2024 Latin American Robotics Symposium (LARS 2024)

Arequipa, Peru
11-14 November 2024

IEEE Catalog Number: CFP24A78-POD
ISBN: 979-8-3315-0881-4

Copyright © 2024 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 is a print representation of what appears in the IEEE Digital Library. Some format issues inherent in the e-media version may also appear in this print version.***

IEEE Catalog Number:	CFP24A78-POD
ISBN (Print-On-Demand):	979-8-3315-0881-4
ISBN (Online):	979-8-3315-0880-7
ISSN:	2639-1775

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

Table of Contents

Enhancing UAV Spraying Efficiency through Payload Sensor Integration...1
Celso Barcelos, Leonardo Alves Fagundes-Junior, Daniel Gandolfo, Martin Saska, Alexandre Brandão

Physarum Route Optimization: Bio-inspired Strategies for Mobile Robot Navigation...7
Dieisson Martinelli, Andre Schneider de Oliveira, Vivian Cremer Kalempa

Preventing and Mitigating Repetitive Strain Injury with an Intuitive Hand Recognition Interface for Multi-Robot Teleoperation...12
Lucas Zick, Dieisson Martinelli, Andre Schneider de Oliveira, Vivian Cremer Kalempa

Enhancing Agricultural IoT Networks: Multi-Robot Wireless Charging Task Allocation through Reinforcement Learning...18
João Gomes Carvalho, Ranulfo Bezerra, Ricardo Rabelo, João Monte

Path Planning based on Probabilistic Foam for a Robotic Smart Walker in Dynamic Environments...24
Alysson Paulo Holanda Lima, Pablo Alsina, Adelardo Medeiros, Dennis Barrios-Aranibar

UAV RGB image encryption based on DNA coding algorithm and row and column interleaving...30
Maria Tejada-Begazo, Christina Chacón

Imitation Learning and Dimensionality Reduction for the Resolution of Inverse Kinematics in Anthropomorphic Robotic Arms...36
Victor Cornejo Arismende, Dennis Barrios-Aranibar

SPO: Single Pass Optimization for Soccer Simulation 2D...42
Walber Rodrigues, Pedro Cunha, Rafael Labio, Mateus Machado, Paulo de Mattos Neto, Edna Barros

Q-Learning-Based Multi-Objective Global Path Planning for UGV Navigation...48
Hiago Batista, Thayron Hudson, Kevin de Carvalho, Alexandre Brandão

Evaluating Computer Vision Solutions for Automated Medicine Detection Applied to Grasping...54
Thiago José Souza, João Pedro Paula, Joao Marcelo Teixeira, Adrien Durand-Petitevil

Photo-Realistic and Labeled Synthetic UAV Flight Data Generation Using ROS and Gazebo...60
Lucas Silva, Juliana Ferreira, Paulo Rezeck, Michel Silva, Thiago Gomes

Analysis and Comparison of Slip Detection Methods for Quadruped Robots...66
Paulo Vale de Carvalho, Vivian Suzano Medeiros, Marco Meggiolaro

Enhancing 3D Object Detection in Autonomous Vehicles: Multi-Sensor Fusion with Attention Mechanisms...72
Eduardo Honorato, Denis Wolf

KT-Imitation: Efficient Visual Imitation for Autonomous Navigation Based on Keypoint Timeline...78
Karen Li, Hanqing Qi, Jiawei Xu, Edward Jeffs, David Saldana

Universidad Católica San Pablo | Departamento de Ingeniería Eléctrica y Electrónica

Out-of-Distribution Object Detection in Autonomous Vehicles With Yolo Model...84
Eduardo Honorato, Mariana Uchida, Thiago Silva, Denis Wolf

Sensor Fusion of LiDAR and Stereo Camera for Forest Mapping...90
Amador Marcelino de Souza Neto, Roseli Ap. Francelin Romero

Reinforcement Learning-driven automatic calibration for color segmentation-based robot detection...96
Maria Clara Alves Acruchi, Geovany Lima Nunes, Breno Cavalcanti, Thiago José Souza, Adiel Teixeira de Almeida Filho, Mateus Machado, Edna Barros

