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A Survey of 3D Document Corpus Visualization

X. Fang, C. Jacquemin, F. Vernier and B. Luo

This study proposes a survey on it mainly around 2 functions units in the visualization pipeline: spatial layout and interaction. For the former, 4 layout styles (node-link, cluster, virtual widget and miscellaneous) and 2 augmentation types (focus+context, photo-realistic rendering) are introduced and, for the latter, 4 interaction styles of (3D walkthrough, filter, specification placement and annotation) and 2 augmentation types (multimedia and animation) are also suggested. In addition, 7 application areas are also provided to present some interesting findings study and future directions. (*Information Technology Journal 8 (1): 1-15, 2009;* ***doi:*** *10.3923/itj.2009.1.15*)

Visualization Systems Supporting the Reading of ArabicDocument for non Arabic Speakers

R.J.R. Yusof, R. Zainuddin, M.S. Baba and Z.M. Yusoff

This study addresses a reading comprehension problem and visualization as the suggested solution. When one read, one would intend to understand the text being read. It is absolutely an exception in the context of one Arabic document called the Quran. Thus, visualization techniques are then useful to support the understandability of the document for non-Arabic speakers such as the Malaysian and Indonesians. Descriptions and review of four prototype systems that use visualization techniques: scatter plot, trivariate plot, network diagrams, directory approach and hyperbolic. This study discusses reading and visualization theories, the problems encountered while reading the Arabic document (the Quran), comparative discussions on the prototype systems and functional requirement proposed to enhance the prototype. (*Information Technology Journal 8 (1): 16-27, 2009;* ***doi:*** *10.3923/itj.2009.16.27*)

An Energy Efficient and Balance Hierarchical Unequal Clustering Algorithm for Large Scale Sensor Networks

Y. Wang, T.L.X. Yang and D. Zhang

Organizing Wireless Sensor Networks (WSN) into clusters enables the efficient utilization of the limited energy resources of the deployed sensor nodes. However, the problem of unbalanced energy consumption exists and it is tightly bound to the role and to the location of a particular node in the network. The so-called hot spot occurs when cluster heads closer to the sink node are burdened with heavier relay

traffic and tend to die much faster. To mitigate or avoid the problem, the Partition Energy Balanced and Efficient Clustering Scheme (PEBECS) has been proposed, which divides the entire WSN into several equal partitions reasonably and groups the nodes into clusters of unequal sizes. Cluster heads in these partitions closer to the sink node have smaller cluster sizes than those farther, thus they can preserve some energy for the inter-cluster communications. Further, the cluster heads are elected by using a node-weight heuristic algorithm, where the node's residual energy, the node's degree difference and the relative location in WSN are considered, such that more balanced load is achieved. Simulation results show that PEBECS outperforms significantly in optimizing the cluster heads' energy consumption, balancing the nodes' energy consumption, prolonging the network lifetime and improving the network scalability.(*Information Technology Journal 8 (1): 28-38, 2009;* ***doi:*** *10.3923/itj.2009.28.38*)

Application of the Two-Axle Robot Tracing Object System with Multithread Control Technology

K.C. Chen, K.S. Hsu, M.G. Her and M.C. Chiu

The main aim of this study is to promote the efficiency of a control system using a multithread digital control design. In this system, the management of a computer's input and output information is handled appropriately by the program language. The multithread digital control design is used in the robotic arm's tracking system. The advantage of this multithread digital control design is to activate each procedure running simultaneously when the transient overload of the information's input and output in the control system occurs. Therefore, the time run in the multithread system will be shorter than that run in a traditional single thread system in which each procedure is lined up for running. In this study, case studies of multithread application used in image tracking and robot control are introduced. The results reveal that the speed of the tracking system can be improved by using the multithread technique under an immediate procedure plan. (*Information Technology Journal 8 (1): 39-48, 2009;* ***doi:*** *10.3923/itj.2009.39.48*)

A Multifunctional System for Supporting Collaborating Works and Decision Making

H.T. Lin

The objective of this study is to present a brainstorming-based multifunctional system which supports collaborating works on creativity activity and decision making. Brainstorming has been recognized as an effective group decision supporting approach. Go with the technology shift, brainstorming has been evolved

from traditional, electronic, to currently web-based version. There are advantages and disadvantages in each of version. The development of Information and Communication Technology (ICT) takes giant leap in last decade. In this study, a new version of brainstorming platform is proposed and constructed with multimedia and various ICT technologies. The objective of this proposed system is to keep and enhance the advantages of brainstorming approach and makes the disadvantages as few as possible. A comparison between several versions was made. This comparison shown that the proposed system is superior to others from system functions point's of view. A user satisfaction survey based on TAM model was conducted at a college in Taiwan. The result shown that these senior students felt this system was useful and easy to use for group creative tasks. (*Information Technology Journal 8 (1): 49-56, 2009;* ***doi:*** *10.3923/itj.2009.49.56*)

An Energy-Balancing Unequal Clustering Protocol for Wireless Sensor Networks

J. Yang and D. Zhang

In this study, a novel energy-balancing unequal clustering protocol (EB-UCP) for wireless sensor networks is presented. EB-UCP achieves a good performance in terms of lifetime by unequal clustering and balancing the energy load among all the nodes. An unequal clustering algorithm from probability view is employed to form clusters. Clusters closer to the sink node have smaller sizes than those farther away from the sink node, thus cluster heads closer to the sink node can preserve more energy for the purpose of inter-cluster data forwarding. In addition, the distribution of sensor nodes is deployed according to the energy-balancing layered algorithm and therefore the energy consumption in every layer is nearly equal. Finally, an energy-efficient data transmission mechanism on basis of the above is proposed. Simulation studies show that EB-UCP leads to more uniform energy dissipation and enlarges the lifetime of networks than EEUC (Energy Efficient Unequal Clustering) and LEACH (Low-Energy Adaptive Clustering Hierarchy). (*Information Technology Journal 8 (1): 57-63, 2009;* ***doi:*** *10.3923/itj.2009.56.63*)

A Comparison of Support Vector Machine and Decision Tree Classifications Using Satellite Data of Langkawi Island

H.Z.M. Shafri and F.S.H. Ramle

This study investigates a new approach in image classification. Two classifiers were used to classify SPOT 5 satellite image; Decision Tree (DT) and Support Vector Machine (SVM). The Decision Tree rules were developed

manually based on Normalized Difference Vegetation Index (NDVI) and Brightness Value (BV) variables. The classification using SVM method was implemented automatically by using four kernel types; linear, polynomial, radial basis function and sigmoid. The study indicates that the classification accuracy of SVM algorithm was better than DT algorithm. The overall accuracy of the SVM using four kernel types was above 73% and the overall accuracy of the DT method was 69%. (*Information Technology Journal 8 (1): 64-70, 2009;* ***doi:*** *10.3923/itj.2009.64.70*)

Data Discovery in Grid Using Content Based Searching Technique

R. Renuga and Sudha Sadasivam

The aim of this study is data discovery in data grid using content based search technique. This study models scientific data grid as a large peer to peer based distributed system model. Content based discovery mechanisms are applied for data discovery using this model. Grids tie together distributed storage systems and execution platforms into globally accessible resources. Data grid deals with large computational problems by providing geographically distributed resources for large-scale data-intensive applications that generate large data sets. Data grids provide collection management and global namespaces for organizing data objects that reside within a grid. This proposed mechanism has been investigated using the grid simulator gridsim. (*Information Technology Journal 8 (1): 71-75, 2009;* ***doi:*** *10.3923/itj.2009.71.76*)

Optimal Weights for Consensus of Networked Multi-Agent Systems

Xiang-Shun Li and Hua-Jing Fang

In this study, a way to design the optimal weights associated with edges of undirected graph composed of multi-agent systems is presented. The optimal weights are designed to make the states of the multi-agent systems converge to consensus with a fast speed as well as the maximum communication time-delay can be tolerated. The method used in our research is based on linear matrix inequality theory. The convergence speed which is determined by the second-smallest eigenvalue of graph Laplacian matrix is assumed to be a given value, at the same time the maximum communication time-delay which is decided by the maximum eigenvalue of Laplacian matrix can be got. In order to get required second-smallest eigenvalue and optimal maximum eigenvalue, the order of Laplacian matrix is reduced by variable decomposition. Moreover, designing the

optimal weights is equivalent to minimizing condition number of a positive-definite matrix. Simulation results are coincidental with theoretical analysis. (*Information Technology Journal 8 (1): 77-82, 2009; **doi:** 10.3923/itj.2009.77.82*)

Group-Based Unidirectional Proxy Re-Encryption Scheme

Chunbo Ma and Jun Ao

This study presents a unidirectional proxy re-encryption scheme for group communication. In this study, a proxy is only allowed to convert ciphertext for Alice into ciphertext for Bob without revealing any information on plaintext or private key. It is suitable for the environment in which no mutual relationship exists and transitivity is not permitted. Finally, this study proves the proposed scheme secure against chosen ciphertext attack in standard model. (*Information Technology Journal 8 (1): 83-99, 2009; **doi:** 10.3923/itj.2009.83.88*)

A High Precision Selective Harmonic Compensation Scheme for Active Power Filters

Geng Tao, Li Baoshen and Zhao Jin

This study proposes a high precision selective harmonic compensation scheme for active power filters, which compensates selective current harmonics detected by Kalman filter and harmonic current is tracked by a novel PI controller-recursive integral PI controller. As Kalman filter can detect each order harmonic separately, the compensation on delay time arouse from digital implementation is performed. Since traditional PI is subjected to inherent steady-state error, a recursive integral PI regulator is proposed to compensate for the harmonic current, which can eliminate steady-state error. The proposed scheme improves the stability of APF, prompts the precision of harmonic compensation and is applicable to both single phase and three phase inverters. The effectiveness of the scheme is verified by simulation. (*Information Technology Journal 8 (1): 89-94, 2009; **doi:** 10.3923/itj.2009.89.94*)

Logic Petri Nets and Equivalency

Y.Y. Du and B.Q. Guo

Logic Petri nets (LPN) can describe and analyze batch processing function and passing value indeterminacy in cooperative systems and its practical applications are shown with some nontrivial examples. This study focuses on the analysis of the

modeling power of LPNs and the equivalency between LPNs and Petri nets with inhibitor arcs (IPN). The equivalency is proved formally and a constructing algorithm of equivalent IPNs from LPNs is proposed based on the disjunctive normal forms of logic input/output expressions. Moreover, the size of an LPN model is smaller than that of the equivalent IPN model. (*Information Technology Journal 8 (1): 95-100, 2009; **doi:** 10.3923/itj.2009.95.100*)

Car Park System: A Review of Smart Parking System and its Technology

M.Y.I. Idris, Y.Y. Leng, E.M. Tamil, N.M. Noor and Z. Razak

Due to the proliferation in the number of vehicles on the road, traffic problems are bound to exist. This is due to the fact that the current transportation infrastructure and car park facility developed are unable to cope with the influx of vehicles on the road. To alleviate the aforementioned problems, the smart parking system has been developed. With the implementation of the smart parking system, patrons can easily locate and secure a vacant parking space at any car park deemed convenient to them. Vehicle ingress and egress are also made more convenient with the implementation of hassle free payment mechanism. With vehicle detection sensors aplenty on the market, the choices made may defer due to the different requirements in addition to the its pros and cons. Subsequently, the various sensor systems used in developing the systems in addition to the recent research and commercial system on the market are examined as vehicle detection plays a crucial role in the smart parking system. (*Information Technology Journal 8 (2): 101-113, 2009; **doi:** 10.3923/itj.2009.101.113*)

Smart Parking System using Image Processing Techniques in Wireless Sensor Network Environment

M.Y.I. Idris, E.M. Tamil, Z. Razak, N.M. Noor and L.W. Kin

This study aims to improve parking facilities by the introduction of a new Smart Parking Systems that would reduce empty parking space searching time. Most of the recent parking technologies relies on intrusive sensor to detect empty parking space and did not specifically guide patrons to specific parking lot. Therefore, the author proposed the implementation of Smart Parking System using image processing technique, Wireless Sensor Network (WSN) and shortest path algorithm in order to help patrons in finding vacant parking space. The pre existing security surveillance (CCTVs) will be used as a sensing nodes to identify vacant parking space. The captured image will be processed through the RabbitCore®

Microcontroller and the processed data will be transmitted via ZigBee® to a central computer to store and update the occupancy status of available parking space vacancies in the database. The system will automatically assigned a space to patrons using A-Star (A*) shortest path algorithm based on the point of nearest entrance of the building. The patron will be guided to the specified location by referring to variable massage sign and the map printed on the parking ticket. RFID technology will also be used to uniquely tag the reserved ID to the database. The information on the ID will be used to remind patrons of their parking location during payment upon leaving. (*Information Technology Journal 8 (2): 114-127, 2009; **doi:** 10.3923/itj.2009.114.127*)

Distance Based Outlier for Data Streams Using Grid Structure

Manzoor Elahi, Lv Xinjie, M. Wasif Nisar and Hongan Wang

This study deals with grid-based outlier detection method which can figure out most outstanding outliers from a high speed datastreams. It is capable to find outliers even with the evolution of datastream where there is a chance that object properties may change with the time. Grid structure used in this study can help to save number of extra calculations in case of nearest neighbor queries and can provide a solid platform for applying distance based nearest neighbor approach for finding outliers. Proposed grid based method efficiently partition incoming stream into chunks and store these chunks one by one into a fixed width grid structure for further processing. Each chunk of stream is processed with the combination of fixed width grid structure and distance based nearest neighbor approach. Through efficient pruning of safe regions, proposed method only needs to operate over the candidate regions for finding outliers. This method takes into account both, local and global view of outliers and assign score to each detected outlier and does not sacrifice the correctness of its results for fast processing time. Proposed method can operate faster, need limited memory resources, having low computation cost and found to be highly efficient for data stream environment. Several experiments on real and synthetic datasets show the effectiveness of proposed method. (*Information Technology Journal 8 (2): 128-137, 2009; **doi:** 10.3923/itj.2009.128.137*)

Parking Guidance System Utilizing Wireless Sensor Network and Ultrasonic Sensor

M.Y.I. Idris, E.M. Tamil, N.M. Noor, Z. Razak and K.W. Fong

This study introduces a new approach of parking system by using Wireless Sensor Network (WSN) technology equipped with ultrasonic sensors. The system also

implements shortest path algorithm to calculate the shortest distance from the parking berth to the nearest preferred entrance. The system operates by monitoring the availability of the vehicle berth and making the information collected available for patrons and car-park operator. The information gained from the detection sensor and calculation from the shortest path algorithm is used to guide patrons to parking berth. The car-park operators use the sensors' information to aid in overall management and planning. WSN is chosen since it enables reliable information gathering and measurement to be transmitted through wireless channel without having to install new cabling for network and electricity to reach each sensing device. (*Information Technology Journal 8 (2): 138-146, 2009;* ***doi:*** *10.3923/itj.2009.138.146*)

Assignment of External Off-the-Job Training Courses to Employees Using Genetic Algorithm

Rong-Chang Chen, Ting-Tsuen Chen and Wei-Luen Fang

The purpose of this study is to employ a genetic algorithm to solve the assignment problem of external off-the-job training courses. External off-the-job training offers many benefits to enterprises and thus is considered as a competitive weapon for many companies. With such understanding, planning and offering suitable training programs to employees is crucial. In this study, GA is employed as an analytical tool to allocate training courses to employees. The allocation is decided by a system which takes the employees' preferences as well as the fairness of the allocation into consideration. The use of GA in solving the problem shows that the complex problem can be well solved and suitable allocations can be made. In addition, the system constructed by our approach is also easy to use and can facilitate the allocation under many different kinds of scenarios of the company. (*Information Technology Journal 8 (2): 147-155, 2009;* ***doi:*** *10.3923/itj.2009.147.155*)

A Hybrid Heuristic Ant Colony System for Coordinated Multi-Target Assignment

Bo Liu, Zheng Qin, Rui Wang, You-Bing Gao and Li-Ping Shao

The aim of this study is to solve the target assignment of coordinated distributed multi-agent systems. Earlier methods (e.g., neural network, genetic algorithm, ant colony algorithm, particle swarm optimization and auction algorithm) used to address this problem have proved to be either too slow or not stable as far as converging to the global optimum is concerned. To address this problem, a new

algorithm is proposed which combines heuristic ant colony system and decentralized cooperative auction. Based on ant colony system, the decentralized cooperative auction is used to construct ants' original solutions which can reduce the numbers of blind search and then the original solutions are improved by heuristic approach to increase the system stability. The performance of the new algorithm is studied on air combat scenarios. Simulation experiment results show present method can converge to the global optimum more stably and faster by comparing the original methods. (*Information Technology Journal 8 (2): 156-164, 2009;* ***doi:*** *10.3923/itj.2009.156.164*)

Stability of Continuous-Time Vehicles Formations with Time Delays in Undirected Communication Network

Xiang-Shun Li and Hua-Jing Fang

This study mainly focuses on stability analysis of vehicles formations with time delays in the communication network. The network model with time delays of swarm vehicles for continuous-time systems is introduced. The vehicles exchange information according to a pre-specified (undirected) communication graph. The feedback control is based only on relative information about vehicle states shared via the communication links. Asymptotical stability of vehicles formations for both delay-independent and delay-dependent cases is analyzed. The sufficient conditions for vehicles formations stabilities are investigated based on tools from linear matrix inequality theory, algebraic graph theory, matrix theory and control theory. Finally, an illustrative example is used to show the validity of the theoretical results. (*Information Technology Journal 8 (2): 165-172, 2009;* ***doi:*** *10.3923/itj.2009.165.172*)

Integrated Approach of Reduct and Clustering for Mining Patterns from Clusters

A. Arora, S. Upadhyaya and R. Jain

In this study, a method is presented for selection and ranking of significant attributes for individual clusters which lead to formulation of concise and user understandable patterns. Cluster is set of similar data objects and similarity is measured on attribute values. Attributes which have same value for majority of objects in a cluster are considered significant and rest non significant for that cluster. Reduct from rough set theory is defined as the set of attributes which distinguishes the objects in a homogenous cluster, therefore these can be clear cut removed from the same. Non reduct attributes are ranked for their contribution in

the cluster. Pattern is then formed by conjunction of most contributing attributes of that cluster. (*Information Technology Journal 8 (2): 173-180, 2009;* ***doi:*** *10.3923/itj.2009.173.180*)

Independent Global Constraints-Aware Web Service Composition Optimization

Xianwen Fang, Changjun Jiang and Xiaoqin Fan

In semi-automatic service composition, developers should construct the process model according to concrete application requirement and then the instance services are bound automatically for every abstract task and make the composite service with optimal performance. This study presents independent global constrains-aware Web service composition method based on associate Petri net (APN) and genetic algorithm (GA). Firstly, an APN modeling methods which can describe multi-attribute multi-constraint relations and associate relation between component services is proposed. Secondly, combining with the properties of APN, GA is used to search a legal firing sequence with the biggest trust value in the APN model and the composite service corresponding to the legal firing sequence is the optimal solution. Finally, the experimental simulation is given out. Theoretical analysis and experimental results indicate that this method owns both lower computation cost and higher success ratio of service composition. (*Information Technology Journal 8 (2): 181-187, 2009;* ***doi:*** *10.3923/itj.2009.181.187*)

