Editorial

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Intelligent Systems (IS) concern the manner in which computerised systems provide informed and sophisticated solutions to a diverse range of theoretical and practical problems arising in science, engineering, business and industry. The past two decades have witnessed a revolution in terms of technological development and the integration of artificial intelligence-based techniques for simulation and decision support tools. IS-based simulation, prototyping environments and models have been applied to a variety of domains such as medicine and genomics, transportation, power systems management, business and finance, and control and management.

The aim of this special issue has been to bring together emerging trends, concepts, and developments emphasising the role of IS in advanced simulation and prototyping applications. Due to the rapidly developing nature of this area, this special issue includes theoretical as well as applied research contributions to the state-of-the-art in the field.

After a careful review phase, nine out of 33 submitted articles were selected. These reflect different aspects and track advances in IS for applied simulation and prototyping. In Yaacoub et al. the authors apply a hybrid convex-hull approach for modelling 3D medical data in virtual environments. Within another virtual environment application domain, Tawfik and Liatsis use genetic search optimisation to arrive at high-performance tactical driving decisions in a simulated traffic model. In a different intelligent transportation systems context, Particle Swarm Optimisation (PSO) has been applied for obtaining fuzzy-behavioural rules for mobile-robot navigation in Adriansyah and Amin's contribution. Anitha et al. successfully developed a variant of PSO for optimising the power flow problem. From the control systems domain, Boulkroune et al. have formulated an indirect adaptive fuzzy output-feedback control-based observer for Single Input Single Output (SISO) uncertain non-linear systems and have demonstrated its performance in a simulation framework. Nagar and Sokhi present a wavelet-based adaptive approach for identifying coding and non-coding patterns in DNA sequences with applications to comparative genomics. Another contribution in the area of computational biology is from Liatsis et al. who have developed an image processing approach to automate the process of analysing cDNA microarray images. A higher-order recurrent neural network paradigm has demonstrated favourable performance for financial time-series prediction in the work by Hussain et al. Finally, Ghoshal and Samantaray have presented a parameter estimation-based bond graph model for automating the fault detection and isolation procedure for safety critical environments.

On the whole, this special issue attempts to provide a wide spectrum of interesting research papers on various aspects of IS approaches with a diverse range of simulation applications, theories, and techniques within the domain. It is hoped that the volume will be useful to many researchers and practicing engineers working in this field.

The authors must be commended for their valuable contributions. The referees of these papers have done justice to the entire review process and have helped in improving the quality and clarity of presentation of the papers. Thanks are also due to Dr. M. Dorgham, Editor-in-Chief of IJISTA, for creating an opportunity for further exploring the topic of this special issue.

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