



RAAD 2023

32nd International Conference on Robotics in Alpe-Adria-Danube Region



Plenary Sessions

P1 Plenary session 1 Arnold Wednesday, June 14, 09:00 – 10:00

Chair: Tadej Petrič

09:00 **Robot Learning from Few Examples by Exploiting the Structure and Geometry of Data**

Sylvain Calinon

P2 Plenary session 2 Arnold Thursday, June 15, 09:00 – 10:00

Chair: Aleš Ude

09:00 **Robot That Learns Complex Task Learning**

Dongheui Lee

P3 Plenary session 3 Arnold Friday, June 16, 09:00 – 10:00

Chair: Bojan Nemeč

09:00 **Current Advances and Future Challenges in Robotic Frontiers**

Marko Munih

Keynote Sessions

K1 Keynote session 1 Arnold Wednesday, June 14, 14:00 – 14:40

Chair: Leon Žlajpah

14:00 **Yaskawa: Use of Digital Twins in Robotics Applications**

Peter Arko, Erih Arko

14:20 **Neurosurgical Robots – Is Small Also Beautiful?**

Gernot Kronreif

K2 Keynote session 2 Arnold Thursday, June 15, 14:00 – 14:40

Chair: Andrej Gams

14:00 **Robotoh: TBD**

TBD

14:20 **Advances in Medical Robotics**

Doina Pisla

Nominated Papers Sessions

N1 Nominated Arnold Wednesday, June 14, 14:40 – 16:00

Chair: Leon Žlajpah

14:40 **A Novel Intraoperative Force Estimation Method via Electrical Bioimpedance Sensing**

Zhuoqi Cheng, Leonardo S. Mattos

15:00 **Teaching Humanoid Robot Reaching Motion by Imitation and Reinforcement Learning**

Kristina Savevska, Aleš Ude

15:20 **Remote Center of Motion Based on Null Space and Virtual Joints in a Surgical Robotics Research Platform**

Miha Deniša, Jan Kranjec, Aleš Ude

15:40 **Implementation and Testing of a Shoe Polishing Process with a Collaborative Robotic System**

Matteo Forlini, Giacomo Palmieri, Luca Carbonari, Marianna Ciccarelli, Alessandra Papetti

N2 Nominated Arnold Thursday, June 15, 14:40 – 16:00

Chair: Ivana Budinska

14:40 **Understanding Why SLAM Algorithms Fail in Modern Indoor Environments.**

Linus Nwankwo, Elmar Rueckert

15:00 **Scenario Concatenation for Vehicle Testing by Solving a Vehicle Routing Problem with Skill and Temporal Synchronization Constraints**

Robert Fina, Andreas Mueller, Johannes Wenninger, Daniel Reischl, Hubert Gatttringer

15:20 **A Lightweight Method for Detecting Dynamic Target Occlusions by the Robot Body**

Savvas Sampaziotis, Sotiris Antonakoudis, Marios Kiatos, Fotios Dimeas, Zoe Doulgeri

15:40 **Navigation of a Mobile Platform in a Greenhouse**

Jakob Gimpelj, Matevž Semolič, Marko Munih, Sebastjan Šlajpah, Matjaž Mihelj

Technical Sessions

WM1 Perception and Learning Arnold I Wednesday, June 14, 10:30 – 12:00

Chair: Marko Švaco

10:30 **Optimal Camera Placement for Maximized Motion Capture Volume and Marker Visibility**

Jakob Ziegler, Andreas Mueller, Hubert Gatttringer

10:48 **In-Hand Pose Refinement Based on Contact Point Information**

Iñigo Iturrate, Yitaek Kim, Aljaz Kramberger, Christoffer Sloth

11:06 **Probabilistic Online Robot Learning via Teleoperated Demonstrations for Remote Elderly Care**

Floris Meccanici, Dimitrios Karageorgos, Cock J. M. Heemskerk, David A. Abbink, Luka Peternel

11:24 **Deep Learning Prediction Models for the Detection of Cyber-Attacks on Image Sequences**

Dusan Nedeljković, Zivana Jakovljevic

11:42 **Exploring the Potential and Challenges of Reinforcement Learning for Object Pushing with Robots**

Domen Težak, Marko Munih, Matjaž Mihelj, Janez Podobnik

WM2 Service Robotics Arnold II Wednesday, June 14, 10:30 – 12:00

Chair: Doina Pislă

10:30 **Road Curb Detection: ADAS for a Road Sweeper Vehicle**

Ivan Bilić, Goran Popović, Tibor Bataljak Savić, Ivan Marković, Ivan Petrović

10:48 **Assistance Systems for Construction Site Safety: Revealing Static Forces for Deconstruction Processes**