Analysis and Application on Rate-Distortion Model Oriented Scalable Video Sequences

Mande Xie, Guiyi Wei and Yun Ling

According to the characteristic of the existing main R-D models, these R-D models are firstly classified into three categories: analytic, empirical and semi-analytic. And then their quantitative performances are evaluated. After the performances of the existing main R-D models are in-depth analyzed and compared, some general rules are proposed to select the best model for a target system. On this basis, an algorithm for establishing the piece linear R-D model and a method of property analysis and modification are proposed according to the feature of Peer to Peer (P2P) video streaming media system. The experience results show the piece linear R-D model is accuracy and the method of property analysis and modification is validated. (*Information Technology Journal 8 (2): 188-194, 2009;* ***doi:*** *10.3923/itj.2009.188.194*)

Fuzzy Adaptive Proportional Integral and Differential with Modified Smith Predictor for Micro Assembly Visual Servoing

Linfeng Bai, Fugui Chen and Xiangjin Zeng

This study presents a control scheme based on fuzzy adaptive PID with a modified Smith predicator for the control of micromanipulation. For the vision delay, a timing modeling of visual servoing system is built. According to analysis for the position based dynamic look and move control scheme, the control scheme employs fuzzy PID with a similar structure to the Smith predictor called modified Smith predictor to eliminate the vision delay. The simulations and experiments show that the vision control system with the proposed control scheme has better dynamic performance than the vision control system with a single PID controller. The proposed control scheme resolves the problems of vision servoing's inherent time delay, which meets the requirements of micromanipulation. (*Information Technology Journal 8 (2): 195-201, 2009;* ***doi:*** *10.3923/itj.2009.195.201*)

Advantage of Digital Close Range Photogrammetry in Drawing of Muqarnas in Architecture

Murat Yakar, Haci Murat Yılmaz, Saadet Armağan Gülec and Mustafa Korumaz

In this study, conventional method and digital close range photogrammetry is compared in sample study for measuring and drawing of muqarnas which is common in architecture. One of the most significant advantages of close range photogrammetry in documentation is giving opportunity to measure buildings or part of the buildings especially very high, very low, dangerous, not accessible or very detailed like muqarnas or damaged. It is a big facility to measure required measurement of the parts of the building from the photograph. Its another important thing in documentation that these data can be used in the future again and they can be shared with other users and they are easy to store in computer. (*Information Technology Journal 8 (2): 202-207, 2009;* ***doi:*** *10.3923/itj.2009.202.207*)

Low Cost Quantum Realization of Reversible Multiplier Circuit

M.S. Islam, M.M. Rahman, Z. Begum and M.Z. Hafiz

Irreversible logic circuits dissipate heat for every bit of information that is lost. Information is lost when the input vector can not be uniquely recovered from the output vector. Theoretically reversible logic dissipates zero power since the input vector of reversible circuit can be uniquely recovered from the output vector.

Reversible computation has applications in digital signal processing, low power CMOS design, DNA computing and quantum computing. This study presents an overview of the well-known reversible gates and discuss about their quantum implementation. A new PFAG gate and its quantum implementation are presented. Finally, this study proposes a novel low cost quantum realization of reversible multiplier circuit and compares its superiority with the existing counterparts. (*Information Technology Journal 8 (2): 208-213, 2009;* ***doi:*** *10.3923/itj.2009.208.213*)

A Decomposition Based Algorithm of Graph Containment Query

Li Xian-Tong and Li Jian-Zhong

In this study, an algorithm ESGC is proposed to implement graph containment query problem, both exact and similar. The index of ESGC is built on two parts, the process of graph dataset decomposition and a hash table. The processing of graph dataset decomposition forms a structure which reduces the size of candidate answer set. And the hash table is composed by graph canonical code, through which the algorithm avoids subgraph isomorphism test during picking candidate answers out. The progress of the performance is coming from thus two parts. Experimental results illustrate that ESGC performs an efficient graph containment query and achieves right and entire answer set. (*Information Technology Journal 8 (2): 214-219, 2009;* ***doi:*** *10.3923/itj.2009.214.219*)

Core Optimization Simulation for a Pressurized Water Reactor

A. Hussain and C. Xinrong

In this study, a research has been carried out for the design of an optimal core configuration for a TRISO fueled compact sized PWR core. This is a light water cooled and moderated reactor that employs TRISO fuel particles in zirconium-sheathed fuel rods. The combination of PWR technology and TRISO fuel has been preferred for research to get the benefits of TRISO fuel in terms of enhanced integrity against the release of fission fragments and high negative temperature coefficient of reactivity in well proven PWR technology. This PWR design possesses additional safety features associated with the default design of TRISO fuel particle, which makes its use suitable even in a densely populated area. The designed core can be utilized for heating and desalination purposes or at any remotely located research facility. The current research study has been focused on the core configuration, instead of selecting one of the standard fuel lattices which are mostly being used in nuclear power plants; an inventive fuel lattice has been

suggested for the optimal design. The TRISO fuel particle size and fuel pitch have also been optimized to achieve a compact size core. Neutronic transport theory lattice code WIMS-D/4 was used for the calculation of group constants (D, Σa and $\nu\Sigma f$) and infinite multiplication factor (k_{∞}). This calculated data were used in diffusion theory code CITATION for the purpose of achieving effective multiplication factor (k_{eff}) and estimated life of the core. The detailed and thorough analyses revealed that core configuration plays a dominant role in determination of compactness and excess reactivity of the core. The amount of excess reactivity has been increased and core size has been condensed by designing an optimal core. (*Information Technology Journal 8 (2): 220-225, 2009;* ***doi:*** *10.3923/itj.2009.220.225*)

A New Localization Algorithm for Iris Recognition

Ghassan J. Mohammed, Hong Bing Rong and Ann A. Al-Kazzaz

This study presents a new localization algorithm for iris recognition. Iris recognition systems have received increasing attention in recent years. Iris localization is very important for an iris recognition system. The proposed algorithm localizes both iris boundaries (inner and outer) and detects eyelids (lower and upper). In the localization of the iris inner boundary, the approximate pupil center is detected then Daugman's integrodifferential operator is applied. While for localizing the iris outer boundary, an approach based on boundary points detection and curve fitting is adopted. First, a set of radial boundary points is detected by performing image integral projection along angular directions within specified image blocks, then a circle is fitted to these points. Steps after localization are based on Daugman's iris recognition system. Thus, the 2D Gabor filter is employed for extracting iris code for the normalized iris image. Experimental results on CASIA V 1.0 iris image database and performance evaluation based on the analysis of recognition results, indicate that the proposed method has better performance in both iris segmentation and recognition. (*Information Technology Journal 8 (2): 226-230, 2009;* ***doi:*** *10.3923/itj.2009.226.230*)

An Empirical Analysis of the Contributions of Information Technologies to the Production Process in Adana, Province of Turkey

Ahmet Ergülen

To cope with increasing and changing competition environment with globalisation, organisations have to achieve quality. And, it can be argued that information technologies, as an exceptional factor that is able to affect all units and functions

of organisations, plays an important role in achieving quality. This study aims at determining the extent to which information technologies and systems are used in production lines for 162 SMEs (Small and Medium Size Enterprises) organisations operating in various sectors in Adana Province. The results obtained from an analysis of the data, collected implementing a survey, employing exploratory factor analysis, indicates that information technologies contribute significantly to TQM (Total Quality Management) and to each dimension of TQM. In addition, empirical results show that information technology does not affect equally all the dimensions of TQM. (*Information Technology Journal 8 (2): 231-235, 2009;* ***doi:*** *10.3923/itj.2009.231.235*)

The Algorithm of Short Message Hot Topic Detection Based on Feature Association

Qindong Sun, Qian Wang and Hongli Qiao

Aiming at the mobile short message (SMS) hot topic extraction, the text features and statistical regularity of SMS are analyzed in this study. The formal description of SMS hot topic is given and an algorithm of SMS hot topic extraction based on feature association analysis is proposed. According to the proposed algorithm, feature words of SMS can be clustered into different word bags by calculating the association degree of these feature words and the hot topic can be identified by means of word bags matching. Experiments results show that the proposed algorithm can detect the hot topic in the SMS messages effectively, which is useful to the analysis of SMS popular sentiments. (*Information Technology Journal 8 (2): 236-240, 2009;* ***doi:*** *10.3923/itj.2009.236.240*)

Selecting and Combining Classifiers Simultaneously with Particle Swarm Optimization

Li Ying Yang, Jun Ying Zhang and Wen Jun Wang

A weighted combination model of multiple classifier systems based on Particle Swarm Optimization was reviewed, which took sum rule and majority vote as special cases. It was observed that the rejection of weak classifier in the combination model can improve classification performance. Inspired by this observation, we presented a problem that how to choose the useful classifiers in a given ensemble, especially in the reviewed model. In this study, a combination algorithm was proposed, which implemented classifiers' selection and combination simultaneously with particle swarm optimization. We describe the implementation

details, including particles encoding and fitness evaluation. Nine data sets from UCI Machine Learning Repository were used in the experiment to justify the validity of the method. Experimental results show that the propose model obtained the best performance on 5 out of 9 data sets, and averagely outperforms the reviewed model, majority voting, max rule, min rule, mean rule, median rule and product rule. The results were analysed from the point of the characteristic of data set. (*Information Technology Journal 8 (2): 241-245, 2009;* ***doi:*** *10.3923/itj.2009.241.245*)

Adaptive Stream Multicast for Video in Heterogeneous Networks

Dilmurat Tursun and Wang Liejun

This study first proposes a novel adaptive stream multicast for MPEG-4 FGS video to meet these challenges. Based on the fine-granularity property of MPEG-4 FGS video coding technology, the scheme tries to delivery multimedia multicast service over the heterogeneous networks in a similar way as that to transport water in pipelines, where the valves in pipelines adjust water flux to next pipeline. A new method of computing PSNR is also first advanced to evaluate the MPEG-4 FGS video transmission. Simulated results indicate that the scheme could dispose the heterogeneity of networks and end-systems freely, with permanent stability, flexible scalability and unprejudiced fairness and TCP-friendliness. (*Information Technology Journal 8 (2): 246-249, 2009;* ***doi:*** *10.3923/itj.2009.246.249*) 246-249

Review of Feature Detection Techniques for Simultaneous Localization and Mapping and System on Chip Approach

M.Y.I. Idris, H. Arof, E.M. Tamil, N.M. Noor and Z. Razak

In Vision Simultaneous Localization and Mapping (VSLAM), feature detection is used in landmark extraction and data association. It examines each pixel to find interesting part of an image that would differentiate the landmark and the less important image details. There are numerous studies in this field but they are scattered in many journals and proceedings which would require many hours just to find related material. Therefore, this research has grouped important studies done in this field to be analyzed by future researcher. Feature detection techniques such as Harris, Scale Invariant Feature Transform (SIFT), Speeded-Up Robust Features (SURF), Features from Accelerated Segment Test (FAST) and etc. is

discussed in this study. A background history of each technique, their evolution and performance comparison is presented. (*Information Technology Journal 8 (3): 250-262, 2009;* ***doi:*** *10.3923/itj.2009.250.262*)

Optimum Method Selection for Resolution Enhancement of Hyperspectral Imagery

F.A. Mianji, Y. Zhang and A. Babakhani

The study categorizes the most frequent researched areas of resolution enhancement in hyperspectral imagery and emphasizes on their applications, requirements, achievements and limitations of different approaches. An evaluation of the capabilities of different classes of super-resolution algorithms in hyperspectral imagery shows that there is no generic approach to optimally produce high-quality results on general hyperspectral images and the adequacy of an algorithm is a function of multiple factors, namely, access to multisource information, computational complexity, availability of reliable training data for learning-based methods, efficiency of the algorithm and the expected application. It is also shown that spectral mixture analysis based techniques are appropriate for developing high performance and fast super-resolution algorithms in hyperspectral imagery. (*Information Technology Journal 8 (3): 263-274, 2009;* ***doi:*** *10.3923/itj.2009.263.274*)

An Index Structure for Fast Query Retrieval in Object Oriented Data Bases Using Signature Weight Declustering

I. Elizabeth Shanthi and R. Nadarajan

An important question in information retrieval is how to create a database index which can be searched efficiently for the data one seeks. One such technique called signature file based access method is preferred for its easy handling of insertion and update operations. Most of the proposed methods use either efficient search method or tree based intermediate data structure to filter data objects matching the query. Use of search techniques retrieves the objects by sequentially comparing the positions of 1s in it. Such methods take longer retrieval time. On the other hand tree based structures traverse multiple paths making comparison process tedious. This study describes a new indexing technique for object-oriented data bases using the dynamic balancing of B+ tree called SD (Signature Declustering) tree. The SD-tree represents all 1s in signatures in a compact manner that results in saving of insertion and searching time. Analytical experiments

have been conducted by varying the signature length and the distribution of signature weight. The study clearly indicates the advantage of fast retrieval time in a way quite different from the other methods suggested in the past. (*Information Technology Journal 8 (3): 275-283, 2009; **doi:** 10.3923/itj.2009.275.283*)

Robot Map Building in Unknown Dynamic Environment Based on Hybrid Dezert-Smarandache Model

Li Peng, Huang Xinhan and Wang Min

In this study, a new method of information fusion DSmT (Dezert-Smarandache Theory) which is extended from Bayesian Theory and Dempster-Shafer Theory (DST) is introduced to solve the problem of robot map building in an unknown dynamic environment. The grid map method is adopted and a sonar sensor mathematical model is constructed based on DSmT. Meanwhile a few of general basic belief assignment functions (gbbaf) are constructed to deal with the uncertain and imprecise, sometimes even high conflicting information obtained by sonar sensors with the application of hybrid DSm model in the system and consideration of characteristics of sonar sensors. At last, Pioneer II mobile robot is used to carry out experiments of map building. The 2D general basic belief assignment (gbba) maps are structured and then correlative 3D gbba maps are built by openGL. The comparison of created ichnography with the real map testified the validity of hybrid DSm model for fusing imprecise information and map building proposed by this research. (*Information Technology Journal 8 (3): 284-292, 2009; **doi:** 10.3923/itj.2009.284.292*)

The Deployment Algorithms in Wireless Sensor Net Works: A Survey

Jiming Chen, Entong Shen and Youxian Sun

In this survey we focus on a variety of sensor nodes deployment algorithms that have been proposed and studied by researchers through the years. Some recent development of this research topic is introduced in a classified manner. We discuss the random deployment, incremental deployment and movement-assisted deployment algorithms and make comparisons between them in term of features, pros and cons, etc. Some related research topics such as the sensor model, localization techniques, communication range and sensing range, convergence and termination conditions are investigated in detail. (*Information Technology Journal 8 (3): 293-301, 2009; **doi:** 10.3923/itj.2009.293.301*)

A Secure Non-Interactive Deniable Authentication Protocol with Strong Deniability Based on Discrete Logarithm Problem and its Application on Internet Voting Protocol

Bo Meng

In this study, firstly the status and security properties of deniable authentication protocol are discussed and then a secure non-interactive deniable authentication protocol based on discrete logarithm problem is developed. At the same time we prove that the proposed protocol has properties: completeness, strong deniability, weak deniability, security of forgery attack, security of impersonate attack, security of compromising session secret attack and security of man-in-the-middle attack. The security properties of several typical protocols and proposed protocol are compared. Lastly, an application of the proposed protocol, an internet voting protocol with receipt-freeness without strong physical assumption, is provided. (*Information Technology Journal 8 (3): 302-309, 2009;* ***doi:*** *10.3923/itj.2009.302.309*)

Performance Evaluation of Wavelet Packet Modulation over Mobile Satellite Channel

W.Z. Zhong, Q. Guo and Y. Guo

The performance of WPM over the mobile satellite channel is presented and analyzed. The theory analysis and the simulation results show that the orthogonality of WPM can help the system be robust to the multipath effect and the extend period of WPM symbols can decrease the frequency selective fading of the system. The simulation result demonstrates that the performance of mobile satellite communication system using WPM is dependent on the support length of the wavelets, therefore a ratio decreasing algorithm is proposed in this study to improve the performance by weakening the support length effect. The simulation result shows that the better performance can be achieved by using proposed method. (*Information Technology Journal 8 (3): 310-317, 2009;* ***doi:*** *10.3923/itj.2009.310.317*)

Influence of Silicon Carbide Composite Barrier on Electrical Tree Growth in Cross Linked Polyethylene Insulation

A. Samee, Z.H. Li, C.H. Zhang and Z.P. Huang

The aim of research is to study the interaction between electrical tree and nonlinear barrier. The propagation of electrical tree in solid insulation is of great particular

concern for power engineering industry as it is regarded as most significant mechanism for dielectric breakdown in high voltage equipment. Composite material with barriers and surrounding matrix polymers are used to extend the breakdown time of the insulation. The major influence of barriers on propagation of electrical trees is investigated in this study with experiments and software simulation. The very low conductivities of modern insulating material do not permit the dissipation of accumulated space charge and charge at the extremities of the propagating electrical tree channel. High field non-linear conductivity characteristics of SiC were employed at the barrier to influence the electrical tree growth as they impinge upon on the barrier. The electrical tree growth was greatly reduced and time to breakdown extended. The tree propagation characteristics were studied by needle plane electrode geometry with five different concentration of SiC at the barrier (5, 10, 20, 40 and 60% by weight). The results show that propagating electrical tree channels did not penetrate the barrier when SiC has high field non-linear conductivity characteristics i.e., percolation threshold >35% SiC. As a result of this phenomenon, the tree growth and barrier penetration is inhibited, leading to extended lifetime of insulation. (*Information Technology Journal 8 (3): 318-325, 2009;* ***doi:*** *10.3923/itj.2009.318.325*)

Feasibility and Critical Success Factors in Implementing Telemedicine

H.M. Judi, A.A. Razak, N. Sha'ari and H. Mohamed

The objectives of this study are the evaluation of feasibility and critical success factors in the telemedicine implementation in Malaysian hospitals. A sample of hospitals located in Klang Valley, an area that surrounds the capital of Malaysia, Kuala Lumpur were contacted in order to seek their perspectives in this matter. A questionnaire survey was used to gather the data and descriptive analysis was performed to analyze the data. The results show that only small number of participating hospitals have telemedicine applications and suggest that many of Malaysians hospitals are not yet ready for the application. Feasibility evaluation based on four factors: operational, time, economic and technical criteria. The study finds that operational and technical component of feasibility factors are more important than time and economic dimension. The ability to attract customers and opportunity to acquire latest infrastructure and skills justify the need of telemedicine in hospital. Successful implementation of telemedicine is related to the availability of three factors: strong fundamental knowledge and infrastructure, planning and management of health information and technology and fulfilment of legal and ethical issues and constant evaluation of telemedicine implementation. (*Information Technology Journal 8 (3): 326-332, 2009;* ***doi:*** *10.3923/itj.2009.326.332*)

