
Editorial

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Biographical notes: Narendra D. Londhe received his BE degree from SSGMCE, Shegaon in Electrical (Electronics & Power) Engineering in 2000. He further received his MTech and PhD degrees from Indian Institute of Technology Roorkee in 2004 and 2011, respectively. He joined National Institute of Technology Raipur in 2009 as Assistant Professor and is teaching both UG and PG course subjects related to digital signal and image processing, pattern recognition etc. He has published numbers of research articles in peer-reviewed journals and reputed conferences. He is an active IEEE Senior Member. He has supervised 13 MTech dissertations and guiding six PhD theses.

Ramesh K. Sunkaria received his BTech degree in Electronics Engineering from GNDU, Amritsar and MTech degree in Electronics and Communication Engineering from GNDEC, Ludhiana in 1990 and 2004, respectively. He received his PhD degree from Electrical Engineering Department, IIT Roorkee in 2010. He has worked as Engineer in BHEL, Haridwar till 1994 and Assistant Director (Engineering) in IBES, Govt. of India till August 1996. At present he is Assistant Professor in Department of Electronics & Communication Engineering, Dr. B.R. Ambedkar National Institute of Technology, where he has been teaching UG/PG courses related to biomedical signal/image.

Anil Kumar received his BE degree from Army Institute of Technology (AIT) Pune, Pune University in Electronic & Telecommunication Engineering and MTech and PhD degrees from IIT Roorkee, India, in 2002, 2006 and 2010, respectively. Currently, he is an Assistant Professor in the Electronic & Communication Engineering Department, PDPM IITDM, Jabalpur, India. His research interests are design of digital filters & multirate filter bank, multirate signal processing, biomedical signal processing, image processing, and speech processing.

Deepti Mittal received her BTech degree in Electronics Engineering from Harcourt Butler Technological Institute, Kanpur, and MTech (Hons.) degree in Electronics & Communication Engineering from Govind Ballabh Pant University of Agriculture & Technology, Pantnagar in 1999 and 2004 respectively. She did her PhD degree in Electrical Engineering Department, Indian Institute of Technology Roorkee in 2011. She worked as a Lecturer/Lecturer (Senior Scale) in Department of Electronics Engineering, Moradabad Institute of Technology,

Moradabad from September 1999 to February 2007. At present she is Assistant Professor in Thapar University, Patiala. She has published her works in reputed journals and conference proceedings.

This special issue on Medical Signal and Image Processing of the *International Journal of Signal and Imaging Systems Engineering (IJSISE)* consists of total nine well-deserved research works presented by various researchers from across the world. All the research articles have significant contribution in the areas of medical signal and image processing. These will be surely motivating and benefiting the incoming research in this field.

First paper in the issue ‘Paradoxical sleep stages detection using somnographic EOG signal for obese and non-obese patients’ gives new dimension to the study of paradoxical sleep stages detection using EOG as compared to the traditional way based on EEG. Authors have given the classification methodology composed of three phases: a pre-processing phase, a descriptors extraction phase and an automatic detection of rapid eye movement (REM) sleep stages phase. Authors have received better detection efficiency of 93.28% compared to expert’s results that have used the four polysomnographic signals. The patients of both obese and non-obese nature have been tested here.

In the second paper of the issue, ‘Automatic classification of slow-wave sleep and REM-sleep stages using somnographic ECG signal: some preliminary results for obese and non-obese patients’, by same authors as of the first paper of issue, authors have extended their approach in the first paper to classify the slow-wave sleep and REM sleep stages based on cardiac rhythms. This is very innovative way to classify sleep stages on the basis of polysomnographic ECG signal. Authors have tested the work for both obese and non-obese patients’ dataset from PHYSIOBANK and achieved the appreciable classification efficiency of 92.28% and 91.82% in slow-wave sleep and REM sleep stages, respectively.

