ROBOT 2024

7th Iberian Robotics Conference

Program

November 6th – 8th, 2024

Universidad Politécnica de Madrid
E.T.S. Ingenieros Industriales
Centre for Automation and Robotics UPM-CSIC

C/. José Gutiérrez Abascal, 2. 28006.
Madrid, Spain.

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Welcome Message

We are delighted to welcome you to ROBOT 2024: the 7th Iberian Robotics Conference, taking place in Madrid from November 6th to 8th, 2024. We extend our heartfelt gratitude to all participants for their invaluable support and contributions, which are vital to the success of this event. ROBOT 2024 promises to be an exceptional platform for knowledge exchange among robotics researchers and industry professionals.

Over 100 papers will be presented during oral sessions, and seventeen posters will showcase the latest project results. We are excited to feature three distinguished guest lecturers who will address cutting-edge topics in robotics, including avatars, exoskeletons, and robot autonomy. Additionally, we will host a roundtable discussion on the future challenges facing the field.

Madrid offers an inspiring backdrop with its stunning architecture, world-class gastronomy, and rich multicultural atmosphere. The city is renowned for its museums, vibrant cultural scene, and lively nightlife.

This year, we are particularly pleased to highlight our collaboration with IEEE, along with SEIDROB and SPR, in organizing the ROBOT conference. This partnership will enhance the visibility of our publications and attract even more researchers to our community. We would also like to express our gratitude to the Escuela Técnica Superior de Ingenieros Industriales at the Universidad Politécnica de Madrid and the Centre for Automation and Robotics UPM-CSIC for hosting this conference.

Once again, welcome to Madrid! We hope you enjoy an engaging and enriching experience at ROBOT 2024.

ROBOT 2024 Organizing Committee.

ROBOT2024 Committees

Organizing Committee

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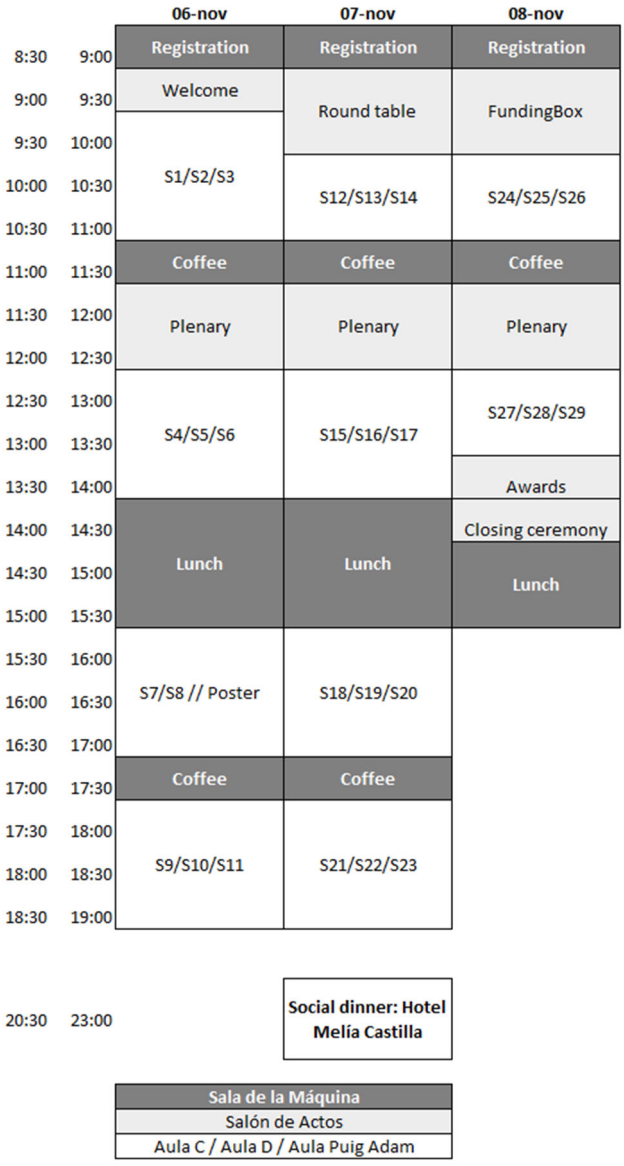
Conference schedule

The following table shows the calendar for the main activities during the conference.



