And corresponding tests were carried on in laboratory and in field road. It's found that the sensor not only can bear the destruction of high temperature and shearing, but also can satisfy the test requirement on dynamic transfer. Without especially protection, the survival rate in field road arrived to 82%. It's also found that the influence of the rigidity of the base layers on the dynamic response is large, and found that the dynamic strain at the bottom of each surface layer under moving load presents not only tensile

strain but also compressive strain

Backstepping Variable Structure Control with L2 Gain for Nonlinear Torpedo Depth System

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Abstract

The nonlinear torpedo model is converted into the combination of input-output and zero dynamic. The input-output dynamic is established using the torpedo depth, climbing rate and attitude angular velocity as the state variables, with rudder control input. The other is stable zero dynamic, including attitude angular and velocity. Considering attitude angular velocity as the virtual controller of torpedo climbing rate, we present a backstepping robust L2 gain control strategy. Variable structure control term is used to eliminate uncertainties in input parameters. In simulation, the torpedo depth can be controlled well in the conditions of uncertainties and various initial states, and other state variables in torpedo model are stabilized. Key Words - Torpedo depth Nonlinear L2 Gain Backstepping control Variable structure control.

Research of Distributed Curvature Modal Sensors with Optical Fiber on Vibration Measurement for Thin Structures

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Abstract

Thin structures have been applied widely in different areas of engineering. They are prone to elastic vibration when submit to external dynamic excitations or interference, which will not only lower system stability, but also threaten the people's lives .Thus, it is significant to research this topic in depth. Generally, many acceleration sensors are put on the cover of the structure to measure the vibrations and strain sensors have been recently used for it. However, it is difficult to measure strain in thin structures and there are also limitations when applying multi-spot distributed measurement method. Based on the theory that the vibration of practical structure can be decoupled into multiple vibration models, a new concept of curvature modal sensors with optical fiber is proposed to measure vibration models.

The Predictions of Luminous Intensity and Wavelength of Light-Emitting Diode by Neural Network

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Abstract

The aim of this research is to predict the luminous intensity and wavelength of Light-Emitting Diode (LED) chip by using neural network technique. The data simulated was measured by Electrical Luminescence (EL) technique. The well trained neural model could be used to predict the optoelectronic attributes of LED chip in advance. The predicted results are expected to help the engineer can modify the parameters of epitaxy growth accurately to ensure the chip can be in conformance with the quality request.

A Hybrid Supervised Neural Network Learning Algorithm

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Abstract

In this paper, a hybrid supervised learning algorithm for neural network was proposed. The problem of local minimum learning usually occurred in the real application of neural network is tried to be solved or reduced. In order to improve the efficiency and stability of conventional error back-propagation learning algorithm, a hybrid learning method combining the linear multi-regression and backpropagation techniques was developed. To demonstrate the superiority of the method we developed, one example was simulated. The conventional BP learning method was also performed as the comparison with the new method proposed. From the results shown, the conventional BP method easily makes neural model plunge into the local minima. On the contrary, the new method we proposed not only has a fast learning, but also has a better learning efficiency.

An Intelligent Fault Diagnostics for Turbine Generator by Modified Neural Model

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Abstract

In this paper, an intelligent fault diagnostic tool for oil-fired power plant with turbine generator by using the modified neural network was proposed. This tool is able to monitor the running condition of power plant immediately. It also can reveal the fault situation if the power plant had some troubles.

Therefore, such a well designed mechanism can bused as the training tool for laboratory course in power turbine studies. To demonstrate the feasibility of the tool we developed, several real case studies were simulated. From the simulation results shown, the tool we developed is very promising in the real applications.

The Represented Model of Wave-Induced Ship's Motions by Using Neural Network

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Abstract

In this paper, the traditional neural network technology has been utilized to modeling the waveinduced ship motions in irregular seas on the Kaohsiung harbor in Taiwan. The training data for neural network is obtained from real case experimental measurements. The proposed tool makes possible the handling of a non-linear dynamic system with insufficient input information. The real case of sea trial results are used to train the networks and to demonstrate the validity of the proposed procedure **Keywords:** neural networks, ship's motion, roll, pitch.

Design of a Fuzzy Logic Controller with a Variable Structure Based Supervisor

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Abstract

This paper presents a stable variable structure control scheme for achieving uniformly ultimately bounded control of a class of nonlinear systems. To reach a better performance, a generalized two-input single-output fuzzy controller is incorporated into the scheme to help improve dynamic responses when the trajectories enter into an ultimate bound. For practical consideration, we added a GA-based alpha-beta filter in front of the fuzzy controller to suppress noise and obtain smooth input signals. A force-adaptive robot effector acting on various profiles of surfaces has been used as a simulative example to demonstrate its effectiveness.

