Foreword and Editorial

International Journal of Hybrid Information Technology

We are very happy to publish this issue of an International Journal of Hybrid Information Technology by Science and Engineering Research Support Society.

This issue contains 39 articles. Achieving such a high quality of papers would have been impossible without the huge work that was undertaken by the Editorial Board members and External Reviewers. We take this opportunity to thank them for their great support and cooperation.

The paper “Classified Comparison of Operational Efficiency to Internet Company in China Based on DEA Model” concentrates on the study of efficiency in internet enterprise in China. In order to evaluate the operational efficiency of the Internet Company in China, this paper constructed the index system of the efficiency evaluation at first. Then it appraises the overall efficiency and variation tendency about Internet Company of China Based on DEA method from cross section data and temporal patterns. At the same time this paper classifies the Internet Company into three types: E-commerce, Information supplier, and Communication-Equipment supplier and make a comparative analysis to the performance and changing trend of different types.

The paper author of paper “The Study of GPS Vision Navigation System of Multi-stage Real-time Matching Algorithm” introduces a matching constraint and layer-by-layer search structure which is suitable for GPS vision navigation system, and puts forward a feature aided multi-stage matching algorithm. The algorithm firstly makes the match of the more obvious characteristics points, then the matched points information are used to determine the subsequent points general disparity range through the geometric constraints, thus improving the matching speed and accuracy. Using different types of outdoor natural topographic map matching experiments were conducted.

Paper “A Low Power Low Noise Chopper-Stabilized Two-stage Operational Amplifier for Portable Bio-potential Acquisition Systems Using 90 nm Technology” presents a high performance chopper-Stabilized Two-stage operational amplifier for biomedical applications. This Two-stage is designed for low noise, low power, high PSRR and high CMRR. The Miller compensation technique (Cc) is used with a nulling active resistance (Rz) implemented using Transmission gate (TG) transistors for stable operation in feedback mode. Chopper stabilization technique has been widely used in amplifiers for flicker (1/f) noise and offsets reduction purposes using the principles of modulation and demodulation. Thus, the functionality and performance of modulation and demodulation circuits determines the realization and attainment of chopper stabilization. The operational amplifier was manufactured in a SPECTRE using GPDK 90nm CMOS technology with threshold voltages of a 0.17 V and -0.14 V achieve a low power 2.6uW, at 10Hz high CMRR up to 130dB and PSRR up to 70dB at 1V power supply.

The Author of Paper “A Survey on Query Suggestion” gives a general review of query suggestion methods. On the whole, all the methods can be grouped into two categories:
session based methods and click-through based methods. Adjacency based query suggestion, co-occurrence based query suggestion, query-flow graph based query suggestion, clustering based query suggestion, and bipartite graph based query suggestion are presented respectively in detail.

In the Paper “Various Roadside Populations Effects on Data Throughput over Cooperative Vehicular Ad hoc Networks” the author considers the roadside populations as to supply vehicles’ requirements based on both a proposed algorithm and simulation results. Moreover, it studies the roadside self-participation to enhance the transfer rates and achieve fair resource distribution among the requested vehicles based on coalition formation.

Paper “LogCEP - Complex Event Processing based on Pushdown Automaton” proposed a new CEP system LogCEP using pushdown automaton to support efficient processing of conjunction and negation. First, the semantic and query language specification of LogCEP system are presented. Then, an automaton named LogPDA is proposed for query processing in LogCEP system. LogPDA construction method describes how to convert a query to LogPDA automation. The LogPDA execution approach describes how to detect the specified pattern using LogPDA. Meanwhile, most of previous NFA-based optimizations can be employed to improve the evaluation efficiency.

In the paper “A New Efficient Meta-Heuristic Optimization Algorithm Inspired by Wild Dog Packs”, a new, efficient meta-heuristic optimization algorithm inspired by wild dog packs is proposed. The main idea involves using three self-competitive parameters that are similar to the smell strength. The parameters are used to control the movement of the alpha dogs and, consequently, the movement of the whole pack. The rest of the pack is used to explore the neighboring area of the alpha dog, while the hoo procedure is used to escape from the local optima. The suggested method is applied to several unimodal and multimodal benchmark problems and is compared to five modern meta-heuristic algorithms.