A Secure Remote Mutual Authentication and Key Agreement without Smart Cards

Han-Cheng Hsiang and Wei-Kuan Shih

This study proposes a new and secure scheme for remote mutual authentication without using the smart cards. The scheme may satisfy all of the essential security requirements. In the last couple of decades the Internet technology has advanced so rapidly. It leads to the spreading and penetration of the technology to the network services and applications. Remote user authentication is a very effective means to check the legality of a user. Among many schemes, password authentication has been commonly used. Also in many schemes proposed for the remote user authentication, smart card has been intensively used to store the secret information for authentication. However, the smart card and its reader are not always available everywhere and in anytime. With this scheme, the user can login to the remote server from anywhere and in anytime to access the secure service. This may be more practical and easy-to-use. (*Information Technology Journal 8 (3): 333-339, 2009;* ***doi:*** *10.3923/itj.2009.333.339*)

Missile Fault Detection Based on Linear Parameter Varying Fault Detection Filter

Cui Yu, Huang Xin Han and Wang Min

Focusing on the problem of fault detection and isolation (FDI) for a missile in the cruise phase, a solution based on Linear Parameter Varying (LPV) Fault Detection Filter (FDF) is proposed. The missile LPV model incorporating faults is established and converted to a suitable form for the appliance of LPV FDI via simplifying and other tools. Based on that, a fault detection system of missile is proposed for fault detection and isolation, of which the LPV filter bank can be designed using standard geometrical approach. Simulation results demonstrate that the designed fault detection system will alarm in a short time once faults happen and then locate the fault part correctly. Since the designed fault detection system is suitable for the high maneuverability of the missile and the on-line calculation load is small, the solution is of great practical value. (*Information Technology Journal 8 (3): 340-346, 2009;* ***doi:*** *10.3923/itj.2009.340.346*)

Steady-State Modeling of Static Synchronous Compensator and Thyristor Controlled Series Compensator for Power Flow Analysis

M.O. Hassan, S.J. Cheng and Z.A. Zakaria

In this study, steady-state modeling of Static Synchronous Compensator (STATCOM) and Thyristor Controlled Series Compensator (TCSC) for power flow studies has been represented. STATCOM is modeled as a controllable voltage source in series with impedance and firing angle model for TCSC is used to control active power flow of the line to which TCSC is installed. Proposed model for TCSC takes firing angle as state variable in power flow formulation. To validate the effectiveness of the proposed models Newton-Raphson method algorithm was implemented to solve power flow equations in presence of STATCOM and TCSC. Case studies are carried out on 9-bus system to demonstrate the performance of the proposed models. Simulation results show the effectiveness and robustness of the proposed models; moreover the power solution using the Newton-Raphson algorithm developed incorporating firing angle model possesses excellent convergence characteristics. (*Information Technology Journal 8 (3): 347-353, 2009;* ***doi:*** *10.3923/itj.2009.347.353*)

Convergence and Runtime of an Ant Colony Optimization Model

X. Yu and T. Zhang

This study considered a model of an Ant Colony Optimization (ACO) algorithm for the general combinatorial optimization problem. The model proved that it can converge to one of the optima if only this optimum is allowed to update the pheromone model and that it can not converge to any of the optima if two or more optima are allowed. The iteration complexity of the model can be computed easily. And then a lower bound of time complexity of a real ACO algorithm for the general combinatorial optimization problem can be obtained. (*Information Technology Journal 8 (3): 354-359, 2009;* ***doi:*** *10.3923/itj.2009.354.359*)

Artificial Immune-Chaos Hybrid Algorithm for Geometric Constraint Solving

Xue-Yao Gao, Li-Quan Sun and Da-Song Sun

Geometric constraint solving can be transformed into optimization problem which is non-linear and multi-variable. Geometric constraint solving based on artificial immune algorithm and improved chaos search strategy is proposed in this study. The local optimal solutions obtained by artificial immune algorithm are used as the heuristic information and the global best solution is searched by improved chaos

search strategy in the neighborhood of local optimal solutions. In order to enhance precision and searching speed, chaos search area is controlled in the neighborhood of local optimal solutions by reducing search area of variables. This algorithm differs from current optimization methods in that it gets the global best solution by excluding bad solutions. Experiment results show that the proposed method is better than artificial immune algorithm and can deal with geometric constraint solving efficiently. (*Information Technology Journal 8 (3): 360-365, 2009;* ***doi:*** *10.3923/itj.2009.360.365*)

Efficient Remote Mutual Authentication and Key Agreement with Perfect Forward Secrecy

Han-Cheng Hsiang and Wei-Kuan Shih

This study will demonstrate both Juang's scheme and Shieh-Wang's scheme do not provide perfect forward secrecy and are vulnerable to a privileged insider's attack. Besides, their scheme has the problem of slow wrong password detection and user cannot change his password freely. To remedy these flaws, this study proposes an efficient remote mutual authenticated and key agreement scheme with perfect forward secrecy. The proposed scheme not only provides perfect forward secrecy but also satisfies all the security requirements needed in remote mutual authentication and key agreement scheme. (*Information Technology Journal 8 (3): 366-371, 2009;* ***doi:*** *10.3923/itj.2009.366.371*)

A Bandwidth-Aware Job Grouping-Based Scheduling on Grid Environment

T.F. Ang, W.K. Ng, T.C. Ling, L.Y. Por and C.S. Liew

This study explores the feasibility of job scheduling strategies and extend the job grouping-based approach using the idea of bandwidth-awareness. As today's best-effort network generally experiences low bandwidth and high delay, we aim to maximize the Grid resource utilization and reduce the delay by considering the bandwidth criterion. A simulation environment using GridSim is developed to model job scheduling process. Exploiting the simulation environment, a job scheduling strategy that encompasses the job grouping concept coupled together with bandwidth-aware scheduling is proposed and evaluated. The proposed scheduling strategy focuses on grouping independent jobs with small processing requirements into suitable jobs with larger processing requirements and schedules

them in accordance with indeterminist network conditions. The simulation result demonstrates that the proposed strategy succeeds in minimizing the total processing time by at most 82% as compared to its counterpart. (*Information Technology Journal 8 (3): 372-377, 2009; **doi**: 10.3923/itj.2009.372.377*)

A Hybrid Path Matching Algorithm For XML Schemas

A. Rajesh and S.K. Srivatsa

The approach proposed in this study uses a simple path matching algorithm to perform the structural matching. The novelty in this approach is that the path matching algorithm considers only the paths to leaf nodes in the schema trees for the matching process there by eliminating the need for repeatedly parsing the elements of the schema tree as in the other approaches. This greatly reduces the time required to identify the matches. And the paths are treated as a set of strings comprising of the labels of the nodes in the path. Treating the paths as set of strings greatly simplifies the matching process as the same approaches used in the linguistic matching process can be used in the path matching process. (*Information Technology Journal 8 (3): 250-262, 2009; **doi**: 10.3923/itj.2009.378.382*)

Planar Displacement Detection with Point Feature Matching

Chen Feng-Dong, Hong Bing-Rong and Liu Guo-Dong

A novel planar displacement detection method is implemented using Scale Invariant Feature Transform (SIFT) point feature matching on a calibrated optical grating-vision measuring platform. SIFT is a method for extracting and describing image key-points, which are robustly invariant to scale, rotation and translation as well as robust to illumination changes and limited changes of viewpoint. The platform is moved along its x axis step by step and a series of images are captured with corresponding grating sensor values. SIFT feature points are extracted and matched between the successive images through a K-Dimension Tree (KD-Tree) based feature matching algorithm to detect the displacement of each step. The detected values are compared with the corresponding grating sensor values. Experimental results prove that the accuracy of the method is less than 10 μm in this environment. (*Information Technology Journal 8 (3): 383-387, 2009; **doi**: 10.3923/itj.2009.383.387*)

A Novel Dynamic Video Summarization Approach Based on Rough Sets in Compressed Domain

Li Xiang-Wei, Zhang Ming-Xin, Zhao Shuang-Ping and Zhu Ya-Lin

In this study, a novel dynamic video summarization approach based on Rough Sets (RS) is developed. It can not only rapidly generate video summary that minimizes the visual content redundancy for input video sequences, but also specify the number of frames to get various summary according to user demand. First, DCT coefficients and DC coefficients, the most important video visual features are extracted from raw video sequences to represent video information. Second, an Information system is constructed with DC coefficients. Third, a new and concise Information system is achieved by using the reduction theory of RS, meanwhile, the effective representation of frames and its corresponding reduced frame numbers are recorded, i.e., dynamic video summarization. Experimental results indicate that the proposed algorithm is more effective and intelligent than conventional methods in video summarization generation. (*Information Technology Journal 8 (3): 388-392, 2009; **doi**: 10.3923/itj.2009.388.392*)

The Cardinal Orthogonal Scaling Function in Higher Dimension

Guochang Wu, Yadong Zhang and Zhengxing Cheng

In this study, the cardinal orthogonal scaling function in higher dimension is classified by the relation the highpass filter coefficient and wavelet's samples in its integer points, thus, the sampling theorem in the wavelet subspace is obtained. Then, the symmetry property of cardinal orthogonal scaling function is discussed, and some useful characterizations are given. At last, two examples are constructed to prove the theory. (*Information Technology Journal 8 (3): 393-397, 2009; **doi**: 10.3923/itj.2009.393.397*)

Artificial Neural Networks Modelling of Non-Asbestos Brake Lining Performance Boric Acid in Brake Pad

Ibrahim Mutlu

In this study, the friction coefficient-temperature and time experiments are carried out for the produced non-asbestos brake linings. For the evaluation of brake linings with different ingredients the mean value the friction coefficient and the standard deviation which gives the variation of the friction coefficients are

calculated experimental. Recently, the ANN is successfully implemented for the prediction of experimental results in many areas. This is due to the capability of ANN in modeling of non-linear relation. The prediction of experimental results is advantageous for time and cost. In this study the ANNs are used for the prediction of mean value of friction coefficient and standard deviation for produced brake linings with different amount of organic dust and barite. The values of samples not included in education are compared with real values. (*Information Technology Journal 8 (3): 398-402, 2009; **doi:** 10.3923/itj.2009.398.402*)

Hardware/Software Co-Design Implementations of Elliptic Curve Cryptosystems

Turki F. Al-Somani, Esam A. Khan, Ahmad M. Qamar-ul-Islam and Hilal Houssain

This study presents a survey of hardware/software co-design implementations of Elliptic Curve Cryptosystems (ECCs). A critical study of the underlying finite field, the representation basis and the partitioning schemes of these implementations is conducted. The study shows that all implementations are implemented over binary fields GF(2^m) and the implementations that use polynomial basis are more than implementations that use normal basis for finite field arithmetic. The study also shows that the best partitioning scheme, among the surveyed implementations, implements the finite field arithmetic on hardware and the remaining operations of the ECC on software. (*Information Technology Journal 8 (4): 403-410, 2009; **doi:** 10.3923/itj.2009.403.410*)

UMQA: An Internal Algebra for Querying Multimedia Contents

Zongda Wu, Zhongsheng Cao and Yuanzhen Wang

For internal query processing, we in this study discuss an operator-based algebraic language called UMQA, whose operators are formally similar to those of the relational algebraic system. To deal with UMQL's extensions for structure, feature and spatio-temporal queries, UMQA is also introduced with some new operators: structure selection (σ^{SE}), structure expansion (η), feature selection (σ^{FE}) and spatio-temporal selection (σ^{SP}), which make UMQA of equivalent capability with UMQL on multimedia query specification, but more suitable for internal query processing due to it representing multimedia queries in an algebraic way. We also introduce an approach to translate UMQL queries into UMQA plans equivalently and a powerful set of algebraic translation formulas that is important for query

optimization by algebraic rewriting. Last, we summarize a UMQL prototype information system which uses UMQA as its internal processing algebra and briefly discuss the efficient implementation of UMQA operators. (*Information Technology Journal 8 (4): 411-426, 2009; **doi:** 10.3923/itj.2009.411.426*)

Finding Related Web Pages in Parallel by Using Grouped Link Structures

Shen Xiaoyan, Chen Junliang, Meng Xiangwu and Zhang Yujie

In this study, a block co-citation algorithm is proposed to find related pages for a given web page in two steps. First, all hyperlinks in a web page are segmented into several blocks according to the HTML structure and text style information. Second, for each page, the similarity between every two hyperlinks in the same block is computed. Then the total similarity from one page to the other is obtained after all web pages are processed. For a given page u, the pages which have the highest total similarity to u are selected as the related pages of u. The block co-citation algorithm was implemented in parallel to analyze a corpus of 37, 482, 913 pages sampled from a commercial search engine and demonstrate its feasibility and efficiency. Experimental results for 28 pages pertaining to 7 topics indicated that the performance of the block co-citation algorithm is superior to traditional co-citation algorithm. This method is very suitable for application in commercial search engines. (*Information Technology Journal 8 (4): 427-440, 2009; **doi:** 10.3923/itj.2009.427.440*)

Study on Method of Robust Multidisciplinary Collaborative Decision for Product Design

Lijun Yan, Zongbin Li and Xiaoyang Yuan

A robust method for decentralized multidisciplinary collaborative decision was presented which adopts interval to describe the uncertainty of decision variables and non-cooperative game theory to model the relationship between design teams under decentralized decision environment. Considering the Rational Reaction Sets (RRS) from non-cooperation game theory as design constraint in the decision space, multidisciplinary collaborative decision is described as interval based constraint solving problem and then a two-step solving approach was proposed to obtain final robust decision scheme of product design. The first step is to eliminate initial range of decision variables using consistency algorithm and the second step is to search the robust decision point in consistent interval with design capability indices as judgment rule of robustness. A new kind of feasibility censor

based immune chaotic algorithm for model solving was designed. Design of bear and rotor system involves complex coupled relationship of dynamic and tribology and is a typical multidisciplinary conflict and decouple problem. A robust and powerful decision method between different disciplines can not only quicken design process of bear and rotor, but also improve the design quality. To show the problem, a typical elastic bear and rotor system with single disk is used as example to validate the effectiveness and reliability of proposed decision approach. (*Information Technology Journal 8 (4): 441-452, 2009;* ***doi:*** *10.3923/itj.2009.441.452*)

A Tolerance Rough Set Based Semantic Clustering Method for Web Search Results

Xian-Jun Meng, Qing-Cai Chen and Xiao-Long Wang

The objective of this study is to present a new web search results clustering algorithm which uses the tolerance rough set based approach to find the different meanings of the query in web search results and then organizes these results into different clusters according to their related meanings about query. Each meaning of the query can be represented by its contexts in each result and if there is a significant correlation between two context words, it is more likely that these two words represent the same meaning of query and also suitable as good indication of the meaning of query. In this study, the search results are organized in groups that each group of results relates to context words with high correlations and then these groups are merged into the final clusters representation using both cluster contents similarity and cluster documents overlap. The correlated context words with high documents coverage are selected as the labels of each cluster. Some experiments were conducted on different search results sets based on various queries. The results and comparisons of the proposed algorithm with that of the popular search results clustering algorithms through an empirical evaluation establish the viability of this proposed approach. (*Information Technology Journal 8 (4): 453-464, 2009;* ***doi:*** *10.3923/itj.2009.453.464*)

A Novel Visual Tracking Approach Incorporating Global Positioning System in a Ubiquitous Camera Environment

Hsien-Chou Liao and Pao-Tang Chu

Global Positioning System (GPS) is popularly used in object tracking. Current GPS tracking system is mainly based on a digital map of a GIS (geographic information system) and marks the location of an object on the map. However, it

is insufficient to perceive the situation of the object. On the other hand, the deployment of cameras is toward a ubiquitous camera (UbiCam) environment, especially in the urban area. If GPS can be incorporated with UbiCam environment, the visual information acquired from a camera is useful to improve the problem of current GPS tracking systems. In this study, an approach called GODTA (GPS-based Object Detection and Tracking Approach) is proposed in this study. GODTA is mainly based on the coordinate transformation method. The transformation is according to the parameters computed from a set of five calibration points. If the transformed image coordinate is within the rectangle range of the camera image, it means the object is within the FOV (Field-of-View) of the camera and then the object can be labeled on the image. Two experiments, fixed position and continuous tracking, were also designed to evaluate the performance of GODTA. The lowest average Locating Error (LE) of the transformed image coordinate is 42 and 38 pixels, respectively. The results show that GODTA is feasible for fulfilling GPS-based visual tracking service and incorporates GPS system and UbiCam environment successfully. (*Information Technology Journal 8 (4): 465-475, 2009;* ***doi:*** *10.3923/itj.2009.465.475*)

Clustering Large Spatial Data with Local-density and its Application

Guiyi Wei, Haiping Liu and Mande Xie

In this study, a new algorithm LD-BSCA is proposed with introducing the concept of local MinPts (a minimum number of points) and the new cluster expanding condition: ExpandConClId (Expanding Condition of ClId-th Cluster). We minimize the algorithm input down to only one parameter and let the local MinPts diversified as clusters change from one to another simultaneously. Experiments show LD-BSCA algorithm is powerful to discover all clusters in gradient distributing databases. In addition, we introduce an efficient searching method to reduce the runtime of present algorithm. Using several databases, we demonstrate the high quality of the proposed algorithm in clustering the implicit knowledge in asymmetric distribution databases. (*Information Technology Journal 8 (4): 476-485, 2009;* ***doi:*** *10.3923/itj.2009.476.485*)

A Novel Method for Segmentation of the Cardiac MR Images using Generalized DDGVF Snake Models with Shape Priors

Lixiong Liu, Yuwei Wu and Yuanquan Wang

In this study, a novel method is presented for segmentation of the endocardium and epicardium of the left ventricle in cardiac magnetic resonance images using snake

models. We first generalize the DDGVF snake model by introducing two spatially varying weighting functions which characterize the boundary information; this generalized DDGVF snake can conquer the spurious edges raised by artifacts while maintaining the desirable properties of DDGVF of distinguishing the positive and negative boundaries. This is especially helpful for the tasks on hand because the endocardium and epicardium of the LV in MR images can be characterized as positive and negative boundaries. Observed that the left ventricle is roughly a circle, a shape constraint based on circle is introduced into the snake model. This new constraint can prevent the snake contour from being trapped and leaking out so as to maintain the global shape of the snake contour during evolution. In addition, fourth-order PDEs are employed for noise removal. We demonstrate the proposed approach on an *in vivo* dataset and compare the segmented contours with manual collections; the results show its effectiveness. (*Information Technology Journal 8 (4): 486-494, 2009;* ***doi:*** *10.3923/itj.2009.486.494*)

Objective Based Flexible Business Process Management Using the Map Model

A. Bentellis and Z. Boufaîda

In the proposal, a flexible business process management axed on the objective concept and for the process lifecycle is presented. The main feature of this approach is that the map model is used as the key element to drive the construction and execution of flexible business processes. An analysis phase starts with a model which fully considers the objective and sub-objectives of the business process, when defining it. A design phase uses the map model for specifying and representing the possible plans that are capable of achieving the predefined objective and this will be done in a modular manner. Examples are presented from a case study in the travel agency Numédia. The architecture of the execution engine for, so defined, business process map modeling is presented for its interpretation and its execution. Finally, an evaluation of the degree of flexibility brought by proposed management is given. (*Information Technology Journal 8 (4): 495-503, 2009;* ***doi:*** *10.3923/itj.2009.495.503*) 495-503

