Foreword and Editorial

International Journal of Multimedia and Ubiquitous Engineering

We are very happy to publish this issue of International Journal of Future Generation Communication and Networking by Science and Engineering Research Support Society.

This issue contains 28 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 “Optimal Routing Strategy on Scale-free Networks with Heterogeneous Delivering Capacity” proposed the information traffic dynamics on scale-free networks considering the heterogeneous delivering capacity. In the previous researches, the delivering capacity is the same for all nodes in the system, which obviously contradicts the real observations. In this paper, a heuristic algorithm for the optimization of transport is proposed to enhance traffic efficiency in complex networks. Their algorithm balances traffic on a scale-free network by minimizing the maximum effective betweenness, which can avoid or reduce the overload in some busy nodes. The simulation result shows that the network capacity can reach a very high value, which is four times more than that of the efficient routing strategy.

Paper “An Experimental Study Analysis of Security Attacks at IEEE 802.11 Wireless Local Area Network” has worked an experimental analysis to study some of the well-known attacks pertaining to IEEE 802.11 WLAN. At first, some of the open issues related to this fragile technology have been discussed. Based on this vulnerabilities and threats categories some of the major attack has been performed in a live environment by using open source software tools i.e Aircrak-nj, kismet. etc. The analysis and finding from this paper’s proved that the complexity of attacks had increased by time and the Wifi technology are becoming more dangerous to the end users and business environment.

In the paper “Heterogeneous Honeycomb-like NoC Topology and Routing based on Communication Division”, a configurable network and an efficient routing algorithm is designed so that the topology is regular and easy to expend while the adjustable density of transmission roads could satisfy the varied requirements of different PEs. Experimental results have shown that the design is more desirable in terms of network delay, power consumption and area cost among other important performance parameters of a network.

The research paper entitled “Researches on Ominimedia Development Strategies and Core Competitive Strength Improvement in the Context of Triple Play” focused on the theme of Ominimedia, studied the traditional media development strategies to Ominimedia and analyzed in detail the strategies of cloud, tube, end and content aggregation based on the development trend of triple play. At the same time it explored the strategies for Ominimedia core competitive strength improvement from multiple dimensions of 3D media, communication channel, AirSharing and brand operation with the expectation of offering references to Ominimedia globalization in the context of triple play.
The paper “Performance Evaluation of Shortest Path Routing Strategy using Cognitive Radios” states that radios have spectrum sensing capabilities and thus can easily switch to free spectrum band. The use of such type of radios not only improves the routing performance but at the same time improves the overall throughput of the network. To show the same, they implement shortest path routing strategy in MATLAB-7.01. The routing scheme uses two types of radios one with spectrum sensing capability such as cognitive radios and the other which doesn’t. The following performance metrics such as Packet Delivery Ratio (PDR), Delay, Success Ratio and Hop count are taken into consideration for measuring the efficiency. The result shows that a node having spectrum sensing capability outperforms the other one.

Authors of the paper “An Improved BER-Optimal Relay Selection Scheme for Decode-and-Forward Cooperative Networks” propose an improved WLF relay selection scheme, in which relays are selected according to instantaneous channel state information (CSI) and a cooperative threshold is set up to eliminate some unsatisfying candidate relays from the set of alternative candidate relays and thus reduce the amount of calculation. Theory analysis and simulation results both show that the improved WLF relay selection scheme proposed can be easily implemented and achieve almost the same BER performance as that of WLF scheme while the computational complexity is much lower.

The paper “An Overview on Interference Management in 3GPP LTE-Advanced Heterogeneous Networks” provides a holistic overview of ICIC strategies in this emerging wireless system. Towards this objective, the evolution of inter-cell interference management techniques is thoroughly investigated from TDM based enhanced inter-cell interference coordination (eICIC) techniques to more advanced Coordinated Multi-Point (CoMP) transmission/reception, while comparing and contrasting their common features and differences. Finally, Carrier Aggregation (CA) is explored in detail as an advanced and challenging mechanism in order to have an efficient resource allocation and inter-cell interference mitigation in LTE-Advanced HetNet environments.