In the paper “Design and Implementation of Self-validating Pneumatic Actuator Hardware System Based on DSP and MCU” A dual processor system is implemented using C8051F060 and TMS320F28335 to acquire the signals and complete fault detection, diagnosis and self-validating parameters calculating. C8051F060 is used to data acquisition and preprocessing of the actuator inner signals, and communicate with Host PC. TMS320F28335 is used to run the self-validation algorithm and fault diagnosis algorithm and transfer the self-validation outputs to C8051F060.

The authors of paper “Influencing Factors of Information Channels Adoption of Forest Farmers on Grain for Green Program in Western China”, aims to find out the main factors that influencing the adoption of these information channels of forest farmers in Western China. Rough set theory is used to solve the problem of main factors reduction.

Paper “A Real-Time Vibration Frequency Measurement System of Bridge Pier”, developed a real-time remote monitoring system (RTRMS) to receive the vibration frequency of bridge pier. The system included a front station and a middle station. A multi-hop wireless routing is employed to transmit the data from the front to the middle station. The front station includes a receiver equipped to receive the vibration frequency, and a wireless sensor network to transmit the data. The middle station is designed by an embedded system for storing the data. The pressure test shows that the loss rate of received data is less than 0.6%. The consuming
power of one day is 3 ampere hours in the front station and 30 ampere hours in the middle station if the 12 voltage battery is used.

The paper “The Study of China Vehicle Internet-Consumer Satisfaction Based on Bayesian Network” analyzes the theories about customer satisfaction model both in China and abroad. All of them are expected difference theory as the core, evaluating the benefit of consumer satisfaction by perception the difference of perceived benefits and loss. On this basis, by the internet-questionnaire survey, the China internet-automobile customer satisfaction evaluation system of the bayesian model is established. From this, it can be obtained the main factors of the customer satisfaction and their influence degree.

In the paper “Research on Technological Innovation Talents of the Six Provinces of Mid-China based on BP Artificial Neural Networks of the Golden Section Theory”, BP neural network is used to evaluate based on the construction of evaluation index system of the technological innovation talents’ competitiveness. It determine the actual situation of the evaluation system according to the input layer, hidden layer and output layer of the model as well as the number of neurons in each layer. The number of neurons in the input layer is the number of indices of technological innovation talents evaluation. The output layer represents the comprehensive ability level and has only one neuron. However, it is difficult to figure out the number of hidden layers of BP neural networks. It uses the golden section method to accurately select their layers. This can effectively avoid the problem of excessive training error due to the random selection of hidden layer. Then it illustrates the accuracy and usefulness of this algorithm with the case of the technological innovation talents of the six central provinces. Tests show that the comprehensive ability of technological innovation talents of Hubei is the most powerful in the six central provinces and is followed by Anhui. The remaining four provinces have similar levels. The actual development of technological innovation talents agree well with the experimental results.

Paper “Information System of Yadnya Ceremony on Android-Based” design and make a model of the system that presented the Yadnya ceremony through Android-based information systems. The system will provide information related to activities such as execution time of Yadnya ceremony, implementation procedures, pemuput, place of ceremony, video, and images of the ceremony. Users will obtain data or information by accessing the application from the server system.

