Introduction

This special issue grew out of *IEEE International Conference on Electro/Information Technology* (EIT), Chicago, May 18–20, 2007. The EIT conference is organized annually by the IEEE Region 4 (R4). EIT2007 was hosted by Illinois Institute of Technology and supported by electro technology industries active in the IT field including: MOTOROLA, NATIONAL INSTRUMENTS, PTC, NORTH AMERICAN COLOR, ANSOFT, ALTERA, SHURE, WILEY, and MATHWORKS.

This conference covered selected topics concerned with electrical and computing engineering and related disciplines with information technology emphasis. The EIT series of conferences was initiated in 2000 and soon became the major gathering for experts in those fields with high quality papers and several keynote speakers known throughout the world. From about 200 papers submitted to the conference, the program committee selected, following a thorough peer-review process, 125 papers for publication and presentation in technical sessions. The quality of the papers received was in general very high. Authors of the twenty two papers considered to be the most innovative and original in terms of computing and information technologies were invited to submit "*substantially extended and updated manuscripts with additional original computational materials based on their most recent research*" for possible publication in this issue. Each submitted extended manuscript was reviewed by 3 to 6 reviewers rigorously using the journal review form. The seven manuscripts included in this issue are those that passed through the journal's rigorous review process successfully.

The first paper of this special issue is on image reconstruction employing a shape from shading method by incorporating a novel hybrid principal component analysis algorithm to achieve reliable surface estimation. As demonstrated by experimental results, the method led to satisfactory reconstruction of the human head using only one gray scale image. The second paper describes the design and development of a data acquisition unit for a glucose sensor by a technique based on the unique optical characteristics of glucose in the near infrared region. The sensor, being implantable with multi-channel operation, is intended for use in a feedback controlled insulin delivery system for the in situ treatment of diabetes.

A new method for image contrast enhancement based on the combined actions of histogram equalization, multiple graylevel thresholding, and connected component analysis is described in the third paper. The method can achieve both local and global contrast enhancement with low distortion in image appearance, which is especially important for applications that require the image outlook to be well preserved.

Avoidance control is the subject of discussion in the fourth paper. By applying a sequential quadratic programming method to the minimization of a scalar nonlinear function, a trajectory tracking scheme with safe collision conflict resolution for two aircrafts has been developed by the authors, who have obtained data to demonstrate that conflict resolution between two aircrafts was accomplished in a smooth way.

With the objective of developing better design techniques employing timing and spectral analysis for analog integrated circuits, the authors of the fifth paper applied the blind source separation technique to analyze the compound effect of multiple noise sources. The work puts forth the concept of cocktail-party problem in electronic networks and introduces DSP techniques to noise source separation. A non-scalar approach for computing exactly the minimum data storage in a multidimensional signal system is described in the sixth paper. Two applications of the technique to memory management are described, covering the impact of loop transformations and the assessment of mappings of multidimensional signals into the physical memory. The final paper in this special edition is on the application of fuzzy cognitive maps for troubleshooting electronic circuits. Qualitative assessment based on trends and the notion of reachability are introduced to identify the causes of faults, resulting in a more efficient process than that provided by full simulation.

S. Hossein Mousavinezhad
EIT2007 General Chair
Idaho State University
Pocatello, ID83209-8060, USA
E-mail: mousseye@isu.edu

Thomas Wong
EIT2007 Technical Program Chair
Illinois Institute of Technology, USA