GUEST EDITORIAL PREFACE

Special Issue on Advances in Machine Vision, Image Processing, and Pattern Analysis, Part 1

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A lot of advancements have been made recently in the field of image processing and pattern analysis. This special issue of IJSDA aims to focus upon the latest developments in theory, methodologies and applications in the highly interdisciplinary research arena of machine vision, image processing and pattern analysis. The theme addresses mathematical, physical, architectural and computational aspects of machine vision, analysis, matching and recognition along with its subsequent connection with Human Vision System (HVS). Further, it is known that computational intelligence serves as a powerful tool to mimic and process human knowledge. The integration of artificial intelligence, soft computing and machine learning adds to various computational enhancements in machine vision and image processing.

This special issue consists of the extended version of papers which were initially presented at the Third International Conference on Frontiers in Intelligent Computing: Theory and Applications (FICTA-2014) held during 14–15 November 2014 at Bhubaneswar (Odisha), India. This conference was jointly organized by Bhubaneswar Engineering College (BEC), Bhubaneswar, India and CSI Student Branch, ANITS, Vishakhapatnam (A.P.), India. FICTA 2014 received a good number of submissions from the different areas relating to intelligent computing; finally with the acceptance ratio of 0.43 its proceedings were published as Vol. 327 & 328 of Springer Advances in Intelligent Systems and Computing (AISC) Series. The special issue is further bi-

furcated into two parts. Part I will published as second issue (vol. 4, no. 2) whereas Part II will be published under third issue (vol. 4, no. 3).

The Part-I of this issue presently comprises of five articles which are the shortlisted papers published under the tracks of 'Advanced research in Computer Vision, Image and Video Processing' and 'Soft Computing, Evolutionary Computing, Bio-inspired Computing and Applications' under FICTA 2014. The aggregation of articles published under this issue have been compiled to present advancements in image features extraction dealing with 3D face recognition, textured and document image analysis followed by two works on video processing focussing upon reduction of computational complexity in scalable video coding and extraction of key frames from long surveillance videos.

The first article in this issue by Ganguly et al., extended their initial work on 3D face recognition entitled 'Illumination, Pose and Occlusion Invariant Face Recognition from Range Images Using ERFI Model' to operate in the unconstrained environment (i.e. under varying illumination, pose, expression as well as occlusion). The same has been considered among the known challenging tasks in the domain of face recognition. The performance investigation of recognition rates has been carried out in this work using synthesized datasets like: Frav3D and Bosphorus databases using fusion of SIFT and SURF features. The authors' concludes with the statement that weighted fusion vector based face recognition scheme implies promising recognition rates than individual SIFT and SURF features.

The second article by Singh and Urooj focused upon the rotation invariant analysis of textured images. The authors' in this work presented Localized Radon Polar Harmonic Transform (LR-PHT) to analyze and capture the information from texture regardless their geometric deformation. Here, the Radon Transform is calculated for unit disk area inside the image where the rotations of image were converted into translation and then the translation invariance was achieved using Gaussian derivative wavelet. It has been demonstrated that their method performs significantly well for directional textures. The advantage of proposed method lies in its robustness to additive white noise and impulse noise.

The work of Balaji et al. has been communicated in the third article which presents a block mode detection algorithm for scalable video coding using probability model. The proposed algorithm has been coined as a fast mode decision algorithm with less complexity unlike the traditional Joint Scalable Video Model (JSVM). The probability model is applied for both intra-mode and inter-mode predictions of Base layer and Enhancement layers in a Macro Block (MB). Further, the estimated Rate Distortion Cost (RDC) for modes among layers is used to determine the best mode of each MB. The experimental results show that this algorithm achieves 26.9% of encoding time with minimal degradation in PSNR.

The fourth article entitled 'A Novel Framework for Efficient Extraction of Meaningful Key Frames from Surveillance Video' is an interesting piece of work on video analysis of long videos with significantly reduced computational cost. The proposed framework incorporates human intelligence in the process of key frame extraction. The results are compared with the results of IMARS (IBM Multimedia Analysis and Retrieval System), results of the key frame extraction methods based on entropy difference method, spatial color distribution method and edge histogram descriptor method. Caviar and ChokePt datasets have been used for validation and comparison of results.

The fifth and final article in the sequence by Singh et al. proposed a robust word-level handwritten script identification technique using texture based features to identify the words written in any of the seven popular scripts namely: Bangla, Devanagari, Gurumukhi, Malayalam, Oriya, Telugu, and Roman. The texture based features comprise of a combination of Histograms of Oriented Gradients (HOG) and Moment invariants. The technique has been tested on 7000

handwritten text words in which each script contributes 1000 words. Based on the identification accuracies and statistical significance testing of seven well-known classifiers; Multi-Layer Perceptron (MLP) has been chosen as the final classifier which is then tested comprehensively using different folds and with different epoch sizes. The overall accuracy of the system is found to be 94.7% using 5-fold cross validation scheme, which is quite impressive considering the complexities and shape variations of the said scripts. The authors' have further laid directions for continued research in recognizing other Indic scripts in any of the multi-script environments.

To sum up, this special issue has highlighted the new advancements in features extraction with special emphasis on texture features to improve the performance of machine vision tasks like: face recognition, document analysis and video surveillance. The collected papers provide interesting and promising advances of the state of the art trends in pattern analysis with respect to images and videos. As guest editors we hope that spectrum of research works covered under this special issue will be of value for multitude of readers. At the same time, we are grateful to the authors for making their valued research contributions to this issue and their patience in crucial revision stages.

The technical standards and quality of published content is based on the strength and expertise of the reviewer board members who have been grossly involved in providing high quality reviews for the submitted papers. Our special thanks goes to the Editor-in-Chief of the International Journal on Systems Dynamics Applications (IJSDA), Dr. Ahmad Taher Azar, Benha Unversity, Egypt, for all his help, support, efficiency and competence rendered to this special issue. Last, but not the least our heartfelt thanks are due to Prof (Dr.) Suresh Chandra Satapathy, Corresponding Editor of Springer AISC Series FICTA 2014 (Chairman- Division-V: Education and Research, Computer Society Of India), in providing active support and collaboration in carrying out selections and making calls to the authors' of quality articles for extension of their work and its subsequent submission in this special issue of IJSDA.

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