Foreword and Editorial

International Journal of Future Generation Communication and Networking

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 25 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 “A Dependable Monitoring Mechanism Combining Static and Dynamic Anomaly Detection for Network Systems” proposes a dependable monitoring mechanism combining static threshold-based and dynamic anomaly detection to achieve high dependable and low cost monitoring. Firstly, the performance metrics of host and network are collected through different methods. In static threshold-based detection phase, the secondary metrics are combined to several group items. When any group item exceeds its threshold, dynamic detection methods are adopt to further detect anomaly. In dynamic detection phase, PCA, joint Gaussian distribution, and Bayesian classification are combined to achieve low cost and efficient anomaly detection.

In the paper “Robustness Analyses of Internet Topology with Power-law Features”, tried to study the characteristics of the Internet topology in the autonomous system. Firstly, it put focus on power-law characteristics of Internet topology and gives power-law distribution comparison experiments between Internet topology and that of the small-world network. Experiments show clearly that the topology of the Internet has power-law distribution. Secondly, it focuses on study the robustness of Internet topology, and experiments show that Internet is robust to random failures and fragile to target attacks.

The paper “Admission Control Using Stochastic Learning Games in Cognitive Radio Networks” investigate the performance improvement gained by applying cognitive radio to a multiple Wireless Service Providers (WSPs). It considers several independent WSPs and two types of users: primary (licensed) and secondary (unlicensed) users. It has proposed a scheme for secondary users to manage their handoff based on a threshold on the number of channels fixed by the WSP. As each WSP evolves in a random environment, it proposes a game theoretic framework to find a Nash equilibrium and a stochastic learning algorithm to converge to this equilibrium. A Markov process, with continuous time and finite state space, models the system.

In the paper “Study on OFDM Symbol Timing Synchronization Algorithm”, proposed an improved timing synchronization algorithm which adopted the training sequence, and the timing synchronization estimation function has been optimized for this improved algorithm research of Schmidl & Cox and Minn synchronization algorithms. The peak platform issue of Schmidl & Cox algorithm, the no sharp peak issue of Minn (1) algorithm and the vice peak issue of Minn (2) algorithm were eliminated based on the improved algorithm.
Paper “The Minimum Mean Square Precoding Method for Eliminating Asynchronous Interferences in Cognitive Radio System” put forward a novel kind of precoding method based on the minimum mean square error to eliminate interference to primary and secondary asynchronous users among which there are influences in wireless communication system. In this method, asynchronous interferences are eliminated in the precoding process and this process also satisfies users’ server quality. Analysis and simulation show that the proposed scheme effectively, under the condition of the limitation of interferences in main user system, enhances the second user system capacity and improve the reliability of the transmission system of second users system.

In the paper “The Research of Long-Distance Data Transmission Based on Meteorological Sensor Network”, present improved system architecture of wireless sensor node that is capable of meeting the strict requirements of intensive meteorological observation systems. It adds a solar power supply module to replenish node energy and adopt a network processor and a data acquisition processor collaborating with each other to improve the computation and computation capacity. Furthermore, it designed a dual-band data transmission mechanism so as to adapt to requirements of different transmission distances. The tests have indicated that using solar power can fulfill a node’s energy demand; whereas the design on computing and computing can dynamically meet the specific requirements of different applications.

The paper “Application of Generalized Sidelobe Canceller and Sparse Array in Relieving Congestion in Multi-beam CDMA Systems” investigate the relationship between antenna parameters (main beamwidth, sidelobe attenuation...) and blocking probability of multibeam CDMA system under the presence of hotbeam. From that, it consider deployment sectoring dynamically based on Generalized Sidelobe Canceller (GSC) structure to get blocking probability below 1%. In addition, it considers the way to decrease the complexity of array antenna using sparse array.

In the paper “Design and Realization of Baseband Signal Downsampling in LTE System” introduced a new downsampling method using a multi-stage half-band filter with three half-band decimation filters. Compared with the traditional one, the new method showed a great increase in computing efficiency. The new filter was designed and a plan of implementing this filter on FPGA was suggested.

