

10th IFAC Symposium on Robot Control 2012

(SYROCO 2012)

**Dubrovnik, Croatia
5-7 September 2012**

ISBN: 978-1-62276-367-2

Printed from e-media with permission by:

Curran Associates, Inc.
57 Morehouse Lane
Red Hook, NY 12571



Some format issues inherent in the e-media version may also appear in this print version.

Copyright© (2012) by Elsevier Limited
All rights reserved.

Printed by Curran Associates, Inc. (2012s)

For permission requests, please contact the publisher, Elsevier Limited
at the address below.

Elsevier Limited
The Boulevard, Langford Lane
Kidlington OX5 1GB, United Kingdom

Phone: +44 (0)1865 844640
Fax: +44 (0)1865 843912

Email: eurobkinfo@elsevier.com

Additional copies of this publication are available from:

Curran Associates, Inc.
57 Morehouse Lane
Red Hook, NY 12571 USA
Phone: 845-758-0400
Fax: 845-758-2634
Email: curran@proceedings.com
Web: www.proceedings.com

Table of Contents

- xii Welcome Message
- xiii Organisation
- xiv Committees
- xvi Sponsors
- xvii Plenary talks

Day 1: September 5, 2012

Modeling and Identification, 10:50-12:30, Divona 1

- 1 Interrelation Analysis for Interpersonal Behaviour Understanding in Social Context
Kamrad Khoshhal Roudposhti, Jorge Dias
- 7 Modeling of a Three Wheeled Omnidirectional Robot Including Friction Models
Mariane Dourado Correia, André Gustavo Scolari Conceição
- 13 Modeling and Observation of Hysteresis Lost Motion in Elastic Robot Joints
Michael Ruderman, Torsten Bertram
- 19 A New Method for the Identification of Flexible Joint Manipulators Using Motor Force/torque Data
Maxime Gautier, Anthony Jubien, Alexandre Janot, Pierre-Philippe Robot
- 25 A New Output Error Method for a Decoupled Identification of Electrical and Mechanical Dynamic Parameters of DC Motor-Driven Robots
Pierre-Philippe Robot, Maxime Gautier, Anthony Jubien, Alexandre Janot

Sensory Based Robot Control, 10:50-12:30, Divona 2

- 31 The Project ThermalMapper - Thermal 3D Mapping of Indoor Environments for Saving Energy
Dorit Borrmann, Andreas Nüchter, Marija Đakulović, Ivan Maurović, Ivan Petrović, Dinko Osmanković, Jasmin Velagić
- 39 Comparison of Statistical Model-Based Voice Activity Detectors for Mobile Robot Speech Applications
Ivan Marković, Hrvoje Domitrović, Ivan Petrović
- 45 Specification of Robotic Systems on an Example of Visual Servoing
Cezary Zielinski, Tomasz Kornuta, Mateusz Boryń
- 51 Vision-Based Loitering Over a Target for a Fixed-Wing UAV
Pietro Peliti, Lorenzo Rosa, Giuseppe Oriolo, Marilena Vendittelli
- 58 Ethologically Inspired Human-Robot Communication for Monitoring Support System in Intelligent Space
Takuya Ichikawa, Wataru Beppu, Szilveszter Kovacs, Péter Korondi, Hideki Hashimoto, Mihoko Niitsuma

Invited Session: Reasoning with Semantic Knowledge in Robotics, 10:50-12:30, Asimon

- 64 Describing and Classifying Situations with Description Logics in Ubiquitous Robotics
Antonello Scalmato, Antonio Sgorbissa, Renato Zaccaria
- 71 Tracing Commodities in Indoor Environments for Service Robotics
Oscar Martinez Mozos, Francois Chollet, Kouji Murakami, Ken'ichi Morooka, Tokuo Tsuji, Ryo Kurazume, Tsutomu Hasegawa
- 77 Answer Set Programming for Reasoning with Semantic Knowledge in Collaborative Housekeeping Robotics
Erdi Aker, Volkan Patoglu, Esra Erdem
- 84 Semantic Norms for Mobile Robots: When the End Does Not Justify the Means
Cipriano Galindo, Alessandro Saffiotti
- 90 Hybrid Reasoning in Perception: A Case Study
Martin Günther, Joachim Hertzberg, Masoumeh Mansouri, Federico Pecora, Alessandro Saffiotti

Invited Session: Computer Vision Systems for Robots and Vehicles, 10:50-12:30, Bokar