Conference WIFI

User: robot2024
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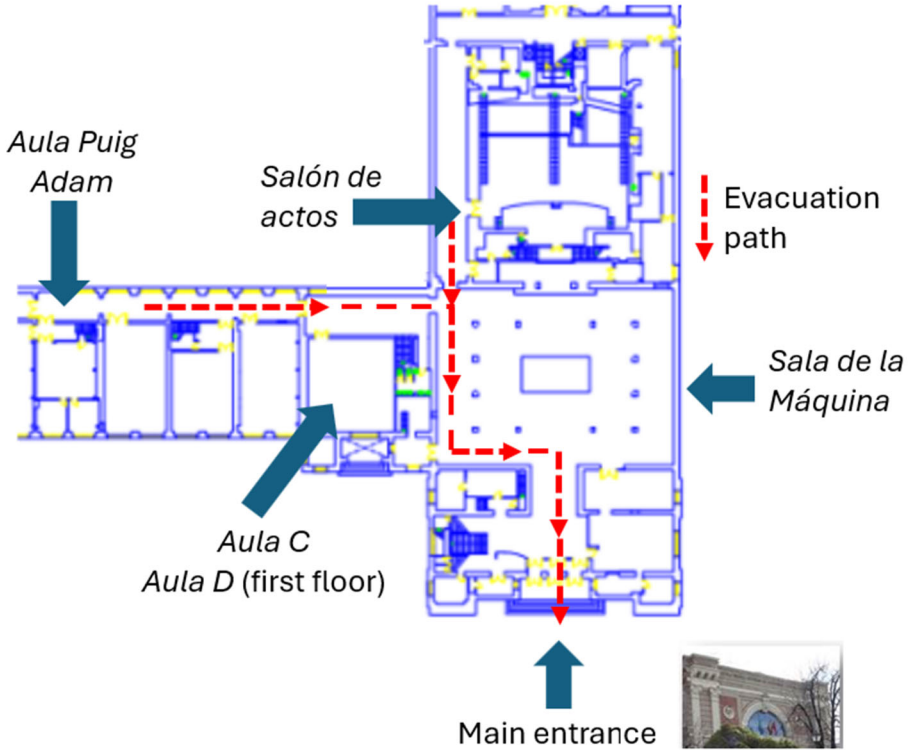
Layout of the main rooms



Sala de la Máquina distribution

Guest Lecturers

Wednesday, November 6 – 11:30–12:30

Lecturer: Prof. Hiroshi Ishiguro.

Title: "Avatar and the future society".

Abstract:
The AVATAR SYMBIOTIC SOCIETY project envisions a future where societal limitations of body, brain, space, and time are overcome through the use of teleoperated robotic avatars. These avatars will enable users, including vulnerable individuals, to engage actively in various social roles—such as work, education, and healthcare—without constraints. By 2050, advancements in technology are expected to enhance personal freedom regarding location and time, fostering a balanced society where avatar symbiosis is integral. The project highlights the potential of avatar systems for diverse applications, including emergency response and telecommuting, as they allow for immersive interaction, remote navigation, and object manipulation. The conference will showcase the current state of avatar technology and discuss future research challenges in this evolving field.

Bio:
Hiroshi Ishiguro received a Ph. D. from Osaka University, Japan in 1991. He is currently Professor of Department of Systems Innovation at Osaka University, Visiting Director of Hiroshi Ishiguro Laboratories at the Advanced Telecommunications Research Institute (ATR), Project Manager of MOONSHOT R&D Project, Thematic Project Producer of EXPO 2025 Osaka, Kansai, Japan, and CEO of AVITA, Inc. His research interests are interactive robotics, avatar, and android science. Geminoid is an avatar android that is a copy of himself. In 2011, he won the Osaka Cultural Award. In 2015, he received the Prize for Science and Technology by the Minister of Education, Culture, Sports, Science and Technology. He was also awarded the Sheikh Mohammed Bin Rashid Al Maktoum Knowledge Award in Dubai in 2015. Tateisi Award in 2020, and honorary doctorate of Aarhus university in 2021.

GUEST LECTURER

Thursday, November 7 – 11:30–12:30

Lecturer: Dr. Ignacio Galiana

Title: "Powering the human workplace: Next generation wearable technologies for a workforce in motion".

Abstract:
Verve Motion, launched from Harvard University in 2020 with a mission to power the human workplace through wearable robotics. Since inception, Verve has raised over $40M from leading investors, and has partnered with major customers in the supply chain, logistics, and 3PL sectors to elevate their workforce. This talk will explore how wearable technologies are transforming the workplace by enhancing worker safety and productivity, both on and off the job. We'll discuss the journey from a university project to launching a robotics start-up, commercializing a novel technology and scaling up. Key topics include the spin off process, fundraising, Product-Market Fit, and business models for robotic systems.

Bio:
Ignacio Galiana is the co-founder and CEO of Verve Motion, a company revolutionizing connected wearable technology for the millions of workers powering today's economy and society. Verve launched in 2020 from Harvard University's Biodesign Lab.
Prior to Verve, Dr. Galiana was a staff member at Harvard University, and the technical lead for the Harvard team under the DARPA Warrior Web program. Galiana received his Ph.D. in Automation and Control from Universidad Politécnica de Madrid in 2013. During his Ph.D. focused on the design and control of haptic devices for VR and Telerobotics.

Friday, November 8 – 11:30–12:30

GUEST LECTURER

Lecturer: Prof. Ricardo Sanz

Title: "Robot Autonomy: from Intelligence to Consciousness".

Abstract:
There are two major challenges in robots that deal with open environments: having the necessary physical capability and having the necessary mental capability. Physical capability has been the central topic in robotics research ever since; however, the topic on mental capability is only reaching its peak of relevance in recent times when higher levels of autonomy are required. In this talk we will focus on this mental aspect, analyzing the domain of robot autonomy from the perspective of the manifest synergy between robotics and artificial intelligence.

