

Editorial

This special issue on Topic Trends in Computing Research aims to promote the latest developments and key topics in the field of computing and its applications, performed by Mexican researchers supported by CONACyT grants, especially in Spain.

This special issue mainly presents improved versions of works presented and discussed at the 2nd Jornadas de Cooperación CONACyT-Catalunya (JCCC) held at the Universitat Politècnica de Catalunya (UPC) in Barcelona, Spain; in June 2015. In addition, the invitation was open to all contributions from the Computing arena made by Mexican researchers supported by CONACyT grants.

Although it is impossible to cover every aspect of the research performed by Mexican researchers supported by CONACyT grants, this special issue aims to provide a good and representative sample of it. I hope that this special issue will be able to provide the readers some representative and exciting snapshots of the actual research performed by Mexican researchers supported by CONACyT grants, especially in Spain.

All contributions underwent a very strict peer review process made by experts in the corresponding areas. As a result, this special issue presents four relevant papers covering diverse topics.

In the article *Unsupervised Machine Learning Application to Perform a Systematic Review and Meta-Analysis in Medical Research*, the authors Carlos Francisco Moreno-García, Magaly Aceves-Martins, and Francesc Serratosa work on the issue of missing data in statistical analysis of multiple data sources. They proposed a new method of database completion and its posterior analysis using machine learning techniques. Their proposal is tested on two cases: a movie ranking database scenario and a real life systematic review and meta-analysis of obesity prevention scientific papers. In the experimental stage, the new method demonstrated its usefulness and good agreement with the prediction made by the state of the art method.

The article *Single-Camera Automatic Landmarking for People Recognition with an*

Ensemble of Regression Trees by Karla Trejo and Cecilio Angulo is devoted to a new approach proposed by the authors for automatic landmarking of body shapes on still images for training the Active Appearance Model. The new technique landmarks full body contours, which significantly enhances robotic vision recognition. The developed system can be used for many practical purposes, including domestic service robots equipped with basic technological resources due to economic reasons or efficiency purposes.

Octavio Castillo Reyes, Josep de la Puente, David Modesto, Vladimir Puzyrev, and José María Cela, the authors of the paper *A Parallel Tool for Numerical Approximation of 3D Electromagnetic Surveys in Geophysics*, work on developing a simpler and more effective parallel computational implementation of the controlled-source electromagnetic method (CSEM) which is a common electromagnetic method in geophysics. Their development is based on the linear Edge Finite Element Method in 3D isotropic domains. The results of testing the system demonstrated good efficiency and an acceptable accuracy in the numerical approximation.

The paper *Design of a Speed Adaptive Controller for a PMSM by Artificial Intelligence* (written in Spanish with the title *Diseño de un controlador de velocidad adaptativo para un MSIP utilizando inteligencia artificial*) by Omar Aguilar-Mejía, Rubén Tapia-Olvera, Iván Rivas-Cambero, and Hertwin Minor-Popocatl considers the control schemes of permanent magnet synchronous motors. The authors have performed a comparative analysis of a synchronous motor response with four control strategies: conventional proportional integral, sliding mode, fuzzy logic, and neural networks. Their proposal of a new control procedure is based on neural networks and showed the best performance since it is able to adapt to diverse conditions and is computationally efficient.

I hope these articles will be valuable contributions to the development of the Computing field in México.

I want to thank all people involved in this undertaking, from the authors to the reviewers for

their effort and work, and JCCC 2015 steering committee and CyS editors in chief for offering me the opportunity of preparing this special issue.

Finally, I hope that readers of this special issue will enjoy the mix of topics presented here and perhaps find the inspiration to push these fields a step further; or it opens the door for new collaborations.

This volume of the journal also contains regular paper and a thematic section.

The regular papers are as follows.

Ajit Kumar, Dharmender Kumar, and S.K. Jarial, the authors of the paper *A Comparative Analysis of Selection Schemes in the Artificial Bee Colony Algorithm*, study a particular swarm intelligence based technique, namely, the Artificial Bee Colony Algorithm (ABC), with respect to different selection schemes applied in it. The schemes examined include tournament selection, truncation selection, disruptive selection, linear dynamic scaling, linear ranking, sigma truncation, and exponential ranking. These schemes have been tested and compared on six standard benchmark functions. The obtained simulation results showed the efficient performance of the schemes other than the standard ABC.