A Maekawa Set Based Marking Scheme

Zaihong Zhou, Dongqing Xie and Bingwang Jiao

This study describes a novel Maekawa-set-based probabilistic Marking Scheme (MMS). It aims at the disadvantages of the FMS scheme, which are the large number of false positives caused by fragment marking and the need of network topology in node exclusive-or (XOR) restore, etc. The MMS scheme is to split

the edge, which is composed of the IP addresses of two neighboring routers into fragments and allocates fragment-id for each fragment. Then, it will generate a Maekawa set based on those fragment-ids. The number of subset is m and the length of subset is k for the Maekawa set. While packets pass through a router, the router will write the k fragments orderly to the IP header by m times with an optimal probability, where the fragments are split from the edge and recombined in Maekawa subset way. There is no false positive in this MMS scheme after the attack path is reconstructed theoretically. In addition, it has several other advantages, it requires fewer packets to reconstruct the attack path; computation overhead is low; it does not require the network topology support as well as is able to prevent the hijacked router from forging the markings. (*Information Technology Journal 8 (4): 504-512, 2009;* ***doi:*** *10.3923/itj.2009.504.512*)

Numerical Simulation of Flow Around a Row of Circular Cylinders Using the Lattice Boltzmann Method

S. Ul Islam and C.Y. Zhou

This study describes a numerical study of flow past a row of circular cylinders at different Reynolds numbers with different distances between the cylinders using the Lattice Boltzmann Method (LBM). Numerical simulations are performed to investigate the blockage effect for the ranges of $R_e \leq 200$ and $B = W[R] \leq 25R$, where, R_e, R and W are the Reynolds numbers, the radius of the cylinders and the distance between the center of the cylinders, respectively. The Strouhal number and drag forces exerted on the cylinders are quantified jointly with the flow patterns around the cylinders in the form of vorticity contours. It is found that both the drag coefficient and Strouhal number increase when B decreases. It is also observed that the Strouhal number, in general increases as R_e increases for a fixed value of B for the ranges of R_e and B studied. The distance B, between cylinders is limited within 25 in this simulation because of computational resources. (*Information Technology Journal 8 (4): 513-520, 2009;* ***doi:*** *10.3923/itj.2009.513.520*)

On-Line Analytical Processing Queries for eXtensible Mark-up Language

Mourad Ykhlef

eXtensible Mark-up Language (XML) is emerged as a standard to exchange data over the Web. A large amount of heterogeneous data is now available on the Web in different sources; these data are generally represented or published in XML format. A XML data warehouse is an integrated repository of different XML data

sources enabling analysts to gain insight through fast access to a variety of possible views on XML data which are organized in a dimensional model. XML data warehouse can be queried by On-Line Analytical Processing (OLAP) queries. This study proposes XML data cube model which is a well-founded approach to represent OLAP data using XML. XML data cube enables the use of external XML data for selection and grouping. Recently a SQL-like query language XRQL is proposed to query XML data. The XRQL queries capture the flavour of SQL queries while offering constructs for navigation, XML data construction and grouping. This study shows how OLAP queries can be expressed by using XRQL in a natural way and extends XRQL by GROUP BY CUBE and GROUP BY ROLLUP operators to enable analysts to express more complex OLAP queries on XML data cube. (*Information Technology Journal 8 (4): 521-528, 2009;* ***doi:*** *10.3923/itj.2009.521.528*)

A Component-based Management Platform for Multi-source Spatial Data

Wensheng Wang, Chao Li, Zeze Wu, Yibing Luo, Qingtian Zeng, Xiaorong Yang, Nengfu Xie and Xiangwei Zhao

This study introduces a component-based management platform for multi-source spatial data. The four-layer architecture and the main functions designed for the management platform are addressed in details. The main components, including the integration component for multi-source spatial data, the role-based security management component for spatial data, the user-friendly mapping component and the sharing component for spatial data are presented, respectively. Finally, as a typical application case, the platform has been used to manage the county-range agricultural spatial data in China. (*Information Technology Journal 8 (4): 529-536, 2009;* ***doi:*** *10.3923/itj.2009.529.536*)

Guaranteed Cost Fault-tolerant Controller Design of Networked Control Systems under Variable-period Sampling

Xuan Li and Xiao-Bei Wu

This study investigates the problem of integrity against actuator failures for networked control systems under variable-period sampling. Assuming that the distance between any two consecutive sampling instants is less than a given bound, by using the input delay approach, the networked control systems under variable-period sampling are transformed into the continuous-time networked control

systems under time-varying delays. Then the existence conditions of guaranteed cost fault-tolerant control law is testified in terms of the Lyapunov stability theory combined with Linear Matrix Inequalities (LMIs). Furthermore, the guaranteed cost fault-tolerant controller gain and the minimization guaranteed cost can be obtained by solving a minimization problem. A numerical simulation example demonstrates the conclusions are feasible and effective. The proposed control method resolves the problems of variable-period sampling and actuator failures, which meets the requirements in industrial networked control systems. (*Information Technology Journal 8 (4): 537-543, 2009;* ***doi:*** *10.3923/itj.2009.537.543*)

A Benchmark for Perceptual Hashing based on Human Subjective Identification

Hui Zhang, Qiong Li, Haibin Zhang and Xiamu Niu

This study proposed a novel benchmark for evaluating the robustness and discriminability properties of perceptual hashing algorithms. Firstly, two major problems neglected by traditional benchmark are analyzed thoroughly with a concrete experiment. One problem is the inconsistence between the subjective feeling and the objective perceptual distance, the other is the partiality of the performance for different attacks. And then, in order to overcome the problems, a new benchmark for perceptual hashing based on human subjective identification is proposed and the corresponding evaluation methods are presented by illustrative experiments and examples. Present benchmark methods are fairer and more comprehensive than the traditional methods. (*Information Technology Journal 8 (4): 544-550, 2009;* ***doi:*** *10.3923/itj.2009.544.550*)

Analysis of the Constraints and Effects of Frequency Source Noise on High-resolution DBS Imaging

Xie Xianming and Pi Yiming

Doppler Beam Sharpening (DBS) technique is one of high-resolution radar imaging technique. DBS images are widely used in tactical reconnaissance, terrain matching and navigation, as well as target identification, etc. Range walking correction technique and azimuth dechirping technique can increase the coherent accumulated time of DBS imaging system, which provides greater space for high-resolution DBS Imaging. However, the resolution of DBS images will be limited

by frequency source phase noise. This study addresses the effects of frequency source phase noise on the high-resolution DBS imaging. Quantitative estimates are derived analytically based on the second-order statistics characteristic of oscillator phase noise. The research results could further consummate high-resolution DBS imaging theory and provide theory basis for DBS imaging system design. (*Information Technology Journal 8 (4): 551-557, 2009;* ***doi:*** *10.3923/itj.2009.551.557*)

Screen-Based Prototyping: A Conceptual Framework

E. Kheirkhah, A. Deraman and Z.S. Tabatabaie

In any software development process, Requirements Engineering (RE) has been recognized as a critical factor in determining the quality of the software projects. In this study, an efficient technique, that is screen-based prototyping, is proposed to increase users' involvement in RE tasks and bridge the communication gap between end-users and software developers. This prototyping technique can be employed by most of requirements engineering methodologies. Screen-based prototyping employs the use-case driven approach in constructing prototypes and realize each use-case using a sequence of screens. Graph structure and related concepts are used to implement the prototypes and create various scenarios of use-cases. (*Information Technology Journal 8 (4): 558-564, 2009;* ***doi:*** *10.3923/itj.2009.558.564*)

Adaptive Handoff Algorithm in Next-generation Cellular Networks

A.L. Yusof, M. Ismail and N. Misran

The objective of this research is to propose an adaptive handoff algorithm which can effectively deal with hotspot cells in next-generation cellular networks. Under the proposed algorithm, the signaling burden is evenly distributed and the regional network boundary is dynamically adjusted according to the traffic load, handoff type and speed of mobiles in advance, before handoff execution. A simulation model is developed to investigate the handoff performance. The simulation results find that the proposed algorithm is better than traditional handoff algorithm. Therefore, this algorithm enhances the service quality of users by flexibly manage the overloaded cells. (*Information Technology Journal 8 (4): 565-570, 2009;* ***doi:*** *10.3923/itj.2009.565.570*)

Knowledge Management Strategy Determination in Programs: A Case of Iran Tax Administration Reform and Automation

M.R. Mehregan and M.S. Zanjani

This study aims to examine the determinant role of program dimensions onto knowledge management strategies. The research proposes a new framework for classifying different KM strategies in programs and makes propositions about how the size, geographical desperation and the nature of programs affect the portfolio of strategies suitable for each program. Prior studies tend to examine only one dimension of knowledge management strategies: personalization versus codification. In this study, personalization versus codification and generalization versus specialization are highlighted as two distinct dimensions of KM strategies. The study highlights that codification is more suitable for large, geographically dispersed programs; while generalization is more suitable for programs conducting projects that are more standardized and routine in natu To achieve the main research goals; two-phase research strategy is employed. At first, knowledge derived from an analysis of the literature is used in order to design the conceptual framework of the research. Then, the results of the case study of Iran Tax Administration Reform and Automation program employed to evaluate the research propositions. The results show that the program is used personalization-specialization knowledge management strategy. The study gives valuable information, which hopefully will help programs to accomplish knowledge management. (*Information Technology Journal 8 (4): 571-576, 2009;* ***doi:*** *10.3923/itj.2009.571.576*)

Optimization of Adaptation Gains of Full-order Flux Observer in Sensorless Induction Motor Drives Using Genetic Algorithm

Hui Luo, Yunfei Lv, Xin Deng and Huajun Zhang

This study presents a new optimization method of the adaptation PI gains of the full-order flux observer in the sensorless induction motor drives. The new method employs a Genetic Algorithm (GA) based optimization routine that can be implemented off-line. A suitable fitness function is defined to assess the tracking performance, the noise sensitivity and the stability of the rotor speed estimation system when each individual's parameters are employed. The tournament selection is used to choose the parent individuals and a large mutation probability is used to prevent the evolution from the prematurity. The PI gains calculated according to the design guidelines are put in the initial population to quicken the optimization

procedure. With the help of the proposed method, the desirable PI gains can be obtained and the optimization procedure is fast and efficient. Simulation results show that the estimated speed tracks the practical speed well when the obtained PI gains are employed. Simulation results validate the proposed method in the study. Since, the efficient optimization ability, the Genetic Algorithm (GA) is pretty suitable for the optimization of the adaptation PI gains of the full-order flux observer in the sensorless induction motor drives. (*Information Technology Journal 8 (4): 577-582, 2009;* ***doi:*** *10.3923/itj.2009.577.582*)

A Novel PCM/FM Multi-symbol Detection Algorithm for FPGA Implementation

Zhilu Wu, Nan Zhao, Shuying Li and Guanghui Ren

In this research, a Baseband Quadrature Complex Rotation Multi-Symbol Detection (BQCR-MSD) algorithm is proposed. It can greatly reduce the computational complexity of MSD due to the partial correlation and complex rotation techniques applied, so is more suitable for implementation on large scale digital device such as Field Programmable Gate Array (FPGA). Simulation results also show that despite of the computational complexity decrease, the performance of BQCR-MSD algorithm is excellent and very close to that of MSD. (*Information Technology Journal 8 (4): 583-588, 2009;* ***doi:*** *10.3923/itj.2009.583.588*)

Knowledge Transfer Optimization Simulation for Innovation Networks

Chuanrong Wu and Deming Zeng

Based on the characteristics of knowledge transfer in innovation networks, an optimization model of the discount expectation of profits is presented, which can determine the optimal time of knowledge transfer. Important factors, such as knowledge absorption capacity, update rate of knowledge in the network, discount rate, the time of knowledge transfer, market share, product life cycle, etc. are taken into account in the model. A large number of simulated experiments are implemented to test the efficiency of the optimization model. Simulation experimental results show that the calculated results are in accordance with the actual economic situation. The optimization model can provide useful decision support in knowledge transfer time for enterprises. (*Information Technology Journal 8 (4): 589-594, 2009;* ***doi:*** *10.3923/itj.2009.589.594*)

Facial Expression Recognition Using Improved Support Vector Machine by Modifying Kernels

W. Liejun, Q. Xizhong and Z. Taiyi

This study proposes a novel facial expression recognition approach based on improved Support Vector Machine (SVM) by modifying kernels. The idea comes from the work of Amari that enlarging the spatial resolution around the margin by a conformal mapping, such that the separability between classes is increased. Experiments on Japanese Female Facial Expressions (JAFFE) database show that the Classification Accuracy Rate (CAR) is remarkably improved after modifying the Gaussian kernel. Experiments also show that the importance of selecting an appropriate parameter when modifying the kernel. (*Information Technology Journal 8 (4): 595-599, 2009; **doi:** 10.3923/itj.2009.595.599*)

Performance Comparison of UDP-based Protocols Over Fast Long Distance Network

Yongmao Ren, Haina Tang, Jun Li and Hualin Qian

As massive data generated in large scale e-Science projects such as High Energy Physics (HEP) and astronomical observation (e-VLBI) needs to be transported internationally over fast long distance network, high performance transport protocol is needed. Based on UDP, some reliable transfer protocols are designed. This research mainly studies the principles of these protocols and compares their performance by experiments. It is found that they far outperform TCP, but still have some limitations and can't satisfy the requirement of bulk data transfer perfectly. (*Information Technology Journal 8 (4): 600-604, 2009; **doi:** 10.3923/itj.2009.600.604*)

New Evolutionary Algorithm Applying to a Type of Facility Location Problem

Wang Lai-Jun, Sun Xiao-Ling and Shi Zhongke

Mathematical model is built for solving a type of Facility Location Problem (FLP) in this study first. Then, genetic algorithm using symbolic coding is proposed. Based on this GA, a new evolutionary algorithm is proposed using of the basic idea of Particle Swarm Optimization (PSO). Symbolic coding method is still used in the new algorithms, which makes the model scale decrescent and reflects its

characteristics. But the selection operator and mutation operator are all abandoned here. Furthermore, a type of total probability crossover is performed and the evolutionary policy of particle swarm optimization is absorbed into the new algorithm, which reduces the complexity and enhance the efficiency greatly. The model and the algorithm have been applied to a government-funded traffic project. The process of constructing the evolutionary algorithm based on total probability crossover dispensed with any especial condition, so our algorithm is universal to all facility location problem. (*Information Technology Journal 8 (4): 605-609, 2009;* ***doi:*** *10.3923/itj.2009.605.609*)

Rough Sets based Temporal-spatial Color Descriptor Extraction Algorithm in Compressed Domain for Video Retrieval

Li Xiang-Wei, Li Zhan-Ming, Zhang Ming-Xin, Wang Yi-Ju and Zhang Zhi-Xun

In this study, based on Rough Sets (RS), a compact and efficient temporal-spatial color descriptor extraction algorithm is developed in compressed domain. Firstly, Discrete Cosine Transform (DCT) coefficients and Direct Current (DC) coefficients, the most important video visual features are extracted from raw video sequences to represent video information. Secondly, an information system table is constructed using DC coefficients. Thirdly, a novel and concise information system table is achieved by using the reduction theory of RS, i.e., core of information system. The core contains major visual color information and eliminates the redundant video information. Furthmore, DC coefficients also contain important spatial information of each frame, so the core of information system can regard as effective temporal-spatial color descriptor for video retrieval. Compared to existing technologies, the proposed algorithm enjoyed the following three advantages: the extracted descriptor consider not only visual color feature and temporal information, but also spatial information of each frame, the algorithm introduced attributes reduction theory of RS and the more redundant video information are eliminated and the whole process accomplished in compressed domain, so the volume of video data also decreased dramatically. Effectiveness is documented by experimental results. (*Information Technology Journal 8 (4): 610-614, 2009;* ***doi:*** *10.3923/itj.2009.610.614*)

A Novel Minimax Probability Machine

Mu Xiangyang and Zhang Taiyi

This study presents an empirical study for Minimax Probability Machines (MPM) for prediction. Considering that the Euclidean distance has a natural generalization

in form of the Minkovsky's distance, a novel MPM using Minkovsky's norm in Gaussian kernel function is proposed. The performance of proposed method is evaluated with the prediction for Ethernet traffic data. Result shown that the novel MPM here in using Gaussian kernels with Minkovsky's distance (α=1) and (α=5) can achieve better prediction accuracy than the Euclidean distance. (*Information Technology Journal 8 (4): 615-618, 2009; **doi:** 10.3923/itj.2009.615.618*)

Anti-collusive Self-healing Key Distribution Scheme with Revocation Capability

ChunLai Du, MingZeng Hu, HongLi Zhang and WeiZhe Zhang

This study proposes an anti-collusive self-healing group key distribution scheme with revocation using dual directional hash chain. The session key is computed from three parts: forward key, backward key and random session number. The former two parts are built on dual directional hash chain. Users are provided with a set of private secrets according to their legal lifetimes. In terms of communication cost, the proposed scheme is more efficient than the previous schemes not based on one-way hash chain and is slightly increased compared with the previous scheme based on one-way hash chain. According to the security analysis results, the proposed scheme can resist the collusion of revoked users and newly joined users. (*Information Technology Journal 8 (4): 619-624, 2009; **doi:** 10.3923/itj.2009.619.624*)

Formalizing Deniability

Bo Meng

A formal framework of deniability in the deniable authentication protocol is presented. By introducing Kessler and Neumann logic as a tool, the proposed framework formalizes the strong deniability and weak deniability, which are the key properties in the deniable authentication protocol. The formal framework establishes what can construct an evidence of deniability. Based on the construction, the simple and easy to be applied framework enables the identification of deniability and provides a heuristic to take evidence of deniability into consideration in the early stages of designing a deniable authentication protocol. Two typical deniable authentication protocols, including a interactive and a non-interactive one are analyzed by both informal method and the proposed formal framework. (*Information Technology Journal 8 (5): 625-642, 2009; **doi:** 10.3923/itj.2009.625.642*)

An Ontology-Based Manufacturing Design System

Sun Wei, Ma Qin-yi and Gao Tian-yi

In this study, an ontology-based system is proposed to solve problems raised in the manufacturing design by expanding traditional development activity with Knowledge Management (KM), a Product Knowledge Model (PKM) and the Intelligent Application System (IAS). The KM helps to management the knowledge in the design process, while the PKM supports to locate proper information and the IAS is responsible for applying the product knowledge among different application systems throughout the product life cycle. The PKM is encoded in OWL to realize semantic match and enhance the performance of organization capability and knowledge sharing. The routine design assistance is developed to reuse the product knowledge based on configuration method generating function satisfied solution rapidly by reasoning the configuration rules represented in SWRL. The information retrieval theory is involved to support manufacturing knowledge sharing. A prototype system of binging machine design is developed to verify the proposed approach, using the semantic web technology, for seamless sharing domain-specific design knowledge among multidisciplinary organizations and intelligent supporting the manufacturing design. (*Information Technology Journal 8 (5): 643-656, 2009; **doi**: 10.3923/itj.2009.643.656*)

Performance Evaluation of Mobile Sub-Networks Convergence Approaches in a Personal Distributed Environment

K. Abd Jalil and J. Dunlop

There are two approaches to handle the convergence of mobile sub-networks in the Personal Distributed Environment (PDE). In order to make decision which approach to be used in the PDE, a simulation model was developed to compare the approaches. Based on the simulation model and also analytical studies, performance evaluations were carried out on both approaches. This study will start with the introduction of the PDE concept and followed by the overview of the protocol used to support network mobility in PDE. The explanation of the simulation model and its environment will then follows. This is then followed by the explanation on the implementation of both approaches in the simulation model. The de-convergence of the sub-networks using both approaches will also be discussed. This will then be followed by the discussion on the metrics used to carry out the performance evaluation together with its derivation. The results from the evaluations will then be presented. At the end of this study, the most suitable

convergence approach of mobile sub-networks in the PDE will be determined. (*Information Technology Journal 8 (5): 657-667, 2009;* ***doi:*** *10.3923/itj.2009.657.667*)

Integrated the Intelligent Agent Behavior Model and Billing Service into Communication System

Steven K.C. Lo, Huan-Chao Keh, Yi-Hung Lin and Wang Jo-Chi

The evolution of mobile communications has been rapidly popular in recent years. In Taiwan, mobile phones predominantly possess multiple functions. In other words, mobile phones are not only conventional phones but also smart computer systems embedding with intelligent agent mechanisms to integrate heterogeneous applications. In addition, the billing system (Customer DB, Tariff and Sharing Schemes, Rating and Bill Data) is the crucial part of the communication system. It is an independent system to calculate the fee of communication. There are a lot of applications embedded into the mobile device in the market; however, how to integrate the billing system with the applications is insufficient. This study uses the RFID characteristics and intelligent agent attributes to establish a communication channel in order to automatically transmit data packets from the source site to the destination site. It exploits the intelligent agents to combine the intelligent parking system and the billing system. In addition, it proposes four kinds of intelligent behavior models including the intelligent agent cooperation behavior model, communication behavior model, coordination behavior model and competition behavior model to improve the process more smoothly and automatically. Using the intelligent agent characteristics and integrating the RFID features with the billing system are the most significant key factors. The proposed method improves the process, reduces the management cost and provides more flexible, stable and available systems. (*Information Technology Journal 8 (5): 668-677, 2009;* ***doi:*** *10.3923/itj.2009.668.677*)

DOSM: A Data-Oriented Security Model Based on Information Hiding in WSNs

Xiangrong Xiao, Xingming Sun, Xinbing Wang and Lei Rao

In this study, we propose a non-cryptology and protocol-independent technique based on information hiding, called Data-Oriented Security Model (DOSM).

