Foreword and Editorial

International Journal of Control and Automation

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

This issue contains 22 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.

In the paper “A Measurement Method for Dispersion in Optical Fiber Communication with Long Distance”, from the view of summarizing the existing method and put forward new methods to measure the fiber dispersion. The main contribution is the establishment of a measurement method for dispersion. With the development of the telecommunication, optical fiber has been widely used. It has the characteristics of long distance transmission and large capacity, but it also has dispersion exists. The dispersion can be divided into some types. Mode dispersion plays a major role in multimode fiber, while chromatic dispersion or intramodal dispersion are the main mechanism in single mode fiber. Generally, it is quite important to test the dispersion and know the dispersion characteristics. The theoretical basis and experimental device, which are both based on the interference principle, have been introduced in detail. The device is used to measure the fiber dispersion characteristics of optical fiber and the results shows the validity of the theory and the designed test device.

Authors of paper “A Focused Crawler Based on Correlation Analysis”, try to builder a focused crawler based on vector space model and TF-IDF text correlation analysis. They take the seed URL as a collection entrance and fetch web pages from internet. Then analysis page information though technological like web content extraction, page link analysis technology and get the main content of one page. By the correlation analysis method based on VSM and TF-IDF text, they calculate the correlation between pages and the topics what have been defined, so it can achieve the purpose of the focus areas of the web.

Paper “NIA based Mobility Management Technique for Seamless Roaming in Heterogeneous Networks” is concerned of improving QoS performances and interconnecting different networks. By solving this, an agent called NIA (network interworking agent) and multiple IGMA (interworking gateway mobility agent) has been deployed. The UDP and TCP simulation results are obtained using NS2 environment and compared with an existing macro mobility protocols.

The paper about “QoS Route Optimization Algorithm for the Dynamic Traffic and Network Service” analyze influence of the dynamic of traffic and network to QoS parameter. Based on the analysis result, the QoS analysis in Legend domain is given, and the upper bound of delay and backlog in Legend domain. For the case of non-independent cross traffic, the relationship expression of different traffic is got.

The paper “Performance Evaluation of ASMR with QRS and RZLSR Routing Scheme in Mobile Ad-hoc and Sensor Networks”, evaluates the performance of Adaptive Secured
Multipath Routing (ASMR) when it is associated with QRS and RZLSR proposals. Multipath routing is an efficient technique in handling failovers and it improves the Quality of Service (QOS). Increasing the number of vulnerabilities imposed us to use the secured multipath routing. The proposed technique is adaptable for MANET and WSN, when they deal with unreliable data communications. ASMR is desperately outperforming when it is associated with RZLSR compared to QRS scheme and it is assisting for secure data transmission.

The paper about “Research and Development of Ethernet Communication System in Numerical Control Workshop” takes ZNE-100TL module realized the embedded Ethernet and RS-232C data transfer function as the hardware platform, takes VC++ as software platform, applied Ethernet technology to realize communication the CNC equipment with CAD/CAPP/CAM center. This is good for production management and data transmission in numerical controlled workshop, which can improve the production efficiency. There are 10 sets of CNC equipment in a numerical controlled workshop, and set up the CAD/CAPP/CAM center, there is a problem that each production unit is an information island, which cannot implement informatization management.

Authors of paper “A Probabilistic Algorithm for MANET Clustering” propose a Probabilistic Algorithm for MANET Clustering (PAMC) to improve the performance of this wireless technology. They simulate an algorithm and evaluate it based on two criteria: the average number of clusters and the average re-affiliation. Mobile ad hoc network (MANET) is a type of ad hoc network that MANET nodes can change their locations and configure by themselves on the fly. Because of mobility the MANET nodes, the management of a large MANET is difficult, therefore, clustering in a MANET is an important technique. A large network is divided into several sub networks applying clustering method. When the topology of the network is dynamic and ad hoc, the process of clustering is very complicated.

The paper about “A Self-adaptive Packet Scheduling Algorithm for Hybrid-traffic in Heterogeneous Wireless Networks”, configures QoS policies for heterogeneous network system agents, with the change of network resources dynamically adjusts traffic scheduling strategy. The main contribution of this paper is that a novel self-adaptive packet scheduling algorithm PFM-LWDF is proposed, which improve the complex scheduling hierarchical structure in the existing research works with a hybrid service QoS guarantee. Based on maximum weighted priority delay correction algorithm, the algorithm considers throughput, delay and packet loss rate, and respectively assigns weighting factor.

