Editorial

The aim of this special issue is to gather together a representative, prolific sample of the current research in applications of Machine Learning and Pattern Recognition undertaken in Ibero-America. It contains 13 articles that are extended versions of selected papers presented at CICCI 2013, the Second International Conference on Informatics and Computer Sciences held in Havana, Cuba, from 20-22 March 2013, within the 15th International Convention and Fair INFORMATICA 2013.

At CICCI2013, 225 papers were received and 128 were accepted as full presentations or posters. From the accepted papers, 33 were invited submit extended versions of their works to be considered for publication in a Special Issue of the Journal "Computación y Sistemas". Each work was reviewed by three members of an international committee of reviewers who suggested a number of modifications completed by the authors. Finally, 13 papers were accepted for this special issue. We offer the reader the extended and reviewed versions of these accepted papers.

Iris recognition has gained more popularity in the last decade inside the pattern recognition community. This biometric technology is one of the most robust human identification methods. In the paper "Eyelid Detection Method Based on a Fuzzy Multi-Objective Optimization", a new eyelid detection method based on a fuzzy multi-objective optimization approach is presented. The eyelid occlusion is a quality factor that may significantly affect the accuracy of Iris recognition methods.

Another approach for iris recognition is presented in "The functional data analysis as an alternative for the automatic biometric images recognition: Application in the iris" where the authors use Functional Data Analysis for images representation. The experimental study carried out with iris images shows the effectiveness of this approach.

Learning from images usually involves a preprocessing step previous to the calculation of image features used afterward for classification. The precision of segmentation influences the calculated feature values and can affect the results of classification. In "Effects of Interpolation on Segmentation in Cell Imaging", the effects of interpolation on the precision of image segmentation were studied, using instances of cell microscopy images and different interpolation and segmentation methods. The results obtained suggest the convenience of interpolating the microscopy images before segmentation in order to improve the precision of segmentation.

In the paper "Graph Reduction Algorithm without Loss of Information", the authors propose a graph reduction algorithm without loss of information. The proposal has a flexible way to specify how much the user wants to reduce the graph. The proposal can be used in solving various types of problems, contributing to obtain optimal responses in less time.

In "Introducing Biases in Document Clustering", the author focuses on the particular case of clustering documents known to belong to a certain category as the result of a document categorization process. The paper explores several ways in which the information that should have been initially used to build the classifiers may additionally be used to bias the results of clustering.

Learning in data streams introduces several new problems not presented in other application areas of Machine Learning. In particular, the target function that needs to be learned may change over time and any learning model, induced with previous data can become inconsistent. This problem, known as concept drift, is addressed in "Learning with Online Drift Detection" where the authors propose a new method for its detection independent of the learning algorithm. Another related problem in

data streams learning is noise detection. It is important to differentiate when newly arrived data is an outlier or a concept change. Authors of "Noise Detection and Learning Based on Current Information" propose a new method for noise detection in data streams environment that can be used in dataset construction.

Particle Swarm Optimization (PSO) is a well-known meta-heuristic extensively used for numerical optimization due to its key advantages, mainly its simplicity and high convergence rate. However, this last behavior deteriorates the swarm diversity causing a premature convergence to local optima. In "Towards swarm diversity: Random Sampling in Variable Neighborhoods procedure using a Lévy distribution" the authors introduce two main improvements in the original algorithm to obtain a suitable mechanism for controlling the swarm diversity, outperforming other algorithms reported in the literature, for both unimodal and multimodal problems.

Ant Colony Optimization (ACO) is another Swarm Intelligence method widely used. In "Traffic flow estimation using Ant Colony Optimization algorithms" this method is used to simulate and optimize the traffic flows in a city. Two approaches were used and tested with real-life traffic demand in Havana city. The results show this meta-heuristic is particularly well suited for this kind of problems. Ant Colony Optimization is also used in "Mutating HIV protease protein using Ant Colony Optimization and Fuzzy Cognitive Maps: drug susceptibility analysis" to study the dynamics of the resistance mechanisms in HIV proteins mutations against existing antiviral drugs. The HIV protein is modeled as a dynamic system through Fuzzy Cognitive Maps. The inference capabilities and the causal relations expressed in the obtained maps are used to generate, using an ACO algorithm, protease sequences which report low resistance to the studied drugs.

Another interesting bioinformatics application is presented in "Aggregation of Similarity Measures for Ortholog Detection, Validation with Measures Based on Rough Set Theory". The authors present a novel algorithm for ortholog detection that involves the aggregation of similarity measures characterizing the relationship between gene pairs of two genomes. The algorithm uses the Markov's clustering algorithm over the similarity bipartite graph obtained from data.

Fault diagnosis is another application field where meta-heuristics can be used if it is modeled as an optimization problem. In "An approach of Fault Diagnosis using Meta-heuristics: a new variant of the Differential Evolution Algorithm" the authors develop a method for fault diagnosis using a new variant of the Differential Evolution Algorithm. The results of the numerical experiments with DC Motor benchmark, indicates the suitability of this approach for obtaining robust and sensitive diagnosis.

In "Speech enhancement with local adaptive rank-order filtering" a local adaptive algorithm for speech enhancement is introduced. The algorithm improves the quality of a speech signal preserving its intelligibility. The performance of the proposed algorithm is compared with other speech enhancement algorithms in terms of objective metrics showing its ability to suppress additive noise.

Machine Learning and Pattern Recognition are two closely related scientific research areas with an increasing number of theoretical results as well as practical applications. We believe these papers provide a useful snapshot of the development reached in these areas in Ibero-America. The editors thank the reviewers for their valuable contributions in producing this special issue, as well as Grigori Sidorov for his support.

José Ruiz-Shulcloper
IAPR Fellow,
Head of the Research Group on Logical
Combinatorial Pattern Recognition,
Director of the Advanced Technologies
Applications Center (CENATAV),
DATYS: Technologies & Systems,
Cuba

Carlos Morell Pérez
Head of the Artificial Intelligence Research Group,
Computer Sciences Department,
Universidad Central "Marta Abreu" de Las Villas,
Cuba