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Academia de Științe
Tehnice din România
Technical Sciences
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The 33rd International Conference on Robotics in Alpe-Adria-Danube Region RAAD 2024

June 5-7, 2024, Cluj-Napoca Romania



Organized by
Technical University of Cluj-Napoca
CESTER - Research Center for Industrial Robots Simulation and Testing

Under the patronage of
IFTToMM International Federation for the
Promotion of Mechanism and Machine Science

Program at the Glance

	Wednesday, 5 th of June, 2024		Thursday, 6 th of June, 2024		Friday, 7 th of June, 2024	
9:00	9:00 - 9:30 – Opening (Room Vivaldi)		9:00 – 10:00 Plenary Session II – <i>Assistance Robot for Otological and Sinus Endoscopic Surgery: Advancing Surgical Innovation</i> Damien Chablat - École Centrale Nantes, Nantes Université, CNRS, LS2N, UMR, Nantes, France (Room Vivaldi)		9:00 -10:00 Plenary Session III - <i>A Global Overview on Designing and Using Mechatronic Healthcare Assistive Devices</i> José Machado - University of Minho, Portugal (Room Vivaldi)	
	9:30 – 10:30 Plenary Session I- <i>Local versus global Kinematics</i> Manfred Husty - University of Innsbruck, Austria (Room Vivaldi)					
10: 00	10:30 - 11:00 Coffee break (Hotel Lobby)		10:00 – 10:30 Coffee break (Hotel Lobby)		10:00 - 10:30 Coffee break (Hotel Lobby)	
11:00	11:00 - 12:40 Technical session Perception and Learning I (Room Vivaldi)	11:00 - 12:20 Technical session Medical Robotics and Biomechanics I (Room Verdi)	10:30 -12:10 Technical session Kinematics and Dynamics I (Room Vivaldi)	10:30 -12:10 Technical session Motion Planning and Control I (Room Verdi)	10:30 - 12:50 Technical session Service Robotics and Applications (Room Vivaldi)	10:30 - 12:50 Technical session Mobile Robots and Innovative Robot Design (Room Verdi)
12:00	Meeting of RAAD ISC (Hotel Restaurant)		12:10 – 13:10 Lunch break (Hotel Restaurant)		12:50 – 13:50 Award Ceremony and Closing (Room Vivaldi)	
13:00			12:40 - 14:00 Lunch break (Hotel Restaurant)			
14:00	14:00 – 14:20 Keynote session I - <i>Advancing Service Robotics: Navigating Requirements, Confronting Challenges, and Embracing New Trends</i> Giuseppe Carbone - University of Calabria, Italy (Room Vivaldi)		13:30 – 15:10 Technical session Kinematics and Dynamics II (Room Vivaldi)		13:30 – 15:10 Technical session Motion Planning and Control II (Room Verdi)	
15:00	14:20 – 16:00 Technical session Perception and Learning II (Room Vivaldi)	14:20 – 16:00 Technical session Medical Robotics and Biomechanics II (Room Verdi)				
16:00	16:00 – 16:30 Coffee Break (Hotel Lobby)		15:10-18:00 Visit to the Turda Salt Mine			
17:00	16:30 – 18:10 Technical session Medical Robotics and Biomechanics III (Room Vivaldi)	16:30 – 18:10 Technical session Industrial Robots and Education (Room Verdi)				
18:00						
19:00	19: 30 – 21:30 Welcome reception (Grand Hotel Italia Restaurant)		19:00 – 22:30 - Conference Banquet (da Vinci Restaurant)			

Detailed Technical Program

Wednesday, 5th of June, 2024

	Plenary Session I	Room Vivaldi	Wednesday, 5th of June, 9:30- 10:30
Chair: Doina Pisla			
9:30	<i>Local versus global Kinematics</i> Manfred Husty		

