Editorial

Marimuthu Karuppiah

School of Computing Science and Engineering,
VIT University,
Katpadi, Vellore, 632014, India
Email: marimuthume@gmail.com

Javier Medina Quero

Department of Computer Science,
University of Jaen,
Campus Las Lagunillas,
s/n, 23071, Spain
Email: jmquero@ujaen.es

Biographical notes: Marimuthu Karuppiah is now an Associate Professor in School of Computing Science and Engineering, VIT University, Vellore, India. He has authored or co-authored 50 research papers in journals and conference proceedings of international reputes. He is a life member of Cryptology Research Society of India (CRSI) and Computer Society of India (CSI). He is a Senior Member of IEEE and member of ACM. His main research interests include cryptography and wireless network security, in particular, authentication and encryption schemes.

Javier Medina Quero received the MSc and PhD in Computer Science in the University of Granada, Spain, in 2007 and 2010, respectively. He is working as a researcher in the University of Jaén in the research group Intelligent Systems Based on Fuzzy Decision Analysis (Sinbad2). He has published more than 15 works with journal citation report in the fields of fuzzy logic, e-health, intelligent systems, ubiquitous computing and ambient intelligence.

1 Background

Nowadays, worldwide public and private enterprises are becoming progressively dependent on information stored on their server infrastructure. The capability to access vital information without location-bias enables the enterprises including medical infrastructures, government facilities, military installations, power plant systems, financial centres, etc. to increase effectiveness manifold. In these circumstances, it is vital to introduce superior intelligent security features to protect the data banks against data theft or unwarranted loss. This special issue shall throw light on new advancements in the field of information security and the implementation of computational intelligence while enhancing the resources of present information security infrastructures. This special issue has acknowledged overwhelming responses from researchers, and it has received many high-quality submissions from various countries around the world. All the submitted

papers have been reviewed by at least three independent experts. We expect that this special issue focuses on cohesive information related to the of information security, including relevant applications in solving information security challenges using computational intelligence, and it also delivers stimulations for future research.

2 Papers in special section

In the paper entitled 'Image pre-processing of icing transmission line based on fuzzy clustering', Jing et al. propose a kind of electric transmission lines icing image segmentation algorithm based on quick bi-circulating level set to improve effect of electric transmission lines icing image segmentation algorithm. Firstly, carry out pre-treatment to greying of electric transmission lines icing image and decrease noise influence in image; secondly, improve fuzzy c mean value clustering algorithm and propose SPKFCM algorithm by increasing space penalty function, which is used for automatic initialisation of quick bi-circulating level set algorithm; finally, it is shown that proposed algorithm has better segmentation effect and segmentation efficiency by experiment contrast on electric transmission lines icing image.

The paper of Lei et al. entitled 'A study on power balance control strategies of mining variable speed magnetic coupling based on fuzzy self-adaptive PID' studied fuzzy self-adaptive PID control strategies that are applicable to mining variable speed magnetic coupling based on analysis on the magnetic coupling mathematical model fitted by a large number of data simulation and calculation by combining traditional PID control strategies and fuzzy control methods and then carried out experiments for further verification. It can be proved by experimental analysis that such control strategy can not only solve multi-motor driving power balance problems effectively, but adapt to working condition changes and revise control parameters automatically, which can provide theoretical support for project practices.

Selvanambi and Natarajan propose a work to predict the breast cancer stage as benignant or malignant from the given input dataset with parameters such as instance clump thickness, uniformity of cell size, uniformity of cell shape, marginal adhesion, single epithelial cell size, bare nuclei, bland chromatin, normal nucleoli and mitoses. Predicting the cancer stage helps to determine the best way to contain and eliminate the breast cancer. The results shows the enhanced social spider optimisation (ESSO) is employed better and evaluates the metrics as accuracy 97%, sensitivity 98%, and specificity 95% compared with other techniques. The accuracy is fine tuned in this work were contrasted with existing work and the stage of breast cancer is predicted.

