
Editorial

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Biographical notes: From August 1994 to August 1996 Professor Zhang was an engineer at Xi'an Institute of Navigation Technology, Xi'an, China. From May 2003 to May 2007 he was a postdoctoral fellow at school of mechanical engineering of Dalian University of Technology, Dalian, China, with the direction of stability of delayed neural networks, and from August 2005 to present he is a Professor with the research direction of Intelligent Computing and its Applications at Dalian University, Dalian, China.

1 Introduction

With the rapid development of computer and network technologies in recent years, research and applications in computer graphics, imaging and image processing, computer-aided design, computer animation, simulation and modelling receive an increasing attention from researchers across the world. Continual, pioneering research is essential to further promote the development of those areas to benefit their applications in various fields.

The aim of this special issue of the "*International Journal of Computer Applications in Technology*" is to provide the state-of-the-art in computer graphics, imaging and image processing, computer animation and other related fields to present the latest research and applications including advanced development tools.

2 Papers in this issue

The first paper in this issue, 'Using unsupervised neural network approach to improve classification of satellite images', by Karima Sari, Borna Tighiouart and Fatima Ghedjati, proposes an approach to unsupervised neural networks; it is the topological map of Kohonen. The authors applied the method to perform a classification of satellite images at high spatial resolutions. It has a set of tests to allow the determination of appropriate parameters that characterise the Kohonen map. The method was evaluated to obtain optimal classes.

The second paper, 'Designing of lampshade with 3D CG application and manufacturing of designed shape in graphic science education', by Hirotaka Suzuki, Ai Sakaki, Kensuke Yasufuku and Takashi Matsumoto, introduces model manufacturing of lampshade into graphic science education. The authors explain the objective of the class, schedule of the class, detailed content of the lampshade designing exercise, submitted CG drawings and paper models and result of class evaluation by students.

The third paper, 'Research on PSO algorithms for the rectangular packing problem', by Jinmin Wang, Yang Qi and Jing Zhang, researches the search efficiency of the particle swarm optimisation (PSO) algorithm. Through fitting the data to the length of the solution interval and the number of iterations, a strong search capability for the PSO was proved. The results of experiments with comparisons of many disturbance strategies showed that a stochastic strategy was beneficial for raising the search capability of the algorithm.

The fourth one, 'An automated algorithm for lesion identification in dynamic contrast enhanced MRI', by G. Malu, Elizabeth Sherly and Sumod Mathew Koshy, concentrates on algorithmic development for segmentation of lesions, automating region of interest (ROI), and to delineate the malignancy on DCE-MR images. The proposed system would enhance the diagnostic accuracy of doctors without looking into all suspected areas one by one in each slice from the DCE-MRI. The system also facilitates to compute Volume Rendering by forming a 3D structure of the lesion area.

The fifth paper, 'Contourlet transform with modified particle swarm optimisation for despeckling and feature enhancement of SAR images', by I. Shanthi and M.L. Valarmathi, gives a contourlet transform with Modified PSO (MPSO) for the feature enhancement, edge preservation and despeckling of SAR images. In this paper, despeckling and preservation of edges are combined with improved gain function which optimises the contourlet coefficients for the enhancement of quality of denoised image. Experimental results show that the contourlet transform with MPSO gives better quality of image.

The sixth paper, 'Geometry processing in developing a software tool for NC wire EDM', by Sande Gao, Loulin Huang and Baoling Han, proposes a new software tool that can efficiently convert complex shapes into NC wire EDM programmes with a high precision. Geometry processing adopted in the software tool, including

view transformation, snapping and breaking algorithms, transformation of arc parameters, data structure of geometric information is presented.

The seventh paper, ‘An online noise reduction method for sequential data based on Bernstein–Bezier curve formulation’, by Weimin Gao, Xiaoyong Fang, Jingguo Zhao and Qingyun Luo, distilled feature of Bernstein–Bezier curve formulation and proposed a novel online curve (online Bernstein–Bezier curve, OBB curve)-based noised reduction method. Experiments proved that OBB curve was a novel online curve, and the online noise reduction with the OBB curve is feasible and effective.

The eighth paper, ‘Cloud removal using efficient cloud detection and removal algorithm for high-resolution satellite imagery’, by E. Menaka, S. Suresh Kumar and M. Bharathi, presents a technique Efficient Cloud Detection and Removal Algorithm (ECCR) based on remote sensing information.

The ninth paper, ‘Research on driving system modelling and power matching for large wheel-type transporter used in iron and steel mills’, by Rui Guo, Wei Li, and Jingyi Zhao, researches on power matching and optimum performance control for non-linear driving system.

Through analysis and modelling by the characteristics of the engine and hydraulic converter, input/output characteristic and drawbar performance of the engine and torque converter are obtained. Proved by practice, the research results have important guiding significance, which can be applied to other similar products.

The 10th paper, ‘An alternative conics drawing algorithm on a hexagonal grid using method of deviation’, by Prabukumar Manoharan and Bimal Kumar Ray, proposes the algorithms to scan converting conics on hexagonal grid using method of deviation. The method of deviation computes pixel nearest to analogue curve using only integer arithmetic. The proposed algorithm is comparable favourably with the latest conics drawing algorithm on hexagonal grid. The idea may be applied to scan converting any arbitrary curves. The transformation function to convert Cartesian coordinate system to hexagonal coordinate system is also proposed.

The 11th paper, ‘Development of cooperative education and basic engineering education: aided by 3D CAD and 3D RP modelling’, by Tsutomu Araki and Shigeo Hirano, reports on the recent status of Drafting and Design Education using 3D CAD and 3D RP modelling in Tsukuba University of Technology of Japan.