In the paper “Network Traffic Prediction Based on SVR Improved By Chaos Theory and Ant Colony Optimization”, network traffic prediction is one of the significant issues. The model for network traffic prediction should meet the following requirements. First, the model should be taken into consideration the characteristics of the network flow such as burstiness, long-range dependence, periodicity and self-similarity. To achieve this, they decompose the original flow in a multi-scale manner into a set of linear and stable representations, and introduce chaos theory to improve the diversity and search coverage. Second, the model should be efficient and accurate. To this end, they propose a prediction model based on SVR, and utilize Ant Colony Optimization (ACO) algorithm for parameter selection of SVR. Besides, they conduct experiments to evaluate the proposed model.

In the paper “The Research on OA Based On Mobile Telephone”, the global trend of the information and network has changed the peoples’ life and work style. The traditional OA model can’t keep step with the rapid development of the information society. Time and space becomes a main obstacle to the OA. This paper puts forwards a new thought to solve this problem by designing a mobile message module. It can realize mobile OA and may promote the development of the E-government.

Paper “Performance Analysis of Different Wavelet Families Over Fading Environments for Mobile WiMAX System” presents performance analysis in terms of Bit Error rate (BER) of
different wavelet families in OFDM System under the joint effect of path loss, multipath fading and noisy environment for Mobile WiMAX. The results obtained show that the performance of the mobile-multipath environments for 16-QAM modulation schemes is enhanced as Daubechies and Biorthogonal wavelet families offers lower BER with different Path loss model. The performance measurements and analysis was done in simulation developed in MATLAB.

The research paper “Wireless Sensor Networks Coverage Optimization based on Improved AFSA Algorithm” focuses on redundant network nodes, short life cycle and other defects and firstly sets nodes utilization and network effective coverage as optimization goals, so as to establish relevant mathematical model, and then introduce the inverse Gaussian mutation algorithms on AFSA, making the improved algorithm to solve the model, and get the optimal coverage scheme for wireless sensor networks. Simulation results show that the improved AFSA can effectively improve the coverage of wireless sensor network nodes, effectively reducing network costs, and the network lifetime has been extended.

Paper “An Improved CPE Localization Algorithm for Wireless Sensor Networks” proposed an improved CPE (Convex Position Estimation) localization algorithm that reduces the localization error without requiring additional hardware and computational costs. In the proposed scheme, they first estimate the location of sensor nodes using Convex Position Estimation (CPE), and then refine the location of sensor nodes using the location of the two-hop anchor nodes. The simulation results show that the new localization algorithm effectively improves the positioning accuracy compared with the traditional CEP localization algorithms.

The paper “Performance Analysis of the Impact of the Propagation Environments on the WiMAX Service Classes” analyzes the impact of the propagation environments on the WiMAX service classes and they measure the QoS performances of the service classes that are utilized from the mobile users. Simulation experiments are done utilizing the ns-2.33 simulator where all five service classes of the WiMAX are properly configured. Performances analysis of the service classes in mobile WiMAX is done measuring the average throughput, average delay and average jitter in various propagation environments. Obtained results give important conclusions about the QoS of the five service classes in mobile WiMAX in various propagation environments.

In the paper “High Secure Mobile Operating System Based on a New Mobile Internet Device Hardware Architecture”, a new Mobile Internet device architecture is proposed. Focusing on the characteristics of the new architecture, a high secure operating system with internal network structure is designed. There are two sub-kernels in the secure operating system, an inter-kernel data transmission protocol is implemented for communicating between two sub-kernels, which is connection-oriented and can provide reliable peer-to-peer connectivity. In this paper, they proposed the data transmission protocol implementation procedure and analyze protocol transmission efficiency.

