

Probabilistic Modelling of Nanoscale Inverters

Lan Long, Xiaojun Lu, Jian Ping Li, and Gang Zhao

Abstract - The device failure must be taken into account in the nano-scale design. This paper presents the probabilistic logic model to model the probabilistic behavior of a nanoscale inverter and inverter cascade. The analysis shows that the device probability distribution highly depends on the system structures and other performance parameters.

Index Terms - Digital circuit, probability, probability logic, nanoelectronics.

An Optimal Adaptive Iterative Learning Control in Nonlinear Systems Using Perturbation Model

Yixin Xu and Zhihua Xiong

Abstract— An optimal adaptive iterative learning control (A-ILC) algorithm based on perturbation model is proposed to handle model parameters change. Sufficient conditions of convergence are derived for the A-ILC. It has also been proved that the tracking error will converge to a small constant. Compared with other optimal A-ILC, the proposed method has capacity to cope with nonlinear systems. Simulation results on a typical batch reactor has shown the effectiveness.

Index Terms: adaptive iterative learning control, perturbation model, nonlinear systems, model parameter variation

Energy-Aware Optimizing Routing for Wireless Ad Hoc Networks

Xianlong Jiao, Xiaodong Wang and Xingming Zhou

Abstract—The nodes in wireless ad hoc networks are powered by the batteries, and transmission or receiving of the data packets and control packets will drain the batteries deployed at these nodes. So designing energy efficient communication techniques is one of the most important challenges for wireless ad hoc networks. In this paper, we propose an energy-aware optimizing routing protocol for wireless ad hoc networks which is based on PEER [1]. We incorporate the path accumulating characteristic and related link cost into the route table, and try to solve the problems existing in PEER protocol. The results of simulation in both static scenarios and mobile scenarios show that EAOR achieves better performance in energy consumption than AODV and PEER.

A Modified Differential Evolution for Constrained Optimization

Xiaohui Yuan, Bo Cao, Bo Yang, and Yanbin Yuan

Abstract—This paper proposes a hybrid differential evolution method to solve constrained optimization problems. In the proposed method, we apply chaos theory to obtain self-adaptive parameter settings associated with DE. In order to handle constraint effectively, comparisons among feasible and infeasible solutions are made so as to provide a search direction towards the feasible region. Furthermore, a simple feasibility-based selection comparison technique is devised to guide the process toward the

feasible region of the search space. The performance of the proposed method has been examined by its application to thirteen test cases, which were widely studied benchmark constrained optimization problems in literature. The results are very competitive with respect to three state-of-the-art evolutionary optimization algorithms and show that the proposed method is effective for handling constraints.
Index Terms—Differential evolution; chaos; constrained optimization; constraint handling

Research on Intelligent Vehicles longitudinal Control in Platoon Based on Vehicular Ad Hoc Networks

Yu Guizhen, Ding Nenggen, Feng chong Guo, Keyou

Abstract—It is necessary to know status information (such position, Speed and angle) of each vehicle itself and his neighbor vehicles for intelligent vehicles in platoon (IVIP), this paper formulates the problem in terms of sensing and communicated information named vehicular ad hoc networks (VANEs). By emulating intelligent vehicles in platoon using a group of small vehicles, the authors will discuss the IVIP architecture and its VANETs. The IVIP safe distance intervehicle control model were analyzed under using the VANETs ADOV route which was introduced. The paper is value for intelligent vehicle researcher.

Index Terms – Intelligent Vehicle; Vehicle Platoon; Vehicular Ad Hoc networks.

Study on the Performance of Grid Computing in Power System Distributed Computing

Abstract— This paper attempts to evaluate the performance of grid computing to be applied in electric power system. It can integrate distributed computing resources to perform high performance computing, hence, potentially providing an ideal solution for electric power system that is inherently distributed topology. This paper tested the performance of grid computing used as distributed monitoring and control, and distributed parallel computing. The test results show that the grid computing based distributed parallel computing can achieve comparable performance to that of MPI (Message Passing Interface), while it can be implemented on wide-area network and with lower performance of computers. To further improve the performance, WD-MPI (Wide-area Dynamic MPI), based on peer-to-peer (P2P) communication management of messaging is developed. In order to deal with flexible communication and bear with data delay or even data loss, asynchronous iterative algorithm is designed.

Index Terms— Electric Power System, Grid Computing, Distributed Processing, Monitoring and Control, Parallel Computing

KEY GENERATION FROM FACE FEATURES

Bo Fu, Jianping Li

Abstract—User always needs to remember passwords in many systems. But a low-entropy password is easy to be attacked, and a high-entropy password is not easy to be remembered. A scheme of key generation from face features is proposed. This scheme is based on FCS (Fuzzy Commitment Scheme) and utilizes the error-correct encoding technique and Hash algorithm to hide random key into biometric features. It realized

secure key reconstruction and authentication. This scheme not only protects the user's key but also prevents user's biometric features revealed effectively. The design is provably effective for biometric key generation and secure management through the experiment. The scheme is easy to extend to other biometrics since the extracting process of biometric features can not affect it.

Index Terms—Face recognition; Biometrics; Error-correct encode; Biometric key

Research on the Hierarchical Index of the Multimedia Educational Resources Database System

Abstract---Both the understanding of the semantics of the query requirement and that of the annotation of the resources will affect the efficiency of the information retrieval in the multimedia educational resources database system. This paper studies the representation of the features of the multimedia educational resources and the relationships between the hierarchical features. A hierarchical index is built based on the relationships to satisfy all kinds of queries to the educational resources database system. The high level semantics of the resources were mapping to the low level media features. The resources semantics annotated were extended by the mapping rules and the recall was improved. The mapping rules of the hierarchical characters also provide a way to represent the semantics of the resource automatically. The subject ontology standardizes both the annotation and the query requirement.

The precision will also be improved.

Index Terms—Hierarchy index, Educational Resources Database, Subject Ontology.

Filesystem Research and Implement based on uITRON Platform

Yujie Hao, Wulin Li, Jianping Li, Ping Kuang, Hui Liu

Abstract—In this paper, based on uITRON platform to design and implement a embedded file system can be divided into three parts including virtual file system, cache and FAT file system. The function of virtual file system is to support a serial POSIX interface for user and register or unregister a kind of file system textend material embedded file systm such as fat, ext2 and so onThe part of cache management can improve efficiency for accessing the block device and searching a file. There are two new points: firstly the cache can be registered and unregistered at anytime; secondly we refine the flow of cache in Linux platform. Finally, the third part of FAT file system can support three data format types including FAT12, FAT16 and FAT32. Meanwhile the file system can support short file name and long file name. In addition, the embedded file system can be used to access many block devices, such as ramdisk, SD card and so on.

Key words: uITRON , file system , page cache , VFS , FAT

Information Coverage based on Non-additive Measure in Wireless Sensor Networks

Wenming Cao, Rui Wang, Weixin Xie

Abstract—This paper generalizes the information coverage from probability space to Sugeno measure space, and

proposes a notion of λ -g random coverage based on non-additive measure. The simulation results show that λ -g random coverage is a more general coverage analysis for information coverage in wireless sensor networks. It can be transformed to probability coverage on one hand; it can also satisfy different requirements of non-additive information coverage on the other hand.

Index Terms—sensor network, λ -g random coverage, nonadditive measure, information coverage

Wavelet features and Gaussian Process Classifiers for Face Recognition

Jie Lin, Jianping Li, Guiduo Duan, Ji Ming

classification problem and some Gaussian Process classifiers had been proposed. Engaging the Gaussian Process classifiers, in this paper, we propose a new face recognition algorithm based on wavelet face features and binary Gaussian Process classifiers. This method employs a binary tree method to extend the ability of binary Gaussian Process classifiers for dealing with multi-class problem. In the experiments, we compare our face recognition algorithm with other traditional techniques including PCA and Associative memory Model on ORL and MIT-CBCL face database. The experimental results show that our face recognition algorithm is effective and competitive.

Index Terms— Gaussian Process Classifier, face recognition, wavelet.

A Novel Model for Variable Allocation on Memory-Bank of DSP

Lei Zhang, Jianping Li, Weiwei Lv

Abstract—Cooperation between CPU and memory is a key to improve efficiency of DSP application. There is an obvious gap between high speed of CPU and low memory band-width. New memory architecture had been invented to tackle the bottleneck. Furthermore, HW/SW co-design is a useful way for this problem, especially in real-time and huge data digital signal processing area. In this paper, we address the variable allocation problem in parallel model, to maximize the benefit of memory-bank architectural feature. We focus on a new graph model called data parallel allocation graph (DPAG) for the variable partitioning. Unlike the previous graph model, which is known as the interference graph (IG), our graph model can be used to analyze a cyclic DFG. After that, we provide a scheduling algorithm that based on DPAG model, it could dynamical adjust the variable allocation to gain maximum parallel property.

Index Terms—memory-bank; variable allocation; parallelism; DSP; graph model

Two Points on the Cost Management of Engineering Projects

Gu Hong-bo, Yong Long

Abstract—Cost management of engineering projects is an everlasting topic for construction enterprises. How to manage the cost and what the performance of the cost management is directly relevant to the economic benefits, survival and development of the construction enterprises. To reduce the engineering cost, we should minimize the material and labor consumption through the whole process and in every aspect of the construction. And the root way to enhance the market competitive strength of the construction enterprise is to control all the consumptions influencing the engineering cost within the planned scope. The article makes a primary probe into the management of the cost from two aspects: the all-sided management and the whole life-span cycle management of the engineering cost.

Index Terms—Construction engineering, project management and cost control.

Hybrid Recommendation based on Fuzzy Clustering and Data Filling

Ruiqin Wang

Abstract—In recent years, recommendation system has been widely used in many e-commerce environments to provide personalized guide and product recommendation. We all know that the most popular recommendation techniques—*Collaborative Filtering* has its drawbacks such as sparsity, scalability and cold-start problem. In this paper, a novel hybrid recommendation method has been proposed to overcome the limitations of CF. Firstly, we use a smooth filling technique on rating matrix with multiple data sources to solve the sparsity problem. Secondly, fuzzy clustering technique from both user and item sides has been used to improve the scalability and precision of the system. Finally, we experimentally evaluate our approach and compare it with the traditional collaborative filtering approach, the result of which demonstrates the effectiveness of our approach.

Index Terms—hybrid recommendation, collaborative filtering, fuzzy-clustering, data filling

Research on Semantic Grid Resource Query

Guoming Lu, lemin Li, Janping Li, Xiaofeng Gu, and Hui Liu.

Abstract—A dynamic grid computing environment is characterized by entity autonomy, and distribution. Within this paper, we describe a grid resource management model KRMM, Knowledge-based Resource Management Model, which manages the resource in a decentralized way while query and match resource based on global grid knowledge. With supporting of RDF and RDQL, KRMM can easily support grid resource set-matching and gang-matching. Further more, by extending ontology and inference rule, KRMM can support network centric resource correlated query by derived knowledge reasoning. This model is flexible and extensible, and is suitable for large scale grid resources matchmaking. **Index Terms**—Knowledge, Grid, Resource management

Terrain Following Flight Modeling and Simulation Research

Duan Xiaojun, Wu Chengfu, Chen Huaimin, Kang Fengju

Abstract—The real terrain following flight test is very dangerous, costly and time-consuming. To find faults of aircraft's terrain following system, improve terrain following algorithms, test Low Altitude Navigation Pod and reduce the flight-test risk, terrain following system's models, real-time HIL simulation platform and related key technologies are introduced. Simulation data is compared with real flight test data demonstrating the models and simulation have strong validity and credibility.

Index Terms—Terrain Following; Real-Time HIL Simulation; Low Altitude Navigation Pod

Construction Minimum Energy Cluster In Wireless Sensor Networks

Bo Tang, Yandong Wang, Mingtian Zhou

Abstract—As much as possible to prolong lifetime of wireless sensor networks (WSNs) is one of the most important challenges in designing and deploying WSNs. Since the battery sensor node equipped has limited energy amount, using cluster-based techniques can reduce the energy consumption efficiently and the communication patterns and topology of cluster also determinate the whole cluster energy consumption. In this paper, we firstly analyze the model of energy dissipation for transmitting data from the member nodes to cluster head; then propose a method to establish a minimum energy relaying link with an optimal number of hops to minimize communication energy costs over the link. This method is a significant guideline of realizing energy saving in WSN. Simulation shows that these methods can improve the efficiency of energy consumption and prolong the lifetime of network.

Index Terms—wireless sensor networks, minimum energy relaying link

A Methodology to Detect Malware Based on the NTFS file system

Guangyuan Yang, Yichao Li, Xiaodong Li

Abstract—By researching on the current developing trends of malicious programs, systematically comparing the various technologies and methodologies which are with respect to the hiding and detection of the files, and then comprehensively analyzing their deficiencies, we finally provide a brand-new hiding and detection methodology based on the NTFS file system, which makes the detection more integrated and reliable, especially on malicious programs. The experiment indicates that this methodology can almost detect all the current malicious programs which use hiding file technology.

Index Terms—Malware, NTFS file system, File hiding and detection, Rootkit, file system

Study on Automatic Identification Technology Architecture for Trucks

Chen Zhou, Luo Wuming and Han Pingyang, *Member*

Abstract—A technology architecture model on truck automatic identification is presented in this paper to realize intransit services demanded by intelligent transportation system(ITS) and logistics system, for example, Electronic Toll Collection(ETC), traffic information provision, telecommunication, navigation, items automatic identification, items status monitoring and theft avoidance. That model is based on a variety of ISO standards including Dedicated Short-Range Communication (DSRC), Communication Air-interface Long and Medium range (CALM), Radio Frequency Identification (RFID) and Global Position System (GPS). This paper also covers the components and fixing of on-board AIT equipment. Furthermore, operational process of truck transportation is analyzed to meet the requirements of both ITS and logistics system.

Index Terms – Truck Automatic Identification; DSRC; RFID; CALM;

Research of Multibiometrics Identification Based on Wavelet Analysis

SenHua Wang , JianPing Li

Abstract—In this paper, a kind of new method about Multibiometrics Identification based on wavelet analysis was proposed. In the method, the single biologic characteristics (iris and fingerprint) were abstracted by Gabor wavelet and the wavelet and neural network was adopted for recognition. Furthermore, data fusion was carried out at matching layer and decision layer. The analyses of the theory and emulational experimental evidence showed that this method possesses higher discrimination related to other methods in the same condition.

Index Terms—Multibiometrics Identification, Wavelet and Neural network, Data fusion

Topological Semantic Based Similar

GeometryGraph Searching

SHE Li, FU Yan

Abstract—To satisfy the requirement of geometric graph drawing and searching on disciplinary knowledge platform, this article introduces the related thought and methods of graph similar in the pattern recognition and understanding, analyzes the graph similar feature, features similarity connotation and similarity property. Property then the computation method of similarity degree is put forward. The graphic features are described by means of graph while the graphic coding mode is proposed at the same time, with which the graphic can be changed into digital. In the following, graphic code as the source and similarity degree as a basis hierarchy discrimination algorithm of graphic similarity is brought forward. It shows that the new algorithm has stronger flexibility and stability compared with traditional one.

Index Terms—Topological Semantic; Graph Similar; Similaritydegree; Graphic Feature code.

The Research of GA Optimization Neural Network Weights Blind Equalization Algorithm Based on Binary Coding

Zhang Liyi, Liu Yong, Liu Ting, Sun Yunshan, Li Qiang

Abstract—Two-stage optimization project was proposed by applying genetic algorithm to neural network blind equalization. At first, the initialization weight was optimized using the characteristic of genetic algorithm, which is strong global search capability. And then, optimal weight was gained in virtue of the merit of BP algorithm, which is fast local search speed. Simulation shows that, compared with traditional blind equalization based on BP neural network, the convergence speed of proposed algorithm is quickened, state residual error is decreased and BER is reduced.

Index Terms—blind equalization algorithm, neural network, genetic algorithm, initial weight

A Method of Feature-Weighted Based on a Combination of Concept Attribute and Keywords

XiWei Wang¹, JinRui Chen², LinZhi Zhao, JingJing Shen

Abstract—This article aims to improve the method of feature weighting which based on concept attribute. HowNet-based conceptual feature weighting method only considers hierarchical structure, without location information in a given source text. This paper made research on the classification influence when characters appeared in title, abstract, outset and ending of source ext, and On thebasis of this, A Method of feature-weighted based on a combination of concept attribute and keywords is expounded.

Index Terms—Feature-Weighted,Attribute,Keywords,HowNet

Authentication Scheme of Remote Users by Using Multimodal Biometric and Smart

Cards

De-song WANG , Jian-ping LI , Yuan TANG, FU-long XU, and Yue-hao YAN

Abstract—In the recent several years, Lee et al. and Lin-Lai proposed fingerprint-based remote user authentication schemes using smart cards. But their schemes are vulnerable and susceptible to the attack and have practical pitfalls. Their schemes perform only unilateral authentication (only client authentication). In order to overcome the flaw, Khan and Zhang present a strong remote user authentication scheme by using fingerprint-biometric and smart cards. The proposed scheme is an extended and generalized form of ElGamal's signature scheme whose security is based on discrete logarithm problem, which is not yet forged. In addition, computational costs and efficiency of the proposed scheme are better than other related schemes. But as the time lapses, fingerprint of some people will be changed, such as being burned or being wounded. Once such case happened, the user won't be authentication. So we propose the authentication scheme of remote users by using multimodal biometric (fingerprint and face features) and smart cards. Proposed scheme not only overcome drawbacks and problems of previous schemes, but also provide a stronger and more secure authentication of remote users over insecure network.

Index Terms—authentication, fingerprint, face, biometric, smart card, security

Overview on Thresholding Functions of Wavelet Shrinkage

Zhang Yi, LI Jianping, Wang senhua, Xiao Shucheng

Abstract— In recent years, there has been a plenty of work on using wavelet method for denoising, due to its effectiveness and simplicity. Wavelet denoising methods are classified three classes that include shrinkage, projection and correlation method [1]. Nowadays studying for wavelet denoising is focused on shrinkage method which is categorized two classes: one is thresholding shrinkage and another is scale shrinkage. In fact thresholding shrinkage is more useful, comprehensive and effective than others at present. Thresholding function is a crucial factor in thresholding shrinkage and this paper will introduce all kinds of thresholding functions as follows.

The Description Logic-based Image Retrieval

Jianming Liao, Guoxia Liu, JianPing Li, Yujie Hao, Xiang Zhang

Abstract—Due to the image is full of meaning, and it is difficult to accurately describe the characteristics of the image content by textual information, such as image color, texture, shape, and so on. Express method for the outline borders, colours and texture of the foreground is brought forward, using mathematics, which can express the basic graphic shape clearly. Fuzzy integral Sugeno also is used in the graphic conversion for measuring the similarity.

Index Terms—Description Logic, Image Retrieval, Sugeno

Research on Personalized Search Engine Based on User Profile

Xiao Wu, Peng Wang , Dan-Ning Li, Jian-Ping Li

Abstract—With the rapid development of Internet, the number of accessible web pages has been growing exponentially on the Internet. It therefore has become increasingly difficult for users to find information that satisfies their individual needs. This paper presented a vector-based model developed to improve the effectiveness of search engines. With this model, described by a hierarchy tree, the user preferences (profile) could be defined and recorded. Each of these constructed user profiles was made adjustable in each query to meet precisely his or her individual needs. Furthermore, an adjusting algorithm for the user profile was developed. A series of simulation tests indicated that the precision of the returned web pages

was effectively improved.

Index Terms—Information retrieval, interest tree, personalized search, user profile

Fuzzy Granules Clustering Analysis Based on Quotient Space

Xingxing Tan, Yongquan Yu, Xiayu Zhang , Hongfei Yang and Feng Ye

Abstract—This paper proposes a fuzzy granules clustering algorithm which based on quotient space. It makes use of metric space and F-statics approach. In this algorithm, information granule is represented by quotient space distance and different clustering results can be got by different granules. At the same time, it makes full use of accuracy of clustering by F-statics to find the optimal clustering mode from the different granules clustering results. The algorithm is especially efficient for the case that it is difficult to evaluate the performance of clustering in advance. As the experiment did by Matlab showed, it found the optimal clustering mode and proved its validity.

Index Terms—quotient space, granular computing, clustering analysis, F-statics, optimal clustering

Study of Legendre Wavelets Neural Network Based on BP Neural Network

Luo Ya, Xiao Shucheng

Abstract— A Legendre wavelets neural network is constructed with Legendre wavelets based on BP neural network. Because of the piece wise expression and being polynomials features which Legendre wavelets defined on the interval $[0,1)$ has, the Legendre wavelets neural network has the advantages of simple structure and high convergence rate. Trained by BP algorithm, a better approximate result is obtained by using Legendre wavelets neural network with six wavelet basis functions to approximate one function.

Index Terms— legendre wavelets, BP algorithm, legendre wavelets neural network

Hierarchical Classification Model of Attribute Decomposition Approach Based on Rough Set

Qizhong Zhang

Abstract—In data mining, it is difficult to construct classification model for massive high-dimension databases. Time complexity of computation is high, and obtained classification models are difficult to understand or interpret. Based on rough set theory, this paper proposed a new attribute decomposition approach to discover concept hierarchy in the database and establish hierarchical classification models. For familiar databases with prior knowledge, several attributes are grouped together; for unfamiliar databases, attributes are selected and grouped together according to data table decomposition measure; and then objects' classes are re-labeled according to the coincidence search indicator proposed in this paper. Then discover intermediate concept layer, construct hierarchical classification models, divide massive high-dimension databases into small databases hierarchically. Besides, because intermediate concept layers have certain physical meaning, the understandability of the model is greatly improved. Finally, this paper validated the effectiveness of this algorithm with cases and public datasets from UCI. The result shows that this algorithm can produce hierarchical classification models with clear hierarchies, strong understandability, while still keeping high classification rate.

Studies for Disjoint Paths Algorithm

with QoS constraints

Ren Hong, Zhang Min, Jiang Yinghua, Ren Jingan

Abstract—The definition and relative theories of disjoint paths with QoS constraints were summarized. the model of disjoint optimal paths with QoS constraints problem was illustrated. current disjoint paths algorithm were analyzed. at last the direction for future study and problem existed of disjoint paths algorithm with QoS constraints were put forward.

Index Terms—QoS, disjoint paths, routing

Optimum dynamic parallel downloading scheme

Li ZePing, Lu Xianliang, Li Lin, Nie Xiao Wen, and Pu Xun

Abstract— In order to improve parallel download efficiency and performance, we first consider how to select an optimum server subset from all replica servers, and then an optimum dynamic parallel downloading scheme is proposed for minimizing parallel downloading time, and balancing the load and the traffic among all replica servers located at different positions within the network. The experimental results show that the proposed scheme is superior to the existing schemes.

Index Terms—content distribution network, peer-to-peer, parallel downloading algorithm.

Investigation on Basic Attributes of Subsystems in Complex System Based on Voronoi Diagram

QU Zhi-ming, GAO Ai-kun, and LI Yi-jie

Abstract—Any complex system (CS) are composed of many subsystems. The subsystems interaction and sharing attributes reflect the basic properties of the CS. The basic subsystem attributes and their effects are the important contents studying the relations between subsystems and the entire CS. Using the mathematical tool of voronoi diagram, the CS is divided into many subsystems and integrated in the voronoi diagram. Moreover, the inner features of the subsystems are analyzed. Through the analysis, the moving subsystems are introduced and described. Utilizing the voronoi neighbor relations, the attributes such as integration, information balance, and space self-adaptability and information correlation are generalized by analyzing the moving subsystems' voronoi neighbor information characteristics. Based on the voronoi neighbor, the theoretical foundations of the research on subsystem interaction will be studied.

Index Terms—balancing attributes; CS; subsystem; Voronoi diagram

Platoon Dispersion Prediction Under the Condition of Adjacent Cycle Traffic Flow Overlapping Based on Least Square SVM

Lu Shoufeng, Liu Ximin, Dai Shiqiang

Abstract—Coordinated signal control can improve the continuity of vehicular traffic flow movement and reduce delay. Cycle Flow Profile (CFP) is the base for calculating coordinated signal control parameters. Platoon dispersion characteristic determines the CFP. So, improving platoon dispersion prediction accuracy can obtain significant benefit for signal coordination. When the velocities of the vehicles vary greatly, faster vehicles of next cycle can catch up the slower vehicles of the current cycle. Traffic flow overlapping of adjacent cycle is an important characteristic. The paper adopts least square support vector machine to predict platoon dispersion and compares prediction accuracy with Robertson formula. The results are promising.

Index Terms—Platoon Dispersion Prediction, Adjacent Cycle, LS-SVM

Analysis and Design of Energy Balance Control System in Iron and Steel Enterprise

Abstract—Due to the status of the energy information management of iron and steel industry in China, this paper analyzed the energy balance theoretical foundation of iron and steel enterprise energy based on Tonghua Iron and Steel Group Company. Composition and function of the energy balance control system have been introduced in detail. Further, it presents the design idea of data mining and energy balance expert system and discussed the key technology of design the real-time database. The fact of two past years proved that the operation of energy balance control system has reduced whole energy consumption of Tonggang Group Company more than 2% actually. It means there are more than 50 million yuan have been saving every year.

Index Terms—energy balance, data mining, expert system, real-time database, energy consumption

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Index Terms—energy balance, data mining, expert system, real-time database, energy consumption

Research on Safety-Running Expert System for Steam-turbine-generator

ZHANG Zhi-Gang , CAO Jing-Sen

Abstract—Along with the development of the power industry, the single generator's capacity of the generating set and the numbers are enlarging continuously. Once malignant accidents take place, it may result in huge loss. It's necessary to design high reliable expert system, collecting together the operation experience of power group expert, supervising the safety running of power system.

Index Terms—expert system, safety running, fuzzy-weighted inference algorithm, Steam-turbine-generator

Research on Xylophone-playing Manipulator Based on Beating Keys with Single Mallet

Tingjun Wang, Youlian Song, Zhonghai Yu, Ye Wang and Shaojie Xin

Abstract—According to requires of playing xylophone, a new type of xylophone-playing manipulator based on beating keys with single mallet is presented. Its structure, working principle and important performance

parameters are analyzed. The xylophone-playing manipulator consists of mallet-moving structure, mallet-holding structure, mallet-beating structure and control system. By means of three servo motors being controlled respectively and encoders being used to detect positions of the servo motors, the manipulator achieves to control movements of the mallet. These include lateral movement, lengthwise movement and mallet-beating movement. Its control system and motion controller have also been designed and analyzed. It is designed to adopt host computer and slave computer control mode so that communication and data transfer mode between industrial control computer and DSP are discussed. Inertia reducing has also been discussed. The results show that the xylophone-playing manipulator can preferably imitate a hand to play xylophone. Its synchronistic belt structure and servo control system for position and velocity ensure accurate movement positioning. It has simple structure, agile motion, little inertia and accurate playing positioning. It can play some un-complex music according to music control programs in host computer.

Index Terms— Motion controller, mallet-beating structure, mallet-holding structure, mallet-moving structure

Research on Modeling and Stability Analyzing of Networked Control Systems with Parameter Uncertainties and Long Time Delay

MU Guoyan, Li Jing, Kang shugui and Wang ying

Abstract—Considering the uncertain long time-delay of networked control systems with parameter uncertainties, the modeling problem was discussed and analyzed firstly. Suppose sensor nodes of networked control system were time-driven, actuators and the controller were event-driven, the sampled data of sensors were lumped together into a single data packet, and the transmission delay was more than one sampling period and parameter uncertainties existed in the system, the networked control system with parameter uncertainties and long time delay was modeled as an uncertain discrete linear system with long time-delay. And then based on Lyapunov functional approach, sufficient conditions of asymptotic stability of closed-loop systems were given, and the state feedback controller was obtained based on the feasible solution of the linear matrix inequalities. The simulation results verify that the method is valid for the uncertain long time-delay problem of networked control systems with parameter uncertainties.

Index Terms—Linear Matrix Inequality, Long Time Delay, Lyapunov Stability, Networked Control Systems, Parameter Uncertainties

Monocular Reconstruction of Human Motion by MTA with Weighting Parameter Determination

Li Zhang, Ling Li

Abstract--A motion trend analysis method is proposed to reconstruct human motion from un-calibrated monocular video. In this method, weighting parameter determination which synthesizes contribution from 2D re-projection mismatches and 3D positional coherence is a critical component for the accuracy and efficiency of motion reconstruction. Numerical studies are conducted on experiments from synthetic and real video data to demonstrate the correctness of the weighting parameter determination method.

An Improved Robust Digital Watermarking

Algorithm Base on WaveletDecomposition

Guiduo Duan, Tianxi Huang, Jianping Li

Abstract—Based on Deepa Kundur's paper [1], in this paper we present an improved version with stronger robustness. Instead of random picking, we select embedding position according with HVS characteristic, and by mathematical deduction, specific conditions are given to make sure the algorithm works well when the quantified distance is tiny or even 0, which is impossible for the original algorithms. In this way, both robustness and imperceptibility are guaranteed. Experiment results show that proposed algorithm greatly enhanced the ability to against various attacks, especially cropping, as well as offering superior advantages over Deepa's algorithms.

Index Terms—Digital watermarking, wavelet transform, HVS, Condition Deduction.

Handwritten numeral recognition by Model Reconstruction based on Manifold Learning

Wu Wei, Yang Xiaomin, He Xiaohai, Chen Mo

Abstract—To overcome the instability of handwritten character caused by different writing style, a novel approach of model reconstruction based on manifold learning is proposed in this paper. Traditional recognition method reduce dimension firstly, and then recognize the character in the reduced feature space. In this paper, we present a method based on reconstruction LLE. The algorithm first reduce dimension in each class. Then reconstruct the character in each class. Finally character recognition is then conducted based on the error analysis of reconstruction model. The algorithm proposed in this paper is tested on the characters in MINST character database and the experimental results demonstrate that the method can effectively improve the recognition rate of handwritten digits and provide a new approach to the research of handwritten digits recognition.

A New Algorithm for Solving Frequency BandDerangement of Wavelet Packets

Xiaojing Chen, Zhenwen Liu, Di Wu, Yong He, Shou Liu

Abstract—A new algorithm was put forward to solve frequency band derangement of wavelet packet transform without changing the original wavelet packet algorithm. Although wavelet packet transform has many merits, the sequence of decomposition frequency bands was not arranged based on frequency ascending order. In this paper, the reasons of frequency band derangement were analyzed: the frequency domain of the highpass filter (G) and lowpass filter (H) was restricted and finite, which cause frequency band derangement. The sequence of frequency band of wavelet packet transform was rearranged by the new algorithm using recursive and dichotomy algorithm. The new algorithm not only has solved the defection of frequency band derangement, but also explained clearly the physical meaning of wavelet packet transform, furthermore. Because of unchanging the original wavelet packet algorithm, the new algorithm can be applied in practice conveniently.

Index Terms—wavelet packet transform, frequency band derangement, highpass filter, lowpass filter

A Genetic Algorithm based on Metropolis Ruleand its Application in Multi-agent based Ecommerce

Li Jian , Jing Bo

Abstract- In Multi-agent based E-commerce, how to make the negotiation agents gain satisfying result farthest and negotiate efficiently is a key issue. As for this problem, a genetic algorithm based on metropolis rule is present and the algorithm is applied in bilateral multi-issue simultaneous bidding negotiation protocol in E-commerce. The negotiation agent can send the information of its issue range and the issue weight to the third party agent which it trusts, and then the third party agent use the genetic algorithm which is present in this paper to give the optimal result. In the experiments, the two methods are used to compare. The first is simple genetic algorithm (SGA), the second is the genetic algorithm based on metropolis rule (MGA). The difference is the later algorithm adds the metropolis rule. The experiments show that the algorithm present in this paper can help agents to negotiation more efficiently.

Improved Minimum Interference Routing Algorithm for MPLS

XU Jie, XU Fu-long, FENG Zhi-gang, LAI Kun-feng

Abstract- In this paper, on the basis of existing dynamic routing algorithms for MPLS traffic engineering, an improved minimum interference routing algorithm for optimizing network throughput is proposed. This algorithm takes into account both network topology and traffic distribution condition. It is more effective by introducing flow-prediction of ingress-egress nodes used for routing computation.

Index Terms- traffic engineering, MPLS, dynamic routing, ingress-egress node

A Class of Reproducing Kernel Spaces Generated Based on Gauss Wavelet

Caixia-Deng , Sheng-Zhu

Abstract — In this paper, the Gauss wavelet is used as windowed function in windowed Fourier transform, and then a class of reproducing kernel spaces are induced , meanwhile the reproducing kernel spaces are used to approximate the Hilbert space.

*Index Terms—*Gauss wavelet, reproducing kernel space, windowed Fourier transform, Bargmann space

Temperature Precise Control for Semiconductor Laser Based on Genetic Algorithm

CHUAN-RONG XU, rongrui cHen, XIUWEN YANG, ZHANG JIE

*Abstract—*In this paper a temperature control method for laser was proposed. The genetic algorithm was used to calculate parameters of PID control to get constant operating temperature by controlling thermoelectric cooler. The long-term experiment showed the variation of laser temperature was smaller than 0.1 degree and the variation of output laser wavelength was limited in 0.01nm, which met the practical requirement well.

*Index Terms—*Diode laser, Genetic algorithms, Temperature control

An Affective Decision-making Model in Humanoid Robot

Yu Jun, Wang Zhiliang, Xie lun, Xia Yongxiang, Li Zhiqiao, Pang Xiang

Abstract—This article introduces a general function configuration of humanoid robot. In order to endow humanoid robot with emotion, the article applies decision-making of multi-mode behaviors based on artificial psychology. Such the behaviors of humanoid robot can be more similar to human and be more easily comprehended by human. And human can interact with the humanoid robot more spontaneously and intuitively. By using the affective decision-making model in explanation robot, the basic interaction between human and humanoid robot can be achieved.

Index Terms—Artificial intelligence, artificial Psychology, affective model, humanoid robot

An Improved Coding Algorithm Based On EZWAlgorithm and HumanVisualCharacteristics

Xiaofeng Gu, Bing Xue, Jianping Li, Guoming Lu, Shixin Sun

Abstract—The paper proposes a wavelet transform coding algorithm based on visual characteristics after a thorough analysis of the original EZW algorithm. By the tests, the improved algorithm not only bears the effective compression performance of the original EZW algorithm, but also improves the visual quality of image.

