



# Technical Program





# Welcome to ROBOT'2019

It is our pleasure to welcome you all to the ROBOT'2019 conference, held in Porto, Portugal during 20 – 22 November 2019. ROBOT'2019 is the 4th edition of the Iberian Robotics Conference, a series of conferences that are a joint organization of SPR – Sociedade Portuguesa de Robótica / Portuguese Society for Robotics and SEIDROB – Sociedad Española para la Investigación y Desarrollo en Robótica / Spanish Society for Research and Development in Robotics. The conference organization had also the collaboration of several universities and research institutes, including: School of Engineering of the Polytechnic Institute of Porto, Polytechnic Institute of Bragança, University of Porto, University Politècnica de Catalunya, University of Zaragoza / I3A, INESC TEC, Centro Universitario de la Defensa, CEDRI and LIACC.

The technical program includes five plenary talks on state-of-the-art subjects on robotics, given by well-known scientists in their fields of research, and 110 original articles with cutting-edge scientific findings in a wide range of topics related to the rapidly evolving areas of robotics, organized in 16 special sessions, plus a main/general robotics track. We hope that ROBOT'2019 will enable delegates to exchange research ideas and to establish collaborative networks for advancement of science and knowledge discovery in the field of robotics and associated technologies.

We are offering a hard copy of the technical programme for delegates to use. Moreover, as is the tradition in ROBOT conferences, delegates will also receive soft copy conference proceedings published by Springer.

The social programme of the conference comprises a Welcome Reception in the evening of Wednesday 20th November, a tour to some of the main spots of Porto and a guided visit to the Porto Wine Cellars, followed by the conference banquet where the participants will be able to have a taste of traditional Portuguese cuisine, in the evening of Thursday 21st November, and a Farewell Cocktail in the evening of Friday 22nd November. We hope that this will meet the delegates' expectation of ROBOT'2019 and of the Porto hospitality.

There will also be tours arranged to visit robot research laboratories in the School of Engineering of the Porto Polytechnic and in the Faculty of Engineering of the University of Porto during the evening of Wednesday 20th November and afternoon of Thursday 21st November, respectively. These laboratories will highlight the state-of-the-art research being carried out in autonomous and industrial robots.

Finally, if you have queries or require any assistance please do not hesitate to approach the conference helpers or members of the conference organising team. We wish you all a successful and fruitful ROBOT'2019 conference and hope you enjoy the event from both technical and social aspects.

Manuel F. Silva, José Luís Lima, Luís Paulo Reis, Alberto Sanfeliu & Danilo Tardioli  
ROBOT'2019 General/Program Co-Chairs



Wednesday 20 November 2019		
Time	Programme session	
08:00-09:00	Registration	(Secretariado)
09:00-09:20	Opening Session	(Auditorio E)
09:20-10:20	Keynote-1: Elon Rimón	(Auditorio E)
10:20-10:40	<b>Coffee- break</b>	(Dining Room)
10:40-13:00	Session Wm1 (Auditorio E)	Session Wm2 (Sala de Atos)
	26	21
10:40-11:00	33	30
11:00-11:20	38	36
11:20-11:40	50	35
11:40-12:00	55	53
12:00-12:20	89	87
12:20-12:40	99	107
12:40-13:00		
13:00-14:00	<b>Lunch</b>	(Restaurant)
14:00-15:00	Keynote-2: Luis Merino	(Auditorio E)
15:00-16:40	Session Wa1 (Auditorio E)	Session Wa2 (Sala de Atos)
	47	59
15:00-15:20	64	82
15:20-15:40	86	90
15:40-16:00	98	155
16:00-16:20	106	144
16:20-16:40		
16:20-16:40	<b>Coffee- break</b>	(Dining Room)
16:40-18:20	Session We1 (Auditorio E)	Session We2 (Sala de Atos)
	54	19
16:40-17:00	74	25
17:00-17:20	84	34
17:20-17:40	91	73
17:40-18:00	110	76
18:00-18:20		
18:30-19:00	<b>Laboratory Tour</b>	
Visit to INESC TEC CRAS research laboratory.		
19:00-20:30	<b>Welcome reception</b>	
Welcome reception.		

Thursday 21 November 2019		
Time	Programme session	
08:00-09:00	Registration	(Secretariado)
09:00-10:00	Keynote-3: Nuno Lau	(Auditorio E)
10:00-10:20	<b>Coffee- break</b>	(Dining Room)
10:20-12:20	Session Tm1 (Auditorio E)	Session Tm2 (Sala de Atos)
	24	40
10:20-10:40	31	51
10:40-11:00	58	69
11:00-11:20	63	75
11:20-11:40	81	104
11:40-12:00	108	116
12:00-12:20		
12:20-14:00	<b>Lunch</b>	(Restaurant)
14:00-16:00	Session Ta1 (Auditorio E)	Session Ta2 (Sala de Atos)
	112	118
14:00-14:20	135	120
14:20-14:40	141	119
14:40-15:00	127	62
15:00-15:20	128	130
15:20-15:40	146	149
15:40-16:00		
16:00-16:20	<b>Coffee- break</b>	(Dining Room)
16:30-17:30	<b>Laboratory Tour</b>	
Visit to INESC TEC CRIIS research laboratory.		
17:30-20:00	<b>Porto City Tour</b>	
City tour to the main spots in Porto and guided tour to the Port Wine Cellars.		
20:00 - 23:30	<b>Banquet</b>	
Conference banquet.		