The Represented Model of Wave-Induced Ship's Motions by Using Neural Network

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Abstract

In this paper, the traditional neural network technology has been utilized to modeling the waveinduced ship motions in irregular seas on the Kaohsiung harbor in Taiwan. The training data for neural network is obtained from real case experimental measurements. The proposed tool makes possible the handling of a non-linear dynamic system with insufficient input information. The real case of sea trial results are used to train the networks and to demonstrate the validity of the proposed procedure. **Keywords:** neural networks, ship's motion, roll, pitch.

[1]Research of Navy Vessel Synergetic Design System Based on SBA

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Abstract

Combining the system analysis method, the system of navy vessel synergetic designing was brought forward based on the integrative environment in Simulation Based Acquisition (SBA). First, upon the research of the SBA acquisition mode of navy vessel and its design mode, a new system of synergetic designing was raised and its mostly components was analyzed. Then, to prove the capability and validity of warship synergetic designing system, static and dynamic modeling are presented to the function and action of the control program with UML.

Analysis and Formulation of Printing Process to Develop Knowledge-Based

Scheduling Software

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Abstract

We have addressed the improvement of production efficiency and the review of business process for an automotive parts supplier, and the goal of this study is the development of production management software. This paper describes the business result analysis in printing process and a formulation of the tacit procedure by observing worker's empirical rule to develop the knowledge-based scheduling software. The whole of business processes are clarified by our previous researches, and the scheduling problem of printing process has been mainly discussed. Previously the printingprocess has been improved only by theoretical aspect, however it cannot flexibly respond to the change of production conditions such as the dispersion of order, the interrupt of urgent task, and the inventory quantity of parts in spiteof the actual field can handle these. Therefore this paper regards that the technical know-how of tacit knowledge in the actual printing field is absolutely necessary factor in response to the change of production conditions, and a formulation designed to the minimization of setup operation are expressed.

Satisfiability Problem of Linguistic Truth-Valued Intuitionistic Propositional Logic

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Abstract

Truth degree and falsity degree of intuitionistic fuzzy proposition are two truth values with linguistic hedge. In this paper, we constructed linguistic truth-valued intuitionistic propositional logic(LTV-IP) based on linguistic truthvalued lattice implication algebra(LIA) which can express both the comparable and incomparable truth values. Some logic properties regarding reasoning are then obtained. Especially, the implication operation of LTV-IP can be deduced from four times implication of their truth values. Finally, we discussed the satisfiable problem of LTV-IP and proposed resolution principle of LTV-IP.

A New Approach for Generator Maintenance Scheduling in Deregulated Power Systems

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Abstract

This paper presents a parallel-refined simulated annealing (PRSA) approach for the generator maintenance scheduling (GMS) problem to maximize profit objective function. The merit of simulated annealing (SA) is preserved and the deficiency is pruned away in the proposed PRSA. The proposed PRSA is an effective method because the multiple search trajectories parallel and refined in each stage. The near optimal solution for each trajectory in current state can be derived from the local optimal solutions by using the parallel optimization process. The proposed parallel searching strategy can obtain optimal or near-optimal solution for the GMS problem. This paper has demonstrated the effectiveness and feasibility of applying the proposed approach for the 50-unit GMS problem.

A Platform Framework for Cross-lingual Text Relatedness Evaluation and Plagiarism Detection

Abstract

Research work related to plagiarism detection methods in dealing with monolingual texts (e.g. English texts) have been well established in recent years. However, little attention has been paid to facilitate plagiarism detection in cross-lingual text collections (e.g. English and Chinese texts). In this paper we present a system platform to evaluating text similarity and relatedness in multilingual text collections for plagiarism detection. First, we utilized a number of selected texts in Chinese-English parallel corpora collected from internet to train text classifiers based on the Support Vector Machines (SVM) model. As such, the multilingual texts of unknown category can be classified by the trained classifiers. Subsequently, the resulting categorized texts were measured by means of a language-neutral clustering technique based on

Self-Organizing Maps (SOM) method for evaluating semantic similarity among texts. The preliminary results show that our platform framework has the potential for cross-lingual text relatedness evaluation and plagiarism detection.

FAVC: Clustering categorical data using the Frequency of Attribute Values Combinations

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Abstract

This paper proposes a new clustering algorithm for categorical data based on the frequency of attribute values combinations (FAVC). This algorithm finds all the combinations of attribute values in a record (which represent a subset of all the attribute values), and then groups the records using the frequency of these combinations. As the FAVC algorithm considers all the subsets of attribute values in a record, records in a cluster have not only similar attribute value sets but also strongly associated attribute values. The FAVC algorithm evaluated with real and synthetic data sets. The FAVC is shown better clustering results and superior running time in comparison with that of

COOLCAT.