Index Terms—wavelet transform; human visual characteristics; EZW algorithm; compression coding algorithm

An Immune Network Algorithm with Density and Depth Information for Data Clustering

Abstract—AINet is an evolutionary algorithm based on the principle of immune system. In this paper, we introduce a novel algorithm AINDD (AINet with Density and Depth factor) which is implemented by modifying AINet with two factors that is absent in the original algorithm. We apply this algorithm in data clustering to illustrate the main process. There are basically two steps taken. First, the experimental data set is compressed by AINet with the density factor which is designed to ameliorate the antibody mutated effect. Then the multilayer MST cutting strategy with a depth factor is operated on the output of the first step. The obtained clustering results show that this algorithm can increase the accuracy of data clustering on some level, which could shed some lights on the further improvements of artificial immune network models.

An Improved Local Search Algorithm for Scheduling Independent Tasks on Parallel Processors

Shang Mingsheng, Wang Qingxian, Fu Yan and Li Jianping

Abstract—In this paper, we study the problem of scheduling a set of independent tasks onto parallel systems, with the objective to find a mapping of all tasks such that the finish time is minimum. We develop an improved local search algorithm which shortens the makespan greatly. Extensively experiments verify the power of our algorithm.

Index Terms—task scheduling, parallel computing, independent task, local search algorithm, makespan

Control of fractional-order chaotic system to approach any desired stability fixed point via linear feedback control

Zhou Ping, Zheng Ji-ming, and Zhang Nian-ying

Abstract—According to stability theory of fractional-order linear systems, we can obtain any desired stability fixed point from fractional-order chaotic system via linear feedback control. The condition of any desired stability fixed point is established theoretically rigorous. The control parameters are irrelative with stability fixed point.

Index Terms—fractional-order chaotic system, stability fixed point , feedback control

A New Secure Communication Scheme Based on Synchronization of Chaotic System Driven by Auxiliary System

Yonghong Chen, Shoji Kasahara, Yutaka Takahashi

Abstract—This paper proposes a chaotic secure communication scheme by introducing a concept of key function (KF) and key initial conditions (KICs). By using KF, secret signal is combined with complex chaotic signal in order to augment the security of transmitted signal. KICs are used to enlarge minor mismatch of drive signal which is generated by auxiliary chaotic system to drive identical chaotic systems in sender and receiver, so as to increase initial conditions' sensitivity of whole system. At an encrypter, based on encryption key functions (EKFs), a sufficiently complicated chaotic transmitted signal is generated which consists of masked secret information and chaotic system signals. In this system, the auxiliary chaotic system is used to drive two identical chaotic systems in sender and receiver to be synchronized. At the decryption, if and only if offers the same auxiliary system' KICs and right decryption key function (DKF) corresponding to EKF, it can retrieve secret information. Then security of chaotic secure communication system is greatly enhanced.

Index Terms—key initial condition, key function, secure communication, chaotic synchronization.

Circular searching algorithm for contours extraction based on discrimination analysis

Zhi-heng zhou, de-lu zeng

Abstract—Contours extraction in the image has a wide variety of applications in computer vision. Current algorithms are confronted with the problems that the optimization of energy function will trap in local minimums and the contour evolutions greatly depend on the initial contour selection. A searching algorithm for object contours using a series circles with adaptively changing centers and radiuses is proposed in this paper. So, as few pixels as possible are used to finish the searching. On the other hand, Discrimination Analysis is used to judge the object boundary points in order to avoid deciding the gradients threshold. Simulation results show that the proposed algorithm performs contours extraction greatly.

Keywords:

Contour extraction; circular searching; discrimination analysis

The Generation Algorithm of Minimal DNF for Discernibility Function in Rough Set Theory

Zhiwei Yin, Dan Li, Jianpei Zhang

Abstract—The generation method of the disjunctive normal form (DNF) for discernibility function is one of the important factors which influence the efficiency of attribute reduction based on Skowron discernibility matrix. The direct search method based on mathematic model has problems such as waste of memory space and CPU occupation time because the calculated result is not a minimal DNF for discernibility functions. Aim at problems mentioned above, a novel algorithm which can directly generate the minimal DNF of discernibility functions combining with the simple matrix operations is presented. This algorithm saves memory space and CPU occupation time, and enhances the generation efficiency of decision rules through the way of using simple matrix operations instead of using complicated generation procedure of DNF for discernibility function.

Patch-Based Texture Synthesis Via Mincut/Max-flow Algorithms

WU Bo, WANG Yan, LIU Xiao-Yun

Abstract—In this paper, we introduce a new algorithm for image texture synthesis from an input sample. In our approach, patch regions from a sample image are selected and copied to the output and then stitched together along optimal seams to generate a new output. In contrast to other techniques, we use min-cut/max-flow technique to determine the optimal patch region between the input and the output texture, and we use a zigzagged double direction scanning method instead of raster scan order method. This can restrain texel's imperfection and orientation of texture synthesis effectively. The results show that our method can produce a more satisfactory effect.

Keywords—Texture Synthesis, Minimum Cut, Maximum Flow, Markov Random Fields

Inseparable Wavelet Combined with SPIHT Algorithm Based Image Compression

Zhang Jie, Xu Pengfei Xu Chuanrong

Abstract—This paper presents a family of coset based constructed(CBC) two-dimensional biorthogonal inseparable wavelet, and we analyze the characters of two dimensional signals transformed through our wavelet. Combined with SPIHT coding scheme, a scheme of image compression is given out. Experimental result shows that our scheme performances nearly the same with that of CDF97 wavelet. The advantage of our scheme is that the filter coefficients we construct are all binary rational numbers, thus, the complexity of computation can be reduced notably, and the realization on hardware will be much easier.

Index Terms—two-dimensional inseparable wavelets, biorthogonal, SPIHT encoding image, compression

Research on VRPTW Optimizing Based on Improved Two-Phase Algorithm for Electronic Commerce

Chunyu Ren

Abstract—Vehicle route problem with time windows of logistics distribution is the important step optimizing logistics distribution and indispensability content of electronic commerce activity. For VRPTW optimization under electronic commerce is a special problem that includes many aspects, hybrid strategy is usually introduced to classify and optimize route by two artificial intelligent methods. Therefore, the Improved Two-Phase Algorithm needs to be adopted to get solutions. New algorithm offers a very effective method to solve problem of distribution vehicle schedule with time windows through the test.

Index Terms—Electronic commerce, vehicle routing problem with time window, Self-organized mutation arithmetic operator, improved two-phase algorithm

An Algorithm for Routing Based on Quantum Superposition States

Zhi Nie, Peng Wang, Jian-ping Li, Guan Yin

Abstract—There are many routing problems belong to NP type, traditional methods will lose efficiency by ordinary because of large computation. So, in order to reduce the communication complexity, a high-speed and efficient algorithm using quantum superposition states technology has been proposed which can be used in routing choice. In this paper, we reported on the latest routing technology and constructed a general mathematical model of quantum routing algorithm according to the principle of quantum superposition states. Simulating results show that the routing through the algorithm gains an advantage over conventional algorithm. Furthermore, it has stronger practicality and robustness.

Index Terms—Quantum mechanics, routing algorithm, state function, superposition states.

A Tree-based Energy-efficient Routing Algorithm For Wireless Sensor Networks

ZHENG Gu-ping, ZHOU Yu

Abstract—Considering the limited energy and transmission range of sensor nodes in sensor networks, a tree-based energy-efficient routing algorithm is discussed. According to maximum residual energy of nodes, a tree whose root is the sink node was set up in the covered field in which nodes with maximum residual energy less than ε are leaves. And a reliable routing algorithm is used when there have nodes death in the transmitting process. To optimize the algorithm, we use the α -constraint, which puts a soft limit on the maximum number of children a node can have in a tree. It can achieve lower latency and more energy-efficient, and the lifetime of the network is prolonged.

Index Terms—Wireless sensor network, Routing, Maximum residual energy

On Nonlinear Approximate Optimal Controllers for Disturbance Rejection

De-Xin Gao, Wen-Wu Zhang

Abstract - This paper considers the feedforward and feedback optimal controller design problem for a class of nonlinear systems with external disturbances. An approximate optimal control algorithm is developed. By constructing the sequences to decoupling the nonlinear two-point boundary value (TPBV) problems, the original optimal control problem is transformed into a sequence of nonhomogeneous linear TPBV problems. The optimal control law is obtained by iterative solving the constructing sequences, which consists of accurate linear feedforward and feedback terms and a nonlinear compensation term. By using the finite-step iteration of the nonlinear compensation sequence, we can obtain a suboptimal control law.

Simulations indicate the algorithm is efficient and robust with respect to persistent disturbances.

Index Terms - nonlinear systems, disturbances, approximate optimal controller

Particle Swarm Optimization Algorithm Based on Divided-interval Chaotic Search

Xu Qiushi , Wang Xiangdong, Lin Zhen , Wang lei , Wang Junfeng

Abstract—Though chaotic particle swarm optimization algorithm lets particles search in the whole variable space, the search scale is too large and the high precision of solution is hard to achieve. This paper proposes a particle swarm optimization algorithm based on divide-interval chaotic search, it lets the particles search in the selected interval, reduces the scope of the search space, and makes the solution more approximate to the global optimum. And the comparable experiment shows that the algorithm has preferable results.

Index Terms—Chaos; particle swarm optimization; divided interval

Application of an Improving Particle Swarm Optimization Algorithm in Controller Parameters Optimization

Zhao Guo-rong, Qu Jun-wu, Gao Qing-wei

Abstract—In this paper an improving particle swarm optimization (PSO) Algorithm of PSO based on double object function is proposed, and it is applied to the optimization of Block Diagonal Controller (BDC) parameters, which respectively adopts error absolute value and integral of error absolute value as object function that achieves on-line Optimization of controller's parameters. Comparing to conventional choosing controller's parameters according to experience, it adopts this method that can automatic optimize controller's parameters, and decreases designing difficulty of controller. The simulation results demonstrate this method can effectively tune BDC parameters, which has the traits of better capability of global search, quick convergence and better optimizing effect.

Keywords—object function; PSO; BDC; optimization; DOF PSO

A Modified Differential Evolution for Constrained Optimization

Wen Shuhua Lu Qingbo Zhang Xueliang Wang Xiaoli

Abstract—This paper proposed a modified differential evolution algorithm (MCDE) to solve constraints optimization problems. The method used three simple selection criteria based on feasibility to guide the search in the feasible region. The proposed approach did not adopt the penalty function method, in contrast to the penalty function method, the constraint-handling technique of this paper is very simple, does not require additional parameters. In addition, this paper incorporated the center point of the population into the DE algorithm, and modified the crossover factor of DE algorithm. Simulation and comparisons

based on four testing functions and one engineering example demonstrate the effectiveness, efficiency and robustness of the proposed MCDE.

Index Terms—Constrained Optimization, Differential Evolution, Modified

A Fast Iris Localization Algorithm Based on Hough Transformation

Qin Huang, Xiaofeng Gu, Jianping Li, Jianming Liao, Huamin Liu

Abstract—In this paper, we propose a fast and robust iris localization algorithm based Hough transform. We make a contrast with the algorithm proposed by Wildes, which is also based on Hough transform and has representative. The wildes algorithm is proved has high accuracy but it's time consuming, thus it's not has good real-time performance. Our algorithm preserves the high accuracy characteristic and makes a great improve in executing efficiency. Iris localization includes the inner boundary localization (the contour between pupil and iris) and the outer boundary localization (the contour between iris and sclera). Our algorithm use different method to improve the two boundary localization according to different characteristic of the two. Experimental data shows good performance of our algorithm.

Index Terms—hough transform, iris localization, morphologic opening

Constructing 3D Virtual Museums on Internet

Zhen Liu

Abstract—There are many museums for public in china, but some people seldom visit any museum, how to develop museum resources has important meaning for society. With the recent development of 3D technology on Internet, application of virtual reality is becoming a hot topic in the domain of virtual museums. People strongly hope to get more 3D information from virtual museums. In this paper, a method of constructing a virtual museum is demonstrated. Ningbo Exhibition Center and HeMuDu museum are selected as the experimental scenes, and these two virtual museums are built in 3D software and VRML language. Users can roam and watch in the two virtual museums.

Index Terms—Virtual Reality, Web3D, Museum, Internet

A Novel Frequent Itemsets Finding Algorithm Based On Variant Support Value

Hu Xiaodan, Wang Yongchu

Abstract—There are many frequent itemsets finding algorithm been developed in the past several years, To simplify the question, a constant support constraint is used in most of these algorithms, this has some different with our ordinary knowledge, In general, itemsets that contain only a few items will tend to be interesting If they have a high support, whereas long item-sets can still be interesting even if their support is relatively small. To improve this question, this paper proposed a novel algorithm to find the frequent itemset which satisfy a length-decreasing support constraint. Experiments show that this algorithm is much faster than the FP-growth algorithm for finding itemsets at a constant support.

Index Terms—data mining, frequent itemset, support value

Computer Simulation of Metal Cutting Process on the Elastic-plastic Deformation

Jinling Song

Abstract—Computer simulation of the metal cutting process has been done for von Mises yielding criterion and Prandtl-Reuss flow rule. Based on the physical model, mathematical modeling is brought forth with modified

lagrangian matrix equation. Super-over-relaxation method is applied for solving the elasto-plastic deformation problems. Programs for grid plotting, calculating and graphically-reporting are edited and successfully executed. Experiments have shown that the simulating system is able to supply the reliable and acceptable decision-making of the machining design for technicians or workers .

Index Terms—Computer simulation, Metal cutting, Mathematical Model, Stress-strain distribution

Image Fusion Approach Based on Bidimensional Empirical Mode Decomposition

Youzhi Zheng, Zheng Qin, and Xiaodong Hou

Abstract—This paper proposed a novel multiresolution image fusion approach, which is based on bidimensional empirical mode decomposition (BEMD). The BEMD image is different from the former multi-scale image fusion algorithms which need predetermined filters or wavelet functions. This letter made research on several key issues relevant to the 2D image decomposition and proposed a BEMD image fusion rule to 2D Intrinsic Mode Functions (2D IMF) and residue image of BEMD. The experiments showed the improved performance of this novel algorithm compared with the discrete wavelet transform (DWT).

Index Terms—image fusion, Bidimensional Empirical Mode Decomposition (BEMD), 2D Intrinsic Mode Functions (2D IMF) surface interpolation, consistency checking

Image Super-resolution Reconstruction Based on Sub-pixel Registration and Iterative Back Projection

Fengqing Qin, Xiaohai He ,Wei Wu,Xiaomin Yang

Abstract—In respect to a sequence of low-resolution images taken from a moving camera to the same scene, a practical approach is proposed to reconstruct a high-resolution image utilizing the complementary information between these images. The four-parameter rigid transformation model is proposed. The movement parameters are registered by Taylor series expansion. The displacement vectors are estimated from coarseness to fine by the use of gauss pyramid model. According to the estimated sub-pixel precision parameters, image super-resolution reconstruction is performed by the adoption of iterative back-projection (IBP). The experimental results show that the algorithm in this paper achieves high registration precision and good reconstruction effect.

Index Terms—Super-resolution, Image registration, Image reconstruction, Iterative back Projection.

Bits Error Rate Simulation in Carrier Wave Modulation and expanded frequency correspondence with CDMA

YANG Yongjian, YANG Xu and ZHANG Wei

Abstract—Normally mobile telecommunication systems always be more complex radio technology and error control technology, also has high level signal modulation method, traditional method is not easy to analyze and process. Computer Simulation not only can lower design cost, improve design efficiency, but also can help the designer and operator's engineer understanding the radio technology easier. This paper aim at to move to carry a numeral transmitting of Carrier Wave Modulation and to deliver to expand the frequency correspondence with CDMA in the mobile telecommunication systems, establishing Computer Simulation model, calculating way of the system, studying the Monte Carlo Simulation of binary correspondence system and Simulation validity on expanding frequency of the DS for controlling the sine wave interference by using MATLAB .We got the relation curve of the characteristics of modulation, SNR(Signal Noise Ratio)and bit error ratio by imitating the bit error ratio of the system. It is valid for thorough comprehension and analyzing the complications characteristic of the mobile telecommunication system.

Index Terms — Carrier Wave Modulation, Computer Simulation, Expand the frequency correspondence with CDMA, mobile telecommunication systems, Monte Carlo Simulation.

A Quasi-Monte Carlo Based Gaussian Particle Filter

Bin Wu, Hong-Bing Ji, Xi CHEN

Abstract : A novel Gaussian particle filter based on Quasi- Monte Carlo integration is proposed for nonlinear filtering problems with Gaussian distributions. The conventional Gaussian particle filter, with less complexity than particle filter, also has the same problem that approximation accuracy deteriorating caused by the randomness of particles from Monte-Carlo sampling. The proposed algorithm, called QMCGPF, circumvents this difficulty by placing the particles deterministically according to a Quasi-Monte Carlo integration rule. With weighted low-discrepancy particles in place of weighted random samples, the Quasi-Monte Carlo methods can obtain better approximation performance in nonlinear estimation. Experimental results with a simulated 2D tracking problem demonstrates the effectiveness of the proposed new QMC-based filtering algorithm.

A Novel Mechanism for Detection and Prevention of Distributed Denial of Service Attacks

Lin Pingping ,Zhang Xiaosong

Abstract:Give a simple but practical scheme for detecting and defending against Distributed Denial of Service (DDoS), especially for Highly Distributed Denial of Service (HDDoS) attacks by monitoring the increase of new IP addresses. Unlike previous proposals, this proposal includes three modules: detecting, filtering, and illegal-packets analyzing. To improve the detection accuracy, we also proposed a simple but robust algorithm: sliding window algorithm. In the filtering module, a filter performs its tasks only during attacks. While the attack-packets-analyzing module uses a trap to analyze attack packets, perfects the defense system. Simulation results demonstrate the effectiveness of the proposed scheme under varieties of DDoS attack scenarios.

Key words: DDoS; filter; sliding window; trap

Adaptive Object Tracking Based on Distribution of the Particles

Wang Shu-Peng, Ji Hong-Bing

Abstract—This paper addresses the problem of the model update for tracking in the framework of particle filters. The appearance of the target varies during tracking due to the change of the illumination, visual angle and occlusions, thus the model of the target should be updated online during the tracking result is reliable. We propose an approach that incorporates dynamics knowledge into the model update process to make the tracker more robust. The particle filter has proven to be a powerful visual tracking tool, and it approximates the posterior density of the target using a set of weighted particles. The distribution of the particles involves a mixture of dynamics feature and appearance of the target. An adaptive appearance model update process is designed for object tracking based on the distribution of the particle. We show that the proposed tracking algorithm provides more robust performance than that with the present algorithms.

Index Terms— Model update, object tracking, object model, particle filter.

The Study of Single-phase Self-excited Induction Generator Feeding static Inductive Loads

Weijun Wang, Jing Yang, Ping Feng, Junhua Guo, Longbo Mao, Ming Jiang

Abstract-Static inductive loads are general in the true-life. The capability of single-phase self-excited induction

generator feeding static inductive loads has been studied in this paper and been proved by tests. These results can improve the practical application of the single-phase self-excited induction generator.

Keywords—single-phase self-excited induction generator, static inductive load, capability of feeding loads

Image Compression Based On Double Adaptive Lifting Scheme Wavelet and SVM

Mao Minghu, Liao Jianming, Zhong Linyun , Li JianPing, Lu Xiaojun,

Abstract—A novel algorithm of image compression based on double adaptive lifting wavelet and support vector machines (SVM) was presented in this paper. Contract to traditional image compression algorithm with traditional lifting scheme wavelet transformation, our algorithm obtained two development that firstly the edge of a image was kept unsmooth which result in a clear image because the updating and prediction function are selected to change adaptively along with the edge information of image; secondly good effect was obtained in high compression because the SVM is creatively used to bind with wavelet.

Experiment demonstrated that the algorithm presents well especially in damage image compression.

Index Terms—Double Adaptive Wavelet Transform; SPIHT; SVM; Image Compression.

Image Definition Recognition Based on the Composite Model of Wavelet Transformation and Neural Networks

Chen Guojin, Zhu Miaofen, Fei Haibo, Li Yan

Abstract—Based on the composite model of wavelet transformation and neural networks, the method of image definition recognition has stronger ability in image edge character extraction, nonlinear process, self-adapted study and pattern recognition. In the paper two-dimension (2D) discrete wavelet transformation is used to extract image signal character, and 7 wavelet components and 16 statistical values obtained from the statistical process of original image are treated as the image characteristic values for the follow-up recognition and analysis. The 5 layer model of BP neural networks is constructed to perform image definition recognition. A fastest descent method with an additional momentum item of variable step length is adopted to adjust network weights. The designed neural networks first train the training set composed by 75 images and then perform experimental verification for the testing set composed by 102 images. The results showed that this is a very effective identifying method with a high recognition rate.

Index Terms—Image processing, Definition recognition, Neural networks, Wavelet transformation

The fusion of infrared and visible images with orthogonal multiwavelet*

Chang-Xing Li Han-Zhang Qu Bin Zhang

Abstract— Multiwavelet possess more better mathematic property compared with scalar wavelet, but in practice, the design of prefilter or balanced filters determined the processing result. The balanced multi-filter banks are designed for OPTFR multiwavelet and a new fusion algorithm is presented associating this multi-filter with V. Petrovic's fuse-then-decompose technique.

At each resolution level, input images are transformed into their horizontal gradient map representations and then are fused into a single horizontal gradient map which is filtered by gradient filters to produce the fused horizontal subband image. At same time the input images are decomposed with low-pass multi-filters in the horizontal direction to get approximations which are then processed in the same manner as the input images but in the vertical direction. This produces the vertical fused subband image and the quarter-band low-pass approximations. Same operation were employed on the low-pass approximations for several steps and the final approximation are fused using arithmetic method. The fusion image was obtained through

opposite reconstruction process. The approach retains the detail information of input images better than conventional fusion method, The simulation results testify validity of the algorithm.

Defocused Image Restoration Using RBF Network and Iterative Wiener Filter in Wavelet Domain

SU Li-yun MA Hong PENG Jian LI Zheng

Abstract—A novel semi-blind defocused image deconvolution technique is proposed, which is based on RBF neural network and iterative Wiener filtering. In this technique, firstly a RBF neural network is trained in wavelet domain to estimate defocus parameter. After obtaining the point spread function (PSF) parameter, iterative Wiener filter is adopted to complete the restoration. We experimentally illustrate its performance on simulated data. Results show that the proposed PSF parameter estimation technique is effective.

Index Terms—Defocused Image Deconvolution; Wavelet Transform; RBF Neural Network; Iterative Wiener Filtering

Study of Enhancing features of Digital Oscilloscope to measure period of Analog Modulation Signal

Yuan Jimin, Li Xiaoling, Zhang Chunyu, Li Jianping

Abstract—This paper proposed enhancing a feature of digital oscilloscope (DSO) to measure period of modulation waveform. It analyzed measurement robustness and solved available the robustness of period measurement of modulation waveform by selecting skillfully a reference level and an iterative algorithm, and proposed a method to avoid the difficulty of the estimation of the peaks number disturbed by small burrs wave on the top of peaks. At last it illuminated the application confine. This method is novel and simple which decreases greatly iterative steps and computational burden, and the error of period measurement is very small. Programming as a function and interpolating it into the function database of oscilloscopes, it is advantaged to realize feature of periodic measurement of modulation waveform in DSO.

Keywords—digital oscilloscope; modulation; period measurement; autocorrelation function

An approach for Image Retrieval Based on Wavelet coefficient co-occurrence matrix

First A. Beizhan Wang, Second B. Qingqi Hong, Third C. Cuihua Li, Fourth D. Qingshan Jiang and Fifth E. Liang Si

Abstract—This paper integrated the advantages of co-occurrence matrix and wavelet transform and proposed a new method based on wavelet coefficient co-occurrence matrix. The new approach constructed four co-occurrence matrices based on wavelet coefficient matrix, and then it picked up the texture parameters of the four co-occurrence matrices for image retrieval, it not only considered the spatial correlation info, but also took full advantage of excellent character of wavelet transform. The experimental results show that the new method has an advanced general performance and its computational complexity is lower than wavelet histogram technology.

Index Terms—co-occurrence matrix; image retrieval; texture character; wavelet coefficient; wavelet transform

Sensitivity Analysis of Combined Boundedly Rational System Optimal Traffic Assignment and Arterial Green-Wave Signal Control Model

Lu Shoufeng, Liu Ximin, Dai Shiqiang

Abstract—Signal control mechanism has important effect on traffic assignment strategy and network performance. Efficiency and fairness are two important indexes for evaluating traffic assignment strategy. To date, disutility minimization behavioral rule has received most attention. UE assumes that all the users are strictly selfish, they will strictly select minimum travel cost route. This assumption is not practical. Boundedly Rational User Equilibrium has been discussed. Some literatures have studied the unfairness of SO traffic assignment strategy. We base on boundedly rational notion and satisficing decision rule to formulate Boundedly Rational System Optimum (BRSO) model, in which the travelers will be assigned to the tolerable paths, and the objective function is to minimize the total travel time. BRSO model seeks to the integration of efficiency and fairness. Sensitivity analysis of combined BRSO and arterial green-wave signal control model is studied for toy network. Under nonlinearity of signal setting, total network travel cost does not decrease when tolerance factor increases. This phenomena contradicts with our original anticipation.

Index Terms—Sensitivity Analysis, Boundedly Rational System Optimum, Green-Wave Signal Control

Neural Networks' Backward Forecasting Ability for Spectroscopy

Wang Li, Zhang Chijian*, and Feng Yuan

Abstract—The application of the neural networks in the molecule spectroscopy is discussed. The backward forecast ability of neural networks by applying the adaptive network-based fuzzy inference system (ANFIS) is researched, and the impulsive discharging emission spectrum of the molecule is applied to training and forecasting. This method can forecast important spectral information such as the position and the intensity of the peaks. The forecasted position errors of peaks are all less than 0.2nm and the mean square error (MSE) of intensity is less than 1.93%. The results indicate that it is feasible for the backward forecast of spectrum. At the same time, this paper show that neural networks is not only forecast future, but also back-infer 'past'.

Index Terms—Neural Network, the adaptive network-based fuzzy inference system (ANFIS), backward forecast, spectroscopy

Multi-agent Modeling of Stock Market with Multiple Trading Strategies

Chi Xu, Xiaoyu Zhao, and Zheru Chi

Abstract—The artificial intelligence and information discovery technologies are applied to construct the intelligent agents for SF-ASM. The moves of agents in the market compose a complicated interaction with a collection of relatively autonomous entities with no central control. The important features in an actual financial market can be quantitatively replicated, in which trading volume volatility and market price dynamics are favorably persistent.

Index Terms—Multi-agent modeling, Artificial neural networks, Genetic Algorithm, Fuzzy logic control

Improved Two-Factor Worm Propagation

Model on Scale-Free Networks

Zhiguang Qin, Ling Wu, Hongsong Shi, Lisha Chen

Abstract—For the scale-free graph is a more accurate model of the real network, in this paper, we provide a consideration of worm propagation on scale-free networks. In addition to the same two-factors as the Two-Factor model has proposed (countermeasures taken by ISPs and users, the slowed down worm infection rate coming from the congestion and troubles of some routers caused by worm's rampant propagation), we take hubs' influence into account. Based on the Two-Factor worm propagation model, we derive an improved worm propagation model to accommodate the scale-free networks. Simulation of this model matches the observed data of Code Red worm better than previous models do. This model leads to a better understanding and prediction of the scale and speed of Internet worm spreading.

Index Terms—Worm propagation model, Two-Factor, Scale-free network

A Flexible Teleoperation System for Semiautonomous Mobile Robot

Wentao Yao, Liping Yu, Huaping Liu, Kezhong He and Donghua Ding

Abstract—Teleoperation is necessary when the mobile robot can not deal with a certain task autonomously and it allows human beings to execute tasks in remote or dangerous environment. However, most teleoperation systems have fixed base stations. When the mobile robot is far away from the base station, the quality of communication is deteriorated. This paper proposes a flexible teleoperation system for a semi-autonomous mobile robot. An innovation of our system is that the operator is also in a vehicle and therefore we form a mobile base station. By this means, we can obtain more flexible teleoperation performance because we can improve the communication condition by moving the mobile base station. The system enables efficient and robust teleoperation in unknown and unstructured environments. Experiments demonstrated the effectiveness of this teleoperation system.

Modeling Military Organization Based on Multi-Agent in Battlefields

Hongjie WANG, Tao Zhu, Guocen CHANG, Lei Zang and Xuejun LI

Abstract—Organization is an incorporate form of MAS. We study CGF modeling and simulation based on multi-agent from the viewpoint of organization, and establish an organization meta-model based on the four-layer architecture of mission/role/capability/agent. Basic elements of the meta-model were defined and described, the formalization description of the organization model was found out and an example to validate the model was given. The capability concept for organization role and agent was presented to improve the mission distribution flexibility and adaptability.

Index Terms—MAS; organization meta-model; capability; role; CGF.

Multiple-Model Estimation for Hybrid System with Reweighted Variable Structure IMM Algorithm

BaiSheng Yang, Hongbing Ji, *Member, IEEE*

Abstract—Multiple-model (MM) filtering algorithms, such as the interacting MM (IMM) and generalized pseudo-Bayesian (GPB) scheme, are widely used in the state estimation for hybrid systems. In this paper, a novel MM algorithm called reweighted variable-structure IMM (RVSIMM) is presented by improving the reweighted IMM (RIMM) algorithm through the likely model set (LMS) adaptation scheme. RIMM is a recursive implementation of the maximum a posteriori (MAP) state sequence estimator, which is an instance of the alternating expectation conditional maximization (AECM) algorithm. RIMM achieves a better estimation performance by the $\hat{\pi}_k$ reweighting process but results in additional computation costs simultaneity, which is one of the embarrassments to MM algorithms. Furthermore, both IMM and RIMM are the fixed-structure MM

(FSMM), of which the estimating performances may be lowered by the outputs from unmatched models. Variable-structure MM (VSMM) schemes such as model group switching (MGS) and likely model set (LMS) scheme are effective to deal with these problems. Here, LMS is adopted because of its simpleness and efficiency. Finally, the simulation results show that the proposed algorithm has advantages over the existing ones in terms of estimating precision and computational load.

Index Terms—hybrid system, multiple-model, reweighting fusion, likely model set filter

Mult-Path and Multi-Constraint-Based Load Balancing Method for Real-Time Application

Zhao Juan, Guo Ping, and Jiang Ying-hua

Abstract—Based on the Diffserv and MPLS traffic engineering, a multi-path and multi-constraint-based load balancing method is proposed for the QoS request of real-time application. This method firstly looks for paths that satisfy delay requirement and load-balancing, then selects paths with both lower delay and lower load-balancing factor. The results indicate that the proposed method increases the success probability of path setup, enhances the utilization of network resources and balances the network load.

Index Terms—Load balancing, Multi-constraint routing, QoS routing, Real-time application

Modeling and Control of a Class of Networked Control Systems with Random Data Drops and Delays

Lin Zhen, Wang Xiangdong, Xu Qiushi, Xie Ling

Abstract—Aim at the main problems such as random delays and data drops exist in the NCS, the networked induced delays of the NCS are considered as interval variables governed by a Markov chain, and the NCS with data drops is considered as a switch of irregular shutdown. Using the upper and lower bounds of the delays, a discrete-time Markovian jump system with norm-bounded uncertainties is presented to model the NCS with random delays and data drops. Based on this model, an output feedback controller is constructed via a set of linear matrix inequalities and a simulation experiment verifies the validity of the given results.

Key words—networked control system, data drops, random delays

Research on Dynamic Neural Network Identification for Piezoelectric Smart Structures

Jingjun Zhang, Ercheng Wang, Ruizhen Gao, Weize Yuan

Abstract—Neural network identification of piezoelectric vibration system plays an important role in the application of neural network control method for piezoelectric smart structures, so how to improve the effect of identification is a critical problem. In the paper, a kind of BP neural network with delay which has a spring-parallel identification structure is employed to identify the nonlinear dynamic system of piezoelectric smart cantilever beam, which surface is bonded several piezoelectric patches. Considering the effect of piezoelectric patches to the mass and stiffness of beam and the difficulty of extracting the experimental data, the author analyses the modals and the transient response of beam using ANSYS (finite element software) and obtains the dynamics response data of beam. A BP neural network with delay time is built and trained offline in basis of the data using MATLAB Neural Network Toolbox. Then a case is analyzed and the results show the neural network has the quick convergence, good generalization ability, ideal identification and can be used into the vibration control of piezoelectric smart structures using neural network control algorithm..

Index Terms—delay time, neural networks, piezoelectric smart structures, system identification

Asynchronous FIFO Method and Its Applications in Elimination of Sub-steadiness in Multi-clock Domains

Lizhi Gu, Xiaodong Duan

Abstract—Based on survey of the phenomena and imperilment of sub-steadiness, reviews the features and applications of synchronizers to eliminate the sub-steadiness of information accessing in multi-clock domains in integrated circuits; analyzes systematically the functions of the method of asynchronous FIFO, and presents the utility of the FIFO in the chip of ATM accesses. It is shown that asynchronous FIFO method is successfully adopted to remove the phenomena of sub-steadiness, and reinforce the reliability of the circuits.

Index Terms—asynchronous FIFO, Gray code, Sub-steadiness, synchronizer

Automatic Identification of the Stance Foot from Monocular Video without Gait Analysis

En Peng, and Ling Li

Abstract- This paper presents a novel method to identify the stance foot directly from monocular video containing human motion. Unlike many existing methods that are restricted to specific type of human motion, e.g. walking or running, the proposed method works for any kind of human motions. In addition, neither the calibration of camera model nor the reconstruction of human posture is required in the proposed method. Experimental results on both synthetic and real video show that the proposed method is highly reliable and suitable for practical applications.

Research on and Implementation of communication protocol and system for a new P2P/CS Hybrid Architecture

PENG Jian, ZHANG Daping, WU Jiaxin, WANG Jun, and LU Chengsan

Abstract—The new P2P-C/S hybrid architecture is put forward and the communication mechanism and node selection algorithms for the hybrid architecture are discussed in detail.. Because the architecture and the communication protocol can change the degree of participation of the server and the peers, it can ease the burden of SourceNode or improve the expansibility and stability of the system. The BTPublisher, which is improved on the base of the popular BitTorrent, is based on the hybrid architecture. In the system, because the SourceNode is introduced to the traditional P2P network, the BTPublisher can have the characters of high expansibility and high-efficiency transmission.

Index Terms—P2P, C/S, Communication Protocol, BitTorrent, SourceNode

Moving Objects Segmentation in Video Sequences

Kuang Ping, Jianping Li*, Gu XiaoFeng, Liao Jianming

Abstract—Moving objects segmentation accurately is one of the most challenging problems in computer vision. This paper present a novel approach to segment moving objects with edge information and temporal information using graph cuts model. To improve this problem, motion segmentation problem is considered as an image-labeling process in which every pixel in the image will be assigned a label describing its motion between consecutive frames. And a graph cuts based energy minimization method is used by define a measure function of smoothness and accuracy of motion vectors to achieve this goal. And to improve the accurate of the motion edge map, an improved ME (Moving Edge) map acquiring method is proposed. Experiments and results show that our algorithm is efficient and noise robot.

