

Preface to the CLEI 2024 Special Issue (Volume II)

This special issue of the CLEI Electronic Journal proudly presents a selected collection of extended and revised papers from the 50th Latin American Computing Conference (CLEI 2024) held at the Universidad Nacional del Sur, SADIO - Bahía Blanca, Argentina, from the 12th to the 16th of August 2024.

CLEI 2024 featured five tracks on different computer science and informatics areas and a series of associated events and was co-located with the 53rd Jornadas Argentinas de Informática (JAIIO 53).

The five research tracks at CLEI 2024 focused on the state-of-the-art in different fields: Computer Science Education, Computer Technology, Intelligent Systems, Software Systems, and Systems In Practice.

The associated events organized within CLEI 2024 were:

- III Latin American School in Informatics (ELI)
- XVI Latin American Congress of Women in Computing (LAWCC)
- XXXI Latin American Contest of Master's Thesis (CLTM)
- X Latin American Contest of Doctoral Thesis (CLTD)
- 13th Latin American Networking Conference (LANC)
- II Workshop on Cybersecurity in Latin America and the Caribbean (CIBERLAC)
- I Latin American Workshop in Quantum Software Engineering (TLISC)

The conference received an impressive 268 submissions across its main tracks. With an overall acceptance rate of 35%, a total of 96 papers were accepted for presentation. Following a rigorous selection process, the authors of 24 top-ranked papers were invited to submit extended versions for this special issue. From these, 18 papers were ultimately submitted and underwent a new, meticulous review by CLEI 2024 reviewers and external academic experts. Seven of these were published in the first volume of this special issue ([Vol. 28 No. 3](#)), and we are pleased to include the remaining seven accepted papers in this second volume.

In the following paragraphs, the articles of this second volume are presented in order of publication:

“Assessment of Red and Blue Team Training in the Cyber Range Tectonic using Process Mining”: Cybersecurity is a growing concern for all kinds of computer systems. This paper evaluates the implementation of Tectonic, an academic cyber range, i.e., a specialized computer system whose objective is to simulate realistic cybersecurity scenarios for training purposes. The authors propose a new methodology based on process mining, with the goal of evaluating users' progress and determining whether they have achieved the training goals. The work includes the report of the results obtained from applying the methodology in a real-life setting, involving several student teams from different universities in the Latin American region, showing the viability of application and the usefulness of the approach to determine the outcomes of the training sessions and to provide insights to improve their effectiveness.

“Evolutionary Multi-objective Multicast Virtual Network Function Placement in NFV-SDN Networks”: Software-defined networking (SDN) and network functions virtualization (NFV) enable flexible multicast transmission with in-network data processing. The multicast routing problem in NFV-SDN networks involves optimizing routing trees and virtual network function (VNF) placement to meet traffic demands efficiently while balancing resource use and fairness. Given its complexity and conflicting objectives, this paper models it as a multi-objective optimization problem (MOP), minimizing total resource cost, transmission delay variance, and blocked requests. The study proposes Multi-Objective Evolutionary Algorithms (MOEAs) to find Pareto-optimal solutions. Simulations show that the MOEA-based approach outperforms a single-objective method, delivering efficient and non-dominated solutions.

“OntoPriv: Towards Designing a DPV-based Legal Ontology for Knowledge Retrieval and Compliance in Privacy Legislation”: The protection of personal data is a growing concern worldwide, and different regulations are being approved in order to safeguard privacy. This paper presents OntoPriv, a legal ontology which can support

compliance with Ecuador's Organic Law on Personal Data Protection (LOPD), as well as with the Data Privacy Vocabulary (DPV) W3C standard. OntoPriv was developed as a systematic framework which is useful to check legal obligations and to strengthen privacy practices, as well as to encourage accountability, leading to improved data governance. This framework can also facilitate automated compliance and in general provide organizations with a robust tool for considering complex data protection requirements.

“Crosscutting Teaching Strategies for Software Development Teams: Insights from Kolb's Inventory”: The study focuses on identifying the predominant learning style among software industry professionals to help define teaching strategies and provide a baseline for tailoring training approaches. To this purpose, Kolb's Learning Styles Test was administered to 112 software development professionals to identify the predominant learning style. The Thinking Learning Style was found to be the most prevalent among industry professionals. Based on this finding, the authors present customized teaching strategies to address key challenges in software engineering training. The proposed teaching strategies were validated through an external focus group with professional training consultancies, which provided valuable insights, particularly regarding the inclusion of collaborative activities and the adaptation of methods for remote learning environments. Finally, this research contributes to the ongoing discourse on software engineering education by underscoring how personalized, adaptive strategies can transform training programs.

“Active Learning Pedagogical Strategies in Software Engineering University Courses”: The authors conducted a Rapid Review to identify the active learning strategies used in Software Engineering higher education. As a result, 18 active learning strategies on software engineering were found across 49 studies (between 2018 and 2023) that presented application experiences. Games and Project-Based Learning were the most frequently used strategies. The authors conclude that active learning strategies can be used in different higher education settings and promote skill development. In addition, it is possible to combine active learning strategies with traditional learning activities in order to foster both lower and higher order thinking skills.

“Worker assignment models for hiring people with disabilities in service organizations”: The authors propose a mathematical programming model for task assignment in the context of hiring people with disabilities in service organizations. They discuss a real-life example at the Intendencia de Montevideo. The mathematical programming model includes four different ways to measure success, considering the goals of different stakeholders. The authors compare the results of using the model versus manually assigning tasks. They also study how the results change based on different values for the coefficients and the number of available positions. The main conclusion is that mathematical programming models are an effective way to support decision-making and help integrate workers with disabilities in a service organization.

“Multiclass Diabetic Retinopathy Classification based on Low-Rank Adaptation”: Deep learning has shown great promise in diagnosing different medical conditions, in some cases performing competitively with human experts. Nevertheless, the effectiveness of the methods depends on the model architecture being employed. The authors of this work have focused on the diagnostic of diabetic retinopathy, and particularly the training of a deep learning model using a Low-Rank Adaptation technique, in order to classify three possible conditions: no retinopathy, non-proliferative retinopathy, and proliferative retinopathy. The method was applied to four data sets of different sizes, to discuss the performance of the model and to establish directions for future work.

We are deeply grateful to the CLEI 2024 Track Chairs for their invaluable work and dedication, which were essential in selecting the papers for this special issue. Our sincere thanks also go to the many reviewers who volunteered their time and expertise, ensuring the quality and rigor of these publications. Finally, we thank all the authors for their contributions and their commitment to advancing research within our Latin American community. We hope this collection not only disseminates important findings but also inspires further collaboration and innovation.

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