Paper “Improved Trust Based Routing Mechanism in DSR Routing Protocol in MANETs” discusses the challenging issues in MANET routing security. It presents improved DSR, a trust-based scheme for securing DSR routing protocol in MANET using the friendship mechanism and gateway. The path which is most optimum is chosen as the final route from source to destination. The gateway nodes should not be malicious. The nodes can evaluate the routing paths according to some selected features (such as node reputation and identity...
information) before forwarding the data through these routes. It is implemented in the scheme, simulation (using NS2). This scheme provides a robust environment where MANET nodes can trust each other in a secure community.

In the paper “SLQE: An Improved Link Quality Estimation based on Four-bit LQE”, four-bit has been found to be a good estimator; however its performance heavily depends on the tuning of its parameters. But authors of the paper found that Four-bit couldn’t be working effectively in responding to the burst situation after repeated experiments. So they redesigned the link estimation method, called Stable Link Quality Estimation (SLQE), which combines active probing with passive snooping to make estimation more stable. They have found that the new design can cope with the emergency. Moreover it also enhances the robustness of the network, and saves the overall energy consumption of the network.

In the paper “Joint Beamforming and Power Allocation Cognitive Radio Networks under Imperfect CSI”, the problem of joint beamforming and power control is investigated in underlay CR networks with imperfect CSI. The objective is to maximize the sum utility of secondary users (SUs) under the primary users (PUs) interference power constraints and the transmission power constraint of SUs. First, the joint beamforming and power control problem is formulated under game theory framework, where the SUs compete with each other over the beamforming vectors and transmission power level made available by the PUs. Moreover, the channel uncertainty is described using ellipsoid sets and the interference power constraints can be converted into robust interference power constraints. Besides, Nash equilibrium (NE) is considered as the solution of this game. Finally, simulation results show that the proposed scheme can converge to a locally optimal pair of beamforming vector and transmission power level in the presence of channel uncertainty.

The paper “Effect of Fading on Performance of VANET in Realistic Scenarios Using NCTUns6.0” explored the impact of fading on network throughput and packet drop. Interesting results show the performance evaluation of without fading environment and Rayleigh fading in different scenarios. NCTUns 6.0 (National Chiao Tung University Network Simulator) is used to justify the result that is a GUI based open source platform for vehicular Ad-Hoc network. Various performance issues are also surveyed with the help of this simulator.

The paper “Traffic Driven Epidemic Spreading in Weighted Homogeneous Networks” aimed to investigate the impact of weights on the traffic driven epidemic spreading in weighted homogeneous networks, an epidemic model in pseudo-random network with adjustable weights is presented. In the scenario that epidemic pathway is defined and driven by traffic flows, the epidemic spreading velocity of SI model in weighted homogeneous networks is obviously accelerated when the edge weight is different. And in traffic driven SIS model, the epidemic threshold is found to be proportional to the inverse of the average node betweenness. It is better to control the epidemic spreading when the edges have the same weight. Simulation results have confirmed the theoretical predictions.

The paper “IGAA: An Efficient Optimization Technique for RFID Network Topology Design in Internet of Things” introduces an optimization-based IGAA approach which outperforms existing RFID topology designs by turning up more favorable reader deployment and system performance. The new approach employs an advanced multi-objective fitness function and improved genetic annealing algorithms (GAA) to pursue a better RFID topology design. By
involving an improved gene-stirring operation to help preserve good genes and locate optimal solutions for reader deployment, it is simple in operation but effective in practice. Experimental evaluation shows that when compared with related approaches, IGAA can yield better solution quality with less search time.

The Authors of “Multi-path Routing Improved Protocol in AODV Based on Nodes Energy” propose a multi-path routing protocol (EM-AODV) in AODV that based on nodes energy. EM-AODV designs methods of obtaining nodes energy by upgrading the route discovery and route maintenance process of AODV, calculates the path of comprehensive energy derived path priority by routes total hops and nodes energy to format the multi-path routing mechanism. The energy as the metric prerequisite during the routing process, by setting nodes energy bound and balancing nodes data forwarding to postpone network lifetime. Simulation results show that EM-AODV has lower average end-to-end delay, well improve the energy consumption.

