Guest editorial

Pervasive computing in cognitive communications applications

It aims to circulate original work and development activities in the form of research publications and product developments from the researchers, academia and scientists from industries on latest pervasive computing techniques in wire and wireless communication signal processing applications. The topic of interest covers wide area applications: Mobile networks, sensor networks, multirate and multidimensional sampling, computer vision, statistical processing, radar, sonar, seismic audio and video, remote sensing and coding techniques and signal processing. A pervasive computing in communication signal processing incorporates novel theorems, algorithmic approaches, coding, compression techniques and searching algorithms for wide variety of applications.

It is focused to highlight the practical methodologies and emerging algorithmic implementations related to the topics that cover up-to date critical issues, research by professional communities. It provides a platform for the all researchers with various backgrounds and medical experts to express the research in the rapidly growing fields of wire/wireless cognitive communications. A signal with multi-disciplinary in nature finds its application in signal processing and computer vision. Perception of research community typically focuses on the development of pervasive computing algorithms in cognitive informatics, data transmissions and cognitive radio networks/devices.

The prime aim of this special issue is to motivate researchers to publish their latest research works focusing on the issues and challenges and their remedial solutions in the field of wire/wireless communications, computing techniques/algorithms, wireless sensor networks and its ideal pervasive computing techniques. The proposed submissions and presentations should be original and unpublished works.

Papers in the special issue

The Special Issue is composed of seven outstanding contributions.

Krishna *et al.* proposes a third-order discrete time sigma delta modulator (SDM) with optimum performance by addressing instability and power dissipations issues, and a novel SDM architecture is designed and verified in behavioral modeling in MATLAB/SIMULINK environment. Simulation results show that performance parameters of proposed modulator achieved SNR of 105.41 dB, SNDR of 101.96 dB and DR of 17 bits for the signal bandwidth of 20 kHz. The proposed discrete time modulator designed with 1-bit quantizer and optimum oversampling ratio proved as power efficient. Integrator scaling coefficients are generated in LabVIEW environment for pure third-order noise shaping. This paper describes single-loop SDM design with optimum selection of integrator weights for physiological signal processing in IoT applications. The proposed discrete time modulator designed with 1-bit

The authors would like to express our gratitude and congratulations to all the authors of the selected papers in this Special Issue of *International Journal of Pervasive Computing and Communications* (Emerald Publisher) for their contributions of great value in terms of quality and innovation. The authors would like to thank also all the reviewers for their contribution to the selection and improvement process of the publications in this special issue. Our hope is that this Special Issue will stimulate researchers in both academia and industry to undertake further research in this challenging field. We are also grateful to the *International Journal of Pervasive Computing and Communications* Editor in Chief and the Editorial office for their support throughout the editorial process.

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quantizer and optimum oversampling ratio proved as power efficient. Integrator scaling coefficients are generated in LabVIEW environment for pure third-order noise shaping.

Alam *et al.* investigates Cloud users can access services at anytime from anywhere in the world. On average, Google now processes more than 40,000 searches every second, which is approximately 3.5 billion searches per day. The diverse and vast amounts of data are generated with the development of next-generation information technologies such as cryptocurrency, internet of things and big data. To execute such applications, it is needed to design an efficient scheduling algorithm that considers the quality of service parameters such as utilization, make span and response time. Therefore, this paper aims to propose a novel Efficient Static Task Allocation (ESTA) algorithm, which optimizes average utilization. Cloud computing provides resources such as virtual machine, network, storage, etc. over the internet. Cloud computing follows the pay-per-use billing model. To achieve efficient task allocation, scheduling algorithm problems should be interacted and tackled through efficient task distribution on the resources. The methodology of ESTA algorithm is based on minimum completion time (MCT) approach. ESTA intelligently maps the batch of independent tasks (cloudlets) on heterogeneous virtual machines and optimizes their utilization in infrastructure as a service cloud computing. To evaluate the performance of ESTA, the simulation study is compared with Min-Min, load balancing strategy with migration cost, longest job in the fastest resource-shortest job in the fastest resource, suffrage, MCT, minimum execution time and opportunistic load balancing on account of make span, utilization and response time. The simulation result reveals that the ESTA algorithm consistently superior performs under varying of batch independent of cloudlets and the number of virtual machines' test conditions.

Aylapogu *et al.* focus the design geometry of the suggested high gain switched beam Yagi-Uda antennas. The constructed antenna has been developed with Rogers Substrate, relative permittivity (εr) of 4.4, tangent of loss 0.0009 and with height of 1.6 mm. The proposed antenna has an input impedance of 50, and it is connected to input feed line with 2 mm. In forthcoming life, the antennas play key role in all the wireless devices, because these devices perform with high gain and high efficacy. The pivotal principle of this paper is to accomplish the gain as high, high directivity and interference is low at higher frequencies. Therefore, it is more applicable to 5G mobile communications and millimeter wave communications.

