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Editorial

It is my pleasure to present to the readers of the journal "Computación y Sistemas" the new volume of the journal. There are several interesting papers that may draw your attention.

A new super image reconstruction algorithm is proposed in the paper "A Super-Resolution Image Reconstruction using Natural Neighbor Interpolation" by Christian J. Enríquez-Cervantes and Ramón M. Rodríguez-Dagnino. The authors obtain a high resolution image from many low-resolution images of the same scene by implementing the natural neighbor interpolation algorithm for scattered data. The results of experiments on some standard state of the art images show good performance of the proposed technique. In addition, the authors demonstrate the effectiveness of their method applied for automatic automobile number plate recognition using low resolution images.

The research in the paper "Hierarchical Contour Shape Analysis" by Daniel Valdes-Amaro and Abhir Bhalerao is done in the field important in many image processing applications, for example, in medical examination. The proposed shape analysis in performed in a multilevel mode taking advantage of Laplacian and Gaussian pyramids. The authors demonstrate on the datasets of brain and leaf images that their method is more compact and especially effective for analysis of natural shapes which include repeated patterns.

In the article "Morphological Filtering Algorithm for Restoring Images Contaminated by Impulse Noise" by Jorge Domingo Mendiola-Santibañez, Miguel Octavio Arias-Estrada, Israel Marcos Santillán-Méndez, Juvenal Rodríguez-Reséndiz, Martín Gallegos-Duarte, Domingo José Gómez-Meléndez, and Iván Ramón Terol-Villalobos, a novel iterative method of image restoration using morphological transformation is proposed. The method is capable of restoring gray scale images that contain noisy pixels. For the noise level up to 10%, the new method improves the performance of state of the art techniques since it can detect damaged pixels and process them apart from the uncorrupted pixels.

The authors of the paper "A Photometric Sampling Strategy for Reflectance Characterization and Transference," Mario Castelán, Elier Cruz-Pérez, and Luz Abril Torres-Méndez work on modeling reflectance properties of objects which is a challenge in image processing and understanding. Their strategy is applied to create a 3D shaped representation of a source object with a more realistic reflectance and transparency behavior. The advantages of the novel method are shown on various materials located in different illumination context. The method is realized in three stages: photometric sampling; singular value decomposition for describing color, texture and other features; transfer of reflectance properties onto a 3D image using a synthetic sphere.

One of the issues in computer vision is tackled in the paper "Camera as Position Sensor for a Ball and Beam Control System" by Alejandro-Israel Barranco-Gutiérrez, Jesús Sandoval-Galarza, and Saúl Martínez-Díaz. The authors experiment with a ball and beam system using a digital camera as a position sensor to visually control the system instead of state of the art analog resistance sensor. The advantages of the new method are a reduced sampling rate and simpler calculation of the ball position coupled with easy calibration of the camera.

The article "Recursive Median Filter for Background Estimation and Foreground Segmentation in Surveillance Videos" by Freddy Alexander Díaz González and David Alejandro Arévalo Suárez address the topic of automatic detection of events using images taken by surveillance cameras. One of the challenges in this field is the presence of noise in images. To resolve this issue the authors developed a method using a recursive median filter and a temporal moving window.

The article "Characterization of Difficult Bin Packing Problem Instances Oriented to Improve Metaheuristic Algorithms" by Adriana Mexicano Santoyo, Joaquín Pérez Ortega, Gerardo Reyes Salgado, and Nelva Nely Almanza Ortega describes a new method of characterizing difficult

instances in the bin packing problem. The authors employed the results of such characterization in the development of a new method to reduce the search space of a metaheuristic algorithm. The performance of the new method is shown to be superior to some state of the art methods.

A new similarity measure is proposed in the article "Improving the Multilayer Perceptron Learning by Using a Method to Calculate the Initial Weights with the Quality of Similarity Measure Based on Fuzzy Sets and Particle Swarms" by Lenniet Coello, Yumilka Fernandez, Yaima Filiberto, and Rafael Bello. The novel measure based on fuzzy set theory and particle swarm optimization is used for weight calculation in a multilayer perceptron. The proposed method was experimentally compared with other state of the art methods showing a better performance.

Pavel Novoa-Hernández, the author of the paper "Evolutionary Multi-objective Optimization for Scheduling Professor Evaluations in Cuban Higher Education" is interested in the scheduling problem which is employed in many diverse real-life applications. In the article, this problem is solved for scheduling evaluation of professors in Cuban institutions of higher education. Using multi-objective optimization and a variant of the evolutionary algorithm NSGA-II, the author obtained promising results thus opening a new direction to develop more powerful computational methods in this area.

In the paper "Admission Control and Channel Allocation for Dynamic Spectrum Access using Multi-objective Optimization," Anabel Martínez-Vargas, Ángel G. Andrade, Roberto Sepúlveda, and Oscar Montiel-Ross attack the issue of spectrum shortage proved in previous research to be a spectrum access problem. To solve this problem, the authors develop a dynamic spectrum access which protects primary users from undesired interference of secondary users. Another contribution is a new algorithm to control data rate and the number of secondary users taking into consideration quality of service requirements.

A challenging topic in the field of natural language processing is considered in the article "Segmentation Strategies to Face Morphology Challenges in Brazilian-Portuguese/English Statistical Machine Translation and Its Integration in Cross-Language Information Retrieval" by Marta R. Costa-jussà. The quality of machine translation is not excellent yet and needs improvement. The author proposes to integrate a morphological module in a statistical machine translation system and experiments with this approach applying it to solve the multi-language information retrieval task. Another contribution of the paper is a new parallel corpus for the Brazilian-Portuguese/English language pair aligned at the sentence level.

The objective of the paper "Design of a General Purpose 8-bit RISC Processor for Computer Architecture Learning" by Antonio Hernández Zavala, Oscar Camacho Nieto, Jorge A. Huerta Ruelas, and Arodí R. Carvallo Domínguez is to provide a detailed and comprehensive description of a processor designed specifically to teach the subject of computer architecture in a more efficient way. The presented 8-bit RISC soft-core processor was used in teaching a computer architecture course at the higher education level for 4 years. It proved to be effective in learning and was accepted well by students.

In the paper "Identification of Harmonic Sources in Electrical Power Systems Using State Estimation with Measurement Error," the authors Luis Alberto Hernández Armenta, David Romero Romero, and Jaime Robles García show that it is possible to detect the location of harmonic series in a power system based on the total harmonic distortion of the current even in the presence of measurement errors. The experimental results obtained from testing a system with two sources of harmonic demonstrate the benefits of the proposed method.

The paper "PID Control Law for Trajectory Tracking Error Using Time-Delay Adaptive Neural Networks for Chaos Synchronization" by Joel Perez P. and Jose P. Perez reports experiments with a new controller designed by the authors and based on a dynamic neural network for unknown system tracking. In the proposal, Lyapunov-Krasovskii control functions analyze the stability of the tracking error, and the control law is based on the PID approach. The controller is applied to chaos synchronization and showed its usefulness. Its advantage is that it considers fewer inputs than states.

The topic of the paper "A Counting Logic for Trees" by Everardo Bárcenas belongs to the area

of automated reasoning and regular tree languages. The solution process applied to reasoning problems becomes much harder if counting constraints are added. The author develops an optimal logic-based reasoning model for regular tree languages with counting operators introduced. The author's model is an extension of the fully enriched μ-calculus for trees with global numerical constraints. Moreover, the article demonstrates the model's optimality for such XML reasoning problems as XPath queries with schemas.

This issue would be helpful for researchers and students who are interested in recent advances in computing science.

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