	Technical Session Perception and Learning I	Room Vivaldi	Wednesday, 5th of June, 11:00 - 12:40
Chair: Tadej Petrič, Olimpiu Tatar			
11:00	<i>Outliers - Do Image and Feature Domain Outliers Coincide in Robotic Applications?</i> Axel Vierling, Karsten Berns, Urooj Iltifat		
11:20	<i>An algorithm for determining the coordinates of a test tube by a robotic aliquoting system based on a combination of the Hough method and a result filtering algorithm</i> Larisa Rybak, Vladislav Cherkasov, Dmitry Malyshev, Dmitry Dyakonov, Giuseppe Carbone		
11:40	<i>Deployment of Algorithms for Autonomous Drone Racing in a Real Environment</i> Marko Šušnjar, Kosta Jovanović		
12:00	<i>Contactless Assembly of a Pi and a Plug Micropart with Electrostatic Force Fields</i> Georgia Kritikou, Vassilis Moulitanitis, Nikos Aspragathos		
12:20	<i>Modern Quality Control: Integrating Computer Vision in Inspection of PCB Elements</i> Luka Šiktar, Filip Šuligoj, Marko Švaco, Branimir Čaran		

	Technical Session Medical Robotics and Biomechanics I	Room Verdi	Wednesday, 5th of June, 11:00- 12:20
Chair: Mathias Brandstötter, Alessandro Gasparetto			
11:00	<i>Dynamic Analysis of an Exoskeleton Robotic System for Stair Walking Assistance</i> Ionut Daniel Geonea, Daniela Tarnița		
11:20	<i>A Compact Low-Frequencies Vibrational Bioreactor to Induce Cellular Response</i> Luca Ragno, Alberto Borboni, Gabriele Benini, Elena Laura Mazzolini, Rosalba Monica Ferraro, Paola Ginestra		
11:40	<i>Design of wearable prostheses: a new approach</i> Pedro Moreira, José Machado, Calin Vaida, Doina Pisla, Daniel Miranda, Nuno Martins, Vítor Carvalho, Demétrio Matos		
12:00	<i>Workspace Analysis for Laparoscopic Rectal Surgery: A Preliminary Study</i> Alexandra Thomieres, Dhruva Khanzode, Emilie Duchalais, Ranjan Jha, Damien Chablat		

	Keynote session I	Room Vivaldi	Wednesday, 5th of June, 14:00- 14:20
Chair: Med Amine Laribi			
14:00	<i>Advancing Service Robotics: Navigating Requirements, Confronting Challenges, and Embracing New Trends</i> Giuseppe Carbone		

	Technical Session Perception and Learning II	Room Vivaldi	Wednesday, 5th of June, 14:20 – 16:00
Chair: Marko Švaco, Ovidiu Detesan			
14:20	<i>Cost-Effective Robot Arm Teleoperation via Human Pose Tracking with Monocular Camera</i> Bernard Parfaite, Luka Petrović, Ivan Marković, Ivan Petrović, Vlaho-Josip Štironja		
14:40	<i>Revolutionizing Speech Emotion Recognition: A Novel Hilbert Curve Approach for Two-Dimensional Representation and Convolutional Neural Network Classification</i>		

	Suryakant Tyagi, Sándor Szénási
15:00	<i>Positioning of a Surgical Parallel Robot using Artificial Intelligence</i> Florin Covaciu, Paul Tucan, Gabriela Rus, Adrian Pisla, Ionut Zima, Bogdan Gherman
15:20	<i>Effects of Increased Entropy on Robustness of Reinforcement Learning for Robot Box-Pushing</i> Zvezdan Loncarevic, Andrej Gams
15:40	<i>Determining Sample Quantity for Robot Vision-to-Motion Cloth Flattening</i> Peter Nimac, Andrej Gams