The paper “An Application of Fiber-Connected Distributed Antennas to Heterogeneous Networks: Energy Efficiency Perspective” focuses on the spectral efficiency (SE) advantages achieved by cooperative transmission and the associated power consumption that may affect the energy efficiency (EE) of the system. A detailed power model is developed to benchmark the various sources of energy consumption in fiber-connected DAS. Then a simple but efficient pre-coding scheme is proposed to reduce the computation complexity associated with cooperative transmission, thus lowering the power consumed by baseband processing while at the same time maintaining a high throughput performance. Through detailed and extensive simulations, this paper demonstrates the SE and EE advantages of the application of fiber-connected DAS in HetNet.

The paper “Study of Deflection Routing from an Information-theoretic Perspective” study the deflection routing processes of point-to-point networks from an information-theoretic perspective. It is found that the packet routing processes, which can further be divided into path determination and path switching, are quite analogous to channel communications. And such a corresponding relationship makes it possible to analyze routing processes and its performance with models and concepts in the information theory.

Paper “Cognitive Radio System Cross-layer Routing Algorithm Research” combines the link reliability and the shortest time delay and a joint strategy for cognitive route, the policy routing process combined with spectrum allocation, adopt cross-layer approach, in the process of routing implementation spectrum availability judgment and update, ensuring the continuity of the routing process, reduce the high rate of the circuit. In this method assumes that each cognitive are equipped with a radio transceiver; A wireless communication interface; Transceiver can correctly perceive available spectrum, and when the spectrum utilization changes, can adaptively adjust; Wireless communication will result in the creation of public control channel, used for the exchange of information, the simulation results demonstrate the superiority of the algorithm.

In the paper, “A Task Scheduling Algorithm Based on Potential Games in Cloud Computing Environment”, a new task scheduling algorithm based on potential game is proposed. They prove that the potential game will reach Nash equilibrium quickly. Also, the system load balancing level is adaptive with the number of users’ task changing. The experimental results show the priority of the proposed algorithm.
The paper “Design of Micromachining Based Patch Antenna to Enhance Performances for RFID Tag Application” discussed about introduction of RFID system and Micromachining technology. Micromachining based antenna provides effective performance compared to normal silicon platform patch antenna. The bandwidth, gain, S11 parameter of the micromachining based patch antenna has increased compare to normal silicon platform antenna and the circular polarization also obtained for this antenna. Therefore, micromachining based technology provides attractive features which are not possible through traditional technology. Hence, micromachining based antenna can be used for RFID tag application.

Paper “An Efficient Traffic Analysis and Optimization on the Dynamic Network Using Two Stage Routing Algorithm” describes the enhancement of driving direction to maintain traffic strategies on the road network. In the existing system will reduce the traffic emission is made by assigning weight for all the edges of the network by using PageRank algorithm. It typically lacks the time consumption for preferring new routes, even if the route is of high quality is a serious problem in it. So that the proposed system, weight propagation model is used to detect the traffic environment and also provide the optimal alternative route from source to destination by using two stage routing algorithm. This will enhance the driving direction for effective eco-routing.

In the paper “A Reliable Information Fusion Algorithm for Reputation Based Wireless Sensor Networks” proposes a novel, reliable information fusion algorithm, called reputation-driven information fusion (RDIF). In this work, a clustering algorithm is employed to divide all of the sensor nodes into many clusters. Then, a reputation system is established for each cluster, and an information fusion algorithm driven by reputation values is performed by the cluster head. In addition to the sensor nodes’ reputation values, it also considers the values of the readings collected by the sensor nodes and eliminate the outliers before fusing information.

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