Index Terms—graph cut, moving object segmentation

Robust Fast Tracking Algorithm Based on Mean Shift

Jian Sun , Zheng You , Feng-qi Zhou and Jun Zhou

Abstract - Tracking objects in video using the mean shift technique has been the subject of considerable attention. A problem with MS is that it becomes easy for the tracker to get confused with background which having the similar histogram distribution. We proposed a robust fast tracking algorithm which is based on the adaptive over-relaxed strategy. Meanwhile the relation between the bandwidth and the mean-shift vectors was derived. A novel tracker designed by this theory is robust to the background which having the similar histogram distribution. Compared with the standard MS algorithm on real application data sets, the proposed method decreases the time of iterations required to achieve convergence and increase the robustness. A physical simulation system for tracking objects was designed and realized by employing DM642EVM as video signal processor, TMS320LF2407 as the two axis servo system controller

Index Terms – MeanShift, Physical Simulation, Tracking moving object.

A Modified State Space Predictor by Optimal Control Model for Flight Simulator Transport Delay

Wang Chunguang, Jiang Hongzhou, and Li Guixian

Abstract—This paper presents the theoretical development of a modified state space predictor based upon the state space predictor developed by Liwen Guo. The optimal control model for pilot-vehicle analysis is applied to the delay compensation design. Example results based upon aircraft reference model are compared with the measured results and with simulation analyses performed with the modified state space predictor and the state space predictor. The predictor error obtained with the modified state space predictor is shown to compare more favorably with the simulation results than the state space predictor. Moreover, the modified state space predictor is fairly superior to the state space predictor in compensating the short delays.

Index Terms— transport delay, optimal control model, flight simulator, state space predictor

MATLAB Simulation of Zhang Neural Networks for Time-Varying Sylvester Equation Solving

Yunong Zhang, Weimu Ma, Ke Chen, and Peng Li

Abstract—In recent years, many studies have been reported on real-time solutions of algebraic problems including matrix inversion and linear equations solving. Recently, a special kind of recurrent neural networks

has been proposed by Zhang *et al* for online solving Sylvester equation with time-varying coefficients. Such neural networks perform much better on solving timevarying problems in comparison with gradient- based neural networks. This paper investigates MATLAB simulation of Zhang neural networks (ZNN) for the real-time solution of time-varying Sylvester equation. Simulation results substantiate the theoretical analysis and demonstrate the efficacy of such neural networks on time-varying Sylvester equation solving, especially when using the power-sigmoid activation function.
Index Terms—Recurrent neural networks, linear matrix equation; time-varying Sylvester equation, MATLAB Simulation

Mobile-Agent-Based Middleware in Grid Environment

Di LIU, Jia CHEN

Abstract—This paper proposed a mobile-agent-based middleware model to fit the features of heterogeneity, distribution, dynamic and local autonomy in Grid environment. The model can resolve the main problems that expose in the Grid environment .The model architecture is illuminated and the work principle and implement of the mobile agent is analyzed and illuminated. Finally we present the experiment result by comparing the general grid with our mobile-agentbased grid.

Index Terms—mobile agent, middleware, grid

Measuring system for mechanical analysis of disturbed soil based on virtual instrument technology

Shucaï Xu, Jinhuan Zhang, Jianqiao Li, Rui Zhang

Abstract—Soil is a kind of discrete, multiphase compound that is composed of soil particles, liquid and air. When soil is disturbed by bulldozing plate, the mechanical behavior of the disturbed soil will become very complex. Based on Law of Action and Reaction, the dynamic mechanical behavior of disturbed soil was indirectly analyzed by measuring and studying the forces acting on the bulldozing plate by soil currently, so a stress-strain virtual measuring system for bulldozing plate, which was designed by the graphical programming language DASYLab, was used to measure the horizontal force F_z . In addition, during the course of design, the experimental complexities and the interferential factors influencing on signal logging were analyzed when bulldozing plate worked, so the anti-jamming methods of hardware and software technology were adopted correlatively. In the end, the horizontal force F_z was analyzed with Error Theory, the result shown that the quantificational analysis of F_z were identical to the qualitative results of soil well, and the error of the whole test system is under 5 percent, so the stress-strain virtual measuring system was stable and credible.

Keywords—Virtual instrument; Stress-strain; Data acquisition; Anti-jamming; Ratio of performance to price

Fast Measurement of Protein and Fat Content in Milk Powder Based on Infrared Spectroscopy Technique and LS-SVM

Di Wu, Shuijuan Feng, Yong He

Abstract: Protein and fat are two important components of milk powder. The fast and non-destructive detection of protein and fat content in milk powder is important. Infrared spectroscopy technique was applied to achieve this purpose. Least-squares support vector machines (LS-SVM) was applied to building the prediction model based on infrared spectral transmission rate. Based on LS-SVM, when it is to protein content, the determination coefficient for

prediction (R_p^2) was 0.9517 and root mean square error for prediction (RMSEP) was 0.520201. While it is to fat, R_p^2 was 0.9796, and RMSEP was 0.836708. It is concluded that infrared spectroscopy technique can do the quantification of protein and fat content. The process is simple and easy to operate, and the performance of LS-SVM is better than that of back propagation artificial neural networks (BP-NN). Based on this study, a simple and non-destructive spectra sensor can be designed for the quantification of protein and fat content in milk powder.

Keywords: infrared spectroscopy, SVM, fat, protein

A New System of Generalized Nonlinear Set-Valued Variational Inclusions

Mao-Ming Jin, Yong-Qin Yang, and Jian-Ping Li

Abstract—In this paper, a new system of generalized nonlinear set-valued variational inclusions in Banach spaces is introduced and studied. By using the resolvent operator technique for H – accretive mapping due to Fang and Huang, we construct some new iterative algorithms for approximating the solutions of the system of generalized nonlinear set-valued variational inclusions and prove the existence of the solutions for the system of generalized nonlinear set-valued variational inclusions and convergence of iterative sequences generated by the algorithm. These theorems improve, unify and generalize many known results variational inequalities and variational inclusions.

Keywords— H – accretive mapping; system of generalized nonlinear set-valued variational inclusions; Mann iterative algorithm; existence and convergence

A method of vehicle' window localization based on the proportion of the size of vehicle

Yurong Luo, Jianli Liu

Abstract—This paper presents a method of vehicle' window localization based on the proportion of the size of vehicle. Unlike the light color vehicles, as there are no obvious characteristics of the location of vehicle' window, so only the localization of the deep color vehicle' window is developed. The method extracts foreground figure from the input image by background subtraction method. In most cases, however, because of the existence of the shadow, it leads to serious impacts on the accuracy of object recognition system. Considering this, first of all, we eliminate the shadow of the foreground figure, and then we get the ultimate location of the vehicle' window according to the proportional relationship between vehicle' window location and the size of vehicle. In the stage of the shadow elimination, it has to judge whether there is shadow in foreground figure, so we present a method of smoothness assessment. Once the existence of the shadow is confirmed, we estimate the direction of the shadow. Finally, we eliminate shadow by using clustering method which makes use of the similar brightness between pixels. Experimental result shows the applicability of the method.

A Workflow-based Massive Cartoon Task Distribution Module

Rongfang Ma ,Hao Tan,Chunlan Fang,Yifeng Shi,Xiaoming Wang

Abstract—Domestic animated cartoon has step to its golden age. In other hand, workflow is a key technology of task dispatching system, and it also is a key to promote the efficiency of cartoon production. This paper aims to

tell this workflow computation model, tell its logic and the rule about how to organize flow task together, expression by the appropriate model and implementary computation. Last, a module and data structure about how to apply it to cartoon area is given.

Index Terms—Cartoon production, Workflow engine, Task distribution, Workflow management system

Responses of Maglev Guideway on Bridge Based on Different Parameters

Q. C. Wei, Y. S. Deng, and C. F. Wan

Abstract—The track of Shanghai maglev railway lays viaduct structure in most sections along the route, but in such areas as valley, great river, etc., where viaduct structure can not span across, the guideways specific for the bridge may be required. There are a lot of factors influencing the dynamic responses of this system. In this paper, the train speed, the bearing stiffness of bridge, the flexural rigidity of bridge girder, the marshalling and random irregularity are studied. At first, an integrated dynamic model of maglev vehicle-guideway-bridge coupling system is established based on TR maglev vehicle, the elevated-guideway and bridge technology. Then, a special simulation program is developed. Finally, the dynamic responses of the system are simulated and analyzed.

Index Terms—Railway transport, Maglev, Guideway, Dynamics, Irregularities, Simulation

A Community-based 2-Layer Orchestration Mechanism for Service Composition

Chu Lijun, Zheng Xuefeng, Wang Shaojie

Abstract—It is obvious that efficient and agile orchestration mechanism for service composition can ensure the scalability and high-efficiency of Web service composition system. Now there are two kinds: centralized and decentralized mechanisms, but in fact, both of two have some defects. On the basis of analyzing them, a service community-based 2-layer orchestration mechanism for dynamic service composition is proposed, which adds a community layer to distribute the control logic and corresponding execution load, Analysis results show that 2-layer mechanism improves scalability and availability and it lessens the unnecessary load and complexity to the system in terms of managing and error recovery and fault handling.

Fast Local Rerouting using Source-Based Tree Failure Recovery

Li Qiaoqin, Zeng Jiazhi, Yi Fasheng

Abstract—Current link-state routing protocols such as OSPF or IS-IS react to link failures through link-state advertisement and e-computation of the routing table. This involves a convergence process. The convergence process increases router overload, transient loops and slows down reaction to failures. We propose a new routing technique called Source-Based Tree Failure Recovery (STFR), which allows a router to discover a new working path under failure without waiting for completely state consistency in all routers. The aim of STFR is to eliminate the convergence process and achieve fast recovery from link failures. Our simulation shows that compared to previous work of local recovery methods, STFR can provide better resilience guarantee under failures with low overheads.

Index Terms—IGP convergence, Internet Routing Protocol, Protection, Restoration, Source-Based Failure Recovery

Multi-relational Naïve Bayesian Classifier towards Relational Individual

Guangmei Xu, Bingru Yang, Bolin Wu¹, Wei Song, Yiqing Qin

Abstract—The \mathcal{G} Graph-NB algorithm is the first try which integrates Naive Bayesian classifiers with relational database without pruning has poor accuracy because of statistical bias. To solve the problem, this paper proposes a multi-relational Naive Bayesian classifier towards relational individual (RI-MRNBC). Its counting method is based on relational individual instead of tuples in current table. Accordingly, RI-MRNBC gives improved Naive Bayesian formula towards relational individual. Experiments show RI-MRNBC can get high efficiency and good accuracy.

Index Terms—Multi-relational data mining, naive bayes, classification, relational individual

Congestion Control and Dynamic Routing based Internet Worm Simulation

Zhiyu Hao, Xiaochun Yun, Jinqiao Shi, Hongli Zhang

Abstract—Internet worms are one of the greatest threats to the Internet. Simulation is an efficient method to study the behavior of Internet worm propagation. All the current worm simulators can not provide the dynamic changing of topology and the dynamic routing mechanism, which badly compromises the fidelity of the Internet worm simulation. This paper presents a high-fidelity packet-level Internet worm simulator, called CDRWS (Congestion Control and Dynamic Routing based Worm Simulator). CDRWS includes accurate congestion control and dynamic routing models, thus greatly improves simulation fidelity. Experimental results show the correctness of CDRWS, and also the effects of the congestion control and dynamic routing models on the behaviors of worm propagation.

Index Terms—network simulation; worms; dynamic routing

Application of invariant moments technology in Chinese character recognition

YANG Ming-xin, TIAN Juan, ZHANG Zhi-qiang, ZHENG Yu-zheng

Abstract--To improve practicable performance of image registration and enhance restorable performance of Chinese character aberration, a novel character recognition method based on invariant moments is presented. Invariant moments are highly concentrated image features that are shift-, rotation-, scale- and intensity-invariant. It's widely used due to its merit lower misjudgement ratio and image reconstruction and image recognition by less rank matrix. Chinese chess experiments prove that the proposed algorithm's characteristics are small calculations, high discrimination and geometric invariance.

Underground Fuel Depot Fire Recognition Based on Computer Vision

Yang Du, Dong Wang, Kang-Ning Li, and Jun Chen

Abstract—Being more hazardous than common fires, the fire in an underground fuel depot should be detected and recognized at early stage quickly and reliably. A new computer vision based algorithm for real-time fire detecting is put forward and tested in a simulative underground fuel depot. First, the potential fire regions are primarily detected according to their characteristic color spectra and whether their spatial structure is similar to the fire model. Then the fire motion is detected through fire-like pixels differential between consecutive frame images. At last, a Discrete

Fractal Brownian Incremental Random field (DFBIR) based texture-analyzing model is applied to identify the fire.

Index Terms—Fire detection, image processing, computer vision, underground fuel depot

The application of the fuzzy logic strategy in linear induction motor control system

Yuhua Wang, Xilin Zhu, Zhiqian Dang, Shirong Wang and Lin Li

Abstract - To overcome the defect of the magnetic thrust ripple in linear induction motor direct magnetic thrust control system, a fuzzy logic direct magnetic thrust control system for linear induction motor is proposed. For the sake of decrease magnetic thrust ripple, fuzz logic strategy is introduced into the system. In the fuzzy logic direct magnetic thrust control system, the magnetic thrust error and the stator flux linkage error of linear induction motor were all properly divided into several fuzzy subsets, for selecting the voltage space vector accurately to decrease the magnetic thrust ripple. The simulation and experiment have shown that dynamic response performance of this system is improved and magnetic thrust ripple is effectually decreased.

Keywords: linear induction motor fuzzy logic magnetic thrust stator flux linkage

ON PRECISE INTEGRATION METHOD FOR AMERICAN OPTIONS

YONG WU¹, NA LIU², LINHUA ZHANG³

Abstract—In this paper, an algorithm for numerical solutions of American option models is presented in terms of the precision integration. We discretize the space variable employing finite differences appropriately so that the resulting semi-discrete system of equations is a system of ordinary differential equation, and then we apply precise integration method to the semi-discrete system, and analyze errors of the method. Numerical results show that the proposed algorithm is practicable and efficient.

Index Terms—Finite difference; Precise Integration ; Option.

A Network Security Situation Evaluation Model Based on C4ISR

Wang Qiao Zhang Xiaosong

Abstract--Based on the idea of C4ISR, we propose an evaluation model with real-time network security situation representation capacity. By adopting the buffer schedule mechanism of operating system, the potential insecurity criteria are treated by the initialization method of the evaluation architecture. The important insecurity information of network is represented in the network security situation evaluation model precisely. Hence, the key points of network security information analysis are emphasized and the evaluation results are really available.

Key words--C4ISR; Initialization criteria; Security situation

An application of λ -SVR method to flood disaster evaluation

WU Sheng, XIE Jian-cang, HUANG Duo

Abstract—The boundary value of each evaluation index of flood grade is defined artificially, however, in most situations, the actual indexes value would not always fall in the same grade area. It

makes evaluating the flood grade more difficult. The paper provided a grade classification method based on the support vector machine, by which classification model was established with limited samples. Taking the flood disaster in Henan Province as an example, establishing the training set based on various known indexes boundary value, the paper proved that the accuracy rate of classification model was over 85%, illuminated that this method could effectively mine the classification information involved in high-dimensional space of flood disaster indexes through analyzing actual samples of flood disaster.

Index Terms—Flood disaster, Evaluation of flood disaster, ε -Support Vector Regression

Trajectory Planning of a Manipulator in Joint Space Based on RBF Neural Network

Qingwen Qu, Jixiang Wan

Abstract—In this paper, a new methodology for optimal trajectory planning of robotic manipulator in the joint space has been described. The RBF neural network is used for general approaching problem of nonlinear mapping in the joint space. A single-input and six-output RBF neural network model is built and trained. The data got from the inverse kinematics equation are used as training samples and the interpolating calculation was completed in 6-dimension joint space. With characters of rapid convergence and well approximation, this new algorithm is fault tolerant and irrelative with order of inputs, which can ensure the result trajectory is smooth enough. The algorithm has been tested in simulation in the software ADAMS, yielding good results by studying the kinematics and the dynamics performance of the robot.

Keywords—joint space, RBF neural network, trajectory planning

Simulation of Unparallel Train Schedule of Double-Track Automatic Blocking Based on Cellular Automaton Model

Yongsheng QIAN, Peiji SHI, Hailong WANG, and Hongxia KANG

Abstract - The phenomenon of passengers and freight trains, the high and low speed trains mixed run at the same section, has brought difficulties for the train capacity computational method, But the simulation technology based on cellular automaton demonstrates its unique superiority to solve this kind of question. Based on the NaSch and Li Keping's traffic model, in view of the railway transportation characteristics, the movement rule of cellular automaton is revised, the cellular area and changing regulation are stipulated. The related parameters are demarcated. Also one kind cellular automaton based on railway section control is proposed, which is used to the railway system and can simulate the train running of unparallel train schedule. The effects of the ratio of the numbers of the trains at different speeds and the train headway on the train capacity of the section are analyzed. The result of simulation shows that this situation is in accordance with the reality of the railway system.

Index Terms - Cellular Automaton Model; train schedule; computer simulation; train capacity; automatic blocking system

The Study on the Stability Control of Vibratory Machining Process System with Closed Feedback

Lizhi Gu

Abstract—Through the analysis of closed feedback models for the vibratory machining system and conventional

machining system, in terms of systematical rigidity as the assessment index

for the stability, discusses and presents the influence of vibration parameters, phase ϕ and frequency f_r on the stability of vibratory machining process, optimizes the controlling parameter with values of 100-158 Hz. Results of the current study has proven that under non-constrained conditions, the vibratory machining system runs more stably than conventional machining system, indicating and supporting the judgment that vibratory cutting may enhance the machining efficiency a great deal.

Index Terms—closed loop, controlling, rigidity, stability, vibratory machining

Influences of Optical Link Gain on Optically Controlled Phased Array

GAO Yuxiang, XU Qing, HE Zishu

Abstract — By using numerical simulation model of OCPA, patterns and pulse compressions of array, which are influenced by various optical link gain conditions, are analyzed and simulated. The results indicate that patterns and pulse compressions of OCPA are affected by different combination manners of fluctuation of optical link gain, and, moreover, become worse as the extent of fluctuation of optical link gain increasing.

Index Terms — Optically controlled phased array, optical link gain, array pattern, pulse compression.

The Application of SOA Technology on Automobile Supply Chain Information Integrated

Shu-rong ZOU, Zhen-ming XU, Shu-ying WANG, and Kun-kun WANG

ABSTRACT: Based on analyzing the problems of auto industry supply chain of China, The facing challenge of auto industry supply chain integrated and supply chain structure of manufacturer enterprise centered, Use the basic thought of SOA technology, An service-oriented information system framework of automobile is presented and an integration system architecture of automobile industry supply chain based on SOA is put forward. It could be flexible enough to meet the functional requirements and business strategy changes.

Key word: SOA; automobile supply chain; information

Semantic Association Identification and Knowledge Discovery for Business Applications

XIANG Peisu, TIAN Ke, HUANG Qinzen

Abstract: Public and private organizations have access to vast amount of internal, deep Web and Open Web information. Transforming this heterogeneous and distributed information into actionable and insightful information is the key to the emerging new class of business intelligence. In this paper we discussed semantic approaches to support analytics on vast amount of heterogeneous data. A prototypical demonstration of this research and technology is presented in the context of an aviation security application.

Key words: Semantic Web technology, semantic analytics, semantic association, content analytics, ontology, RDF

A Dynamic Preview Following Model of Car Drivers

Wu Yihu, Yu Dan and Liu Yanni

Abstract—A dynamic preview model of following speed is advanced in the paper to reflect the dynamic characteristics of different drivers, which is based on preview follower theory. The course of car-following is divided into two phases that are the preview phase and following phase. All the drivers are classified into three categories; they are radical driver, common driver and conservative driver. The car-following behaviors of the above drivers are modeled and the characters of them are analyzed by setting different parameters both in physiology and psychology. The results of simulation show that the model could describe the car-following behavior truly and reflect the differences of car-following behaviors between different drivers accurately. So the model advanced could offer some help for traffic flow researching and traffic accidents preventing.

Index Terms—Traffic Engineering, Car-following behavior, Dynamic preview, Behavior character

Predicting Corporate Financial Distress Based on KPCA and Improved SVM

Jianguo Zhou, Tao Bai, and Jiming Tian

Abstract—In this paper, we construct a hybrid of kernel principal component analysis (KPCA) with improved support vector machine (SVM) model using genetic optimization algorithm (GA) for financial distress prediction. KPCA is used as a preprocessor of SVM to extract the principal features of original data and employed GA to optimize the parameters of SVM. Additionally, the proposed GA-SVM model that can automatically determine the optimal parameters was tested on the prediction of financial distress of listed companies in China. Then, we compared the accuracies of the proposed GA-SVM model with other models of multivariate statistics and other artificial intelligence. Especially, we adopted bootstrap technology to evaluate the reliability of validation. Experimental results showed that the GA-SVM model performed the best predictive accuracy and generalization, implying that the the proposed model is successful for financial distress prediction.

Index Terms—Financial Distress; SVM; GA; KPCA

Application of Full-digital DC-DC Converter in Hybrid Electric vehicle Energy transmission System

WANG Ying-hai, ZHANG Hao-ming

Abstract—To improve energy using efficiency of hybrid electric vehicle(HEV), a bidirectional DC-DC converter was studied: Full-digital PWM boost DC-DC converter was used to transfer energy from super capacitor(SC) to motor through DC bus when HEV accelerated; Full-digital PWM buck DC-DC converter was used to transfer feedback energy from the DC bus to super capacitor when HEV decelerated.

Experimental results indicate that super capacitor with full-digital DC-DC converter can improve energy using efficiency of HEV system greatly.

Automatic Gait Recognition Based on SV

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MA Ying, LI Bo, TANG Yuan, WANG Zhu

Abstract—Human detection algorithm based on Support Vector Machines and system realization were system-matically discussed. We extract local shape mutation feature of the targets through wavelet transformation of the static image, and combine the gait feature of the dynamic frame. We also use a better learning and generalization of two-layer support vector machines in a small sample conditions. Our approach has real-time, high accuracy and wide range of application.

Index Terms—gait feature, human detection, real-time, two-layer support vector machines, wavelet transformation

First Exit Time of Markov Processes for Particle Transport in Fluidized Bed Reactors

Yan Fu, Hui Gao, and Xiaoling Li

Abstract—In this paper we study a Markov process that has been proposed by Dehling, Hoffmann and Stuut (1999) as a model for particle transport in fluidized bed reactors. We propose different boundary condition at the exit of the reactor that captures the fact that particles cannot leave the reactor by diffusion, and the net downward drift is related to the volume balance. In the discrete model, we show that processes satisfy Danckwerts' law, stating that the expected first exit time equals V / v where V denotes the volume of the reactor occupied by the fluid and v the volumetric inflow rate. In order to ease and double check the proof, we use Maple for mechanical support.

Index Terms—Markov Process; Particle Transport; Fluidized Bed Reactors

A New Speech Enhancement Algorithm Using Wavelet Packet Transform

Jichang Guo, Wenliang Wang

Abstract—A new algorithm for speech enhancement based on wavelet shrinkage method is presented in this paper. First, the noisy speech by the Bark-scaled Wavelet Packet (BS-WPD) is decomposed to simulate the human auditory characteristics. Then a new thresholding algorithm which has many advantages over soft and hard thresholdings put forward by D.L. Donoho and I.M. Johnstone is proposed. Simulation results indicate that this new method is very useful and efficient in the process of white noise reduction from speech, and the new thresholding algorithm gives better SNR improvement than other traditional thresholding algorithms.

Index Terms - *Speech Enhancement; threshold; Wavelet Packet; SNR*

Research on the Composition Uniqueness of Connector Architecture Based on Graph Transformation

Du Junwei

Abstract—Graph transformation system, which has the nimble assembly technology and the complete semantics and syntax foundation, is the new methodology about system composition. Ehrig presented a generic

composition framework on connector architecture using Petri nets, which provides a powerful support for dynamic and static component assembly in different domains. However, this framework is not flexible enough in practice, because it restricts the disjunction among import interfaces in each reduction step. Therefore, we extend the framework by presenting an unique condition of composition, and prove that the framework is unique on structure and content under this condition.

Index Terms—generic component; morphism; connector; transformation; Petri nets

On-line Batch Processes Monitoring Based on Dissimilarity Analysis

Liqing Di, Zhihua Xiong, and Xianhui Yang

Abstract—A novel multivariable statistical process control(MSPC) method based on the dissimilarity analysis is proposed for on-line batch process monitoring. The dissimilarity of data between the current batch run and a preassigned reference batch run is used as monitoring index. The possibility density function of the dissimilarity index distribution is estimated by kernel density function and the control limits are computed. The on-line monitoring is realized through utilizing the Kalman filter method to estimate the whole trajectory of the current batch run. The monitoring performance of the proposed method is compared with the traditional multiway principal component analysis (MPCA) method on a fed-batch penicillin fermentation process. The results have shown that the proposed method performs well to successfully detect the faults in batch processes. *Index Terms*—batch process, dissimilarity, Kalman filter, kernel density estimation

Study of Deleted Files' Tree Based on NTFS

Liu Naiqi, Gong Yong, Hao Yujie, Dong Bin

Abstract—The paper analyzes the base structure of NTFS(New Technology File System) File Format in detail and deeply introduces its DS (Data Structure) of types and attributes of MFT (Master File Table). It elaborates how to build up deleted Files' Trees following NTFS Index Files Tree. It gives out respective algorithms of NTFS Index Files Tree and deleted Files' Tree, then it focuses on analyzing the efficiency of algorithm of deleted Files' Tree and comes up with a plan of optimization of algorithm. *Index Terms*—NTFS, MFT, Index Files Tree, deleted Files' Tree, Data Recovery

PASSWORD RECOVERY USING SET RECONCILIATION

Bo Fu, Guiduo Duan, Jianping Li *Abstract*—Set reconciliation algorithm which is firstly described by Yaron Minsky and Ari Trachtenberg is based on set polynomial encoding. A novel scheme for password recovery based on set reconciliation is presented. And low entropy password is used to recover high entropy password. Standard hash function and symmetric cryptography essentially act as password storing after encrypted by the key from the low entropy password sets. The design is provably secure against a computationally unbounded attacker if password space is proposed large enough.

Optimization and Simulation for Equipment Maintenance Policy of Industrial Enterprise

Chen Qi, Zhao Tao, Du Ji-huan

Abstract—When the risk control requirements incur significant increases in cost for overhauls, it's a necessity to update the current system to achieve risk control objectives. This article combines overhaul and system update together and considers a combinatorial optimization problem. A combinatorial optimization model is then established. The objective of the model is to find the appropriate time for system update as well as to optimize overhaul cycles for new and old equipments. Finally, the Monte Carlo method is used to simulate the model.

Simulation results show that the combinatorial optimization model is effective.

Color Transfer and Retinex Theory Based Illumination Invariance

Abstract—The paper proposes a novel algorithm based on Retinex theory and color transfer to get illumination invariance among images, taking one of the images as a reference. Most of the algorithms focus on eliminating the illumination effect of one image, while our method corrects the variable illumination among images. Therefore, the algorithm can be applied to target tracking, recognition, matching and 3D reconstruction to diminish the illumination variations. Experiment results validate the method.

A Survey of Complex Packing Problems with Behavioral Constraints

Zhiqin Qian*, Heng Cao, Lizong Lin

Abstract—Complex packing problems (CPP) are restricted by various behavioral constraints (such as inertia, balance, stability, vibration, electromagnetic field, temperature field) besides conventional requirements of non-overlapping and space utilization efficiency. Based on relevant literatures, we present this survey. Firstly the typical examples of CPP are described. Then we introduce solution algorithms of CPP such as heuristic algorithm, graph theory algorithm, simulated annealing algorithm, genetic algorithm, human-computer interaction. Finally we discuss some aspects of prospective development in this area.

Performance Analysis of Wireless Distributed Measurement System Based on IEEE802.11

Benliang Li Houjun Wang Li Li Bin Yan

Abstract—This paper puts forward the model of Wireless Distributed Measurement System (WDMS) based on IEEE802.11 by focusing on the trend and requirement of future distributed measurement system and the IEEE802.11 standard. The MAC layer and the PHY layer that affect the real time performance of system are analyzed. By setting up the simulation network scenario of Wireless Distributed Measurement System in software, we research the parameters of throughput and delay in distributed measurement system based on IEEE802.11b, which gives theory argument and reference data for further system design. *Keywords*—Wireless distribute

Power Fault Recognition Based on Multiwavelet Packet with Different Pre-processing Methods and Wavelet Neural Network

LI Dongmin, LIU Zhigang, SU Yuxiang, CAI Jun

Abstract—Multiwavelets own better properties than those of traditional wavelets. The pre-processing method of multiwavelet is one of key factors affecting its applications. A novel power fault recognition method based on multiwavelet packet coefficient entropy (MPCE) and wavelet neural network (WNN) is proposed. Firstly, the appropriate multiwavelet packet decomposition of the sampled transient current is performed and each MPCE of transient current is calculated. Then the eigenvector of the current signal is constructed, and by taking the eigenvector as training samples the WNN is trained to implement the fault recognition. The proposed method

with different pre-processing methods is compared with the means based on traditional wavelet packet and WNN. Simulation results show that the proposed method is effective and feasible.

Study on Cooperative Effect, Knowledge Acquisition and Learning Capacity within Skill-based Competitive Strategic Alliances*

LONG Yong , GU Hongbo

Abstract—Skill-based competitive strategic alliances are becoming an increasingly important form in the competition of international business. When they are formed, valuable learning opportunities may be created for the alliance partners. The primary objective in this paper is to explore the relationship among cooperative effects, knowledge acquisition and learning capacity within skill-based strategic alliances. We think knowledge acquisition is central task of the alliance partners, important condition of cooperative effect increasing, and is depended decidedly on learning capacity within Skill-based strategic alliances. *Index Terms*—Skill; Strategic alliances; Cooperative effect; Knowledge acquisition; Learning capacity

A Research on the scheduling of product oil tank farm

Jin Li*, Aijie Guan, Yunji Wang, and He Huang

Abstract—The scheduling of product oil tank farm is necessary work for oil blending and leaving factory. The model of scheduling optimization based on set theory and related concepts are given in this paper. An algorithm to solve this discrete optimization problem has been proposed. A scheduling system including monitor subsystem and scheduling subsystem has been developed based on intelligent real-time development environment G2 by using above results and experiential knowledge of engineers. The application of the scheduling system shows it can improve the productivity and profitability of the refinery.

Research on Urban Traffic Incident Forecast Information Mining Based on Neural Networks

ZHU Yin, ZHAI Runping

Abstract—This paper introduces some basic related theories of data mining technique, including the basic perception and main related methods. Then this paper presents the disadvantages of the conventional methods and fuzzy neural networks, which has the advantages of high precision and fast convergence speed. Moreover, the urban traffic incident forecast system has been developed which takes advantages of this improved method. Finally, this paper discusses the promising developments and some related applications of the information mining technique based on this method.

Study on color night vision method of dual-spectrum low

light level in single-channel*

Lianfa Bai, Yi Zhang, Chuang Zhang, Qian Chen and Baomin Zhang

Abstract—The design project of color night vision method of dual-spectrum low light level (LLL) in single-channel is presented, and the simulating result of the method is given too. The method is based on filter film of separating spectrum that separates LLL CCD image into two parts, which are long wave stripe image and short wave stripe image. Compensating between frames are done to long wave stripe image and short wave stripe image respectively; long wave (LW) image and short wave (SW) image after compensating are fused and hue space mapped; color display image is obtained to increase identifying probability. The color night vision method of dual-spectrum LLL in single channel resolves problems of matching difficult, bad real-time and high cost in the color night vision system of dual-channel.

Development and Prospect on Mobile Peer-to-Peer Computing

XinZheng Niu, Kun She, MingTian Zhou

Abstract—The development of personal mobile devices and wireless communication technology accelerates development of mobile P2P computing. It means a kind of Peer-to-Peer, equal cooperation and share in mobile users node. A lot research progress about file sharing, routing mechanism, integrated framework, access control and so on are made in mobile P2P computing. Based on the description for the characteristics of mobile P2P computing, the paper deeply discusses the problems that must be resolved in mobile P2P computing. Then, typical model system and important research fruits are analyzed. The paper points out the direction to the research in the future.

An Object Categorization Method Based on Gabor Wavelet and SVM

Dekun Hu, Jianping Li, Siyu Zhan, Lei Zhang, and Desong Wang

Abstract—In this paper, we proposed a object categorization method based on Gabor wavelet and SVM in still image. Both of the SVM and the Gabor wavelet transform have some robustness against the position and scale of the objects. In the first step, we build some filters with Gabor wavelets and extract features from image, and then feature reduction is obtained via a contribution of features from the feature space to the decision function of SVM. Experiments with a object categorization system show that combining GWT with feature reduction leads to a speed-up categorization performance.

Failure Analysis of Bricklaying Arch Based on Bott Duffin Inverse Model

Huang Shi-Wu, Li Jian-Ping, Li Qi-Yun, Guo Luo-Jun

Abstract—Bott Duffin inverse model, which provides with the automation analysis method to solve the nonlinear equations including the supplement equation with unknown parameter has been described in this paper. Based on the model, the simulation on the cracks of bricklaying arch built by three-layer stone material has been done. The simulation results are consistent with that of experiment. The research results show that the numerical simulation method put forward in this paper, which tensile strength is considered, can describe the distribution and growth of cracks in bricklaying arch in effect. Cracks likely emerge in the middle of arch, the foot of the arch, 1/4 arch, 1/8 arch. Crack depth changes non-linearly with increase of load.

THE PARALLEL FFT TRANSFORM IN DISTRIBUTED SYSTEM

Hui Liu, Chan Zheng, Bo Dai, Chensan Lu, Xinyi Li

Abstract—Considering the rapid development of paralleling machines, more speed, more efficiency and higher precision of digital signal transform algorithm are wanted. And lately with the development of new programmable digital signal processing (DSP), the need is becoming more contended. In the FFT transform algorithm, we divide the Data into some blocks, and then, based on the structure of FFT parallel model. It's proved that the parallel algorithm processing is efficient with high speed up outcome. Also the FFT transform is carefully analyzed, optimized and implemented throughout performing at the computer DAWN2000, with huge parallel computing capability.