Friday 22 November 2019		
Time	Programme session	
08:00-09:00	Registration	(Secretariado)
09:00-10:00	Keynote-4: Miro Kovac	(Auditorio E)
10:00-10:20	<b>Coffee- break</b>	(Dining Room)
10:20-12:40	Session Fm1 (Auditorio E)	Session Fm2 (Sala de Atos)
	43	23
10:20-10:40	45	52
10:40-11:00	56	57
11:00-11:20	92	66
11:20-11:40	93	88
11:40-12:00		
12:00-12:20		32
12:20-12:40		97
12:40-14:00	<b>Lunch</b>	(Restaurant)
14:00-15:00	Keynote-5: Gianni A. Di Caro	(Auditorio E)
15:00-16:20	Session Fa1 (Auditorio E)	Session Fa2 (Sala de Atos)
	100	117
15:00-15:20	111	136
15:20-15:40	115	139
15:40-16:00	125	143
16:00-16:20		
16:20-16:40	Closing Session	(Auditorio E)
16:50-18:00	<b>Farewell cocktail</b>	
Farewell cocktail.		

Colour Map:

Keynote Address	
Laboratory Visits	
Social Program	
Mobile Robots for Industrial Environments	
Intelligent Perception and Manipulation	
General Robotics	
Collaborative robots for industry applications	
Radar-based applications for robotics	
Simulation in Robotics	
Machine Learning in Robotics	
Agricultural Robotics and Field Automation	
Future Industrial Robotics	
Rehabilitation and Assistive Robotics I	
Autonomous Driving and Driver Assistance Systems	
Aerial Robotics for Inspection and Maintenance	
XXth Workshop on Physical Agents	
Autonomous Sailboats and Support Technologies	
Educational Robotics	
Core concepts for an Ontology for Autonomous Robotics	
Field Robotics in Challenging Environments	

Note: Numbers in the presentation slots are ID#s of papers



# ROBOT 2019 Technical Programme

Wednesday 20 November 2019

<b>Time: 08:00 - 09:00</b>	
08:00-09:00	Conference Registration (Secretariado)

<b>ROBOT 2019 Opening Session</b>	
<b>Time: 09:00 - 09:20</b>	<b>Venue: Auditório E</b>
Time	Presentation
09:00-09:20	Opening Session

<b>Keynote Address – 1</b>			
<b>Session Chair: José Luís Lima</b>			
<b>Time: 09:20 - 10:20</b>			<b>Venue: Auditório E</b>
Time	Paper ID	Proc Page	Presentation
09:20-10:20		4	Perspectives on Minimalistic Robot Hand Design and a New Class of Caging-to-Grasping Algorithms <i>Elon Rimon</i>

<b>Session – Wm1: Mobile Robots for Industrial Environments</b>			
<b>Session Chair / Co-Chair: José Lima / Luís Piardi</b>			
<b>Time: 10:40 – 13:00</b>			<b>Venue: Auditório E</b>
Time	Paper ID	Proc Page	Presentation
10:40-11:00	26		Versatile and massive experimentation of robot swarms in industrial scenarios <i>Vivian Cremer Kalempa and Andre Schneider de Oliveira</i>
11:00-11:20	33		Edge-enabled Autonomous Navigation and Computer Vision as a Service: a Study on Mobile Robot's Onboard Energy Consumption and Computing Requirements <i>Jens Lambrecht and Eugen Funk</i>

11:20-11:40	38		A bio-inspired approach for robot swarm in smart factories <i>Ronnier Frates Rohrich, Andre Schneider de Oliveira, Luis Piardi and Marco Antonio Teixeira</i>
11:40-12:00	50		Positioning system for UAV precision tasks near walls in GPS denied and metallic environments <i>Felix Orjales Saavedra, Javier Losada Pita, Alejandro Paz Lopez and Alvaro Deibe Diaz</i>
12:00-12:20	55		CRAS (Climbing Robot for Autonomous inSpection): The Challenges of a High-Temperature Tank <i>Nicolas Dalmedico, Higor Barbosa Santos, Juliano Scholz Slongo, Marco Antônio Simões Teixeira, Piatan Sfair Palar, Vinicius Vargas Terres, André Schneider de Oliveira, Lúcia Valéria Ramos de Arruda, Flávio Neves Junior and Júlio Endress Ramos</i>
12:20-12:40	89		Indoor Environment Monitoring in Search of Gas Leakage by Mobile Robot <i>João Afonso Braun Neto, Luís Piardi, Thadeu Brito, José Lima, Ana Pereira, Paulo Costa and Alberto Nakano</i>
12:40-13:00	99		Performance of new global appearance description methods in localization of mobile robots <i>Vicente Román, Luis Paya, María Flores, Sergio Cebollada and Óscar Reinoso</i>