Bio:
Ricardo Sanz got a degree in electrical engineering in 1987 and a Ph.D. in robotics and artificial intelligence in 1990. Since 1991, he has been a member of the Department of Automatic Control at the Universidad Politecnica de Madrid, Spain, teaching Computer Programming, Artificial Intelligence, Automatic Control and Systems Engineering. His main research interests are architectures and methodologies for intelligent systems. He has been involved in tens of research projects on autonomous control, software technologies for complex, distributed controllers, real-time artificial intelligence, cognitive robotics, bio-inspired controllers and philosophical aspects of intelligence. He has been associate editor of the IEEE Control Systems Magazine, the Cognitive Systems Research journal, the International Journal of Machine Consciousness, the Journal on Biologically Inspired Cognitive Architectures and Frontiers in Robotics and AI. He is a former chairman of the OMG Control Systems Working Group and the IFAC Technical Committee on Computers and Control. He has performed as an expert for the European Commision in the evaluation and review of research projects in the domains of embedded control systems, distributed control systems, systems dependability, cognitive systems and robotics, future and emerging technologies and cyber-physical systems. Since 2004 he is the coordinator of the UPM Autonomous Systems Laboratory, where he has been involved in many research projects at the national and international levels. Most of these projects sit at the convergence of automatic control, software development, artificial intelligence and general cognition. He is currently involved in the EU projects CORESENSE, METATOOLand AIRSHIP. His personal website is www.rsanz.com.

ROUND TABLE

Round table

Thursday, November 7 – 9:00– 10:00

The round table focuses on the challenges of robotics in the coming years. This round table will be chaired by **Jon Aguirre** and participants are:

- **Teresa Riesgo**, General Secretary of Innovation,

- **Bernd Liepert**, President of euRobotics, and

- **Jorgina Díaz**, President of Hisparob and Business Development Director at Alisys.

PAPER PRESENTATION

WEDNESDAY NOVEMBER, 6

S1: UAVs (09:30 – 11:00)

Room C
Chair: Guillermo Heredia

Exploring DJI Tello as an affordable Drone Solution for Research and Education.

Patricia García, Lucia Arribas, Pablo Pueyo, Luis Riazuelo, and Ana Cristina Murillo.

Modelling and Control of a 5DoF Tilting Quadrotor.

Antonio González Morgado, María Palmero Monroy, Aníbal Ollero, and Guillermo Heredia.

Information-oriented and energy-aware path planning for multiple air-dropped small Unmanned Aerial Vehicles.

José Bento, Meysam Basiri and Rodrigo Ventura.

Realistic Unmanned Aerial Vehicle Simulation: A Comprehensive Approach.

David Tejero-Ruiz, Francisco Javier Pérez-Grau, Antidio Viguria and Aníbal Ollero.

S2: Telerobotics (09:30 – 11:00)

Room D
Chair: Daniel Galán

Image and Command Transmission Over the 5G Network for Teleoperation of Mobile Robots.
Thiago B. Levin, João Miguel Oliveira, Ricardo B. Sousa, Manuel F. Silva, Bruno S. Parreira, Héber Miguel Sobreira and Hélio Sousa Mendonça.

Task Automation in Construction Sites: Robot Learning from Teleoperated Demonstrations.
Irati Rasines, Miguel Prada, Alfonso Domínguez, Elisa Prada, Anthony Remazeilles and Itziar Cabanes.

Development of a remote handling intervention to plug and unplug an electrical connector of a vacuum pump at CERN.

Violeta Redondo Gallego, José Rodriguez-Nogueira, Sergio Di Giovannantonio, Luca Rosario Buonocore, Carlos Veiga Almagro, Manuel Ferre, Eloise Matheson, Mario Di Castro and Christopher McGreavy.

Implementation of a Control System Environment for Validating ITER Remote Handling Operations.
Tamara Benito and Antonio Barrientos.

S3: Autonomous navigation (09:30 – 11:00)

Room Puig Adam
Chair: Vicente Matellán

Towards the always-on operation of mobile service robots.
Mojgan Ghanbari, Shahed Rasekh, Amaro Sousa and Pedro Fonseca.

Purely Topological Exploration of Underground Environments.
Lorenzo Cano, Danilo Tardioli and Alejandro R. Mosteo.

Modular Framework for Autonomous Waypoint Following and Landing based on Behavior Trees.
Miguel Gil-Castilla, Raúl Tapia, Iván Maza and Aníbal Ollero.

Survey of SLAM algorithms with ROS support.
Abel Teixeira, Hugo Costelha, Carlos Neves and Luís Bento.

S4: UAV II (12:30 – 14:00)

Room C
Chair: Lino Marques

Improving Lidar Based Tracking of UAVs Using an Approach Based on Focusing.
Alberto Cerutti, Sedat Dogru and Lino Marques.

MANTIS: UAV for Indoor Logistics Operations.
André Dias, João J. Martins, José Antunes, André Moura and Jose Almeida.

Combining Route Planning and Visual Servoing for Offshore Wind-Turbine Inspection Using UAVs.
Álvaro Caballero, Raúl Tapia and Aníbal Ollero.