Behavior-Based Control with Learning from Demonstration for Path Following Applied to Mobile Robots Soccer...102
Matheus Luiz, Mario Pastrana Triana, Guilherme Achilles de Oliveira e Aguiar, Raul Costa, Luiz Rodrigues e Silva

Robotic Traffic Cone System for Lane Closure using Computer Vision and Decentralized PID Control...108
Angelo Casas, Manuel Martínez, Daniela Zavala Gutierrez, Elvis Jara Alegria

Design of High-Speed Autonomous Sorting system with GRASP Distribution Algorithm...114
Julio Sinche, Julio Arias, Diego Arce, Jose Balbuena, Francisco Cuellar

Comparative Evaluation of YOLO Models for Gauge Detection...120
Franco Rivadeneira, Eduardo Cabrera Yi, Alessandro Miyahira Yagui, Miguel Zinanyuca Yábar, Francisco Cuellar

A survey on robot fleet management systems for industrial processes...125
Reynaldo Gago, Mauricio Galassi, Filipe Silveira, Gustavo Freitas

A Framework for Selecting and Implementing Ground Mobile Inspection Robots in Industrial Applications...131
Filipe Silveira, Reynaldo Gago, Ralf Luis de Moura, Gustavo Freitas

Decoupled Visual Servoing Control of a 7-DOF Robot Manipulator for an Onboard Monocular Vision System...137
Maria Tejada-Begazo, Dennis Barrios-Aranibar

Kinematic Modeling of Serial Robotic Manipulators to Automate the Packaging Process of Tuna Cans...143
Clevex Rodriguez, Maikol Sánchez, Leonardo Guimaraes, Jose Cornejo, Ricardo Palomares

Conceptual design of two adaptive mechanisms to irregular surfaces for a street sweeping brush...149
Rosendo Velez, Gabriel Bermudez, José Rodríguez, Yuri Vidal, Paulo Guzman

Heat It Up: Using Robo-gym to Warm-up Deep Reinforcement Learning Algorithms...155
Gabriel Bermudez, Matheus Aparecido do Carmo Alves, Gabriel Duarte Gonçalves Pedro, Thiago Boaventura Cunha

Extrinsic LiDAR-Robot And LiDAR-Camera Calibration For Multi-sensor Fusion...161
Gilmar Cruz Júnior, Héctor Azpúrua, Fernando Lizarralde, Gustavo Freitas

An Approach Based on a Programmable Intelligent Space for Human-robot Interaction...167
Luiz Carlos Cosmi Filho, Matheus Oliveira, Miquelly Lucas, Lucas Fehlberg Follador, Raquel Vassallo

Development of a Teleoperation System for Controlling a Scaled Prototype Robot for Rescue Tasks in Natural Disasters...173
Ivan Aguilar Cama, Dennis Barrios-Aranibar

Control strategies for gutter maintenance robot...179
Marllely Hernandez, Sofía Dussán Díaz, Adrian Fernando Chavarro, Ruthber Rodriguez Serrezuela, Mario Arbulu

Variable-Speed Dubins Orienteering Problem...184
Vinícius Faria, Caio Conti Guidote Ribeiro, Douglas Guimarães Macharet

Real-time Robotics Situation Awareness for Accident Prevention in the Industry...190
Juan Deniz, André Luiz da Silva Kelbouscas, Ricardo Grando

Addressing UAV Communication Latency: A Simulation Approach with Network Model Predictive Control in CoppeliaSim and Mininet-wifi...196
Mateus de Barros, Igor Mayer Soares, Cesar Marcondes

Design and Control of a Fabric Vacuum-Powered Artificial Muscle for Rehabilitation Devices...202
Sergio Elmer Cancán Estares, Emir A. Vela

Adaptive Generalized Social Space Delimitation for Human-Robot Interaction Tasks...208
Manuela Silva, Aline Silva, Douglas Guimarães Macharet

Visual Odometry through Optical Flow Integrated with a Multi-sensor Localization System Applied to Mining Vehicles...214
Gabriel Gomes, Gilmar Cruz Júnior, Jacó Domingues, Gustavo Pessin, Armando Neto, Gustavo Freitas