<b>Session – Wm2: Intelligent Perception and Manipulation</b>			
<b>Session Chair / Co-Chair: Roemi Fernández / Filipe Neves Dos Santos</b>			
<b>Time: 10:40 – 12:40</b>			<b>Venue: Sala de Atos</b>
Time	Paper ID	Proc Page	Presentation
10:40-11:00	21		ROS Framework for Perception and Dual-Arm Manipulation in Unstructured Environments <i>Delia Sepúlveda, Roemi Fernández, Eduardo Navas, Pablo González de Santos and Manuel Armada</i>
11:00-11:20	22		Modular Dual-Arm Robot for Precision Harvesting <i>Eduardo Navas Merlo, Roemi Emilia Fenández Saavedra, Delia Sepúlveda Muñoz, Manuel Ángel Armada Rodríguez and Pablo Gonzalez-de-Santos</i>
11:20-11:40	35		Integrating Multiple Sources of Knowledge for the Intelligent Detection of Anomalous Sensory Data in a Mobile Robot <i>Manuel Castellano-Quero, Juan-Antonio Fernández-Madrigal and Alfonso García-Cerezo</i>



11:40-12:00	53		A Manipulation Control Strategy for Granular Materials based on a Gaussian Mixture Model <i>Carlos M. Mateo, Juan Antonio Corrales and Youcef Mezouar</i>
12:00-12:20	87		Visual and tactile fusion for estimating the pose of a grasped object <i>David Álvarez, Maximo Roa and Luis Moreno</i>
12:20-12:40	107		Object Classification for Robotic Platforms <i>Samuel Brandenburg, Pedro Machado, Pranjali Shinde, Joao Filipe Ferreira and Martin McGinnity</i>

<b>Session – Wm3: General Robotics</b>			
<b>Session Chair / Co-Chair: Luís Paulo Reis / Manuel Silva</b>			
<b>Time: 10:40 – 12:40</b>			<b>Venue: Sala de Reuniões</b>
Time	Paper ID	Proc Page	Presentation
10:40-11:00	30		Generalized Camera Array Model for Standard Plenoptic Cameras <i>Nuno Barroso Monteiro and José Gaspar</i>
11:00-11:20	36		Evaluation of SLAM Algorithms for Highly Dynamic Environments <i>Oliver Roesler and Vignesh Padubidri Ravindranath</i>
11:20-11:40	122		Mind Perception of a Sociable Humanoid Robot: A comparison between elderly and young adults <i>Maryam Alimardani and Sonia Qurashi</i>
11:40-12:00	131		Velocity-based Heuristic Evaluation for Path Planning and Vehicle Routing for Victim Assistance in Catastrophe Scenarios <i>Manuel Toscano Moreno, Anthony Mandow, María Alcázar Martínez Sánchez and Alfonso García Cerezo</i>
12:00-12:20	32		Robot Navigation to approach people using G <sup>2</sup> -Spline path planning and Extended Social Force Model <i>Marta Galvan, Ely Repiso and Alberto Sanfeliu</i>

12:20-12:40	103		Human-robot Collaborative Navigation Search using Social Reward Sources <i>Marc Dalmasso, Anaís Garrell, Pablo Jiménez and Alberto Sanfeliu</i>
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<b>Keynote Address – 2</b> <b>Session Chair: Alberto Sanfeliu</b>			
<b>Time: 14:00 - 15:00</b>			<b>Venue: Auditório E</b>
Time	Paper ID	Proc Page	Presentation
14:00 - 15:00			Human-aware decision making and navigation for service robots <i>Luis Merino</i>

<b>Session – Wa1: Collaborative robots for industry applications</b> <b>Session Chair / Co-Chair: Pedro Neto / José Lima</b>			
<b>Time: 15:00 – 16:40</b>			<b>Venue: Auditório E</b>
Time	Paper ID	Proc Page	Presentation
15:00-15:20	47		Augmented reality system for multi-robot experimentation in warehouse logistics <i>Marcelo Limeira, Luis Piardi, Vivian Kalempa, André Schneider and Paulo Leitão</i>
15:20-15:40	64		Collision avoidance system with obstacles and humans to collaborative robots arms based on RGB-D data <i>Thadeu Brito, Jose Lima, Pedro Costa, Vicente Matellán and João Braun</i>
15:40-16:00	86		Human manipulation segmentation and characterization based on instantaneous work <i>Anthony Remazeilles, Irati Rasines, Asier Fernandez and Joseph McIntyre</i>
16:00-16:20	98		Spherical UAV for indoor human-robot interaction <i>Agustin Ramos Hurtado, Pedro Jesus Sanchez Cuevas, Guillermo Heredia Benot and Anibal Ollero Baturone</i>
16:20-16:40	106		Towards Endowing Collaborative robots with fast learning for minimizing Tutors' demonstrations: What and When to do? <i>Ana Cunha, Flora Ferreira, Wolfram Erlhagen, Emanuel Sousa, Luís Louro, Paulo Vicente, Sérgio Monteiro and Estela Bicho</i>

<b>Session – Wa2: Radar-based applications for robotics</b> <b>Session Chair / Co-Chair: Francisco Curado / Eurico Pedrosa</b>			
<b>Time: 15:00 – 16:20</b>			<b>Venue: Sala de Atos</b>
Time	Paper ID	Proc Page	Presentation
15:00-15:20	59		Asynchronous mmWave Radar Interference for Indoor Intrusion Detection <i>Edgar Gonçalves, Daniel Albuquerque, Eurico Pedrosa and Francisco Teixeira</i>
15:20-15:40	82		Machine learning methods for radar-based people detection and tracking by mobile robots <i>José Castanheira, Francisco Curado, Eurico Pedrosa, Edgar Gonçalves and Ana Tomé</i>
15:40-16:00	90		Low Cost Binaural System Based on the Echolocation <i>Thiago Moreira, José Lima, Paulo Costa and Márcio Cunha</i>
16:00-16:20	155		Tracking Drones With Drones Using Millimeter Wave Radar <i>Sedat Dogru, Lino Marques and Rui Baptista</i>

