

Editorial

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At the start of 2021, this first issue of Volume 18 of Computer Science and Information Systems contains 13 regular papers and 4 articles in the Special Section: Invited Papers of Distinguished Top Cited ComSIS Authors in last 10 years. We invited 10 authors of the most cited papers in the last 10 years to prepare new articles for our journal, and we are happy that four of them accepted our invitation. Accordingly, we are very thankful to those most cited authors who were willing to accept our invitation and prepare new papers for our journal, and we hope that their new articles will also be highly cited in the future. Last but not least, acknowledge the diligence and hard work of all our authors and reviewers, without whom the current issue, and journal publication in general, would not be possible.

The regular paper section starts with “Throughput Prediction based on ExtraTree for Stream Processing Tasks” by Zheng Chu et al, where the problem of large volumes of streaming data is tackled by proposing a volatility detection algorithm, a selection algorithm, and a throughput prediction method based on the ExtraTree ensemble learning algorithm. Experimental results demonstrate good accuracy and efficiency of the proposed approach.

The second article, “Multi-Objective Optimization of Container-Based Microservice Scheduling in Edge Computing” by Guisheng Fan et al. formulates container-based microservice scheduling as a multi-objective optimization problem, and proposes a latency, reliability and load balancing aware scheduling (LRLBAS) algorithm to determine the container-based microservice deployment in edge computing, based on particle swarm optimization. Simulation experiments showcase the effectiveness and efficiency of the proposed algorithm.

“PureEdgeSim: A Simulation Framework for Performance Evaluation of Cloud, Edge and Mist Computing Environments” by Charafeddine Mechalikh et al. presents PureEdgeSim, a simulation toolkit that enables the simulation of cloud, edge, and mist computing environments and the evaluation of the adopted resources management strategies, in terms of delays, energy consumption, resources utilization, and tasks success rate. Evaluation on the introduced case study demonstrates the effectiveness of the proposed framework modeling complex and dynamic environments.

In the article entitled “DroidClone: Attack of the Android Malware Clones - A Step Towards Stopping Them,” Shahid Alam and Ibrahim Sogukpınar propose DroidClone, an approach for detection of code clones (segments of code that are similar) in Android applications to help detect malware. DroidClone uses control flow patterns for reducing the effect of obfuscations and detecting clones that are syntactically different but semantically similar enough, and is independent of the underlying programming language. Evaluation incorporating real malware demonstrated good accuracy, as well as a reasonable degree of resistance to obfuscations.

Masoud Reyhani Hamedani et al., in “TrustRec: An Effective Approach to Exploit Implicit Trust and Distrust Relationships along with Explicit ones for Accurate Recommendations,” present TrustRec, an approach based on matrix factorization that provides a solution to three identified problems of existing trust-aware recommendation approaches, incorporating them all into a single matrix factorization model. Experimental results demonstrate that TrustRec outperforms existing approaches in terms of effectiveness and efficiency.

“A Dual Hybrid Recommender System based on SCoR and the Random Forest,” authored by Costas Panagiotakis et al. uses the synthetic coordinate recommendation system (SCoR) and the random forest machine learning model to construct a dual hybrid recommender system by proposing a dual training approach resulting in two recommender systems that are subsequently combined. Experimental results demonstrate the high performance of the proposed system on the Movielens datasets.

The article “A Method of Assessing Rework for Implementing Software Requirements Changes,” by Shalinka Jayatilleke and Richard Lai present a definition for rework and describe a method of assessing rework for implementing software requirements changes. The method consists of three stages: (1) change identification; (2) change analysis and (3) rework assessment. A running example is used to explain the concepts.

“Double-Layer Affective Visual Question Answering Network” by Zihan Guo et al. proposes a network architecture (DAVQAN) that divides the task of generating emotional answers in visual question answering into two simpler subtasks: the generation of non-emotional responses and the production of mood labels, with two independent network layers used to tackle these subtasks. The article also introduces a more advanced word embedding method and more fine-grained image feature extractor to further improve accuracy.

Muhammad Ahmad Rathore and JongWon Kim in their article “Spatio-temporal Summarized Visualization of SmartX Multi-View Visibility in Cloud-native Edge Boxes” explore a family of data summaries that take advantage of the multiple layers i.e. physical/virtual resources with temporal and spatial correlation among distributed edge boxes. The authors present the idea of maintaining summarized spatio-temporal data and verify it through visualization of gathered operational data.