	Technical session Medical Robotics and Biomechanics II	Room Verdi	Wednesday, 5th of June, 14:20 – 16:00
Chair: Karsten Berns, Daniel Condurache			
14:20	<i>An Analysis of Virtual Reality Applications in Rehabilitation Engineering</i> Cosmin-Ilie Cotia, Silviu-Dan Mândru		
14:40	<i>Low-Cost Functional Infrared Spectroscopy Based System as a Brain-Computer Interface</i> Ana Fenesan, Alexandru Ianoși-Andreeva-Dimitrova, Silviu - Dan Mandru		
15:00	<i>Phenomenological modelling of the flexion-extension movement of human lower limb joints</i> Marius Georgescu, Daniela Tarnita, Cosmin Berceanu, Ionut Daniel Geonea, Danut-Nicolae Tarnita		
15:20	<i>Continuous-Time Robust Control for Cancer Treatment Robots</i> Vlad Mihaly, Iosif Birlescu, Mircea Șuşcă, Damien Chablat, Petru Dobra		
15:40	<i>Accuracy and repeatability of a parallel robot for personalised minimally invasive surgery</i> Doina Pisla, Paul Tucan, Damien Chablat, Nadim Al Hajjar, Andra Ciocan, Alexandru-Vasile Pusca, Adrian Pisla, Corina Radu, Grigore Pop, Bogdan Gherman		

	Technical session Medical Robotics and Biomechanics III	Room Vivaldi	Wednesday, 5th of June, 16:30 – 18:10
Chair: Kosta Jovanović, Damien Chablat			
16:30	<i>A Concise Review of Upper Limb Prostheses</i> Radu-Octavian Sandu, Ioan Doroftei, Cristina-Magda Cazacu		
16:50	<i>MEDROVER: Medical Assistant Robot for patient monitoring and treatment management</i> Roxana Rusu-Both, Balazs-Attila Molnar		
17:10	<i>Analysis Study of Working Modes Within a Redundant Architecture for a Spherical Parallel Manipulator (SPM)</i> Jasser Enbaya, Juan Sandoval, Moncef Ghiss, Zoubeir Tourki, Said Zeghloul, Amine Laribi, Marc Arsicault		
17:30	<i>Mixed-Reality-Guided Teleoperation of a Collaborative Robot for Surgical Procedures</i> Gabriela Rus, Nadim Al Hajjar, Paul Tucan, Andra Ciocan, Calin Vaida, Corina Radu, Damien Chablat, Doina Pisla		
17:50	<i>Task Oriented Collaborative Robots: Intervention in Repetitive Task for Worker Well-Being</i> Ashita Ashok, Jovan Šumarac, Aleksandar Rodić, Karsten Berns		

	Technical session Industrial Robots and Education	Room Verdi	Wednesday, 5th of June, 16:30 – 18:10
Chair: Nikos Aspragathos, Tiberiu Antal			
16:30	<i>Industry needs in Robotics Education</i> Francesco Aggogeri, Nicola Pellegrini, Riccardo Adamini		
16:50	<i>Unimate and Beyond: Exploring the Genesis of Industrial Robotics</i> Ovidiu Detesan, Iuliana Fabiola Moholea		
17:10	<i>Beyond the Horizon: Anticipating Future Challenges in the Field of Robotics</i> Ovidiu Detesan, Iuliana Fabiola Moholea		

17:30	<i>A Short Overview on Terrestrial Hybrid Locomotion Mobile Robots Procedures</i> Cosmin Straticiuc, Ioan Doroftei, Cristina-Magda Cazacu
17:50	<i>Augmented Reality Guided 3D Printed Robotic Arm Assembly: A Comprehensive Framework for Interactive Learning</i> Radu Comes, Zsolt Levente Buna, Raul Silviu Rozsos, Grigore Pop

Thursday, 6th of June, 2024

	Plenary Session II	Room Vivaldi	Thursday, 6th of June, 9:00- 10:00
Chair: Calin Vaida			
9:00	<i>Assistance Robot for Otological and Sinus Endoscopic Surgery: Advancing Surgical Innovation</i>		Damian Chablat