Instead of one layer of protection, the proposed scheme offers two-fold protection against attack. An attacker first explores whether the data in question carries any useful information and then conducts extraction on it. Information is concealed by changing some properties of the data, which does not incur extra overheads to the sensor nodes. With the help of DOSM, each forwarding node can verify the embedded marks using the source node ID in each packet. This mechanism is used to filter data in a distributed manner. It can also avoid fake and tamper attacks by terminating bad packets as soon as they are detected. The data security is guaranteed by filtering the inconsistent packets between the hidden data and its source ID, which yields low energy consumption and high reliability. The simulation results show that the proposed DOSM protects the security of data communication and achieves data authentication invisibly at small overhead expense. (*Information Technology Journal 8 (5): 678-687, 2009;* ***doi:*** *10.3923/itj.2009.678.687*)

The Effects of Firms Resources and Capabilities on its Performance of IC Design Industry in Taiwan

Yuan-Yao Feng, Wei-Hwa Pan, Yueh-Chuen Huang and Yan-Kwang Chen

The aim of the study is to examine the relationship between firms resources and capabilities and its performance of IC design industry in Taiwan. The resource-bases view of the firms has become an important conceptual framework in strategic management but has been criticized for lack of an empirical base. A few researchers have been able to develop measures of resources and capabilities, identify their importance in a specific industry context and link firm's resource positions to firm performance. In this study, we examine the relationship between firms' resources and capabilities and its performance of Taiwan's IC design industry. The empirical findings are as: R and D resources and capabilities have no effects on firms performance. Marketing resources and capabilities, operation resources and capabilities, human resources and management all have positive effects on firms performance. Physical capital resource and management have no effects on firms performance. The analysis in this study provide a more convincing evidence for examining a more long-term relationship between resources and capabilities on firms performance, thus provide a implications for the management of firms' resources acquisition, allocation and utilization activities of Taiwan's IC design industry so as to facilitate their firms performance. (*Information Technology Journal 8 (5): 688-697, 2009;* ***doi:*** *10.3923/itj.2009.688.697*)

Realizing Large Virtual Web-Based Collaborative E-Commerce with B2X Middleware

BIN XU

E-commerce enterprises are facing the challenges from globalization. However, it costs much time and budget in building and maintaining web-based collaborative e-commerce platforms. It's also difficult to integrate several collaborative platforms into a larger platform, so as to make better collaboration. Manual collaboration between different platforms results in non-timely information exchange in large scale e-commerce and un-efficient end-to-end business collaboration. Yet a new cost efficient middleware, B2X (business to any), is proposed to integrate different e-commerce platforms and related protocols are defined. The architecture and related protocol of B2X are presented. A prototype of B2X has been built and a continuous integration model for large virtual web-based B2B (Business to Business) collaboration with B2X is presented to enhance the collaboration between the e-commerce enterprises. (*Information Technology Journal 8 (5): 698-707, 2009;* ***doi:*** *10.3923/itj.2009.698.707*)

A New CAD Models Retrieval Method Based on Shape Similarity

Sun Wei, Ma Tie-Qiang and Guo Li

The CAD model retrieval based on shape similarity is the research focus of computer graphics and computer-aided design field. To obtain higher retrieval precision and efficiency, a new CAD model retrieval method based on shape similarity is proposed. The method is divided into two steps. Firstly, breadth-first-search-based spanning tree algorithm is applied to obtain an initial boundary matching between retrieval object and retrieval condition. Secondly, the topology adjacency approximation algorithm is put forward to find the optimal boundary matching based on the initial boundary matching by the cycle and approximation process and the matching result is used to calculate the shape similarity between retrieval object and retrieval condition. In order to calculate the similarity between various types of boundary faces, a new similarity calculation method is present. Finally, a CAD model retrieval system on the platform of UG is developed based on the proposed method. Experimental results show that the proposed method is feasible and effective. (*Information Technology Journal 8 (5): 708-716, 2009;* ***doi:*** *10.3923/itj.2009.708.716*)

Simulated Distribution of the Retinal Photoreceptors for Space Variant Resolution Imaging

Zuojin Li, Weiren Shi and Zhi Zhong

This study presents a new computable method to simulate distribution of the retinal photoreceptors for space variant resolution imaging. In this presented method, first, a model of Laplacian and Gaussian multi-resolution pyramids is built; second, a weighting function coming from human visual psychological experiments is adopted in the presented model, lastly, a typical linear interpolation method is used between steps of multi-resolution pyramids. Another contribution of this study displays some experiments revealing the preliminary relationship between the place of gaze (foveation), image resolution and image compression rate. Compared with traditional uniform image processing methods, some experiment results show that the presented method in this study, approaches closer to the biological fact of visual perception and resolves the ring artifacts distortion, a problem left behind from the earlier study. The most obvious application of space variant resolution technique can be presented for digital image compression in low-bandwidth image communication. (*Information Technology Journal 8 (5): 717-725, 2009;* ***doi:*** *10.3923/itj.2009.717.725*)

Security Policy Management for Systems Employing Role Based Access Control Model

Chao Huang, Jianling Sun, Xinyu Wang and Yuanjie Si

In this study, we propose the redundancy and inconsistency checking algorithms to support the policy management of systems employing role based access control model. Present method is based on the formal definition of the policy redundancy and policy inconsistency. Via constructing the role graph, we analyze the redundancy and inconsistency one by one. According to the features of each type of redundancy and inconsistency, present algorithm checks all the possible violations and generates the related policy elements to help the security administrator to amend the policy afterwards. The performance test demonstrates that the approach is efficient enough for practical usage. Present approach could guarantee the conciseness as well as consistency of the access control policy, at same time reduce the burden of access control administration significantly. (*Information Technology Journal 8 (5): 726-734, 2009;* ***doi:*** *10.3923/itj.2009.726.734*)

Modeling of Software Fault Detection and Correction Processes Based on the Correction Lag

Yanjun Shu, Hongwei Liu, Zhibo Wu and Xiaozong Yang

This study presents a software reliability growth model integrating the fault detection process with the fault correction process. Although, a few research projects have been devoted to the modeling of these two processes, most of them studied the correction lag from a theoretical viewpoint of time delay. In this study, the correction lag is characterized by the remaining uncorrected faults which can be clearly observed from the actual data. Through analyzing its varying trend, the Gamma curve is found to be appropriate in representing the correction lag function. Then, the proposed model is derived. Two real data sets of software testing are used to evaluate models. Experimental results indicate that the proposed model not only provides better performance than other models on both fault detection and correction processes, but also does better in describing the correction lag. Finally, a revised software cost model is presented based on the proposed model. From the analysis on the determination of software release time, the new cost model shows more practical than the traditional approach. (*Information Technology Journal 8 (5): 735-742, 2009;* ***doi:*** *10.3923/itj.2009.735.742*)

Robust Controller Design for Synchronization of Two Chaotic Circuits

Shun-Jih Wang, Neng-Sheng Pai and Her-Terng Yau

This study present a robust algorithm to synchronize, under the master/slave configuration, a class of piecewise linear chaotic circuits based on sliding mode control. The synchronization objective is to obtain identical synchronization between the master and slave systems in spite of the existence of external disturbances and structural variations. A switching surface is adopted such that it becomes easy to ensure the stability of the error dynamics in the sliding mode. Then a Sliding Mode Controller (SMC) is derived to guarantee the occurrence of the sliding motion, even when the system is undergoing external disturbance and structural variations. This controller renders the closed loop system robust with respect to matched bounded disturbances and to terms produced by structural variations. The advantages of this method can be summarized as: (1) it is a systematic procedure for chaos suppression, (2) it can be applied to a variety of chaotic systems whether it contains uncertainties or not, (3) this controller is robust

to external disturbance and (4) there is no chattering in controller, so it is easy to implement. Numerical simulations have verified the effectiveness of this method. (*Information Technology Journal 8 (5): 743-749, 2009; **doi:** 10.3923/itj.2009.743.749*)

Modeling and Design for Dynamic Workflows Based on Flexible Activities

Peng Li and Yuyue Du

A rapidly changing environment forces the workflow management systems to change their workflow processes ever more frequently. In order to improve the flexibility of workflow management systems, a dynamic workflow model is proposed in this study. The concepts of flexible activities and historical execution information are put forward to construct dynamic workflow models in this method. Each flexible activity is used to encapsulate a group of indeterminate factors, e.g., the constraint rules and optional sub-activities when reifying a flexible activity. Historical execution information is the executive logging of a previous workflow instance. Two algorithms are put forward to guarantee the correctness of sub-workflows and the global control of dynamic processes. Furthermore, a simple example is given to validate the proposed dynamic workflow model. However, this method cannot perform well if there existing loop structures in sub-workflows and the reifying processes of flexible activities are not intelligent enough. (*Information Technology Journal 8 (5): 750-756, 2009; **doi:** 10.3923/itj.2009.750.756*)

Cooperation Enforcement Among Selfish Nodes in Ad Hoc Networks under Noise

Dongbin Wang, Mingzeng Hu, Hui Zhi and Jianwei Ye

In ad hoc networks, the source node can take help of the intermediate nodes to communicate with the destination node by relaying the packets hop by hop. But nodes are constrained with limited resources, so nodes tend to be selfish and cooperative behaviour in forwarding packets for others can not be taken for granted. In the study, we present a two-player packet forwarding game under noise. An incentive-compatible condition under which the selfish one will be deterred from defection by the subsequent punishment and then turn to cooperate is analyzed. The impact of parameter settings of punishment strategy and isolation strategy on cooperation enforcement is discussed. The simulation results show that

the proposed packet forwarding approach can effectively stimulate cooperation among selfish nodes under noise. (*Information Technology Journal 8 (5): 757-763, 2009; **doi**: 10.3923/itj.2009.757.763*)

Weight-Based Feature Selection for Conditional Maximum Entropy Models

Lu Li, Xuan Wang and XiaoLong Wang

Conditional maximum entropy models provide a unified framework to integrate arbitrary features from different knowledge sources and have been successfully applied to many natural language processing tasks. Feature selection methods are often used to distinguish good features from bad ones to improve model performance. The selection of features in traditional methods is often performed based on different strategies before or along with feature weight estimation, however, weights themselves should be the only factor to measure the importance of features. This study proposes a new selection method based on divide-and-conquer strategies and well-trained feature spaces of small sizes. Features are divided into small subsets, on each of which a sub-model is built and its features are judged according to their weights. The final model is constructed based on merged feature space from all sub-models. Experiments on part of speech tagging show that this method is feasible and efficient. (*Information Technology Journal 8 (5): 764-769, 2009; **doi**: 10.3923/itj.2009.764.769*)

Design of TDD/TDMA 4G System with Link Adaptation

Liu Zunxiong, Xu Zheng, Feng Xingle and Lu Zhaogan

In current 4G system given in recent literatures, channel estimation overhead and complexity of Multi-User Detectors (MUD), may lead to bad performance in fast fading channel scenarios when large number of users exists. So, a novel 4G system with TDD/TDMA as duplex and wireless access is designed to reduce channel estimation spending and avoid MUD, as only one user can be active to communicate with base station. Under the requirement of 4G systems, radio frame structure is elaborately designed to fit for fast fading channel scenarios. The system architecture with consideration of link adaptations for a novel eigenmodes coupled universal space-time codes, is given and evaluated for performance of TDD/TDMA 4G systems. Results show the proposed TDD/TDMA 4G can meet the requirement of 4G system under the classical ITU channel profiles. (*Information Technology Journal 8 (5): 770-775, 2009; **doi**: 10.3923/itj.2009.770.775*)

Range-Based Clock Synchronization Protocol for Wireless Sensor Networks

Zhetao Li, Renfa Li and Liangjiao Liu

This study presents a novel range-based clock synchronization protocol by exploiting non-synchronized TDOA. It combines the method of Network Time Protocol (NTP) with round-trip TDOA. By applying round-trip TDOA repeatedly, all nodes in network efficiently synchronize to each other. Furthermore, clock synchronization and ranging can be performed simultaneously. Simulation results show it outperforms Timing-sync Protocol for Sensor Networks (TPSN) and Reference Broadcast Synchronization (RBS) in terms of the number of message exchanges and synchronization error. (*Information Technology Journal 8 (5): 776-780, 2009;* ***doi:*** *10.3923/itj.2009.776.780*)

Spectral Analysis of Sanskrit Devine Sound OM

A.A. Gurjar and Siddharth A. Ladhake

Our attentiveness and concentration are pilfered from us by the proceedings take place around us in the world in recent times. Different challenges and impediments are faced by the people work in the industries, offices and even in business. It is tough to handle the stress some times. Therefore, to come out of the aforementioned troubles, meditation is essential for all human beings. In the same way, for pschychological stress, speech signal is uttered to be a considerable indicator. In the direction of mediating human subject, OM is a spiritual mantra, outstanding to fetch peace and calm. The entire psychological pressure and worldly thoughts are taken away by the chanting of OM mantra. Elimination of disruption and introduction of new dynamism in the body are given by the OM chanting. The consciousness could be promoted through the repetition of OM mantra. Furthermore, this mantra transcends the restrictions of a mentality. To systematically understand the meditative chant, termed the divine sound OM, is the endeavor of this research work. Spectral analysis has been carried out for OM mantra to study its structure and to identify the factors, which have been found to influence the human nerve system. By this analysis, we could conclude stress gets minimized after OM chant. (*Information Technology Journal 8 (5): 781-785, 2009;* ***doi:*** *10.3923/itj.2009.781.785*)

Composing Disparate Services and Data Dynamically Based on EBS

Shu-Qing Peng and De-Yun Chen

In this study, a new framework that disparate services and data are composed dynamically based on ESB is proposed, in which business process is analyzed into multiple work-data flows. Dynamic routing mechanism is applied to map abstract description of services and data to their respective providers. This new framework can implement dynamic composition of disparate services and data. (*Information Technology Journal 8 (5): 786-790, 2009; **doi**: 10.3923/itj.2009.786.790*)

Asymptotically Optimal Geographical Routing for Multimedia Wireless Sensor Networks

Zhetao Li, Renfa Li, Di Wu and Conte Mohamed

In multimedia wireless sensor networks, multiple packets are generated for the same destination. All these packets go through the same route in a session when using current geographical routing. However, detour is inevitable in geographical routing without the help of global state. A progressive yet effective strategy is proposed to mitigate inefficient detour in geographical routing. In asymptotically optimal geographical routing, detour mode was substituted by greedy mode with the help of a subset of nodes acting as way points. The average performance of the proposed algorithm is compared to Greedy Perimeter Stateless Routing (GPSR) and the benchmark shortest path algorithm. Simulation results show that in average the proposed algorithm can reduce as much as 50% of hops on the routes obtained by GPSR. (*Information Technology Journal 8 (5): 791-795, 2009; **doi**: 10.3923/itj.2009.791.795*)

Speech Recognition Algorithm of Parallel Subband HMM Based on Wavelet Analysis and Neural Network

Zhou Ping, Tang Li-Zhen and Xu Dong-Feng

The purpose of speech recognition is able to extract the content of the speech in various conditions and transform from speech to text automatically. Based on human hearing perception mechanism, we propose a decomposition method using independent parallel subbands for speech recognition. In this method, wavelet processing is introduced into Hidden Markov Model (HMM) and Fuzzy Neural

Network (FNN) is used to improve the convergence speed and to avoid local optimal in speech detection. Experiment results show that the proposed hybrid speech recognition model is more robust when noise presents. We combine the dynamic modeling of CDHMM and the classification capability of fuzzy neutral network, this has been a hot research area in recent years and can be applied to speech-text transform devices. (*Information Technology Journal 8 (5): 796-800, 2009; **doi:** 10.3923/itj.2009.796.800*)

Machine Learning Approach in Optimizing Negotiation Agents for E-Commerce

S.C. Ng, M.N. Sulaiman and M.H. Selamat

This study discusses the implementation of machine learning approach in negotiation agents that can learn their opponent's preferences and constraints during one-to-many negotiations. A novel mechanism in learning negotiation is introduced. The genetic-based model of multi-attribute one-to-many negotiation, namely GA Improved-ITA is proposed. The GA Improved-ITA agents first utilize Genetic-Based Machine Learning (GBML) to identify their opponent's preferable negotiation issues. It is then followed by branch and bound search to search for the best value for each of the issues. The performance of GA Improved-ITA is promising when it is compared with the results of one-to-many negotiations obtained by Bayesian learning model and heuristic search algorithm. (*Information Technology Journal 8 (6): 801-810, 2009; **doi:** 10.3923/itj.2009.801.810*)