<b>Session – Wa3: Simulation in Robotics</b> <b>Session Chair / Co-Chair: Nuno Lau / Artur Pereira</b>			
<b>Time: 15:00 – 16:20</b>			<b>Venue: Sala de Reuniões</b>
Time	Paper ID	Proc Page	Presentation
15:00-15:20	46		Coverage Path Planning Otimization for Slopes and Dams Inspection <i>Iago Biundini, Aurelio Melo, Milena Pinto, Guilherme Marins, Andre Marcato and Leonardo Honório</i>
15:20-15:40	94		Evaluating an AEF Swimming Microrobot Using a Hardware-in-the-loop Testbed <i>José Emilio Traver, Ines Tejado, Cristina Nuevo-Gallardo, Javier Prieto-Arranz, Miguel A. López and Blas M Vinagre</i>
15:40-16:00	102		Fully Coupled Six-DoF Nonlinear Suboptimal Control of a Quadrotor: Application to Variable-pitch Rotor Design <i>Saeed Rafee Nekoo, José Ángel Acosta and Aníbal Ollero</i>

16:00-16:20	144		Learning Low-Level Behaviors and High-Level Strategies in Humanoid Soccer <i>David Simões, Pedro Amaro, Tiago Silva, Nuno Lau and Luís Paulo Reis</i>
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<b>Session – We1: Machine Learning in Robotics</b> <b>Session Chair / Co-Chair: Mónica Faria / Luis Merino</b>			
<b>Time: 16:40-18:20</b>			<b>Venue: Auditorio E</b>
Time	Paper ID	Proc Page	Presentation
16:40-17:00	54		Effects of a SFM reward in Robot Navigation based on Deep RL <i>Óscar Gil and Alberto Sanfeliu</i>
17:00-17:20	74		A Cross-Situational Learning based Framework for Grounding of Synonyms in Human-Robot Interactions <i>Oliver Roesler</i>
17:20 - 17:40	84		A Novel Model For Emotion Detection From Facial Muscles Activity <i>Elahe Bagheri, Azam Bagheri, Pablo G. Esteban and Bram Vanderborgth</i>
17:40-18:00	91		Producing Parameterized Value Functions through Modulation for Cognitive Developmental Robots <i>Alejandro Romero, Francisco Bellas, José Antonio Becerra Permy and Richard Duro</i>
18:00-18:20	110		Benchmarking Deep and Non-deep Reinforcement Learning Algorithms for Discrete Environments <i>Fernando Duarte, José Lau, Artur Pereira and Luís Reis</i>

<b>Session – We2: Agricultural Robotics and Field Automation</b> <b>Session Chair / Co-Chair: Filipe Neves Dos Santos / Raul Morais</b>			
<b>Time: 16:40-18:20</b>			<b>Venue: Sala de Atos</b>
Time	Paper ID	Proc Page	Presentation
16:40-17:00	19		Cleaning Robot for Free Stall Dairy Barns: Sequential Control for Cleaning and Littering of Cubicles <i>Ilja Stasewitsch, Jan Schattenberg and Ludger Frerichs</i>

17:00-17:20	25		A Version of Libviso2 for Central Dioptic Omnidirectional Cameras with a Laser-based Scale Calculation <i>André Aguiar, Filipe Santos, Luis Santos and Armando Sousa</i>
17:20 - 17:40	34		Deep Learning applications in agriculture: a short review <i>Luís Santos, Filipe N. Santos, Paulo Oliveira and Pranjali Shinde</i>
17:40-18:00	73		Forest robot and datasets for biomass collection <i>Ricardo Reis, Luís Santos and Filipe N. Santos</i>
18:00-18:20	76		An autonomous guided field inspection vehicle for 3D crop monitoring <i>José M. Bengochea-Guevara, Dionisio Andujar, Karla Cantuña, Celia Garijo-Del-Río and Angela Ribeiro</i>

**Session – We3: Future Industrial Robotics**

**Session Chair / Co-Chair: Germano Veiga / Jon Agirre Ibarbia**

**Time: 16:40-18:20**

**Venue: Sala de Reuniões**

Time	Paper ID	Proc Page	Presentation
16:40-17:00	68		Perception of Entangled Tubes for Automated Bin Picking <i>Gonçalo Leão, Carlos M. Costa, Armando Sousa and Germano Veiga</i>
17:00-17:20	114		Applying Software Static Analysis to ROS: The Case Study of the FASTEN European Project <i>Tiago Neto, Rafael Arrais, Armando Sousa, André Santos and Germano Veiga</i>
17:20 - 17:40	123		Autonomous Robot Navigation for Automotive Assembly Task: an Industry Use-case <i>Luis Rocha, Héber Sobreira, José Lima, Francisco Rodrigues, Germano Veiga and A. Paulo Moreira</i>
17:40-18:00	138		Smart Data Visualisation as a Stepping Stone for Industry 4.0 - a case study in investment casting industry <i>Beatriz Cruz, Armando Sousa, Ângela Cardoso, Bernardo Valente and Ana Reis</i>

