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 Society.

This issue contains 20 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 “Trustworthiness Measure Platform of Intelligent Subway Information System” states that with the development of urban rail transit, the wisdom subway information system based on the technology of wireless sensor network and RFID emerged at the right moment. This paper analyzes the framework of the wisdom subway information system and studied the system trustworthiness in detail. Authors develop a measurement model that provides a new method for measuring the software trustworthiness and a platform used to measure the software trustworthiness of the information system.

In the paper “Strategic Fit Issues in Information System Research: Concept, Operationalization and Future Directions”, in recent years, strategic fit issues attract both academia and practitioners due to the debate of productivity paradox of information system (IS). This study provides a comprehensive literature review on the strategic fit issues in IS research and suggest some future research directions. In detail, conceptualization of strategic fit in IS research, operationalization of related constructs, and antecedents and consequences of strategic fit are included. The main contribution of this study is to explicitly and critically investigate the current status of strategic fit research in IS area.

In the paper “A Novel Mechanism on Network Selection for Fourth Generation Communication Networks”, in a heterogeneous networking environment of Fourth Generation communication technology, there will have a coexistence of different radio access technologies to serve the user. The users will always try to get the best service from the heterogeneous network. So selection of best access network at a particular time will be problematic and challenging. There will be a conflict between the network technologies of a heterogeneous networking system. Authors have taken into account the influence of some factors on which the selection of best access network will depend. Also, they have tried to solve the network selection problem by using Game theoretical concept. By using the concept of strategy space, quality points and weighting factors in the game theoretical model, a mathematical way for selecting the best network is demonstrated. The paper introduces the concept of optimum network selection mechanism from any number of competing networks.

The paper “A New Structural Analysis Model for E-commerce Ecosystem Network” establishes a new theoretical and methodological analysis model based on ecosystem theory and network science for researching on e-commerce market structure. The model considers three steps to answer the questions for explaining the structure—element identification, relationship analysis and formation mechanism analysis. Then, several suggestive
applications based on the analysis model are shown. The systematic analysis framework provided by the model will lead to further research that will reveal the hidden mechanism of Web economic and Internet social system.

The paper “A Study of Short-term Effect Measurement for Information Publication in Government Microblog” discusses that from the microcosmic point of view, based on AISAS model, aiming at real cased and data of government microblog information publication, this article makes a quantitative empirical research using correlation analysis and regression analysis and construct a quantitative model to measure the short-term effect of government microblog information publication. The measurement model lay a theoretical basis for improving effect of government microblog information.

Paper “A Game-theoretic Approach for Efficient Clustering in Wireless Sensor Networks” discusses that in wireless sensor networks, clustering divides network into clusters and makes cluster heads (CHs) responsible for data aggregation. CHs play a significant role in such topology and focus should be fixed on the CH selection. Due to the constraints on available resources, however, a sensor node is likely to be selfish and refuse to serve as a CH. Based on game theory, this paper models the problem and discusses the condition of Nash Equilibrium. Moreover, in case of disconnection between a CH and the sink, data replication is adopted.

The paper “Fault Pheromone Trail Evaporation of Power Distribution Networks using Ant Colony Optimization” presents an ACO Based Pheromone Trail Evaporation method for fault searching in Power Distribution Networks. ACO Based Pheromone Trail Evaporation method is ‘co-operative agent approach’, which is inspired by the convergence rate and behavior of real ant colonies for finding a shortest path to reach food. Hence, in the proposed method is a set of co-operative agents called ‘ants’ co-operates to find a better solution for evolutionary fault searching.

The paper “A Connectivity-based Strategy for Roadside Units Placement in Vehicular Ad Hoc Networks” discusses that in urban scenario, the imbalanced spatial distribution of traffic flow exerts an important influence on the performance of communication between vehicles and the Roadside Unit (RSU). This paper presents a strategy for RSUs placement based on the road traffic characteristics, aiming at improving connectivity in vehicular ad hoc networks. To divide the coverage area of each RSU, we propose an Expansion and Coloration Algorithm (ECA). The average connectivity model for all vehicles in the network is established based on the results obtained from ECA. The RSUs placement problem is formulated as a combinatorial optimization problem, of which the objective is to maximize the average connectivity probability by searching for an optimal position combination of the given RSUs. Taking part of an actual urban road network as an example, the RSUs placement problem is calculated and the optimal placement scheme is evaluated.

In the paper “Image Forgery Detection Based on Semantics”, the development of powerful image editing software has made it easy to create visually convincing digital image forgeries. Recently some research works based on general low-level visual features in the field of digital image forensics have been conducted to address this problem. However, there has been little work by analyzing the high-level semantic content of the image. This paper discusses the forgery detection problem of digital image from the point of high-level semantic, and proposes the framework of image forgery detection based on semantics. The framework consists of three components including image recognition, semantic logic reasoning engine
and generation of semantic rule. A new fuzzy logic semantic reasoning model for image forgery detection is proposed in this paper.

Paper “A Dynamic Programming Model to Optimize the Capacity Control with the Priority of Air Cargo” concentrates on the problem of the air cargo space management strategy with a comprehensive, abstract and simplified way, on the basis of the actual characteristics of transport demand in China's air cargo market. Authors focus on the urgent transportation of goods and general cargo transport whose time requirements are different. The paper first proposes a single-leg cargo space management dynamic programming model according to the different time limit of different kinds of goods, and then the two dimensional single-leg air cargo problem is transformed into one dimensional two-leg airline network problem. Then, they use the expanded method of dynamic programming decomposition to solve the model.