Feature Selection for Image Steganalysis using Hybrid Genetic Algorithm

Zhihua Xia, Xingming Sun, Jiaohua Qin and Changming Niu

Learning-based methodology has been demonstrated to be an effective approach to dispose the steganalysis difficulties due to the variety of image texture. A crucial process of the learning-based steganalysis is to construct a low-dimensional feature set. In this study, a feature selection method based on Hybrid Genetic Algorithm (HGA) is presented to select feature subsets which not only contain fewer features, but also provide better detection performance for steganalysis. First, the general framework about utilizing Genetic Algorithm (GA) to do feature selection for steganalysis is presented. Then, we analyze similarity among individuals (SI) in each generation and the Transformation of Generations (TG) to determine whether the GA has converged into a local area. Next, according to the

SI and TG, the restarting operation is incorporated into the HGA to allow the algorithm to escape from the unsatisfactory local area. In the experiments, three feature subsets are formed from a universal feature set for three typical steganography methods, respectively. The experimental results show that the classifiers using the feature subsets gain better detection accuracy and higher speed than those using the universal set. (*Information Technology Journal 8 (6): 811-820, 2009; **doi:** 10.3923/itj.2009.811.820*)

Soundness Analysis of T-Restricted Interorganizational Logical Workflow Nets

Wei Liu, Yuyue Du and Haichun Sun

Interorganizational Logical Workflow Nets (ILWN) can efficiently model cooperative systems based on Petri nets, workflow techniques and temporal logic. But soundness of arbitrary ILWNs is hard to decide. This study defines the concept of T-restricted Logical Workflow Nets (LWN) and proposes an important subclass of ILWNs composed of n T-restricted LWNs: T-restricted ILWNs. The sufficient and necessary conditions of T-restricted ILWNs preserving soundness are obtained and the rigorous analysis approach is presented based on their static net structures only. Moreover, two approaches of combining n T-restricted LWNs into one T-restricted ILWN are given. The concepts and techniques proposed in this study are illustrated with a useful example of an auto gas station system. (*Information Technology Journal 8 (6): 821-829, 2009; **doi:** 10.3923/itj.2009.821.829*)

Mining Personalized User Profile Based on Interesting Points and Interesting Vectors

Zeze Wu, Qingtian Zeng and Xiaowen Hu

To dig out the implicit meanings in user's multi-behavior sequences, a new approach of mining personalized user profiles is proposed. Firstly, the method is presented to mine user's interesting points and interesting vectors. A user's interesting profile is obtained by combining the interesting point group with interesting vector group together, which is denoted by a weighted directed graph. Then, an algorithm is proposed to calculate the similarity between such user profiles. To verify the effectiveness of the approach proposed in this study, personalized recommendation experiments are realized by using content-based filtering and collaborative filtering, respectively. The results show that the average

not acceptance rates of these recommendation services are only 5.94% using content-based filtering recommendation and 3.7% using collaborative filtering. It indicates that the approach proposed in this study is quite available in mining personalized user profiles. (*Information Technology Journal 8 (6): 830-838, 2009; **doi**: 10.3923/itj.2009.830.838*)

Neural-Based GA Optimization on Multi-Objective CNC Turning

Tian-Syung Lan

With the L_9 (3^4) orthogonal array of Taguchi experiment, the four cutting parameters with three levels are selected to determine the $3^4 = 81$ sets of full experimental combinations. Additionally, the ECOCA-PC3807 CNC (Computer Numerical Control) lathe is utilized to diameter finish turn the S45C. The surface roughness (Ra), tool wear ratio (μm^{-2}) and cutting force (N) are experimentally measured as quality objectives. The BPN (Back-Propagation Network) is moreover introduced to learn the randomly selected 45 sets of experimental results. The remaining 36 sets of experimental results are furthermore employed to verify the constructed multi-quality predictor for CNC turning. Considering the learning rate as 1 and momentum factor as 0.5; the results of 4000 times of BPN training through a hidden layer indicated that the prediction accuracy of 95.87, 94.32 and 92.29% for surface roughness, of tool wear ratio and cutting force, respectively. The GA optimization on multi-objective CNC turning proposed in this study surely provides an economic and prospective approach. (*Information Technology Journal 8 (6): 839-846, 2009; **doi**: 10.3923/itj.2009.839.846*)

Quality Prediction Model of Injection-Molded Rib Design using Back-Propagation Network

Tian-Syung Lan and Ming-Yung Wang

In this study, an analytical model of a rectangular thermoplastic ABS (Acrylonitrile Butadiene Styrene) plastic cover with rib of a given thickness (2.8 mm) was introduced and the dimensions as well as width of the rib were selected as the control factors for simulation. Additionally, the deflection under a constant force of 150 Newton at the back centre of the cover was defined as quality characteristic. Moreover, the $L_9(3^4)$ orthogonal array for four factors and three levels from Taguchi method was additionally considered to layout the $3^4 = 81$ sets of full simulations. By commencing the BPN (Back-Propagation Network) to learn

the selected 45 sets of simulated results. The remaining 36 sets of simulated results are then employed to verify and construct a quality predictor of rib design. Considering the learning rate as 1 and momentum factor as 0.5, the results of 20000 times of BPN training through a hidden layer indicated that the accuracy of deflection prediction reached 95.87%. In this study, the full FEM (Finite Element Method) simulated results from the 81 sets of combinations layout by Taguchi method are learned and verified by BPN for the design of injection-molded rib. It is shown that the quality of a plastic rib can surely be effectively found with the proposed economic and prospective BPN. This study exactly contributes an economical technique to the quality prediction of rib design for plastic injection industry in minimizing the development period of a new product. (*Information Technology Journal 8 (6): 847-854, 2009;* ***doi:*** *10.3923/itj.2009.847.854*)

Fractal Cluster Based Aging Model of Electrical Treeing in Polymeric Insulation

A. Samee, Z.H. Li, C.H. Zhang and Z.P. Huang

The aim of this study was to develop an aging model based on the concept of generation of micro voids due to thermally-activated, electrically-enhanced breakage of bond structure of the polymeric insulation. Here, we have modeled electrical tree structures as fractal cluster which are formed due to coalescing of micro voids. In this study we have derived the electrical tree growth rate equation and formula for time of electrical tree propagation to failure. We have extended this approach for multifactor aging which can modify the bond breaking and repair energies of insulation under multi-stress conditions, which can eventually affect the electrical tree growth time to failure. We have provided an overview of phenomenological and physical aging models, the mechanism of formation of micro-voids from breaking of bond under combined thermal and electrical stress and the process of fractal clusters (electrical trees) formation due to coalescence of micro-voids. (*Information Technology Journal 8 (6): 855-862, 2009;* ***doi:*** *10.3923/itj.2009.855.862*)

Multi-Video-Sources Selection Strategy in Mobile P2P Streaming Media Architecture

Mande Xie

A mobile peer to peer architecture for streaming media system was firstly proposed. According to the architecture, a serial scheduling and parallel scheduling

algorithm were proposed for multi-video-sources. If quality of service monitored by the receiving-peer is degraded, the serial scheduling algorithm triggered the video source change event and synchronized the multi-video-sources by the time model of the streaming sequence. If the multi-video source concurrently sent the data to the receiving-peer, the parallel scheduling algorithm assigned the transmission task by frame-level bit assignment strategy. The algorithm firstly formulated the assignment problem to a nonlinearity programming problem and then transformed it into an integer programming problem based on the piece linear rate-distortion model. At last, the assignment problem was transformed into a general linear programming problem by relaxing the constraint condition. The algorithm was implemented by a greedy strategy and a piece approximate method was designed to map the solution between a linear programming problem and an integer linear programming problem. The experiment results show the algorithm is accuracy and valid and the distortion brought by the approximate method is neglected. The algorithm is very suited to a mobile P2P video streaming system. (*Information Technology Journal 8 (6): 863-870, 2009;* ***doi:*** *10.3923/itj.2009.863.870*)

Ontology-Based Model for Software Resources Interoperability

Bo Ding and Li-juan Sun

In this study, we propose an ontology-based framework to provide an integrated view, which could integrate various software resources and realize semantic interoperability between different software resources. Ontologies are divided into shared ontology and domain ontology. The design of shared ontology is described in detail. The shared ontology which has explicit ontological semantics, implements the uniform representation of heterogeneous information and helps to shield the heterogeneity of software resources systematically. The domain ontology is a domain-specific functional design ontology repository, in which, the invoking functions of the specific platform is encapsulated. The Collaborative Functional Design Environment (CFDE) is built through the shared ontology and the domain ontology. The CFDE facilitates the semantic interoperability among diverse software resources, which provides more software resources and better service to users. (*Information Technology Journal 8 (6): 871-878, 2009;* ***doi:*** *10.3923/itj.2009.871.878*)

Successful Supply Chain Practices through Organizational Knowledge and E-Business Technology

P.K. Chen, Chung-Ming Huang and Chun-Hsien Su

In recent years, organizational knowledge has played an important role in supply chain. Many manufacturers believe that the creation and sharing of organizational knowledge can improve supply chain practices. This study explores, the effect of organizational knowledge on supply chain practices and whether organizational knowledge can be created and shared through e-business. We examine the influence among e-business technology, organizational knowledge, supply chain practices and competitive performance. Present results indicate that organizational knowledge has a positive effect on supply chain practices, leading to competitive performance. Otherwise, organizational knowledge can be created through e-business. In addition, e-business technology can also play a role in knowledge sharing, so as to improve organizational knowledge. This in turn can affect the sharing between supply chain partners, which leads to effective supply chain practices. In this study, we analyze 552 samples from top manufacturing firms based in 24 countries and perform Structural Equation Modeling (SEM) to test our hypotheses. (*Information Technology Journal 8 (6): 879-886, 2009;* ***doi:*** *10.3923/itj.2009.879.886*)

Fair Blind Signature Based Authentication for Super Peer P2P Network

Xiaoliang Wang and Xingming Sun

Anonymity has received increasing attention in the literature due to the users' awareness of their privacy nowadays. While, anonymity related issues have been extensively studied in Peer-to-Peer (P2P) systems, numerous concerns have been raised about the issue of providing authentic partners in P2P systems. In addition, the network authority requires controlled anonymity, so that misbehaving entities in the network remain traceable. We are working on seeking novel and more effective methods to control anonymity, authentication and traceability. In this study, we propose a security architecture to ensure anonymity and authentication for honest users and keep traceability for misbehaving users in P2P systems. We use Fair Blind Signature Trust (FBST) to resolve the conflicts among anonymity, authentication and traceability. Signature scheme that has information about identity ensures authentication. At the same time, use of blind signature and additional anonymous scheme provides anonymity. Moreover, traceability is achieved due to the fairness of fair blind signature. Security analysis shows that the FBST can perfectly solve tradeoff between anonymity, authentication and traceability. (*Information Technology Journal 8 (6): 887-894, 2009;* ***doi:*** *10.3923/itj.2009.887.894*)

Using Immune Network in Nonlinear System Identification for a 3D Parallel Robot

Pin-Chang Chen

Nonlinear system identification can improve control performance significantly, especially when the system dynamic behaviors are unknown and with great nonlinearity. The concept of immune network simulated the concentration of a set of antibodies. The immune system has the following features: self-organizing, memory, recognition, adaptive and ability of learning. Therefore, immune network could be applied to nonlinear system identification and provided various feasible system models with robust and adaptive characteristics. In this study, a new type of 3D parallel robot arm manipulator with human interface and the parallel motion control of a platform manipulator actuated by three AC servomotors are introduced. To comprehensively realize the performance of the parallel robot, the immune network which theoretically derived for the application of quantified and graphical performance synthesis is presented. Thus, the capability of this parallel robot in its applications as well as its future research and development are approached. The findings of this study should contribute positively to the practice of using immune network to improve the nonlinear system identification and develop a system model with robust and adaptive characteristics. (*Information Technology Journal 8 (6): 895-902, 2009; **doi:** 10.3923/itj.2009.895.902*)

Study of MDA Based Semantic Web Service Composition

Zhengdong Zhu, Yanping Chen, Ronggui Lan and Zengzhi Li

This study presents a Semantic Web Services composition method based on Model-Driven Architecture (MDA). It uses UML class and use-case diagram to build a model of static composition for OWL-S and it uses activity diagram to build a model of dynamic composition for OWL-S. Based on semantic matching degree, the matching methods are used to select a subset of the available web services and then the most suitable composite web services is identified. Through a translation to a verifiable Promela model, the composition UML models are verified by SPIN tool. The verified UML models are stored as templates in the knowledge base of ontology for reuse. Present method not only improves the development efficiency of the semantic web, but, also ensures the correctness of the composition process. (*Information Technology Journal 8 (6): 903-909, 2009; **doi:** 10.3923/itj.2009.903.909*)

Privacy Preserving in Ubiquitous Computing: Architecture

Tinghuai Ma, SenYang, Wei Tian and Wenjie Liu

In this study, we summarize the main principles of privacy-aware system and present a new architecture. We preserve the person's location privacy by using the methods of spatiotemporally-based anonym and location information disturbing. In the spatiotemporally-based anonym method, the space and time are divided into pieces. While, an entity hands over from one domain to another, its ID will be refreshed. In the location information disturbing method, there are two methods to disturb coordinate data. One is transferring coordinate to a random data, the other is transferring coordinate to a fixed data. (*Information Technology Journal 8 (6): 910-916, 2009; **doi:** 10.3923/itj.2009.910.916*)

Taguchi Optimization of Multi-Objective CNC Machining Using TOPSIS

Tian-Syung Lan

In this study, surface roughness, tool wear and Material Removal Rate (MRR) are major intentions in modern Computer Numerical Controlled (CNC) machining industry; therefore, the $L_9(3^4)$ orthogonal array of Taguchi experiment is selected for optimizing the multi-objective machining. Through, the examination of surface roughness (R_a), tool wear ratio (mm^{-2}) and the calculation of Material Removal Rate (MRR) ($mm^3\ min^{-1}$); machining objectives are then received. By using Technique for Order Preference by Similarity to Ideal Solution (TOPSIS), the multiple objectives can additionally be integrated and introduced as the S/N (signal to noise) ratio into the Taguchi experiment. The mean effects for S/N ratios are moreover analyzed by MINITAB to achieve the multi-objective turning parameters. Through, the confirmation results, it is shown that the three objectives from our optimum parameters are all greatly advanced compared to those from benchmark parameters. Parametric optimization is a hard-solving matter because of the interactions between parameters. This study not only proposes a novel parametric optimization technique using Technique for Order Performance by Similarity to Ideal Solution (TOPSIS), but also contributes the satisfactory solution for multiple CNC turning objectives with profound insight. (*Information Technology Journal 8 (6): 917-922, 2009; **doi:** 10.3923/itj.2009.917.922*)

Improving Accuracy of Intention-Based Response Classification using Decision Tree

S.A. Ali, N. Sulaiman, A. Mustapha and N. Mustapha

This study focused on improving the dialogue act classification to classify a user utterance into a response class using a decision tree approach. Decision tree classifier is tested on 64 mixed-initiative, transaction dialogue corpus in theater domain. The result from the comparative experiment show that decision tree able to achieve 81.95% recognition accuracy in classification better than the 73.9% obtained using Bayesian networks and 71.3% achieved by using Maximum likelihood estimation. This result showed that the performance of decision tree as classifier is well suited for these tasks. (*Information Technology Journal 8 (6): 923-928, 2009; **doi:** 10.3923/itj.2009.923.928*)

An Investigation on Cost and Accuracy Analysis of Real-Time Kinematic GPS Method in Acquisition of Spatial Data for GIS

Omer Mutluoglu and Ayhan Ceylan

In this study, acquisition of spatial data for GIS with RTK-GPS and conventional survey methods have been compared in view of cost and accuracy. One of the main components of a Geographic Information System (GIS) is the formation of the database. More than 70% of the time and cost is spent on developing this database. The success of a GIS project depends on the accuracy and currentness of the obtained spatial data required for development of the GIS project. This study presents analyses of the accuracy and costs of several methods of obtaining spatial data for a GIS project in a test area selected at the Campus of Konya Selcuk University. About a 20 ha test area were established in Selcuk University Campus to compare RTK-GPS and classic methods. Detail points in the test area were measured according to polar coordinate method by using electronic tacheometry. Spatial data concerning the same area were obtained with Real Time Kinematic GPS (RTK GPS). Polar coordinate method (classical method) was accepted as a basis and compared with the spatial data obtained from RTK-GPS method in terms of accuracy and cost. As a result, it was noted that real-time kinematic GPS methods were found to be appropriate for the GIS projects requiring high accuracy (e.g., cadastral, public works, infrastructures, etc.). (*Information Technology Journal 8 (6): 929-933, 2009; **doi:** 10.3923/itj.2009.929.933*)

A Critical Review of Receipt-Freeness and Coercion-Resistance

Bo Meng

In this study, we first briefly introduce the development status of core cryptographic primitives related to implementation of receipt-freeness and coercion-resistance. These core cryptographic primitives consist of blind signature, deniable encryption, mix net/verifiable shuffles, designated verifier proof/signature, knowledge proof protocol, plaintext equivalence test, secure multi-party computation and deniable authentication protocol. Then, a typical deniable encryption scheme is analyzed and improved. Moreover, the state-of-art of receipt-freeness and coercion-resistance, based on the internet voting model proposed by us, is presented. Finally, the status in quo of formal analysis of receipt-freeness and coercion-resistance is discussed. (*Information Technology Journal 8 (7): 934-964, 2009;* ***doi:*** *10.3923/itj.2009.934.964*)

A Review of Hardware Transactional Memory in Multicore Processors

X. Wang, Zhenzhou Ji, Chen Fu and Mingzeng Hu

In this study, we give a review of the current Hardware Transactional Memory (HTM) systems for Multicore processors. Hardware transactional memory systems are classified into the following three categories: how to perform version management and conflict detection, whether to support unbounded transactional memory and whether to support transactions nesting. Finally, we discussed two active research challenges: the relationship between transactional memory and Input/Output operations and Instruction Set Architecture (ISA) supporting. (*Information Technology Journal 8 (7): 965-970, 2009;* ***doi:*** *10.3923/itj.2009.965.970*)

Off-Line Jawi Handwriting Recognition Using Hamming Classification

Z. Razak, N.A. Ghani, E.M. Tamil, M.Y. Idna Idris, N.M. Noor, R. Salleh, M. Yaacob, M. Yakub and Z.B.M. Yusoff

This study proposes a System-on-chip design for an off-line Jawi handwriting character recognition application. The system is implemented using VHSIC Hardware Description Language (VHDL). The character recognition chip will be

developed using, Discrete Wavelet Transform (DWT) for feature extraction and Hamming distance algorithm for classification of Jawi characters. The system architecture and implementation will also be discussed in this study. A set of 132 Jawi character's image has been used for generating the unique code during feature extraction process and has been tested for recognition process. (*Information Technology Journal 8 (7): 971-981, 2009;* ***doi:*** *10.3923/itj.2009.971.981*)