Chaotic Synchronization for a Fractional-order Electronic Oscillator

Zheng Ji-ming, Zhou Ping, and Zhang Nian-ying

Abstract—One synchronization method is presented for a fractional-order electronic oscillator only via a scalar signal drive and linear feedback. The synchronization technique, based on stability theory of fractional-order systems, is simple and theoretically rigorous.

The Research of Peer-to-Peer Network Security

Chen Jinrui, Li Jianping

Abstract—Peer-to-Peer applications are rapidly gaining acceptance among users of Internet-based services in the recent years, and is now the focus of researches and attentions. It is applied in many fields, and will be prosperous in the future. However, concerns have been raised about the possibility that malicious users can exploit the network to spread tampered-with resources. Because of the features of Peer-to-Peer network, it is complex to solve security issues. Nowadays, most of good Peer-to-Peer network application development platforms only provide some degree of support secure applications. Therefore, it is necessary to design more excellent security model.

A Routing Scheme that Meet the QoS Multi-Constrained in the Wireless Sensor Network

Xiang Zhang, Jianming Liao, Guoxia Liu, Ping Kuang, Hui Liu

Abstract—The key objective of wireless sensor networks (WSNs) is to use the restricted embedded resource efficiently and to maximize their life time. Quality of service (QoS) routing is one of the key technologies to provide differential services and utilize the whole resource effectively for WSNs. We present a new energy best routing method which could meet the requirements of QoS bandwidth and has longer network life time. This method constructed the Node Selection Model, Energy Assessing Model. The genetic quantum Algorithm (QGA) which utilizes the set of the available nodes was used to construct the route. The Markov chain proved the algorithm that is strong convergence and also the convergence speed is exponent. In addition, the choosing intervals of the controlling parameters proposed by the QGA algorithm have been determined based on the simulations and the analysis results. It has been shown from the experiments that the energy best routing method has better adaptability and longer lifetime.

Analysis and Research on Scanning Strategy and Propagation Model of Internet Worm

Wang Sujun, Li Jianping

Abstract—With the wide application of the Internet, worm's threat to security of computer system and security of network increases day by day. Especially under the environment of Internet, the diversified spread ways and the complicated applied environment make the emergence frequency of the network worm increase, the propagation becomes faster, and the coverage rate is wider. In this paper, the definition and research situation of Internet worms, exploration function component and execution mechanism are first presented, then the scanning strategies and propagation model are focus discussed, and finally discuss the development trend of propagation and the future research directions of Internet worm..

A Survey of Routing Protocols for Mobile Ad Hoc Networks

Abstract—Mobile ad hoc networks (MANET) is a kind of wireless network that can be deployed instantly and provide easy network communication without the support of pre-established network infrastructures, such as base stations. This network architecture brings promise of much better mobility and communication capacity. In order to facilitate communication within the network, a routing protocol is used between a pair of nodes so that message may be delivered in a timely manner. In this article we identify various techniques used for classifying routing protocols for MANET. Comparisons of their characteristics are given according to their routing strategies and relationships. *Index Terms*—MANET, Mobile ad hoc network, Routing Protocol

Best and Worst-case Fuzzy Geometric Coverage in Sensor Networks

Rui Wang, Wenming Cao, Weixin Xie

Abstract—The sensing abilities of networked sensors are affected by environmental factors and their own degenerations such that the sensing abilities reduce to a smaller value, then a fuzzy annulus is formed. So it is fuzzy to anticipate this sensing behavior. We investigate the coverage issues in sensor networks based on fuzzy theory and propose a new notion of fuzzy geometric coverage. Based on this model, we define the best and worst-case fuzzy geometric coverage, and construct the Delaunay diagram and Voronoi diagram to solve the problem. The analysis and simulation results show that the proposed model has a good performance in solving fuzzy coverage problem in sensor networks.

A Classification Model Based on Support Vector Machines and Euclidean Distance Classifier

Zhu Yonli, Zheng Jianbai, Wang Fang

Abstract—Based on statistical learning theory, Support Vector Machines has been well recognized as a powerful computational tool for nonlinear problems with high dimensionalities but small sample size. Considering the deficiencies of one-against-one SVM classifier, such as having inseparable regions and the tardy classified speed, we present a new method to improve one-against-one SVM classifier using Euclidean distance classifier, and construct the new classification model. To prove the validity of the new model, apply it to diagnose the transformers' faults. The results show that the improved classifier has excellence in both classification accuracy and computation efficiency.

Reverse Tunneling on Mobile IP

Luo Ya, Xiao Shucheng

Abstract—Three kinds of tunnel protocol have been introduced in this paper : IP Encapsulation within IP, Minimal Encapsulation and Generic Routing Encapsulation. Reverse tunneling is a tunneling from mobile host to home agent, and makes it possible for the mobile host from foreign network to communication in the network whose router has access filters. Through the application of IPSec protocol in mobile IP, safety service can be provide to mobile IP, which enable mobile IP customers to access VPN protected by firewall without destroying existed safety structure.

The Numerical Analysis of Bridge's Dynamic Response under Vehicle Traveling

Abstract—In the analysis of the stone arch bridge fatigue life-span, the problem that whether the dynamic response should be taken into consideration at the time the vehicle passing through the bridge is arguable among the researchers. A stone arch bridge of 60m span is used as the calculating model for the numerical simulation of the dynamic response of the stone arch bridge under moving load based on Ansys. A specific analysis of the displacement change of the stone arch bridge is done based on the result of the numerical simulation. The result shows that both the static response and dynamic response of the displacement of the bridge are of the same order of magnitude. And it also indicates that the most dangerous point is the center of the bridge, when the vehicle moves onto the bridge and in the center of bridge. It is necessary to do vibrancy research for a stone arch bridge under moving load. It also provides the analysis of the stone arch bridge fatigue life-span with theory foundation.

Research of Parallel Control Strategy Based on Optimization Theory in Large-scale Weapon Equipment

YU Chuan-qiang, GUO Xiao-song, ZHAN-An, Wu Hai-cheng

Abstract - To solve the issue that sequential control using in large-scale complex weapon equipment takes much preparation time of war, a design based on parallel control is proposed. It depicts the constraints network model and presents the decomposition-collaborative model of parallel control. In the paper, it discusses the solving strategy of the model, establishes collaborative algorithm containing constraint conflict and optimization object function. The solving strategy can keep the control really optimal and keep the system running normally in case of conflict.

Kinematic Analysis and Simulation of a Manipulator based on ADAMS and MATLAB

Abstract—The relationship of velocity between the end of the manipulator and each joint is discussed in the basis coordinates system. The inverse velocity is analyzed using Jacobian matrix method for the manipulator. Considering its practical geometric parameters, restriction and physical characteristic, the virtual prototype of the robot is established in ADAMS, and then the co-simulation was completed by applying the ADAMS/Controls and MATLAB/Simulink. The virtual prototyping model of the robot provides a basis for research on off-line programming of the modular robot.

Research on Bilateral Control Strategy of Tele-operation 6-DOF Manipulators with Force Tele-presence

Zhuxin Zhang, Dingxuan Zhao, Tiehua Chen

Intelligent control strategy for turbine supercharged set in marine supercharged boiler

Qidan Zhu, Jingqiao Zhang, and Songjiang Lou

Abstract—Turbine supercharging set is used to supply highpressure combustion-supporting air. It strengthens heatconvection and improves boiler heat rate. But the control forturbine supercharging set is a control with the characteristics oftime-varying and nonlinearity and complex coupling. It is difficultto get the good performance through the traditional control mode.Evaluating of the characteristics of fuzzy control with quickdynamic response, good robustness and neural network controlwith good study capability, good generalization capability, a fuzzyCMAC controller based on GA parallel structure is presented inthis paper. A simulation with established mathematics model of their flux of supercharged boiler is carried out, The simulationresults show the method's validity and better adaptability andcontrol results.

The Power Plant Mixed Bidding Strategy Model Based On The Fuzzy Set Method

Dong Fugui, Li Ning, Li yanbin

Abstract—The electricity market is not a perfect competitiveone but rather the oligarch market. The power plants canmaximize their own profits by bidding strategy. Power plant'sbidding strategies for maximum revenue in spot market arediscussed in this paper. Based on the mixed strategy model, thispaper uses the fuzzy set method to describe the competitors'bidding behaviors, then the fuzzy multi-criteria decision-makingtheory is adopted to integrate various strategies of power plantand then make a solution as an optimal bidding strategy.

Comparison of Clustering Methods with Generating Mixture Component Data

Mei SUN, Lingjun KONG, Haojun SUN

Abstract—Clustering is an important research topic andcore technology in Data Mining. Clustering algorithmshave been researched deeply. Now, there are lots ofdifferent clustering algorithms, they are used in specialfields and users. In order to use these algorithms better,some researchers have proposed some standards to evaluatethe Clustering algorithms. This paper aims to evaluateClustering algorithms form another aspect—using thegenerating mixture component data sets which haveoverlapping phenomenon to compare Clusteringalgorithms' property. Based on the concept of overlap ratewe can generate data sets with different geometricalcharacter. Then we use the data sets to evaluate Clusteringalgorithms to find the applicability of clustering algorithms.

Research on Autonomous Rendezvous Techniques Based on Motion Equations of Line-of-Sight

Abstract—In this paper, the autonomous rendezvous technology is investigated based on the relative motion equations of line-of-sight (RMELS). The rendezvous is divided into two stages (for saving energy): parallel approaching and rotational approaching. In the first stage, the line-of-sight angle (LSA) keeps a constant, which is equal to its initial value, while the line-of-sight distance (LSD) is controlled to decrease. When the active spacecraft is close to the passive spacecraft (but not to the ultimate object), the rendezvous comes to the next stage. In the second stage, LSA is controlled to meet the docking direction and the control to LSD still goes on until reach the ultimate objective. In order to guarantee practicability and feasibility, the orbital perturbation error between two spacecrafts, the whiff error and the observation error are taken into account. In the longitudinal channel, a control method which combines stepwise velocity control with sliding mode control is put forward. In the lateral channel, the control to LSA is conducted through sliding mode control. The simulation results show the validity and robustness of the proposed approaching method.

The Monitoring and Analysis System of Power Quality Based on Virtual Instrument and Wavelet Transform

Zhenmei Li, Jin Shen, Peiyu Wei, Shulian Yang

Abstract—The remote monitoring system of power quality based on C/S and B/S mixed mode was developed by using the virtual instrument technology, network technology and database technology. It is an open distributed system mainly composed of database server, Web server, virtual instrument and remote client. The paper proposes a method of monitoring and analyzing voltage fluctuation and flicker by means of wavelet transform: the signals were divided into multi-frequency bands according to the voltage flicker signal character, thus the feature of the flicker was extracted, so were the frequency and amplitude of voltage fluctuation, and the accurate moment voltage flicker occurred. The remote storage and access for a large quantity of data in power quality monitoring was realized by using ADO in LabVIEW. Through internet explorer, the remote client can browse the real-time monitoring data of power quality, such as frequency deviation, voltage deviation, voltage fluctuation and flicker.

Performance Analysis and Simulation of Routing Protocols for Ad Hoc Networks

Abstract—With the flexibility and robustness, ad hoc network has become the researching hot spot of wireless network, especially in military field. The purpose of this paper is to extract the relative merits of these mechanisms by studying and comparing the performance of four prominent routing protocols: DSDV, DSR, AODV and TORA. We systematically analyze the protocol performance in different aspects, such as delay, routing load, throughput, loss ratio, scalability, routing mechanism, multicast support, unidirectional link support and power saving. Our simulation results show that AODV in general outperforms DSDV, DSR and TORA in terms of previous performance metrics. As a result, we conclude that the differences in the protocol mechanisms can lead to significant performance differentials, which provides a beneficial reference for further study on more scalable routing protocols supporting the QoS in ad hoc networks.

Research on Key Problems about Wireless Sensor Network

Abstract—As an important technology in information gathering, transmission and processing, Wireless sensor network has a widerange of potential uses in the military and civilian fields, and it is the current hot spot. The most important issues are security in the design of wireless sensor networks. This paper analyses the characteristics of wireless sensor networks and the security threat it faced by in-depth, in the same time make some research on its corresponding security measures.

Bias Compensation Recursive Least Squares Identification Algorithm for MISO Stochastic Systems

Wang-Li Yang, Shui Yu, Wen-Guang Cao

Abstract—This paper derives a bias compensation recursive least squares (BCRLS) identification algorithm for multi-input single-output (MISO) stochastic systems by means of the prefilter idea. It's going to use a designed prefilter embedding the known zeros into the systems and use the given information by the zeros to compensate the biased term in least-squares estimates, then to derive a BCRLS algorithm. And the analysis shows that the BCRLS algorithm can give the unbiased estimates of the system model parameters in the presence of colored noises, irrespective of the noise model. Moreover the BCRLS method can give higher accuracy estimates even in the non-stationary case of the system inputs. This theoretical analysis is verified by simulation tests.

Fuzzy Control with Logical RBF Neural Networks for Hydraulic Actuator System

Abstract— For complex control problems, it is also desirable to introduce neural networks into fuzzy control so as to simplify and automate the specification of linguistic rules. This leads to good adaptation, good robustness and less dependency on the precise model of the system. In the paper, a fuzzy control with logical RBF neural networks has been developed and applied to the positioning control of a hydraulic actuator system. The simulation experiment results verify the superiority of the proposed control to the conventional PID control in the static and dynamic control performance. The merits of both fuzzy control and artificial neural networks are well used

Global Exponential Stability of Fuzzy Cellular Neural Networks With Variable Coefficients

Abstract—In this paper, the global exponential stability of fuzzy cellular neural networks (FCNNs) with variable coefficients and unbounded delays was investigated. Without assuming the boundedness and differentiability of the activation functions, based on the properties of M-matrix, by constructing vector Lyapunov functions and applying differential inequalities, the sufficient conditions ensuring globally exponential stability of the equilibrium point of fuzzy cellular neural networks with variable coefficients and unbounded delays are obtained.

Elite Strategy for Particle Swarm Optimization Algorithms

Yu Liu, Zheng Qin

Abstract— Elite strategy is proposed to improve the performance of Particle Swarm Optimization (PSO) algorithms. Several the best individuals from the best solution achieved so far by every particle (pbest) are selected to constitute an elite group at every iteration. When every particle updates its velocity, along every dimension the particle could independently select the nearest position from the same dimension of elite members as its attractor. Because elite members jointly guide the search for every particle instead of only one the best particle, elite strategy could effectively control the diversity of the swarm and then alleviate getting trapped into the local optimum. In our experiments, the classic PSO algorithm, linearly decreasing weight particle swarm optimization (LDWPSO), is used to validate the effect of elite strategy. The global local version of LDWPSO, the local version of LDWPSO with von Neumann topology, the local version of LDWPSO with circle topology, and LDWPSO equipped with dynamic elite strategy were compared. The experimental results show that elite strategy can greatly improve the performance of LDWPSO algorithms, especially, on complex function with many local minima.

A Novel Algorithm of Character Segmentation in Vehicle License Plates

Huang fan, Li zhi-min,
Zhang jing, Wan rui, Zhang
feng-yang, *IEEE*

Abstract— Character segmentation for license plate is a key component of an automatic vehicle license recognition system. A novel adaptive approach of character segmentation for badly degraded images is proposed. First, the non-uniform illumination correction, contrast enhancement and binarization are introduced; then, top-bottom edges of characters can be obtained by the units of the plate horizontal projection respectively; finally, the candidate regions of characters are located according to the plate vertical projection for coarse segmentation. And the character segmentation regions are determined by prior knowledge of license plate. The experimental results based on Chinese license plates shows that the proposed method is fast and accurate, and is tolerant to license plate with deformations, rotations, plate frame, rivet, the space mark, and so on.

Efficient ID-Based Authenticated Key Agreement

JIN Lijie, XU Chunxiang

Abstract— An efficient ID-based authenticated key agreement protocol is proposed in this paper. This protocol provides known key security, perfect forward secrecy, key-compromise impersonation resilience, unknown key-share and imperfect key control. The computational complexity of the proposed protocol is only one elliptic curve point multiplications, one elliptic curve point addition and one operation of the pairing for each party, and the proposed protocol is efficient. The proposed protocol can be extended to address key escrow and key confirmation for application in reality.

Quantum Denoising Algorithm

Abstract— Quantum threshold algorithm is proposed to reduce the noise of signal. Quantum superposition

principle is used to construct noise model in wavelet domain. We consider that signal is quasi quantum system. Every wavelet coefficient belongs to a superposition state. We don't know whether it belongs signal or noise until we measure it. Unlike hard threshold algorithm quantum threshold algorithm hasn't a certain threshold. The probability that a wavelet coefficient belongs to signal or noise is decided by a distribution function. Finally, several experiments are made to compare the proposed method with conventional hard threshold algorithm. The pseudo-Gibbs phenomena can be reduced by this algorithm.

Automatic Structural Test Data Generation Using Immune Genetic Algorithm

Chen Yong, Zhong Yong, Bao Sheng-Li, He Fa-Mei

Abstract—Automatic structural test data generation is a key problem in software testing, which is the most important quality assurance measure currently. Its implementation can not only significantly improve the effectiveness and efficiency but also reduce the high cost of software testing. As a robust metaheuristic search method in complex spaces, genetic algorithm (GA) has been applied to test data generation since 1992. Although GA-based test data generation outperforms other approaches, there are still several shortcomings such as slow convergence, time-consuming fitness calculation, population degeneration, and so on. In order to make better performances, this paper proposes a framework for automatic structural test data generation using immune genetic algorithm that can help to decrease probability of population degeneration and to accelerate convergence to the global optimum.

Model and Algorithms for Scheduling Independent Tasks on Heterogeneous Systems

Abstract—In this paper, we study the problem of scheduling a set of independent tasks onto a heterogeneous system. The goal is to find a mapping of all tasks onto available resources such that the sum of costs of all tasks is minimized, while the difference of the number of tasks on any two machines is no more than one. We develop an integer programming (IP) formulation for modeling this problem. This problem is transformed to an assignment problem, and an optimal algorithm based on Hungary method is presented to solve this problem. To speed up the solution, two heuristics are also given. Experimental results show the correctness of the IP formulation and the effectiveness of our heuristics.

An Effective Parallel Hybrid GA for Traveling Salesman Problem

Yanbin Liu, Jun Huang

Abstract—This correspondence presents a hybrid genetic algorithm (GA) to find high-quality solutions to the Traveling Salesman Problem (TSP). The proposed method is combined with greedy algorithm in the crossover and Lin-Kernighan heuristics in the mutation to compensate for the traditional GA lack of local search ability. Compared it with other GAs, it works more effectively and efficiently. Based on these, it utilizes recursive divide and conquer approach to parallelize the hybrid GA. The experimental result with benchmarks shows that this algorithm not only has a high tour quality but also costs less running time.

Dual Quaternion Interpolation Algorithm in Five-axis CNC System with High Speed and Precision Machining

Pei-nan Li and Rui-feng Guo

Abstract—High speed and precision machining technology[1,2,3] have been rapidly adopted in five-axis CNC system for their high productivity. The design of trajectory generation and control algorithms plays a crucial role in realizing the accuracy requirement for high speed feed motion. Most interpolation algorithms for five-axis CNC machining are focused on studying techniques to design position, orientation, and feedrate curves in such a way using iso-parametric correspondence as to avoid excessive angular velocities. However, it is difficult to guarantee such correspondence. To help alleviate such difficulties, this paper presents a new interpolation algorithm to five-axis CNC tool path generation for sculptured surface machining. Interpolation algorithm using dual quaternion has several advantages over the algorithm of interpolating translation and rotation independently and then combining the results. The effectiveness of the proposed interpolation algorithm is verified in Matlab. The results show the velocity, acceleration and jerk of five-axis machining can be smooth without losing machining accuracy and surface quality.

Simulation of IRFPA Nonuniformity Correction Algorithms Based on Reference Radiant Point

TANG Yuan, LI Jian-ping, WANG De-song, and YAN Yue-hao

Abstract—The mathematics model of IRFPA (infrared focal-plane arrays) nonuniformity correction is firstly analyzed in this article, and then the simulation steps are designed, lastly the nonuniformity responsive model of IRFPA with the MATLAB software is established. Relying on the model, necessary simulated data should be obtained and the nonuniformity correction algorithms, which base on reference radiant point, have been simulated. In order to simplify the design of model and improve response time in the practical engineering application, this simulated model focuses on the correction algorithms, which base on reference radiant point. Finally, the measurement of nonuniformity is discussed and analyzed.

Temporal-Spatial Filter Algorithm for MRP Feature Extraction

Shengli Xie, Meichun Liu, Jin Wang

Abstract—For motor related brain-computer interface (BCI), discriminative spatial pattern (DSP) is one of the most successful algorithms in extracting the feature of movement related potential (MRP). However, by sliding window and cross validation, DSP can not catch MRP temporal feature effectively. In this paper, we propose a new algorithm called temporal-spatial filter (TSF). Given MRP signals, TSF employs alternate optimization to seek a pair of temporal-spatial projections that simultaneously maximize the between-class scatter and minimize the within-class scatter. The experimental results show that TSF outperforms DSP in extracting MRP feature. If combining the event-related desynchronization (ERD) and MRP, TSF still obtains better performance than DSP. *Index Terms*—Brain-computer interface (BCI), movement related potential (MRP), discriminative spatial pattern (DSP).

Improved Apriori algorithm based on graph models

Tang Ying Jianping Li

Abstract—Finding association rules is an important data-mining problem and can be derived based on mining large frequent candidate sets. In this paper, several graph models in finding association rules are proposed and an improved Apriori algorithm based on graph models is generated. A numerical experiment and comparison to the Apriori algorithm are carried out. Finally two interesting heuristic graph models are presented which may be useful in some special cases. *Index Terms*—Apriori algorithm, graph models, association rule mining

Comparing and Analysis of DHT Routing Algorithm in P2P System

Xiu Li Guanghui Lu Junfeng Tan

Abstract--The peer-to-peer system is a kind of new technique used in network calculating, the purpose of the technical is to link the different computer in the network together, and make use of the Internet and Web to stand to order to win any idle resources well. This paper introduces the core thought of DHT (distributed hashtable) algorithm and structured P2P network used DHT structure. In the very great degree the differentiation of different DHT protocol is lying in to define different routing algorithm. In the end this paper analyzed and compared a few current DHT protocols and their routing algorithms.

An adaptive niche Particle swarm optimization algorithm by evolution grads

Jing YANG Songping YAO Jianpei ZHANG

Abstract --A new particle swarm optimizer, called evolutionary grad-included niche PSO, is presented based on the ;°prematurity;± in global optimization. The new algorithm maintains particle swarm's diversity by dividing it to small niches. The convergence is speeded up by evolutionary gradient, and the capability of jumping out of the local optimal solution is enhanced. The experimental results show that the improved algorithm not only has more advantage in multi-modal function optimization problem than genetic algorithm and PSO, but also can avoid the premature convergence problem effectively.

A Efficient Clustering Algorithm Suitable for Mass Data Mining

Yulong Xu, Jinrui Chen, Hong Zhou, Dawei Xiao

Abstract—The efficiency and fast of data mining algorithms is strongly needed with data becoming larger and larger. In the current clustering algorithms, has not yet applied to the mass data mining clustering algorithm. In this paper, the classic clustering algorithm kmeans is researched, use the ideological of division and distribution, a new highly efficient clustering algorithm that is named d_kmeans (distributed kmeans) clustering algorithm is presented. In M-handling process reduce the time complexity nearly about the original I/M , theoretical and experimental results show that the algorithm suitable for mass data mining. *Index Terms*—kmeans, clusters d_kmeans; distributed;

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Index Terms—kmeans, clusters d_kmeans; distributed;

Preliminary Research of Real-time Denoising Algorithm Based on Wavelet Theory

Xiang Yunfeng, Li Jianping

Abstract—There is always some noise contained in the signal that we acquisition in engineering application. The useful information within original signals can be displayed available only with denoising. Fourier Analysis (FA), Gabor Analysis (GA) and Wavelet Analysis (WA) are some popular signal analysis tools. WA is the primary tool for time-frequency analysis which is developed on FA. WA is so flexible in the localize time-frequency analysis that can focus on arbitrary detail of the given signal. So it is compared to the μ -Microscope of time-frequency analysis which is acknowledged by both mathematic world and engineering application area. In the field of signal processing, the processed signal is often real-time. It means that we must consider the real time of algorithm besides its complexity. That is a more challenging subject. This paper is based on WA theories, through comparing after processing many signals, and gives an available real-time algorithm that can get waveform feature of temporary, stationary ones from contaminated signal. The resolution ratio, signal/noise ratio and real-time processing ability can be raised with the algorithm. These instructions give you guidelines for preparing papers for IEEE TRANSACTIONS and JOURNALS. Use this document as a template if you are using Microsoft Word 6.0 or later. Otherwise, use this document as an instruction set. The electronic file of your paper will be formatted further at IEEE. Define all symbols used in the abstract. Do not cite references in the abstract. Do not delete the blank line immediately above the abstract; it sets the footnote at the bottom of this column.

Arbitrary Subdivision Algorithm and Joining of C-B-spline

Qin Xinqiang Song Liping

Abstract- C-B-spline curves are an extension of cubic uniform B-spline curves. In addition to having many properties that B-spline curves have, they have an adjustable shape parameter λ , and can represent arcs precisely. This paper presents the subdivision algorithm and G_1 condition of C-B-spline curves based on the analysis of C-B-spline basis functions and terminal properties. The G_1 and G_2 continuous conditions between C-B-spline curves and cubic uniform B-spline curves are given. The results have definite geometric meanings that are useful for the shape modification and representation of C-B-spline curves, and they can also be extended to surface modeling with C-B-spline. *Keywords*: C-B-spline, cubic uniform B-spline, joining, subdivision

Beamlet-based Linear Feature Detection Algorithm for Welding Image Processing

DENG Shuangcheng, JIANG Lipei, XUE Long, JIAO Xiangdong

Abstract - Weld seam images are replete with noise due to welding arc, heat and splatters, and ordinary line detection algorithms such as Hough Transform is not an ideal approach to extract significant linear features from it. In this paper, we present a novel line detection algorithm based on beamlet analysis, a new multiscale image analysis theory defined by David L. Donoho. The algorithm is described in detail after introducing the beamlet dictionary and beamlet transform. Taking into account of some special characteristics of welding image

processing, we add an orientation-thresholding step to the standard beamlet-based line detection algorithm. Experiments are conducted to detect linear features in noisy weld seam images at different scales and to test the anti-noising performance of our algorithm. The result of experiments show that our algorithm is characterized by its high efficiency and its prominent anti-noising performance, and is very suitable for detecting linear features in highly noisy weld seam images. The orientation threshold can not only reduce the calculation load, expedite its running speed, but also it can help to improve the anti-noising performance of the standard beamlet-based line detection algorithm.

A Novel Algorithm for Packet Classification Based on Network Traffic

Li Lin, Lu XianLiang

Abstract-- Packet classification is one of the basic techniques for many applications such as routers, firewalls and differentiated services. However, with the rapid development of the Internet, it has already become a performance bottleneck in network infrastructures. To improve the performance of packet classification, a great number of algorithms have been proposed. Among them, the linear search algorithm is the simplest. Although its performance is very low, many packet classification algorithms still adopt it. The reason is that the simple algorithm can achieve a balance between the storage space and the execution time. This paper presents a novel algorithm called ROBRC (Rule-ordering Optimization Based on Resolving Conflicts) to improve the performance of the linear search algorithm. As there are some rule conflicts in firewall databases, the optimal rule ordering problem is NP-Complete [5]. Facing with this situation, ROBRC cuts conflicting rules to resolve conflicts and thus can rearrange rules easily according to the statistical characteristics of network traffic. Experimental results show that ROBRC improves the average performance of the linear search algorithm at a reasonable cost of memory space.

Computer Simulation for 2D Temperature Distribution in Orthogonal Metal Machining

Lizhi Gu

Abstract— Cutting heat and temperature is one of the important phenomena and has a great influence on the metal machining processes. Based on the modified Lagrangian Finite Element Method for the deformation connected closely with the heat, a mathematical model with 2D in orthogonal machining has been built up with triangular elements of 309, and nodes of 200 for the work, chip, and tool. Frictional boundary condition is imposed on the interface between the work and the tool face, as one heat source. The heat from shearing on the shearing plane is another heat source. The material to machine is supposed to be of continuum and homogeneity. Programs have been successfully executed and comparison is made between the simulation and experiments, and reveals the good agreement between them. One of the findings from the study is that the temperature and pressure centers are homocentric and located a distance from the tool edge, accounting for the common wear of the tool crater, taking the cutting of 45 steel as an example.

Substation Fault Diagnosis Method Based on Rough Set and k -Nearest Neighbor Algorithm

Hongsheng Su

Abstract— In view of the characteristics such as more complex and uncertain factors in fault diagnosis systems of substation, in the paper k -nearest neighbor algorithm was applied to forecast decision-making rules of uncertain and incomplete information during substation fault diagnosis. However, k -nearest neighbor algorithm considers all attributes while classifying a new instance, which for that led to curse of dimensionality. To resolve

the problem, rough set was used to perform the knowledge reduction and eliminate the irrelevant attributes. In addition, rough set was also used to evaluate the importance of system parameters. According to the importance of system parameters, each attribute was weighted while computing the distance between the two instances. The prior probability of instance occurrence was also fully considered while classifying a new instance. In the end, an example in substation fault diagnosis indicates the proposed method is very effective.

Minimizing Makespan for Single Batch-processing Machine with Non-identical Job Sizes Using a Hybrid DNA Evolutionary Algorithm

Cheng Ba-yi, Chen Hua-ping, and Wang Shuan-shi

Abstract—This paper proposes a hybrid algorithm to solve the scheduling problems on a single batch-processing machine with non-identical job sizes. The Particle Swarm Optimization (PSO) approach is integrated into the DNA Evolutionary Algorithm (DEA) to conquer the immature convergence. The operators of DEA, including division, horizontal selection and mutation, are adopted except the vertical selection which leads to local optimum. The PSO is used to evolve the individuals from DEA to improve the ability of global optimization. To decode the individuals, the Batch FirstFit algorithm is used to transform them into batches and produce the solutions of the scheduling problems. In the experiment, all levels of instances are simulated and the results demonstrate that the HDEA method outperforms Genetic Algorithm. **Index Terms**— Scheduling; Batch-processing machines; Non-identical job sizes; DNA Evolutionary Algorithm

The research of PSO algorithms with non-linear time-decreasing inertia weight

Lei wen, Zhao cai xi

Abstract - The particle swarm optimization (PSO) firstly proposed by Eberhart and Kennedy, is a computational intelligence technique. The inertia weight is an important parameter of PSO algorithm. In this paper, we designed 2 nonlinear time-decreasing inertia weight to use in GCPSO algorithm. At last a series of experiment is performed to test the performance of GCPSO with different inertia weight function. For most case, The result indicates the nonlinear time-decreasing inertia weight, especially the convex nonlinear time-decreasing inertia weight has a better performance than linear time-decreasing inertia weight and constant inertia weight. **Index Terms** - PSO, GCPSO, non-linear inertia weight, evolutionary computation

A New DOA Estimation Algorithm Based on Fractional Fourier Transform for Wideband LFM Sources

Yunsong Zhou

Abstract—A new method based on the fractional Fourier domain signal subspace decomposition for DOA estimation of wideband LFM sources in sensor arrays is introduced. The proposed approach detects LFM sources with fractional Fourier transform (FRFT), estimates their parameters, and constructs the fractional Fourier domain correlation matrix of the sensor array signals as well as the steering vector corresponding to each source. The MUSIC algorithm is then used to estimate the DOA of LFM sources. Its performance is numerically evaluated. **Index Terms**—Fractional Fourier transform, array signal processing, LFM signal, DOA estimation,

MUSIC algorithm

Research on QoS Scheduling Algorithms

Li Xiao-lin, Jiang Ying-hua, Guo Ping, Zhao Juan

Abstract—In this paper, QoS scheduling algorithms are discussed, and their performance objectives and technology attributes are pointed out after comparison. The hotspots in current research are analyzed and then a new idea for further study is proposed. *Index Terms*—QoS scheduling algorithm timestamp.

Analysis and Modification to Image Segmentation Method Based on GVF Snake Model

Jinyong Cheng, Xiaoyun Sun

Abstract—Gradient vector flow (GVF) snake model is used widely in image segmentation. GVF snake has larger capture range and stronger convergence ability to boundary concavities than traditional snake. In this paper, based on theory analysis and experiment confirmation, we indicate a limitation of GVF snake that it can not capture the thin boundary indentation perfectly because of the counteraction of some external force in diffusing process. Then an improved algorithm is put forward by tracking the original GVF force and adding a new external force. Experiments indicate that the new algorithm can improve GVF snake model's ability to capture the thin boundary indentation. *Index Terms*—Image processing, edge detection, image segmentation, active contour models, gradient vector flow

AN ALGORITHM OF AUTOMATIC WHITE BALANCE BASED ON DYNAMIC THRESHOLD

LI Xu-Jian, FANG Sheng, YANG Xiaodong, Zhang Jian

Abstract—In recent years digital cameras have captured the camera market. Although the factors that consumer consider is the quality of the photographs produced. White balance is one of the methods used to improve the quality of the photographs. The basic white balance methods are, however, powerless to handle all possible situations in the captured scene. In order to improve the white balance we divide this problem in two steps—white point detection, and white point adjustment. The proposed method basically solves the problem of detecting the white point very well. The experimental results show that the proposed method can achieve superior result in both objective and subjective evaluation terms. The complexity of the proposed system is acceptable. The proposed method can be easily applied to digital cameras to obtain good results.

Population Degeneracy Phenomena Analysis on Genetic Algorithm for the Fixed Charge Transportation Problem

Xiaoke Ma, Tao Yang, Yan Wang, and Yuanping Zhang

Abstract—Population degeneracy phenomena (PDP) in genetic algorithms (GAs) drives the GAs to converge to a single individual quickly and debases the capacity of search, which results from the recombination operator,

sampling error etc. A complete PDP analysis on the GAs for the fixed charge transportation problem (FCTP) is developed, which proves that both the GA with matrix code and the GLSA are not suit for the FCTP. For the former, the recombination operator results in degeneracy and the mutation operator can not restrain the degeneracy. For the latter, the initialization solution is path-leaves. Furthermore, a sufficient condition for PDP caused by recombination operator and its probability are proposed simultaneously. *Index Terms*—Population degeneracy phenomena, genetic algorithm, fixed charge transportation problem, sorted edge sets.