Dynamics-Aware Fast Multi-Drone Exploration of Unknown Environments.
Juan Zacarías Bardají, Eduardo Montijano Muñoz and David Morilla-Cabello.

S5: Advanced Industrial applications (12:30 – 14:00)

Room D
Chair: Rodolfo Haber

Parameter Identification of a 6-DoF Serial Manipulator with Coupled Joints and Load-Assisting Springs for Industrial Applications.

Matteo Nini, Federica Ferraguti, Matteo Ragaglia, Mattia Bertuletti, Simone Di Napoli and Cesare Fantuzzi.

Performance of the counterbalance systems in heavy industrial robots under cyclic operation.
Julen Urrutia, Mikel Izquierdo, Ibai Ulacia, Nora Agirre, Ibai Inziarte and Jon Larrañaga.

High Bandwidth Force Control for Robotic Friction Stir Welding.
Valentin Kamm, Armin Lechler and Alexander Verl.

Enhancing Quality Inspection in Zero-Defect Manufacturing Through Robotic-Machine Collaboration.
Alberto Villalonga, Yarens J. Cruz, Diego Alfaro, Rodolfo E. Haber and Fernando Castaño.

S6: Advanced Programming (12:30 – 14:00)

Room Puig Adam
Chair: Christyan Cruz

Unsupervised Trajectory Segmentation and Gesture Recognition through Curvature Analysis and the Levenshtein Distance.
Guillem Tapia, Adrià Colomé and Carme Torras.

Robotic approach trajectory using Reinforcement Learning with Dual Quaternions. (V. 755)
Daniel Frau-Alfaro, Santiago T. Puente, Ignacio de Loyola Páez-Ubieta and Edison Velasco-Sánchez.

Robotic visual servoing for tracking structureless moving parts.
Christian Schröder, Marco Schumann, Rico Löser, Philipp Klimant and Martin Dix.

Programming Manipulators by Instructions.
Rafael de la Guardia.

S7: UAVs III (15:30 – 17:00)

Room C
Chair: Ramón Suárez

A Methodology for Designing Knowledge-Driven Missions for Robots.
Carmen De Rojas Pita-Romero, Guillermo García Patiño Lenza, Miguel Fernández Cortizas and Pascual Campoy Cervera.

Developement of a platform with 2 DoF to assist the cooperation between grounded mobile robots and UAVs in landing operations.
Emerson Kaneda, Guido Berger, Vitor Pinto, Milena Pinto, Murilo Ferreira, Flávio Rossini and José Lima.

Deep Reinforcement Learning Framework for UAV Indoor Navigation.
João J. Martins, Alexandre Amaral, André Dias and José Almeida.

Real-Time Beach Monitoring: Addressing Beach Safety With UAVs and Computer Vision.
Rodrigo Da-Silva-Gómez, Alejandro Rodríguez-Ramos, David Pérez-Saura, Guillermo GP-Lenza, Fernando Palacios-López, Salvador Domínguez, Ana Redondo-Rodríguez, Daniel Sanz-Merodio, Helder Rodríguez, Pascual Campoy, and Miguel López.

S8 Neural networks applied to robotics (15:30 – 17:00)

Room D
Chair: João C. Oliveira

Robot Modeling with Autoregressive Transformers.
Javier Fañanás-Anaya, Gonzalo López-Nicolás and Carlos Sagüés.

Pedestrian Action Classification from a Vehicle's Perspective.
Jaime Villa Plaza, Arturo de la Escalera Hueso and José María Armingol Moreno.

Pallet and Pocket Detection Based on Deep Learning Techniques.
Daniele Caldana, Artur Cordeiro, João Pedro Souza, Ricardo B. Sousa, Paulo M. Rebelo, António Joaquim Silva and Manuel F. Silva.

Automatic labeling for Thermal Imaging Datasets Generation.
Daniel Cantón and María T. Lázaro.

S9: Path planning (17:30 – 19:00)

Room C
Chair: Alfonso García-Cerezo

Integrating DEM Path Planning in the Navigation and Control System for UGVs in Rough Terrain: A Case Study on Multiple Victim Evacuation.
Manuel Toscano Moreno, Manuel Sánchez Montero, Juan Alberto García Esteban, Anthony Mandow Andaluz, Jesús Morales Rodríguez and Alfonso García Cerezo.

AGVs vs AMRs: A Comparative Study of Fleet Performance and Flexibility.
Rita Tomé Silva, Marina Brilhante, Héber Sobreira, Diogo Matos and Pedro Costa.

Evaluation of Neural Euclidean Signed Distance Fields for Distance-Aware Local Path Planning.
Guillermo Gil, José Antonio Cobano, Fernando Caballero and Luis Merino.

Optimizing Initial Path Finding in Informed-RRT* with a Novel Map-Adaptive Sampling Technique.
Zoran Najdovski, Saeid Nahavandi Tommaso Felice Banfi, Francesco Dorati, Nicola Manzoni and Jesus Martínez-Gómez

S10: Control (17:30 – 19:00)

Room D
Chairs: Adrià Colomé

Safety Methods for Cartesian Control of Redundant Robotic Arms.
Juan Antonio Delgado-Guerrero, Adrià Colomé, Sergi Foix and Carme Torras.