The article *(Hyper)sequent Calculi for the ALC(S4) Description Logics* by Juan Pablo Muñoz, Everardo Bárcenas, Iván Martínez, and José Ramón Enrique Arrazola proposes a cut-free tree hypersequent calculus for terminological reasoning in the Description Logic ALC proving its soundness and completeness. The authors also developed a proof system for ALC without restrictions on roles based on tree hypersequents. Additionally, a complexity analysis and an implementation are presented.

Skein problems in Hamiltonian graphs are explored in the article *Trajectory Graphs Appearing from the Skein Problems at the Hypercube* written by Feliú Sagols, Guillermo Morales-Luna, and Israel Buitrón-Dámaso. The authors studied the mathematical properties of Skein problems and proved that such problems are reduced to the Independence Problem in Graph Theory. The authors' contributions can be used in cryptography for authentication purposes applying a huge graph as a private key and a maximum independent set as the public one.

An analysis of social networks applied to education is presented in the paper *Social Network Analysis: a Practical Case Study* by Antonieta Kuz, Mariana Falco, and Roxana Giandini. Using Gephi as a simple tool for social network analysis, the authors evaluate the dynamics of asynchronous communication in a forum. The results are considered within the educational environment. The proposed technique shows usefulness and potential effectiveness for online analyses of interaction patterns which will help the teacher to evaluate the social climate and select appropriate methods.

A new estimation technique for an instrumental variable tool is proposed in the paper *Diagonal and Recursive Parameter Estimation for Black-box Systems with Bounded Inputs and Outputs* (written in Spanish with the title *Estimación diagonal y recursiva de parámetros para sistemas tipo caja negra con entradas y salidas acotadas*) by Rosaura Palma Orozco, José de Jesús Medel Juárez. The authors also designed a diagonalization process which does not include the calculation of pseudo-inverse matrices. The obtained results demonstrate that it is possible to reconstruct the observable signal with a probability approximation. Unlike state of the arts procedures, the proposed technique estimates the matrix contribution on line with a linear complexity.

This volume also contains thematic section "Advanced Applications of Computing Science", where guest editors are Alicia Martínez Rebollar and Marcela Rodríguez Urrea. The papers of this section had their own call for papers and reviewing procedure according to the standards of the journal. This section contains four papers.

The article *New Perspectives on the Use of Spatial Filters in Magnetoencephalographic Array Processing* by Claudia Carolina Zaragoza-Martínez and David Gutiérrez describes the use of spatial filters in the solution of the neuroelectric inverse problem which involves very complex mathematical calculations. Since it is possible to manage such calculations with today's computer power, the authors claim that new spatial filters, such as those based on eigenspace projections, can be used to improve the classical LCMV solution.

The article *Semantic Approach to Context-Aware Resource Discovery over Scholarly Content*

Structured with OAI-PMH (written in Spanish with the title *Enfoque semántico para el descubrimiento de recursos sensibles al contexto sobre contenidos académicos estructurados con OAI-PMH*) by Arianna Becerril García, Rafael Lozano Espinosa, and José Martín Molina Espinosa responds the challenges imposed on developers of information retrieval applications by the need to deal with the big data accumulated in the Web. In such applications, there is a need to retrieve and display information taking into account the user context and requirements. The new model suggested by the authors is based on ontologies and can also be extended to make use of Linked Data.

A socially important theme is tackled in the paper *Inferring Social Isolation in Older Adults through Ambient Intelligence and Social Networking Sites* by Wilfrido Campos, Alicia Martínez, Wendy Sanchez, Hugo Estrada, Jesus Favela, and Joaquin Perez. For the first time, they applied the computational mechanisms specified in the title to monitor social isolation levels in older adults. Their best predictive model achieved an accuracy of 87% and a type II error of 15%. In

future the authors plan to implement their model in a computer system of one of social institutions. The system will determine the social isolation level in elderly people and alert caregivers and relatives of possible risk situations.

The paper *Memory Binary Particle Swarm Optimization (MBPSO) Applied to a Spectrum Sharing Problem* (written in Spanish with the title *Optimización binaria por cúmulo de partículas con memoria (MBPSO) para resolver un problema de espectro compartido*) by Esteban Martínez, Ángel G. Andrade, Anabel Martínez-Vargas, and Guillermo Galaviz analyzes spectrum sharing problem for Heterogeneous Networks. The aim is to promote the coexistence of different radio systems in the same spectral portion. The authors apply binary optimization using PSO with memory. Their results are better than of similar approaches.

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