The paper “Design of Ethernet-CAN Protocol Conversion Module Based on STM32” presented Ethernet-CAN protocol conversion reference model based on the STM32 according to the characteristics of the CAN protocol and the TCP/IP protocol adopted by Ethernet. Considering the case that two kinds of network work at the same time at different rates and in order to reduce the cost and the volume, high cost performance and high integration 32-bit ARM STM32F103RC is used as main control chip of microcontroller. Ethernet-CAN protocol conversion module has been designed. The compact and high reliability embedded TCP/IP protocol stack uIP is adopted and the way of TCP connection was established for data transmission.

In the paper “Delay-based Congestion Control for Multipath TCP” reviews the existing multipath TCP congestion control algorithms and then analyzes and formulates the goals and problems need to be achieved and solved. A delay-based congestion control algorithm named Weighted Vegas (wVegas) is provided. Finally, two possible modifications are demonstrated
including adjusting the congestion control window according to how far the path is from congestion and redefining the behavior when loss occurs.

The paper “Performance Assessment of a Block Cipher Encryption based Channel Encoded Cooperative MIMO MCCDMA Wireless Communication System” made a comprehensive simulative study on the performance assessment of a MIMO MC CDMA wireless communication system. The proposed system under investigation consider a communication link between three multi antenna supported units such as a mobile user unit, base station and relaying node. The system incorporates four low-complexity channel equalization techniques, various digital modulations and Block cipher encryption based channel coding schemes. From MATLAB based simulated study on synthetic data transmission, it is found a quite noticeable impact on deploying a single relaying node on performance enhancement of the presently considered MIMO MCCDMA system. The system is also capable of showing its robustness in retrieving transmitted data over hostile multipath fading channels in a scenario of thickly populated urban area.

In the paper “A Kalman Filtering Channel Estimation Method Based on State Transfer Coefficient Using Threshold Correction for UWB Systems” proposes a novel KF channel estimation method using the STC with threshold correction. By setting a reasonable threshold, the estimation performance of STC can be greatly improved in the time-varying Ultra-Wideband (UWB) channel environment.

The paper “MRBL: An Efficient Multicast Routing Protocol with Backup Labeling in MANETs” presents an advanced tree-based multicast routing protocol which uses an improved label mechanism to maintain the topology and multicast groups of a MANET, and uses the built backup paths to secure better transmission stability. Simulation results show that, with slightly more control overhead, the new routing protocol is able to yield constantly higher delivery ratios vs. increased data flow, when compared with other multicast routing protocols.

In the paper “An Adaptive Precoder for Out-of-band Power Reduction in OFDM-Based Cognitive Radio System” proposed an adaptive precoding scheme based on the adaptive orthogonal projection matrix for OOB power suppression. Low complexity is the main feature of this preceding scheme. Simulation and analysis show that this method reduces the out-of-band power significantly by forcing the power spectrum density (PSD) of several frequency points in OOB to be zero. An advanced precoding scheme proposed later achieves a tradeoff between performance of OOB power suppression and bit error rate (BER) in the receiver. With those schemes, an adaptive precoder is proposed, which has three ways to adaptively adjust precoding matrix to achieve a balance among the complexity of system, the performance of out-of-band power reduction and BER in the receiver.

The paper “Performance of Efficient Routing Protocol in Delay Tolerant Network: A Comparative Survey” aims to detail basic & general aspects specific to information needs in DTN routing and present classification chart. It discusses some detail of routing issues and classifications of routing protocols. Routing is one of the major issues affecting the overall performance of DTN networks in terms of resource consumption, data delivery. Over the past few years a number of routing protocols have been proposed for DTN networks. In this paper mainly three DTN routing protocols Epidemic, PROPHET and Spray and Wait Routing protocols are discussed.
In the paper “Cooperative Beamforming Research for Two-Way Relay in Cognitive Radio by a New SDP Method”, investigate the problem of cooperative beamforming design in cognitive radio network with a primary network and a secondary network. In the secondary network, the two transmitters communicate by the help of relays each other, and the relays select the amplify-and-forward (AF). The aim of this paper is to minimize the total power of relays in the secondary network with the SNRs of two transmitters under constraints and the QoS requirement of the primary user. Therefore, it design an optimization model with constrains. It considers a SDP relaxation method and proves that there is a rank-one optimal solution which is the optimal solution of the original problem. So it obtain weights of the beamforming and the optimal power of relays.