A Lyapunov-Based Switching Scheme for Selecting the Stable Closed-Loop Fixed Attitude-Error Quaternion During Flight.
Francisco Gonçalves, Ryan Bena, Konstantin Matveev and Néstor Pérez-Arancibia.

An LQG Approach to the Control of Unmanned Wing-In-Ground Vehicle.
Sofija Ilić, Zorana Milošević, Ramon A. Suarez Fernández, Claudio Rossi and Sergio Domínguez.

Model Predictive Control for B-Spline Trajectory Tracking in Omnidirectional Robots.
José Pedro Carvalho, António Paulo Moreira and António Pedro Aguiar.

S11: Robotics for agriculture (17:30 – 19:00)

Room Puig Adam
Chairs: Roemi Fernández

Leveraging Behavior Trees for Hybrid Autonomous Navigation in Seasonal Agricultural Environments.
Juan Francisco Rascón, Pau Reverté, Xavier Ruiz, Mateus Sanches Moura, Daniel Serrano and Carlos Rizzo.

Multispectral Image Segmentation in Agriculture: Evaluating Deep Learning Models with Train-Test Split and Cross-Validation Strategies.
Wilgo Cardoso, Tiago Barros, Gil Gonçalves, Cristiano Premebida and Urbano Nunes.

Fast Ready-to-harvest Cotton Detection and Classification with YOLOv8 in Greenhouse Crops.
Guillem González, Antonio Martínez, Vicente Martínez, Sergi Foix and Guillem Alenyà.

Design and Implementation of an Innovative Soft Tool for Robotic Pollination.
Eduardo Navas, Kai Blanco, Daniel Rodríguez-Nieto and Roemi Fernández.

THURSDAY NOVEMBER, 7

S12: Grasping (10:00 – 11:00)

Room C
Chair: Vítor Pinto

On-Body Navigation Robot with Grasping Control.
Luz M. Tobar Subía Contento, Anthony Mandow and Jesús M. Gómez-de-Gabriel.

Improving Grasping Performance of Underactuated Two Finger Robotic Hands Using Variable Stiffness.
Dylan Denizon, Sedat Dogru and Lino Marques.

Genetic Algorithms for Optimal Grasping in Automated 3D-Printed Part Extraction.
Enrique García Torija, Virgilio Gómez, Mohamed Khalil Kahlaoui, David Álvarez, Miguel Hernando and Ricardo Sanz.

S13: Robot prototype 1 (10:00 – 11:00)

Room D
Chair: José Lima

A Robotic System Based on a Universal Joint Actuated by Two Cables Applied to the Orientation of Photovoltaic Panels.
Marco Carpio, Roque Saltaren, Juan Cely, David Carpio and Willian Yupa.

Development of a wire-driven compliant joint fin for a bio-inspired underwater robot.
Eliseo de J. Cortés Torres, Luis Eduardo García, Luis E. Villamizar Marin and Cecilia García Cena.

Developing a Modular Anthropomorphic Robotic Manipulator.
José Martins, Vítor Hugo Pinto, José Lima and Paulo Costa.

S14: Human-Robot Interaction I (10:00 – 11:00)

Room Puig Adam
Chairs: Víctor F. Muñoz

Human-robot collaborative assembling task planning by using digital twin.
Paula Luque-Contreras, Álvaro Galán-Cuenca, Juan María Herrera-López, Marcos Rollón and Víctor F. Muñoz.

Human-robot harvesting plan negotiation: perception, grape mapping and shared planning.
Marc Dalmasso, Francisco Garcia-Ruiz, Thomas A. Ciarfuglia, Leonardo Saraceni, Ionut M. Motoi, Emilio Gil and Alberto Sanfeliu.

Learning to Move Objects with Fluid Streams in a Differentiable Simulation.
Kārlis Freivalds, Laura Leja and Oskars Teikmanis.

S15: Human-Robot interaction II (12:30 – 14:00)

Room C
Chair: Fernando Matía

MAPLE: A Multi-Agent, Prosocial Learning Environment, Engaging and Motivating Children.
Deanna Kocher, Tamar Kushnir and Keith Green.

A New Emotional Social Robotic Platform.
Daniel Sotelo, Javier Laserna, Daniel Galan and Fernando Matia.

Body Gestures Recognition for Social Human-Robot Interaction.
Javier Laplaza, Joan Jaume Olvier, Alberto Sanfeliu and Anais Garrell.

Surgeon gesture recognition sensor system for a laparoscopic suture manoeuvre.
Manuel Vargas-Puga, Paula Luque-Contreras, Juan María Herrera-López, Antonio J. Reina-Terol and Víctor F. Muñoz.

S16: Autonomous navigation (12:30 – 14:00)

Room D
Chair: Juan Cely

Effects of the thrusters orientation in the displacement of the underwater robot UDrobot: Design and Experimentation.
Juan S. Cely, Marco Carpio and Roque Saltaren.

Dynamic AMR Navigation: Simulation with Trajectory Prediction of Moving Obstacles.
Tomás Cadete, Vítor Hugo Pinto, José Lima, Gil Goncalves and Paulo Costa.

