

2016 XIII Latin American Robotics Symposium and IV Brazilian Robotics Symposium (LARS/SBR 2016)

**Recife, Brazil
8-12 October 2016**



**IEEE Catalog Number: CFP16A78-POD
ISBN: 978-1-5090-3657-8**

**Copyright © 2016 by the Institute of Electrical and Electronics Engineers, Inc
All Rights Reserved**

Copyright and Reprint Permissions: Abstracting is permitted with credit to the source. Libraries are permitted to photocopy beyond the limit of U.S. copyright law for private use of patrons those articles in this volume that carry a code at the bottom of the first page, provided the per-copy fee indicated in the code is paid through Copyright Clearance Center, 222 Rosewood Drive, Danvers, MA 01923.

For other copying, reprint or republication permission, write to IEEE Copyrights Manager, IEEE Service Center, 445 Hoes Lane, Piscataway, NJ 08854. All rights reserved.

******This publication is a representation of what appears in the IEEE Digital Libraries. Some format issues inherent in the e-media version may also appear in this print version.***

IEEE Catalog Number:	CFP16A78-POD
ISBN (Print-On-Demand):	978-1-5090-3657-8
ISBN (Online):	978-1-5090-3656-1

Additional Copies of This Publication Are Available From:

Curran Associates, Inc
57 Morehouse Lane
Red Hook, NY 12571 USA
Phone: (845) 758-0400
Fax: (845) 758-2633
E-mail: curran@proceedings.com
Web: www.proceedings.com

CURRAN ASSOCIATES INC.
proceedings
.com

2016 XIII Latin American Robotics Symposium and IV Brazilian Robotics Symposium

LARS-SBR 2016

Table of Contents

Message from the General and Program	
Chairs	xii
Organizers	xiii
Reviewers	xiv

Vision Systems for Robots I

Using Deep Learning for Exploration and Recognition of Objects Based on Images	1
<i>Stevenson Contreras and Fernando De La Rosa</i>	
Vision-Based Obstacle Avoidance Using Deep Learning	7
<i>Joel O. Gaya, Lucas T. Gonçalves, Amanda C. Duarte, Breno Zanchetta, Paulo Drews-Jr., and Silvia S.C. Botelho</i>	
A Semi-Automated Approach for Recognizing Moving Targets Using a Global Vision System	13
<i>Roger Ripas-Mamani, Claudia Cervantes-Jilaja, Yessica Rosas-Cuevas, Raquel E. Patiño-Escarcina, and Dennis Barrios-Aranibar</i>	
Object Subtraction Planar RGB-D SLAM	19
<i>Leonardo A.V. Souto and Tiago P. Nascimento</i>	
A Top-Down and Bottom-Up Visual Attention Model for Humanoid Object Approaching and Obstacle Avoidance	25
<i>Hendry Ferreira Chame and Christine Chevallereau</i>	

Robot's Architecture

An Emotion-Based Interaction Strategy to Improve Human-Robot Interaction	31
<i>Caetano Mazzoni Ranieri and Roseli A.F. Romero</i>	
The Use of Smartphones as a Smart Sensor for Intelligent Vehicles	37
<i>Geraldo Luciano De Carvalho Neto, Danilo Alves De Lima, and Arthur De Miranda Neto</i>	

Towards the Electromechanical Design of an Autonomous Robotic Sailboat	43
<i>J.M. Vilas Boas, A.G. Silva Júnior, D.H. Santos, A.P.F. Negreiros, J.E. Alvarez-Jácomo, and L.M.G. Gonçalves</i>	
Modeling, Test Benches and Identification of a Quadcopter	49
<i>João Gutemberg B. Farias Filho, Carlos E. T. Dórea, Wallace M. Bessa, and João Lucas C. B. Farias</i>	
An Independent Control System for Testing and Analysis of UAVs in Indoor Environments	55
<i>Viviano S. Medeiros, Renno E.D. Vale, Yuri C. Gouveia, Wellton T. Souza, and Alisson V. Brito</i>	
A Bio-inspired Apodal and Modular Robot	61
<i>Pedro P.S. Guimarães, Matheus M. Nunes, Thaís F. Galembeck, Lucas Bamidele T. Kalejaiye, Ruan P.A. Tenório, Dianne Magalhães Viana, Flávio De Barros Vidal, and Carla M.C. E C. Koike</i>	
Dimitri: A Low-Cost Compliant Humanoid Torso Designed for Cognitive Robotics Research	67
<i>Ahmadreza Ahmadi, Christopher Tatsch, Fabrício Julian Carini Montenegro, Jun Tani, and Rodrigo Da Silva Guerra</i>	

