Editorial

We have the pleasure to introduce this number of Computación y Sistemas which includes 12 regular papers and 5 special issue articles. On the one hand, regular articles cover a range of computer science subfields, approaching problems in the borders of knowledge, thus advancing the state of the art. On the other hand, special issue papers focus in a very specific topic that is transversal to many areas of computers and systems. In the following we outline the main contrubution of each article.

Evolutionary computation is the name given to a variety of techniques that take inspiration in the processes of biological evolution for solving complex problems. Whereas the analogy is far from being accurate, results obtained by these techniques are astounding in a wide variety of domains and applications. In fact, the field of evolutionary computation has been quite active in the last decades. Making critical to keep track of advances and progress on both, fundamental and applied research, in this field. We organized a special issue in Computación y Sistemas that aims at compiling research advances in all aspects of evolutionary computation and other bio-inspired methodologies.

The special issue collects high quality research from Mexican researchers mainly. Received articles cover different aspects of evolutionary computation, from applications to basic research. In the following we summarize the contributions in this special issue.

Julio Barrera, Osiris Álvarez-Bajo, Juan J. Flores, and Carlos A. Coello Coello, in their article entitled *Limiting the velocity in the Particle Swarm Optimization algorithm*, introduce a new mechanism for adaptively regulating the velocity of the PSO algorithm in each iteration. This mechanism can substitute factors that are used for this purpose (e.g., inertia weight, constriction factors), obtaining competitive performance in a suite of benchmark functions.

Nancy Pérez, Oliver Cuate, Oliver Schütze and Alejandro Alvarado present their work entitled *Including Users Preferences in the Decision Making for Discrete Many Objective Optimization Problems*. In their article, they propose two novel strategies for the improvement of non dominated solutions to incorporate user preferences in the direction of the Pareto front that the user prefers to explore. The paper targets many-objective optimization problems, experimental results are reported in instances of the vehicle routing problem with windows.

Enrique Naredo, Miguel Aurelio Duarte-Villaseñor, Manuel de Jesús García-Ortega, Carlos E. Vázquez-López, Leonardo Trujillo, and Oscar S. Siordia in their article entitled *Novelty Search for the Synthesis of Current Followers* report the use of novelty search with a genetic algorithm (NS-GA) for topology synthesis of current follower circuits. Experimental results show that the proposed methodology was able to discover new solutions that the reference method (GA-OS) could not. Making the NS-GA method a promising solution for other problems related with automated synthesis of circuits.

Noel Enrique Rodriguez Maya, presents in his article entitled *Performance Comparison of Evolutionary Algorithms for University Course Timetabling* Problem a comparative study of genetic algorithms and differential evolution for the timetabling problem. This interesting study considers as cases of study the real timetabling problems of three Mexican universities. Interestingly, the differential evolution methodology obtained the best results.

Last, but not least, Víctor R. López-López, Leonardo Trujillo, Pierrick Legrand, Victor H. Díaz-Ramírez and Gustavo Olague present in their article entitled *A comparison of local feature extraction paradigms applied to visual SLAM*, an interesting study on evolutionary and non evolutionary methodologies for salient point detection and visual description of images in the task of Simultaneous Localization and Mapping. The comparison included computer vision techniques, methods evolved using GP; and a novel technique. For experimentation a real robot is considered.

As can be noticed, the thematic issue covered several variants of bio-inspired optimization

methodologies (genetic algorithms, differential evolution, genetic programming, particle swarm optimization), and a diversity of problems were approached from benchmark functions, to classical problems (e.g., timetabling, vehicle routing) and to novel domains (e.g., visual SLAM and automated circuit design). We are pleased that this compilation indeed fulfilled our initial goals, by providing the reader a snapshot of cutting edge research in evolutionary computation.

Finally, we are very grateful with reviewers, editors in chief, authors, colleagues and our institutions that helped us with the organization, dissemination and realization of the special issue. We really hope readers find useful this compendium of high quality publications in a pretty much dynamic and exciting field.

Now we pass to the presentation of the regular papers of this volume.

Three articles on topics related with natural language processing were accepted for publication. Goutam Majumder, Partha Pakray, Alexander Gelbukh, and David Pinto present in their paper, *Semantic Textual Similarity Methods, Tools, and Applications: A Survey,* a comprehensive review on methods for estimating textual similarity at different levels (word, sentence, paragraph, document). A categorization of methods is presented and available tools are described in the article.

The problem of coreference resolution in Russian is faced by Svetlana Toldova and Max Ionov in their paper *Mention Detection as a Step for Coreference Resolution in Russian: Machine Learning Approach.* The proposed method relies in mention detection, for which basic, structural, and lexical features are considered. Mention detection methods are then applied for coreference resolution. The developed techniques outperform the adopted baselines.