	Technical session Kinematics and Dynamics I	Room Vivaldi	Thursday, 6th of June, 10:30- 12:10
Chair: Andreas Müller, Radu Comes			
10:30	<i>Geometric Robot Calibration Using a Calibration Plate</i>		Bernhard Rameder, Hubert Gattringer, Andreas Müller
10:50	<i>Algorithm for obtaining balanced specific sliding coefficients at the points where the meshing stars and ends for external spur gears</i>		Tiberiu Antal
11:10	<i>A Novel Approach Exploiting Contact Points on Robot Structures for Enhanced End-Effector Accuracy</i>		Jan Šifrer, Tadej Petric
11:30	<i>Multi-axis AM: slicer and toolpath for 2.5D/3D/5D printing</i>		Lakshmi Srinivas Gidugu, Marius Laux, Vishnu Parameswaran Nair, Mathias Brandstötter
11:50	<i>Comparative study of the kinematic performance indices for the 3-U(RPRGR)RU and the 3-URU parallel robots</i>		Alexandru Oarcea, Elida-Gabriela Tulcan, Robert Kristof, Erwin-Christian Lovasz

	Technical session Motion Planning and Control I	Room Verdi	Thursday, 6th of June, 10:30- 12:10
Chair: Ivana Budinská, Roxana Rusu-Both			
10:30	<i>Time-Optimal Transport of Loosely Placed Liquid Filled Cups along Prescribed Paths</i>		Klaus Zauner, Hubert Gattringer, Andreas Müller

10:50	<i>Constrained Online Motion Generation from Unfiltered User Commands</i> Thomas Kordik, Christian Zauner, Hubert Gatringer, Andreas Müller
11:10	<i>Orientation trajectory planning based on unit quaternions for spray painting robots</i> Andrea Vegnaduzzo, Lorenzo Scalera, Daniele Pillan, Alessandro Gasparetto
11:30	<i>RobotBlockSet (RBS) - A comprehensive robotics framework</i> Leon Žlajpah, Tadej Petric
11:50	<i>Physical Interaction Interpretation in Industrial Robotics using Dynamic Time Warping Principles</i> Zavisa Gordic, Kosta Jovanović

	Keynote session II	Room Vivaldi	Thursday, 6th of June, 13:10- 13:30
Chair: Giuseppe Carbone			
13:10	<i>Static and Dynamic Analysis of Osteoarthritic and Orthotic Human Knee</i> Daniela Tarnița		

	Technical session Kinematics and Dynamics II	Room Vivaldi	Thursday, 6th of June, 13:30- 15:10
Chair: Ivan Petrović, Giuseppe Carbone			
13:30	<i>Kinematic Analysis of the Seven-Bar Linkage 7-PR(RRRR)RP used for Medical Disinfection Robot</i> Elida-Gabriela Tulcan, Sticlaru Carmen, Alexandru Oarcea, Melania Olivia Sandu, Erwin-Christian Lovasz		
13:50	<i>Experimental evaluation of a collision avoidance control for redundant manipulators</i> Giacomo Palmieri, Luca Carbonari, Daniele Costa, Matteo Forlini, Federico Neri, Cecilia Scoccia		
14:10	<i>Automatic Differentiation of Serial Manipulator Jacobians Using Multidual Algebra</i> Daniel Condurache, Iosif Birlescu, Bogdan Gherman, Cojocari Mihail		

14:30	<i>Mathematical and mechanical model of a tamping rammer for making rammed earth walls</i> Radu Mircea Morariu - Gligor
14:50	<i>Establishing of Dynamic Control Functions for a Hybrid Robot based on Analytical Mechanics Principles</i> Claudiu Schonstein

	Technical session Motion Planning and Control II	Room Verdi	Thursday, 6th of June, 13:30- 15:10
Chair: Aleksandar Rodić, Ionut Geonea			
13:30	<i>Design of a data collection system for robot digital twins</i> Ionut Lentoiu , Theodor Borangiu, Silviu Raileanu		
13:50	<i>AI-based multi-criteria path planning of Cartesian robot with telescopic arm for tree fruit picking</i> Aleksandar Rodić, Uroš Ilić, Ilija Stevanović		
14:10	<i>Electromagnetic Simulation of Robotic Dynamic Scenes for Novel Sensor Developments</i> Vlaho-Josip Štironja, Luka Petrović, Dubravko Tomić, Zvonimir Šipuš, Ivan Petrović		
14:30	<i>Mobile exploration robot with hybrid locomotion system</i> Antonio-Ioan Banabic, Mihai-Olimpiu Tatar		
14:50	<i>Robotic platform for position control of a ball</i> Simona-Daiana Sim, Attila Medgyesi, Zsofia Lendek, Calin Vaida, Vlad Mihai Mihaly, Mircea Şuşcă, Petru Dobra, José Machado		

