Preface

In this number a selection of papers from the XXXVIII Latin American Conference in Informatics (CLEI) are presented. CLEI is probably the most important general conference in Latin America in the computer science and engineer disciplines. Its high standard is one of the most valued properties among researchers. CLEI is the home of six different symposiums that focus on the following areas: 1) Artificial Intelligence and Operational Research, 2) Software Engineering, 3) Infrastructure, Hardware and Software, 4) Computer Graphics, Virtual Reality and Image Processing, 5) Theory and 6) Informatics and the Society. The symposiums have been chaired by José Aguilar and Carlos Brizuela, Oscar Pastor and Raquel Anaya, Harold Castro, Luciana Nedel and Pablo Figueroa, Ernst Leiss and Gabriela Marin and Paula Zabala respectively. Yezid Donoso and Benjamín Barán were the general co-chairs for the whole conference.

The selection has been rather competitive. Over five hundred papers were submitted for evaluation in the different symposiums, the average acceptance ratio was 35%. From the accepted papers, only nine were selected for this post-proceeding. These have in common a high score in the evaluation process and theoretical content. The stringent requirements limit the selection to four symposiums: Artificial Intelligence and Operational Research provided three papers, Software Engineering another three, Computational Theroy two and Infrastructure, Hardware and Software one. In what follows a short review of the articles published in this number is presented.

From the Computational Theory Symposium two papers were selected. In the first one, “Some remarks concerning the algorithmic analysis of gene regulatory networks” by J. Andrés Montoya, Carolina Mejía study an algorithmic problem related the gene regulatory networks. The problem consists in counting the fixed points in boolean networks, in particular monomial ones. The authors prove that the counting of fixed points is \#P complete even in this restricted case. In the second one, “Sorting Permutations by Reversals through a Hybrid Genetic Algorithm based on Breakpoint Elimination and Exact Solutions for Signed Permutations” by José Luis Soncco-Álvarez and Mauricio Ayala-Rincón, a standard genetic algorithm for solving the problem of sorting by reversals unsigned permutations is proposed. This approach is based on Auyeung and Abraham’s method which uses
exact solutions for the signed case in order to build approximate solutions for the unsorted one. Additionally, an improved genetic algorithm is proposed, that in the initial generations applies reversals that simultaneously eliminate two breakpoints, a heuristic mechanism used by several approximation algorithms. As control mechanism for estimating the precision of the results, a correct implementation of an 1.5-approximation algorithm was developed. Also, the results were compared with permutations for which exact solutions are known, such as Gollan’s permutations and their inverses. Several experiments with randomly generated permutations were performed and the results showed that in average the precision of the outputs provided by both the standard and improved genetic algorithms overcome the results given by the 1.5-approximation algorithm as well as those results provided by previous known genetic approaches.

The Artificial Intelligence and Operational Research Symposium has selected three papers. In the paper “TAO+: Extending the Conceptual Framework TAO to Support Internal Agent Architectures in Normative Multi-Agent Systems” by Emmanuel Sávio Silva Freire, Enyo José Tavares Gonçalves, Mariela Inés Cortés, Yrleyjânder Salmito Lopes, Marcíus Gomes Brandão, the authors introduce an extension of the Taming Agents and Objects (TAO). TAO is a conceptual framework for Multi-Agent Systems (MAS) used as a foundation for the modeling language MAS-ML. The extension proposed, allows the representation of different agent architectures and the norm concepts. The second paper “A Technical Analysis Indicator Based On Fuzzy Logic” by Alejandro Escobar, Julián Moreno and Sebastián Múnera introduces an indicator for technical analysis based on fuzzy logic is proposed, which unlike traditional technical indicators, is not a totally objective mathematical model, but incorporates subjective investor features such as the risk tendency. In addition to present the detailed formulation of the indicator, in this paper a validation for the same is presented, which makes use of a multi-agent based simulation platform within which the behavior and profits obtained by agents that used traditional technical indicators such as MA, RSI and MACD, are compared against those obtained by agents that use the fuzzy indicator for the decision making process. Finally, In the paper “A Comparison of Multi-label Feature Selection Methods using the Problem Transformation Approach” by Newton Spolaôr, Everton Alves Cherman, Maria Carolina Monard and Huei Diana Lee, proposes multi-label feature selection methods which use the filter approach to reduce the dataset dimensionality by removing irrelevant and/or redundant features. To this end, two standard multi-label feature selection approaches, which transform the multi-label data into single-label data, are used. Besides these two problem transformation approaches, the ReliefF and Information Gain are used to measure the goodness of features. This gives rise to four multi-label feature selection methods. The methods are evaluated experimentally with ten benchmark datasets. The results show that ReliefF is able to select fewer features without diminishing the quality of the classifiers constructed using the selected features.

The Software Engineering Symposium has selected three papers. The first one, “Verification of Model Transformations: A Survey of the State-of-the-Art” by Daniel
Calegari and Nora Szasz, presents an exhaustive review of the literature on the verification of model transformations analyzing three components: the transformation itself, the properties of interest addressed, and the verification techniques used to establish the properties. The authors take a problem-based approach exemplifying those aspects of interest that could be verified on a model transformation and show how this can be done. The paper concludes the need of an integrated environment for addressing the heterogeneous verification of model transformations. The second, “Towards Security Assurance in Round-Trip Engineering: A Type-Based Approach” by Jaime A. Pavlich-Mariscal, Mara Consuelo Franky and Ariel Lopez proposes a round-trip engineering approach for access control that preserves security assurance both when generating code from models and vice versa. The approach is to extend programming languages’ typing mechanisms with additional rules that ensure consistency between models and code, even when code is arbitrarily modified by programmers. This paper presents a formal description of the solution and an initial sketch of the required proofs of correctness. Finally, in the paper “On the Representation and Aggregation of Evidence in Software Engineering: a theory and believe based perspective” by Paulo Sérgio Medeiros dos Santos and Guilherme Horta Travassos presents a preliminary proposal to use empirically-based theories and belief functions as a means to represent and aggregate evidence. By having evidence explained by the same theory, the authors used belief functions to combine them in a way that the theory propositions (cause-effect values) result from combined evidence. They suggest this can be an useful way to obtain a good estimate of multiple evidence combination. In addition, they indicate its possible usefulness for practitioners to formalize and reuse their experiences. A real-case application of the approach is presented by formulating a theory for Usage-Based Reading inspection technique and aggregating the evidence acquired in three related empirical studies. This application indicated that the approach can give compatible results with the aggregated evidence.

The Infrastructure, Hardware and Software Symposium has only chosen one paper, “MultiS: A Context-Server for Pervasive Computing”, by Felipe Weber Fehlberg, Carlos O. Rolim, Valderi R. Q. Leithardt, Cláudio F. R. Geyer and Luciano C. Silva. In it the authors propose a context server calle MultiS, which has the goal of solving the problems arising from the context recognition layer (in charge of transforming raw data collected from the context in useful information), and which includes the following advantages: a) the production of new context data based on the information of several sensors and an ability to react to changes in the environment; b) definition of a composed language for the context data called CD-XML; c) support for mobility.

We expect the reader to enjoy this selection that shows the high level of the research being done in Latin America and presented at CLEI.

Yezid Donoso
Rodrigo Santos