Renuka N *et al.* proposes the tremendous growth of wireless applications and the demand for high data rate, the spectrum utilization improvement has been the most crucial challenges for wireless communication. Adapting cognitive radio with orthogonal frequency division multiplexing or offset quadrature amplitude modulation (OFDM/OQAM) improves the spectrum and energy efficiencies. Thus, it overcomes the spectral leakage problem at the transmitter side and leads to less interference from secondary user (SUs) to primary user (PUs) and between the SUs in cognitive radio technology. The benefit of exploiting pulse shape filtering in the OFDM/OQAM is to not only eliminate the requirement of the guard bands but also reduce the out of band energy transmission, which also improves the spectral isolation from the neighboring systems. But the high peak to average power ratio (PAPR) phenomenon is a common issue in the majority of the multicarrier modulation systems and thus OFDM/OQAM is no exception in this case. Therefore, this paper aims to examine the effect of integrating the Walsh–Hadamard Transform (WHT) on the power spectral density and investigates the problem of PAPR in the WHT/OQAM system.

Kollu *et al.* describes data centers evolve constantly in size, complexity and power consumption. Energy-efficient scheduling in a cloud data center is a critical and challenging research problem. It becomes essential to minimize the overall operational costs as well as environmental impact and to guarantee the service-level agreements for the services

provided by the cloud data centers. Resource scheduling in cloud data centers is NP-hard and often requires substantial computational resources. To overcome these problems, the authors propose a novel model that leads to nominal operational cost and energy consumption in cloud data centers. The authors propose an effective approach, parallel hybrid Jaya algorithm that performs parallel processing of Jaya algorithm and genetic algorithm using multi-threading and shared memory for interchanging the information to enhance convergence premature rate and global exploration. Experimental results reveal that the proposed approach reduces the power consumption in cloud data centers up to 38% and premature convergence rate up to 60% compared to other algorithms.

Valiveti *et al.* focus on road accidents, an inadvertent mishap can be detected automatically and alerts sent instantly with the collaboration of image processing techniques and on-road video surveillance systems. However, to rely exclusively on visual information especially under adverse conditions like night times, dark areas and unfavorable weather conditions such as snowfall, rain and fog which result in faint visibility lead to incertitude. The main goal of the proposed work is certainty of accident occurrence. Temporal, spectral, psychoacoustic features, gammetonegram of the recorded audio signal are extracted. A high-level vector is generated based on centroid and the extracted features are classified with the help of machine learning algorithms like SVM, KNN and DT. The audio samples collected have varied SNR ranges and the accuracy of the classification algorithms is thoroughly tested.

Konkyana *et al.* proposes a novel compact Kuznets-curve with a Parabola-shaped quad-band notched antenna is demonstrated in this paper. The presented prototype is ascertained on a composite material composed of woven fiberglass cloth with an epoxy resin binder. The resulting UWB antenna ranges 3.1–3.54 GHz, 5.17–5.51 GHz, 5.74–6.43 GHz and 6.79–7.60 GHz. To avoid the other intermediate frequencies, the projected antenna incorporating the slots with a patch. The antenna adaptation of the defected ground plane has been achieved through the quad notched band with operating frequency ranges from 2.56 to 7.6 GHz and with eliminated frequency ranges 3.55–5.16 GHz, 5.52–5.73 GHz, 6.44–6.78 GHz and 7.66–10.6 GHz. The stated configuration of the proposed antenna is competent to many networks such as LTE and X-band applications. The experimental study encountered the significance of the proposed antenna.

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Peter Ho Chiung Ching received his PhD in Information Technology from the Faculty of Computing and Informatics, Multimedia University. His doctoral research work was on the performance evaluation of multimodal biometric systems using fusion techniques. Dr Ho is a Senior Member of the Institute of Electrical and Electronics Engineers. Dr Ho has published a number of peer reviewed papers related to location intelligence, multimodal biometrics, action recognition and text mining. He is currently an Adjunct Senior Research Fellow in the Department of Computing and Information Systems, School of Science and Technology, Sunway University.

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Shuichi Torii received the BD degree from Kagoshima University in 1983 and MD and PhD degree from Kyushu University in 1985 and 1989, respectively, all in mechanical engineering. He then worked as the visiting scholar at University of Michigan, where he studied the solidification and oxidization in reactor using the experimental method and numerical simulation. In 1993, he became the associate professor at Kagoshima University, where he studied the thermal fluid flow transport phenomena for rotating machinery and combustion and the development of turbulence model. Since 2003, he currently is a Professor of Department of Mechanical Engineering at Kumamoto University. He focuses on production and development of clean energy and renewable energy, thermal fluid flow transport phenomena using nanofluids, advanced cooling device development with the use of nanofluids and development of new clean fuel with the aid of shock-wave.