In “A QPSO Algorithm Based on Hierarchical Weight and Its Application in Cloud Computing Task Scheduling,” Guolong Yu et al. propose a modification of the quantum behaved particle swarm optimization (QPSO) algorithm called hierarchical weight QPSO (HWQPSO) in which the higher the fitness value of a particle, the higher the level of the particle, and the greater the weight. The effectiveness of the approach is demonstrated on the task scheduling problem for cloud computing platforms, exhibiting faster convergence, shortest time consumption and the most balanced computing resource load.

The article “Convexity of Hesitant Fuzzy Sets Based on Aggregation Functions” by Pedro Huidobro et al. mathematically extends the notion of convexity for hesitant fuzzy sets in order to fulfill some necessary properties, namely being compatible with the intersection operation and fulfilling the cutworthy property.

“Spoken Notifications in Smart Environments Using Croatian Language” by Renato Šoić et al. proposes a model for natural language generation and speech synthesis in a smart environment using the Croatian language. Evaluation of user experience quality

demonstrates that most users perceive grammatically correct spoken texts as being of the highest quality.

Concluding the regular paper section, “Students’ Preferences in Selection of Computer Science and Informatics Studies – A Comprehensive Empirical Case Study” by Miloš Savić et al. presents a survey-based empirical study with the goal of determining the main motivating factors directing students to select computer science, informatics or similar study programs. The survey was conducted on a sample of more than 1500 students from five well established faculties of computer science and informatics at three largest university cities in Serbia, showing that while the majority of students are primarily interested in that topic, there was also a significant number of students who wanted to study something else, but selected computer science and informatics due to more possibilities for employment and higher salaries.

The Special Section: Invited Papers of Distinguished Top Cited ComSIS Authors begins with “Hypothetical Tensor-based Multi-criteria Recommender System for New Users with Partial Preferences,” where Minsung Hong and Jason J. Jung propose a hypothetical tensor model (HTM) to leverage auxiliary data complemented through three intuitive rules dealing with user’s unfamiliarity with item domains. The approach has three phases: (1) four patterns of partial preferences are found that are caused by users’ unfamiliarity, (2) rules are defined by considering relationships between multi-criteria, and (3) complemented preferences are modeled by a tensor to maintain an inherent structure of and correlations between the multi-criteria. Experiments on a TripAdvisor dataset showed that the approach offers a considerable performance boost compared to the baseline methods.

The second article in the special section, “Metaphor Research in the 21st Century: A Bibliographic Analysis” by Dongyu Zhang et al. examines the advancements in metaphor research from 2000 to 2017 using data retrieved from Microsoft Academic Graph and Web of Science. The article presents a macro analysis of metaphor research and expounds the underlying patterns of its development, revealing the evolution of research topics and the inherent relationships among them and providing insights into the current state of the art of metaphor research as well as future trends in this field.

Next article, “Incorporating Privacy by Design in Body Sensor Networks for Medical Applications: A Privacy and Data Protection Framework” by Christos Kalloniatis et al. proposes a privacy and data protection framework that provides the appropriate steps to undertake proper technical, organizational and procedural measures in an eHealth/M-Health system. The framework supports the combination of privacy with the newly introduced General Data Protection Regulation (GDPR) requirements in order to create a strong elicitation process for deriving the set of the technical security and privacy requirements that should be addressed.

Finally, Sašo Sršen and Marjan Mernik, in “A JSSP Solution for Production Planning Optimization Combining Industrial Engineering and Evolutionary Algorithms” tackle the job shop scheduling problem (JSSP), where p processes and n jobs should be processed on m machines so that the total completion time is minimal. In this article, the production times are integrated into an evolutionary algorithm to solve real-world JSSP problems, proposing an Internet of Things (IoT) architecture as a possible solution.

We hope that this issue brings diverse and very interesting papers that cover a range of contemporary research topics and that scientific community and readers will enjoy read-

ing them. Also, we believe that the presented research could be attractive and represent a good starting point and/or motivation for other authors to extend the presented scientific achievements and continue with similar research efforts.