Third paper of the issue ‘Robust mass classification-based local binary pattern variance and shape descriptors’ presents new technique to classify the macro calcification in the breast mammogram images. The method characterises the local density in different types of breast tissue patterns information into the LBP histogram. The performance of macro-calcification detection methods is developed using FARABI database. Performance results are given in terms of Receiver Operating Characteristic (ROC).

Fourth paper of the issue ‘Different approaches of analysing EEG signals for seizure detection’ proposes the study of epileptic seizures raised due to disturbed electrical activity of the brain and its classification. This work involves the performance evaluation of state-in-art classifiers based on SVM, ANN and wavelets. Gray level co-occurrence matrix (GLCM) and statistical features are extracted from the decomposed EEG signal.

Fifth paper entitled ‘Decision tree classifiers for mass classification’ proposes that the mass detection from the mammogram is important for breast cancer diagnosis. This

paper proposes the classification method for breast masses using the decision tree techniques. This paper presents the comparison result of 12 decision tree algorithms including ADTree, BFTree, DecisionStump, FT, C4.5, LADTree, LMT, NBTree, RandomForest, RandomTree, REPTree and CART.

In the sixth paper entitled ‘Tamper detection of electrocardiographic signal using watermarked bio-hash code in wireless cardiology’ a new technique is proposed to detect undesirable modifications, if present, in a transmitted bio-medical ECG signal. While transmitting, the medical information becomes highly vulnerable to miscellaneous attacks like tampering, hacking etc. A watermark is added in the Electrocardiographic (ECG) signal to increase the level of security, to help protect the integrity of the data and to decrease the chances of wrong diagnosis.

In the seventh paper in the issue ‘A variant approach for human forensic identification using dental radiographs with skeleton and contour’ a biometric system based dental radiographs is improvised further. In this paper, a skeleton-based shape matching algorithm for dental bitewing and periapical images is proposed. The dental radiographs receive more uniform illumination in pre-processing. This is followed by improvised teeth isolation using bifurcation technique. The contour and shape are extracted based on active contour model and skeleton, respectively. Finally, shape matching is done by both contour based and skeleton based approaches. The experimental results are obtained on a database of 100 AM images. This algorithm provides a hit rate of 0.77 both for the contour and the skeleton approaches.

In the eighth paper of the issue ‘Beat detection algorithm for ECG and arterial blood pressure waveforms using empirical mode decomposition: a unified approach’ a unified algorithm is presented for R-peak detection in ECG and systolic peak detection in arterial blood pressure signal using empirical mode decomposition. The algorithm is able to detect both, the R-peaks in ECG and systolic peaks in ABP signal.

In the ninth and last work presented in the issue ‘Prediction of game performance in Australian football using heart rate variability measures’, an innovative study is presented in medical-based performance evaluation in sports like football. A new methodology Wrapper subset based genetic algorithm is proposed here which is found better with respect to HRV, PCA based prediction based systems. These kinds of systems are really helpful to coaches to identify the effect of training on players and further in the selection of high performance players for the match.

We guest editors feels that this issue will really help and motivate the budding researchers to grow in this area which bridges the gap between medical and technical fields. In

preparing this issue, there is lots of hard work done by various people who deserves a mention here. We first of all are really grateful to Editors in Chief of *IJSISE* Prof. George Constantine Giakos and Prof. Dimitrios A. Karras who accepted our proposal of the special issue and encouraged us. Prof. Dimitrios A. Karras not only always replied to our queries but also communicated his time to time suggestions in his ill health also. The special issue was later supervised by Chief Editor Prof. George Constantine Giakos who

motivated and brought required expedition in the work. During this endeavour, the major applaud goes to the reviewers who accepted all our time limits and repetitive reviewing. The authors also need to be thanked for their patience they have shown during the proceedings. At last a big 'Thank You' from us to Liz Harris, Journal Manager of *IJSISE*, who tirelessly entertained authors' impatient queries and keep pushing things forward. She has shown faith in us and helped to bring out this issue.