A Multilingual Hierarchy Mapping Method Based on GHSOM

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Abstract

With the increasing amount of multilingual texts in the Internet, multilingual text retrieval techniques have become an important research issue. However, the discovery of relationships between different languages remains an open problem. In this paper we propose a method, which applies the growing hierarchical selforganizing map (GHSOM) model, to discover knowledge from multilingual text documents. Multilingual parallel corpora were trained by the GHSOM to generate hierarchical feature maps. A discovery process is then applied on these maps to discover the relationships between documents of different languages. The relationships between keywords of different languages are also revealed. We conducted experiments on a set of Chinese-English bilingual parallel corpora to discover the relationships between documents of these languages.

A Novel Extension of Rough Set Model in Incomplete Information

System

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Abstract

The purpose of this paper is to investigate the incomplete information system in which all unknown values are considered as “do not care” conditions by rough set technique. Based on the non-symmetric similarity relation for classification analysis in such information system, we propose the concept of valued similarity relation to show the degree that an object is similar to another one. The fuzzy rough set technique is employed to form rough approximations in terms of valued similarity relation. Further on the problem of inducing decision rules from incomplete decision system is addressed. Some numerical examples are employed to substantiate the conceptual arguments.

A Customer Data Mining Model Based on Fuzzy BP Neural Network

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Abstract

In this paper, we adopt a new synergetic algorithm, and according to the size of user vector intersection to select the nearest neighbors' collection, and use fuzzy BP neural network to forecast the score of user appraising to the option. The algorithm decreases sparseness of the nearest candidate data collection and avoids the disadvantage of dimensionality reduction method. Living example simulation indicates: this method raises the forecast accuracy, and raises the

selection q

Design and Implementation of Process Mining System Based on α-Algorithm

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Abstract

In the Service-oriented Architecture (SOA), business process analysis of the activities and process

redesign is an important aspect. Creating a process model is a time-consuming task and requires the participation of experts, as a "Business Process Reengineering" technology, process mining is an important way of monitoring business activities and improving the efficiency of workflow modeling, that is emerging research field. In this paper, we design and implement a graphic and interactive process mining system which is based on α-algorithm, its core idea is to extract information about processes from workflow log, and then we carry on the validation of the mining result.

N-Divided Travel Algorithm for SLCA Problem

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Abstract

Keyword search for smallest lowest common ancestors (SLCAs) is a convenient method to retrieve information from XML documents for most of users, especially who have no knowledge or experience on XML. There have been many proposed algorithms solving SLCA problem through transforming XML documents into XML trees labeled with Dewey codes. This paper presents a new solution, N-Divided Travel (NDT), targeted to light XML data retrieval. NDT scans Dewey codes at most once theoretically. Compared with LISA II, which has been proven to outperform ILE and SE, NDT do not need any join operations or mapping operations or extra data structures kept in memory. The new algorithm works more efficiently and fits for parallel environment after modification needed. LISA II and NDT also have been evaluated analytically and experimentally on data generated by XMark.

A Novel Approach for Frame-based Knowledge Similarity

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Abstract

This study proposes the RF-RS-RV structure for frame-based knowledge and integrates methods of conditional probability, vector matrices, and rule-based inference to establish a frame-based knowledge similarity algorithm. This algorithm can accurately calculate frame -based knowledge similarity matrices and determine the relationship among knowledge items, this relationship can function as the knowledge source for conflicts treatments and increase the added-value of the knowledge, so wrong
decisions be avoided. **Keywords**: Conditional Probability, Vector Matrices,
Artificial Intelligence inference, Similarity

Truth Value Flow Inference in Hybrid KBS Constructed by KWS

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Abstract

The Knowware System (KWS) has been proposed as an intelligent tool to support the development of knowledge-based system (KBS). It offers a set of intelligent components as basic processing units for the

user to model and develop a customized hybrid intelligent system more easily and conveniently without the necessity of being familiar with AI techniques. The framework of hierarchical knowledge representation and inference has been defined for the knowledgebased processing in KBS constructed by KWS. As a continued work, this article discusses the confidence transfer among different types of intelligen components by further extending the truth value flow inference.

Acquisition of Tuning Rules for Hot Strip Looper System based on Fuzzy Classifier System

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Abstract

In these days, electro mechanical systems are widely automatized in industry. However, the intervention of human is essential to enhance the performance of electro mechanical systems. Therefore, the methods and systems that have a technical substitution of expert's skilled technique are needed for teaching and assisting the unexperienced workers. PID controller of a hot strip looper control system is treated in this study. In hot strip looper control system, control parameters are to be optimized according to the rolled material, because control dynamics are greatly influenced by rolling conditions. We aimed to develop a support technology that autonomously acquires tuning rules like a skillful expert's decision-makings from accumulated operating data. A fuzzy classifier system is used for decision-making and learning hypotheses. A fuzzy classifier system could generate plural rules and pick up available rules from them. IF-THEN descriptions based on fuzzy theory were used for the representation of decision-making rules.