A Multiple Constrained Stability QoS Multicast

Routing Algorithm in MANET

Hua Chen, Yan Chen, Pengzhen Dong

Abstract A mobile ad hoc network (MANET) consists of a set of mobile hosts that can communicate with each other without the assistance of base stations. This paper introduces a multiple constrained stability QoS multicast routing algorithm in MANETs (MCQMR). The key idea of MCQMR algorithm is to construct the new metric-entropy and select the stability path with the help of entropy metric to reduce the number of route reconstruction so as to provide QoS guarantee in MANET. The simulation results show that the proposed approach and parameters provide an accurate and efficient method of estimating and evaluating the route stability in dynamic MANETs.

Active Control System of Turbine Tip Clearance

QI Xing-Ming, PIAO Ying

Abstract: The tip clearance is one of the most concerned aspects of aero-engine's reliability and performance. Recent technological advances in the field of active clearance control promise to minimize the tip clearance loss without the adverse tip shrouding effects. This paper is most focused on the design of active control system of turbine tip clearance without the tip sensors, which limit the practical applications because the reliability and intensity can not reach the requirements of aero-engine. Composed of the existing sensor equipments, the active control system, with advanced tip clearance analysis programs embedded in the computer on wing, calculates the real-time tip clearance to control the execution implements. By the means of finite element method, this paper calculates the changes of the tip clearance of one aero-engine's high pressure turbine (HPT). With the contrast of former methods, some reasonable conclusions have been reached as follows: There are two pinch points of minimum tip clearance in first acceleration and hot re-burst acceleration, respectively. The RPM is the key issue for the distortion of turbine disc, while the temperature is the key point of shroud and blades. **Keywords:** Active control system, Tip clearance, Finite element method, HPT, Aero-engine

Analysis of the the second-order nonlinear discrete-time tracking-differentiator as a filtering

Abstract—A new second-order nonlinear discrete-time tracking-differentiator is presented, and its filtering ability is studied. Under the condition of some parameters proper choice of the tracking-differentiator, some approximated linear second-order discrete-time tracking-differentiator is obtained. To some input signal time series containing some noise, by the measure of front filter and reverse filter so as to cancel phase delay, a general solution of the filter problem containing front edge effect and rear edge effect is obtained. To this tracking-differentiator, there exist a filtering factor, proper adjustment this parameter can effectively increase its ability of removing noise. Finally some numerical simulation results are given, as a result the feasibility of the tracking-differentiator's filtering method is confirmed. *Index Terms*—nonlinear system; discrete-time tracking-differentiator; second-order system; simulation and analysis; differential obtain

Automatic Tongue Image Segmentation

Hongguang Fu, Weimin Wang, Junhua Yang, and Rongqiu Wu

Abstract—A novel automatic tongue image segmentation method based on graph theory is presented and implemented. Main steps include: (1) Zoom the image; (2) Choose a color model; (3) Segment the image based on graph theory; (4) Mark the target based on study theory; (5) Estimate the segmentation result using sub window and decision tree and give feedback. This method integrates some technologies such as multiple resolution, image segmentation based on graph theory, sub window, decision tree and so on. Our results show that once segmentation ratio is 71.4% and total segmentation ratio is 91.7%. From our experiment results, the method greatly improves the segmentation efficiency and accurate rate which is promising.

VLSI Design of Equalizer Using Pipelined Filter

Lin Pingfen, Peng Bei

Abstract—When a digital signal is transmitted over an atypical bandlimited channel, noise and intersymbol interference often arise and are the main impairments to reliable communication, sometimes both with multipath and Doppler spread. A design of equalizer using pipeline technique is presented for the efficient equalization in high-speed communication over multipath channels with large delay spreads. In such a terrible situation, the number of filter taps in equalizer may be up to 200 or more. The size and cost would be a critical problem if we implement the equalizer in conventional method. To overcome this shortage, this paper proposes a VLSI design of equalizer with pipeline filter technique. The mapping results show that the proposed design reduces nearly 50% in size compared with the conventional equalizer.

A Novel Biometric Image Integrity Authentication Using Fragile Watermarking and Arnold Transform

De-song WANG, Jian-ping LI, De-kun HU, and Yue-hao YAN

Abstract—A fragile watermarking scheme based on singular value decomposition (SVD) and Arnold transform is proposed for the integrity authentication of biometric images via computer network. We exploit singular values of singular value decomposition of biometric images to check the integrity of biometric images. In order to make authentication data, the singular values are changed to the binary bits using modular arithmetic. The binary bits of authentication data are embedded into the least significant bit (LSB) of the original biometric image. The pixels to be changed are randomly selected in the original biometric image. The advantages of this scheme are that 1) we can detect any modification of watermarked biometric images, 2) the quality of watermarked biometric images is very high because only a few bits of authentication data are embedded. Experimental results show that the proposed fragile watermarking scheme can be applied to the integrity authentication systems based on biometric image.

A New Method of Multi-face Detection Base On Skin Model and Gaussian Distribution Model

Jianhua Li, Jiandang Hou, Qinghua Gao, Jie Wang

Abstract—The speed and the accuracy of face detection algorithm are very important for network sensors applied in human-computer-interface. A new method of face detection is presented in this paper. The algorithm is based on skin color clustering features and projecting distribution characteristic. Firstly, the approach utilizes the skin color features to transform the original image into a binary-image. Then projecting the binary-image to X-axes and Y-axes respectively, two curves are obtained. Their means and variances can be obtained. Gaussian distribution curves with same means and variances can be calculated. Finally, according to the solution of Gaussian equation, an accurate face region is found. Simulation shows that the method proposed is fast and needs less computation. *Index Terms*—face detection, Gaussian distribution, projection, skin model

A Time-Delay Regularization Based Diffusion Model for Image Denoising

Wang Qiang and Feng WANG

Abstract—In this paper, a new time-delay regularization based anisotropic diffusion model is proposed for image denoising by analyzing the moving of the level lines of the image. The model can preserve the details in the image such as edges and corners. Furthermore, we construct the numerical computational method and estimate some important parameters for the proposed model. The numerical examples are presented to show that our model can remove the Gaussian white noise very efficiently and preserve the fine structures very well.

Moving object detection in video sequences

Xiaofeng Gu, Hui Yao, JianPing Li, Ping Kuang, Shixin Sun

Abstract—This paper discussed a popular method for moving object detection in stationary situation, and then proposed a new method to decide whether the pixel is matched. By considering the pixel values from lots of frames as stochastic process, we used adaptive mixture of Gaussians to model the background, and then used the idea of maximizing likelihood to determine whether the pixel is matched. Compared with the popular matching method, there are more supporting evidences in mathematics. Finally the experimental results show that the new matching method is also effective.

Resolution Scalable Image Coding Through Recombining DCT Coefficients

Zongze Wu, Shengli Xie, Xie Zhang, Kexin Zhang, Yiguang Chen, Jin Wang

Abstract : The basic unit of image coding based on DCT was deemed as a complete entity, such as 8×8 code block in JPEG standard, therefore, the image coding based on DCT has large difficulty to implement resolution scalability. This paper proposed a resolution scalability scheme for image codec based on DCT. The encoder recombines the DCT coefficients according to their frequency, and the sub DCT code blocks are encoded in term of the image resolution. After decoding the coefficients from low-frequency to high-frequency, the decoder selects the IDCT models to reconstruct the image from low resolution to high resolution. Experimental results show that our method can get more flexible scalability than that of the methods of DWT base.

Study on Forecasting Model of Enterprise Human Resource Based on Neural Network

Zhu Miaofen, Chen Guojin

Abstract—The demand forecasting of human resource is a very important work of the enterprise human resource management. Aiming at the complex influence factors, non-linearity, low precision of usual forecasting methods, influence factors of human resource structure forecasting are analyzed, the forecasting method based on the artificial neural network is proposed, and then a $6 \times 18 \times 18 \times 12 \times 3$ BP network forecasting model is

established. A fastest descent method with an additional momentum item of variable step length is adopted to adjust network weights. The forecasting model is trained by using the enterprise's correlated data as its inputs and outputs, and the parameters are determined finally. The test results indicate that the forecasting error of the forecasting model based on the artificial neural network is less than 5%, it is of high accuracy, wide scope of application, self-learning and adaptive capacity and so on. *Index Terms*—Forecasting model, Human resource, Neural network, Enterprise

RESEARCH ON DENOISING THEORIES OF METAL MAGNETIC MEMORY SIGNAL BASED ON WAVELET TRANSFORM

LI-JUN LIU , XIAN-ZUN MENG, PENG-FEI WANG

Abstract— There are three main theories all based on wavelet transform, as using wavelet transform processes metal magnetic memory signals of oil depot pipeline. Among them, the non-linear technique can achieve the best effect. The article describes the processing theory based on the nonlinear technique in detail, furthermore discusses three factors which affect denoising effect. In project practice, the means arrives at the satisfactory effect.

Demodulation of AM Signal Based on Adaptive Linear Networks and Elman Networks

Yuan Jimin^{1,2} , Li Xiaoling³, Zhang Xiangyu², Li Jianping⁴

Abstract—This paper proposed a method of combining an adaptive linear network with a spatio-temporal neural network to enhance a feature of digital oscilloscope to measure AM modulation signal. A basic Elman neural network structure was improved by adding the connection of weights from output layer to hidden layer and delayed the feedback signal and adopting learning algorithm of gradient descent with an additive momentum factor. The improved network has fast learning speed, high precision of approaching function, and good adaptability, also there is not oscillation or wavelet on the output waveform. At the same time, an adaptive linear network and an Elman network were combined in series. An adaptive linear network realized optimal filtering function and enhanced anti-jamming capability. It realized to demodulate AM signal by combining two networks. This novel method decreases greatly computational burden and the error is very small. It is advantaged to program a function and interpolate into the function database of digital oscilloscopes to realize feature of measurement of AM modulation signal.

Multi-source Remote Sensing Image Fusion Based on Nonsubsampled Contourlet Transform

Xiujuan Li and Shutao Li, *Member, IEEE*

Abstract—The goal of multi-source remote sensing image fusion is to obtain a high-resolution multispectral image which combines the spectral characteristic of the low-resolution data with the spatial resolution of the panchromatic image. In this paper, methods using nonsubsampled contourlet transform (NSCT) for fusing multispectral low-resolution images with a more highly resolved panchromatic image are described. All the input images are decomposed firstly with NSCT. Then the decomposition coefficients on the different scale are combined using substitution or comparison rule, and the fused image is obtained by taking the corresponding inverse NSCT of the fused coefficients. The spatial and spectral effects are evaluated by qualitative and quantitative measures and the results are compared with those of existing discrete wavelet transform (DWT). The

results show that the new method can keep better spatial resolution of the panchromatic images, and better spectral effect of the multispectral images. And the results give some guidance on how to control over how much spatial detail or spectral information should be retained.

Image Texture Classification Based on Wavelet Transform and SVM

Gao Lan, Song Qingguo, Li Chuang., Hua Qing, Yang Chuang

Abstract—Wavelet transform (WT) has the advantage of multi-scale analysis, which is especially fit for classifying image texture. Since the appearance of Mallat pyramidal algorithm [1], WT has been widely used. In this paper, texture feature vector are extracted and calculated by wavelet transform, and then, we use SVM as the classifier, in which we bring out a novel method "D'D Bayesian and cross-validation to select the parameter, and establish the SVM model. With the experiment result, the method is proved effective in image texture classification. **Index Terms**—Wavelet transform (WT) Image Texture Support Vector Machines (SVM) Parameter Select

A Vehicle-logo Recognition Method Based on Wavelet Transform and Invariant Moment

WANG Mei, QIU Libo, WANG Guohong, LI Tingjun

Abstract—Shape feature is a useful descriptor for object recognition. Wavelet decomposition is fit for shape feature extraction and image denoising. Then the object recognition can be executed by shape feature invariant moment distance. The experiments results for actual vehicle-logo images taken from traffic stations show that the method is practical and effective. **Index Terms**—Wavelet Decomposition; Shape Feature; Invariant Moment Distance; Vehicle-logo Recognition

Improvement of ART-2 Neural Network's Adaptation System Patterns

Guangshun Yao, Hongliang Yao

Abstract—ART-2 is a self-organized and unsupervised artificial neural network constructed from adaptive resonance theory which can be used to classify continuous active data. We have found that the theory is limited of the same phase data with different amplitudes and insensitivity to gradual change data during the simulation of data classified with ART-2 neural network. Therefore, we propose a new neural network model based on adaptive resonance theory. We provide the model construction and relevant algorithm as well as the comparison with ART-2. **Index Terms**—adaptation system patterns; construction; neural network

Mapping Features to Semantic Space for 3D Model Retrieval

Liquan Li, Zheng Qin and Biao Leng

Abstract—In this paper, a novel offline supervised learning method is proposed to map low-level features to high-level semantic space for 3D model retrieval. Firstly, users are expected to retrieval models through relevance feedback learning, and the retrieval history will be recorded in a distance matrix which can be renewed gradually. Then, Laplacian Eigenmaps is used to establish the representations of models in semantic space by means of retrieval history. Experimental evaluation on the standard repositories PSB shows that our method can effectively capture the user's knowledge in mind and embody it in the retrieval results. The algorithm also

displays its strong generalization ability in our experiments.

Design and Realization of Silicon MEMS-Based Micro Magnetic Compass for Mini-UAV

SHENG Wei, MA Zhen-zhen, and FANG Jian-cheng

Abstract—High cost, low response frequency and dynamic time delay are general problems in most of the existing micromagnetic compass (MMC). According to the characteristic of mini-UAV navigation and control system, this paper presents a silicon MEMS-based integrated MMC, determining attitude by both accelerometers and anisotropic magnetoresistance (AMR) sensors through estimating the mini-UAV state utilizing the Z-direction gyroscope. On the other hand, the magnetic disturbance around the MMC is calibrated. The experiments show that this MMC, with good collective performance, 0.5° heading accuracy, 1/5 cost and 50Hz response frequency, is able to meet the requirements of extraordinary precision, low cost and real time communication.

Index Terms—MMC; MEMS; mini-UAV; AMR; Attitude determination

A Fast Three-dimensional Multilevel Algorithm for Drawing Large General Graphs

Zhou Weihua, Huang Jingwei

Abstract—This paper presents a fast algorithm for drawing large general graphs with straight-line edges in the three-dimensional space, which employs the multilevel method as the framework of drawing large graphs, and adopts the forcedirected algorithm combined with the bary-centralizing method to refine the single-level layouts. Also, two speed-up methods, the constraint-normalization and oct-tree space decomposition are used. Experiments show its fast speed and nice results. It's capable of nicely drawing 10,000 vertex graphs in around 40 seconds. Furthermore, we illustrate its practicality in exploring the large graphs.

Index Terms—graph drawing; multilevel method; forcedirected algorithm

Robust Incentives in P2P Networks

HaiMei Xu, LinJian Tang, ShouQing Qi, YanJun Shi

Abstract—Lack of central authority, highly dynamic memberships, availability of cheap identity (i.e., pseudonyms), hidden or untraceable actions and collusive behaviors in P2P systems lead to free-riding and tragedy of common. Overcoming these problems is central to the performance and robustness of P2P systems. Many incentives have been proposed and implemented to encourage peers' cooperation. In this paper, we outline two key incentive techniques in recent years. One is reputation-based incentive, a peer with high reputation value can get more profit from the network. The other is based on game theory which utilizes MD, AMD and DAMD for game design.

A Dynamic Cooperation Model of Multi-Agent System

Weiping Zhou, Jianming Liao, Rongfang Ma, Hui Liu, Guoming Lu

Abstract—A single agent has limited knowledge and problem-solving capability. To solve a problem well, the agents should cooperate with other agents. So the multi-agent systems (MAS) are paid wild attention to by many researchers so far. In a multi-system, agent would have an adaptive capability to deal with the variety of environment according to adaptive learning. In this paper, starting with architecture of agent, the formation of communicational message among agents is presented, and the reasons why agents need to collaborate with the others are also given. Finally, we proposed a cooperation model in an agent group and mostly discussed a

corporation strategy. We mainly analyze one of two cooperation algorithms and give a simulation experiment in the paper at last.

Incremental Learning and its Application in Multi-agent based E-commerce

LI Jian, JING Bo

Abstract--With the rapid development of MAS, the on-line negotiation is needed urgently. But because of the incomplete information, the negotiation is rather inefficient. In this paper, an on-line dynamic incremental learning algorithm is presented to overcome the problem, which can learn the agent's reservation price by Q-learning algorithm. During the negotiation process, the agent which uses the algorithm is in the dynamic environment, and need not to save the negotiation information, so it is on-line. The agent learns the incomplete information by the feedback information through negotiation. In the experiment, the two kinds of agent are used to compare, one is the agent with no learning, and the other is the agent with the learning algorithm in this paper. The experiment results show that the agents with the learning algorithm in this paper can learn the incomplete information of its opponent and so they can negotiate more efficiently.

INTRODUCTION

The Unicast Multi-Constraint Routing Algorithm Based on Lagrangian relaxation method

Jiang Yinghua, Zhang Min, Ren Jinan, Ji Honming

Abstract—The QoS routing is a hot issue in research, among which the QoS multi-constraint routing is a difficult problem. Pointing out a weak point in the H_MCOP algorithm, the author successfully applies geometric series and binary search algorithm to it, and gets a heuristic routing algorithm of the QoS multi-constrained routing. And the author makes simulation based on NS2, the results of which indicate that this algorithm can find a low cost path and the calculation costs to find the path is low too. *Index Terms*—QoS, Routing, Multi-Constraint, Lagrangian relaxation

An Improved Node-Disjoint Multi-path Routing Protocol in Ad Hoc Networks

Zhen Qin Lemin Li

Abstract—An Improved Node-Disjoint Multi-path Routing (INDMR) protocol is proposed to overcome the shortcomings of on-demand Node-Disjoint Multi-path Routing (NDMR) protocol. The improvement of INDMR protocol aims to reduce the shared links between multiple sources and destinations in ad hoc networks. Compared with NDMR protocol, INDMR protocol proposes load evaluation and load update methods to enable data packets to be transmitted through a path with the lowest load among multiple node-disjoint paths. Simulation result shows that INDMR protocol achieves lower average packet delay with little difference in packet delivery rate. *Index Terms*—ad hoc network; multi-path routing; node-disjoint; shared links.

Multi-modal reasoning in medical diagnostic system

Xu Feng, Zhang Xiaoshuan, Lv Dandan, and Fu Zetian

Abstract—This paper focuses on the design of multi-modal reasoning machine which consists of one forward diagnosing module and one backward confirming module in order to diagnose syndrome of swine diseases. In the forward diagnosing, evidence theory is applied to solve the obstacle of syndrome in swine diagnosis field. In the backward confirming, aiming to conflict of evidence in the combination of evidence, a method of set pair analysis (SPA) is first adopted in expert system, and uncertain symptom information and unknown symptom information can also be easily and correctly distinguished in the process of diagnosing. A case study is presented (e.g. Swine influenza) and the results are also discussed.

A Mobile Collaboration Plotting System Based on Multi-Agent

Yuhui Cao, Weihong Wang and Zheng Qin

Abstract—Aiming at the issue of collaboration plotting in mobile computing environment, a mobile collaboration plotting system based on multi-agent was constructed. At first, the interrelated formalizable definition about mobile collaboration plotting system was given. Then, the collaboration model of multi-agent was introduced, the architecture of mobile collaboration plotting based on multi-agent was proposed. And, the algorithm of mobile collaboration plotting was designed. At last the prototype instance of the system was shown. The practice indicates the system was feasible and efficacious and provided strong support to the implement of mobile collaboration plotting.

Research on Guidance with Terminal Impact Time Constraint

Peng Wu, Ming Yang

Abstract—According to the requirements of some types of missile which attack target with terminal desired impact time at the terminal point, a new guidance problem with terminal impact time constraint is investigated, which can be applied to salvo attack of anti-ship missiles. The closed form solution based on optimal control method is derived. The solution is combination of the PNG law and the feedback of the impact time error, which is difference between the designated impact time and the impact time by PNG. The new guidance law can be used to guide multiple missiles to hit a stationary simultaneously at a desirable impact time. Numerical simulation results demonstrate that the proposed guidance law can guide missiles to hit the target with desired impact time simultaneously.

Sliding Mode Control with Frequency Shaped Surface for Rotor-Magnetic Bearing System of Magnetically Suspended Reaction Flywheel

Liu Gang, Li Cai-feng

Abstract — Aiming at high-accuracy active vibration control requirement of magnetically suspended reaction flywheel, a sliding mode control scheme of its rotor-magnetic bearings based on frequency shaped sliding mode surface is presented. The proposed scheme can deal with imbalance, nonlinearity and external disturbance. Firstly, dynamic model with imbalance is constructed. Secondly, the whole closed-loop control system is designed. In the scheme, sliding mode surface optimized by H_2 performance is obtained by dynamic filter, a fuzzy logic system realizes self-adaptive gain adjustment to reduce chattering greatly, tracking output and differential are gotten by nonlinear tracking-differentiator, which not only has the properties of good filter performance and suppresses disturbance, but also displacement sensors are removed, which can increase reliability and simplify hardware circuit. Finally, it is verified that the proposed control scheme is effective. The simulation results show

that position and velocity tracking errors are convergent to approach zero in short time, rotor can rotate around the principal axis of inertia, and automatic balancing is realized. Compared with conventional sliding mode, the proposed scheme has the advantages of smaller control currents and chattering is not obvious.

State Fusion Estimation with Missing Measurements

Liu Bao-Sheng, Yan Li-Ping, and Shi Hang

Abstract—State fusion estimation based on measurements missing stochastically with a certain probability is studied. An effective algorithm is presented based on Federated square root filter, Kalman filter and missing measurements checking. Theoretical analysis and simulation results show the effectiveness of the algorithm.

Index Terms—Information fusion, State estimation, Kalman filter, Measurement missing

Design of Sensor Network for the Security Infrastructure of Electric Power System

Abstract—This paper discusses the design of a sensor network for the security infrastructure of power system applications. The architecture of the whole system is designed in detail. And the implementation of software and hardware is described. IEC 61850 is adopted as the communication protocol in this system and IEEE 1451 as the interface. The whole system is actively synchronized with the combination of GPS and IEEE 1588 protocol.

Index Terms— Electric Power System, Sensor Network, Security Infrastructure, Wide-area Time Synchronization

Linux-based Lineage File and its Evolution

Yujie Hao, Yanjun He, Jianping Li, Guoming Lu, Hui Liu
Abstract—Linux kernel only provides the limited access control mechanisms, lacks the existing access control model to support effectively. In order to overcome the insufficiency of Linux in the safe access control aspect, enhance safe control flexibility and usability, this article has studied the LSM (Linux Security Module) security framework and the Lineage-based Access Control technology, proposed a method that uses the LSM framework to achieve LSLinux (Lineage Security Linux), and discussed on the problem of its realization in detail in the Linux environment.

Application Of Wavelet Analysis In Fringe Detection

SenHua Wang, JianPing Li, Shaoxu Lv

Abstract—In this paper, the general idea of the fringe detection which using wavelet analysis were put forward. By the study of the detection for image fringe of heterogeneity (such as mechanical image and medical image), the maximum module method of wavelet transform and the directional method of wavelet were used to carry out detection. The design was practical through the certification of the theoretical analysis and the experimental result. Furthermore, the contrasting effect of the algorithm illustrated that the better effect would be got if the differential algorithm was adopted.
Index Terms—Fringe detection, Maximum module, Directional Wavelet

Convergence and Stability of Iterative

Algorithm for A New System of Variational Inclusions

Zheng-Qi Liao, Mao-Ming Jin

Abstract—In this paper, we introduce a new system of (A, η) -accretive mapping inclusions in Banach spaces. By using the resolvent operator technique for (A, η) -accretive mappings, we construct a new iterative algorithm for solving the system of (A, η) -accretive mapping inclusions. We prove the existence and uniqueness of solutions, and discuss the convergence and stability of iterative sequences generated by the algorithm. Our results extend, improve and unify many known results variational inequalities and variational inclusions. **Index Terms**— (A, η) -accretive mapping; system of (A, η) -accretive mapping inclusions; resolvent operator technique; iterative algorithm; convergence and stability

Real-time Correction of Performance Forecast in Distributed Computing System Resource

YANG Yongjian, YANG Xu and LI ShuQiu

Abstract—Effective load prediction for nodes is a good method to get resource allocation and task attempter algorithm with high performance, in order to adjust and improve performance of distributed application. Status of Grid resource varies abruptly, consequently load prediction should be corrected and adapted again, so real-time correction is introduced in the process of load prediction, which can correct the prediction algorithm from parameter estimation, error and status, so that it can implement the adaptation itself, and get better prediction precision. It shows in experiment results that using real-time correction in prediction can reduce error with little system spending. **Index Terms** — distributed computing, performance forecast, real-time correction, system resource.

Mobile Robot Room Location System Design and Research

GAO junyao, GAO xueshan, ZH U wei, ZHU jianguo, WEI boyu

Abstract—How to locate mobile robot in room is an important problem which decides mobile robot movement control and intelligent. Many position methods now are not adapted in room or expensive. In this paper, a laser rotated coding location system is advanced. This method uses rotated coding laser line to mark each angle. Each angle has a code independently. Receiver on robot receives coding laser, and calculates angle of robot to laser sender. Two senders are used to cross locate receiver position. This system can locate mobile robot in mm level. This precision is enough for mobile robot. Price is low comparing to other methods. It is easy to use. It is stable and hasn't accumulated error. It can be used in many fields where need room location system. **Index Terms**—mobile robot, measure, locate, room, laser.

Feature Matching and Tracking for Visual Odometry of Mobile Robot

Yingkui Du, Janda Han and Yandong Tang

Abstract—A stereovision algorithm is proposed for visual odometry to estimate motion of mobile robot by providing feature pair sequence. It is composed of feature extracting, matching and tracking. Firstly, corners are extracted as features by Harris operator and grid-based optimizing. In feature matching and tracking, serious problems are caused by variable illumination between stereo images. An improved Moravec's Normalized Cross Correlation (MNCC) algorithm is presented to reduce illumination affect in computing correspondence of

corners. On current stereo image pair, extracted corners are matched by correlation-based bidirectional algorithm and outliers are rejected by epipolar constraint. Matched corners are tracked in pre-estimated search windows. The computational cost is greatly reduced by limiting number of corners, pre-estimating search window and feature local-updating. Simulation results validate that our algorithm is efficient and reliable.

The Locating Method by Measuring Its Acceleration for In-pipelines Inspection Robots

Ting-Hong Yang , Su Yi , Dan Qi , He Tao , and Chuan-Rong Xu
Abstract—Based on Newtonian Mechanics and Kinematics, the locating method by measuring its acceleration for in-pipelines inspection robots is presented. To resist the influence of vibrational noise on the acceleration data, a lowpass filter is designed and applied. And the exceptional conditions is described too. At last, the cumulation of the error, which increases with t_2 , is discovered after the analysis of performance for this method. To solve the problem of the error's cumulation, it is mentioned that this method and the locating method by photoelectric cyclometers should be integrated for their own strong points. At last, the application flow chart of LMMA is presented.

Research on Service-Oriented Spontaneous Network Based on Jini™

Huan Wang, Xiaofeng Gu, JianPing Li, Hui Liu, Xinyi Li

Abstract—Based on Newtonian Mechanics and Kinematics, the locating method by measuring its acceleration for in-pipelines inspection robots is presented. To resist the influence of vibrational noise on the acceleration data, a lowpass filter is designed and applied. And the exceptional conditions is described too. At last, the cumulation of the error, which increases with t_2 , is discovered after the analysis of performance for this method. To solve the problem of the error's cumulation, it is mentioned that this method and the locating method by photoelectric cyclometers should be integrated for their own strong points. At last, the application flow chart of LMMA is presented.

The Design of Reliable DBMS

Zhong Zhou, Wen Jun,

Abstract—In traditional DBMS, a transaction is regarded as an atomic operation, any failure of whose sub operations leads to the whole transaction fails, especially high-concurrency requests and resource competition happens. In this paper, the reliable DBMS uses T^2 Transaction Data Queue and failure-recovery mechanism of DTP to re-schedule and re-allocate resources, which provides customers with reliable transactions which were not guaranteed in traditional DBMS, in this way, the reliability in DBMS can be improved.

Incremental Bayes Classification Based on Feature Vector

Zhiwei YIN, Xishuang Dong, Jianpei ZHANG, Jing YANG

Abstract-- Naïve Bayes is one of simple and practical methods to process classification. But there are two problems. One is that Naïve Bayes can not process incremental classification, and the other is that the time complexity of mass data algorithms is very high. We proposed one method called Incremental Bayes Classification Based on Feature Vector to solve these two problems. And the way to gain feature vector was given through combining vector principle with Euclid Distance. The procedure of incremental classification was described elaborately. At last, the ability of incremental classification of our algorithm was proved better, and the time complexity was lower through doing experiments. At the same time, we analyzed efficiency of our algorithm.

Defects in Intrusion Detection System and its Optimization

Yangdong Shou, Yujie Hao, Jianping Li, Xiaofeng Gu, Guoming Lu

Abstract—This paper mainly introduces the function, disadvantages and optimization of the intrusion detection system (IDS). Facing the problem of the security of IDS itself, we use Java-based security mechanism, and real-coded genetic algorithm to optimize its design. *Index Terms*—Intrusion Detection System (IDS), security strategy, Real-coded Genetic Algorithm

A New Modeling of Radar Target and Implementation of Radar Target HWIL Simulation System

Zhao Qi, Fei Yuanchun, Chen Ning, Li Baoxue

Abstract—This paper makes some research on the involved theoretical focuses of the characteristics, the modeling and simulation of the radar target especially the near field target and implementation of near field radar target HWIL (hardware-in-the-loop) simulation system and proposes a new modeling method. Highlights modeling method. HWIL simulation can be defined as a kind of real-time simulation system which uses hardware to replace the mathematical model of simulation. Radar target HWIL simulation system has become an important method on the research of the characteristics of the radar target, evaluating radar and replacing outfield test. *Index Terms*—near field radar target, modeling and simulation, HWIL simulation

Railway Freight Demand Forecast Based on System Dynamic

Liansheng Tang, Cheng Wenming, Jian Liang, Zeqiang Zhang

Abstract—This paper proposes a dynamic model of railway freight demand forecast. Railway is the lifeline of China economic development. Railway freight forecast degree of precision directly impact on the normal operation of the national economy. In order to effectively forecast the railway freight logistics industry scale, the system dynamics model of Sichuan Province railway freight forecast was build based on the analysis of influence factor of railway demand increase model. Firstly, it provides a general framework to examine the freight demand. Secondly, it analysis the influence factor of railway freight forecast. Thirdly, the system dynamic model is proposed and is used to Sichuan railway freight demand forecast. The railway freight demand was predicted at different national economic growth rate in next few years. The impact of the demand for rail freight related factors was analysis according to the certification of system dynamics in the railway freight demand forecast. The result demonstrated that the system dynamic is an effective method at prospects for the demand forecast application.

Harmonic Detection Based on HHT with Its Boundary Improved New Technique

SU Yuxiang, LIU Zhigang, LI Keliang, LI Dongmin

Abstract—This paper describes a novel approach to improve the border effects of Hilbert-Huang Transform (HHT). The new method, consisting of artificial neural network (ANN) and mirror extension, is introduced for extending short time series. First, the analytic signal is extended by ANN with backpropagation (BP) learning

algorithm, and then the extended signal is decomposed by using Empirical Mode Decomposition (EMD) at the same time using mirror extension to extend the signal which is decomposing. To restrain border effects of Hilbert Transform, BP network is adopted again to extend the intrinsic mode functions (IMFs) before Hilbert transform (HT) is applied. Hilbert-Huang Transform with the proposed boundary improved method is used to detect harmonic signals in this paper, simulation and comparative results reveal that the method can effectively improve the border effects of HHT method, and obtain accurately harmonic components.

Towards Trusted Networks

Guoming Lu, Lemin Li, Janping Li, Jianming Liao, and Yujie Hao

Abstract—Over the last two decades, the Internet has transformed the life of people around the world. However, there are aspects of its design, based on decisions made in the 1970's that severely limit its security, availability, and manageability. Trusted network is the promising technology to address these problems. In this paper, we first review trusted computing, and then we study essential properties of trusted network, at last outline the key challenges in constructing trusted networks. *Index Terms*—trusted network, architecture, internet

Application of Rule Induction Method Based on

Rough Sets in Digital Watermarking

YAN YAN, HONGBO YI, XUDONG LIU

Abstract—This paper based on the feasibility of using rough sets theory in digital image watermarking technology. The carrier image was regarded as a knowledge system, and condition attributes and decision attributes are represented by some visual characteristics. Embedding method of watermark information which is adapted to the visual demand was summarized after objective analyses. Results of the experiments carried on test images show that the embedding rules acquired according to this paper have good effect. *Index*

Terms—Digital Watermarking, Rough Sets, Rule Induction, Visual Characteristic

The Aircraft Assignment of MMAS Based On Dynamic Visible Information

WANG Jinbiao, ZONG Shaopeng, WANG Yuankun, SHI Gang,
WANG Wei

Abstract—The MAX-MIN Ant System algorithm (called MMAS as following) is one of the best approaches to resolve many classic combinational optimization problems. It makes many improvements based on the Ant System. In this paper it is applied to resolve the aircraft assignment problem for the first time. Mutation tactics is lead into MAX-MIN Ant System. Then the new model is defined so that the algorithm is improved. Its model has modification based on dynamic visual information. Through carrying on experiments, the NP-Hard problem in aviation industry is solved, and the effect is more prominent. *Index Terms*—Aircraft Assignment; MMAS; Dynamic Visible Information; Heuristic

Applications of Spatial Index Optimization in PMR Quad-trees

ZHOU Qiao-lin

Abstract—In order to improve the efficiency of construction of spatial index structures, in this paper, some improvements had been made on the algorithm of bulk-loading PMR quad-trees, which are two complementary techniques: an improved insertion algorithm and a bulk-loading method. Namely, switching the experiment data to sample data, constructing spatial indexes respectively with dynamic inserting and bulk loading method, which taking different split threshold and maximal depth as independent variable, the results of experiments show that improved algorithms exploit fast spatial index construction as well as yield significant performance improvement for bulk-loading PMR quad-tree, the algorithm can be extended to handle other spatial data structures based on regular partition.