The paper “Discriminant Locality Preserving Projections Based on Neighborhood Maximum Margin” took a research about the small size sample problem of the discriminant locality preserving projections method, and proposed the discriminant locality preserving projections method based on neighborhood maximum margin (NMMDLPP). Firstly, the training sample structured a weighted of K-nearest neighbor graph, and gave the weight parameter to each side of the nearest neighbor graph for obtaining the intraclass neighbors and interclass neighbors local geometry information of each point; then reduce the interval between the intraclass neighbors and increase the interval between the interclass neighbors with the result of transfer matrix, and applied the neighbor point optimal refactoring coefficient of the data to the objective function. This method chose the difference between the locality preserving between-class scatter and the locality preserving within-class scatter as the objective function to avoid of calculating the inversion of matrix. This method has conducted an experiment on the UMIST face database and Yale face database.
Paper “Tuning New Fuzzy Control for Nonlinear Second Order System” used Cognitive method to create portfolio of movement robot manipulator. Gradient descent (GD) fuzzy controller was used and robot’s postures and trajectory were expected in MATLAB/SIMULINK environment. Fuzzy logic controller (FLC) is an influential nonlinear controller to certain and uncertain systems which it is based on artificial intelligent and computes the required torques using the nonlinear feedback control law. Practically a large amount of systems have uncertainties accordingly this method has a challenge. Linear proportional-integral-derivative (PID) controller is a significant combination nonlinear stable-robust controller under condition of partly uncertain dynamic parameters of system. This technique is used to control of highly nonlinear systems especially in nonlinear time variant nonlinear dynamic system. To compensate for the dependence on model-free parameters, PID methodology is used. The nonlinear model dynamic formulation problem in uncertain system can be solved by using PID theorem. Proportional-Derivative-Integral (PID) theory is used to estimate the system dynamic.

Paper “Research on Group Emotional Intelligence Effects on Group Decision-making under Emergency” proposes the concept model of group emotional intelligence, adopts 2x2 factorial design, carries on survival experiment including 52 groups, and analyzes the influence of the group emotional intelligence on intra-group conflict, conflict management, performance, satisfaction and cohesion. Utilizes the statistical software SPSS19.0 for data analysis, and draws reliable conclusions. The conclusions offer references for enhancing emotional management capacity and problem-solving abilities of decision-making groups in emergencies environment. After various types of emergencies, victims and rescuers will have negative psychological and mental reactions, such as stress response, psychological disorder. In this case, making the right group decision is the most important issue.

In the paper “A New Symbolic Method for Discernibility Matrix in Rough Set”, a novel method for discernibility matrix using Zero-Suppressed BDDs (ZBDD) and Ordered binary decision diagrams (OBDD) is proposed, experiment is carried to compare the storage space of discernibility matrix with that of ZBDD and OBDD, results show that the new method has better storage performance and improve the attribute reduction for those information systems with more objects and features.

In the paper “Novel Adaptive Fuzzy Inference Controller for Highly Nonlinear System” intelligent control of robot arm using Proportional-Integral-Derivative (PID) Adaptive Fuzzy Gain scheduling (PID-AFGS) is design for two degrees of robot arm. Robot manipulators are multi inputs-multi outputs, nonlinear and time variant system, therefore control of this system is the main challenge in robotic science. Control robot arm according to linear methodology are often having lots of problems because robotic systems are always highly nonlinear. Design accurate controller for robot manipulator is difficult because some dynamic parameters such as compliance and friction are not well understood and some robot parameters such as inertia are difficult to measure accurately and caused to variation in dynamic response. Fuzzy logic controllers have been applied in many applications. One of the important methods to solve above challenge is design adaptive controller based on fuzzy logic.

The paper “Effect of Nanoparticle Size on the Interface Bond Energy in KTa0.5Nb0.5O3 / Polyimide Composites” investigated the effects of particle size on the interface bond energy in KTa0.5Nb0.5O3/ polyimide composites using the molecular dynamics method. The composites of polyimide and the KTa0.5Nb0.5O3 nanoparticles with different size (0.4 nm,
0.5 nm, 0.6 nm, 0.8 nm, 1.2 nm, and 1.4 nm) have been established and simulated using the Forcite program package of Materials Studio software. The calculated results show that the interface bond energy is 38~150 Kcal/mol, which indicate the Van der Waals force exist between the nanoparticle and polyimide matrix. The interface bond energy of the smaller nanoparticle is greater than the larger nanoparticle due to the size effect. The introduction of the smaller nanoparticle could generate the stronger intermolecular bonding interaction between the nanoparticle and polyimide matrix.