The paper “Comparative Study of Hyperelliptic Curve Cryptosystem over Prime Field and Its Survey” states that public key cryptography is the famous cryptography technique used in many corporate sectors for developing software to provide security services. Hyperelliptic Curve Cryptosystem (HECC) is one of the public key cryptographic technique, an expansion of Elliptic Curve Cryptography which offers the similar level of security compared with other cryptosystems such as RSA, ECC and DSA. HECC supervise the ECC due to shorter operand size.

In the paper “New Polyphase Complementary Sequence Sets for Wireless Communication Systems”, in contemporary wireless communication systems, complementary sequences play fairly important roles. Based on polyphase perfect sequences (PPSs), this paper presents a construction method, whose basic idea is to sample a given PPS with equal space, for yielding a family of periodic polyphase complementary sequence sets (PPCSSs). The advantages of this method include the family size of resultant PPCSSs is the same as that of the PPSs employed, and the number and length of sub-sequences in the proposed PPCSSs can be altered on demand.

Paper “A Low Power 5.8GHz Fully Integrated CMOS LNA for Wireless Applications” states that a low power 5.8 GHz fully integrated CMOS low noise amplifier (LNA) with on chip spiral inductors for wireless applications is designed based on TSMC 0.18 µm technology in this paper. The cascode structure and power-constrained simultaneous noise and input matching technique are adopted to achieve low noise, low power and high gain characteristics.

The paper “Design and Implementation of a Linear Quadratic Regulator Based Maximum Power Point Tracker for Solar Photo-Voltaic System” states that a maximum power point tracking (MPPT) technique based on linear quadratic regulator (LQR) approach for solar photo-voltaic system has been proposed in this paper. LQR based MPPT controller has been designed with online set-point adjustment approach using current, radiation and temperature sensors.

The paper “A Wolf Colony Search Algorithm Based on the Complex Method for Uninhabited Combat Air Vehicle Path Planning” states that path planning for uninhabited combat air vehicle (UCAV) is a class of complicated high dimensional optimization problem, which mainly centralizes on path planning considering the different kinds of constrains in the complex environment of war. In order to solve this problem, it is converted to a kind of
constrained function optimization problem, and a wolf colony search algorithm based on the complex method is proposed, which combines the complex method with a wolf colony search algorithm, and it solves the problem of UCAV path planning successfully.

Paper “Towards Events Detection from Microblog Messages” discusses that microblogs have dramatically changed the mechanism of information propagation. It has been an inevitable issue for governments and enterprises to face the challenges that microblogs bring to public safety management. Based on the properties of microblog information and its diffusion, this paper presents a survey on the events detection from microblogs, and recent advances on some key related issues are especially focused and discussed.

In the paper “Identical Synchronization of a New Chaotic System via Nonlinear Control and Linear Active Control Techniques: A Comparative Analysis”, most of the synchronization techniques belong to the master-slave (drive-response) system configurations in which the two chaotic systems are coupled in such a manner that the performance of the second (slave /response) system is influenced by the first (drive/master) system and the first system is not disturbed by the exertion of the second (slave / response) system. In this research paper, the synchronization problem of two widely used techniques, the Linear Active Control and Nonlinear Control Algorithms have been studied to achieve chaos synchronization of a new chaotic system.

The paper “The Application of Wavelet Threshold on Compressive Sensing in Wireless Sensor Networks” states that Compressive sensing (CS) is a novel framework which exploits both the sparsity and the intra-correlation of the signal in structural health monitoring (SHM) based on wireless sensor networks (WSNs). It contains sparse signal representation, the measurement matrix selection and the reconstruction algorithm. The SHM signal is recovered by M measurements following the restricted isometry constant (RIC). However, the signal should be denoised before reconstruction. This paper discusses two wavelet noise reduction methods, soft threshold and hard threshold method, and verifies the performance of different methods for SHM signal reconstruction.

The paper “Development of a Remote Automatic Weather Station with a PC-based Data Logger” presents the development of a prototype weather station to measure the following weather data: air temperature, relative humidity, dew point, wind speed, and rainfall. The weather station, which has been designed for remote operation, performs automatic or unmanned measurements of weather data and transmits it wirelessly to a PC for logging and display by means of a graphical user interface. The remote station is powered using solar energy through a battery which also stores charge for a 24-hour operation of the system.

In the paper “A Study of the Factors Influencing Forest Farmers Information Technology Adoption”, information technology is one of the most important factors that have been impacting the development of forestry construction, with forest farmers playing an increasingly crucial role in promotion of information technology. Survey data in this paper, collected from Yongan County and Youxi County in Fujian Province, uses combined Rough Set Theory (RST) and Support Vector Machine (SVM), applied for reduction of influential factors of information technology adoption behavior of forestry farmers. The result shows factors, i.e., age, education, highest degree of the family, average annual income, forestland area, average annual income of forestland, status of fixed phone, average spending on mobile
phone per month, status of cable TV and connection to the Internet, are of key influential in forestry farmers’ decision of information technology adoption.

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