18:00-18:20	142	Development of an Autonomous Mobile Towing Vehicle for Logistic Tasks <i>Cláudia Rocha, Ivo Sousa, Francisco Ferreira, Héber Sobreira, José Lima, Germano Veiga and A. Paulo Moreira</i>
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<b>Laboratory Tour</b> <b>Session Chair: Eduardo Silva</b>	
<b>Time: 18:30-19:00</b>	<b>Venue: INESC TEC LSA</b>
Time	Presentation
18:30 - 19:00	INESC TEC CRAS - Centre for Robotics and Autonomous Systems <i>Eduardo Silva</i>

<b>ROBOT 2019 Welcome reception</b>	
<b>Time: 19:00-20:30</b>	<b>Venue: tbd</b>
Time	Presentation
19:00 - 20:30	Welcome reception

## Thursday 21 November 2019

<b>Time: 08:00 - 09:00</b>	
08:00-09:00	Conference Registration (Secretariado)

<b>Keynote Address – 3</b> <b>Session Chair: Luís Paulo Reis</b>			
<b>Time: 09:00 - 10:00</b>		<b>Venue: Auditório E</b>	
Time	Paper ID	Proc Page	Presentation
09:00 - 10:00			Optimization and Learning in Robotics <i>Nuno Lau</i>

<b>Session – Tm1: Rehabilitation and Assistive Robotics I</b> <b>Session Chair / Co-Chair: Paulo Ferreira / Pedro Guedes</b>			
<b>Time: 10:20-12:20</b>		<b>Venue: Auditório E</b>	
Time	Paper ID	Proc Page	Presentation
10:20-10:40	24		Classification of daily activities using an intelligent tip for crutches <i>Asier Brull, Aitor Gorrotxategi, Asier Zubizarreta, Itziar Cabanes and Ana Rodriguez-Larrad</i>
10:40-11:00	31		ExoFlex: an upper-limb cable-driven exosuit <i>David Pont Esteban, Aldo Francisco Contreras González, José Luis Samper Escudero, Manuel Ferre Pérez and Miguel Ángel Sánchez-Urán</i>
11:00-11:20	58		Using a Collaborative Robot to the Upper Limb Rehabilitation <i>Lucas Fernandes, Jose Lima, Paulo Leitao and Alberto Nakano</i>
11:20-11:40	63		Grasping Angle Estimation of Human Forearm with Underactuated Grippers using Proprioceptive Feedback <i>Francisco Pastor, Juan M. Gandarias, Alfonso J. García-Cerezo, Antonio J. Muñoz-Ramírez and Jesús M. Gómez-de-Gabriel</i>

11:40-12:00	81		Integration of a surgical robotic co-worker in an endoscopic neurosurgical assistance platform <i>Álvaro Muñoz García, Irene Rivas Blanco, Javier P. Turiel, Victor Muñoz Martínez, Juan Carlos Fraile Marinero, Eusebio de la Fuente López and Jose María Sabater Navarro</i>
12:00-12:20	108		Smart Companion Pillow -- An EPS@ISEP 2019 Project <i>Alexandre Soares dos Reis, Elien Gielen, Ko Hendrik Johan Wopereis, Marcel Pasternak, Vaido Sooaar, Tobias Schneider, Abel J. Duarte, Benedita Malheiro, Jorge Justo, Cristina Ribeiro, Manuel Silva, Paulo Ferreira and Pedro Guedes</i>

**Session – Tm2: Autonomous Driving and Driver Assistance Systems I**  
**Session Chair / Co-Chair: Vitor Santos / Arturo de La Escalera**

Time: 10:20-12:20		Venue: Sala de Atos	
Time	Paper ID	Proc Page	Presentation
10:20-10:40	40		NOSeqSLAM: Not only Sequential SLAM <i>Jurica Maltar, Ivan Marković and Ivan Petrović</i>
10:40-11:00	51		ADAS and AD web visualization application <i>Duarte Barbosa, Miguel Leitão and João Silva</i>
11:00-11:20	69		A General Approach to the Extrinsic Calibration of Intelligent Vehicles Using ROS <i>Miguel Riem de Oliveira, Afonso Castro, Tiago Madeira, Paulo Dias and Vitor Santos</i>
11:20-11:40	75		Self-Awareness In Intelligent Vehicles: Experience based Abnormality Detection <i>Divya Thekke Kanapram, Pablo Marin-Plaza, Arturo De La Escalera, Carlo Regazzoni and Lucio Marcenaro</i>
11:40-12:00	104		Joint Instance Segmentation of Obstacles and Lanes using Convolutional Neural Networks <i>Leonardo Cabrera Lo Bianco, Abdulla Al-Kaff, Jorge Beltran, Fernando Garcia and Gerardo Fernandez Lopez</i>
12:00-12:20	116		Scalable ROS-Based Architecture to Merge Multi-source Lane Detection Algorithms <i>Tiago Almeida, Bernardo Lourenço and Vitor Santos</i>