The paper “Bayesian Analysis of Power Function Distribution Using Different Loss Functions” obtains Bayesian estimators of the shape parameter of Power function distribution. For the Posterior distribution of this parameter, it consider Exponential Prior, Pareto Prior, Chi-Square Prior, Quasi Prior and Extension of Jeffrey’s Prior. The three loss functions taken up are Squared Error Loss Function (SELF), Quadratic Loss Function (QLF) and Precautionary Loss Function (PLF). The performance of an estimator is assessed on the basis of its relative Posterior risk. Monte Carlo Simulations are used to compare the performance of the estimators. It is discovered that the PLF produces the least Posterior risk when Exponential and Pareto Priors are used. SELF is the best when Chi-Square, Quasi and Extension of Jeffrey’s Priors are used.

In the paper “Robust Stabilization of a Class of Uncertain Fractional-order Chaotic Systems via a Novel Sliding Mode Control Scheme”, proposes a novel sliding mode control (SMC) scheme to stabilize a class of fractional-order chaotic systems. Through constructing two sliding mode variables, the control problem of n-dimensional system can be transformed to the equivalent stabilizing problem of a reduced-order system. Subsequently, on the basis of second-order sliding mode (SOSM) technique, a robust control law is designed, which strongly attenuates the chattering phenomenon inherent in traditional sliding mode controller, and guarantees the existence of sliding motion in a finite time. The stability of two sliding mode variables to the origin is proved by conventional and fractional Lyapunov theories, respectively. Finally, two numerical examples are provided to illustrate the effectiveness of the proposed approach.

In the paper “The Study of Product Availability in a Dual-channel Distribution Supply Chain with (Q, R) Policy of Retailer”, authors focus on the supply chain model with a single product in electronic and retail channel, only a supplier and a retailer in system, customers have alternatives to choose the channel that is better suited to their needs, some of them may alternatively switch to the other channel when a stock-out occurs in their preferred channel. Supplier and retailer implement one-for-one and (Q, R) ordering policies respectively to replenish their inventories. They set up the profit model of supply chain by Markov process, and study the product availability of supply chain. The result shows that the stock-out based substitution rate may increase or decrease the efficiency of decentralized supply chain; the centralized supply chain can adjust the based-stock levels timely to different stock-out based substitution rate and benefit from it, the supplier and retailer in a decentralized supply chain are more inattentive to customers’ stock-out based substitution rate, and prone to lose their benefits.

In the paper “Study of One Kind of Extended Proportional Guidance Law”, an extended proportional guidance law is designed based on the traditional dynamic differential equation, and this improved performance is for maneuvering targets, analyzing the effect of normal overload and trajectory curvature by extended proportional guidance law.
The paper “Design and Implementation of a Time-frequency Analysis System for Non-stationary Vibration Signals Using Mixed Programming” uses the EMD-WVD combined method as an example to present the programming thoughts and processes. The effectiveness of the system is validated using a simulation signal and an experimental signal. The system can be executed separately from MATLAB environment. At present, in the feature extraction of non-stationary vibration signals, many time-frequency analytic methods have emerged to meet the further need of non-stationary signal analysis such as Wavelet Transform (WT), Short Time Fourier Transform (STFT), Wigner-Ville Distribution (WVD), Empirical Mode Decomposition (EMD), Ensemble Empirical Mode Decomposition (EEMD) and so on. However, these time-frequency analysis methods can only be carried out on Matlab platform and the processes are of low efficiency, bringing a lot of inconvenience in signal analysis because they can not run on Windows system independently.

The paper about “Some Comparative Studies for Cursive Handwritten Tifinagh Characters Recognition Systems”, present two comparative studies; the first one is between two methods of features extraction which are the mathematical morphology, the zoning and the hybridization of these two methods. The second comparative study is between both supervised methods used in learning-classification which are the Multi-Layer Perceptron (MLP) and the Support Vector Machines (SVM) applied to cursive handwritten Tifinagh characters recognition.