In the paper entitled 'Prediction of oil production based on SVM optimised multi-objective particle swarm optimisation', Wang-Yin et al. propose a model the energy supply sustainability problem is modelled as optimisation solution problem aiming at maximising NP-hard network energy residue ratio (ERR). This algorithm is worked by adopting cross-layer manner, which first maximises the link energy efficiency by the power control at physical (PHY) layer and then maximises network ERR by the access control at media access control (MAC). The simulation results show that the network ERR maximisation algorithm performs excellently in improving network lifetime as well as increasing the number of users served by renewable energy.

The paper of Min et al. entitled 'An improved adaptation algorithm for signer-independent sign language recognition" presents MLLRMAP adaptive progressive

non-specific integrated manpower language recognition framework. This approach optimises the division MLLR regression class to provide more accurate initial MAP model, which give full play to the rapidity and the MAP MLLR progressive. Then introduced MCE model parameter estimation algorithm to compensate for the limitations of the model parameters adaptive method to further reduce the system error rate and accelerate the recognition speed. Meanwhile, for the MCE algorithm computationally intensive problems proposed improvements. Experimental results show that the adaptive sign language data required for this algorithm is less than traditional MLLR and MAP methods, while improved average recognition rate by 15.6%.

The paper of Hongbo entitled 'Design of remote control system for intelligent irrigation based on ZigBee and GPRS' propose a solar power-moving schedule of mobile-based optimal coverage (SPMSC). In accordance with the content of SPMSC, every sensor node is able to obtain energy through the solar panel. The moving schedule of sensor nodes is determined through predicting the quantity of solar power as to realise the optimal coverage project with the minimised quantity of sensor nodes and the energy consumption. As the simulation result indicates, the proposed SPMSC, compared with other similar projects, has the 4% decrease of sensor node quantity and the 10% increase of the network lifetime.

Basu et al. proposed a modification of AES for high-definition (HD) image encryption that uses a genetic approach for the S-Box generation and key expansion processes in their paper entitled 'Modification of AES using genetic algorithms for high-definition image encryption'. S-Boxes have been evolved to have high nonlinearity and low transparency. Also, in the key generation, the process has been randomised by using only genetic operators. As a result of applying genetic modifications to AES, the proposed algorithm has been found to be more secure against the differential and side-channel attacks and shows reduced pattern appearance when applied for encryption of HD images.

In the paper entitled 'A study on flow based classification models using machine learning techniques', Chokkanathan and Koteeswaran discuss about flow based classification models such as port based, payload based, statistical based and behavioural based classifications which are frequently used for identifying traffic classes. Techniques (Methods): Widely used techniques such as port based, pay-load based, behavioural based and statistical based classification models are discussed and sample data sets have been produced with graphical notations to strengthen the analysis process. Sathyaraj and Prabu propose a hybrid prediction model using computational intelligence technique to predict software fault.

In the paper entitled 'Labelled decision-making method based on neural network model and pruning algorithm', Du propose a method of generating cost-sensitive decision tree based on the correlation degree of neural network attributes through quoting the correlation degree of neural network attributes and cost-sensitive learning. This method reduces the condition attributes by using rough set theory, and takes the correlation degree and cost performance of attributes as the bases of split node to build the cost-sensitive decision tree by using modified information gain method during the process of building decision tree. It is shown in test result that such method is superior to commonly used method of generating decision tree in classification accuracy and the number of nodes generated. The paper of Yuan and Lan entitled 'Design of water quality monitoring system based on WSN and ZigBee' design a set of water quality monitoring

system on the basis of wireless sensor network, ZigBee technology and GPRS technology based on actual demand realise a large scale of real-time water quality monitoring.

In conclusion, as we expected, this special section provides a gist of technologies using computational intelligence informatics and information security. Although only a few issues are addressed in this special section, those are dealt in depth. We hope that these contributions would help the readers to enhance their knowledge and motivate them to work on computational intelligence informatics and information security environment.

Acknowledgements

We would like to thank editor-in-chief for allowing us to host this special section. The editorial office staffs are awesome and thanks for their support. We are thankful to the authors and reviewers for their thoughtful contributions. We would like to express our sincere gratitude to all the contributors who have submitted their high-quality manuscripts and to the experts for their support in providing review comments and suggestions on time.