Friday, 7th of June, 2024

	Plenary Session III	Room Vivaldi	Friday, 7th of June, 9:00- 10:00
Chair: Daniela Tarnita			
9:00	<i>A Global Overview on Designing and Using Mechatronic Healthcare Assistive Devices</i>		José Machado

	Technical session Service Robotics and Applications	Room Vivaldi	Friday, 7th of June, 10:30- 12:50
Chair: Med Amine Laribi, José Machado			
10:30	<i>Evaluating the Potential of Passive Exoskeletons in Modern Industries: A Comprehensive Analysis of the Impact on User Well-being and Efficiency</i>		Giacomo Palmieri, Luca Carbonari, Daniele Costa, Matteo Forlini, Federico Neri, Cecilia Scoccia
10:50	<i>Increasing the Energy Efficiency of Robotic Workplaces</i>		
	Rostislav Wierbica, Jakub Krejčí, Václav Krys, Tomáš Kot		
11:10	<i>Design of an under-actuated mechanism for collecting and cutting crop samples in precision agriculture</i>		
	Giuseppe Quaglia, Luca Samperi, Lorenzo Baglieri, Giovanni Colucci, Luigi Tagliavini, Andrea Botta		
11:30	<i>An exoskeleton for overhead work support equipped with pneumatic artificial muscles: an insight on transmission design</i>		
	Maria Paterna, Carlo De Benedictis, Carlo Ferraresi		
11:50	<i>A Literature Review and Design Considerations Towards a Gripper for Tomato Harvesting</i>		
	Dmitry Malyshev, Luigino Filice, Giovanni Mirabelli, Francesco Longo, Bruno Bernardi, Carbone Giuseppe, Larisa Rybak		
12:10	<i>Embracing the Gentle Touch: Design and Simulation of an Intelligent Soft Fingertip for Adaptive Agricultural Harvesting</i>		
	Nader Al Khatib, Daniele Cafolla		
12:30	<i>Technological analysis of types of milking systems and robots: A Review</i>		
	Denis Chikurtev, Ava Chikurteva, Elena Blagoeva		

	Technical session Mobile Robots and Innovative Robot Design	Room Verdi	Friday, 7th of June, 10:30- 12:50
Chair: Gernot Kronreif, Bogdan Gherman			
10:30	<i>A 3D Printed Reconfigurable Multi-fingered Gripper</i> Boštjan Baras, Miha Deniša		
10:50	<i>3D Printed Harmonic Drive for Legged Mobile Robots</i> Debora Gabriela Buleandra, Andrei Baneasa, Radu-Calin Donca		
11:10	<i>Modeling, parameter estimation and control design of 4WIS4WID mobile robot: Simulation and experimental validation</i> Branimir Čaran, Marko Švaco, Filip Šuligoj, Bojan Jerbić		
11:30	<i>Autonomous mobile robotic system for measuring the electrical conductivity of soil</i> Franci Ovčak, Sebastjan Šlajpah, Marko Munih, Matjaž Mihelj		
11:50	<i>Design and test validation of humanoid tripod-based limbs</i> Marco Ceccarelli, Matteo Russo, Steven Beaumont, Léo Neves, Earnest Ofonaiké		
12:10	<i>Soft Grasping Delicate Parts by Robotic Effectors</i> Stefan Havlik, Jaroslav Hricko		
12:30	<i>Challenges in Polystyrene Mold Making for Clay Panels Using Industrial Hotwire Carving</i> Marko Jovanovic, Andrej Čilag, Marko Vučić, Igor Babić, Mirko Raković, Vesna Stojakovic, Bojan Tepavčević		