In the paper “Study on Loading Capacity of Miniature Boats Fabricated from Hydrophobic Plant Leaves”, authors established mathematical model of loading capacity, comparing the measured values and measured values of loading capacity, the error ratio of loading capacity is about 4.0-6.1%. The loading capacity is made up of buoyancy and surface tension, percentage of buoyancy and surface tension in the loading capacity is affected by the contact angle and geometry size of miniature boats.

Paper about “Estimation of Backward Perturbation Bounds for Linear Least Squares Problem”, present a simple estimation to this bound which can be easily computed especially for large problems. Numerical results demonstrate the validity of the estimation. Waldén, Karlson, and Sun found an elegant explicit expression of backward error for the linear least squares problem. However, it is difficult to compute this quantity as it involves the minimal singular value of certain matrix.

Authors of paper “Design of Digital FIR Filter Based on MCMAT for 12 bit ALU using DADD & WALLACE Tree Multiplier”, presents in the proposed method the effectiveness in different parameters are achieved with low cost, high speed and effective results are done by faithfully rounded truncated multipliers with operations of carry save adder. Direct form of FIR filter utilizes based on MCMAT for multiplication and accumulation operations; it will reduce the area by decreasing the number of different components like structural adders and registers. By using MCMAT operation in the digital FIR filters, optimal results can be obtained in terms of power and area specifications. The proposed 12 bit Arithmetic and Logic Unit is designed along with MCMAT based digital FIR filter for reducing area and increasing speed in real time applications.

In the paper “Research on Peak-detection Algorithm for High-precision Demodulation System of Fiber Bragg Grating”, the wavelength demodulation system based on tunable F-P filter was introduced. In order to improve the detection accuracy of wavelength, the filtering
and curve fitting technologies were applied in the FBG wavelength demodulation system based on tunable F-P filter. These methods could realize the accurate peak-location of output signals of the photo detector. According to the characteristics of noise, the FIR low-pass filter was designed to filter the obtained light power signals so as to provide the input signals with high SNR for the peak-detection algorithms. By analyzing and comparing several typical peak-searching algorithms, the algorithm of Gauss formula nonlinear curve fitting (L-M) was chosen to fit the digitized light power signals. The experimental results show that L-M fitting algorithm reduces the mean square error by 7.5% compared with the Gauss fitting algorithm. For the Gauss signal in the wavelength demodulation system designed in the paper, the L-M algorithm has lower mean square error than other peak-searching algorithms. This algorithm is suitable for FBG wavelength demodulation system based on tunable F-P filter. It can efficiently raise the accuracy of wavelength demodulation system.

In the paper “Enhanced Hybrid Cat Swarm Optimization Based on Fitness Approximation Method for Efficient Motion Estimation”, a new algorithm based on Hybrid Cat Swarm Optimization (HCSO) is proposed to reduce the number of search locations in the BM process. In proposed algorithm, the computation of search locations is drastically reduced by adopting a fitness calculation strategy which indicates when it is feasible to calculate or only estimate new search locations.

Paper “Research on Inventory Sharing and Pricing Strategy of Multi-channel Retailer with Channel Preference in Internet Environment” study the inventory strategy and the pricing strategy of the products in the dual channel considering the online channel preference. And then it proposes a shared inventory and a dynamical pricing strategy. In addition, it study the influence of the related parameters on the profit of the retailers. At last, the numerical analysis shows that the shared inventory and the dynamical pricing strategy can bring more profits for the retailers.

The paper about “Investigations on Modeling and Simulation of Printed Folded Dipole Antenna” modeled and simulate asymmetric microstrip folded dipole antenna on substrate materials and study the antenna performances. The conventional wire dipole antenna configurations are converted into corresponding microstrip version. The complementary nature of parallel coplanar strip line and waveguide models have been used to model the dipole antenna. The transmission line parameters namely, even-odd mode effective dielectric constant and characteristic impedance have been analyzed. It study the effect of dielectric material on radiation characteristics of the printed folded dipole antenna, such as effective dielectric constant, characteristics impedance, input impedance and bandwidth. The antenna shows bandwidth improvement below 3 GHz frequency with asymmetric form of strip folded dipole.