<b>Session – Tm3: Aerial Robotics for Inspection and Maintenance I</b> <b>Session Chair / Co-Chair: Guillermo Heredia / Jesus Capitan</b>			
<b>Time: 10:20-12:20</b>			<b>Venue: Sala de Reuniões</b>
Time	Paper ID	Proc Page	Presentation
10:20-10:40	20		Design optimization of a ducted-drone to perform inspection operations <i>João Vilaça, Alberto Vale and Filipe Cunha</i>
10:40-11:00	28		Positioning System for Pipe Inspection with Aerial Robots using Time of Flight Sensors <i>Manuel Perez, Alejandro Suarez, Guillermo Heredia and Anibal Ollero</i>
11:00-11:20	70		An aerial robot path follower based on the 'Carrot chasing' algorithm <i>Hector Perez-Leon, Jose Joaquin Acevedo, Jose Millan-Romera, Alejandro Castillejo-Calle, Ivan Maza and Anibal Ollero</i>
11:20-11:40	71		Online detection and tracking of pipes during UAV flight in industrial environments <i>Augusto Gómez Eguíluz, Julio Lopez Paneque, José Ramiro Martínez de Dios and Aníbal Ollero</i>
11:40-12:00	72		ROSS-LAN: Robotic Sensing Simulation scheme for bioinspired robotic bird LANding <i>Juan Pablo Rodríguez Gómez, Augusto Gómez Eguíluz, José Ramiro Martínez de Dios and Aníbal Ollero</i>
12:00-12:20	80		TCP muscle tensors: Theoretical analysis and potential applications in aerial robotic systems <i>Alejandro Ernesto Gómez Tamm, Pablo Ramón Soria, Aníbal Ollero and B. C. Arrue</i>

<b>Session – Ta1: Rehabilitation and Assistive Robotics II</b> <b>Session Chair / Co-Chair: Mónica Faria</b>			
<b>Time: 14:00 – 15:00</b>			<b>Venue: Auditório E</b>
Time	Paper ID	Proc Page	Presentation
14:00-14:20	112		Advantages study of the incorporation of an active upper-limb exoskeleton in industrial tasks <i>Andrea Blanco Ivorra, José María Catalán Orts, Jorge Antonio Díez Pomares, José Vicente García Pérez, Luis Daniel Lledó Pérez, Emilio Lobato and Nicolas Garcia-Aracil</i>

14:20-14:40	135		Assistance Strategies for robotized laparoscopic <i>Alicia Casals, Albert Hernansanz, Narcís Sayols and Josep Amat</i>
14:40-15:00	141		Suitable task allocation in intelligent systems for assistive environments <i>Manuel Vinagre, Joan Aranda and Alicia Casals</i>

**Session – Ta2: Autonomous Driving and Driver Assistance Systems II**

**Session Chair / Co-Chair: Arturo de La Escalera / Miguel Oliveira**

<b>Time: 14:00 – 14:40</b>			<b>Venue: Sala de Atos</b>
Time	Paper ID	Proc Page	Presentation
14:00-14:20	118		Semi-supervised Pole-based Localization for Urban Environments <i>Tiago Barros, Luís Garrote, Ricardo Pereira, Cristiano Premebida and Urbano J. Nunes</i>
14:20-14:40	120		Detection of Road Limits using Gradients of the Accumulated Point Cloud Density <i>Daniela Rato and Vítor Santos</i>

**Session – Ta3: Aerial Robotics for Inspection and Maintenance II**

**Session Chair / Co-Chair: Begoña Arrue / Augusto Gomez-Eguiluz**

<b>Time: 14:00 – 16:00</b>			<b>Venue: Sala de Reuniões</b>
Time	Paper ID	Proc Page	Presentation
14:00-14:20	85		Autonomous Drone-based Powerline Insulator Inspection via Deep Learning <i>Anas Muhammad, Adnan Shahpurwala, Shayok Mukhopadhyay and Ayman El-Hag</i>
14:20-14:40	95		Aerodynamic effects in multirotors flying close to obstacles: modelling and mapping <i>P. J. Sanchez-Cuevas, Victor Martín, Guillermo Heredia and Aníbal Ollero</i>
14:40-15:00	119		Development of a Semi-autonomous Aerial Vehicle for Sewerage Inspection <i>Angel Rodriguez-Castaño, Honorio Romero, Jesús Capitán, José Luis Andrade and Aníbal Ollero</i>

15:00-15:20	126		A UAV precision positioning architecture for power line tower inspection using augmented reality tag <i>Alvaro Cantieri, Marco Wehrmeister, André Oliveira, José Lima, Matheus Ferraz and Guido Szekir</i>
15:20-15:40	147		Emergency Landing Spot Detection for Unmanned Aerial Vehicle <i>Gabriel Loureiro, Luís Soares, André Dias and Alfredo Martins</i>
15:40-16:00	150		Evaluation of Lightweight Convolutional Neural Networks for Real-time Electrical Assets Detection <i>Joel Barbosa, Andre Dias, Jose Almeida and Eduardo Silva</i>

**Session – Ta1b: XXth Workshop on Physical Agents I**  
**Session Chair / Co-Chair: Pablo Bustos / Vicente Matellán**

<b>Time: 15:00 – 16:00</b>			<b>Venue: Auditório E</b>
Time	Paper ID	Proc Page	Presentation
15:00-15:20	127		A Modelling and Formalisation Tool for Use Case Design in Social Autonomous Robotics <i>Alba Gragera, Alba María García and Fernando Fernández</i>
15:20-15:40	128		People detection and tracking using an on-board drone camera <i>Cristian Cifuentes-García, Daniel González-Medina and Ismael García-Varea</i>
15:40-16:00	146		Design of a Robotic as a Service Platform to Perform Rehabilitation Therapies <i>Adrián Gallego Castellanos, José Carlos Pulido, José Carlos González and Fernando Fernández</i>