A comparison of DRL with APF and A* with PI Control for Trajectory Planning with Obstacle Avoidance for Sailboat Robots...220
André Araújo, Vishali Mankina, Carlo Cernicchiaro, Philippe Preux, Cosimo Distante, Chales Vasconcellos, Diego Brandão, Esteban Clua, Luiz Gonçalves

CuyBot: A Compact and Low-Cost Tracked Robot with vSLAM for Ventilation Duct Inspection...226
Marcelo Saavedra Alcoba, Brayan Duran Toconas, Fabio Diaz Palacios

Towards an Autonomous Sailboat Navigation Control Architecture...232
André Araújo, Raphael Guerra, Vishali Mankina, Philippe Preux, Cosimo Distante, Chales Vasconcellos, Diego Brandão, Luiz Gonçalves, Esteban Clua

Supervised models for detecting GPS attacks and faults in UAVs: a comparative analysis...238
Isadora Ferrão, André de Oliveira, Vitor Brasil, Daniel Allão, David Espes, Catherine Dezan, Kalinka Castelo Branco

On the Use of Visual Perception for Unmanned Surface Vehicles Navigation...244
Alex Salgado, Arthur Bezerra, Esteban Clua, Luiz Gonçalves

Automated Umbilical Cable Control System for Mobile Robot Navigation...250
Nilton Neto, Mario Torres, André Cid, Renato Junior, Yuri Bespaloff, Luiz de Barros, Héctor Azpúrua, Gustavo Freitas

Rotor Fault Detection and Isolation in Aerial Vehicles with Dozens of Rotors...256
Neeraj Gandhi, Jiawei Xu, David Saldana, Linh Phan

Critical Modal Frequency in Quadcopters: An Analytical and Simulation-Based Arm Study...262
Edward Lopez, Oscar Lostaunau, Luis Flores, Mauricio Rivera, Elvis Jara, Moises Nunez

Nanostructured weight sensor for a service robot wheel...268
Renato Silva Pereira Junior, Luciano Quaresma, Marcos Allan Reis, Alan Segundo, Luiz de Barros, Gustavo Pessin, Héctor Azpúrua, Gustavo Freitas

Instrumentation, Testing, and Measurement of a Strain Gauge for Implementing a Robotic Joint Torque Sensor...274
Joel Layme Ari, Dennis Barrios-Aranibar

A STEM Approach Concerning Educational Robotics in Interdisciplinary Teacher Training...280
Ana Luiza Rodrigues, Filipe Batista, Isabelle Aragão, Larissa Costa Santos, Marcus Batista, Carla Koike, Dianne Viana, Jones Yudi,

Robotic Action Planning Using Language Models...286
César Bastos da Silva, Juan Luis Barraza Ramírez, Niederauer Mastelari, Roberto Lotufo, Jayr Pereira, Eric Rohmer

Experimental Analysis of a vibrating feeder prototype based on electromagnets...292
Andrea Chu Wong, Ignacio Tokumura Yagui, Renato Miranda Barrueto, Elvis Jara Alegria

Performance evaluation of BladeRF and HackRF SDRs in security tests for GPS systems...298
Vitor Brasil Marçal, Daniel Allão, Lucas Ribeiro, Isadora Ferrão, Kalinka Castelo Branco

Development of a CPM Device for Elbow Rehabilitation...304
Adriel Gonzales, Roberto Furukawa

Gaussian-based Proxemic Zone Definition of Groups for Social Robot Navigation...311
Nelson Paco Chipana, Dennis Barrios-Aranibar, José Díaz-Amado, Yudith Cardinale

Remote trajectory programming with sensory feedback for an exoskeleton...317
Jose Guillermo Sanchez Palomino, Raquel Esperanza Patiño Escarcina

In Defense of Multimodal and Temporal Data for Unsupervised Domain Adaptation...323
Felipe Barbosa, Fernando Osorio

A remote monitoring system of Potato Growing Conditions in urban crops...329
Nathali Calla, Dennis Barrios-Aranibar