Christoph Heuer, Sigrid Brell-Cokcan

11:06 **Robotic Assembly of a Wooden Architectural Design**

Federico Neri, Roberto Cognoli, Giacomo Palmieri, Roberto Ruggiero

11:24 **A Fruit Detection Algorithm for a Plum Harvesting Robot Based on Improved YOLOv7**

Jovan Šumarac, Jelena Kljajić, Aleksandar Rodić

11:42 **Adaptive Robotic Levering for Recycling Tasks**

Boris Kuster, Mihael Simonič, Aleš Ude

WA1 Motion planning and control Arnold I Wednesday, June 14, 16:30 – 18:00

Chair: Alessandro Gasparetto

16:30 **An Experimental Setup to Test Time-Jerk Optimal Trajectories for Robotic Manipulators**

Federico Lozer, Lorenzo Scalera, Paolo Boscariol, Alessandro Gasparetto

16:48 **A Force-Based Formation Synthesis Approach for the Cooperative Transportation of Objects**

Mario Rosenfelder, Henrik Ebel, Peter Eberhard

17:06 **Motion Planning Through Model Inversion for a Gantry Crane Moving a Double Pendulum**

Jason Bettega, Dario Richiedei, Iacopo Tamellin, Alberto Trevisani

17:24 **Modification and Optimization of the Trajectory of an Industrial Robot to Scan a 3D-Surface for Quality Inspection**

Atae Jafari-Tabrizi, Dieter P. Gruber, Andrej Gams

17:42 **A Parameter-Linear Formulation of the Optimal Path Following Problem for Robotic Manipulator**

Tobias Marauli, Andreas Mueller, Hubert Gatringer, Hubert Gatringer

WA2 Innovative robots design Arnold II Wednesday, June 14, 16:30 – 18:00

Chair: Gernot Kronreif

16:30 **Robotics and Reconfigurable Mechanisms in Architecture Towards the Synthesis and Control of Reconfigurable Buildings**

Eftychios Christoforou, Marios Phocas, Andreas Mueller, Maria Matheou, Loukas Georgiou

16:48 **Prototyping of Robot Harvester for Plum Farmyards – Mechanical Design**

Aleksandar Rodić, Ilija Stevanović, Uroš Ilić

17:06 **Efficient Robot Hopping Mechanisms with Compliance Using Evolutionary Methods**

Pramod Pal, Anubhab Dasgupta, Avinash Bhashkar, Shishir Kolathaya, Ashitava Ghosal

17:24 **The Effect of Deformation on Robot Shape - Changing Link**

Jakub Mlotek, Jiří Suder, Michal Vocetka, Zdenko Bobovský, Václav Krys

TM1 Medical Robotics and control Arnold I Thursday, June 15, 10:30 – 12:00

Chair: Miha Deniša

10:30 **An Approach for Combining Transparency and Motion Assistance of a Lower Body Exoskeleton**

Jakob Ziegler, Bernhard Rameder, Andreas Mueller, Hubert Gatttringer

10:48 **A Handheld Forceps-Like Tracker for Learning Robotic Surgical Tasks from Demonstration**

Iñigo Iturrate, Kim Schwaner, Thusius Rajeeth Savarimuthu, Zhuoqi Cheng

11:06 **On the Stiffness Modelling of the ProHep-LCT Robotic Needle Insertion Instrument**

Bogdan Gherman, Corina Radu, Andrei Caprariu, Nadim Al Hajjar, Calin Vaida, Andra Ciocan, Paul Tucan, Emil Mois, Doina Pîsla

11:24 **Robot'S Cartesian Stiffness Adjustment Through the Stiffness Ellipsoid Shaping**

Branko Lukić, Nikola Knežević, Kosta Jovanović

11:42 **Explainable Object Detection in the Field of Search and Rescue Robotics**

Peter Hönig, Wilfried Wöber

TM2 Kinematics and dynamics Arnold II Thursday, June 15, 10:30 – 12:00

Chair: Andreas Mueller

10:30 **Optimizing Robot Positioning Accuracy with Kinematic Calibration and Deflection Estimation**

Leon Žlajpah, Tadej Petrič

10:48 **UR10e Robot Drift Compensation for Precision Measurement Applications**

Michal Vocetka, Dominik Heczko, Jan Babjak, Zdenko Bobovský, Václav Krys, Roman Ružarovský, Robert Bočák

11:06 **Dynamically Isotropic Gough-Stewart Platform Design Using a Pair of Triangles**

