GUEST EDITORIAL

Introduction to the Robotica 2018 Special Issue

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Robotics is one of the technological research areas that has been increasing each year significantly, resulting in advancements such as Drones, autonomous cars, and service robots. Every year in Brazil, the **Robotica** symposium and competitions brings together researchers from all over Latin America. This special issue compiles the best publications of Robotica 2018, where the best papers of the outstanding co-allocated symposium **IEEE LARS—Latin American Robotics Symposium** and **SBR—Brazilian Robotics Symposium** were invited to submit an extended version of the conference published versions. All papers went through an in-depth review that was coordinated by the Guest Editors. Each submission to the Journal of Intelligent and Robotic Systems journal was treated as a new submission and went through new rules, and new reviewers differed from those these papers were submitted in the original Symposium. Only high-quality versions that collaborate with robotics state-of-art and that presented no more than 30% of equivalence to the original published version were accepted. The final result is a very high-quality publication comprising the best results in Robotics from Latin America in 2018 and covers a broad range of robotics research fields.

The works found in this special issue contemplate many fields of robotics. The paper **Using Ontology as a Strategy for Modeling the Interface between the Cognitive and Robotic Systems** contributes to the social robotics area by defining an architecture, called Cognitive Model Development Environment (CMDE), that models the interaction between cognitive and robotic systems. In the sub-area of mobile robot control, the work **Pure Perception Motion Control based on Stochastic Nonlinear Model Predictive Control** introduces an approach for dealing with the uncertainty problem that is based on the stochastic nonlinear model predictive control (SNMPC). It can be used to track targets that are observed during some tasks while penalizing undesired behaviors resulting in the desired pose convergence that minimizes the target observation error and the displacement tracking error. Another control work is entitled **A General Framework for Optimal Tuning of PID-like Controllers for Minimum Jerk Robotic Trajectories** and introduces a comprehensive framework for optimal estimation of the gains of PID-like controllers for tracking minimum-jerk robot trajectories. A third control manuscript entitled **Sliding Mode Control with Gaussian Process Regression for Underwater Robots** combines Gaussian process regression with sliding mode control for the dynamic positioning of underwater robotic vehicles.

Navigation problems are also approached in this collection with the work **Strategies for Patrolling Missions with Multiple UAVs**, which proposes a set of strategies for the patrolling problem using multiple UAVs and, as a result, improves the NC-Drone algorithm. The work presents four strategies: Watershed Strategy, Time-based Strategies, Evaporation Strategy, and Communication-Frequency Strategy. Still, concerning UAVs, the work entitled **Drone Reconfigurable Architecture (DRA): a multipurpose modular architecture for Unmanned Aerial Vehicles (UAVs)** proposes the Drone Reconfigurable Architecture (DRA), which is a modular architecture for UAVs with electrical, mechanical, and computational specifications. Regarding path planning, the work **A smooth and safe path planning for an active lower limb exoskeleton** presents an approach to obtain safe and smooth collision-free paths

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from the Probabilistic Foam method (PFM) for a lower limb active exoskeleton based on two main processes: the rosary adjustment and the path smoothing. Also, considering navigation and path planning, the work **Extending Maps with Semantic and Contextual Object Information for Robot Navigation: a Learning-Based Framework using Visual and Depth Cues** addresses the problem of building augmented metric representations of scenes with semantic information from RGB-D images. The work proposes a complete framework to create an enhanced map representation of the environment with object-level details to be used in several applications such as human-robot interaction, assistive robotics, visual navigation, or in manipulation tasks. Furthermore, tackling multi-robot systems, the work entitled **Localization using Ultra-Wideband and IEEE 802.15.4 with nonlinear Bayesian filters: a comparative study** presents two localization strategies that utilize Bayesian filters to combine the local pose estimated by a mobile robot with common metrics in WSN that allows distance estimation. The work investigates two metrics: Ultra-Wideband (UWB) and the Received Signal Strength (RSS).

Learning algorithms are contemplated on the paper **A Dataset Schema for Cooperative Learning from Demonstration in Multi-robot Systems** that proposes a new dataset schema to support learning the coordinated behavior in Multi-Agent Systems from a demonstration. Also, the work entitled **CNN Based Image Restoration: Adjusting Ill-Exposed sRGB Images in Post-Processing** proposes an artificial neural network model to restore images damaged by inadequate sensor exposure, saturation, and underexposure, at the time of acquisition. Finally, robot architectures are studied on the work entitled **A robot architecture for outdoor competitions** that presents a modular design to integrate different components for path planning and navigation of an autonomous mobile robot.

We hope that you enjoy this special issue and that the results achieved by the accepted papers can help in your research.

The Guest Editors

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