

# **2013 Latin American Robotics Symposium and Competition**

**(LARS/LARC 2013)**

**Arequipa, Peru  
21 – 27 October 2013**



**IEEE Catalog Number: CFP13LAR-POD  
ISBN: 978-1-4799-3477-5**

# 2013 IEEE Latin American Robotics Symposium

## LARS 2013

### Table of Contents

Preface .....	1
Organizing Committee .....	viii
Technical Program Committee .....	ix
Reviewers .....	x

---

#### **Sensing and Robot Modeling**

Pole and Crossarm Identification in Distribution Power Line Images .....	2
<i>Pedro B. Castellucci, Luiz C. Lucca, Marcelo Sant'Anna, Gustavo Tralalle, Victor H. Mustacio, José Franciso Resende da Silva, and Sérgio Vallin</i>	
On the Development of a Robotic System for Telepresence .....	8
<i>Paulo A.F. Rezeck, Marcos A.M. Vieira, Luiz Chaimowicz, and Mario F.M. Campos</i>	
A Scheme of Inertial Measurement Unit Using Triaxial 3 Accelerometers .....	14
<i>Anderson B.N. Silva, Samuel Xavier de Souza, and Pablo J. Alsina</i>	
Study of Robots to Pipelines, Mathematical Models and Simulation .....	18
<i>John Faber Archila and Marcelo Becker</i>	
N-BOAT: An Autonomous Robotic Sailboat .....	24
<i>Andouglas G.S. Júnior, André P.D. Araújo, Marcus V.A. Silva, Rafael V. Aroca, and Luiz M.G. Gonçalves</i>	

#### **Robotics Vision**

Feature Transform Technique for Combining Landmark Detection and Tracking of Visual Information of Large Rain Forest Areas .....	30
<i>Felipe Pinagé, José Reginaldo Hughes Carvalho, Emory Raphael Viana Freitas, and José Pinheiro de Queiroz Neto</i>	
Topological Mobile Robot Navigation Using Artificial Landmarks .....	38
<i>David Esparza and Jesus Savage</i>	

A Visual Data Fusion to Aerial and Land Robots Odometry .....	43
<i>Milton Macena Ramos de Lima, José Luiz de Souza Pio, and José Reginaldo Hughes Carvalho</i>	
Occupancy-Elevation Grid Mapping from Stereo Vision .....	49
<i>Anderson A.S. Souza and Rosiery S. Maia</i>	
Development of a Control Platform for the Mobile Robot Roomba Using ROS and a Kinect Sensor .....	55
<i>Elvis Ruiz, Raúl Acuña, Novel Certad, Angel Terrones, and María Eugenia Cabrera</i>	
Real-Time Localization of Mobile Robots in Indoor Environments Using a Ceiling Camera Structure .....	61
<i>Rafaella C.A. Nascimento, Bruno M.F. Silva, and Luiz M.G. Gonçalves</i>	

## **Planning and Control**

Adaptive Control System Design for Robotic Aircrafts .....	67
<i>V. Kh. Pshikhopov, V.A. Krukhmalev, M. Yu Medvedev, R.V. Fedorenko, S.A. Kopylov, A. Yu Budko, and V.M. Chufistov</i>	
Platform Proposal for Control Systems Practices with Smart Mobile Devices .....	71
<i>Alexander S. Rondón and Seminario S. Guillermo</i>	
Control System Design for Autonomous Underwater Vehicle .....	77
<i>V. Kh. Pshikhopov, M. Yu Medvedev, A.R. Gaiduk, and B.V. Gurenko</i>	
Hierarchical Reinforcement Learning Approach for Motion Planning in Mobile Robotics .....	83
<i>Andrea Buitrago-Martínez, R. Fernando De La Rosa, and Fernando Lozano-Martínez</i>	
Fractional Order PD and PID Position Control of an Angular Manipulator of 3DOF .....	89
<i>Arturo Rojas Moreno and Victor Jara Sandoval</i>	
Construction and PID Control for Stability of an Unmanned Aerial Vehicle of the Type Quadrotor .....	95
<i>Rejane Cavalcante Sá, André Luiz C. de Araújo, Antonio T. Varela, and Guilherme de A. Barreto</i>	

## **Artificial Intelligence and Learning Techniques in Robotics**

Reaching New Positions Using an Extreme Learning Machine in Programming by Demonstration .....	100
<i>Jose Hoyos, Flavio Prieto, Carlos Peña, Eduardo Morales, and Marco Perez-Cisneros</i>	

From Reactive to Cognitive Agents: Extending Reinforcement Learning to Generate Symbolic Knowledge Bases .....	106
<i>Rômulo Cerqueira, Augusto Loureiro da Costa, Stephen McGill, Daniel Lee, and George Pappas</i>	
Accelerating Q-Learning through Kalman Filter Estimations Applied in a RoboCup SSL Simulation .....	112
<i>Gabriel A. Ahumada, Cristóbal J. Nettle, and Miguel A. Solis</i>	
Gait Cycle Modeling for an Active Orthosis Using Principal Component Analysis .....	118
<i>Nicholas de Bastos Melo, Pablo Javier Alsina, Carlos Eduardo Trabuco Dorea, and Marcio Valerio de Araujo</i>	
Analysis of Oscillators for the Generation of Rhythmic Patterns in Legged Robot Locomotion .....	124
<i>Dimitar Ralev, José Cappelletto, Juan C. Grieco, Novel Certad, and María E. Cabrera</i>	
A Path Planning Method for Multi-UAV System .....	129
<i>Alessandro Assi Marro and Luiz Marcos Garcia Gonçalves</i>	

## **Multi-robot Systems**

Ground Control Station for Multiple UAVs Flight Simulation .....	136
<i>Alberto Torres Angonese and Paulo Fernando Ferreira Rosa</i>	
A Multi-robot Exploration Approach Based on Distributed Graph Coloring .....	142
<i>Fabricio F. Carvalho, Rodolfo C. Cavalcante, Marcos A.M. Vieira, Luiz Chaimowicz, and Mario F.M. Campos</i>	

## **Robotics in Education**

Methodology for Qualification of Future Teachers in Physics' Degree Course Using Low Cost Robotics .....	148
<i>Alessandro R. Araújo, Aquiles M. F. Burlamaqui, and Rafael V. Aroca</i>	
IREP: An Interactive Robotics Education Program for Undergraduate Students .....	153
<i>Francisco Cuellar, Dante Arroyo, Eiji Onchi, and Christian Penalosa</i>	
The Creation and Application of a Simulator in Educational Robotics Classes .....	159
<i>Carla Fernandes, Sarah Thomaz, Renata Pitta, and Luiz Marcos Goncalves</i>	
<b>Author Index</b> .....	165