Autonomous Guidance of an Aerial Robot using 6-DoF Visual Control and Behavior Trees.
Raul Tapia, Miguel Gil-Castilla, José Ramiro Martínez de-Dios and Anibal Ollero.

Camera Lidar Fusion for Unmanned Aerial Vehicle Detection.
Cosimo Maria Leuci, Sedat Dogru and Lino Marques.

S17: Exoskeletons (12:30 – 14:00)

Room Puig Adam
Chair: Fco. Javier Badesa

A cable-driven exoskeleton to control ankle mobility during gait in children with cerebral palsy.
Iñaki Dellibarda Varela, Pablo Romero-Sorozabal, Gabriel Delgado-Oleas, Álvaro Gutiérrez, Jorge Muñoz and Eduardo Rocon.

Design and assessment of a modular exoskeleton for lifting bimanual loads.
Andrea de la Viuda, Nancy V. Barbosa, Clara Molina, Fernando Blaya, Miguel Berzal, Juan M. Muñoz-Guijosa, Miguel Á. Sánchez-Urán and Manuel Ferre.

Changes in neuromuscular activity with the use of an upper limb exoskeleton: The ELMA prototype. Preliminary results.
Alejandro San Juan, Javier Rueda, Matilde Nannucci, Gonzalo Garrido Lopez, Kexin Zhang, Enrique Navarro and Francisco Javier Badesa.

The Role of Strapping Forces on Human Exoskeleton Interaction Pressure - A Pilot Study.
Stefano Massardi, Matteo Lancini, Juan C. Moreno, Diego Torricelli and David Rodriguez Cianca.

S18: Learning I (15:30 – 17:00)

Room C
Chair: Luis Montano

D-TOP: Deep Reinforcement Learning with Tuneable Optimization for Autonomous Navigation.
Diego Martínez Baselga, Luis Riazuelo and Luis Montano.

Multimodal Human Detection Using YOLO and Representation Learning for Robot Perception.
Kennedy O. S. Mota, Diogo S. de Oliveira, Luís Garrote and Cristiano Premebida.

Active Health Data Collection Using Social Robot.
Nuno Diogo and Plinio Moreno.

Hierarchical Reinforcement Learning and Evolution Strategies for Cooperative Robotic Soccer.
Bárbara Santos, António Cardoso, Gonçalo Leão, Luis Paulo Reis and Armando Sousa.

S19: Human-Robot Interaction III (15:30 – 17:00)

Room D
Chairs: Cecilia Garcia

Dynamic UAV Flight Simulator utilizing a Stewart Platform.
Anurag Mukherjee, Peter Sullivan, William Turner, Irfan Khan, John Economou, Oliver Gilbert and Chris Mahony.

Improving Robot Social Perception in Human-Robot-Interaction using Multi-modal Cues.
Josep Bravo Bravo, Jonathan Cacace, Devis Dal Moro, Daniel Serrano Lopez and Magí Dalmau Moreno.

State Space Exploration with Large Language Models for Human-Robot Cooperation in Mechanical Assembly.
Attique Bashir, Raja Moktafi, Marco Giangreco and Rainer Müller.

Quantifying Engagement: Metrics for Effective Child-Robot Interaction.
Ericka Patricia Madrid Ruiz, Raquel Cedazo León and Cecilia García.

S20: Computer Vision Technologies (15:30 – 17:00)

Room Puig Adam
Chair: João P. Pires

Vision-Based Feedback for Correct Sensor Placement in Medical Studies.
Nerea Gallego, Carlos Plou, Luis Montesano, Ana C. Murillo and Eduardo Montijano.

Compact 3D Time-of-Flight Sensor with Real-Time Multi-Path Separation.
Matthias Ludwig, Roman Gubler, Samuel Schüller and Teddy Loeliger.

Wagon and Container Codes Detection and Recognition based on Yolov8.
Alejandro Diaz-Diaz, Francisco Parrilla Ayuso, Rodrigo De La Iglesia, Rafael Barea and Luis M. Bergasa.

S21: Mobile robots (17:30 – 19:00)

Room C
Chair: Luis M.Bergasa

IoT-Based Solution for Mobile Robots Utilizing Closed-System Elevators in Life Science Laboratories.
Jiahao Huang, Steffen Junginger, Thomas Roddelkopf, Hui Liu and Kerstin Thurow.

A 6-axis force-torque sensor to achieve compliant behavior in an omnidirectional mobile platform for wheeled humanoid robots.
Helber Meneses Navarro, Frank Wang Wu and Federico Ruiz Ugalde

Voice assistant for autonomous vehicles aimed at elderly people.
Jose Berriales Mateos, Pablo Pardo-Decimavilla, Santiago Montiel-Marín, Miguel Antunes, Ángel Llamazares and Luis M. Bergasa.

S22: Virtual Reality (17:30 – 19:00)

Room D
Chair: Ramón Barber

Data Generation in Simulated Domestic Environments for Assistive Robots.
Noelia Fernández Talavera, Gonzalo Espinoza, Alberto Méndez, Adrián Prados, Alicia Mora and Ramón Barber.