In the paper “An Enhanced Cooperative Spectrum Sensing with Wavelet Denoising and Softened Hard Decision for Cognitive Radio Networks” a Cooperative Spectrum Sensing using Wavelet Denoising along with Soften Hard Decision technique has been proposed to improve the performance of spectrum sensing.

In the paper “Investigation on the Dispersion Characteristics in Optical Fiber Telecommunication” appropriate methods are adopted to analyze the photonic crystal fiber. With the adjusting of the structure parameters, authors can design a highly nonlinear photonic crystal fiber with different dispersion characteristics. They study the characteristics of the dispersion of optical fiber communication. According to the analysis to obtain the dispersion characteristics of optical fiber under different parameters. Dispersion is widely existed in the optical fiber. The reason is various, such as material dispersion, waveguide dispersion, mode dispersion, and so on. It will lead to the signal waveform distortion and pulse broadening and
then limit the transmission capacity and bandwidth in the optical fiber. With the rapid development, transmission rate can reach even hundreds of Gb/s, and it may lead to many problems. Correspondingly, compensation methods have been paid much attention, and there are also many methods proposed for the compensation. However, one should know the characteristics of the dispersion in order to get compensation algorithms with much higher efficiency. Optical fiber systems with better performance will be designed and manufactured.

Authors of the paper BPAODV: Black Hole Prevention Using Trust Adhoc on Demand Distance Vector Routing Protocol, addresses the important problems relating to Black hole attack in adhoc network. During the research, a new and robust routing mechanism has been developed. Firstly, on the basis of Trust value and Credential value detection and prevention of Black hole attack has been performed.

The paper “A Coverage Strategy Based on probability-aware Model in Wireless Sensor Networks” proposes a Coverage Strategy Based on probability-aware Model in Wireless Sensor Networks. The strategy using the probability-aware Model, Combining with the node coverage situation, eliminate redundant nodes, establish the optimal work node set, designed to reduce the network energy consumption, set a reasonable number of working nodes. The simulation results show that the new strategy not only to improve the network coverage, but also effectively prolong the network lifetime, improve the quality of network. Meanwhile network coverage optimization control is realized.

In the investigation of paper about “Some Aspects of Rectangular Microstrip Antenna for Mobile Application”, the effects of antenna parameters on the radiation characteristics of a compact size Rectangular Microstrip Antenna suitable for mobile application is studied. In the calculations of antenna parameters, resonant frequency is set at 3 GHz. In investigations, three low cost substrate materials, namely: (a) irradiated poly-guide with relative dielectric constant and loss tangent as 2.32, 0.0005, (b) Glass-Epoxy with and (c) RO3006 with are used to simulate the antenna parameters obtained from various models.

Paper about “A Low Power Consumption Frequency Adaptation Mechanism Based on the Traffic and Implementation on NetFPGA”, proposes an adaptive frequency control mechanism based on traffic to reduce power consumption. By calculating real-time traffic, the network device can adjust its operating frequency. On the premise of maintaining network performance, this mechanism could reduce the power consumption significantly. Besides, the adaptive frequency mechanism has been verified and realized in the NetFPGA Reference Router.