Yogesh Pratap Singh, Ashitava Ghosal

11:24 **Inverse and Direct Kinematics of a Modified Stewart-Gough Platform**

Martin Bem, Simon Reberšek, Igor Kovač, Aleš Ude

11:42 **Analysis of Higher- Order Kinematics on Multibody Systems with Nilpotent Algebra**

Daniel Condurache

TA1 Mobile Robotics and localisation Arnold I Thursday, June 15, 16:30 – 18:00

Chair: Fotis Dimeas

16:30 **Gaining Insights Into a Robot Localization Monitor Using Explainable Artificial Intelligence**

Matthias Eder, Laurent Frering, Gerald Steinbauer-Wagner

16:48 **LiDAR-Based Scene Understanding for Navigation in Unstructured Environments**

Hamid Didari, Gerald Steinbauer-Wagner

17:06 **Probabilistic Fusion of Surface and Underwater Maps in a Shallow Water Environment**

Hannan Keen, Karsten Berns

17:24 **Effective Visual Content of EHMI for Autonomous Vehicles in Pedestrian Zones**

Qazi Hamza Jan, Priyanka Dahiwal, Karsten Berns

17:42 **Comparison of Some Mechanical Amplifiers for Micro- Robotic Devices**

Jaroslav Hricko, Stefan Havlík

TA2 Collaborative Robotics Arnold II Thursday, June 15, 16:30 – 18:00

Chair: Nikos Aspragatos

16:30 **Input-Observer-Based Estimation of the External Torque for Single-Link Flexible-Joint Robots**

Nikola Knežević, Maja Trumić, Adriano Fagiolini, Kosta Jovanović

16:48 **Variable Stiffness Joint Based on Pneumatic Relocation Mechanism**

Luka Misković, Tadej Petrič

17:06 **Physical Education Exercises Validation Through Child-Humanoid Robot Interaction**

Tara Knežević, Marija Radmilović, Jefimija Borojević, Jovan Šumarac, Marko Švaco, Mirko Raković

17:24 **A Singularity-Free Approach for Safe Operation of a Parallel Robot for Lower Limb Rehabilitation**

Paul Tucan, Bogdan Gherman, Alin Horsia, Calin Vaida, Doina Pîsla

17:42 **Blood Serum Recognition Method for Robotic Aliquoting Using Different Versions of the YOLO Neural Network**

Larisa Rybak, Vladislav Cherkasov, Dmitriy Malyshev, Giuseppe Carbone

FM1 Motion planning and control Arnold I Friday, June 16, 10:30 – 12:00

Chair: Aleksandar Rodić

10:30 **Wind Aware Planning Using the Introduced RRT*-Line Algorithm**

Dimitrios Pediaditis, Juan David Galvis Sarria, Nikos A. Aspragathos

10:48 **An Encoder-Decoder Architecture for Smooth Motion Generation**

Zvezdan Loncarević, Ge Li, Gerhard Neumann, Andrej Gams

11:06 **Cloth Flattening with Vision-To-Motion Skill Model**

Peter Nimac, Andrej Gams

11:24 **Center of Mass Wrench Constraints in Presence of Spatially Distributed Contacts**

Milutin Nikolić, Branislav Borovac, Milica Žigić, Mirko Raković

11:42 **Fixed Point Iteration-Based Adaptive Control Improved with Parameter Identification**

Bence Varga, József K. Tar, Richárd Horváth

FM2 Collaborative Robotics Arnold II Friday, June 16, 10:30 – 12:00

Chair: Kosta Jovanović

10:30 **Application of a Phase State System for Physical Human-Humanoid Robot Collaboration**

Tilen Brecej, Tadej Petrič

10:48 **Collision Avoidance in Collaborative Robotics Based on Real-Time Skeleton Tracking**

Matteo Forlini, Giacomo Palmieri, Cecilia Scoccia, Luca Carbonari, Federico Neri

11:06 **A Multi-Feature Augmented Reality-Based Robot Control**

Mohammad-Ehsan Matour, Alexander Winkler

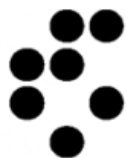
11:24 **Use Case Driven Active Teaching in Robotics for Education and Continuous Professional Development Through a 6-DOF Open-Source Robotics Platform**

Lukáš Mácha, Roman Šmíd, František Petrů, Filip Šáfr

11:42 **Impact of Robot Related User Pre-Experience on Cognitive Load, Trust, Trustworthiness and Satisfaction with VR Interfaces**

Laurent Frering, Clemens Koenczoel, Jochen Mosbacher, Martina Kames, Matthias Eder, Peter Mohr-Ziak, Sebastian Gabl, Denis Kalkofen, Dietrich Albert, Bettina Kubicek, Gerald Steinbauer-Wagner

Organizer



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