

Editorial

This volume of the journal "Computación y Sistemas" presents to readers several interesting papers on various hot themes in computing science.

Hernán Peraza-Vázquez, Aidé M. Torres-Huerta, and Abelardo Flores-Vela, the authors of the paper *Self-Adaptive Differential Evolution Hyper-Heuristic with Applications in Process Design*, proposed a differential-evolution-based hyper-heuristic (DE-HH) approach for the optimization of mixed-integer non-linear programming problems. They handled the constraints by the epsilon-constrained method, and the choice functions can adaptively select appropriate low-level heuristics from a set of 18 DE variants. The experiments were performed on difficult non-convex optimization problems which frequently have to be resolved in chemical engineering. The obtained results have showed that the new approach is able to find a global optimum reliably and efficiently improving some best state of the art results.

The article *Personnel Selection in a Competitive Environment* by Marilyn Bello, Rafael Bello, Ann Nowé, and María M. García-Lorenzo Personnel is dedicated to solving a complex decision making problem which is personnel selection. The authors explored the problem of two employers as decision makers selecting candidates from a set. For a mathematical formulation, the apparatus of the game theory was used. The experiments performed by the authors showed that the selection strategy based on the game theory outperformed the selection following the order established by the ranking of preferences preliminarily defined by employers. The developed method can be applied to any number of decision makers.

The authors of the paper *An Experimental Study of Evolutionary Product-Unit Neural Network Algorithm* Alain Guerrero-Enamorado and Daimerys Ceballos-Gastell studied the behavior of an Evolutionary Product-Unit Neural Network (EPUNN) in different scenarios. They evaluated EPUNN for the classification task on various datasets: sets which contain noise, imbalanced

sets, and datasets with missing values. The performance of EPUNN on these sets was compared to the performance of other four state of the art algorithms. As a result of their experimentation, the authors concluded that EPUNN decreases its accuracy in noisy environments, but it is more robust on imbalanced data.

The article *Fractional Complex Dynamical Systems for Trajectory Tracking using Fractional Neural Network* by Joel Perez Padron reports a study of the trajectory tracking problem. The author obtained a new control law analytically as a theoretic result using Lyapunov theory and then demonstrated the advantages of his proposal by tracking simulation of a simple network with four different nodes and five non-uniform links. The control law presented in this paper can be applied to a wide range of problems in trajectory tracking.

Numerical simulations, described in the article *Smoothing the High Level Canonical Piecewise-Linear Model by an Exponential Approximation of its Basis-Function* by Victor M. Jimenez-Fernandez, Maribel Jimenez-Fernandez, Hector Vazquez-Leal, Uriel A. Filobello-Nino, and Francisco J. Castro-Gonzalez, demonstrated the proof-of-concept related to obtaining smooth-piecewise functions by replacing the basis-function used into the construction methodology of the High Level Canonical piecewise-linear model. Examining their new smoothing technique, the authors observed that the error between the original piecewise-linear curve and its smoothing version is uniformly distributed along each linear partition. It was also shown experimentally that the proposed approach can be applied to practical engineering problems.

A new classification of design patterns oriented to achieve well-designed mobile groupware interfaces is presented in the article *Validating Design Patterns to Mobile Groupware Applications by Expert Users: USAER Case by Huizilopoztli Luna-García, Ricardo Mendoza-González, Miguel Vargas Martin, Jaime Muñoz-Arteaga, Francisco J. Álvarez-Rodríguez, and Laura C. Rodríguez-Martínez*. The strategy developed by the authors

gives guidance for designers to integrate specific interactions in user interfaces for groupware systems. The proposal was tested and evaluated on a case study with expert users from the USAER group in Mexico (Units Support Services for Regular Education). The results of the study confirmed the success of the authors' proposal showing that the knowledge offered by the set of developed patterns is adequate and accurate.

The article *Relationship between the Inverses of a Matrix and a Submatrix* by E. Juárez-Ruiz, R. Cortés-Maldonado, and F. Pérez-Rodríguez presents a new formula obtained by the authors that allows to calculate the inverse of a submatrix in terms of the inverse of the original matrix. The new formula was tested in a computational environment and showed the runtime efficiency when compared against the LU Decomposition for the case of Fourier matrices. The authors also generalized the new formula for the case of inverses of block-partitioned matrices with square blocks of the same size.

Two new lexical resources, SentiWordNet 4.0 and SpanishSentiWordNet, are reported in the article *Unsupervised Opinion Polarity Detection based on New Lexical Resources* by Mario Amores, Leticia Arco, and Claudia Borroto. SentiWordNet 4.0 is an improved and corrected version of SentiWordNet 3.0 developed by the authors which ensures greater certainty in the assigned polarity of the words as positive or negative. The other resource, SpanishSentiWordNet, was compiled by the authors using the previously obtained SentiWordNet 4.0 and Intralinguistic Index, which was also improved by them. Both resources were combined and integrated in the new PolarityDetection library. All these novel resources can be used to facilitate the development of polarity detection applications in both English and Spanish.

The paper *Detección automática de similitud entre programas del lenguaje de programación Karel basada en técnicas de procesamiento de lenguaje natural* (written in Spanish, its English title is *Automatic Detection of Similarity of Programs in the Karel Programming Language based on Natural Language Processing Techniques*) by Grigori Sidorov, Martín Ibarra Romero, Iliia Markov, Rafael Guzman Cabrera, Liliana Chanona-

Hernández, and Francisco Velásquez exposes a new method for calculating similarity between source codes of programs written in the Karel programming language. The authors applied natural language techniques and information retrieval strategies for determining similarity between programs with the practical purpose of code reuse, among other possible implementations. The programs were represented as vectors of features, then latent semantic analysis and a supervised machine learning method were used to calculate the similarity measure. The experiments revealed that the best results were obtained using trigrams of words on one corpus and character trigrams on another corpus.

Anabel Pineda-Briseño, Rolando Menchaca-Méndez, and Giovanni Guzmán Lugo, the authors of the paper written in Spanish with the title *Enrutamiento y posicionamiento integrado en redes móviles ad hoc* (its English title is *Integrated Routing and Positioning in Mobile Ad Hoc Networks*) developed the first integrated framework for positioning and multicast routing in mobile ad hoc networks (MANETs). They also designed a novel protocol as an instantiation of their integrated routing and positioning framework. In order to evaluate the proposal, the authors present a detailed simulation-based analysis. The obtained experimental results demonstrate that the author's new approach outperforms the combined use of ODMRP+Amorphous, which are the most representative multicast routing and positioning protocols in MANETs.

I am sure that the readers of the volume will enjoy reading and learn new ideas from these papers for their research projects.

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