In another quite interesting article by Ines Turki Khemakhem, Salma Jamoussi and Abdelmajid Ben Hamadou, entitled *POS Tagging without a Tagger: using Aligned Corpora for Transferring Knowledge to under Resourced Languages,* the authors show how part-of-speech (POS) tags for under-resourced languages can be obtained by transferring knowledge of aligned POS-tagged corpora. The authors present an effective methodology for transferring knowledge across languages. Experimental results in Arabic language show the method can obtain performance close to other tools designed for POS tagging.

Likewise, a couple of articles on computer vision are included in this issue. Luis David Lara Rodríguez, and Gonzalo Urcid Serrano present in their article, *Exudates and Blood Vessel Segmentation in Eye Fundus Images using the Fourier and Cosine Discrete Transforms,* a methodology relying in signal and image processing techniques for the segmenting exudates and blood vessels from eye funds images. The method is evaluated in a number of real medical images, obtaining results that outperform most related methodologies in both segmentation tasks.

On the other hand, Ahmed Ben Jmaa, Walid Mahdi, Yousra Ben Jemaa and Abdelmajid Ben Hamadoua present in their paper, *New Approach for Hand Gestures Recognition Based on Depth Map Captured by RGB-D Camera,* a method for sign language recognition that uses only depth information. Edge detection is used to segment the hand and an invariant descriptor is proposed. Experimental results in French sign language recognition and a benchmark data set are reported in the document.

Articles in miscellaneous applications of artificial intelligence are included in this number. Leidys Cabrera-Hernández, Alejandro Morales-Hernández and Gladys María Casas-Cardos, in their paper, *Diversity Measures for Building Multiple Classifier Systems Using Genetic Algorithms,* describe a methodology for the generation of ensemble classifiers based in genetic algorithms. The proposed method aims at selecting the optimal combination of classifiers trying to optimize accuracy while taking into account several measures of ensemble diversity. Results in benchmark data show that very effective ensembles can be obtained with the proposed approach.

María del Refugio Ofelia Luna Sandoval and José Ruiz Ascencio in their article, *MUREM: A Multiplicative Regression Method for Software Development Effort Estimation,* present a methodology for estimating efforts in software development. The proposed method incorporates initial conditions of the framework for estimating

software development effort as well as restrictions that depend on the software size. The proposed method is evaluated extensively using a sound methodology and compared to other solutions based on regression. Results obtained by the proposed method are better than those obtained by related methods.

Luis Alejandro Sánchez Pérez, Lusi Pastor Sánchez-Fernández and Sergio Suárez Guerra in their article *Aircraft Class Recognition based on Take-off Noise Patterns,* present a novel application in which machine learning techniques are used to estimate the aircraft type by analyzing sound signals during takeoff, in addition he estimates the geo-referenced trajectory of the takeoff flight path. Experimental results in a data set of aircraft take off sounds are reported.

Netz Romero and Ricardo Barrón-Fernández present in their article entitled *Triangulation Delaunay Validation using Conformal Geometric Algebra* a method to validate Delaunay triangulation based on conformal geometric algebra. The proposed method offer computation and scalability advantages.

Articles in this volume are not restricted to the computer science field; it also contains an interesting article by Jesús E. Molinar-Solís, Víctor H. Ponce-Ponce, José Rivera Mejía, Sergio Sandoval, Miguel Rocha Pérez, Alejandro Díaz-Sánchez, and Humberto Bracamontes del Toro. The article, entitled *A 3µW Low-Power CMOS Class-AB Bilateral Current Mirrorfor Low-Voltage Applications*, presents a compact low-power bidirectional current mirror suitable for low-voltage applications. The key element is the use of a CMOS complementary input stage working in subthreshold regime, which allows setting a reduced bias current through the mirror. Results of simulation are given obtaining good efficiency.

The article entitled *A Mathematical Model for Optimizing Resources of Scientific Projects*, by Mario A. Zurita-Barrón, Jorge A. Ruiz-Vanoye, Ocotlan Diaz-Parra, Alejandro Fuentes-Penna, María Beatriz Bernabé-Loranca, introduce a mathematical formulation of the problem of optimizing resources for R+D projects. The article formulates and implements a model according to the guidelines of the Mexican Council of Science and Technology (CONACYT), results of the

proposed model are compared to real estimations from researchers.

María del Consuelo Argüelles Arellano in her contribution *Challenges of Cyber Law in Mexico*, reviews the status of legislation on intellectual rights, electronic transactions and cyber crime, with emphasis in the Mexican view of these challenges. As important as legislation, optimization of resources in science is key component for the development of countries.

It is clear that this number of Computación y Sistemas provides a compilation of cutting edge research in a wide variety of topics in computing and related fields. Enjoy this number!

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Guest Editors