Parameters Optimization of Pulsed Jet Hydraulic Resonance System

Ming Chen, Jia Ning Pu

Abstract—Optimized combination of parameters of pulsed jet hydraulic resonance system is a key factor to improve the efficacy of pulsed jet. The direct search algorithm in Matlab is introduced in this paper. Six parameters of pulsed jet system are optimized based on this algorithm, which can solve optimal problems without gradient of objective functions. Optimal results are analyzed in detail and a comparison is made between peak values of pressures at the nozzle before and after optimization. The conclusion of comparison shows that the amplitude of pressure at the nozzle has gone up by 40.9% after optimization rather than less than 1% before. So the performance of pulsed jet is improved obviously with optimized parameters. **Index Terms**—Direct search algorithm, Matlab, Pulsed jet, Hydraulic resonance, Optimization

A Universal Accounting System for Grid

Jianhua ADu, Dekun Hu

Abstract—This paper presented a universal Open Grid Services Architecture (OGSA)-based accounting model, which developed with an emphasis on a consistent data model and easy integration into existing scheduling at a few independent resources providers to use under various grid environment. This accounting system mainly addresses to resolve the problem of accounting and charging of resources usage on the grid and provides good quality of services for users. This paper will introduce the basic implementing mechanism, collecting process of resources usage information, resource reservation, resource price policy, grid bank and etc. **Index Terms**—grid; OGSA; accounting; charging; grid bank

Study of Tele-Robotic System under the Condition of Time-Delayed

Tiehua Chen, Dingxuan Zhao, and Zhuxin Zhang

Abstract—Graphic simulation based on virtual reality technology is applied to the tele-operation robot system with tele-presence to make full use of the immersion feeling and the forecast property of the 3-D graphic stereoscopic display, which not only provides the operator with friendly work windows but also can overcome the effect of the communication time delay in tele-operation. In order to investigate the ineluctable communication time delay in force tele-presence of the tele-operation robot system, a tele-presence system based on the virtual reality is setup in this paper. The system structure, geometrical noumenon modeling, and man-machine interface are introduced in detail. In the tele-operation system, graphical robot technology is used to solve the time delay, and the relating experiments have proved the validity of the reappearance of the movement of an actual robot by a graphical robot.

Fuzzy Ontology Models and Framework for Fuzzy Knowledge Modeling on Semantic Web

Jun Zhai, Song Xu, Lixin Shen

Abstract—Ontology is playing an increasingly important role in knowledge management and the Semantic Web. In order to represent formally the fuzzy knowledge, this paper first proposes a new kind of fuzzy ontology models that consists of fuzzy domain ontology and fuzzy linguistic variable ontologies, considering semantic relationships between fuzzy concepts, including set relation, order relation and equivalence relation. Then, a fuzzy ontology framework is presented which can overcome the localization of current fuzzy ontology models. Application of the fuzzy ontology to transportation knowledge modeling shows that this research facilitates the fuzzy knowledge share and reuse for fuzzy systems on the semantic web.

Xiang Zhang^{1,2},
Peng Dai², Lin

Mi Tao², Guang
You Xu²

Multi-Camera Multi-Person Tracking for Intelligent Meeting Scenarios

Abstract—A very efficient and robust multi-camera multi-person tracking system based on a multi-agent architecture using the particle filter for intelligent meeting scenario is presented in this paper. In this system, a behavior analysis oriented consistent foreground detection method is adopted for human detection in meeting scenario. The observed model characterizes the tracked whole body using color and edge orientation histogram features. Since traditional particle filter methods cannot deal with long-term tracking applications effectively which is demanded in meeting scenario, a robust particle filter tracking algorithm is proposed so as to reduce the potential tracking failures. The color histograms in each human detection agent corresponding to each camera are used for maintaining their identities in multiple cameras and multiple persons tracking. Experiment results test the efficacy of our system on a sequence of multiple people moving, standing and sitting in meeting scenario.

Design and Performance of Driver for Coil Array in Focused Magnetic Fields Conductivity Tomography System

Fu Lin, Tao Xiaoyu and Yang Bo

Abstract—In order to perform the driver for coil array in focused magnetic fields conductivity tomography system which makes coil array got proper focus magnetic fields, the crystal oscillator was employed to implement the high-frequency- stability signal source array. And output of the signal source array was sent to programmable amplifier regulating exciting current and then injected into the coil array after power amplified. The system used the driver implemented the excitation for three different architecture and got a good result for focusing the magnetic fields. Although the magnetic fields distribution is not smooth as the theoretical calculation one, both the focusing magnetic effect of the driver is equivalent.

Simulating implement of water curtain cooling expert system on mid-plate

Zhao Yugang, Wang Gang

Abstract— In the light of the difficulties of water-curtain cooling control system, expert system technology be adopted, the inaccurate knowledge of technicians can be expressed and stored into the computer. Based on the Knowledge Base, the reasoning methods be managed, as a sample of steel plate 15MnV, the cooling rule can be set. The simulating result shows that the cooling rule of all kinds of plates can be set, evaluated and optimized. The producing process can be instructed like an expert.
Index Terms—expert system, reasoning machine, water-curtain cooling, Simulating Implement

Index System and Model of Plan

Optimization in a Metallurgy Enterprise Under Supply Chain Management Environment

Shao Juping, Dong Shaohua, and Wu Lihua

Abstract—The management level of a metallurgy enterprise is closely related to internal logistics operation and control. It is required to specially investigate the optimizing methods of metallurgy business. This paper employs the thoughts of supply chain management and the methods of logistics system analysis and modeling, set up the three optimizing index system which include the logistics oriented technical economic index system and the index system of logistics oriented plan optimization and product structure tree. The meaning of every index system and computing method of some index system were explained and provided. The optimization of entire enterprise internal supply chain should be carried out by combining with the three index systems. Optimizing effect was simulated through computer. Additionally, as for the optimization model of logistics oriented plan, it is necessary to provide scientific production logistics control and trace technology to match with it. In a word, method and theory discussed in the paper has practical instruction sense to improve operating capacity of internal supply chain, reduce the enterprise logistics cost in iron and steel enterprise.

The application art of spatial data mining for GIS-T

Rui Wang, Ling Bai, Hai-hui Zhou, De-Tao Ma
Abstract—This paper introduces the theoretic and characteristic of spatial data mining, afterwards puts emphasis on spatial analysis, spatial association rules, cluster and classification approach, which are commonly used in data mining process. Then puts forward three patterns for the integration of spatial data mining and Geographic Information System for transportation. Finally proposes the application of spatial data mining to GIS-T.
Index Terms—Spatial Data Mining (SDM), Geographic Information System for transportation (GIS-T)

Guided joint diagonalization and its application to online blind source separation

Abstract—A new algorithm is proposed for joint diagonalization. With a modified objective function, the new algorithm not only excludes trivial and unbalanced solutions successfully, but is also easy to optimize. The most important thing is, with the new objective function, the proposed algorithm can work well in online blind source separation (BSS) for the first time, although this family of algorithms is always thought to be useful only in batch-mode BSS by far. Simulations show that it's a very competitive joint diagonalization algorithm.

Index Terms—Blind source separation, joint diagonalization.

An Intelligent Mining Sequential Pattern Method for Simulating Olympic Temporary Pots

Cui Xu, Zhao Qing-jiang, Liu Xin

Abstract—The paper gives an intelligent mining sequential pattern method as a way to solve the problem of simulating Olympic temporary pots. Mining sequential patterns serves an essential role to the mining domain and offer useful resources to large number of data users. Although most mining method offer complete mining results, they simply collect and statistic all data and do not provide an effectively analytical method. This study aims to develop an intelligent mining sequential pattern method that unlike traditional statistical method uses a number

of intelligent methods, including the distributed mining of sequential pattern discovery algorithm based on the prefix projected technique and clustering algorithm, and provides more meaningful and accurate results, and at the same time improves the efficiency.

Two-phase model of Markov processes for particle transport in fluidized bed reactors

Hui Gao, Yan Fu, Jimin Yuan and Jianping Li

Abstract—Based on the observation that particles in fluidized bed reactors consist of two phases, a bulk phase and a wake phase, in this paper we present a two-phase model of Markov processes for particle transport in fluidized bed reactors. The parameters in two-phase model are derived step by step in terms of volume balance, which is an obviously convenient way to deal with particles of different size and density that occupy fixed space. In order to show that the two-phase model describes the system well, we prove that our model satisfies Fick's second law, and in the model all materials caught by wake phase are equal to what are disposed at the top of the reactor, which meets the result of circulation. **Index Terms**—Markov processes, fluidized bed, stochastic model, Fick's law

Energy-Balanced by Transmission Range Adjustment with Full Sensing Coverage of Target Area for High-Density WSNs

Qiang Zhang, Erdun Zhao, Junfang Liu, Jun Zhang

Abstract—An optimal energy assumption and sufficient sensing coverage are challenges for sensor network design. In this paper, we firstly design an approach called Full Sensing Coverage of Target Area (FSCTA) by dividing a circular network model into several homogeneous sectors. In this approach, the route nodes transmit data to base station (BS) along the sides of these sectors and the radio of nodes can cover all areas of target area. Then a scheme called Energy-Balanced by Transmission Range Adjustment (EBTRA) in FSCTA is presented to choose the optimal route nodes and their transmission ranges by sleeping schedule. Simulation results show that our flexible approach can not only keep the energy consumption well balanced among the nodes, but also can minimize the total energy consumption obviously. **Keywords**—wireless sensor networks, full sensing coverage, energy consumption balancing, variable transmission range

Applying the Danger Model to Design an Intrusion Detection System

Haidong Fu, Xiguo Yuan, Kui Zhang, Na Wang, Ting Xia

Abstract—For many years, the classic self-nonself (SNS) discrimination models have served security experts to build intrusion detection systems (IDSs). However, the recently accumulative evidences have shown that not only can not the SNS models explain a number of documented phenomena, such as transplantation, tumor and autoimmunity in the context of immunology, but also they aren't able to overcome the scaling problems when in face of tremendous network traffic in terms of computer security. In this paper, a novel artificial immune system inspired by danger theory (DT) is proposed for the purposes of detecting intrusion. We have made the best use of the antigen presenting cells (APCs) to analyze endogenous signals, and harnessed the pattern recognition receptors (PRRs) for the recognition of exogenous signals. Based on the two types of signals, we establish a dynamic detection algorithm to gear to the complex network environment, improving the false positive and false negative.

Profiling of Bioinformatics Applications for
Reconfigurable Computing
Akili Anderson, Ying Chen, Member, IEEE

Abstract -- Bioinformatics applications have emerged as an important class of scientific computing applications and its future success depends on high-performance computers. Due to the characteristics of bioinformatics applications, such as high level of Instruction Level Parallelism (ILP), they can benefit from the hardware flexibility of reconfigurable computing systems. In this paper, we investigate bioinformatics applications on the platform of a reconfigurable computing system that consists of a general purpose processor and a

reconfigurable coprocessor. Our profiling results identify the code blocks of bioinformatics applications (BioBench suite). These code blocks will be used as coarsegrained configurations in the reconfigurable coprocessor of the reconfigurable computing system. The profiling results show the promising performance improvement potential of using reconfigurable coprocessor to execute these code blocks. To the best of our knowledge, this is one of the first such studies.

Index Terms -- Biobench, bioinformatics, profiling, reconfigurable computing,

Probabilistic Characterization of Nanoscale gates

Lan Long, Xiaojun Lu, Jian Ping Li, and Gang Zhao

Abstract - The device failure must be taken into account in the nano-scale design. This paper presents the probabilistic logic model to model the probabilistic behavior of a nanoscale adder. The analysis shows that the device probability distribution highly depends on the system structures and other performance parameters.

Index Terms - Digital circuit, probability, probability logic, nanoelectronics.

Research on the Environmental Establishment of Scientific and Technical Innovation Talents on a Basis of the Theory of Individual Talent Demand

Gu Hong-bo, Yong Long

Abstract—The core of the 11th Five-Year Plan is to build an innovative country. The key to carry out the development target is the quantity and quality of the scientific and technical talents. Moreover, the talent environment plays a critical role in the process of talent cultivation. On a basis of the theory of individual talent demand, the thesis analyzes the individual talent demand for scientific and technical innovative talents. In addition, the thesis provides the actions for the scientific and technical talent environmental construction based on the analysis result.

Index Terms—Scientific & technical innovation, talent cultivation and environmental construction

Modeling and Analyzing Sliding Window Protocol with Improved CPN modeling method

Jinqi Zhu , Ming Liu and Jiazhi Zeng

Abstract—Sliding window protocol (SWP) is the most widely used flow and error control procedure in network. How to describe its dynamic activity in a formal modeling way poses a considerable challenge to us. After analyzing the SWP, we proposed an improved Colored Petri Nets (CPN) model to show how this protocol works. The construction of the CPN model and its analysis are given in detail in this paper. Furthermore, unlike traditional modeling method, CPN arc inscriptions are fully used in our paper to represent system states and simplify the model, so that our method is not only more automated and simpler than previously known CPN modeling method, but also thoroughly avoid the traditionally manual trouble of CPN hierarchy.

Keywords—Sliding window, (Colored Petri Nets) CPN, modeling, state space

Comprehend Network Situation Using Time Series Data Mining and Time Frequency Analysis

Weisong He, Guangmin Hu, Guangyuan Kan

Abstract—In this paper, we propose a network situation comprehension method using multiple time series data mining and time frequency analysis method. This method automatically constructs a system behavior model in the form of a set of rules by applying sample entropy and principal component analysis and piecewise aggregate approximation and symbolic aggregate approximation and time frequency analysis and

association rule mining to the time series data obtained from backbone router, then comprehends current network security situation by checking the subsequence on-line data with the acquired rules.

Index Terms—Network Situation Comprehension, Time Series

Data Mining, Time Frequency Analysis

A response strategy to the DDoS attack

Shi Zhaojun¹, Li Jianping^{1,2}

Abstract—The paper first defines what is the DDoS (Distributed denial of service) attack which is popular in the net now, and introduces some related works in DDoS attack. And then, proposes a response strategy to the DDoS attack, by the abnormal method of the flow to detect whether it has been attacked, cut the distrustful link by IP trace-back, renew the server by the answer-response principle.

Index Terms—DoS, DDoS, IP trace-back, answer-response

Dynamic Address Assignment Protocol Based on DHCP for Wireless Sensor Networks

Difei Zou, Jianming Liao, JianPing Li, Xiaojun Lu, Lihua Fu

Abstract—We propose a new Dynamic Address Assignment Protocol for wireless sensor networks. This new protocol is based on the Dynamic Host Configuration Protocol and is modified into wireless sensor networks. The protocol aims to increase the flexibility and agility of wireless sensor networks with changing the amount of sensor nodes in sensor networks system easily. It is well suit for large-scale wireless sensor networks which update their sensor nodes frequently. The goals are achieved by assigning address dynamically and registering in collectors. We present an implement on wireless sensor network and evaluate our approachnb by discussing the payload ability of a wireless node.

Index Terms—DHCP, Wireless, Protocol, Sensor, Network

Study on Mixed Traffic Flow Signal Control Based on Intelligent Control Theory of China

ZHU Yin, WANG Junli, LI Lei

Abstract—This paper introduces a distributed architecture of the intelligent control integrated system for area-wide mixed traffic flow incident response, information guidance based on signal control. In order to realize the intelligent control system, the paper also presents the incident and congestion forecast algorithms. Finally, as one intersection signal Agent, it can realize the isolated intersection signal control strategy independently by means of fuzzy control theory, which is also considering the bus-priority.

Index Terms—Intelligent Control System; Mixed Traffic Flow; Urban Traffic Control System

Combining the Modified CTRANC and Posterior Union Model for Robust Distant Speech Recognition

Jie Lin, Jianping Li, Ji Ming

Abstract—In this paper, we first present a modified crosstalk resistant adaptive noise canceller (CTRANC) algorithm. Then we propose a new approach for robust speech recognition. This new approach consists of two stages: Firstly, the modified CTRANC algorithm is used to suppress noises, which is supplied with noisy speech and produces enhanced speech of which only some portions remain corrupted by noise. Subsequently the second step is to use posterior union model (PUM) to deal with the remaining unknown partial noise corruption. The simulated experiments are given at the end of this paper, showing that the new method is effective.

Index Terms—CTRANC, Posterior Union Model, speech recognition, noise robustness

Analysis on the Optimization of Control Rights
Disposition in Different Financing Contracts

Wang lan, long yong

Abstract— In the field of venture capital, the problem of the contingent allocation of control rights between entrepreneurs and venture capitalists is in the stage of start. By introducing a continuous variable of control right, the different financing contracts and the cost function to the model of Tirole, this paper extends and rebuilds the model of the venture capital backed companies, analyzing main factor which influenced control power under the different financing tools. The conclusion is: The entrepreneur's participation and inspiration restriction terms are different from the venture capitalist's. the main factor of control power change is the responsibility of entrepreneurs, report mechanism and individual benefit. The combination of convertible securities and the contingent control could optimize the control right.

Index Terms Financing contract, control right, entrepreneurs(EN), venture capitalists(VC).

Robust Face Identification with Cortex
Mechanism

Dekun Hu, Jianping Li, Siyu Zhan, Desong Wang, Jianhua Adu

Abstract— This paper introduces a new general framework for face identification, which is based on cortex mechanism: it describes a hierarchical system that closely follows the organization of visual cortex and builds an increasingly complex and invariant feature representation by alternating between a template matching and a maximum pooling operation, corresponding to two layers of classifiers, a layer with a set of component classifiers and a layer with a single combination classifier. The experiment results demonstrate the strength of the approach on face identification. In addition to its relevance for computer vision, the success of this approach suggests a plausibility proof for a class of feedforward models of object identification in cortex.

Index Terms— Gabor wavelet filter, SVM, Face recognition, visual cortex, Standard Model Features(SMFs)

The Research and Improvement of
Rough set Based Decision Tree

Jing YANG, Han WU, and Jianpei ZHANG

Abstract-- The traditional decision tree algorithm attributes selection strategy is based on information theory. The new attribute selection strategy discern value based is much more better than the traditional one, but it has to compare all objects(records), so has a higher time complexity. In this paper, we use the H-important and L-important concept to improve the new strategy, and reduce the time complexity.

Index Terms-- Decision tree; Rough set; Discern value; H-important; L-important

Hybrid Case-based Reasoning System for
Short-term Load Forecasting

Jinsha Yuan, Li Qu, Weihua Zhang and Li Li

Abstract— Short-term load forecasting plays a significant role in the electric power system. In this paper, an advanced approach based on Case-based Reasoning theory is proposed to help solve the STLTF problem with the aid of rough sets information entropy and principal component analysis methods which is mainly applied to reduce the attributes of load cases and dispose the essentiality and relativity of load data. As a result, the training time in the process of retrieval decreased, and the effective control is executed aiming at petit factors to essential ones. Finally, it is performed on the data of Bao Ding Electric Power Company (BDEPC) during 2000-2004, and the testing result indicated that the presented model is feasible and promising for load

forecasting.

Index Terms—short-term load forecasting, case-based reasoning, rough set, information entropy, principal component analysis

Design of a variable structure adaptive midcourse guidance law

Hu Yun-an, Zhao Yong-tao, Liu Jian-cheng and Wang ying

Abstract—Applying the concept of the generalized interception spot, basing on the variable structure adaptive theory and choosing the relative velocity deflection angle as the sliding-mode, a variable structure adaptive midcourse guidance law is designed. The simulation results show that the indexes of the missile perfectly fulfill the need, which validates the feasibility and the effectivity of the designed guidance law.

Index Terms—the generalized interception spot variable structure adaptive, the relative velocity deflection angle, midcourse guidance law

Research on Congestion Control Mechanism for Micro-communication Element System

XU Fu-long, LI Jian-ping, ZHU Jin-qi, SHEN Qiao-li

Abstract—After analyzing the deficiency of contemporary network architecture, the idea and concept of micro-communication element system(MCES) were introduced, MCES designs different Virtual Circuit (VC) for different types of data. In order to resolve congestion problem and increase good throughput for MCES, a congestion feedback signals based mechanism which uses routing feedback information to adjust the sending rate was proposed. NS simulation results show that this new scheme can significantly improve the performance of network.

Index Terms—Network Architecture, Service Unit, Micro-communication Element , Congestion Control

Research on Optimization Method for Supply Chain Network Design under Uncertainty

Yuansheng Huang and Zilong Qiu

Abstract—The supply chain network design involves the choice of plants and distribution centers to be opened and the distribution network design to satisfy the customer demand with minimum cost.

This paper designs supply chain network in uncertain environment, in which the demands of customers are assumed to be stochastic variables, and the operation costs are considered as fuzzy numbers. We formulate model by fuzzy programming and develop monkey-king algorithm to solve the proposed model.

Moreover, a numerical example is presented to illustrate the effectiveness of model and solution algorithm.

Index Terms—Fuzzy number, Monkey-king algorithm, Stochasticity, Supply chain network design, Uncertainty.

A Novel Adaptive Backoff Scheme for IEEE 802.11 Wireless Networks

J. Fan, F. Gao, Y.B. Cheng, and W.S. Wang

Abstract—In this paper, a new adaptive minimum contention window binary exponential backoff algorithm (referred to as AWBEB algorithm) is proposed to improve the performance of IEEE 802.11 Distributed Coordination Function (DCF) scheme, which is widely used for Ad Hoc networks and wireless LAN. We model the AWBEB algorithm scheme via establishing a bidimensional discrete-time Markov Chain, and the stationary distribution probabilities of AWBEB algorithm are derived. The performance of AWBEB algorithm is analyzed, and then AWBEB algorithm is simulated by computer programming. The analytical and numerical results show that the system saturation throughput and medium access delay of a packet for a given number of nodes N are better than the DCF algorithm.

Index Terms—Ad Hoc networks, Backoff algorithm, Distributed Coordination Function, Wireless LAN

Short-Term Load Forecasting Based on Gene Expression Programming

Limin Huo, Xinqiao Fan, Liguo Zhang and Li Liu

Abstract— The Gene Expression Programming (GEP) is applied to short-term load forecasting, and higher forecasting precision is gained with the error recycling compensation model suggested. The load samples are filtered and processed generally first in order to eliminate the fault data, then the load series of the same time but different days are chosen as the training samples, and by means of the flexible expressive capacity of GEP, the model of different time point is evolved according to time-sharing. Then the errors between forecasting models and samples are evolved by means of GEP as well, and finally, the error compensation models are compensated to the former corresponding forecasting models. And the error compensation models will not be evolved until the results are satisfied. With the forecasting results, it proves that GEP has higher efficiency than Genetic Programming and the error recycling compensation models can compensate the errors of evolutionary process. According to comparison with the results forecasted by means of time series and Genetic Programming, it indicates that the method of GEP and error recycling compensation model in short-term load forecasting has better effect.

Index Terms—short-term load forecasting; gene expression programming; power system; electric power load

A Novel Conflict-free Broadcast Channel Scheduling Protocol for Wireless Sensor Networks

Dalong Zhang, Xiaoyi Zhang, and Hongyi Yu

Abstract—Broadcast is a efficient method that allows the nodes in the wireless networks share the data among other nodes. Because the transmissions of broadcast packet are related to receive of multi-nodes, it is difficult to ensure the reliable transmission of broadcast packet. In the wireless sensor networks, due to limitation of battery power in sensor nodes, it is more difficult to ensure the reliable transmission of broadcast. In the paper, a new synchronous MAC protocol, termed the Evolutionary Reliable Broadcast Protocol (ERBP), is introduced. In existing MAC protocols for WSN, the transmission of the broadcast packet consumes much energy, but the transmission reliability is low. In ERBP, we design a novel receiver-based conflict detecting mechanism and simple four-handshake process of the control packet to solve the problem. By simplifying the handshake process of the control packet, using the periodic sleep scheme and the collision avoidance measures, it reduces the energy consumption. Through study of Energy-efficiency of the protocol, it is proved that the ERBP not only has high transmission reliability of broadcast, but energy-efficiency is better.

Keywords—MAC protocol, wireless sensor networks, reliable broadcasting channel scheduling, energy-efficiency

A Tree-based Protocol for Automated Trust Negotiation

Hui Yao , Chengshi Gao, Qing Dai

Abstract—Automated trust negotiation is an approach to establish trust between strangers without a third trusted authority by exchanging credentials and access control policies. Motivated by the desire to introduce human preference into negotiation, a credential is assigned a weight according to its sensitivity, and a protocol considering weight modeled on a special tree is presented. The proposed protocol is based on local optimization, and successfully performs the exchange of credentials without unnecessary disclosure of them.

Index Terms—Access Control Policy, Automated Trust Negotiation, Credential, Negotiation Protocol

Research on failure analysis and reliability improvement of CNC lathes

Bang-cheng Zhang, Yi-qiang Wang, Zhi-jie Zhou

Abstract - A statistic analysis system for CNC lathes is constructed in this paper. Using this system, the field

failure data of home-made CNC lathes can be collected and the probabilistic distribution of time between successive failures can also be determined. In order to find out the weakness of the traditional home-made CNC lathes, failure mode, effect and criticality analysis is carried out. Based on the detailed analysis of failure causes, reliability growth suggestions and actions to improve reliability of the weak subsystems for the CNC lathes are proposed. The experiments verify that these suggestions and measures can improve the reliability of home-made CNC lathes.

Index Terms - CNC lathe; Reliability Improvement; Failure Analysis; FMECA

Study on Effect and Efficiency of China
regional Software industry
Yu Liping

Abstract—The article carried on the analysis of the Chinese main cities software industry achievements using the statistical analysis and the DEA model, selecting the R&D personnel, the common staff, and the R&D funds investment as the input variable, and the business income, the profit total amount, and the invention patent number as the output variable. The research indicated that the overall profit level of Chinese software industry is not high, and the profit which the software research and development brings to the entire software industry is not remarkable. The area labor division of software industry is explicit, which has the large and complete problem. The efficiency of entire software industry is somewhat low. The pure technical efficiency of eastern area is high, but the scale efficiency is low. The government should play a leading role in the software industry macroscopic management.

Keywords- Software industry, Regional achievements, data envelopment analysis

Study for Straight Outdoor Vent-pipe Positioning
Method of Automobile Based on Binocular
Vision System

Tinmin Deng, Jianxun Liu, Baichuan Lu

Abstract—In the paper, a positioning method of straight outdoor vent-pipe is presented, which bases on the technology of binocular stereo vision and 3-D reconstruction. Measurement principle and mathematic model of these binocular stereo vision systems, which are parallel optical axes of twain CCDs and general ones, are concretely represented. At last, the 3-D appearance of automobile tail is reconstructed on the technology of binocular stereo vision, and the 3-D coordinates values of vent-pipe is computed through the feature of figure and 3-D position of vent-pipe. The experiment results show that the method can realize automatic searching and positioning, and its error is fit for the actual application demand.

Index Terms—Binocular Vision, Vent-pipe Positioning, 3-Dimension Reconstruction

The Numerical Simulation Research of Crack in
the Masonry Arch Bridge

Zhou Jian-Ting, Du Yang, Ou Yi-Hong

Abstract—Using the secondary exploit platform tools of Ansys, the method of the discrete element and the definition of the confinement inactivation on the node is forwarded to carry out the numerical simulation of the crack in this paper. and according to the result of numerical simulation, the location of crack, crack width, crack depth, stress variety in the crack section during the course of the birth and develop of crack are also discussed to make certain the rule of the crack in the masonry arch bridge. Therefore the bridge researcher can confirm whether the bridge need online monitor, maintain and reinforce and which section need online monitor, maintain and reinforce. And the technology also supply for the numerical simulation researcher new way.

Index Terms—masonry arch bridge, crack, numerical simulation

Approach to Rough Set Stratified Fault Diagnosis of
Turbogenerator Vibration
Qizhong Zhang

Abstract—As the structure and vibration of turbogenerators are complicated, their faults are generally multi-level and random, and meanwhile, it also has other characteristics, such as fault information incompleteness, etc. Starting from general problems, this paper constructs a rough set stratified fault diagnosis model with rough set information measurement from data table decomposition. Rule sets obtained from this model have high supportiveness and practicality, and its stratified diagnosis approach is similar to human reasoning approaches, and so is easy to understand. Comparison is performed with real cases between the rough set stratified fault diagnosis model and common rough set fault diagnosis models, and proves the effectiveness of this approach.

Index Terms—Rough Set Information Measurement, Rough Set Stratified Fault Diagnosis Model.

Research on LOD Wavelet Model of Virtual Face
Chen Jun, Du Yang, Cheng Jiming, Wang Dong, Li Weita

Abstract—A fast lifted symmetrical cubic B-spline wavelet transform scheme with C_2 smooth is put forward in the paper for the first time, which meets the needs of face construction. Through the introduction of s-lift and w-lift operators, l filter and h filter are constructed based on the two-scale two-order vanish moment relation. A tensor-product formal two-dimensional mesh MRA subdivision and continuous level of detail control scheme is also studied to reconstruct face mesh. And a typical virtual face is constructed. The error is also analyzed and the results show that by using this LOD control model, the compression ratio is high and the distortion of facial surface is very small.

Index Terms—Filter transform algorithm, Hoisting algorithm, LOD model, Virtual face, Wavelet

Estimating the Tire-road Friction Using a Nonlinear
Observer Designed with the Parameter Identification
Results of LuGre Tire Model
Jiapeng Han, Yongli Sun, XiaoLi Liu

Abstract—In this paper we present a novel nonlinear observer structure for estimating the tire-road friction force under different tire-pressure conditions by use of the friction parameters identification results of LuGre tire model based on ant colony algorithm (ACA) with high precision. The observer developed here is shown feasible for the simplified motion dynamics of a quarter-vehicle model. Simulation results show its reasonableness.

Index Terms—parameter identification; LuGre tire model ;ACA; friction; nonlinear observer.

Fuzzy Variable Structure Control for
Hydraulic Servo System
Yang Yong

Abstract—Based on high-frequency switching control actions, variable structure control (VSC) can strengthen the robustness against external disturbances and system parameter uncertainties. The performance of VSC is influenced by boundary layer width tuning. Integrating fuzzy logic technology into VSC may attenuate the chattering as well as guarantee the steady-state performance. In the paper, A BLW tuning rate based on steady state error is designed based on fuzzy logic inference. A fuzzy variable structure control is proposed and applied to a hydraulic servo system. The simulation experiment results verify the effectiveness of the proposed control as to both the chattering reduction and control accuracy. The merits of both fuzzy control and VSC are well combined.

Index Terms—variable structure control (VSC), sliding mode, varying boundary layer width, chattering reduction, fuzzy control, hydraulic servo system (HSS)

Study on Virtual Reality Oil Tank Fire-Fighting

Simulating Model

Dong Wang, Yang Du, Kang-Ning Li, and Yi-Hong Ou

Abstract—The fire-fighting simulating and training system can be used to improve fuel depot personnel's capability of dealing with fire hazards. The simulation of realistic oil tank fire and the process of fire fighting is one of the key elements for safety simulative training. Engineering fire and fire-fighting model are put forward in this paper to overcome the disadvantages of high requirements for computer hardware and low degree of interaction of fire simulator. Three-dimensional graphical VR simulation examples verify the feasibility of the models.

Index Terms—Fire-fighting training, oil tank, simulating model, virtual reality.

Seek the Best Hamilton Cycle through Matrix Reorganization

XIUWEN YANG, ZHENJIE CHEN, YANFANG TIAN, CHEN JIE, SHUNPENG ZENG

Abstract—The paper based on the paper "Seek the Best Hamilton Cycle through Matrix Turning" find out the principle of revision one by one of three sides to obtain the best Hamilton Circle. We construct complete weighted graph at first, and represent it by matrix, such that the points of the initial Circle are the points which corresponding the upper elements of the matrix main diagonal. Then to carry out several times "Reorganization" on matrix, until the fact that the matrix unsatisfied with the principle of revision one by one of three sides. At last, the weight and route of the best Hamilton Circle are confirmed by the upper elements of the final matrix main diagonal.

Index Terms—Hamilton cycle, Matrix turning, Weighted graph

Multiple Description Coding based on Lower-Tree Wavelet

Zhang Yan, Liu Cuixiang, Yu Ming, Sun Yicai

Abstract—Multiple description coding (MDC) is proved to be an attractive approach for video applications where retransmission is unacceptable or infeasible. In this paper, an MDC algorithm based on the lower-tree wavelet (LTW) is presented. To combat packet loss, amounts of redundancy with the importance of data are added to the original data during the compression process. Experimental results for the transmission of video using for descriptions demonstrate the efficiency of the proposed method.

Index Terms—MDC, Lower Tree, Image Compression, Wavelet Coding

A Control and Monitor CAN Bus Network Based on Fault-Tolerant Control Theory

Yu Chuanqiang Guo Xiaosong Zhan An Chen Deguo

Abstract: The messages transmitted in the CAN bus network of a large-scale weapon system can be classified into urgent messages, instructing messages and state messages. There is a conflict between the real-time property of the urgent or the instructing messages and the continuity of the state messages. In this paper, a method based on fault-tolerant control theory is present to solve the conflict. In the structure of the network, we adopt two CAN buses to transmit the different messages. But the reliability of the network is affected. So we propose the operation method based on fault-tolerant control theory. It can guarantee the reliability by buses switching. Based on the network structure and operation method, we analysis the protocols of the two buses. At last, the network is validated on a four nodes experiment platform. The results of the experiment indicate that the design of the system is successful and meets the requirement of the system. The methods which the paper presented can also bring ideas to other control system based on the network.

An Adaptive Multi-user Detection Algorithm Based on RLS

Liu Ting, Sun Yunshan, Zhang Liyi, Qian Chengxu

Abstract—Adaptive multi-user detection technology only needs the spreading sequence and the delay of the desired user. Its structure is simple, complexity is low. Therefore, it is suitable not only for mobile station but

also for base station. The principle of adaptive minimum mean square error (MMSE) multi-user detection algorithm was expatiated. An adaptive MMSE multi-user detection algorithm based on recursive least squares (RLS) was proposed. Its iteration formula was deduced and the algorithm was simulated by MATLAB. The simulation shows that the BER performance of the algorithm is reduced with SNR increasing.

Index Terms—adaptive multi-user detection, adaptive MMSE multi-user detection, RLS algorithm, MATLAB

A Self-organising Diffusion Protocol of Sensor Network for Robot Navigation in a Dynamic Environment

Dongfei Xu, Ping Jiang, and Jin Zhu

Abstract—Advances in processor, memory and radio technology have enabled small and cheap nodes capable of sensing, communication and computation for constructing wireless sensor networks. They provide a pervasive intelligence solution for robot navigation in a dynamic and large scale environment. In this paper, a self-organising diffusion protocol of wireless sensors is proposed based on a competitive learning strategy, aiming to dynamically clustering similar regions in an environment based on perception of wireless sensors. The clusters of sensor nodes form a dynamic topological map of the environment and path planning to a destination can then be accomplished by propagation of a query to the network. An optimal safe path is achieved or updated efficiently by introducing a communication topology on the top of the selforganising sensor layer. This diffusion protocol is verified by a simulation of robot navigation in a toxic environment.