Blind and Robust Watermarking for Street-Network Vector Maps

Yu-Chi Pu and I-Chang Jou

This investigation develops a novel and blind watermarking approach suitable for street-network vector maps that records the information about roads by points and line segments. The proposed method simplifies the map using the Douglas Peucker algorithm to obtain the feature points and then subdivides the map into mesh segments. After map segmentation, the watermark is embedded in each segment. The proposed approach is superior to other vector map watermarking methods, since, it resolve the synchronization problem from the alternation of vertex coordinates. Moreover, the detection step does not require the original map in either the segmentation step or the watermarking step. Simulation results indicate that the proposed approach can withstand a variety of common attacks, including similarity transformation, map shifting, cropping, simplification and noise addition. (*Information Technology Journal 8 (7): 982-989, 2009;* ***doi:*** *10.3923/itj.2009.982.989*)

Conditioning for State Space Reduction in Program Model Checking

Long Yuejin and Xiao Jianyu

This study aim to propose a scheme of applying program conditioning to reduce state space for program model checking, in which the antecedent of a implication form in LTL formula of program property is taken as the constrained condition of program conditioning and the statements irrelevant to satisfiability of the property are deleted. Analysis and experiment show that not only this scheme can effectively reduce a program's state, but also it can preserve the program's property. (*Information Technology Journal 8 (7): 990-997, 2009;* ***doi:*** *10.3923/itj.2009.990.997*)

A Process Generation Approach of Dynamic Workflows Based Description Logics

FuXin Zhang and YuYue Du

To make workflow processes more flexible, a dynamic generation approach for workflow processes corresponding to an instance is presented in this study. An activity, a part of a workflow, is defined as an action based on Description Logics (DLs). User preferences are considered, since a final solution should satisfy user preferences as much as possible. Also, a hierarchical workflow ontology model is proposed and a deciding method for basic routing relations in workflows is provided to produce the processes completely. Then for generating the processes, a new planning algorithm of workflow processes, DPWPG: Dynamic Planning for Workflow Process Generation, is presented and used to search matching activities in a workflow ontology model, according to ontological reasoning in semantic activities and users' preferences. Finally, an example is given to test the performance of the planning algorithm. (*Information Technology Journal 8 (7): 998-1005, 2009;* ***doi:*** *10.3923/itj.2009.998.1005*)

SRRG: An Effective Self Recovery Routing Game for Mobile Ad hoc Network

Q. Dan-Yang, M. Lin, S. Xue-Jun and X. Yu-Bin

Mobile ad hoc network (MANET) is a centerless packet radio network without the use of any fixed infrastructure. Tremendous attentions have been received because of capabilities of self configuration and self maintenance especially in public safe and disaster recovery situations. Attenuation and interference caused by node mobility and wireless channels sharing, however, weaken the stability of communication links, which makes routing protocol design present nontrivial challenges such as broadcast storm, stale route and delay. The negative impact of wireless routes discontinuity on pervasive communication is alleviated by an effective Self Recovery Routing Game (SRRG) proposed in this study for source-initiated routing protocols by restricting route require zone on intermediate forward nodes according to the solution of optimal exploring equations. The purpose of SRRG is to reduce overhead during route maintenance as well as allowing continuous packet forwarding for fault resilience. NS2 based simulating results indicate that SRRG based on AODV presented in this study achieves much notable improvement for performance of MANET in packet successful delivery rate and total overhead, what is more, obtains much lower average end-to-end

delay susceptibility on network capacity and node mobile state simultaneously to improve robustness and survivability. (*Information Technology Journal 8 (7): 1006-1012, 2009; **doi**: 10.3923/itj.2009.1006.1012*)

Performance Study of Cooperative Diversity System over Nakagami-m Fading Channels

Jingning Wang, Xuejun Sha, Linan Sun and Zhongzhao Zhang

In this study, a cooperative diversity scheme with decoded-and-forward plus amplify-and-forward is proposed by employing truncated stop-and-wait automatic repeat request for error control. All the transmission channels are assumed to exhibit Nakagami-m fading and the cross-layer performance is analyzed for the proposed scheme, such as the channel efficiency in physical layer, throughput and packet loss rate in link layer. The simulation results show that, the proposed scheme has the better cross-layer performance than other cooperative systems. By choosing a suitable partner, the proposed cooperative scheme can provide better performance than non-cooperative systems and spatial diversity gain can be obtained. (*Information Technology Journal 8 (7): 1013-1019, 2009; **doi**: 10.3923/itj.2009.1013.1019*)

The Application of Value Analysis Based on Kano's Two Dimensions Model and Value Expansion Model

Kun-Lin Hsieh

How to obtain the useful Business Intelligence (BI) had known as an important work for most enterprises in Taiwanese, especial for the leisure industry. Hence, in this study, we will demonstrate a value analysis procedure based on the Kano's two dimensions model and value expansion model to address such issue. Besides, an illustrative example owing to the leisure farming at Taitung area in Taiwan is also taken to demonstrate the feasibility and rationality of the proposed procedure. The important findings and conclusions in this study can be summarized as: (1) the Must-be values (keep health, self-satisfactory, leisure experience) for leisure farming case were mined by using the proposed Kano's model; (2) the important products/services, benefits were obtained from the Must-be values by using the proposed value expansion model; (3) managers can know how to rationally and feasibly construct their corresponding competitive strategies for different customers' clusters. (*Information Technology Journal 8 (7): 1020-1026, 2009; **doi**: 10.3923/itj.2009.1020.1026*)

A Quantum Secure Direct Communication with Authentication

Zu-Ning Chen, Zheng Qin and Lei Lu

In this study, a novel quantum secure direct communication protocol is proposed with authentication using the quantum superdense coding scheme and a braid-based key agreement protocol. The security of the proposed protocol is based on the no-cloning theorem, the correlations of quantum entanglement and the fact that the p-th root finding problem on braid groups is intractable even on quantum computers, as well as classical computers. In the proposed protocol, the sender Alice and the receiver Bob firstly apply a braid-based key agreement protocol to share a secret random number, whose size and magnitude are undecided in advance, for authentication. Then, Alice and Bob share a set of EPR pairs. Both sides authenticate each other through the Bell state measurement on their check qubits. Alice encodes a secret message on their message qubits in terms of superdense coding and then sends her message qubits to Bob. After receiving Alice's message qubits, Bob decodes them so as to get the secret message. We prove rigorously that the proposed QSDC protocol can resist the known attacks so far, particularly the man in the middle attacks. At the same time the proposed protocol is similar in the communication way to the common communication. (*Information Technology Journal 8 (7): 1027-1032, 2009;* ***doi:*** *10.3923/itj.2009.1027.1032*)

A Study on Unified Term Co-Occurrence Model

Qiao Ya-Nan, Qi Yong and Hou Di

In order to improve the comprehensive performance and expand the scope of application of traditional term co-occurrence models, this study proposes Unified Term Co-occurrence Model. It unites two types of traditional term co-occurrence models (which are called mother models of Unified Term Co-occurrence Model) and could make a series of compound models of them for various research conditions. Precision and stability are two key performance indicators of term co-occurrence models. The first type of traditional term co-occurrence models are good at stability and the second type of traditional term co-occurrence models are good at precision. The experimental results in this study confirm that precision and stability of Unified Term Co-occurrence Model (UTCM) are not lower than both of its mother models. Then, a new measure for comprehensive

performance is proposed and Unified Term Co-occurrence Model (UTCM) achieves better comprehensive performance compared with both of its mother models. Researchers can use unified term co-occurrence model instead of traditional models as an important tool to get more rational experimental results in relative research fields such as information retrieval, natural linguistic processing and computational linguistics, etc. (*Information Technology Journal 8 (7): 1033-1038, 2009; **doi:** 10.3923/itj.2009.1033.1038*)

Inducing Positive and Negative Rules Based on Rough Set

Tinghuai Ma, Jiazhao Leng, Mengmeng Cui and Wei Tian

Traditional classification rules take the positive form as C→D. A new method of retrieving the negative ¬C→¬D form is introduced in this paper. Negative rules can improve the classification quality in some case. We propose a classification algorithm named Rule Generation based on Classification Attribute (RGCA) to deduct negative and positive rules. The RGCA algorithm won't need processing records item by item. The real dataset are used to verify the presented algorithm. The result shows the negative rules is more than positive rules based on RGCA algorithm, the classification accuracy of RGCA algorithm is better than traditional positive based algorithm. (*Information Technology Journal 8 (7): 1039-1043, 2009; **doi:** 10.3923/itj.2009.1039.1043*)

An Energy-Aware Cluster-Based Routing Protocol for Wireless Sensor and Actor Network

Zhicheng Dai, Zhi Li, Bingwen Wang and Qiang Tang

In this study, an Energy-Aware Cluster-Based Routing (EACBR) protocol which adapts to the characteristics of WSAN is proposed. Sensors and actors are divided into some clusters and every cluster including an actor and some sensors is considered to different subnet. The Shortest Path Trees (SPTs) from sensors as resource to actor as destination in every subnet are calculated by Dijkstra algorithm. The process of EACBR protocol is divided into rounds and SPTs are dynamically generated according to network states in each round. The analysis and simulation results show that EACBR protocol can prolong network lifetime and reduce transmission delay. (*Information Technology Journal 8 (7): 1044-1048, 2009; **doi:** 10.3923/itj.2009.1044.1048*)

The Design of Firewall in Mobile Phone Based on Cross-Layer Collaboration

Hao Yu, Ming-Xiang He and Hai-Chun Sun

Being different from the traditional packet filter firewall, this study gives a design model of mobile phone firewall which is based on the cross-layer collaboration. Firstly, author designed the functional model and the overall framework. Secondly, author devised the key process and algorithm. At last, the author validated the advantage of model through simulation experiments. Through, the simulation experiments, the model is proved to be effective to reduce the firewall's consumption of resources and improve the efficiency and quality of firewall in mobile phone. (*Information Technology Journal 8 (7): 1049-1053, 2009; **doi:** 10.3923/itj.2009.1049.1053*)

Modeling Multimedia Synchronization using Petri Nets

Wei Liu and Yuyue Du

In this study, Logical Time Interaction Petri Nets (LTIPN) were designed to describe multimedia synchronization based on the previous models. In the model, we introduce logical expressions which are used to describe passing value indeterminacy in an logical time Petri net to model multimedia synchronization. And all multimedia synchronization events including multimedia objects are expressed by transitions of Petri nets, while the previous models mostly use places of Petri nets to express multimedia objects. This study provides users simple and intuitive modeling approaches. Basic temporal relations between multimedia objects, multimedia synchronization strategies and user interactive operations can be represented simply and explicitly by the LTIPN. (*Information Technology Journal 8 (7): 1054-1058, 2009; **doi:** 10.3923/itj.2009.1054.1058*)

Connectivity Preserving Distributed Coordination Control with Few Long Range Interactions

Dong-Mei Wang and Hua Jing Fang

Distributed coordination control of multi-agent systems raises fundamental and novel problems in recent years. A great new challenge is the development of robust distributed motion algorithms. In this study, a distributed control strategy for connectivity preserving coordinated motion of multi-agent system is presented by

introduction small-world connections among mainly local interactions. For arbitrary initial network topology, the group consists of several connected subgroups. Some agents are modeled as virtual leader and steer the disconnected subgroup to flock together. In this way, flocking problem can be solved under more relaxed conditions, which need no connectedness of the dynamic topology all the time, even the connectedness of the initial graph. Further, we show that the strategy is robust against connection failures between followers and leader in the leader following coordination control. Simulation results are given to validate the method. (*Information Technology Journal 8 (7): 1059-1064, 2009;* ***doi:*** *10.3923/itj.2009.1059.1064*)

Applying SMV for Security Protocol Verification

Jia Mei, Huaikou Miao and Pan Liu

With the rapid development of the internet, a lot of attentions have been paid to the reliability of the security protocols. Model checking can be used to obtain the assurance that a protocol can not be threatened by an intruder. In this study, on the basis of former researches, an approach is presented for using efficient and complete formal verification tool SMV to model and verify security protocol. By this approach, we can construct related model easily and verifying the property automatically. We illustrate the approach by taking Otway-Rees protocol as an example and discover an attack upon the protocol. Finally, the protocol is adapted to satisfy the security properties. (*Information Technology Journal 8 (7): 1065-1070, 2009;* ***doi:*** *10.3923/itj.2009.1065.1070*)

An Efficient MDC Framework Based on DCT and SPIHT

Lin-Lin Tang and Zhe-Ming Lu

Multiple Description Coding (MDC) is one of the promising methods for robust transmission over non-prioritized and unpredictable networks. Based on the Discrete Cosine Transform (DCT) and the Set Partition in Hierarchical Trees (SPIHT) compression method, this study proposes a new MDC framework. We make full use of the energy concentration of DCT and the similarity among the blocks composed of reordered DCT coefficients to apply the SPIHT algorithm to the transform-domain images composed of reordered DCT blocks. The purpose of using the reordered coefficients is to realize the energy redistribution. Redundancy is introduced by the full and partial encoding method which means the three descriptions, each using different bit rates to encode the information from

three different orientations, i.e., vertical, horizontal and diagonal directions. For transmission we adopt three channels, each containing the hybrid information from three different directions. Experimental results demonstrate that present technique is effective and practical. (*Information Technology Journal 8 (7): 1071-1075, 2009; **doi:** 10.3923/itj.2009.1071.1075*)

Detection on the Period of Long PN Code in DS/SS Signals at Low SNR

Zhong Zhi, Zhao Xintong and Ren Guanghui

To accurately detect the period of long PN sequence in electronic countermeasures in Direct Sequence/Spread Spectrum (DS/SS) communication, a method is proposed in which the influence of information code on the detection of the period of SS signals was eliminated by delaying and multiplying the input DS/SS signals with the known PN rate and then the period of long PN sequence was obtained by reprocessing the power spectrum. Simulation results show that the method proposed can detect both long and short PN sequences accurately at the signal-to-noise ratio less than -13 dB and the detection is little affected by the period of symbol, but it is affected by the period of PN sequence and longer N needs longer sample time if the detected SNR is the same. (*Information Technology Journal 8 (7): 1076-1079, 2009; **doi:** 10.3923/itj.2009.1076.1079*)

A Novel Approach for MMIC Reliability Testing Based on Weibull Distribution

Zheng-Liang Huang, Fa-Xin Yu, Shu-Ting Zhang, Yao Zheng and Ji-Xin Liu

This study describes a reliability test method for reliability evaluation of MMICs (Monolithic Microwave Integrated Circuits) in product inspection applications. It takes advantages of the potentiality of various reliability test approaches, aiming at meeting the requirement of MMIC development. In this way, quicker realistic reliability assessment can be also realized for new products or those without historic data. Applications of this prediction model to real MMICs are illustrated and a general overview of the corresponding parameters' influence is given. The results of this study indicate in order to predict the GaAs MMICs reliability in a fixed shorter time and smaller sample size, one can design the test based on the combination of empirical methods and statistical methods. This study proposed a reliability prediction combing Arrhenius method and Weibull statistical method and

we find Weibull slope is important for the MMICs reliability characterization. The analysis predicts excellent reliability for MMICs based on Arrhenius method, Weibulll method and zero fails result. (*Information Technology Journal 8 (7): 1080-1083, 2009; **doi:** 10.3923/itj.2009.1080.1083*) 1080-1083

A Multi-Channel Multimedia Content Distribution Strategy using Multiple Description Coding

Xuefeng Jiang, Shan Jiang and Ting Peng

Recently multi-channel media broadcast systems on P2P network have emerged in applications such as long-distance education and multimedia broadcast television. As these systems suffer from an obvious serious conflict between huge amounts of data and limited available bandwidth over the Internet, it's unpractical to provide the best network service for the all multimedia service channels. So, there are two key issues for the multi-channel systems: (1) how to reduce transmission delay that multimedia stream of each channel is distributed to all consumers and (2) how to guarantee the QoS metrics of some concernful channels, such as bit rates and latencies. Legacy relevant approaches mainly focus on the assignment of priorities to different peers and provide differentiated service quality to them thereafter. However, the issues of low-delay transmission and service differentiation for the entire channels have not addressed yet. In this study, we propose a multi-channel multimedia dissemination strategy named DiffStream. In DiffStream, Multiple Description Coding (MDC) technology is utilized and each channel disseminates partial streaming data instead of all. And service differentiation is also achieved by treating different channels with varying priorities and reserving bandwidth in advance to different channels in application layer. In addition, an extensive mechanism of vacant bandwidth preemption for improving bandwidth utilization is also raised. Experiments are carried out on NS2 and the results have demonstrated DiffStream's effectiveness in achieving our design objectives. (*Information Technology Journal 8 (8): 1084-1093, 2009; **doi:** 10.3923/itj.2009.1084.1093*)

Characteristics of Flow past a Square Cylinder using the Lattice Boltzmann Method

S. Ul-Islam and C.Y. Zhou

The Lattice Boltzmann Method (LBM) has been seen as an alternative tool for the computational simulation of fluid dynamics. In this study, we use the LBM with

Single-Relaxation-Time (SRT) collision model to simulate two-dimensional (2D) laminar flow past a square cylinder. The main aim of the study is to systematically investigate the influences of the locations of the inflow, outflow and side walls boundaries, where Reynolds number is kept at 100 for all calculations. The side wall boundary locations will be analyzed using the periodic and symmetric boundary conditions. Analyses of the relaxation time parameter also have been investigated. Some physical quantities, such as the drag coefficient, mean drag coefficient, root mean square values of lift coefficient and the Strouhal number are examined for the purpose. We also examined the vortex shedding formation which provides an excellent means of visualizing the von Karman vortex street. We found that there is a certain range for inflow, outflow and side wall boundaries where physical quantities such as drag and mean drag coefficients, root mean square value of lift coefficient and the Strouhal number show some changes. Results also show that, there is a change for physical quantities when the relaxation time parameter is changed from certain range and also effect the computational time. The physical quantities are obtained and compared with other existing experimental and numerical results. (*Information Technology Journal 8 (8): 1094-1114, 2009; **doi:** 10.3923/itj.2009.1094.1114*)

Processing Techniques for Querying Multimedia Contents

Zhongsheng Cao, Zongda Wu, Yuanzhen Wang and Guiling Li

In our earlier studies, we have designed a general-purpose multimedia query language called UMQL, which allows users to query multimedia data based on their content information and then for its internal query representation, we have also designed an operator-based internal query algebra called UMQA, which has equivalent ability with UMQL on multimedia query specification, but focuses on internal query processing implementation. In this study, we discuss the query processing techniques for querying multimedia contents efficiently, namely, how to interpret and implement a UMQA-based query plan to obtain target multimedia data from a database efficiently. More specifically, we first of all discuss the efficient implementations of main UMQA operators. Then, we in theory analyze the execution costs for the implementation algorithms of UMQA operators and present the experimental results of performing these implementation algorithms on a prototype information system. Finally, the acceptable experimental results show that all the processing techniques proposed in this study for querying multimedia contents are feasible and applicable. (*Information Technology Journal 8 (8): 1115-1128, 2009; **doi:** 10.3923/itj.2009.1115.1128*)

