

Recent advances in big data and security engineering for web/distributed applications

The annual International Conference on Future Data and Security Engineering (FDSE) is a premier forum designed for researchers, scientists and practitioners interested in state-of-the-art and state-of-the-practice activities in data, information, knowledge and security engineering to explore cutting-edge ideas, to present and exchange their research results and advanced data-intensive applications, as well as to discuss emerging issues on data, information, knowledge and security engineering. At the annual FDSE, the researchers and practitioners are not only able to share research solutions to problems of today's data and security engineering themes but are also able to identify new issues and directions for future-related research and development work. The proceedings of FDSE have been published in the *Lecture Notes in Computer Science* (LNCS) and *Communications in Computer and Information Science* (CCIS) series by Springer. Besides DBLP and other major indexing systems, the FDSE proceedings have also been indexed by Scopus and listed in Conference Proceeding Citation Index of Thomson Reuters.

FDSE 2020 took place in an entirely virtual mode (Quy Nhon University, Binh Dinh Province, Vietnam) during November 25-27, 2020, which I was the PC co-chair. The two-round call for papers resulted in the submission of 161 papers. A rigorous peer-review process was applied to all of them. This resulted in 24 accepted papers (acceptance rate: 14.9%) and two keynote speeches for LNCS 12466, and 37 accepted papers (including eight short papers, acceptance rate: 23%) for CCIS 1306, which were presented online at the conference. Every paper was reviewed by at least three members of the International Program Committee, who were carefully chosen based on their knowledge and competence. This careful process resulted in the high quality of the contributions published in these two volumes.

This special issue titled "Recent advances in big data and security engineering for web/distributed applications" features selected papers from FDSE 2020. We selected and invited authors of the top-quality papers to revise and extend at least 30% comparing to their published versions in the proceedings. After a double-blind peer review process with at least two reviews is received for each submission, we have decided to accept six papers to include in this issue.

The first paper entitled "Data Quality for Federated Medical Data Lakes," by Johann Eder and Vladimir A. Shekhovtsov from University of Klagenfurt, Austria, is an extended version of one of the invited keynote papers at FDSE 2020. The purpose of this research is to propose an architecture to support researchers to efficiently and effectively identify relevant collections of material and data with documented quality for their research projects while observing strict privacy rules. This paper discusses the quality dimensions for data sets for medical research in-depth and proposes representations of both the metadata and data quality documentation with the aim to support researchers to effectively and efficiently identify suitable data sets for medical studies.

The second paper is entitled "A Study on Time Models in Graph Databases for Security Log Analysis," by Daniel Hofer, Markus Jäger, Aya Khaled Youssef Sayed Mohamed and Josef Küng from Johannes Kepler University, Linz, Austria. In this paper, the authors aim to find and evaluate different approaches how to store timestamps in graph databases and their individual benefits and drawbacks. They have found out an interesting result that the



simplest model with the least graph database-specific concepts in use is also the one yielding the simplest and fastest queries.

The third paper is entitled “A Unified Blockchain-based Platform for Global E-waste Management,” by Swagatika Sahoo, Arnab Mukherjee and Raju Halder from Indian Institute of Technology Patna and RCC Institute of Information Technology Kolkata, India. This paper proposes a robust and reliable e-waste management system by leveraging the power of blockchain technology, which captures the complete life cycle of e-products commencing from their manufacturing as new products to their disposal as e-waste and their recycling back into raw materials.

The fourth paper is entitled “An Effective and Elastic Blockchain-based Provenance Preserving Solution for the Open Data,” by Tran Khanh Dang and Thu Anh Duong from Ho Chi Minh City University of Technology, VNU-HCM, Vietnam. This paper aims to introduce an effective and elastic solution to keep track of data changes and to manage their characteristics within the open data platform and web information systems.

The fifth paper is entitled “A Novel Approach to Diagnose ADHD Using Virtual Reality,” by Ha Min Son, Dong Gyu Lee, Yoo-Sook Joung, Ji Woo Lee, Eun Ju Seok, Tai M. Chung and Soohwan Oh from Sungkyunkwan University, Suwon and Samsung Changwon Hospital, Changwon, Republic of Korea. The purpose of this paper is to improve the objective diagnosis of ADHD by analyzing a quantified representation of the actions of potential patients in multiple natural environments. The results have shown that VR-observed actions can be extracted as quantified data, and classification of this quantified data achieves near-perfect sensitivity and specificity with a 98.3% accuracy rate on a convolutional neural network model.

The sixth and final paper is entitled “Improving the Performance of the Intrusion Detection Systems by the Machine Learning Explainability,” by Quang-Vinh Dang from Industrial University of Ho Chi Minh City, Vietnam. This study aims to explain the state-of-the-art machine learning models that are used in the intrusion detection problem for human-being understandable and study the relationship between the explainability and the performance of the models.

As we can see, all of the selected and accepted papers focus on recent advances in (big) data and/or security engineering as well as the crucial achievements of the Fourth Industrial Revolution for facilitating different aspects of web/distributed applications. These papers are therefore perfectly within the scope and aims of *IJWIS*.

As a PC co-chair of FDSE 2020, as well as a Member of the Editorial Board of *IJWIS*, I would like to congratulate the authors of papers appeared in this special issue for their achievements in FDSE 2020 and inclusion in this issue of *IJWIS*. I would also like to thank the PC members of FDSE 2020 who conducted the initial reviewing process for the conference, the other FDSE 2020 PC co-chairs for selecting the top-quality papers and Eric Pardede, *IJWIS* Co-Editor-in-Chief, who has helped me a lot to manage this issue.

Tran Khanh Dang

*Ho Chi Minh City University of Technology (HCMUT), VNU-HCM,
Ho Chi Minh City, Vietnam, and*

Josef Küng

Johannes Kepler Universitat Linz, Linz, Austria