The paper “A Non-cooperative Game Theoretic Approach to Energy-efficient Power Control in Wireless Sensor Networks” proposed a distributed power control algorithm based on non-cooperative game theory under incomplete information which adopts Signal-to-Interference Noise Ratio (SINR) as utility function. The purpose of power control algorithm for non-cooperative game is to achieve the largest utility by optimal power control strategy, thus improve the total network energy efficiency. Moreover, Bayesian Nash equilibrium theorem is introduced to study the existence and uniqueness proof of Nash equilibrium algorithm.

In the paper “A Global Best Path Meteorological Data Gathering Algorithm for Wireless Sensor Networks”, propose a Global Best Path (GBP) data gathering algorithm based on wireless Sensor Networks with single Mobile Sink (GBP-MSSN). It aims at determining the best position for the single mobile sink and further using global sensors information to generate the best scheme to gather data from specified node. Generating of best scheme is conducted by GBP algorithm which can balance energy consumption among whole sensor networks and further prolong the network lifetime.

Paper “Research on the Forming Mechanism of Group Doctor-Patient Conflicts in China Based on the Complex Social Networks” systematically analyzed the forming mechanism of group doctor-patient conflict on the basis of previous studies, using complex social network theory, and focusing on the structure of the core node of the formation and evolution of group doctor-patient conflict. Forming process of group doctor-patient conflict is extremely complicated. It is above all the interaction based on community structure.

The paper “Enhancing TCP to Improve Throughput of HTTP Adaptive Streaming” enumerated two reason that cause the poor performance of HAS. Two server-based algorithms are proposed targeting them. The two algorithms are novel pacing algorithm in the initial burst phase and reducing tail loss algorithm in the trailing ACKs phase. The novel pacing algorithm aims to reduce burst in the initial burst phase, and skip the slow start after retransmission timeouts occurred in the trailing ACKs phase. The reducing tail loss algorithm aims to reduce the probability of RTO in the trailing ACKs phase.

In the paper “The Challenges of Data Transmission toward Tbps Line rate in DWDM System for Long haul Transmission”, reviews the progress and techniques used to increase wavelength throughput from 2.5Gbps to 100Gbps, and investigates the challenges to transmit data beyond 100Gbps in a single operational cycle. By implementing a super-channel with many optical carriers, it can reduce the requirement for exotic electronics, allowing this technology to be delivered much more quickly than other options. The key to a multi-carrier
super-channel is the use of large scale PICs to reduce optical-circuit complexity and offer the maximum flexibility for an engineering design.

The paper “Interference Management and Traffic Adaptation of Femto Base Station based on TD-LTE” proposed a traffic adaptation scheme with consideration of traffic demands and interference level to select optimal uplink/downlink configuration and efficiently improves system capacity.

In the paper “DFT-based Cluster Analysis Channel Estimation Algorithm for OFDM Systems on Multipath Channels”, proposed enhanced DFT-based channel estimation for OFDM systems. Conventional DFT-based channel estimations improve the performance by suppressing time domain noise beyond the length of the cyclic prefix (CP), so it does not completely suppress the noise. However, they potentially require information on channel impulse responses and may also result in mean-square error (MSE) floor due to incorrect channel information such as channel delay spread. In order to overcome the disadvantage, the proposed channel estimation can improve the performance by deciding significant channel taps adaptively. Significant channel taps are detected on the basis of cluster discriminant analysis.

Paper “Flexible Architecture for Internet of Things Utilizing an Local Manager” presents an flexible architecture for Internet of things utilizing a local manager with the goal to solve many issues. The solution is described from both the system architecture and example applications. The component design and the communication between these components are introduced. The Local Manager architecture is composed of a gateway, Message Broker, Message Relay Bridge and several small applications (Apps) with different purposes. The Local Manager can be used as a platform for future integration of things into cloud services via the Internet.

The paper “ESCA: Evolution-strategy based Service Composition Algorithm for Multiple QoS Constrained Cloud Applications” present a novel service composition framework, which takes advantage of flexibility provided by cloud systems and applies evolution strategy to solve the optimal programming problem of multiple QoS constrained service composition. Furthermore, a QoS negation mechanism is proposed to satisfy the dynamical and elastic cloud environments.

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