Reasoning and Control

Parsimonious Kinematic Control of Nonholonomic Mobile Manipulators	73
<i>Juan José Quiroz-Omaña and Bruno Vilhena Adorno</i>	
Keyframe Movement Optimization for Simulated Humanoid Robot Using a Parallel Optimization Framework	79
<i>Francisco Muniz, Marcos R.O.A. Maximo, and Carlos H.C. Ribeiro</i>	
LQR and H-Infinity Controls of a Free-Floating Space Manipulator with Two Arms	85
<i>Jose Nuno A.D. Bueno, Wenderson G. Serrantola, Rayza Araujo Bezerra, and Valdir Grassi Jr.</i>	
Networks Influence in Centralized and Distributed Discrete Event Systems Control: A Mechatronic Perspective	91
<i>M.V.M. Ferreira, J.P.S. Fonseca, and J.J.P.Z.S. Tavares</i>	
Model Predictive Control of a Heavy-Duty Truck Based on Gaussian Process	97
<i>Fernando Henrique Moraes Da Rocha, Valdir Grassi Jr., Vitor Campanholo Guizilini, and Fabio Ramos</i>	
Whole-Body Modeling and Hierarchical Control of a Humanoid Robot Based on Dual Quaternion Algebra	103
<i>Mariana De Paula Assis Fonseca and Bruno Vilhena Adorno</i>	
Performance Requirements Derivation for IEEE Very Small Size Competition	109
<i>Felipe Celso, Samuel C. Pinto, Igor F. Okuyama, Marcos R.O.A. Máximo, and Natan L. Viana</i>	

Robot's Applications

FPGA Based Sensor Integration and Communication Protocols for Automated Robot Control in Linear Welding	115
<i>Cristiano Rafael Steffens, Valquíria Huttner, Bruno Leonardo Quaresma, Vagner Santos Da Rosa, and Silvia Silva Da Costa Botelho</i>	
Fostering Science and Technology Interest in Chilean Children with Educational Robot Kits	121
<i>Patrício Navarrete, Cristóbal J. Nettle, Constanza Oliva, and Miguel A. Solis</i>	
The Impact of DoS Attacks on the AR.Drone 2.0	127
<i>Gabriel Vasconcelos, Gabriel Carrijo, Rodrigo Miani, Jefferson Souza, and Vitor Guizilini</i>	
Variation in a Humanoid Robot Behavior to Analyse Interaction Quality in Pedagogical Sessions with Children	133
<i>Daniel C. Tozadore, Adam H.M. Pinto, and Roseli A.F. Romero</i>	
Mobile Robotics Integration in Introductory Undergraduate Engineering Courses	139
<i>Rafael V. Aroca, Flávio Y. Watanabe, Márcio T. De Ávila, and André C. Hernandes</i>	

Multi-robots

Time-Optimized Routing Problem for Vehicles with Bounded Curvature	145
<i>Douglas G. Macharet, Jefferson W.G. Monteiro, Geraldo R. Mateus, and Mario F.M. Campos</i>	
Terrain Coverage with UAVs: Real-Time Search and Geometric Approaches Applied to an Abstract Model of Random Events	151
<i>Tauã M. Cabreira E Paulo R. Ferreira Jr.</i>	
New Patrolling Strategies with Short-Range Perception	157
<i>Pablo A. Sampaio, Rodrigo Da S. Sousa, and Alessandro N. Rocha</i>	
Formation Backstepping Control Based on the Cooperative Dual Task-Space Framework: A Case Study on Unmanned Aerial Vehicles	163
<i>Brenner S. Rego, Bruno V. Adorno, and Guilherme V. Raffo</i>	
RoboServ: A ROS Based Approach towards Providing Heterogeneous Robots as a Service	169
<i>Luis F. Costa and Luiz M.G. Gonçalves</i>	
Wheeled Mobile Robot Formation Using Recursive Robust Regulator with Discrete-Time Markov Linear System	175
<i>Mauricio E. Nakai, Roberto S. Inoue, Marco H. Terra, and Valdir Grassi Jr.</i>	
Multi-robot Cooperative Systems for Exploration: Advances in Dealing with Constrained Communication Environments	181
<i>Facundo Benavides, Pablo Monzón, Caroline P. Carvalho Chanel, and Eduardo Grampín</i>	

Navigation of Mobile Robots

Information-Theoretic Frontier Selection for Environment Exploration	187
<i>Jhielson M. Pimentel, Douglas G. Macharet, and Mario F.M. Campos</i>	
Environment Identification and Path Planning for Autonomous NDT	
Inspection of Spherical Storage Tanks	193
<i>Marco Antonio Simões Teixeira, Higor Barbosa Santos, Andre Schneider De Oliveira, Lucia Valeria Ramos De Arruda, and Flavio Neves-Jr.</i>	
Bioinspired Optimization of a Robotic Finger Mechanism	199
<i>Sergio A. Pertuz, Carlos H. Llanos, and Daniel M. Muñoz</i>	
Deformable Virtual Zone and Particle Filters Applied to Obstacle Avoidance in Mobile Robotics	205
<i>John R.M. Chavez, Flávio De Barros Vidal, Dianne Magalhães Viana, and Carla M.C. E C. Koike</i>	
Short-Term Path Planning for High-Level Navigation Control of N-Boat - The Sailboat Robot	211
<i>D. H. Santos, A.P.F. Negreiros, J.E.A. Jacobo, L.M.G. Gonçalves, A.G. Silva Junior, and J.M.V.B.S. Silva</i>	
A New Robot Path Planning Method Based on Probabilistic Foam	217
<i>Y.S. Silveira and P.J. Alsina</i>	
Sampling Based Path Planning and Vector Fields for Curve Tracking by UAVs	223
<i>Alexander Jahn and Luciano C.A. Pimenta</i>	
A New Approach Based in Potential Fields with Obstacles Avoidance for Mobile Robots	229
<i>Tadeu Abreu Cerqueira, Tito L.M. Santos, and André G.S. Conceição</i>	

