Guest Editorial Preface

Special Issue of Revised and Extended Papers From the Fourth Edition of International Conference on Advanced Aspects of Software Engineering

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Software Engineering can be defined as a dynamic discipline that aims at producing high-quality software systems, through systematic methodologies tailored to user-centered design principles, specifically dedicated to the applications of Smart Computing, which have improved our ways of living. Smart systems can be found in different multidisciplinary domains, including smart-transportation, green-energy, environmental protection, smart and connected communities, smart-healthcare, e-banking, e-government, etc.

The software models have boosted the development of millions of software applications for desktops, mobile devices as well as smart devices. During the development process, it is essential to consider the user design principles and methodologies to ensure the quality of these systems. In line with this goal, this special issue aims to offer insights into the latest developments in this domain and to further the research into the successful design, development and evaluation of smart frameworks and applications.

This special issue of the *International Journal of Organizational and Collective Intelligence* (IJOCI), titled "Software Engineering and Smart Applications", contains nine revised and extended papers from the fourth edition of International Conference on Advanced Aspects of Software Engineering, held in November 28-30, 2020 at Constantine2-University (Algeria). This well-established conference series extends the theory, methodology and applications in the domain of Software Engineering. This conference edition will provide an opportunity for the software engineering community to further advance the foundations of software systems, and come up with innovative applications modelling and analysis in emerging areas of cyber-physical systems, embedded systems, socio-technical systems, cloud computing, fog computing, big data, machine learning, security, open source, and sustainability

The nine articles in this special issue cover a wide range of innovative methods, software and hardware, implied in software engineering whereby intelligent systems should be the future technological trend in innovative solutions. Each of these revised and extended papers has undergone full double blind peer review, prior to being selected for this special issue.

"Generic Model for Adaptive Systems Realization" is the first article which is devoted to present a well-defined model, based on the UML standard, to guarantee in a simple way the design and the

realization of adaptive information systems. The proposed model is used to develop a code generator to partially produce domain-specific code.

In the second article: "DNA Cryptography using DNA Fragment Assembly and Fragment Key Expansion for Genomic Data", authors give a tweaked scheme based on DNA fragment assembly to improve protection over insecure channel. The conducted results and comparisons demonstrate that the proposed scheme can balance the three most important characteristics of any DNA masking scheme: payload, capacity, and BPN.

"Design and development of an intelligent system based on the Internet of Things for the early detection of forest fires" constitutes the title of the third article of this issue, which focuses on the development of an intelligent system for the early detection of forest fires, based on an IoT solution. Thus, it adopts the forward neural network algorithm by highlighting its contribution through real experiments, performed on the prototype developed in this work.

Recently, there is an increasing demand for software systems that dynamically adapt their behavior at run-time in response to changes in user preferences, execution environment, and system requirements, the fourth article titled: "Formal Specification of Non-Functional Properties of Context-Aware Systems" presents a specification language that integrates non-functional requirements design and validation in the development process of context-aware self-adaptive systems.

"A Dynamic Scaling Approach in Hadoop YARN", is the five paper of this issue, it defines a dynamic scaling approach in Hadoop YARN (DSHYARN) to add or remove nodes automatically based on workload. Besides, it aims to assure energy efficiency and performance of Hadoop YARN' clusters. To validate the effectiveness of the proposed approach, a case study with sentiment analysis on tweets about covid-19 vaccine is provided.

"A Combined approach for RT-Systems Development and Analysis". This paper defines a new approach for the development of real time systems and applications with a formal support based on rewrite logic. The proposed approach permits to represent the real time design patterns according to the new profile "DPP-RTSA" and shows how to correctly execute and compose the given patterns. Then, the obtained design is translated into formal specification in rewriting logic (RT-Maude) for formal analysis.

In the seventh article: "A Fault Tolerance and Recovery Formal Model for IoT Systems", authors tackle the fault tolerance challenge for assuring IoT systems dependability, while giving a generic microservice architecture called FaTMA (Fault Tolerance- Microservice Architecture for IoT) allowing the detection of things failures by providing continuous and real-time monitoring of their states. They adopt Bigraphical Reactive Systems (BRS) as formalism to define a formal model that describes architectural elements of different IoT system layers and their behavior. Indeed, the execution of the proposed model, through BigraphER tool, permits to simulate and analyze different failure scenarios as well as their restitution strategies.

"Cinco Based Approach for Agent Petri Net Models" is the eight article of this issue that provides automatic simulation models, based on Formal methods, Model Driven Approach (MDA) and Multi Agent Systems (MAS) for complex systems. Authors define a simplified simulation approach of Agent Petri Nets (APN) model to facilitate and accelerate the development and the evaluation of system models. CINCO tooling suite is used to full generation of specific graphical modeling tool for APN model. To highlight the ability of the proposed tool, a real-life example of a traffic light adaptive system is considered and discussed in this paper.

The last paper titled: "Spotted Hyenas Approach for Suicidal Prediction Application in Twitter" is interested by the evolution of the emotional states of individuals captured through microblogging services, such as Twitter. Authors in this article produce a new algorithm inspired by the spotted hyenas life (SHO) to detect person in suicide situation through the analysis of the twitter social network. They propose a new algorithm which gives better performance compared to machine learning algorithms such as Naïve Bayes (NB), K-Nearest Neighbors (KNN), the Decision Tree (DT) and Support Vector Machine (SVM).

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