Towards Common Acquaintance Immunization Strategy for Complex Network

Pan Liu, Huaikou Miao and Jia Mei

The study presents a new immunization strategy for computer networks and populations with board and, in particular, scale-free degree distributions. The proposed strategy calls for the immunization of common acquaintances of random nodes (individuals). Similar to acquaintance immunization, our strategy also requires no knowledge of the node degrees or any other global information. Firstly, we analyze the successful and unsuccessful probability of acquaintance immunization with a simple example and the strategy ineffective reasons. Then, we study the probability of looking for common neighbors and present common acquaintance immunization strategy. Next, to compare common acquaintance immunization with acquaintance immunization, we implement a series of experiments from different aspects. The result of experiments shows that common acquaintance immunization gains higher stability and reliability for protecting complex network and can detect the structure of the unknown network. The conclusions of the study are that, compared with other immunization strategy, our approach requires no the whole information of complex network and efficiently immunizes the HUBS in complex network. (*Information Technology Journal 8 (8): 1129-1139, 2009;* ***doi:*** *10.3923/itj.2009.1129.1139*)

Realization of a Covert Communication System Over the Public Switching Telephone Network

Jixin Liu and Zheming Lu

In this study, a covert communication applying the vector quantization based information hiding algorithm and the Public Switching Telephone Network (PSTN) is implemented. The system aims at offering good security of the secret binary image message and the real-time performance that is very important for the speech calling of the telephone service. Therefore, we adopt a simple and effective encryption method for the secret binary image message prior to the embedding process. The embedding position is also protected by using a secret key. By using these methods, the requirement of short-term protection in the bursting phone call communication for the secret binary image message and the real-time encryption are both fulfilled. Furthermore, an information hiding algorithm based on vector quantization is proposed and the advantage of it is discussed. We evaluate the system with the ITU-T G.729a standard speech codec in StegoPhone, which is

our platform for research on covert communication technology via PSTN. The experimental results show that our method has negligible hearing effects on the conversation speech and meet the requirement of the real-time calling conversation communication via PSTN. (*Information Technology Journal 8 (8): 1140-1149, 2009; **doi**: 10.3923/itj.2009.1140.1149*)

Design of Full Order Observer in Speed Sensorless Induction Motor Drive

Deng Xin, Zhao Jin, Geng Tao and Liu Yang

This study proposes the full order observer feedback gain and adaptive speed PI design methods in speed sensorless induction motor drive. The characteristic of speed estimation plant function, which has impact on adaptive speed estimation PI design, is influenced by the feedback gain design. It is found that poor damping exists when feedback gain is zero and a simple, parameter independent feedback gain design method is introduced. Estimated speed steady state accuracy, noise sensitivity and the relation between speed estimation loop and speed control loop are the affecting factors in adaptive speed estimation PI design. The method of adaptive speed estimation PI design is proposed according to the speed control loop. Steady state and dynamic performance of the sensorless drive using simulation are demonstrated. (*Information Technology Journal 8 (8): 1150-1159, 2009; **doi**: 10.3923/itj.2009.1150.1159*)

The Analysis of the Synthetic Range Profile Based on Doppler Filter Bank using FFT

Wei Peng, Xuegang Wang, Kesong Chen and Bin Tang

A wideband imaging architecture based on subbanding and Doppler filter bank using FFT is developed and its performance is analyzed in detail. The theoretical analysis shows that owing to Doppler dispersion, the target's range profile will produce distortion with the increase in target velocity. The distortion includes range shift and amplitude deformation. At the same time, two related theoretical formulas are deduced for the calculation of the range shift value and evaluation of the amplitude deformation extent of a moving target's range profile formed by the proposed imaging architecture and thereby the maximum critical velocity is derived. When target velocity is less than the maximum critical velocity, a moving target's range profile with acceptable distortion can be obtained. Specific conclusions are verified with some simulations. (*Information Technology Journal 8 (8): 1160-1169, 2009; **doi**: 10.3923/itj.2009.1160.1169*)

The Security Analysis and Enhancement of Photographic Authentication

Hsien-Chou Liao, Cheng-Hsiung Hsieh, Ching-Wen Chen and Wei-Chiang Chen

The aims of this study were to analyze the security of Photographic Authentication (PA) systematically, show that PA is vulnerable under the polling attack and give some suggestions to enhance its security. To achieve the above goals, an automatic attack tool is designed to analysis the security of PA systematically. The tool captures the displayed photos, matches with historical ones to accumulate their counts. It selects the photo with highest count and repeats the process until successful login. In order to interfere with the photo match of the attack tool, a noise displacement method is also used to add noises into the original photos. Correspondingly, two noise reduction techniques are implemented in the attack tool for security analysis of PA with noise displacement methods. Furthermore, a simulation tool is designed to analysis the security of PA under a large number of photo sets. The security of PA is analyzed clearly from the experimental and simulation studies and enhancement ways of PA are also summarized in this study. (*Information Technology Journal 8 (8): 1170-1179, 2009; **doi:** 10.3923/itj.2009.1170.1179*)

Using Renyi Cross Entropy to Analyze Traffic Matrix and Detect DDoS Attacks

Ruoyu Yan and Qinghua Zheng

In this study, we propose Renyi cross entropy to analyze matrix traffic and detect anomaly rather than other entropy metrics, such as Shannon entropy, used extensively in many earlier studies. At first, we introduce a new type of traffic termed IF-flow (internal flow) collected in router. IF-flow can make the attack traffic more conspicuous in a large number of normal traffics, which makes attacks, especially DDoS attacks, spotted more easily. Then, the analysis of Renyi cross entropy of IF-flow matrix traffic, Abilene matrix traffic confirms that matrix traffic distribution has local stability in time. This conclusion provides a guidance to accurately detect anomaly. Finally, Renyi cross entropy is used to detect DDoS attacks existed in IF-flow testing data set and Abilene testing data set. The results of detection experiments show Renyi cross entropy based method can detect DDoS attacks at the beginning with higher detection rate, lower false alarm than Shannon entropy based method. (*Information Technology Journal 8 (8): 1180-1188, 2009; **doi:** 10.3923/itj.2009.1180.1188*) 1180-1188

A View-Based Approach to Three Dimensional Object Recognition

Xu Sheng and Peng Qi-Cong

To improve the performance of three-dimensional object recognition systems, we propose a view-based method in this study. First we extract wavelet moments, texture features and color moments from the 2D view images of 3D objects. Wavelet moments have the multi-resolution properties in addition to the invariant properties under translation, scaling and rotation. Texture features can distinguish objects which have similar shapes and different appearance. Color moments are robust and insensitive to the size and pose of objects. Support Vector Machine (SVM) is chosen as classifier. Then the feature subset selection and SVM parameters optimization are accomplished automatically and simultaneously using Genetic Algorithm (GA) in an evolutionary way. We assessed our method based on the original and noise corrupted 3D object dataset COIL-100. One hundred percent correct rate of recognition was obtained when the number of presented training views for each object was 36 (10 degrees interval) and 18 (20 degrees interval). When the number of training views was reduced, the correct rate of recognition was also satisfied. (*Information Technology Journal 8 (8): 1189-1196, 2009;* ***doi:*** *10.3923/itj.2009.1189.1196*)

Distributed Index based on Geographic Hashing Table for Mobile Ad Hoc Networks

Yongsheng Fu, Xinyu Wang and Shanping Li

Distributed Hash Table (DHT) has proven to be an efficient platform for building a variety of scalable and robust distributed applications like content sharing and location in the internet. However, the adaptation of DHT technology to Mobile Ad-hoc NETwork (MANET) is not straightforward. Network scalability and routing as well as information distribution are major problems for nodes in a MANET, who are only aware of their immediate neighborhood. Several algorithms implement DHT using geographic information in MANET, but they can not adapt well in large-scale network without an efficient localization mechanism. This study propose a new DHT implementation named Distributed Index based on Geographic Hash Table (DI-GHT) in MANET. In DI-GHT, using hashing function, the shared resource location information (index) is mapped to nodes in a geographic area rather than a geographic position. The network is partitioned into domains and DI-GHT distributes resource index in all domains. The

requestor finds the index information in the nearest domains using the hash function and then retrieves the resource. The simulation results and analysis show that DI-GHT outperforms original Geographic Hash Table (GHT) in terms of query success rate and message cost. (*Information Technology Journal 8 (8): 1197-1204, 2009;* ***doi:*** *10.3923/itj.2009.1197.1204*)

Auto Rate MAC Protocol Based on Congestion Detection for Wireless Ad Hoc Networks

Wei Wu, Zhongzhao Zhang, Xuejun Sha and Chenguang He

Some auto rate protocols at the MAC layer have been proposed to improve the throughput of Ad Hoc networks with multiple rates support at physical layer. However, all of them neglect the influence of network congestion. The network performance will deteriorate as a result of transmitting data to a congested node. In this study, an auto rate protocol based on congestion detection called auto rate based on congestion detection (ARCD) is proposed. In the ARCD protocol, congestion level is detected at the receiving nodes and fed back to the sending nodes along with the rate selection information and then the sending nodes transmit a limited number of back-to-back packets at appropriate rates. The simulation results show that the ARCD protocol can not only improve the throughput and packet delivery ratio of Ad Hoc networks by taking full advantage of channel condition, but also achieve hop-by-hop congestion control. (*Information Technology Journal 8 (8): 1205-1212, 2009;* ***doi:*** *10.3923/itj.2009.1205.1212*)

Tower Bridge Movement Analysis with GPS and Accelerometer Techniques: Case Study Yonghe Tower Bridge

Mosbeh R. Kaloop and Hui Li

This study investigates the possibility of using Wden Matlab function and Fast Fourier Transformation (FFT) method for bridge tower movement analysis. GPS and accelerometer techniques were used to collect the lateral displacements, acceleration and torsion displacements data of a Yonghe bridge tower. The analysis of test results indicate that the: (1) noise of GPS signals is high (2) signals accuracy obtained from the wden function increased by 20%; (3) traffic loads are the main factor affects the tower movement; (4) power spectral density is a good parameter to detect the tower movements and (5) GPS can be used as a trustworthy tool for characterizing the dynamic behavior of the low frequency

bridges. (*Information Technology Journal 8 (8): 1213-1220, 2009; **doi:** 10.3923/itj.2009.1213.1220*)

First-Price Sealed Auction Model with Increased Fairness for Resource Allocation in Grids

M. Mirzayi and M.R. Khayyambashi

The goal of grid computing is to achieve all kinds of resources sharing between organizations. Auctioning models are a source of solutions to the challenge of resource allocation in grid. Auction models can guarantee the interest of participants in the grid with fairness and efficiency. In this study, we modify the bidding stage using Signcryption model and a new definition of grid auction fairness is presented that is based on communication network measurement. First-price sealed auction (FPA) is used for resource management using new methods. SimGrid simulation framework is used which support auction protocols and evaluate results from users' perspective as well as from resources' perspective. The results showed that the new model has a good behavior in grid environment and security and fairness increase in auction model with this method. (*Information Technology Journal 8 (8): 1221-1227, 2009; **doi:** 10.3923/itj.2009.1221.1227*)

An Extended iSCSI Protocol Recognizing Multicast Session: iTRM

Huailiang Tan, Weixin Tang and Bin Yin

This study presents an extended definition for iSCSI protocol that recognizes multicast session: iTRM (iSCSI transparent reliable multicast) protocol. The iTRM protocol extends the definition of iSCSI PDU in order to interpret multicast session announcement. Sharing data for iSCSI sessions is delivered via multicast session and NAK of multicast session is transmitted by iSCSI session to ensure reliability of multicast transmission. The iTRM protocol adopts a transparent agent that monitors I/O accessing behavior of iSCSI initiators and launches the multicast session when sharing data is requested by several iSCSI initiators. Test results show iTRM protocol improves the performance of parallel I/O operations when initiators boot simultaneously from a single target. iTRM also enhances the stability of I/O performance of iSCSI network computing system. (*Information Technology Journal 8 (8): 1228-1234, 2009; **doi:** 10.3923/itj.2009.1228.1234*)

A Fast Association Rules Mining Algorithm for Dynamic Updated Databases

Ni Tian-quan, Wang Jian-dong, Peng Xiao-bing and LiuYi-an

To overcome the difficulty of updating frequent item sets in the dynamic database, this study proposes a new algorithm for efficiently mining association rules in dynamic updated databases. The algorithm constructs the corresponding vector subspace according to the number of nonempty subsets in the item sets which is based on the concept of the Apriori algorithm that the maximal frequent item sets are definitely the subsets of database's item set. After the construction of the vector subspace, the dynamic tuples additions and deletions of the database, as well as the updated solutions to the frequent item sets when the minimum support is changed, are determined efficiently by the vector inner computing. Studies show that the algorithm is not only simple in that it needs only to scan the database once, but also capable of processing super database. (*Information Technology Journal 8 (8): 1235-1241, 2009;* ***doi:*** *10.3923/itj.2009.1235.1241*)

An Intelligent Topic Map-Based Approach to Detecting and Resolving Conflicts for Multi-Resource Knowledge Fusion

Huimin Lu and Boqin Feng

In this study, we propose a novel concept of intelligent topic map, which embodies the multi-level, multi-granularity and inherent relevant characteristics of knowledge and realizes knowledge reasoning. With the intelligent topic map as infrastructure, we design a specific ontology fusion process for multi-resource knowledge fusion. Also, we define the taxonomy of merging conflicts which occur during the process of intelligent topic maps merging. We define and classify merging conflicts into data-level conflicts, structure-level conflicts, rule-level conflicts and temporary-level conflicts. We propose the detection and resolution schemes for each merging conflict. Additionally, we implement the multi-resource knowledge fusion conflicts detection and resolution system based on rules. The experimental results show that our method can correctly detect and resolve the conflicts in topic maps merging and it is helpful to improve the quality of multi-resource knowledge fusion. (*Information Technology Journal 8 (8): 1242-1248, 2009;* ***doi:*** *10.3923/itj.2009.1242.1248*)

Intelligent Model for Automatic Text Summarization

M.S. Binwahlan, N. Salim and L. Suanmali

The navigation through hundreds of the documents in order to find the interesting information is a tough job and waste of the time and effort. Automatic text summarization is a technique concerning the creation of a compressed form for single document or multi-documents for tackling such problem. In this study, we introduced an intelligent model for automatic text summarization problem; we tried to exploit different resources advantages in building of our model like advantage of diversity based method which can filter the similar sentences and select the most diverse ones and advantage of the non diversity method used in this study which is the adaptation of intelligent techniques like fuzzy logic and swarm intelligence for building that method which gave it a good ability for picking up the most important sentences in the text. The experimental results showed that our model got the best performance over all methods used in this study. (*Information Technology Journal 8 (8): 1249-1255, 2009;* ***doi:*** *10.3923/itj.2009.1249.1255*)

K-Means Clustering to Improve the Accuracy of Decision Tree Response Classification

S.A. Ali, N. Sulaiman, A. Mustapha and N. Mustapha

The use of deep generation with statistical-based surface generation merits from response utterances readily available from corpus. Representation and quality of the instance data are the foremost factors that affect classification accuracy of the statistical-based method. Thus, in classification task, any irrelevant or unreliable tagging of response classes represented will result in low accuracy. This study focused on improving dialogue act classification of a user utterance into a response class by clustering the semantic and pragmatic features extracted from each user utterance. A Decision tree approach is used to classify 64 mixed-initiative, transaction dialogue corpus in theater domain. The experiment shows that by using clustering technique in pre-processing stage for re-tagging response classes, the Decision tree is able to achieve 97.5% recognition accuracy in classification, better than the 81.95% recognition accuracy when using Decision tree alone. (*Information Technology Journal 8 (8): 1256-1262, 2009;* ***doi:*** *10.3923/itj.2009.1256.1262*)

An Enhanced Particle Swarm Optimization Algorithm

Xue-yao Gao, Li-quan Sun and Da-song Sun

Particle Swarm Optimization (PSO) algorithm is often used for finding optimal solution, but it easily entraps into the local extremum in later evolution period. Based on improved chaos searching strategy, an enhanced particle swarm optimization algorithm is proposed in this study. When particles get into the local extremum, they are activated by chaos search strategy, where the chaos search area is controlled in the neighborhood of current optimal solution by reducing search area of variables. The new algorithm not only gets rid of the local extremum effectively but also enhances the precision of convergence significantly. Experiment results show that the proposed algorithm is better than standard PSO algorithm in both precision and stability. (*Information Technology Journal 8 (8): 1263-1268, 2009; **doi:** 10.3923/itj.2009.1263.1268*) 1263-1268

A Review of Software Transactional Memory in Multicore Processors

Chen Fu, Zhibo Wu, Xiaoqun Wang and Xiaozong Yang

The transactional memory in multicore processors has been a very hot research area over past several years. Many transactional memory systems have been proposed to solve the synchronization problem of multicore processors. Software transactional memory is one of the critical methods to ease parallel programming and improve the scalability in the environment with many cores. In this study, we give a review of the current software transactional memory systems for Multicore processors. Software transactional memory systems are classified into the following categories: transaction granularity, data organization, version management, conflict detection and synchronization. Finally, we discuss an active research challenge: whether strong isolation should be supported for the tradeoff between performance and semantics correctness in software transactional memory systems. (*Information Technology Journal 8 (8): 1269-1274, 2009; **doi:** 10.3923/itj.2009.1269.1274*)

The Characteristics of Orthogonal Trivariate Wavelet Packets

Qingjiang Chen and Zongtian Wei

The notion of orthogonal nonseparable trivariate wavelet packets, which is the generalization of orthogonal univariate wavelet packets, is introduced. An

approach for constructing them is presented. Their orthogonality properties are discussed. Three orthogonality formulas concerning these wavelet packets are obtained. The orthonormal bases of space $L^2(R^3)$ is presented. (*Information Technology Journal 8 (8): 1275-1280, 2009;* ***doi:*** *10.3923/itj.2009.1275.1280*)

Steganalysis Based on Difference Statistics for LSB Matching Steganography

Jiaohua Qin, Xingming Sun, Xuyu Xiang and Zhihua Xia

In this study, a new steganalytic method, which exploits the difference statistics of neighboring pixels, is proposed to detect the presence of spatial LSB matching steganography. In the proposed method, the differences between the neighboring pixels (DNPs), the differences between the local extrema (DLENs) and their neighbors in grayscale histogram are used as distinguishing features and the SVM is adopted to construct classifier. Experimental results show that the proposed method is efficient to detect the LSB matching steganography for the compressed and uncompressed images and outperforms other recently proposed algorithms. (*Information Technology Journal 8 (8): 1280-1286, 2009;* ***doi:*** *10.3923/itj.2009.1281.1286*)

Blockwise Reversible Data Hiding by Contrast Mapping

Wien Hong, Jeanne Chen and Tung-Shou Chen

The insatiate demands for applications of imagery on the internet have further emphasized the importance of data hiding research. In this study, we proposed an improved reversible contrast mapping data hiding scheme that emphasized on the variance feature of the cover image. The cover image is partitioned into blocks where the variance of each block is calculated and sorted. Data was then embedded by reversible contrast mapping in these sorted blocks for which low variance blocks are embedded prior to those high variance blocks. In the proposed scheme, high payload is maintained and embedment can be selective to achieve high stego-image quality. In comparison to another similar work, the proposed scheme preserved significantly high quality in the stego-image especially for small payload. (*Information Technology Journal 8 (8): 1287-1291, 2009;* ***doi:*** *10.3923/itj.2009.1287.1291*)