Vision Systems for Robots II

Real-Time Collision Risk Estimation Based on Pearson's Correlation Coefficient: Comparative Analysis with Real Distance from the Velodyne 3D Laser Scanner	234
<i>E.D. Bravo Solis, A. Miranda Neto, and B. Nina Huallpa</i>	
People Detection and Localization in Real Time during Navigation of Autonomous Robots	239
<i>Percy W. Lovon-Ramos, Yessica Rosas-Cuevas, Claudia Cervantes-Jilaja, Maria Tejada-Begazo, Raquel E. Patiño-Escarcina, and Dennis Barrios-Aranibar</i>	
Semantic Mapping on Underwater Environment Using Sonar Data	245
<i>M. Machado, P. Drews-Jr., P. Núñez, and S. Botelho</i>	
Integration of People Detection and Simultaneous Localization and Mapping Systems for an Autonomous Robotic Platform	251
<i>Alberto Torres Angonese and Paulo Fernando Ferreira Rosa</i>	

A Texture Driven Approach for Visible Spectrum Fire Detection on Mobile Robots	257
<i>Cristiano Rafael Steffens, Silvia Silva Da Costa Botelho, and Ricardo Nagel Rodrigues</i>	

Industrial Robots and Applications

Scheduled Fuzzy Controllers for Omnidirectional Motion of an Autonomous Inspection Robot with Four Fully Steerable Magnetic Wheels	263
<i>Higor Barbosa Santos, Marco Antonio Simões Teixeira, Andre Schneider De Oliveira, Lucia Valeria Ramos De Arruda, and Flavio Neves-Jr.</i>	
Understanding the Implementation of Impedance Control in Industrial Robots	269
<i>Gustavo J.G. Lahr, Joao V.R. Soares, Henrique B. Garcia, Adriano A.G. Siqueira, and Glauco A.P. Caurin</i>	
Uncertainty Analysis of a 2-DOF Planar Parallel Robot by Means of Fuzzy Dynamic Approach	275
<i>F.A. Lara-Molina, D. Dumur, and E.H. Koroishi</i>	
Uncertainty in the Estimation of End-Effector Acceleration and Angular Velocity for Robotic Manipulators	281
<i>João Carlos O. Pena and Leonardo A.B. Tôrres</i>	
Fiducial Markers Applied for Pose Tracking of a Robotic Manipulator: Application in Visual Servoing Control	287
<i>Igor Pereira Vieira, Armando Alves Neto, and Leonardo Amaral Mozelli</i>	
Whole-Body Control of a Mobile Manipulator Using Feedback Linearization Based on Dual Quaternions	293
<i>Frederico Fernandes Afonso Silva and Bruno Vilhena Adorno</i>	
Mixed Reality Applied to the Teleoperation of a 7-DOF Manipulator in Rescue Missions	299
<i>Percy W. Lovon-Ramos, Roger Ripas-Mamani, Yessica Rosas-Cuevas, Maria Tejada-Begazo, Renato Marroquin Mogrovejo, and Dennis Barrios-Aranibar</i>	

Modeling and Simulations

Hierarchical Sensor Fusion Method Based on Fingerprint kNN and Fuzzy Features Weighting for Indoor Localization of a Mobile Robot Platform	305
<i>Carlos Eduardo Setenareski Magrin and Eduardo Todt</i>	
Transfer Learning Heuristically Accelerated Algorithm: A Case Study with Real Robots	311
<i>Luiz Antonio Celiberto Jr., Reinaldo A.C. Bianchi, and Paulo E. Santos</i>	

A Robot Simulator Based on the Cross Architecture for the Development of Cognitive Robotics	317
<i>Danilo H. Perico, Thiago P.D. Homem, Aislan C. Almeida, Isaac J. Silva, Claudio O. Vilão Jr., Vinicius N. Ferreira, and Reinaldo A.C. Bianchi</i>	
Indoor Positioning System Based on the RSSI Using Passive Tags	323
<i>R.H. Murofushi, R.F. Gonçalves, A.R. Sousa, and J J.P.Z.S. Tavares</i>	
Effects of Water Currents in a Continuous Attractor Neural Network for SLAM Applications	328
<i>Guilherme B. Zaffari, Matheus M. Dos Santos, Paulo L.J. Drews-Jr., and Silvia S.C. Botelho</i>	
Monte Carlo Localization with Field Lines Observations for Simulated Humanoid Robotic Soccer	334
<i>Alexandre Muzio, Luis Aguiar, Marcos R.O.A. Máximo, and Samuel C. Pinto</i>	
Testbed Prototype of an Unmanned Aerial Vehicle Design	340
<i>Victor M.D.M. Leite and André Gustavo S. Conceição</i>	
Author Index	346