Keywords— robot navigation; wireless senosrs; dynamic environment; self-organising diffusion protocol

Chinese Character Fuzzy Recognition based on Pixels Distribution Probability of Strokes with Three-Mode and Nine-Section

Ning Wang

Abstract-This paper proposed a new method of Chinese character fuzzy recognition. First, Chinese character is segmented into 9 equal-area quadrate sections on three modes—gridding, horizontal bar and vertical bar. The area and perimeter of character are extracted. The pixels distribution probability of strokes in every section is calculated. They represented the structural and statistic feature of character. Then, single eigenvalue of character is used to reduce the range of elected standard characters. The absolute distance of pixels distribution probability realized the primary character recognition. Finally, fuzzy recognition based on correlation coefficient completed the accurate character recognition. This method is simple and effective. The result of experiment showed the character fuzzy recognition based on pixels distribution probability of strokes is accurate and rapid.

Object Description based on Learning for PCB Inspection

Zhijun Pei, Jianhua Tao, and Haiyan Ren

Abstract - The two prerequisites for the referential-based image comparison method, perfect registration and stable lighting, are hard to achieve under real PCB inspection environment. In this paper, an objection description based on learning for PCB inspection is proposed to compensate for allowable minor variations of object placement and lighting variations, and the threshold image approach is provided to effective avoid false defects. The experimental results show that the developed method is successful in locating defects occurring on PCB, and the result can be used to quality control.

Index Terms – Machine learning; Object description; PCB

An improved method for virtual enterprise

partner selection

Yao Li-hua, Shen Guo-qiang, Wang Ming, Zhang Guo-xuan

Abstract--The Analytical Hierarchy Process (AHP) approach is widely used for multiple criteria decision-making in construction management. However, it requires that decision makers remain consistent in making pairwise comparisons. Although Saaty proposed a method to assess the consistency of pairwise comparisons, no automatic mechanism exists for improving the consistency for AHP. A web-based method that make up drawbacks of the traditional AHP is proposed in this paper, in which by adjusting the decision-makers' final pairwise comparison matrix to low the consistency ratio and improve the reliability of the weights automatically. And a real case study of selection VE partners demonstrated that the proposed method in terms of cost effectiveness, timeliness and improved decision quality.

Intrusion Detection Using Multiple Classifiers

Fusion and Clustering Analysis

Cheng Zhong, Aizhong Mi, Feng Yang

Abstract—Decision fusion of multiple classifiers can obtain more accurately classification than the best single classifier. By applying multiple classifiers fusion and clustering analysis and the nearest neighbor rule respectively, this paper presents a new intrusion detection algorithm. The analysis and experiment results show that this algorithm can achieve a good detection performance and reduce remarkably the errors and false alarms for intrusion detection.

Index Terms—Clustering analysis, Decision fusion, Intrusion detection, Multiple classifiers fusion.

Design of a Voltage Compensation Control

Method Based on DSP

Dejun Tang, Wensheng Wang, Zhenguo Zhao

Abstract—Instant voltage compensation when the power grid sags is important to protecting the customer against collapse, especially those who suffers a lot from voltage instability. A fast compensation method has been proposed in this paper to detect voltage fluctuations and generate control signals. The realization of the control method and the hardware system is based on high quality digital processor TMS320F2812, which is fast enough to carry out instant computation. The experiment results show that the controller can quickly detect sags and drive the power electronic circuit to generate compensation voltage .

Keywords: Control system; Voltage compensation; DSP; Data processing

A Semantic Based Search Algorithm for Similar

Geometric Propositions

SHE Li, FU Yan

Abstract—With the appearance of new information retrieval technique and popularization of the CAI software, people ask more in knowledge search. Semantic search, interactive reasoning and personalized service are its development trend. A semantic based search algorithm for similar geometric propositions is presented. The user interest feature is represented as the vector space model over the domain of geometry. Integrating with semantic analyzing and rules reasoning, a method of computing similarity is provided. Finally, the experiments show that the results are satisfying.

Index Terms—knowledge search; similar geometric propositions; semantic weight; user interest.

Digital Audio Asymmetric Watermarking
Algorithm Based on Neural Networks in the
Wavelet Domain

Guoxia Liu, Jianming Liao, Xiang Zhang, Guoming Lu, Ping Kuang

Abstract—Digital audio watermarking is embedded inaudible information into digital audio data for the purposes of copyright protection, ownership verification, covert communication, and/or auxiliary data carrying. A new digital audio watermarking algorithm is proposed in this paper, which based on Neural Networks and in the Wavelet Domain. The watermark is constructed by utilizing still image and embedded into the significant wavelet coefficients of a digital audio signal. The weights of the neural networks are regulated till the relationship between the host digital audio and the watermark is approximated in the process of watermark being embedded. When compared with other algorithms, it performs watermark detection without the participation of the original digital audio and also has the advantages of transparency, low computational complexity and high robustness.

Index Terms—asymmetric, watermarking, neural networks, wavelet

Iterative Algorithm for A New System of
Generalized Variational Inclusions

Yong-Qin Yang, Mao-Ming Jin, and Jian-Ping Li

Abstract—In this paper, we consider a system of generalized variational inclusions with H -accretive mappings studied by Fang and Huang in Banach spaces. By using the resolvent operator associated with H -accretive mappings, we prove the existence and uniqueness of solutions for this system of generalized variational inclusions. We also construct a new iterative algorithm for approximating the solution of this system generalized variational inclusions and discuss the convergence of iterative sequence generated by the algorithm. Our results improve and unify many known results variational inequalities and variational inclusions.

Keywords— H -accretive mapping; relaxed cocoercive mapping; system of generalized variational inclusions; resolvent operator technique; iterative algorithm; existence and convergence

Simulation of Wyner-Ziv Video Coding
Algorithm Based on Transform Domain

TANG Yuan, BAI Xue, and LI Jian-ping

Abstract—The Wyner-Ziv video coding scheme based on transform domain is researched in this paper. Firstly, the background and basic theories of DVC (Distributed Video Coding) are simply introduced, especially on the theories of Wyner-Ziv (a lossy coding theory of side information on the decoder). Further more, referring to the basic Wyner-Ziv coding scheme, a novel transform domain Wyner-Ziv coding scheme is designed. This method realizes video compression by intra-frame encoding and inter-frame decoding, and uses different codec for different date type. In the specific type codec, the transform coefficients of a Wyner-Ziv frame are encoded independently using a scalar quantizer and hamming code encoder. At the decoder, in order to construct the side information for Wyner-Ziv frame decoding, the motion compensates interpolation. And then the ideal decoded frames are obtained by combining the side information with the Wyner-Ziv frame. Finally, the related simulation and analysis are given.

Index Terms—DVC, Wyner-Ziv coding, Side information, Hamming code

A New Fast Algorithm of M-channels Lifted Wavelet
Transform for Image Compression

Zhen-xian Lin

Abstract—The lifting scheme based on spatial domain has been widely used in the digital image processing that its computes fast and simple, and it is calculated for the reversible from integer to integer wavelet transform. According to M-channels wavelet transform theory and the signal being subdivided, it is carried out the lifting to M-channels wavelet transform, and a new fast algorithm of M-channels lifting wavelet transform is presented in this paper. The algorithm is easy to compare with the traditional wavelet transform that it has only the decomposed algorithm, the composed algorithm is given. However, integer to integer wavelet transform can be

achieved when the operation result is taken the proximal integer. The algorithm is used to image processing. The experiment result shows the algorithm is very useful for image compression.

Index Terms—M-channels lifted wavelet transform, lifting scheme, image compression.

The Combination of Statistical Bandwidth Allocation and Dynamic Bandwidth Allocation Algorithm for QoS in EPON

Lihua Fu, Jianming Liao, JianPing Li, Xiaofeng Gu, Difei Zou

Abstract—Based on the standard of EPON and the research results, this paper introduces the mechanism of multi-point control protocol and compares the Statistical bandwidth allocation(SBA) and Dynamic bandwidth allocation(DBA),according these, this paper proposes a new scheduling algorithm to support the quality of services (QoS) in EPON. Here, static bandwidth allocation for guaranteed bandwidth service and dynamic bandwidth allocation for on-demand, dynamic traffic services.

Index Terms—Ethernet, PON, EPON, DBA, SBA

An Adaptive Video Sequence Denoising Algorithm

Yong Chen ,Qi Huang, Changhua Zhang, Yu hua Cheng

Abstract - Denoising method based on wavelet has become one of the main methods of image denoising. Existing searches are only about images and there exists little study about video sequence denoising. It is difficult to choose threshold in image denoising and it is more difficult in video sequences denoising. Because video sequences are affected by image collection card, temperature, humidity and so on, an adaptive method is needed to determine threshold both adapting to the variation speed of video sequence and reserving the margin information of the images. Based on the idea, we propose an adaptive denoising algorithm based on orthogonal wavelet packet (OWP). We make full use of the characteristic of video sequences that the relativity between the adjacent frames of video sequences is high. Then we adopt the image information of the previous two frames to predicate that of the next frame and adjust the threshold according to the information. It showed that when applied to Automotive Collision Avoidance System, the algorithm is well to denoise.

Index Terms—Denoising method; orthogonal wavelet packet; video sequences

Weighted Association Patterns Mining Algorithm and its Application to Alarm Correlation Analysis in Communication Network

Jing-Yao Feng , Xing-Ming Li

Abstract—Alarm correlation analysis plays an important role in communication network fault management. Using association rule algorithms in alarm correlation systems is a research hotspot. For alarms have different severity levels, an algorithm called WAP Miner based on WAP-tree is proposed in which summation-weighted support and ratio-weighted support are introduced to generate alarm weighted association patterns. This algorithm generates less candidate patterns, and enables us to effectively reduce the computational cost. WAP-tree improves the structure of FP-tree, so at least one third of memory is saved. Experiments demonstrate WAP Miner is much faster than MINWAL(O), and has great promise in knowledge acquisition for alarm correlation systems.

Motion Estimation for Video Stabilization Based on Feature Points and Parameter Space Method

Liu Lingqiao, Fu Zhizhong, Deng Zaiqiang

Abstract—Motion estimation is the crucial step for video stabilization algorithm. There are many literatures focus on it and various methods have been proposed. The solution of this problem is now sophisticated when only replacement is taken into account. But if the rotation between two successive frames can't be ignored, conventional methods may lose their valid. In this paper, we aim to estimate motion parameters when replacement and rotation both exist in the video sequence. A framework based on feature points is employed. In order to find corresponding feature points in successive frames to estimate global motion

parameters, a novel feature point match algorithm based on parameter space is proposed. It can endure great changes of the distribution of feature points and the processing speed is rather fast.

Index Terms—Parameter Space, Feature Point, Motion estimation, video stabilization

Design of Dynamic Feed-back Load Balancing Algorithm of Cluster System based on LVS

Mei Gong, Peng Wang

Abstract—A dynamic feed-back load balancing algorithm (DFLBA) is presented in this paper. In order to simplify the design of load balancer, improve the throughput rate and response time, this algorithm focuses on the adjustment of load allocation by the lead-in of the load redundancy. Conclusions can be drawn through test that this algorithm improves the efficiency of service better than stationary algorithm and some of dynamic algorithm.

Index Terms—Server cluster, LVS, Dynamic feedback, Load balancing, Load redundancy

A Robust Un-embedded Watermarking Algorithm Based on Wavelet

Jingjin Wu, Xuanxing Xiong, Jianping Li

Abstract—In this paper, a new robust digital image watermarking algorithm based on wavelet is proposed. Instead of embedding watermark into a source image, this algorithm uses the source image and the watermark to generate a secret key which will be kept by a third party for copy right protection and watermark detection, and the quality of the source image is not degraded. Moreover, by dividing the wavelet coefficient bands of the source image into some sections and making use of average compare strategy, this algorithm is robust against a lot of attacks, including image compressing, Gaussian noise, blurring and cropping. Experiments in this paper illustrate its effectiveness and robustness.

Index Terms—copyright protection, digital watermark, watermarking algorithm, wavelet transform

Study of Security of IPSec Based on IPv6 and the Diffie-Hellman Algorithm

Yao Yang, Jianming Liao, JianPing Li, Hui Liu, Yujie Hao

Abstract—The Next Generation Internet is going to base on IPv6(Internet Protocol version 6) that has to support IPsec(Internet Protocol Security) that provided two kinds of security mechanisms: Encryption and Authentication. This paper is aimed to introduce AH(Authentication Header) and ESP(Encapsulating Security Payload), and a familiar key exchange algorithm, Diffie-Hellman, and analyzes some possible ways of optimization on it.

Index Terms—AH, Diffie-Hellman, ESP, IPsec

An improved research on Algorithm of finding out all kinds of cycle deadlocks in AGVS Using Task-Resource graph Liang Sun

Abstract—Aiming to solve the problem of low efficiency and inability of finding out all kinds of deadlock, an improved algorithm is proposed using graph theory. The method is as follows: firstly, according to the different positions and tasks of AGV in AGVS, AGVS was modelled using T-R graph. Secondly, the algorithm search out

all kinds of cycle deadlock using graph theory in T-R graph at any time. Once having finished searching all T-R graphs, the algorithm find out all cycle deadlocks in AGVS. The improved algorithm can overcome the disadvantage of the previous: inability of finding out all kinds of deadlocks. The use of control law, which are developed by the improved algorithm, is helpful to avoid new cycle deadlocks effectively. Simulating results coincide with theoretical analyse. Meanwhile, all types of cycle deadlocks and non-cycle ones can be found in AGVS by simply modify of the improved algorithm.

Index Terms—AGVS, T-R Graph, cycle deadlock

Using PSO Algorithm in Problem of Pipelines Running Optimization

Yonggang Zuo, Jun Chen, Jing Yang

Abstract—The running optimization of pipelines is an important measure to decrease the energy consumption for transporting oil. The running optimization of pipelines is a complex integral programming question, it is usually solved in dynamic programming algorithm, genetic algorithm and so on, these algorithms are difficult to operate and sometimes get the answers deviating far from the true optimal answer. This article aimed at solving the optimal model of pipelines running with particle swarm optimization (PSO) algorithm, calculation on a real example proved that the PSO algorithm had profits of high precision and fast speed of iteration, it can be used in the study of pipelines running optimization well.

Keywords—pipelines running, optimization, PSO algorithm

The Fuzzy Covering Algorithm of Constructed Neural Networks

Zhang C.J. and Wang L.

Abstract—This paper introduce a structural definition of fuzzy set and give the clear description of the boundary of pattern recognition of constructed forward propagation (FP) neural networks (NNs). When the system information is imperfection, this method can get more reasonable boundary of classes and higher precision. The above-mentioned turns out to be right in the practices.

Index Terms—constructed FP Neural Networks; Covering algorithm; Fuzzy logic; Pattern recognition

Computer-aided Design and Experiment Research of New Type Permanent Magnet Synchronous Motor

ZHANG Hao-ming, SUN Yu-kun

Abstract—Modern motor needs high speed, high efficiency, high power density and low pulsating torque with fast development of modern control industry; Halbach motor is a novel permanent magnet (PM) motor: One-sided and sinusoidal field is produced by special distribution of permanent magnets. The field can increase air-gap flux while decrease rotor-yoke flux and air-gap harmonic, which can improve power density and efficiency, reduce volume and pulsating torque of motor. Halbach motor design software based on MATLAB and finite element analysis software based on ANYAS reduce period of motor design greatly; Finite element analysis and experiment results prove Halbach motor has much more advantages than traditional permanent magnet motor.

A Parallel Decision Tree Algorithm and Application Research Based on Master/Slave Mode

Shuang Lv, Peng Wang, Gao-Yun Chen, Jian-Ping Li

Abstract—A fast and parallel decision tree classification algorithm based on master/slave mode named FPM_DT is proposed in this paper to handle databases with lots of attributes. It is the first algorithm to introduce several kinds of techniques such as partitioning the training databases horizontally and vertically, partitioning the training datasets in each branch into groups according to the status of datasets distributed. It is

applied in large college education datasets to find instructive rules about college teaching and undergraduate's obtaining employment. Experimental results show that these techniques can not only reduce communication and I/O costs, but also increase the algorithm parallelism.

Index Terms—Classification, decision tree, gini index, parallel algorithm

The Measurement of Coaxiality Errors Based on Genetic Algorithm

Xiaodong Duan, Lizhi Gu

Abstract—Reviewed four ways, minimum zone, minimum circumcircle, maximum inner-circle, and maximum least square, for the measurement of the coaxiality, presented the genetic algorithm with the function of adaptation. By projection of the coordinates of the measured surfaces of the cylinder, the coaxiality errors test is turned into the determination of the center of the contour on the section perpendicular to the axis of the cylinder, then the coaxiality is calculated with a series of transforming formulae through operations of selection, hybrid, and alteration. This method put forward may be applied for the workshop with ease, ready in execution on computer at great speed, and with high accuracy.

Index Terms—coaxiality, datum, error measurement, genetic algorithm, perfect center, species group

An algorithm of deep web crawler's crawling

XIANG Peisu, TIAN Ke, HUANG Qinzhen

Abstract—As an ever-increasing amount of information on the web today is available through search interfaces, users have to key in a set of keywords in order to access the pages from certain web sites, which are often referred to as the hidden web or the deep web. Since there is no static links to the hidden web pages, search engines cannot discover and index such pages. However, according to recent studies, the content provided by many hidden web sites is often of very high quality and can be extremely valuable to many users. How to build an effective hidden web crawler that can autonomously discover and download pages from the hidden web is studied. Since the only "entry point" to a hidden web site is a query interface, the main challenge to a hidden web crawler is how to automatically generate meaningful queries for issue to the site. A theoretical framework to investigate the query generation problem for the hidden web and we propose effective policies for generating queries automatically is provided. Experiment shows that these policies are effective.

Key words: deep web; deep web crawler; query selection; adaptive algorithm

Research on AJAX Security and Solution

Wu Kai-xing, Han Xi

Abstract—Asynchronous JavaScript and XML technologies have taken the Web by storm. The popularity of the AJAX technique for building Web UI is growing at a tremendous rate and shows no sign of stopping. An increasing number of rich Web applications, often called Ajax applications, make use of JavaScript as a data transport mechanism. However, AJAX is far from secure, and the decision to develop a more secure Web application shouldn't be made lightly. It demands that serious security implications be addressed across all phases of the application development life cycle. This paper overviews Ajax technology and explains major security problems faced by Ajax Applications. And then it describes a vulnerability of JavaScript, which allows an unauthorized party to read confidential data contained in JavaScript messages. The attack works by using a <script> tag to circumvent the Same Origin Policy enforced by Web browsers. Traditional Web applications are not vulnerable because they do not use JavaScript as a data transport mechanism. We advocate a two-pronged mitigation approach that allows applications to decline malicious requests and prevent attackers from directly executing JavaScript the applications generate.

Keywords-- AJAX; Java Script; JSON; Security

Parameter Optimization of Ant Colony Algorithm

Based on Particle Swarm Optimization

Yuntao Dai, Liqiang Liu, and Shujuan Wang

Abstract—By combining the ant colony algorithm with particle swarm optimization algorithm, a method of optimum parameter selection was proposed. In this study, the parameters were set as the position information of particle swarm. Then the algorithm was applied to the traveling salesman problem (TSP), and a fitness evaluation function was designed to evaluate the performance of the algorithm solution. Finally, the particles were guided to the direction of a higher fitness. This hybrid algorithm avoids using artificial experience or repeating trials in selecting parameters. Using particle swarm optimization algorithm to find the best set of parameters, we demonstrate the good performance of ant colony algorithm in finding solutions to the TSP.

Research of Adaptive Text Fuzzy Clustering

Method Based on Genetic Algorithm

Wenhua Dai, Cuizhen Jiao, Tingting He

Abstract—As Fuzzy C-means Clustering Algorithm is sensitive to the choice of the initial cluster centers and it's difficult to determine the cluster number, we proposed an Adaptive Text Fuzzy Clustering Method Based on Genetic Algorithm. According to the principle of Vector Space Model, documents were represented as vectors. Then we adopted a new strategy of variable-length chromosome encoding and randomly chose initial clustering centers to form chromosomes among document vectors. Combining the efficiency of Fuzzy C-means Algorithm with the global optimization ability of Genetic Algorithm, the local optimal solution was avoided and the optimum number and the optimum result of cluster were obtained by means of genetic evolution. Experiments indicated that this algorithm was efficient and accurate.

Index Terms—Fuzzy Clustering, Genetic Algorithm, Text Clustering, Variable-length Chromosome

Genetic Algorithms Based Isoflux Multi-Beams

Optimization for Non-GEO Satellites

Jun Jin, Huali Wang, Miao Liu, Yunzhi Liu

Abstract—In LEO communications system, iso-flux coverage is the key to high system capacity. In this paper, a two-steps method of isoflux multi-beams optimization based on genetic algorithms is discussed. At first step, a real-coded genetic optimizer is introduced and developed to optimize the number of beams and the size of cells. At second step, a complex-coded genetic optimizer is used to shape the antenna pattern for each cell. Simulation results are presented to show effectiveness of the approach.

Technology of Data Fusion for Automobile Tire

Pressure Monitoring System

Liu Jianxin, Tan Ping

Abstract -Vehicle handling depends critically on the tire-road contact patch. When the tire inflation pressure changes the contact patch is no longer optimal and the handling properties deteriorate. Therefore it is very important that the tires are correctly inflated. We here focus on a direct tire pressure monitoring system (TPMS), which uses integrated temperature, pressure and acceleration sensor. Under the complex electromagnetic circumstance in automobiles, disturbance and error of the measured data are inevitable. So a novel method of combining arithmetic mean with parameter estimation was introduced to improve the robustness of the system. It could be shown that resultant data from fusion looks more reasonable. A kind of low power consumption control algorithm and rapid Cyclic Redundancy Check (CRC) algorithm were also discussed.

Index Terms - TPMS; Data fusion ;Parameter estimation;Arithmetic mean;CRC

Incremental Rule-extraction Algorithms Based on

Variable Precision Rough Set and Search Tree

Ke Xu, Chuanzhen Chen

Abstract—The incremental rule extraction is one of the main problems of KDD. In this paper, a novel rule extract algorithm- Rule Derivation Based on Variable Precision Rough Set and Search Tree (RDBVPRST) is pro-posed. It is a depth first heuristic search algorithm. Based on this algorithm, the incremental rules are extracted and a known rule set is updated by updating the rules' confidence degree. At last, some examples are given to illustrate the characteristics of this new incremental algorithm.

An Efficient Color Video Coding Method Based on DWT and VQ

Qing-Zhong LI, Yong-Xia ZHAO, Dong-Xiao HE

Abstract—This paper presents an efficient color video coding method based on vector quantization (VQ) and discrete wavelet transform (DWT). In order to remove the inherent correlation among the three components of color images, the input frames are first transformed from the RGB space to the YUV space. The luminance Y image is then coded based on classified tree-structure vectors and global codebook scheme. The global codebook designed can adaptively update and replace the code words of the cookbook with the change of scene according to the inter-frame correlation and the frequency of code words. The coding of chrominance components of U and V images is achieved by using sub-sampling operation and average computation based on human visual system (HVS) characteristics. The experimental results show that while maintaining the acceptable recovery quality, the proposed coding scheme can provide high coding efficiency, especially applying to such scenarios as videoconference and video observation of underwater scenes.

An Accurate Privacy-Preserving Data Mining Algorithm for Frequent Itemsets in Distributed Databases

Hu Xiaodan, Wang Yongchu

Abstract—Mining distributed databases is emerging as a fundamental computational problem. A common approach for mining distributed databases is to move all of the data from each database to a central site and a single model is built. This approach is accurate, but too expensive in terms of time required. For this reason, several approaches were developed to efficiently mine distributed databases, but they still ignore a key issue---privacy. In this paper we present an efficient approach for mining frequent itemsets in distributed databases. Our approach is accurate and uses a privacy-preserving communication mechanism. We show that our privacy-preserving distributed approach has superior performance when compared to the application of a well-known mining algorithm in distributed databases.

Index Terms—data mining, frequent itemset, distributed database

Implementation of 2-D IDCT Based on Distributed Algorithm

Chen Peijiang

Abstract—In order to present an ASIC implementation method of 2-D inverse discrete cosine transform based on distributed algorithm, in the design of 1-D IDCT, a Chen-based fast IDCT algorithm was utilized. Multiplier accumulators were realized by basing on distributed algorithm, which was used to reduce the hardware amount and enhance the speed performance. According to the design method, VHDL simulation, synthesis and layout design of system were implemented. The result shows that this 2-D IDCT ASIC design owns best timing performance comparing with other designs and the design period of this ASIC is lessened and system maintenance becomes easy.

Index Terms—MAC; IDCT; Distributed algorithm; ASIC

Steganography Capable of Resisting JPEG Compression Based on SVD and Genetic Algorithm

CHEN Zhen, LIU Jing

Abstract—In order to resist the attack of JPEG compression and to maintain a good visual quality of stego-image, a steganography capable of resisting JPEG compression based on SVD and genetic algorithm was proposed. The largest coefficients in D component were used to embed secret information and modified by the quantization mechanism. And the largest coefficients in D component were quantized by using the quantization coefficient determined by genetic algorithm. After that, the inverse of the SVD transformation was performed to reconstruct the stego-image. Experimental results show that the quality of the stego-image is good and there is strong resistance against JPEG compression.

Keywords: Steganography; Singular value decomposition; Genetic algorithm

Study Of Image Fusion Based On Wavelet
Analysis

SenHua Wang , JianPing Li

Abstract—Image fusion is an important application of information fusion in image processing. Wavelet has become a sort of mainstream technology in the area of image fusion because it possesses favorable characteristics of localization and multiresolution at time domain and frequency domain at the same time. In this paper, the multispectral image was set as an example for the experiment. A kind of fusion algorithm based wavelet analysis and HIS transform was put forward. And the emphases of the algorithm were the selection of the wavelet bases and the processes of the algorithm. The outcome of the simulation showed that the algorithm of this paper possessed preferable fusion effect than traditional algorithm..

Index Terms—Image fusion, HIS, Wavelet algorithm

A Method of the Image Edge Extraction Based
on Wavelet Denoising

Yujie Hao, Jianping Li, Xuefeng Zhao, Hui Liu, Ping Kuang

Abstract—When using Laplacian operator in edge extraction, the noise makes it unacceptable. To solve it, a new improvement method is proposed, which can denoise effectively and remain edge as more as possible. The experiment proves its efficiency in edge extraction.

Index Terms—edge extract; wavelet transform; thresholding; denosing

Quantum Frequency Operator of Signal

Peng Wang , Jian-Ping Li

Abstract—The frequency operator of signal is obtained in this paper. It reflects the quantum characteristics of signal. It is a linear and hermitian operator. Eigenfunctions, eigenvalues and superposition principle of signal are researched by using the frequency operator. The frequency operator is used to prove the uncertainty principle of signal. The uncertainty principle of signal indicates that the signal can be considered as a kind of the quasi quantum system with wave-particle dualism. The frequency operator is a powerful tool to research the quantum characteristics of signal. The quantum interpretation of frequency operator explains the essence of signal and provides the theory support for applying the framework of quantum mechanics to the signal processing.

Index Terms—Frequency operator of signal, quasi quantum system, uncertainty principle, wave-particle dualism

Efficient Face Protection of H.264 Video in the

CABAC Domain

Xianyu Bao, Jianguo Jiang, Yuan Li, Shu Zhan

Abstract—Recently, several video encryption algorithms have been proposed, which are applied to H.264 compressed bitstreams. Although these algorithms offer many desired advantages compared to conventional ones, they do not consider regions of interest. These regions may need better protection, may be the only regions that need protection, depending on the specific application. In this work an effective face protection scheme including state-of-the-art face detection methods and novel simultaneous CABAC and residual coefficients (RCs) encryption is presented, with an emphasis on encryption aspect. The goal is to identify and encrypt regions corresponding to human faces in a video sequence. Simulation results demonstrate the effectiveness of the proposed scheme.

Index Terms—CABAC coding, confidentiality, face protection, H.264 video encryption

Speech Emotion Recognition Based on Time Domain Feature

Lasheng Zhao, Xiaopeng Wei, and Qiang Zhang

Abstract—In recent years, speech emotion recognition has attracted more and more attention. In this paper, we extracted a new emotion feature named as the Long-term Rise Zero-Crossing Interval (LRZCI). The support vector machine (SVM) is used as classifier. Recognition experiments are conducted on the Danish Emotion Speech (DES) Database. Experimental results illustrate the validity of the kind of feature.

Index Terms—speech; emotion; recognition; feature

Image Segmentation Using Mean Shift Based Clustering

Yinqing LI, Shukui BO

Abstract: Image segmentation is a major step in shape feature extraction, which is one of the most important sections in content-based image retrieval systems. In this paper, we present a color image segmentation scheme based on pixel clustering. The proposed segmentation is based on mean shift clustering method. Earlier clustering techniques based on mean shift use single scale over the entire feature space. In this paper, we present an adaptive mean shift method. Furthermore, a multiscale approach of segmentation is developed based on the adaptive mean shift clustering.

Comparison of the Fractal Dimension Using the Texture Image

First A. Gaolan, Second B. Zhanghui, Third C. Zhao Li Fourth D. Li Jun Fifth E. Zhang Zunhua

Abstract—Fractal dimension (FD) is a feature which is widely used to characterize texture images. Texture could be described by the number and types of fineness, coarseness, smoothness, granulation, randomness, lineation or being irregular or hummocky. Used different methods to calculate different texture images, the FD always were different. But how could evaluate the results. Each image type is approached using a different form of fractal parameterization. The purposes of this article is to compare the results of FDs using the texture image and find how to evaluate the results. we analyze the methods of FDs, especially multi-fractal, and calculate texture image to certify our conclusion.

Index Terms—Fractal dimension, Texture image, Texture analysis

SIGNAL PROCESSING OF MAGNETIC FLUX LEAKAGE INSPECTION OF PIPELINE BASED

ON WAVELET TRANSFORM

YI SU, ZHU-XIN LI, PENG-FEI WANG, HAO WU

Abstract—Non-destructive testing is developing in the direction of automatization and intelligentization, but there still exists some difficulty in analyzing quantitatively the signal of magnetic flux leakage. The Mallat quick algorithm of wavelet transformation is described simply. As an advanced digital signal processing method, wavelet transformation can be used to compress data and separate the signal and the noise in the magnetic flux leakage inspection. So introducing wavelet transformation into the magnetic flux leakage inspection provides high feasibility for the quantitative analysis of the test signals.

Keywords: wavelet transformation; magnetic flux leakage; data compression; noise

Research on Image Scrambling Algorithm Based on Wavelet Transformation

Dehui Yin, Fengqing Qin, Chenhu Zhang, Minjun Li and Bingfa Li

Abstract—Scrambling and gray-level spreading are two methods of image scrambling, whose aim is both to make the scrambled image unrecognizable. In this paper, two scrambling and spreading algorithms are proposed which are wavelet-based scrambling, spreading algorithm and local area single point spreading algorithm. These algorithms change not only the points' position but also the gray value. The experimental results show that these algorithms have good scrambling effect and security, as well as strong anti-attack ability.

Index Terms—Image Scrambling, Information Encryption, Wavelet Transformation

Acquisition Method of Dynamic Image Sequence of Multiple Apples to Obtain Information about Their Entire Surfaces

Wei Xinhua, Zhou Xingpeng, Wang Jinxing, Li Fa-De

Abstract—An experimental machine vision system was designed and implemented for automatic external quality inspection and grading of apples with diameters from 50 mm to 100 mm in a speed of 6 apples per second. A novel roller conveyor was designed to convey and rotate apples regardless of size with an approximately equal rotational speed. During the apples were conveyed literally through the camera's field of view by the roller conveyor, each apple was captured 6 images, and rolled approximately 60 degrees between the exposures of each frame, and got one complete revolution in the camera's field of view.

Index Terms—acquisition; apple; grading; image sequence.

Adaptive MCTF Video Coding Based on Gauss Transition Filtering

Fang Zhijun, Li Runwu, Wang Shengqian

Abstract—In this paper, a gauss-adaptive update method for lifting-based motion compensated temporal filtering is proposed to overcome structural defects of transform coefficient. We utilize adaptive update step based on Gauss Transition Filtering to improve the lowpass frame quality in lifting step (Haar wavelet lifting structure). Experimental results show that the proposed scheme can significantly improve the visual quality and the PSNR performance for motion compensated temporal filtering.

Index Terms—Motion-compensated temporal filtering, Lifting, Gauss transition filtering, scalable video coding

Image Filtering Using Morphological Filter
WANG Guangyan WANG Xia ZHAO Xiaoqun

Abstract—Morphological filter is a new non-linear filter that suits the non-linear and non-stationary signal, such as the image signal. In this paper, four types of morphological filters are shown to filter the noisy image signal. They are the serial cascade, parallel, series-parallel, and the adaptive ranked-order morphological filter especially, which is designed by means of collaborating the order morphology theory and the adaptive filtering algorithm. Finally, some examples of applying the above morphological filters to some real noise-reduction tasks are shown.

Index Terms—image filtering, morphological filter, adaptive filtering, order morphology

Texture Segmentation of SAR Image Using
Multiresolution Pairwise Markov Model
Bao-li Liu

Abstract—A new method for segmentation of synthetic aperture radar (SAR) images is presented to consider spatial distributed characters between pixels of SAR images as well as the local means and variances statistics of gray level, a Gaussian autoregressive (GAR) model under a multiresolution pairwise Markov framework. Based on texture feature images from gray level co-occurrence probability statistics, we examine the texture segmentation of SAR image using the multi-resolution maximization of the posterior marginal (MPM) estimate with corresponding unsupervised segmentation algorithm on those texture feature images. For some SAR images, compared with multiresolution pairwise Markov-GAR model texture segmentation based on gray level images, the results of experimentation show that the proposed method in this paper has a better performance on segmentation precision.

Index Terms—SAR image; Texture feature; Pairwise Markov random field model; Multiresolution MPM; Texture segmentation.

Soundness of Digital Signature in the Presence
of Active Adversaries

ZHU Yu-na, WANG Ya-di, HAN Ji-hong ZHANG Chao

Abstract—This paper extends previous results bridging the gap between the symbol approach and the computational approach. Specifically, for the case of protocols that use signatures, based on the Micciancio-Warinschi method we establish the soundness of digital signature with respect to the computational model.

Index Terms—symbolic model, computational model, computational soundness, digital signature

On-Line Dynamic Reinforcement Learning and its
Application in Multi-agent Based E-commerce

LI Jian, JING Bo

Abstract—With the rapid development of multi-agent systems (MAS), on-line automatic negotiation is often needed. But because of incomplete information agents have, the efficiency of on-line negotiation is rather low. To overcome the problem, online reinforcement learning algorithm is presented to learning the incomplete information of negotiation agent to enhance the efficiency of negotiation. The algorithm is applied to on-line bilateral multi-issue negotiation in Multi-agent based electronic commerce. Three kinds of agents are used to compare with, which are no-learning agents (NA), static learning agents (SA) and dynamic learning agent (DA) in this paper. In static learning agent, the learning rate of Q-learning is set to 0.1unchangeable, so it's called static learning. While in dynamic learning proposed by this paper, the learning rate of Q-learning can change dynamically, so it's called dynamic learning. Experiments show that it can help agents to negotiate more efficiently.