**Session – Ta2b: Autonomous Sailboats and Support Technologies**  
**Session Chair / Co-Chair: Jorge Cabrera Gámez / Pedro Guedes**

<b>Time: 15:00 – 16:00</b>			<b>Venue: Sala de Atos</b>
Time	Paper ID	Proc Page	Presentation
15:00-15:20	62		Force balances for monitoring autonomous rigid-wing sailboats <i>Matias Waller, Ulysse Dhomé, Jakob Kutteneuler and Andy Ruina</i>

15:20-15:40	130	Acoustic detection of tagged Angelsharks from an autonomous sailboat <i>Jorge Cabrera, Antonio C. Domínguez-Brito, F. J. Santana-Jorge, Diego Gamo, David Jiménez and José Juan Castro</i>
15:40-16:00	149	Airfoil Selection and Wingsail Design for an Autonomous Sailboat <i>Manuel Silva, Benedita Malheiro, Pedro Guedes and Paulo Ferreira</i>

<b>Laboratory Tour</b> <b>Session Chair: António Paulo Moreira</b>	
<b>Time: 16:30 - 17:30</b>	<b>Venue: INESC TEC IILab</b>
Time	Presentation
16:30-17:30	INESC TEC CRIIS - Centre for Robotics in Industry and Intelligent Systems <i>António Paulo Moreira</i>

<b>ROBOT 2019 Social Programme</b>	
<b>Time: 17:30 - 23:30</b>	<b>Venue: Porto City</b>
17:30-20:00	City tour to the main spots in Porto and guided tour to the Port Wine Cellars <i>tbd</i>
20:00-23:30	Conference Banquet <i>tbd</i>

## Friday 22 November 2019

<b>Time: 08:00 - 09:00</b>	
08:00-09:00	Conference Registration (Secretariado)

<b>Keynote Address – 4</b>			
<b>Session Chair: Manuel Silva</b>			
<b>Time: 09:00-10:00</b>			<b>Venue: Auditório E</b>
Time	Paper ID	Proc Page	Presentation
09:00-10:00			Soft Aerial Robotics for Digital Infrastructure Systems <i>Mirko Kovac</i>

<b>Session – Fm1: XXth Workshop on Physical Agents II</b>			
<b>Session Chair / Co-Chair: Ismael García Varea / Pablo Bustos</b>			
<b>Time: 10:20 – 12:00</b>			<b>Venue: Auditório E</b>
Time	Paper ID	Proc Page	Presentation
10:20-10:40	43		3d hand joints position estimation with graph convolutional networks: a GraphHands baseline <i>John Alejandro Castro Vargas, Alberto Garcia Garcia, Sergiu Oprea, Pablo Martinez Gonzalez and Jose Garcia Rodriguez</i>
10:40-11:00	45		Map Slammer: Densifying Scattered KSLAM 3D Maps with Estimated Depth <i>Jose Miguel Torres-Camara, Felix Escalona, Francisco Gomez-Donoso and Miguel Cazorla</i>
11:00-11:20	56		Integration of the Alexa assistant as a Voice Interface for Robotics Platforms <i>Alejandro Hidalgo-Paniagua, Andrés Millán-Alcaide, Juan P. Bandera and Antonio Bandera</i>
11:20-11:40	92		Adapting ROS Logs to Facilitate Transparency and Accountability in Service Robotics <i>Francisco J Rodríguez Lera, Angel Manuel Guerrero Higuera, Vicente Matellan Olivera, Francisco Martín Rico, Jonathan Gines and Juan Felipe García Sierra</i>
11:40-12:00	93		A Story-telling Social Robot with Emotion Recognition Capabilities for the Intellectually Challenged <i>David Azuar, Guillermo Gallud, Felix Escalona, Francisco Gomez-Donoso and Miguel Cazorla</i>

<b>Session – Fm2: Educational Robotics I</b>			
<b>Session Chair / Co-Chair: Armando Sousa / Francisco Bellas</b>			
<b>Time: 10:20 – 12:20</b>			<b>Venue: Sala de Atos</b>
Time	Paper ID	Proc Page	Presentation
10:20-10:40	23		Factors Influencing the Sustainability of Robot Supported Math Learning in Basic School <i>Janika Leoste and Mati Heidmets</i>
10:40-11:00	52		Teaching Mobile Robotics using the Autonomous Driving Simulator of the Portuguese Robotics Open <i>Valter Costa, Peter Cebola, Pedro Tavares, Vítor Morais and Armando Sousa</i>
11:00-11:20	57		The Role of Educational Technologist in Robot supported Math Lessons <i>Janika Leoste and Mati Heidmets</i>
11:20-11:40	66		Robot@Factory Lite: An educational approach for the competition with simulated and real environment <i>João Braun, Lucas Fernandes, Thiago Moya, Vitor Oliveira, Thadeu Brito, Jose Lima and Paulo Costa</i>
11:40-12:00	88		Web Based Robotic simulator for Tactode Tangible Block Programming System <i>Márcia Alves, Armando Sousa and Ângela Cardoso</i>
12:00-12:20	97		Development of an AlphaBot2 simulator for RPi camera and infrared sensors <i>Ana Rafael, Cássio Santos, Diogo Duque, Sara Fernandes, Armando Sousa and Luís Reis</i>