SwarmFlowVR: A Virtual Reality User Interface for Multi-Robot Control.
Adam Pooley, Alexandre Gomes de Siqueira and Matthew Hale.

Probabilistic Terrain Analysis Using Semantic Criteria for Legged Robot Locomotion.
Christyan Cruz Ulloa, Miguel Zaramalilea, David Rolando Orbea Jerez, Jaime Del Cerro and Antonio Barrientos.

S23: Robot applications (17:30 – 19:00)

Room Puig Adam
Chairs: Roque J. Saltarén

An IoT-enabled Software Architecture for User-Friendly Fault Diagnosis and Identification: the Welding Cobot Use Case.
Annalisa Bertoli, Federica Ferraguti and Cesare Fantuzzi.

Soft bellow-based 3D printed robot for in-pipe inspection applications.
Kai Blanco, Eduardo Navas, Daniel Rodríguez-Nieto, Luis Emmi and Roemi Fernández.

FRIDAY NOVEMBER, 8

S24: Learning II (10:00 – 11:00)

Room C
Chair: Alejandro Mosteo

Model-Based Policy Optimization for Legged Locomotion.
Javier Garcia-Barcos, Ruben Martinez-Cantin and Luis Montesano.

Evaluating PyBullet and Isaac Sim in the Scope of Robotics and Reinforcement Learning.
Enaitz Berrocal, Basilio Sierra and Héctor Herrero.

Impact of Free-Viewing Search on Transformer-Based Goal-Directed Search.
Gabriel Marques and Plinio Moreno.

S25: ROS (10:00 – 11:00)

Room D
Chairs: Francisco Martín

A ROS-Based Modular Action Server for Efficient Motion Planning in Robotic Manipulators.
Pedro Dias, Luís Rocha, João Souza, Daniel Figueiredo and Manuel Silva.

Evaluating V2X Communications in the CARLA Simulator for a Collaborative Planning Use Case.
Daniel Villalobos del Baño, Santiago Montiel-Marín, Rodrigo Gutiérrez-Moreno, Navil Abdeselam, Antonio Moratilla and Luis M. Bergasa.

Cascade LifeCycle: A Convenient Building Block for Efficient Robot Software Architectures.
Francisco Martín Rico, Rodrigo Pérez Rodriguez, Juan Diego Peña-Narvaez, Francisco J. Rodríguez Lera and José Miguel Guerrero Hernández.

S26: Mapping techniques (10:00 – 11:00)

Room Puig Adam
Chair: Cristiano Premebida

Impact of 3D LiDAR resolution in SLAM approaches: A comparative study in Urban environments.
João Jorge, Tiago Barros, Cristiano Premebida, Martin Aleksandrov, Daniel Goehring and Urbano Nunes.

From Underground Mines to Offices: A Versatile and Robust Framework for Range-Inertial SLAM.
Lorenzo Montano-Oliván, Julio A. Placed, Luis Montano and María T. Lázaro.

Using Deep Learning for 2D Primitive Perception with a Noisy Robotic LiDAR.
Antónia Brito, Pedro Sousa, Ana Couto, Gonçalo Leão, Luis Paulo Reis and Armando Sousa.

S27: Learning III (12:30 – 13:30)

Room C
Chair: Claudio Rossi

Automated detection of cetaceans in their natural habitats via R-CNN and computer vision techniques.
Marta Roman Ruiz, Sergio Dominguez and Claudio Rossi.

Twist and Snap: A Neuro-symbolic System for Affordance Learning of Opening Jars and Bottles.
Jorge Aguirregomezcorta Aina and Maria M. Hedblom.

Imitation Learning for Low-Cost Dexterous Hand Using RGBD Camera.
Adrian Prados, Gonzalo Espinoza, Noelia Fernandez and Ramón Barber.

S28: Robot prototype II (12:30 – 13:30)

Room D
Chair: Antonio Giménez

Dynamic Analysis Base on Lie Algebra of a 2-DOF Spatial Mechanism for a Bio-inspired Manta Ray Robot.
Luis Eduardo García, Eliseo de J. Cortes Torres, Luis E. Villamizar Marín and Cecilia García Cena.

The effective action of cables during the rotation of the End Effector in a planar CDPR.
Marco Carpio, Roque Saltaren, Juan Cely, Julio Zambrano, Natalia Gonzalez and David Carpio.

PETER: a Soft Pneumatic Manipulator with High Resistance and Load Capacity.
Jorge Francisco García Samartín, Mathias Charles, Jaime del Cerro and Antonio Barrientos.

S29: Environment reconstruction III (12:30 – 13:30)

Room Puig Adam
Chair: Lino Marques

Enhancing Efficiency in 3D Object Detection with Knowledge Distillation.
João Correia and Plinio Moreno.

Risk Maps based on Vision and 3D LiDAR.
Rafael Oliveira and Vítor Santos.

Virtual Reality Game for Cognitive Training: a Usability and Qualitative Evaluation.
Diego Guzmán, Carlos Rengifo, Juan Guzmán and Cecilia García.

