
Editorial: Special issue CISIS 2016

The eight contributions selected in this special issue represent a collection of extended papers presented at the 9th International Conference on Computational Intelligence in Security for Information Systems (CISIS 2016) held in San Sebastian, Spain, in October 2016, and organized by the BISITE (University of Salamanca) and the Computational Intelligence (University of Basque Country) research groups.

CISIS aims to offer a meeting opportunity for academic and industry-related researchers belonging to the various, vast communities of Computational Intelligence, Information Security and Data Mining. The need for intelligent, flexible behaviour by large, complex systems, especially in mission critical domains, is intended to be the catalyst and the aggregation stimulus for the overall event.

In the first contribution, by Pintea *et al.*, introduces a mathematical model for computing the risk associated with Greenhouse emissions, within the supply chain network context. The supply model chosen is a two-stage supply chain network, called the Secure & Green Supply Chain Network (SGSCN). In the SGSCN a Manufacturer is directly connected to several Distribution Centers (DC), each of them connected to one or more Customers, (C). The objective of Secure & Green Supply Chain Networks is to minimise transportation costs whilst also maintaining a specified overall security level, including a specified GHG level. The applicability of the proposed model for several supply chain configurations and scenarios is illustrated and discussed in the paper.

Kozik and Chorás propose, in the next paper, a flexible schema for automated application layer request structure identification. Their experiments show that this technique allows to further improve the effectiveness of known detection methods used in this research domain. In this paper, it is shown the possible practical application of the proposed cybersecurity solution in the public domain, namely public administration web-based systems and healthcare sectors. From the scientific point of view, the results of various classifiers and pattern extraction techniques are presented and compared and the possible deployment of the proposed solution in Big Data enabled environments is addressed.

The third contribution Vega *et al.*, proposes the analysis and subsequent characterization of Android malware families, by means of low dimensional visualizations using dimensional reduction techniques. The well-known Malgenome dataset, coming from the Android Malware Genome Project, has been thoroughly analysed through six dimensionality reduction techniques: Principal Component Analysis, Maximum Likelihood Hebbian Learning, Cooperative Maximum Likelihood Hebbian Learning, Curvilinear Component Analysis, Isomap and Self Organizing Map. Results obtained enable a clear visual analysis of the structure of this high-dimensionality dataset, letting us gain deep knowledge about the nature of such app families. Interesting conclusions are obtained from the real-life dataset under analysis.

In the fourth paper, by Gayoso *et al.*, it has been compared the performance of two graphics cards that belong to the parallel computing CUDA platform with two C++ and Java multithreading implementations, using as an example of computation a brute force attack on Hitag2, a well known remote keyless entry application. The results provide valuable information regarding the compared capabilities of the tested platforms and to confirm that such a weak encryption system could be broken in less than a day with medium cost equipment.

In the following paper, by Jove *et al.*, the research is focused on anesthesiology, specifically on the study of the level of unconsciousness (hypnosis) of patients under general anesthesia, in order to obtain a secure system for patients. The idea is to improve the prediction of the patient response during anesthesia, so that the clinician could adjust the drug dosing using this information.

The bispectral index (BIS) is a signal provided by EEG monitors that is accepted as a depth of hypnosis index. This work shows the BIS modeling of patients undergoing general anesthesia during surgery. For this, a model that allows to know its value from the Electromyogram (EMG) and the propofol infusion rate has been created. The proposal has been achieved by using clustering combined with regression techniques and using a real dataset obtained from patients undergoing general anesthesia. Finally, the created model has been tested also with data from real patients, and the results obtained attested the accuracy of the model.

In the next contribution, Martín del Rey *et al.* a study of a SCIRS model for malware propagation with different incidence rates is introduced. This analysis is based on a previous mathematical model to simulate malware spreading in wireless networks where susceptible, carrier, infectious and recovered devices are considered. The notion of incidence is revisited and several types (bilinear, standard and saturated with respect to the infectious and susceptible devices) are studied. Furthermore, the associated basic reproductive numbers are explicitly computed.

In the seventh contribution, the research by Gonzalez *et al.* presents how it is implemented a previous developed Complex Atmospheric Reconstructor based on Machine Learning (CARMEN), in two different neural network frameworks, which use a Graphics Processing Unit (GPU) to improve their performance. To time the training and execution it is provided results of which framework is faster for its implementation in a real telescope to supply new tools to keep improving the reconstruction ability of CARMEN.

Finally, Gayoso *et al.* evaluates the performance of the three types of elliptic curves using some of the examples provided by the initiative SafeCurves and a Java implementation developed by the authors, which allows to offer some conclusions about this topic, been the main conclusion that the running time with Edwards curves is almost twice the time needed when using Weierstrass curves, which have the simpler definition for the operations tested.

The guest editors wish to thank Professor Dov Gabbay (Founding Editor-in-Chief of Logic Journal of the IGPL), for providing the opportunity to edit this special issue. We would also like to thank the referees who have critically evaluated the papers within the short time. Finally, we hope the reader will share our joy and find this special issue very useful.

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