<b>Session – Fm3: Core concepts for an Ontology for Autonomous Robotics</b>			
<b>Session Chair / Co-Chair: Jan Rosell / João Quintas</b>			
<b>Time: 10:20–12:00</b>			<b>Venue: Sala de Reuniões</b>
Time	Paper ID	Proc Page	Presentation
10:20-10:40	29		An Ontology for Failure Interpretation in Automated Planning and Execution <i>Mohammed Diab, Mihai Pomarlan, Daniel Beßler, Aliakbar Akbari, Jan Rosell, John Bateman and Michael Beetz</i>

10:40-11:00	41		Deducing Qualitative Capabilities with Generic Ontology Design Patterns <i>Bernd Krieg-Brückner and Mihai Codescu</i>
11:00-11:20	113		Meta-control and self awareness for the UX-1 autonomous underwater robot <i>Carlos Hernandez Corbato, Zorana Milosevic, Carmen Olivares, Gonzalo Rodriguez and Claudio Rossi</i>
11:20-11:40	132		An Apology for the “Self” Concept in Autonomous Robot Ontologies <i>Ricardo Sanz</i>
11:40-12:00	140		Knowledge and Capabilities Representation for Visually Guided Robotic Bin Picking <i>Paulo Goncalves, Frederico Torres and João Pinto</i>

**Keynote Address – 5**  
**Session Chair: Danilo Tardioli**

**Time: 14:00 - 15:00**      **Venue: Auditório E**

Time	Paper ID	Proc Page	Presentation
14:00-15:00			Robot swarms and the Human-in-the-Loop <i>Gianni A. Di Caro</i>

**Session – Fa1: XXth Workshop on Physical Agents III**  
**Session Chair / Co-Chair: Vicente Matellán / Miguel Cazorla**

**Time: 15:00 – 16:20**      **Venue: Auditório E**

Time	Paper ID	Proc Page	Presentation
15:00-15:20	100		A novel inter-device calibration for Wi-Fi-aided indoor localization systems <i>Miguel Martínez del Horno, Cristina Romero-González, Luis Orozco-Barbosa and Ismael García-Varea</i>
15:20-15:40	111		A review of segmentation methods for 3D semantic mapping <i>Cristina Romero-González, Jesus Martinez-Gomez and Ismael Garcia-Varea</i>

15:40-16:00	115		Learning from the Individuals and the Crowd in Robotics and Mobile Devices <i>Fernando E. Casado, Dylan Lema, Roberto Iglesias, Carlos V. Regueiro and Senén Barro</i>
16:00-16:20	125		Socially-accepted Path Planning for Robot Navigation based on Social Interaction Spaces <i>Araceli Vega, Ramón Cintas, Luis Manso, Pablo Bustos and Pedro Núñez</i>

**Session – Fa2: Educational Robotics II**

**Session Chair / Co-Chair: Francisco Bellas / Armando Sousa**

<b>Time: 15:00 – 16:20</b>			<b>Venue: Sala de Atos</b>
Time	Paper ID	Proc Page	Presentation
15:00-15:20	117		Artificial Intelligence Teaching through Embedded Systems: A Smartphone-Based Robot Approach <i>Luis Llamas, Alejandro Paz-Lopez, Abraham Prieto, Felix Orjales and Francisco Bellas</i>
15:20-15:40	136		Human-Robot Scaffolding, an Architecture to Support the Learning Process <i>Henrique González, John Páez, Fernando Luis-Ferreira, João Sarraipa and Ricardo Goncalves</i>
15:40-16:00	139		Azoresbot: An Arduino based robot for Robocup competitions <i>Jose Cascalho, Alberto Ramos, Francisco Pedro, Nuno Bonito, Domingos Almeida, Armando Mendes, Matthias Funk and Paulo Leite</i>
16:00-16:20	143		BulbRobot - Inexpensive Open Hardware and Software Robot featuring Catadioptric Vision and Virtual Sonars <i>João Ferreira, Filipe Coelho, Armando Sousa and Luís Paulo Reis</i>

**Session – Fa3: Field Robotics In Challenging Environments**

**Session Chair / Co-Chair: Alejandro Mosteo / Danilo Tardioli**

<b>Time: 15:00 – 16:20</b>			<b>Venue: Sala de Reuniões</b>
Time	Paper ID	Proc Page	Presentation
15:00-15:20	61		Trajectory planning for time-constrained agent synchronization <i>Yaroslav Marchukov and Luis Montano</i>



15:20-15:40	83		Graph-based Robot Localization in Tunnels using RF Fadings <i>Teresa Seco, María Teresa Lázaro, Carlos Rizzo, Jesús Espelosín and José Luis Villarreal</i>
15:40-16:00	121		A RGBD-based system for real-time robotic defects detection on sewer networks <i>Luis Merino Cabañas, David Alejo Teissière, Simón Martínez Rozas and Fernando Caballero Benítez</i>
16:00-16:20	156		Detecting Indoor Smoldering Fires with a Mobile Robot <i>Carolina Conceição, João Macedo and Lino Marques</i>

### **ROBOT 2019 Closing Session**

<b>Time: 16:20-16:40</b>	<b>Venue: Auditório E</b>
Time	Presentation
16:50 - 18:00	Closing Session

### **ROBOT 2019 Farewell Cocktail**

<b>Time: 16:50-18:00</b>	<b>Venue: Dining Room</b>
Time	Presentation
16:50 - 18:00	Farewell Cocktail