POSTER PRESENTATIONS

Brief presentation at Aula Puig Adam
WEDNESDAY NOVEMBER 6 (15:30 – 17:00)

Poster presentation will be done at room Puig Adam,
and the exhibition area is at main hall "Sala de la Máquina"

Chairs: José Lima and Jon Aguirre

Tuina®, Enhanced Precision and Efficacy in Physiotherapy Treatments.
Ignacio Secades Riestra, Cristóbal Andrés Blasco and Jaime Felgueroso Peláez.

BatteReverse: A next-generation automated, connected and standarised process for increased safety, efficiency, and sustainability of Li-Ion Battery Reverse logistics.
Alberto San-Miguel-Tello, Eric Domingo, Óscar Palacín and Néstor García

Accountability and explainability in autonomous systems for improved cybersecurity (TESCAC).
David Sobrín-Hidalgo, Laura Fernández-Becerra, Laura Inyesto-Alonso, Alberto Miguel-Diez, Miguel Ángel González-Santamarta, Claudia Álvarez-Aparicio, Adrián Campazas-Vega, Gonzalo Esteban-Costales, Alexis Gutierrez-Fernández, Francisco Javier Rodríguez-Lera, Camino Fernández-Llamas, Vicente Matellán-Olivera and Ángel Manuel Guerrero-Higueras.

Robotics and Communications in Complex Environments (ROBOCOMPLEX).
Luis Montano, Danilo Tardioli, Natalia Ayuso, Jorge Bes, Lorenzo Cano, Juan Dendarieta, María T. Lázaro, Francisco Lera, Diego Martínez-Baselga, Yaroslav Marchukov, Lorenzo Montano-Oliván, Alejandro Mosteo, Julio A. Placed, Luis Riazuelo and José L. Villarroel.

Encouraging the engagement with a social robot through creative colouring activities.
Sara Carrasco Martínez, Marcos Maroto Gómez, Fernando Alonso Martín and Álvaro Castro Gonzalez.

Design optimization and validation of a gripping tool applied to IFMIF-DONES.
Violeta Redondo Gallego, Olga Marín Cañas and Manuel Ferre Pérez.

SIMAR: Safe Inspection and Maintenance Supporting Workers with Modular Robots, Artificial Intelligence, and Augmented Reality.
M. A. Trujillo, A. Ollero, Guillermo Heredia, A. González-Morgado, D. Tejero, I. Pitas, A. Andrianavalomahefa, F. Robertson and R. Guldentops.

Project Summary: SAR 4.0, Leapfrogging to a New Paradigm in Cooperative Human-Robot Cyber-Physical Systems for Search and Rescue.
Alfonso García-Cerezo, Anthony Mandow, Juan Bravo-Arrabal, Raúl Castilla, Ana Cruz, Jesús Fernández-Lozano, Jose Antonio Gómez-Ruiz, Dahui Lin-Yang, Carmen López-Casado, José Luis Martín-Morales, Jorge Luis Martínez-Rodríguez, María Alcazar Martínez-Sánchez, Jesús Miranda, Jesús Morales, David Padial, Francisco Pastor-Martín, Gonzalo Paz, Carlos Pérez-del-Pulgar, Manuel Sánchez-Montero, Javier Serón, Manuel Toscano, Javier Trillo, Ricardo Vázquez-Martín and Pablo Vera.

PoC-ROBOCROP: Autonomous Dual-Arm Robot for Selective Harvesting.

Daniel Rodríguez-Nieto, Eduardo Navas, Alain Antonio Rodríguez-González and Roemi Fernández.

Supporting Extensive Livestock Farming with the use of Autonomous Intelligent Robots.
Francisco J Rodríguez Lera and Lidia Sánchez-González.

Decision Making in Autonomous Robots: Cybersecurity and Explainability (DMARCE).
Miguel Á. González-Santamarta and Francisco J Rodríguez Lera.

The CERN Human Robot Interface for Teleoperation in Hazardous Environments.
José Rodríguez Nogueira, Konrad Marek Chrostowski, Lucas Philippe Comte, Manuel Ferre, Eloise Matheson and Mario Di Castro.

VOJEXT: Collaborative robot for manufacturing and construction
Maria Eugenia Beltrán, Sofia Die and Carlos Lli.

Research at Intelligent Robotics Lab.
Francisco Martín Rico, José Miguel Guerrero, Rodrigo Pérez Rodríguez, Jorge Beltrán de la Cita, Francisco Moreno Olivo, Miguel Ángel de Miguel Juan Sebastián, and Francisco José Ramiro.

The GreenAuto autonomous solutions for intralogistics operations.
Ricardo B. Sousa, Diogo Miguel Matos, Héber Miguel Sobreira, Paulo M. Rebelo, Daniele Caldana, Artur Cordeiro, João Pedro Souza, Manuel F. Silva, Pedro G. Costa, Abel Mendes and Nuno Martins.

PRODUTECH R3 Project Overview – From AMRs to AI and the Digital Twin.
Paulo Rebelo, Ricardo Sousa, Héber Sobreira, Daniel Caldana, Manuel Couto, Marcelo Petry, Manuel Silva, Daniel Ramos, Gustavo Silva, Miguel Duarte, José Beça, Lanna Oliveira, Fillipe Ribeiro and Abel Mendes.

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