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Editorial

Special issue SOCO 2015: Recent advancements in soft computing and its application in industrial and environmental problems

The five papers included in this special issue represent a selection of extended contributions presented at the 10th International Conference on Soft Computing Models in Industrial and Environmental Applications, SOCO 2015 held in Burgos, Spain, June 15th–17th, 2015, and organized by the BISITE and the GICAP research groups.

This special issue is aimed at practitioners, researchers and postgraduate students who are engaged in developing and applying advanced intelligent systems principles to solving real-world problems on the mentioned fields. The papers are organized as follows.

In the first contribution, Griol and Molina, propose an architecture for the development of multi-domain conversational systems that allows: (1) integrating available multi and single domain speech recognition and understanding modules, (2) combining available systems in the different domains implied so that it is not necessary to generate new expensive resources for the multi-domain system, (3) achieving better domain recognition rates to select the appropriate interaction management strategies.

In the next contribution by Sierra and Santos, different control-oriented models of a quadrotor Unmanned Aerial Vehicle (UAV) are obtained by applying different identification methods, from real input/output data. Parametric techniques, neural networks, neuro-fuzzy inference systems, and the hybridization of some of them are applied. The identified models are analyzed and compared in the time and frequency domains. In addition, off-line trained neural networks and adaptive networks with online learning are analyzed, and their advantages and disadvantages regarding modeling are presented.

The third contribution, by Jae-Min and Sung-Bae, presents an agent-based model of labor market to investigate the relationship between the company and the worker. Their approach is illustrated with four simulation results: the effect of workers' resignation, sick leave, dismissal of companies, and productivity growth. Various experiments were conducted to analyze the interactions between worker and company, indicating that performance-based reward strategy and non-greedy strategy in job changing are necessary for companies and workers. The experimental results confirm that the balanced power between worker and company is important in maintenance and extension of labor market, and Nash equilibrium can be maintained in all the cases.

The following paper, by Lopez et al., deals with the realization of physical proof of concept experiments in the paradigm of Linked Multi-Component Robotic Systems (LMCRS). The main objective is to demonstrate that the controllers learned through Reinforcement Learning (RL) algorithms with different state space formalizations and different spatial discretizations in a simulator are reliable in a real world configuration of the task of transporting a hose by a single robot.

The final contribution, by Zubizarreta et al., presents a methodology that uses Artificial Neural Networks (ANNs) to approximate the Direct Kinematic Problem (DKP) is proposed. Based on the 3PRS parallel robot, a comprehensive study is carried out in which several network configurations are proposed to approximate the DKP. Moreover, to demonstrate the effectiveness of the approach, the proposed networks are evaluated considering not only their approximation capabilities, but also their real time performance in comparison with the traditional iterative procedures used in robotics.

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