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Guest Editorial: Medical Image Understanding and Analysis

Greg Slabaugh and Constantino Carlos Reyes-Aldasoro

School of Mathematics, Computer Science, and Engineering
City University London
London EC1V 0HB United Kingdom
⟨Gregory.Slabaugh.1@city.ac.uk⟩
⟨Constantino.Reyes-Aldasoro.1@city.ac.uk⟩

The 18th Conference on Medical Image Understanding and Analysis (MIUA) [Reyes-Aldasoro and Slabaugh, 2014] was organised by City University London and held in London in July 2014. MIUA is the principal UK forum for presenting advances in medical and biomedical image analysis. Of the 58 submissions to the conference, 45 were accepted and presented in a single-track format, with 21 oral presentations and 24 posters. Additionally, the conference featured excellent tutorials by Drs Jasmina Lazic and Antonio Criminisi, along with keynote presentations delivered by distinguished professors, namely David Hawkes, Jean-Christophe Olivo-Marin, and Roger Gunn.

After the conference, authors of papers selected by the programme committee were invited to submit extended versions of their work. A single-blind review was carried out, followed by revisions, resulting in the four papers comprising this special issue. Consistent with MIUA itself, these papers span a diverse set of imaging modalities, technologies, and clinical applications.

In the first paper by Al-Baddai et al. [Al-Baddai et al., 2015], A Combined EMD-ICA Analysis of Simultaneously Registered EEG-fMRI Data, EEG data were recorded concurrently with functional MRI whilst participants were presented with visual stimuli. Recorded data were analysed using Empirical Mode Decomposition and Independent Component Analysis for subsequent significance testing and classification, and the proposed method is shown to be a useful data analysis tool to reveal differences between similar response signals. The next paper by Schenk et al. [Schenk et al., 2015], Automatic High-speed Video Glottis Segmentation using Salient Regions and 3D Geodesic Active Contours, performs segmentation of the glottis from high speed laryngeal videos for analysing vocal fold vibrations. The method performs 3D segmentation on a spatio-temporal volume using a Geodesic Active Contour approach extended to 3D and implemented on the GPU for efficient computation.

The third paper by Koerner et al. [Koerner et al., 2015], Regularized Geometric Hulls for Bio-medical Image Segmentation, describes a novel geometric technique that extends the concept of the convex hull to permit concavity controlled through a regularisation parame-

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ter. An efficient algorithm is presented, along with experiments in three different microscopy applications that demonstrate the versatility and effectiveness of the approach. The final paper by Khazendar et al. [Khazendar et al., 2015], Automatic Identification of Miscarriage Cases Supported by Decision Strength Using Ultrasound Images of the Gestational Sac, proposes a computer-aided diagnosis approach to identify miscarriage in the first trimester of pregnancy by classifying ultrasound images of the gestational sac. An image processing pipeline is presented to crop, enhance, and segment the gestational sac, from which discriminative geometric features are computed to perform the diagnosis and its associated decision strength.

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