

Editorial

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Kicking off the year 2024, this first issue of Volume 21 of Computer Science and Information Systems consists of 10 regular articles and three special sections: “Adaptive Smart Areas and Intelligent Agents” (3 articles), “Role of Agents in Traffic and Transportation” (3 articles) and “Innovations in Intelligent Systems and Applications” (3 articles). This editorial brings brief presentation of regular papers. Papers published in special sections are briefly presented in appropriate guest editorials.

As always, we are thankful for the hard work and enthusiasm of our authors, reviewers, and guest editors, without whom the current issue and the publication of the journal itself would not be possible.

In the first regular article, “FSASA: Sequential Recommendation Based on Fusing Session-Aware Models and Self-Attention Networks,” Shangzhi Guo et al. propose an approach for sequential recommendation based on Fusing Session-Aware models and Self-Attention networks (FSASA), where the Self-Attentive Sequential Recommendation (SASRec) model is used as a global representation learning module to capture long-term preferences under user behavior sequences.

The second regular article, “Applying SPIN Checker on 5G EAP-TLS Authentication Protocol Analysis” by Qianli Wang, applies the SPIN model checker to produce a formal analysis of the 5G EAP-TLS authentication protocol. The article provides a comprehensive understanding of the security properties of the 5G EAP-TLS protocol, and offers valuable insights and guidance for the verification of the protocol’s security properties, security design, and optimization of protocol implementation and interoperability.

“PI-BODE: Programmable Intraflow-based IoT Botnet Detection system,” by Đorđe D. Jovanović and Pavle V. Vuletić, proposes a programmable intraflow-based IoT botnet detection (PI-BODE) system based on the detection of Command and Control (C&C) communication between infected devices and the botmaster. Based on the analysis of the traffic intraflow statistical parameters, the approach allows detecting malicious communication before any attacks occur.

Peng Jiang et al., in “Feature Parameters extraction and Affective Computing of Voice Message for Social Media Environment” analyze the cognitive differences between semantic and acoustic features of voice messages from the perspective of cognitive neuroscience, and present a voice feature extraction method based on EEG (electroencephalogram) experiments, on top of which an affective computing method based on Pleasure-Arousal-Dominance (PAD) is proposed.

In “Machine Learning and Text Mining based Real-Time Semi-Autonomous Staff Assignment System,” Halil Arslan et al. present a machine learning-based decision support system for staff assignment that works with real-time data. The system analyses the description of newly requested tasks using text mining and machine-learning approaches,

predicts the optimal available staff that meets the needs of the project task, and iteratively updates personnel qualifications after each completed task.

The article “Activity Recognition for Elderly Care Using Genetic Search” by Ankita Biswal et al. proposes a model for human activity recognition (HAR) which provides a substructure for the assisted living environment, and uses genetic search based feature selection to manage the voluminous data generated from various embedded sensors. The article also presents a cloud based edge computing architecture for seamless deployment of the proposed model.

José Carlos Paiva et al., in “Comparing Semantic Graph Representations of Source Code: The Case of Automatic Feedback on Programming Assignments,” provide a thorough comparison of the most widespread semantic graph representations for the automated assessment of programming assignments, including usage examples, facets, and costs for each of these representations. A benchmark has been conducted to assess their cost using the Abstract Syntax Tree (AST) as a baseline. The results demonstrate that the Code Property Graph (CPG) is the most feature-rich representation, but also the largest and most space-consuming.

In “MK-MSVCR: An Efficient Multiple Kernel Approach to Multi-class Classification,” Zijie Dong et al. introduce a novel multi-class support vector classification and regression (MSVCR) algorithm with multiple kernel learning (MK-MSVCR) based on two-stage learning (MK-MSVCR-TSL). The two-stage learning aims to make classification algorithms better when dealing with complex data by using the first stage of learning to generate “representative” or “important” samples.

Lazar Nikolić et al., in “An Approach for Supporting Transparent ACID Transactions Over Heterogeneous Data Stores in Microservice Architectures,” present the Service Proxy Transaction Management (SPTM) approach to microservice architectures (MSA), which offers scalable reads and transactions with ACID (Atomicity, Consistency, Isolation, and Durability) guarantees. The novelty of the approach is in intercepting inbound messages to services, rather than having services directly communicate with a transaction manager.

Finally, “SPC5: An Efficient SpMV Framework Vectorized Using ARM SVE and x86 AVX-512” authored by Evann Regnault and Bérenger Bramas describes how the SPC5 sparse matrix/vector product (SpMV) framework was ported to the ARM-based AFX64 CPU by converting Intel AVX512 kernels to the Scalable Vector Extension (SVE) vectorization technology.

This first issue of the Journal brings a number of papers from diverse research domains and contemporary research fields. Accordingly we expect that wider audience will find at least one interesting paper for reading. Also we hope that papers will inspire readers to improve their research or even try to do innovative work in some of research areas presented in papers.