Authors of paper “Research of Evaluation Mechanism of Petrochemical Informatization Projects Based on AHPP”, designs an informatization projects evaluation model to address unreasonable planning process and imbalanced budget for informatization projects of petrochemical enterprises. Analytic Hierarchy Process (AHP) is introduced to provide theoretical support. First, this paper conducts a hierarchical analysis to the decisive project factors in the informatization construction by constructing judgment set for the ladder-type hierarchical mode. Then, it calculates the weight for each factor and makes reasonable decision, which provides guidance to the implement of the informatization projects of petrochemical enterprises.
The paper “An Approach to Verify, Identify and Prioritize IDS Alerts” presents the approach to verify, identify and prioritize alerts based on post processing of alerts. Central to the approach is the computation of new alert metrics in order to further describe and understand interestingness of alerts. It synergized Alert Verification and Alert Prioritization techniques to build an effective alert management technique. The approach gives superior results when compared to other alert management techniques.

In the paper “A Event Weight Based Trust Search Algorithm with Subjective Logic”, a new trust search algorithm was proposed. The influence of event weight to node’s recommended qualifications was fully considered in the new algorithm by the improvement of subjective logic theory, the path dependence and trust-circle caused by the overlapping of friends-circle were solved effectively by the strategies of dual-threshold screening and set added.

Paper “Fatigue Life Validation and Analysis of Connecting Rod”, deals with multi cylinder diesel engine connecting rod for experimental fatigue testing and soft validation of its design. The connecting rod in four stroke reciprocating diesel engine is subjected to variable loading when Engine is in operating condition. The design of connecting rod is critical for the engine Performance, fatigue life, linear vibration & durability of engine. The fatigue failure is occurred due to alternating compressive & tensile stresses during its two revolutions. The fuel combustion inside cylinder generates a huge compressive force at power stroke. The 3D model is prepared and CAE analysis is done to predict the maximum Stresses and check whether it is safe for fatigue failure. The modification in design is done to make it safe for fatigue life.

Paper “The Research of Software Reuse Technology Based on Component” proposes a model of library management information system. Firstly this paper introduces the research background and research status. The second part is the design of reuse system based on the component. The third part is the component-based information management system used for the library management system. The last part is the conclusion. With the expansion of the computer application, the complexity of software and the program code increase rapidly. The increasing requirement of software brings the growth of the size about software. In order to solve these problems, the idea of software reuse emerges. In these years, the software reuse technology develops rapidly. Nowadays, software reuse technology which is based on component is regarded as the most successful implement technology in the software reuse field and the available solution to solve the Software Crisis. In this paper, it researches the software architecture based on component.

In the paper “Exact Solution of Klein Gordon Equation via Homotopy Perturbation Sumudu Transform Method” applies the proposed method (NHPSTM) which is the combination of new homotopy perturbation method and Sumudu transform to solve analytical linear and nonlinear Klein-Gordon equations. The proposed method finds the solution without any discretization or restrictive assumptions and avoids the round-off errors. The fact that the proposed technique solves nonlinear problems without using Adomian’s polynomials can be considered as a clear advantage of this new method over the decomposition method. Obtained results reveal that the proposed method is very efficient, simple and can be applied to other nonlinear problems arising in mathematical physics and engineering.

In the paper “An Improved Square Root Cubature Particle Filter for Navigation”, introduces an improved square root cubature particle filter algorithm (ISRCPF) navigation method in...
order to balance filtering accuracy and time cost. For the lack of measurement information of the PF, it combines square root cubature Kalman filter (SRCKF) with strong tracking filter (STF), and proposes an improved square root cubature Kalman filter (ISRCKF). The ISRCPF adopting the ISRCKF to develop the proposal distribution and incorporates the latest measurement into updating phase is proposed by introducing the ISRCKF into the particle filter framework.

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