The Authors of “WSNs Performance Evaluation Using Non-equilibrium Statistical Mechanics Method” expand the range of performance index which exceeds time delay, packet loss rate, and throughput. Meanwhile, put forward a non-equilibrium statistical mechanics model for integrated WSNs performance evaluation from an evolutionary perspective. A non-linear information dynamics mode is introduced based on the maximum flux principle during the modeling process. The integrated performance evaluation of WSNs can be done by giving reasonable weights of each evaluation index to stabilize the system. The new model reveals the formation pattern and the dynamics law of evolution. The proposed method has been serviced in complex simulation, and the results have indicated that the model is objective and effective.
The paper “Opportunities and Challenges of HTTP Adaptive Streaming” reviews the state-of-the-art of HAS technology and discoveries achieved by numerous researchers. The basic taxonomy of HTTP adaptive streaming systems was described and the major issues associated with HAS systems’ design was summarized. Then the key challenges and open problems and highlight possible avenues for future directions was outlined. HTTP-based Adaptive Streaming (HAS) has emerged as the prominent technology for the delivery of audiovisual content over the Internet in recent years and has a major impact on network traffic. Although traditional stateful session-based streaming solution based on UDP was used initially for media content delivery, researchers and practitioners soon realize that HAS technology, due to get through firewalls friendly, transfer NAT easily, effectively utilize the existing networking infrastructure and provide uninterrupted video streaming service to users with dynamic network conditions and heterogeneous devices, has the potential to improve the Quality of Experiments compared with traditional streaming technologies. Consequently, various HAS media streaming solutions have been proposed and deployed successfully.

In the paper “CARC: A Reliable Routing Mechanism for Cognitive Ad Hoc Networks”, a reliable routing mechanism CARC is proposed, which employs primary and candidate route to communicate under differential cases. Meanwhile, how to choose candidate route, maintain or rebuild route are also elaborated. Numerical simulations show that the proposed CARC protocol has a higher performance compared with other typical protocols.

The paper “Optimal Relay Selection and Power Allocation in Cooperative Cognitive Communication System” focuses on the optimal relay selection and power allocation issue, which studies the communication between SS (Secondary Source) and two SDs (Secondary Destinations) through single relay in CR (cooperative cognitive communication) system. Sufficiently takes the multi-antenna relay, primary-secondary users coexisting, and AF (Amplify and Forward) relay mode as the researching background, and takes the constraints caused by the primary user’s interference and the max transmission power into account, the author proposes to maximize the system throughput by the selection of cooperative relay and the allocation of optimal power. Furthermore, the author also puts forward the approximate expressions of the optimal power allocation, and figures out the optimal solution by the Lagrange multiplier, whose property can be manifested by the simulation and comparison results.

Through an analytical study of paper “Energy Efficient with Network Coding Multipath Routing Algorithm in Wireless Sensor Networks” authors provide guidance on how to choose parameters in the scheme and demonstrate that the scheme is efficient in both multipath and energy consumption. Authors also present an algorithm for deciding the network coding scheme for a node to further reduce energy consumption by minimizing redundant packet transmissions.

The paper “Logical Connectivity Prediction Models for VANET based on Nonlinear Regression and ELM: An Example of the AODV Protocol” simulates the effects of different road traffic parameters on logical connectivity probability and selects three main effect factors, roadway length, vehicle number and vehicle speed. Furthermore, the inner relation between the logical connectivity and the three road traffic parameters is studied based on data mining technique and then two logical connectivity prediction models are presented, the nonlinear regression-based model and the extreme learning machine-based model.
Paper “Performance Study of Various Routing Protocols in VANET Case of Study” evaluate AODV, DSR and OLSR performance in urban scenarios case study. It studies those protocols under varying metrics such as node mobility, vehicle density, and with varying traffic rates. It shows that clustering effects created by cars aggregating at intersections have remarkable impacts on evaluation and performance metrics. The objective is to provide a qualitative assessment of the applicability of the protocols in different vehicular scenarios.

The paper “Security Threats among DICOM Imaging Communications in Public Networks” states that picture archiving and communication systems (PACS) require high-speed networks to transmit large image files between components. Image-data transmission from one site to another through public network is usually characterized in term of privacy, authenticity, and integrity. However, public network’s security issues had always been the significant problems. Recent years, IPv6 brings significant improvements in mechanisms for assuring a higher level of security and confidentiality of the transmitted information. Thus, it is still necessary to take care of some particular aspects. This paper first analyzes how actual security threats and different types of attacks affect IPv6 networks while transmitting Digital Imaging and Communications in Medicine (DICOM) files through the public Internet. Second, illustrate some shortcomings of IPv6 and IPv6’s traffic loads. Finally, some possible solutions against a number of security threats in IPv6 DICOM files transmitting networks have been given.

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Wai-Chi Fang, National Chiao Tung University, Taiwan
Neal N. Xiong, School of Computer Science, Colorado Technical University, USA

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