GUEST EDITORIAL

Signal processing techniques for sustainable cognitive radio communications

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The growing devices and capacity requirements of wireless systems bring increasing demand for RF spectrum. Cognitive radio (CR) system is an emerging concept to increase the spectrum efficiency. CR system aims to enable opportunistic usage of the RF bands that are not occupied by their primary licensed users in spectrum overlay approach. This approach is especially important in signal and image processing, where sets of sensors, large and heterogeneous, provide large amounts of data, usually noisy and corrupted with various sources of interference. From a methodological point of view, cognitive communication is concerned with multi-dimensional and statistical signal processing, especially with problems such as detection, estimation, and optimization. In addition to classical sensing, detection, supervised, reinforcement and learning methods include Bayesian modeling, Markov models, support vector machines, and kernel methods. It spans a broad area of applications, such as military, industrial, medical, transportation and other fields like error control, error detection, adaptive filtering, computer vision, managing data, sensor control, data fusion, blind and semi-blind source separation, sparse analysis, brain-computer

interfaces, signal processing and radio communication. The intelligent system for the cognitive communication is a collection of intelligent terminals with signal processing and mobile capabilities. Among them, each intelligent terminal carries out signal transmission and distributed processing with other intelligent terminals. However, most existing communication architectures, including their signal processing protocols and control algorithms, are designed for centralized networks by default.

This issue aims to gather latest research and development achievements in this area and to promote their applications in all important fields with society needs. This issue features eight selected papers with high quality. The first article, "Salp Swarm Algorithm and Phasor Measurement Unit Based Hybrid Robust Neural Network Model for Online Monitoring of Voltage Stability", presents the online monitoring of voltage stability method. The proposed model is based on Salp Swarm Algorithm based Artificial Neural Network (SSA-ANN). The prime considerations in this model is the use of real time data. The computation time is reduced amongst all the models for all the test cases considered for estimating the VSMI.

The second article, "Efficient Traffic Control and Lifetime Maximization in Mobile Ad hoc Network by Using PSO-BAT Optimization", proposed hybrid Meta heuristic methodology of dynamic mobile ad hoc network focuses on the mobile node energy level and lifetime maximization with the use of velocity estimation and fitness value calculations of PSO-BAT optimization algorithm. The proposed heuristic algorithm enhances the secured routing process of mobile nodes in dynamic mobile network with denial of service mitigation algorithm in a reliable method.

The third article, "The performance analysis of dual-inverter three phase fed induction motor with open-end winding using various PWM schemes", proposed to investigate the performance of various PWM schemes for two inverters fed a three-phase induction motor. The PWM schemes are developed the voltage references and

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modulated using the same or different PWM scheme with simple carrier based PWM method proposed and executed.

The fourth article, "Reliable Service Availability and Access Control Method for Cloud Assisted IoT Communications", the reliable service method availability and access control is discussed to improve the resource allocation and request processing efficiency of Cloud-IoT. This method operates in cloud and gateway layer for resource allocation and request processing respectively. Using a reliable gateway selection method, the requests are processed in a timely manner preventing backlogs and failures. The augmented learning process classifies requests based on time overlap to reduce the backlogs and delay in communication. In the proposed methods, the fore-mentioned processes are augmented to improve the overall performance of cloud assisted IoT platforms.

The fifth article, "Efficient Pre-authentication Scheme for Inter-ASN Handover in High Mobility MANET", proposed a new routing protocol to handle the displacement and direction factors in ad-hoc networks. The proposed Modified EAP based Pre-authentication scheme using Improved ElGamal (MEPIE) overcomes the MITM, replay, DoS and impersonation attacks in MANETs. The proposed mechanism based on the improved ElGamal addresses the inadequacies of ElGamal digital signatures and yields better results.

The sixth article, "Unified Power Quality Conditioner with Reduced Switch Topology for Distributed Networks", In this paper Unified Power Quality Conditioner designed and developed with reduced number of switches and it is controlled by SRF based Carrier Double Zero Sequence Signal Modulation technique. The proposed UPQC system is designed with 10 switches, which provide better performance compared to conventional 12 switch UPQC system. It is implemented to reduce the various power quality issues like minimization of voltage sag and current ripples, harmonics reduction in the input voltage and reduced Total Harmonic Distortion.

The seventh work titled, "False Alarm Detection Using Dynamic Threshold in Medical Wireless Sensor Networks", presents a dynamic threshold algorithm to detect the sensor anomaly to differentiate false and alarms and this system presented for healthcare application in WSN. The error value is calculated using a dynamic threshold which can identify false and true alarm using a majority voting system. The proposed system shows the detection ration is high and false positive rate is lower which conclude that this new approach is particularly useful in WSN application such as health monitoring system and it will be competitive with others.

The eighth article "Design and Development of Planar Antenna Array for MIMO Application" has proposed a Design for implementing an innovative Two T-shaped planar antenna on behalf of ISM band for the MIMO application. The antenna is designed with the Taconic RF-35 substrate having a dielectric constant of value 3.5, while the method of feeding coaxial probe has been employed as antenna feed. The proposed antenna's performance was examined, and it was found that the proposed scheme has better performance compared to the existing schemes.

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