

Preface

It is my pleasure to present the XIX volume of LNCS Transactions on Computational Collective Intelligence (TCCI). This volume includes 11 interesting and original papers, which have been selected after a peer-review process. The papers present interesting research findings and they identify and discuss issues and challenges in the field of building collective intelligence according to new computing trends from networking and cloud computing. Specifically, the papers cover research topics such as new methodologies for information management, recommendation systems, mining and machine learning for big data, security and privacy issues, security and encryption in cloud data centers, social networks analysis, data integration, and image processing.

The papers of the special issue are arranged as follows.

The first paper, “Management and Computer Science Synergies: A Theoretical Framework for Context-Sensitive Simulation Environment” by De Maio et al., presents a theoretical framework to address contextual decision making concerning relations between commitment, loyalty, and customer satisfaction. The authors’ approach is based on a full-mode generation of knowledge starting from the hypothetical assumptions relative to simulation using context data.

The second paper, entitled “Improved Recommendation System Using Friend Relationship in SNS” by Liao et al., investigates how to take better advantage of the friend relationship in SNS through improved recommendation methods and analyzes the case of Chinese users in SNS having massive users and a potential commercial value.

In the third paper, “Bidirectional Analysis Method of Static XSS Defect Detection Technique Based on Database Query Language,” Cui et al. analyze the vulnerabilities of Web applications, such as XSS defects. Their method is based on database query language techniques to build a static analysis method of XSS defect detection of Java Web application by analyzing data flow reversely. The proposed technique is proven useful for big data analysis.

In the fourth paper, “A Multilevel Security Model for Search Engine over Integrated Data,” Zhao et al. study issues arising in integrating multiple sources of data, such as security issue, where different sources of data may have different access control policies. Therefore the authors propose a model to integrate multiple security policies while data are integrated to ensure all data access respects the original data access control policies.

The fifth paper, entitled “Security Analysis of Two Identity-Based Proxy Re-encryption Schemes in Multi-user Networks” by Wang et al., concerns proxy re-encryption, which is to securely enable the re-encryption of ciphertexts from one key to another, without relying on trusted parties. The proxy re-encryption and its variants are very useful nowadays in the context of cloud computing. The authors give formal models for such multi-user schemes and analyze the weakness of two existing security schemes.

In the sixth paper, “Enabling Vehicular Data with Distributed Machine Learning,” Chilipirea et al. address the issues arising in analyzing big data sets with data-mining and machine-learning methods. The authors show the limitations of current approaches and advocate the use of advanced parallel processing methods, models, and cloud computing infrastructures to efficiently analyze big vehicular data, a type of big data arising in vehicular networks. The approach is exemplified for the case of a k-nearest neighbors algorithm.

The next paper is titled “Adapting Distributed Evolutionary Algorithms to Heterogeneous Hardware” authored by Salto and Alba, who analyze the impact of heterogeneity in the performance of a parallel metaheuristics and their efficiency in time when executed in heterogeneous clusters. Therefore, the authors provide a methodology that enables a distributed genetic algorithm to be customized for higher efficiency on any available hardware resources with different computing power, all of them collaborating to solve the same problem.

Wang et al., in the eighth paper entitled “Eroca: A Framework for Efficiently Recovering Outsourced Ciphertexts for Autonomous Vehicles,” address the question of how to ensure the security and privacy of autonomous vehicle systems by encrypting the real-time traffic information and upload the ciphertexts to the center cloud for easily sharing road traffic information among the vehicles. Therefore the authors propose a method to retrieve and update the data from the early-encrypted file in the cloud efficiently using the notion of attribute-based encryption with recoverable sender.

In the ninth paper, “Coarser-Grained Multi-user Searchable Encryption in Hybrid Cloud,” Liu et al. present a new concept of coarse-grained access control and use it to construct a multi-user searchable encryption model in hybrid cloud. The authors implemented such a practical scheme using an improved searchable symmetric encryption scheme, and the obtained results support the claims of their scheme on the security analysis.

The tenth paper, “Quantum Information Splitting Based on Entangled States” by Tan et al., proposes two quantum information splitting protocols that take full advantage of the entanglement properties of Bell states and cluster states in different bases to check eavesdropping. Such protocols are proven efficiently secure against the intercept and resend attack and entangled ancilla particles attack. These protocols are of particular importance for cloud computing systems.

In the last paper, “Zero-tree Wavelet Algorithm Joint with Huffman Encoding for Image Compression,” Zhang et al. employ embedded zero-tree wavelet (EZW) as an effective image encoding algorithm, by improving it through the use of zero-tree structure, wavelet coefficient scanning mode, and embedding EZQ algorithm flow. The improved algorithm is shown to not only increase the compression ratio and encoding efficient, but also improve the peak signal-to-noise ratio of images and make the vision clearer in a more feasible and effective way.

I would like to sincerely thank the authors for their valuable contributions and the reviewers for their time and constructive feedback that greatly helped authors to improve their manuscripts. I would like to thank the Editor-in-Chief of TCCI, Prof. Ngoc Thanh Nguyen, for the opportunity to edit this special issue and for his encouragement. The support by Dr. Bernadetta Maleszka, Assistant Editor of TCCI, is highly appreciated.

This work has been partially supported by funds from the Spanish Ministry for Economy and Competitiveness (MINECO) and the European Union (FEDER funds) under grant COMMAS (ref. TIN2013-46181-C2-1-R).

September 2015

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Transactions on Computational Collective Intelligence
XIX

Nguyen, N.T.; Kowalczyk, R.; Xhafa, F. (Eds.)

2015, XI, 187 p. 65 illus. in color., Softcover

ISBN: 978-3-662-49016-7