
Preface

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Biographical notes: Mamoun Alazab is an Associate Professor at the College of Engineering, IT and Environment at Charles Darwin University, Australia. He received his PhD degree in Computer Science from the Federation University of Australia, School of Science, Information Technology and Engineering. He is a cyber security researcher and practitioner with industry and academic experience. His research is multidisciplinary that focuses on cyber security with a focus on cybercrime detection and prevention. He has more than 300 research papers and nine authored/edited books. He is a Senior Member of the IEEE. He is the founding chair of the IEEE Northern Territory (NT) Subsection.

In today's world, the rapid urbanisation of rural areas leads to the global era of prominent smart cities. Innovations in computer and communication technologies have made urban cities to go smarter with efficient management technologies. Smart cities form the integral component of internet of things (IoT) technology offers various smart services across urban areas. Some of the examples of smart city applications include waste management, e-health systems, smart homes, smart parking, smart transport systems, intelligent lighting systems, disaster management, underwater explorations, etc. The growth of smart cities stimulates quintillions bytes of structured and unstructured data from IoT devices every second. Thus, the development of smart cities adversely creates the bottleneck of big data across the internet. Efficient data collection and management remains to be the most important challenge behind developing smart cities. Further, the growing amount of big data highly influences data uncertainties and complicates decision-making processes.

Soft computing provides effective approaches to deal with real-world uncertainties of smart cities in a most

effective manner. It mainly focuses on inaccurate, approximate, partial, and uncertain data to provide the most effective and robust system solutions. Since the IoT devices are highly resource-constrained, the use of soft computing techniques assists in the efficient management of smart city applications. Furthermore, the combination of computational intelligence with IoT improves the quality of life in smart cities through the provision of various smart services. Most of the soft computing techniques such as neural networks, fuzzy logic, optimisation algorithms, and meta-heuristic search algorithms are actively used in the area of IoT and provides efficient solution to smart cities. This remarkable enhancement of soft computing methodologies across smart city applications emulates the cognitive decision-making process with improved accuracy. However, system control, automation, and data management has become the three major challenges of the existing smart city applications. Some of the active research challenges of applying soft computing to smart cities include automated scheduling algorithms for smart cities, efficient learning algorithms for smart cities, finding optimal solutions,

efficient decision-making algorithms, data collection, and management overheads.

This special issue of the *International Journal of Ad Hoc and Ubiquitous Computing (IJAHUC)* contains 16 peer-reviewed papers. This special issue explores the applications of soft computing in several smart city-based applications. Each of these revised and extended papers have undergone full peer review, prior to being selected for this special issue.

In the first article titled, ‘Evaluation of functional maturity for a network information service – design and case analysis’, Mohammad Al Rawajbeh et al. presented a study on methodological issues for monitoring process to control the state of developing information system for a smart city-based application. In the second article titled, ‘Lion plus firefly algorithm for ternary-based anomaly detection in semantic graphs in smart cities’, M. Sravan Kumar Reddy and Dharmendra Singh Rajput proposed a novel model based on lion plus firefly algorithm for detection of abnormal or suspicious entities in massive data sets generated in smart cities. In the third article titled, ‘User participation behaviour in crowdsourcing initiatives: influencing factors, related theories and incentive strategies’, Xu Zhang et al. reviews the current research works that are related to user behaviour in crowdsourcing initiatives in smart cities.

In the fourth article titled, ‘GSFI_SMOTE: a hybrid multiclass classifier for minority attack detection in internet of things network’, Geeta Singh and Neelu Khare proposed a novel model for detecting minority attacks on smart city-based applications. In the fifth article titled, ‘Optimisation of K-means algorithm based on sample density canopy’, Guo-xin Shen and Zhong-yun Jiang used sample density and canopy to optimise the K-means clustering algorithm. In the next article titled, ‘Uncertainties evaluation and analysis using quantitative technique for a software project’, Harvinder Singh et al. proposed a project risk evaluation technique (PRET) to determine the attractiveness of a software project.

In the seventh article titled, ‘Recent advances in blockchain technology: a survey on applications and challenges’, Saqib Hakak et al. presented a comprehensive survey on recent advances of blockchain. In the next article titled, ‘Device and method for dynamic image display of

financial transaction operation data’, Jingdong Yan and Wuwei Liu discusses the devices and methods for dynamic images to display financial transaction operation data in smart city-based application. In the next article titled, ‘A machine learning approach for celebrity profiling’, Durga Prasad Kavadi et al. presented a novel machine learning model for celebrity profiling.

In the tenth article titled, ‘Computational trust evaluation algorithm for cloud models using fuzzy logic approach’, Vaishali Ravindra Thakare and John Singh K. presented an approach to strengthen the security at data storage for smart cities using a computational trust evaluation algorithm is designed by using a fuzzy logic approach. In the next article titled, ‘Development of image-guided puncture robot used in trigeminal neuralgia treatment’, Bin Liu et al. designed and developed an image-guided, minimally invasive surgical real-time robotic system to improve the safety and accuracy of the surgeon during the puncture procedure. In the next article titled, ‘A recommendation algorithm based on modified similarity and text content to optimise aggregate diversity’, Shuhao Jiang et al. proposed a personalised recommendation method based on modified similarity and text content.

In the 13th article titled, ‘An ICT-based solid waste management system for smart cities: a case of municipality in India’, Rutvij H. Jhaveri et al. proposed a solid waste management system for smart cities by considering a municipality in India as a case study. In the next article titled, ‘SHA-AMD: sample-efficient hyper-tuned approach for detection and identification of Android malware family and category’, Aamir Rasool et al. proposed a novel machine learning-based approach for the detection and classification of android malware. In the next article entitled, ‘A CA-GRU based model for air quality prediction’, Jingyang Wang et al. presented a convolutional neural network-attention mechanism and gated recurrent unit-based approach for prediction of air quality in smart cities. In the 16th article titled, ‘An SDN-IoT-based secure simulation system for smart cities’, Seema Begum et al. proposed software defined network based solution for security issues in IoT-based applications in smart cities.

May these contributions pave the way for the broad and open waters ahead with all the new developments in soft computing techniques for smart city based applications.