A Method of Facial Feature Alignment Based on Multi-initialization ASM

Jinlong Cui, Weisheng Li

Abstract--Active Shape Model (ASM) is one of the most popular methods for facial feature alignment. However, because of the diversities of poses and expressions, the available methods of facial feature alignment based on ASM and their improvements are prone to get into the problem of local minima. In this paper, the facial feature location based on projection function is used to distinguish distinct poses, and a multi-initialization ASM method based on different poses is proposed. This method is able to avoid the ASM search process ending at local minima, especially efficient in dealing with face images which has diverse poses. The experimental results show that the method can enhance the accuracy of ASM with little increase of time requirement since ASM search time is reduced by further initialization.

Index Term--Facial feature alignment, ASM, projection function, multi-initialization ASM

Multiple User Classes Dynamic Traffic Assignment: Formulation and Solution

Zhengwu Wang, Zhongxiang Huang, and Dayong Luo

Abstract—Dynamic traffic assignment (DTA) is the base of real-time traffic control and management. However, the present work on multi-class analytical DTA model assumes that the link travel time function is identical for all travelers. Again the interactions among multiple classes are neglected. Moreover the different route choice rules to different users are hardly considered. Therefore, a multi-class analytical DTA model is proposed in this paper. The user classes typically refer to different classes whose route choice rules are different, such as dynamic system optimization, dynamic user equilibrium, and stochastic dynamic user equilibrium. According to travel time characteristic of each user class, the multidimensional travel time function based on the extended BPR function is built which can satisfy FIFO requirement and express the asymmetric interactions among user classes. At the same time, the interdependences among user classes are modeled based on bi-level programming, and the solution algorithm on bi-level model is designed using iterative optimization algorithm. Finally, the model is applied to the experimental network.

Index Terms—Dynamic traffic assignment (DTA), Multiple user classes, Bi-level programming, Iterative optimization

Credit Risk Assessment on Fuzzy Proximal SVM for Multi-class Classification

Jianguo Zhou, Xiaowei Wang

Abstract—Due to recent financial crises and regulatory concerns, financial intermediaries' credit risk assessment is an area of renewed interest in both the academic world and the business community. In this paper, we propose a multi-category extension of fuzzy proximal support vector machines, where a fuzzy membership is assigned to each data point. Patterns are classified by assigning them to the nearest of M parallel planes, which are proximal to one of the M-categories and separate a category from the rest. The algorithm is simple and fast as no quadratic or linear programming problem is solved. The credit risk assessment also can be seen as an M-categories classification problem. And we hope to find a more effectively method to solve it through this algorithm.

Index Terms—credit of electricity customers, multi-class data classification, fuzzy, proximal support vector machine.

Automatic Fuzzy Rules Extraction of Generalized Fuzzy RBF Neural Network Based

on Hierarchical Evolutionary Programming

Feng Ye, Yongquan Yu, Zhenwen Su, Xiayu Zhang and Xingxing Tan

Abstract—Fuzzy control is an important solution to the control problem of the complex non-linear system. But how to obtain the fuzzy rules has been a bottleneck problem of the system. This paper presents a new algorithm that based on hierarchical evolutionary programming and generalized fuzzy RBF neural network. We can utilize this algorithm to optimize the topology and weights of the RBF neural network so as to obtain.

Index Terms—generalized fuzzy RBF neural network, hierarchical evolutionary programming, mixed code

The DTNN Identification Model of Magnetic Bearing Supporting System

First A. Zhang Maoqing, Second B. Yu Zhongcheng, Third C. Qu Haini, and Fourth D. SunYong
Abstract—The neural networks DTNN identification model is developed on the basis of the force analysis of magnetic bearing spindle, which reflects the nonlinear delay character between inputs and outputs system. This network is able to converge quickly in 5 training steps. The mean square error value reduces to 3.495e-006 in 50 steps. Inspection shows that the neural networks DTNN identification model can fit the I/O character of the magnetic bearing supporting system within a permitted error range. This paper proposes a new approach for magnetic bearing system modeling

A Formal Framework of Coalition Formation and Rational Collaboration in Multi-agent System

Yao-Hai Lin, Shan-Li Hu, and Jian-Bin Luo. *Member, IEEE*

Abstract—Both coalition formation and modeling rational agents with in BDI-architecture are important direction in multi-agent system research. We have define the organizer of the system, and then both constraint to the coalition and the mental attributes of each agent are taken into account. Furthermore, after import some concepts of ATL, the coalition in our system can act rationally in an open system.

Index Terms—Alternating-time Temporal Logic(ATL), Believe-Desire-Intention (BDI), Multi-agent, Request.

Agent-based IDSS Model for Car Flow Forecast in Railway Network

DU Yanping , LI Xuewei

Abstract—Forecast results of car flow can be used to adjust the car flow in the railway network, which can ensure the reasonable distribution of the car flow, and realize the optimum allocation of transportation resource and avoid the overstocking and jaming in the railway line. The present manual method for the forecast of car flow has not adapted the devopment of railway modernization for it has many problems in accuracy and level. So, an Agent-based IDSS model of car flow forecast has been established in the paper, and the Agent-based model structure and its realization have been put forward. The model can not only provide the full and exact information service and decision support for all levels transportation administrator and improve the automatization level of train dispatching, but also balance the transportation ability of all main line effectively. So the realization of the model can obtain the obvious society benefit and economy returns(The revenue will be increased by three to four billion each year).

Index Terms—Agent, Agent-based, forecast of car flow, intelligence decision support system (IDSS)

DMEA: A New Multiobjective Evolutionary
Algorithm Solving Dynamic Constrained
Optimization

Chun-an Liu, and Yuping Wang

Abstract—A new approach to dynamic constrained optimization problems (DCOPs) is proposed. First, we divide the time period of DCOPs into several smallest equal sub-periods. In each subperiod, the DCOPs is approximated by a static bi-objective optimization problem, in which one objective is the original objective of DCOPs, and the other is the degree violation of constraints on the fixed time (environment). Thus, the DCOPs is approximately transformed into several static bi-objective optimization problems defined in different subperiods. Second, a new multiobjective evolutionary algorithm is given based on a new selection operator which needn't judge whether the selected solutions are feasible. The numerical experiments show that the proposed algorithm is effectiveness to DCOPs.

An AIS based Multi-Agent Fault Diagnosis
System

Bing Wu, Shibo Xiong., and Jian Lin

Abstract—A multi-agent system (MAS) is usually used in cases where the problem is complex, data is decentralized, and computation is asynchronous. And the complexity, capability, and robust nature of natural immune systems make artificial immune systems an inviting choice as a platform for developing fault diagnosis systems based on MAS. These properties are pertinent to fault diagnosis systems. In this paper, a novel approach to AIS based MAS fault diagnosis methodology for complex system is presented. The diagnosis scheme consist three kinds of agents: detecting agent, vaccine generation agent and interface agent. Through the three kinds of agent cooperating, it is proved that the system has the capabilities of robust, continuous study and effectiveness.

Index Terms—Multi agent system, Artificial immune systems, Real-value negative selection

Cooperative Inter-Domain Distributed Resource
Allocation Using Stackelberg Game

Peng Li Sheng Wang, Tongyan Li

Abstract—Multiprovider inter-domain resource allocation can be modeled using game theory, since the ISPs act as selfish agents always trying to maximize their revenues. In this paper, we present a new distributive resource allocation framework based on the concept of *Stackelberg* game theory and *dual decomposition*. We show that the hierarchy structure game jointly achieve the global optimization through distributed method without any sensitive internal information revealed (such as network topology or self utilities). Under the scheme, we suggest a scalable algorithm for ISPs to implement its policy in a distributed way. And more importantly, our approach is provably *Fair* and *Pareto-efficient*. Our scheme and application of game theory between ISPs provides a new, promising direction in distributed algorithmic design, which has heretofore been focused mainly on multicast and ad-hoc network.

Keywords—inter-domain, stackelberg game, distributive, nash-equilibrium, pareto-efficient

The force gauge data processing system based on
Pipes and Filters pattern

Cuijuan Ye, Jianming Liao, LinLiang Mei, Guoming Lu, Hui Liu

Abstract—The force gauge data processing system is a typical data flow processing system. This paper introduces the communication protocol between the force gauge and the data processing system. In addition, it introduces the definition and the main feature of the Pipes and Filters pattern. In the end, designs and implements the system based on it.

Keywords—communication protocol 、 Pipes and Filters pattern、 data flow processing system

An Integrated Security Architecture Basing on Artificial Immune System for LAN

Guo Jiandong, Qin Zhiguang , Guo Jianxin

Abstract—Artificial Immune System (AIS) has been used successfully in information security, especially intrusion detection system (IDS). In this paper, an integrated security system based on AIS (ISS-AIS) is been constructed. The goal of ISS-AIS is acquiring efficient and high security of a LAN. The architecture of ISS-AIS is described. Security server, AIS switch, AIS agent and antibody library are proposed as main components of ISS-AIS. The ISS-AIS is a project being developed.

Index Items— Security, integrated, architecture, artificial immune systems.

P2P Traffic Inspection and Identification Based on Transport Layer

Li Yan, Xiaofeng Gu, JianPing Li, Yujie Hao, Xiaoming Wang

Abstract—With its own unique advantages, Peer-to-peer (or P2P) system has gained tremendous momentum in recent years. Their applications become more and more extensive. P2P is used in large-scale, which has facilitated the development of the technology used in network and challenged the use of network bandwidth. Particularly, the application of large-scale audio/video file sharing system and software based on P2P consumes a large fraction of bandwidth resource, and even causes network congestion and decrease of the performance of other businesses. Thus, to ensure the Quality of Service of other normal businesses, a reliable method of inspecting and identifying P2P flows and controlling the consumption of network bandwidth of P2P flows is highly demanded in this paper, we proposed a novel method which can inspect and recognize the P2P traffic based on Transport Layer. With the method, we can control P2P traffic more efficiently.

Index Terms—P2P, Traffic Inspection, Deep Packet Inspection, Connection Pattern , Quality of Service

An Ant Colony Optimization for Partner Selection in Virtual Enterprise

Z. B. Jiang, Y. Gao, Y. S. Ding

Abstract—Partner selection is one of the core problems in the phase of virtual enterprise (VE) creation, since the selection of right partners is crucial to the success of VE. To effectively solve the partner selection and optimization problem in VE practice, a mathematical model with the objective of minimizing the total manufacturing cost of tasks within the due date is discussed in this paper. As the objective formulation is not continuous and differential, it cannot be solved exactly by integer programming, an improved ant colony optimization algorithm (IACO) is proposed to solve the problem. A crossover operator which is usually used in genetic algorithm (GA) is introduced into IACO, so it can improve the search ability of ant colony and make consequently solution better. Finally, an illustrative example is presented to show the efficiency of the algorithm.

Index Terms—Ant colony optimization (ACO), Crossover operator, Partner selection, Virtual enterprise

Finite Element Analysis for Crack Creation in
Vibratory Metal Machining

G.J. Chen, X.L. Liu, L.Z. Gu, D.Z. Yang

Abstract: Insight into the machining mechanism, crack creation and the chip formation in metal vibratory cutting has yet to be carried out for this technique to be used widely and efficiently. The large-scale FEM software, ANSYS, is utilized for the crack creation process and for the quantitative analysis. Contrast and comparison experiments between vibratory and the conventional metal machining is done, revealing a good agreement between the simulation and the experiment and the inborn nature and the principles of the vibratory metal cutting. The fracture impact resistance in the crack tip zone becomes much lower than that in conventional cutting, other conditions being equal. In this case smaller force is required to have deformed the metal plastically and make the fracture occur. Results will be used for the aspects of the basis for workshop operation.

Key words: Finite element analysis, Computer simulation, vibratory metal machining, Crack, ANSYS

Identification and optimal control of tomato
respiration through pre-storage heat treatment

Kang Tu, Tetsuo Morimoto and Yasushi Hashimoto

Abstract: Suitably applied pre-storage heat treatment (35~45°C) can maintain better fruit quality by delaying the ripening process of fruit during storage. The respiration rate of treated fruits remains lower compared with non-treated fruits during subsequent storage. In this paper, the temperature was the control input, varying from 5~40°C, and the quality changes of tomato fruit were indicated by fruit respiration rate, which was monitored as the output. The purpose was to minimize the respiration by the temperature (e.g. pre-storage heat treatment). An objective function was given by the reciprocal number of the average value of the respiration. The dynamic change in the respiration, as affected by temperature, was first identified using neural networks. The neural-network model showed good agreement with the observed responses of respiration. Optimal control of the respiration was then carried out, aiming to reduce the respiration as much as possible. For convenience, the control process was divided into 1-steps. The optimal 1-step set points of temperature which maximized the objective function were obtained using genetic algorithms. Optimal values were obtained under several different constraints of the temperature.

Index terms: Heat treatment; Tomato respiration; Optimal control

Generalizing TOPSIS Method for Multiple Attribute Decision
Making in Intuitionistic Fuzzy Setting

Gui-Wu Wei and Hai-Bo Cao

Abstract—The aim of this paper is to investigate the multiple attribute decision making problems with intuitionistic fuzzy information, in which the information about attribute weights is completely known, and the attribute values take the form of intuitionistic fuzzy numbers. A modified TOPSIS analysis method is proposed. Then, based on the traditional TOPSIS method, calculation steps for solving intuitionistic fuzzy multiple attribute decision-making problems with known weight information are given. The weighted Hamming distances between every alternative and positive ideal solution and negative ideal solution are calculated. Then, according to the weighted Hamming distances, the relative closeness degree to the positive ideal solution is calculated to rank all alternatives. Finally, a practical example is used to illustrate the developed procedures.

Index Terms—multiple attribute decision-making; TOPSIS; intuitionistic fuzzy numbers

Design and Accomplishment of Intelligent
Control on Learning Process for ICAI

Xiangli Huang

Abstract—First, the method and algorithm suitable for programming of obtaining optimal instruction sequences were provided based on knowledge structure and the student's knowledge level in this paper. Then the design of instruction rules were given. Finally, the application of the method in an intelligent computer assisted instruction system was summarized.

Index Terms—fuzzy hypertext, ICAI, instruction scheme.

Traffic model analysis for anomaly detection
Zonglin. Li, Guangmin. Hu and Ruqiang. Zhou

Abstract—Traffic modeling as one of the ways to describe the normal behavior of network traffic is used to detect anomaly. Due to the self-similar model and multi-fractal model are inherently unable to capture the nature of traffic data in all time scales, we propose a novel anomaly detection method based on IDC model analysis to describe the characteristic of traffic data more accurately. By studying the influences of anomalous traffic on the estimation of IDC model through wavelet transform modulus maxima, a cumulative deviation is defined to estimate abnormal behavior. The simulation results show that our method is more sensitive to small anomalous traffic than detection methods based on H parameter analysis, and can accurately detect the anomalies which would not cause the Hurst parameter change evidently. Therefore, it is suite for the early stage detection of anomaly traffic.

Index Terms—anomaly detection, cascade model, wavelet transform modulus maxima (WTMM)

Neural Network of Three_Valued System
Diagnosis Model

Dan Qi , Ting-Hong Yang , Chun-Lin Wang

Abstract—This article discuss how to has used some small neural networks to structure three_valued system diagnosis model, and propose the insertjng to structure the neural network, and make use of this method in the system diagnosis, and proposed a new diagnosis algorithm, effectively has solved the system diagnosis problem

Voice call seamless handover of WiFi-GSM dual
mode terminal

Hesheng Wang, Jun Wen

Abstract—FMC (Fixed and Mobile convergence) is the development trend of telecommunication. How to realize the handover between the WiFi domain and GSM domain is one of the key problems of FMC. This paper not only describes the basic call model of WiFi-GSM in WiFi and GSM network, but also gives the VOIP and IN(intelligence network) technique to realize the handover between GSM and WiFi network.

Index Terms—WiFi-GSM; Handover; Anchor; Server;

Application in Data Safety Analysis Based on
Grey Theory of Data Mining

QU Zhi-ming, GAO Hong, and MA Nan

Abstract—Using the theory of grey system, data mining technology and radial basis function (RBF) neural network method, a new model, the combined model of grey system and RBF neural network, is setup, which aims at solving the user's received data safety analysis. The results show that, in short-term prediction of data safety, GM is an effective way and RBF has perfect ability to study and map. The combined model of grey system and neural network, to a large extent, has the dual properties of trend and fluctuation under the

condition of combining with the time-dependent sequence data. It is concluded that great improvement comparing with any method of trend prediction and simple factor in combined model of grey system and neural network comparing with the any model of grey system and RBF neural network in data safety analysis.
Index Terms—data mining, data safety analysis, grey system, radial basic functions neural network

Optimal Genetic Fuzzy Obstacle Avoidance Controller Design of Autonomous Mobile Vehicle

Wu Yihu, Zhang Yang

Abstract –In order to avoid obstacles efficiently and reach the goal quickly under multi-obstacle environment, we studied the path planning question of autonomous mobile vehicle (AMV) based on ultrasonic sensor information by combining genetic algorithm with fuzzy logic control. Firstly, the dynamic model and kinetic equations of AMV were constructed. Secondly, according to the number of obstacles, the avoiding behavior and rules were presented, moreover, the obstacle-selecting and avoidance rules and flow chart of AMV under multi-obstacles environment were also proposed. Based on above, we designed a fuzzy controller to modify the moving direction of AMV by defining or establishing input variables, output variables, fuzzy membership functions, fuzzy rule base including 25 If-Then fuzzy inference rules and defuzzification method. At last, a genetic algorithm was added for optimal searching parameters which includes the 5×5 consequent variables of the control rule table, the searching parameters, the bottom parameters of triangular membership functions and scaling factors. By setting the total route length as the target function, we founded the optimal genetic fuzzy controller for various obstructive environments through Matlab 6.5 simulation. The simulation results show the optimal controller under obstructive environment has better adaptability and passes shorter route in complex environment.
Index Terms –Autonomous mobile vehicle (AMV), Genetic algorithm, Fuzzy logic, Path planning, Ultrasonic sensors

The Application of Fuzzy Direct Torque Control for Permanent Magnet Synchronous Motors

Tan Kejun Luan Xiuzhen

Abstract – In order to resolve the problem of big torque ripple in direct torque control of permanent magnetic synchronous motor (PMSM DTC), a PMSM DTC method based on fuzzy control is proposed. The hysteresis controllers in conventional PMSM DTC were replaced by a fuzzy controller. The torque error, stator flux linkage error and the stator flux vector angular position are all properly fuzzified into several fuzzy subsets, so that a more suitable space voltage vector can be selected to minimize the torque and flux linkage ripples. The simulation results show that both the dynamic and steady state performances of PMSM are improved based on this fuzzy DTC.
Index Terms –Direct torque control, Fuzzy logic, PMSM

Heterogeneous Data Sources Integration Based on Web Services

ZHU Tao, CHANG Guo-cen ,GUO Rong-xiao

Abstract - With the rapid advance of network and computer technology, sharing and integration of heterogeneous data sources are urgently needed in the military information construction. As the information resources are enormous, various and heterogeneous, it becomes increasingly important to provide an integration platform for realizing information sharing service. In this paper, we build on the technology of Web Services to propose a model of Heterogeneous Data Sources Integration (HDSI), which has four layers including the application layer, global operation layer, local operation layer and data sources layer. To achieve the "transparent access" and "plug and play" of heterogeneous data sources, we adopt the methods of "type mapping" and "remote configuration" via the Web, which has been testified high performance and favourable feasibility in the application.

Index Terms - Web Services, Heterogeneous Data Sources Integration, Type Mapping, Remote Configuration.

The Application of Data Mining Technology in
Oil and Gas Pipeline Security Management

Zhen Zhang, Zhuxin Li, Jianke Guo

Abstract—SQL Server 2005 data mining technology and its function was introduced in this paper. Besides, SQL Server 2005 data mining process was presented in detail. The realization of data mining technology on SQL Server 2005 in oil and gas pipeline security management also be discussed. Based on SQL Server 2005, mining and study to oil and gas pipeline accident data resource, the hope was to provide a certain help for the oil and gas pipeline security management.

Index Terms—SQL Server 2005 Data Mining Oil and Gas Pipeline Security Management

Fuzzy Control System Based on GA Optimization for
Shipborne Crane System

Peng Li, Liu Lei and Haixia Gong

Abstract - The multi-joint shipborne crane system worked in the sea is researched in this paper. It is affected by many kinds of disturbance. The basic fuzzy control's adaptable capacity to the variation of environment conditions and system's parameter with time is not very good for this system. In order to improve the controlled system's robustness and its response characteristic, the parameters of the fuzzy membership function be optimized automatically according to the genetic algorithm (GA) encoded by matrix individual was designed. The designs of controller and optimization algorithm are introduced. The meaning of the optimized parameters is clear. The simulation of the shipborne crane system was completed. The control features of this system are largely improved comparing to the basic fuzzy control.

Keywords: Fuzzy control, Genetic algorithm (GA), Shipborne crane, Intelligent system.

The Confidence bba from the Expert

Hu Xiao-xuan Fu Chao

Abstract -- When the Dempster-Shafer theory (DST) is used to solve real-world problems with subjective characteristics, the rational agent (RA) and the confidence measure (CM) are two factors worthy of researching for the basic belief assignment (bba), the applied foundation of DST. Based on the rational constraint, the basic properties of bba, the conflict between bbas, and the consentaneous distribution rule, we present the quantitative definition of confidence bba.

Flaws Tested by Ultrasonic Base on Wavelet and
Fuzzy Pattern Recognition

Yonggang Zhao, Ze Zhang and Zhiqi Gao

Abstract—The problem of flaw classification in ultrasonic testing has not been solved so far. According to the echo signal of ultrasonic detection taking information of interface bonding quality, a method of flaw classification based on the combination of wavelet transform with fuzzy pattern recognition was presented. Method of extracting characteristic values reflecting the flaw properties using wavelet transformation and the

method of quantificationally recognizing the characteristic values using the principle of closeness optimization of fuzzy pattern recognition were studied. An experimental system was used to test the method above. The experimental results show that by this method human effects on quantificational recognition of flaws can be reduced greatly and the better accuracy of flaw classification can be obtained.

Index Terms—Ultrasonic testing, Simulation model, Wavelet analysis, Fuzzy pattern recognition.

Application of flow forming on developing
new generation of GM GF6 product

Liu Changhong, Liu Xintian, Zhao Lihui, Zhao Xiaoyong, Huang Hu, Sun Xinyi

Abstract—Through the experiment of GM new generation GF6 product flow forming, the influences of blank heat-treatment, size&surface defect of blank, parameter of roller, feed-rate, ect-on the process and product quality were studied systematically. Experiment results indicate that, through take the measurement such as soften blank material, correctly design the parameter of mandrel, rollers and CNC program, strictly control quality of blank, and it is possible to make complex, high precision housing with inside spline of AUTO drive part.

Index Terms—Power flow forming, Inner spline, Process

H_∞ Robust Controller Design of Direct Drive Ring PM
Motors used in NC Rotary Table

Jiakuan Xia Ting Dong Chengyuan Wang Zhen Lin

Abstract - Compared with traditional gear-driven system, the control performances of the permanent magnet (PM) torque motor used in direct drive numerical control (NC) rotary table are influenced by the disturbances mainly derived from motor itself, variable load rotary inertia and uncertain cutting force. Aimed to deal with above problems, the H_∞ robust controller $K(s)$ is designed in this paper, which can restrain the load disturbances and not depend on the accurate mathematic model. The controller $K(s)$ is designed based on the generalized plant $G(s)$ which is composed of the nominal plant and three weighting functions. And regard the H_∞ norm of linear fractional transformation of $G(s)$ and $K(s)$ as suboptimum objective, the H_∞ robust controller $K(s)$ can be obtained by selecting the weighting to optimize the controller parameters. Simulation results show that the proposed H_∞ robust controller can make the ring PM torque motor operate smoothly and be robust to the load torque disturbance, so the proposed robust speed controller meets the requirements of torque motor servo system used in direct drive NC rotary table.

Wavelet analysis for hydrology of Youshui

Bai-junkui

Abstract—T This paper inquiry into Youshui r hydrology under intersect influence of periodical weather variety and earthquakes, seek regularity of weather and earthquake and get efficient prevention and do good for their estimation, give substantial andnational minority literature research by solid example usage as regional evidence and certification combine with wavelet analysis and earthquake theory, geology and dynamics, benefit to social national minority humanities making, all these have innovation. **Index Terms**—Youshui, hydrology, weather, earthquake, social humanities

Study of a Frame Structure of Active
Network Management System

Ma Yan, Qiu Yu-hui, Zhang Ju-Hua

Abstract--The traditional prototype of network management does not accommodate to the management of active

networks, it cannot utilize the distributed copulation capabilities that active networks provides. This paper analyses the structure and mechanism of the active network management system, introduces a pattern of active network management, and studies the structure, management mechanism. The paper also studies the network topology discovery and traffic.

Keywords--Active Network Management; Active Node;Active packet; Algorithm

A Novel User Group Forming Model

Weihong Wang, Yuhui Cao

Abstract—Aiming at the mobile user collaboration issue in mobile collaboration computing environment, a novel model, named MUGFM (mobile user group forming model), was proposed. Based on the discussion about the cooperation requirement and cooperative ways of mobile user, the spatialtemporal factors and collaboration interest of cooperative mobile user were taken as the mainly matter formed the mobile collaborative group, under the specific character of mobile computing environment. Compared with previous user model, the MUGFM is more embodying the essence characteristic of mobile users in a mobile collaboration group, because of the collaboration interest of cooperative mobile user was been considered. So, the MUGFM fit to the specific situation of mobile collaborative computing environment more than others. Nowadays, the MUGFM was applied to the platform building that support the mobile collaboration services. The result indicated that the model has the correctness semantic and the ability depicting effectively the formulation mechanism of mobile collaborative group in mobile collaboration.

Keywords:- Mobile Collaboration; Mobile Computing; User Group Model

Research on Database Managing System Through Middleware

Li Tingjun¹, Qiu Libo¹², Zhu Aihong¹, Xu Jin¹

Abstract—A way of establishing user developing information management for database access through middleware is introduced. We put the data needed for share on the LAN so that users on the LAN can access the data according to the given authority to realize resource share. Yet, the system can be realized on the Internet. The shared data can be accessed through broadband or Internet telephone to extend the scope of system application. Through changing relevant configuration, the development interfaces provided by the middleware can be kept unchanged and the system developed by users can also be kept unchanged. It reduces the work of user's development. The progress and performance of entire system can be improved by letting the professional computer programmer to accomplish.

Index Terms—database; Middleware; access

Intelligent Control of Robotic Elbow Joint based on RBF Neural network

Chao Xie, and Luyuan Liu

Abstract—This paper proposed a robotic elbow joint intelligent control method based on Redial Basis Function neural network(RBF_NN), which is capable of tracking the desired trajectory with high accuracy. Dynamics of robotic joint and design of the RBF-NN-based controller is formulated. A lot of simulations are conducted, and the simulation results have shown that the control strategy is feasible and efficient.

Index Terms—Redial basis function, Robotic elbow joint, Intelligent control

The Design&Simulation Platform for the C2 System of Fleet

Wen wei, Fang wei, He you, and Huang xiaodong

Abstract—The development of the Command and Control System of Fleet(C2F) is a complex process which

needs deep-going research and continuous optimization, and its command relations, info-flows and components have the requirements for future recombination and reconstruction, so it is necessary to use an effective design and simulation platform to help fast designing, amending and validating. This paper introduces such a kind of platform serving for the development of C2F, at the one hand, it supports smooth transition between various phases and seamless integration of miscellaneous models by offering manifold design views, modeling methods and model expressing ways, at the other hand, it supports the fast design and validation of the application systems via offering simple, professional, expandable and automated tools set.

Index Terms— Automation, Command&Control System of Fleet, Modeling, Intergration, Simulation,

The develop of the bombdisposed robot remote
control system base on embedded computer PC104

Fu Wei Giang Liangzhong Bian Qingqing Yang Jin

Abstract - Armed at solving the problems appeared in researching remote control system of the bomb-disposed robot, a five-DOF manipulator and two directions of the freedom are produced, and the manipulator joint angle of the geometric method is given which avoided finding the solution of inverse process of the kinematics. Have applied the RTW code to generate a software , built the target system of xPC Target , used data transfer station , realized parallel working between master control PC machine and embedded computer PC104 , structured bomb-disposed robot servo control system at a distance. The scheme is feasible demonstrated by experiments that include landscape orientation snatching ,portrait snatching fluctuation snatching and so on.

Key words: bomb-disposed robot, remote-controlled operation,
servo control, embedded computer PC104

Non-overshooting Fuzzy-PID Controller for
Temperature Control Systems

Cao Jie, Zhang Yong-wei

Abstract—A fuzzy PID control strategy is brought forward for typical temperature control system, which can save the investment on equipment and achieve the least set time on condition that it does not overshoot. To adapt to the mentioned instance, it improves the traditional fuzzy control strategy and the tuning of PID controllers. Simulation results show that the solution of the controller design is simple, practical and effective.

Index Terms—Fuzzy control, Non-overshooting, PID control, Temperature control.

Study on the Temperature Drift Rejection of Gas
Sensor Array

ZHANG Min

Abstract—Semiconductor gas sensors have the inherent problem of drift, which would emerge obviously with the changing of the circumstance temperature. Temperature sensor, and humidity sensor could be added to the gas sensor array to monitor working circumstance of the gas sensors. A series of temperatures was set by a thermostat employed in the experiment system, 20 gas samples (ten for each concentration) were prepared and the response of sensors to these gas samples was sampled. Two different artificial neural networks were used to recognize samples. The response of temperature sensor was introduced into the original networks and eliminated the misjudgments. Drift was suppressed to some extent and the performance of networks was also improved, which eventually verified the validity of the method for temperature drift rejection.

Index Terms—artificial neural network, gas sensor, temperature drift rejection, temperature sensor.

Automatic Test Solution for Interrupt-driven
Based Embedded Software

Mei Gong, Yue Wu

Abstract—The optimization of test process can bring notable effect on the whole control of quantity, cost and period of embedded software. In this paper, the characteristics and test requirements of interrupt driven based embedded software are analyzed first, subsequently, the design and implementation of a distributive automatic test solution is presented respectively. Finally, both advantages and disadvantages of automatic test in embedded software test are presented.

Index Terms—Software test, Interrupt driven, Embedded software, Automatic test solution

Linguistic Multiple Attribute Decision Making
Method by Closeness to Ideal Point

Gui-Wu Wei and Hai-Bo Cao

Abstract—The aim of this paper is to investigate the linguistic multiple attribute decision making problems with incompletely known weight information. An optimization model is established to determine the attribute weights. Then the linguistic weighted arithmetic average (LWAA) operator is utilized to aggregate the linguistic variables corresponding to each alternative, and then the alternatives are ranked by means of the aggregated linguistic information. Finally, an example is shown to highlight the procedure of the proposed algorithm.

Index Terms—Multiple attribute decision making; Linguistic variables; Attribute weight; Linguistic weighted arithmetic average (LWAA) operator

Efficient Bayesian Network for Music Style
Classification

Yan Fu, Liu Lin, Junlin Zhou, Li Rong, Zhang Lin

Abstract—Music style classification for commercial audience recommendation has become a promising application in computational auditory analysis. This fact raises the question of whether there is a classifier with sufficient efficiency and simplicity to confront the great magnitude of music on the internet. In this paper with careful comparison with famous Neural Network classifier, we develop one easily-conceived and efficient algorithm to fulfill this request. In our method Naive Bayesian Network (NBN) is chosen as music style classifier. After examining and evaluating the conventional auditory features, we obtain eight important features to construct the specific NBN structure for this special classification, and find all the eight features could sufficiently determine the essential elements of music styles. The result from our NBN classifier, compared with that from Neural Network one, demonstrates that considerable improvement on efficiency and simplicity of music style classification could be achieved.

Index Terms—Classification, Music Style, Naive Bayesian Network

A quasi-human heuristic algorithm for the
container loading problem

Duanbing Chen, Wenqi Huang

Abstract—This paper presents a quasi-human heuristic algorithm (QHHA) for the container loading problem with boxes of different sizes and a single container for loading. The objective is to maximize the volume utilization of the container. Two important quasi-human strategies are considered in the algorithm proposed. The first is the maximum caving degree principle, the other is the minimum edge degree principle. The performance of the algorithm is evaluated by LN and BR test problems. For these two test problems, the average volume utilization of the container achieved by the algorithm presented is 70.6% and 88.73% within reasonable runtime, respectively. Experimental results demonstrate that the algorithm proposed is fairly efficient for solving the container loading problem.

Index Terms—Container loading problem; Quasi-human heuristic; Caving degree; Edge degree; Corner-occupying action

Introducing Dendritic Cells as a Novel
Up-Regulation Immune-Inspired Algorithm for
Intrusion Detection

Xue Li and Haidong Fu

Abstract—The research into intrusion detection system (IDS) based on immunology has shifted from the negative selection algorithm to a novel concept, the Danger Theory (DT). Dendritic Cells (DCs) are professional antigen presenting cells in innate immunity that perform the central role of sensing infection situation and coordinating T cells behavior. DCs play an integral part in incorporation of DT into responsive IDSs. To illustrate how the functionality and control mechanism of DCs can be harnessed to solve real network traffic problems, the DCs inspired Model (DCML) for intrusion detection is presented. Introducing interaction between DCs and memory T cells to sense danger is a highlight notion in DCML. Additionally, using multiplicity of signals for input into the final decision increases robustness and effectiveness of IDS. **Index Terms**—Danger Theory, Artificial Immune System, Intrusion Detection, Dendritic Cells

On knowledge management in fish disease
diagnosis expert system

ZHANG Jian, FU Zetian, Tian Dong, ZHANG Xiaoshuan

Abstract—Efficient knowledge management is one of the central challenges for the successful construction and following use of expert system. This paper presents a framework of knowledge management in Fish-expert. The main benefit is high improvement and facilitate in the precision. At present the version of fish-expert V2.0 has been successfully used for some areas in north of China. Compared with the first version, the amount of rules had decreased from 1890 to 312 and the reasoning speed and veracity had been promoted from 1 second to 0.5 second and 85% to 95% or more separately. The result indicates that Fish-expert performance is at least as good as the average of the human experts but can be promoted in the parasite identifies. **Index Terms**—knowledge management, fish disease diagnosis, expert system, China.

