EDITORIAL

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Digital images and robots are nowadays common elements present in the daily life and in science. They are objects of study and tools for varied technical and scientific disciplines such as: Robotics, Computer Vision, Automatic Control, Image Processing or the Virtual Reality, among some others. Those techniques are combined in very diverse ways to build outstanding engineering systems, like humanoids robots with advanced sensors, particularly visuals, vehicles that behave in an autonomous way reacting to contingencies, or robots and virtual environments to help medical surgery, just for mentioning some examples. This number of Computación y Sistemas illustrates the variety of techniques that converge to obtain a system that uses images, robots or both.

The first paper, by A. Rodriguez-Angeles, *et al.*, is an experimental research paper to control a two degree of freedom planar robot using a joint-cartesian optimal and a PID controllers. The controller combines a PID Cartesian action and on-line optimal control to improve the performance of the robot. The optimal control is based on the gradient flow method and the inverse kinematics is not required. The integration of both controllers is done in joint space using the robot Jacobian with direct kinematics and Cartesian errors. The experimental test bed shows better performance with the inclusion of the optimal controller compared with the Cartesian PID action alone.

In the paper by Velasco-Villa et al., the discrete-time model of a two wheel mobile robot and the discrete nonlinear controllers are presented. The discrete model is obtained by integration of the continuous-time kinematic model of the mobile robot. Feedback linearization technique is used to design two discrete nonlinear control laws based on the discrete model previously obtained. A commutation control scheme is used for the tracking problem and a stability test is presented to guarantee that tracking errors converge asymptotically to zero. The proposed control system is tested in a low cost prototype with good performance.

The theoretical paper by Segura presents a formal background with theorems and proofs for a neural network with associative memory, composed by processing units as elements of continuous metric space. The approach can be used for modeling Biology, Neurophysiology and eventually be applied in Robotics technology. The research presented is intended to be a generalization of Little and Hopfield models. One of the goals of the paper is to obtain a more biological plausible model of associative memory provided a mathematical foundation and keeping the features that made attractive the discrete models. The paper also shows that a continuous model can be extended to the case in which the evolution law is non deterministic and is valid regardless of the questions concerning computer cost and effort, i. e., the price to keep for features as stability and biological plausibility.

The paper of Mora-Lumbreras and Aguilera-Ramirez presents the design of a new stereoscope composed by two parallel walls on which the stereoscopic images are projected, with the disparity that allows the observation of 3-D depth. The device is an updated version of the Wheatstone stereoscope, in which the walls are composed with the screens of flat monitors (LCD or plasma). For visualization purposes, the user is provided with a device composed by a pair of mirrors arranged in right angle. Desktop spaces were created in 3-D, with screens of laptops, but the ultimate goal was to create spaces for virtual immersion with the size of a room, by using flat screens of more than three meters.

For their part, Flores-Mendez and Mendez-Cuanalo review the fundamental techniques of color images processing and analysis, by means of an application for the identification of human ears. The review with the transformation of the color space (RGV to HSV), the selection of colored areas on the space HSV (hue, saturation and intensity), the conversion of the color space into gray levels, followed by the image filtering to eliminate noise, and the computation of contrast points serving as a base to the final stage of construction of the lines describing the form of the ear. From apart its canonical review, the contribution resides in the application of the methods providing new standards for biometric identifiers.

Canchola-Magdaleno *et al.* present an original method for transit monitoring at a vehicular intersection that uses a pair of cameras: the first verifies the state of the traffic light, while the second one has a complete view of the crossroad. The goal of traffic light monitoring is to determine the states of activity, which define its functioning, since the access to the controller is not allowed. For monitoring the crossroad activity, they propose to detect and track the cars by discrimination against the background. The trajectories are tracked and grouped by defining typical behaviors. Unusual and undue behaviors are detected when some driver advances over a red light or making forbidden turns. The main contributions of this development are the stability of color analysis in regard to changes of position and illumination for both: the traffic light and for the tracked cars, as well as the analysis and the codification of behaviors, which allows detecting unusual and undue behaviors.

Finally, the thesis of Hernández and Supervisor Cole treats about process scheduling in networks of heterogeneous and dynamic distributed computing systems, preserving essential properties such as reactivity, data-aware and fault tolerance. As a contribution, the authors propose the reactive scheduling system: Global Task Positioning (GTP).

As has been appreciated for the editorial summary, images, robots and techniques like neural networks serve as objects of study and tools for multiple scientific disciplines. Putting into operation a system that handles these objects needs therefore of multidisciplinary aptitudes. We entrust that soon we will edit more special numbers involving these topics.

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