

Second issue of volume 13

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This is the second issue of volume 13 in 2017. The first issue in volume 13 was a double special issue. There will be two more issues of volume 13 in 2017. However, in order to address the backlog of accepted papers that are already listed and are available online under Online First Articles, we are pleased to inform the authors of the accepted papers that the Editorial Office has approved offering eight issues in two volumes in 2018 instead of four issues in one volume for a total printed page count of 1600. Although the load to organize two volumes instead of one will be considerably more, we are taking this step in order to shorten the time between the online and print versions of accepted papers. We expect and hope that the extra volume to be printed in 2018 would achieve this objective to a great extent.

An editorial board dinner meeting was recently held in Anaheim, CA, in April 2017 during the SPIE Conference on Real-Time Image and Video Processing as part of SPIE Symposium on Commercial + Scientific Sensing and Imaging. We thank the board members who attended this meeting discussing various issues related to the journal. A picture of the dinner meeting appears in Fig. 1.

Two issues of focus in the meeting were: (1) ways for Associate Editors (AEs) to improve the turnaround time of the review process, and (2) ways to deal with the increase in the number of submitted manuscripts in which the

contents have already appeared in other publications by the same authors and other unethical behavior such as plagiarism. On a more positive note, we are glad to report that the stature of JRTIP in the image and video processing community has been steadily growing. The number of article downloads in 2016 exceeded 70,000 primarily due to the two volumes that were published in 2016. The quality of the review process is reflected in the acceptance rate of submitted manuscripts, which has remained about 30%. In a survey that was conducted by Springer, 65% of the authors indicated either being very satisfied or satisfied with their publication experience with JRTIP and would consider submitting future manuscripts to JRTIP.

The next editorial board dinner meeting is planned to be held in Orlando, FL, in April 2018 during the SPIE Conference on Real-Time Image and Video Processing. One issue that needs to be pointed out here is that this SPIE conference, which is the only conference dedicated to the real-time aspects of image and video processing and has served as the venue for the gatherings of the editorial board, has been alternating between the SPIE Symposiums in the USA and Europe for the last few years. However, due to a decision made by SPIE, from now on this conference will be held as part of the SPIE Symposium on Commercial + Scientific Sensing and Imaging whose venue rotates between the three cities of Orlando, Baltimore, and Anaheim in the USA.

This regular issue consists of a total of ten papers. The first paper by Akgün entitled “A practical parallel implementation for TDLMS image filter on multi-core processor,” covers a parallel implementation of a two-dimensional mean square algorithm (TDLM) involving weight adjustment. The processing load is handled by threads via splitting an input image into sub-blocks, and distortions between sub-blocks are eliminated using weight

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Fig. 1 Editorial board dinner meeting: (from *left to right*) Mohamed Akil, Christos Grecos, Mukul Shirvaikar, and Nasser Kehtarnavaz

synchronization with neighboring sub-blocks. The developed parallel implementation is shown to provide substantial speedup improvements over the sequential implementation.

The second paper by Uma et al. entitled “CT and MRI image compression using wavelet-based contourlet transform and binary array technique,” provides a 2-D lossy compression technique based on contourlet transform and binary array technique for computed tomography (CT) and magnetic resonance imaging (MRI) images. When applied to CT and MRI images, it is shown that the proposed compression method generates less processing time compared to existing methods. Furthermore, the evaluation results obtained from radiologists indicated that the proposed compression method would accurately reproduce the diagnostic features of CT and MRI images.

The third paper by Salvadori et al. entitled “An optimisation of Gaussian mixture models for integer processing units,” investigates sub-integer implementations of the adaptive Gaussian mixture model (GMM) for background/foreground segmentation for processors having no floating-point unit. Two integer techniques for updating the mean and the variance of each Gaussian are discussed based on a redefined and generalized “round” operation. It is demonstrated that this implementation leads to low memory footprint and computation costs without adversely affecting the segmentation performance.

The fourth paper by Sahlbach et al. entitled “A system-level FPGA design methodology for video applications with weakly-programmable hardware components,” covers a system-level FPGA development concept for video applications with weakly programmable hardware components. This development involves a combination of the following techniques: rapid software prototyping, component-based FPGA design, advanced formal real-time analysis, and code generation. The developed tools are assessed by considering a binarization and a dense block matching application. It is shown that the developed

hardware design achieves comparable performance and chip area compared to a hand-optimized design.

The fifth paper by Hsia et al. entitled “A new method of moving object detection using adaptive filter,” presents a new method that uses a least-mean-square scheme to train the mask operation for low-resolution images. This method involves an adaptive least-mean-square scheme named ALMSS by using the training mask to detect moving objects on resource-limited systems. The experiments conducted using real scenes indicate that the developed ALMSS method is effective for the real-time detection of moving objects. A prototype VLSI circuit is also designed, simulated, and discussed in this paper.

The sixth paper by Tan et al. entitled “A real-time video denoising algorithm with FPGA implementation for Poisson–Gaussian noise,” presents an improvement of the denoising capability of pixel similarity weighted frame averaging (PSWFA) using a pre-filter that consists of a downsampling operator and a Gaussian filter. Moreover, a generalized Anscombe transformation is introduced. This algorithm is then implemented on a Spartan-6 FPGA. The algorithm is compared with several state-of-the-art algorithms that have been implemented on FPGA. The experimental results on both simulated noise videos and actual low-light noise videos demonstrate the effectiveness of the developed algorithm.

The seventh paper by Schliping et al. entitled “Adaptive pattern recognition in real-time video-based soccer analysis,” involves two major contributions: (1) It provides a systematic evaluation of combinations of image features and learning machines in a given online scenario where switching between classifiers is shown to improve robustness and efficiency, and (2) it shows that a proper human–machine interface decreases the number of required operators in the learning process of a system. The experiments conducted have shown high performance in a classification task achieving an error rate of 3% applied to three real-world datasets.

The eighth paper by Meenpal et al. entitled “A scheme for conditional access-based systems using index locations of DCT coefficients,” analyzes an image in the discrete cosine transform (DCT) domain by noting that polynomials of suitable degrees, representing the sorted DCT coefficients, together with the original index locations, can uniquely represent the image. It is shown that the arrangement of the DCT index locations becomes significantly different for various images. As a result, the amount of private data, which a service provider needs to transmit through a secure channel to the customers on demand, is reduced significantly for real-time deployment purposes.

The ninth paper by Lopez et al. entitled “Evaluation of real-time LBP computing in multiple architectures,” discusses solutions that maximize the performance or real-

time local binary pattern (LBP) extraction. A series of different implementations in terms of computational performance and energy efficiency are compared. Different optimizations to reach real-time performance on multiple platforms are also examined. The LBP algorithms are then implemented on several platforms including GPU and ARM processors while making the source codes of the implementations publicly available.

The tenth and final paper by Ratnayake et al. entitled “Embedded architecture for noise-adaptive video object detection using parameter-compressed background modeling,” proposes a resource- and power-optimized FPGA-

based configurable architecture for video object detection by integrating noise estimation, mixture-of-Gaussian background modeling, motion detection, and thresholding. The proposed architecture is simulated, synthesized, and verified for its functionality, accuracy, and performance on a Virtex-5 FPGA-based embedded platform. Both objective and subjective comparisons to existing hardware-based architectures are conducted, showing that the proposed architecture provides substantial performance improvements while utilizing minimal hardware resources.