- 96 ROV Vision-Based Motion Estimation: A Comparison Study
Fausto Ferreira, Gianmarco Veruggio, Massimo Caccia, Gabriele Bruzzone
- 102 Omnidirectional Visual Servoing Using the Normalized Mutual Information
Bertrand Delabarre, Guillaume Caron, Eric Marchand
- 108 Fast Pose Tracking Based on Ranked 3D Planar Patch Correspondences
Robert Cupec, Emmanuel Nyarko, Damir Filko, Ivan Petrović
- 114 Sliding Window Object Detection without Spatial Clustering of Raw Detection Responses
Siniša Šegvić, Zoran Kalafatić, Ivan Kovaček
- 120 A System for Vehicle Surround View
Adam Heđi, Sven Lončarić

Sensor Fusion, 14:30-16:30, Divona 1

- 126 Evaluation of Six Different Sensor Fusion Methods for an Industrial Robot Using Experimental Data
Patrik Axelsson
- 133 Sensor Integration for Stable Target Focusing in Human-Following Robot
Fumiaki Hoshino, Kazuyuki Morioka
- 139 Robot Localization Using Inertial and Wi-Fi Signal Strength Sensors
Gregor Klančar, Igor Škrjanc
- 145 An Inertial/RFID Based Localization Method for Autonomous Lawnmowers
Alessio Levratti, Matteo Bonaiuti, Cristian Secchi, Cesare Fantuzzi
- 151 Extending the Occupancy Grid Concept for Low-Cost Sensor Based SLAM
Jerker Nordh, Karl Berntorp

Robot Control 1, 14:30-16:30, Divona 2

- 157 Dynamical Analysis of an Undulatory Wheeled Locomotor: A Trident Steering Walker
Hiroaki Yamaguchi
- 165 Stabilization of the Capture Point Dynamics for Bipedal Walking based on Model Predictive Control
Manuel Krause, Johannes Engelsberger, Pierre-Brice Wieber, Christian Ott
- 172 Automatic Decision System for the Structure of Vision-Force Robotic Control
Mohamad Bdiwi, Jozef Suchý
- 178 Feedback Control of a Redundant Wheeled Snake Mechanism Using Transverse Functions on SO(4)
Pascal Morin, Claude Samson
- 186 A Discrete-Time Design of Time Delay Control Focus on Control Experimentations of Coordinated Motion Control of Hydraulic Excavator
Boris Vidolov
- 192 Dynamic Model and Control of an Over-Actuated Quadrotor UAV
Riccardo Falconi, Claudio Melchiorri

Underwater Robotics, 14:30-16:30, Asimon

- 198 High Dexterity Docking of an UUV by Fast Determination of the Area Manipulability Measure of the Arm Using ANN
Panagiotis Sotiropoulos, Nikos Aspragathos, Franck Geffard
- 204 Exponential Mapping Controller Applied to an Autonomous Underwater Vehicle
Hildebrando Ferreira de Castro, Pedro Paglione, Carlos Henrique Costa Ribeiro
- 211 Fusing Hydroacoustic Absolute Position Fixes with AUV On-Board Dead Reckoning
Matko Barišić, Nikola Mišković, Antonio Vasiljević

- 218 Planning of Legged Racewalking Gait for an Epaddle-Based Amphibious Robot
Yi Sun, Shugen Ma, Yang Yang
- 224 Distributed Frameworks in Control and Navigation of Small Underwater Vehicles
Đula Nađ, Tomislav Lugarić, Nikola Mišković, Zoran Vukić

Grasping, 14:30-16:30, Bokar

- 229 Monocular Eye-In-Hand Robotic Ball Catching with Parabolic Motion Estimation
Vincenzo Lippiello, Fabio Ruggiero
- 235 Determining Force-Closure Grasps Reachable by a Given Hand
Fidel Gilart, Raúl Suárez
- 241 Modeling and Control of Dual Arm Robotic Manipulators Using Decentralized Navigation Functions
Kim Vizins, Dimos V. Dimarogonas, Bo Wahlberg
- 247 A Probabilistic Framework to Detect Suitable Grasping Regions on Objects
Diego Faria, Ricardo Martins, Jorge Lobo, Jorge Dias
- 253 Discrete Fuzzy Grasp Affordance for Robotic Manipulators
Danny Eizicovits, Maayan Yaacobovitch, Sigal Berman
- 259 Modeling and Control for Object Manipulation by a Two D.o.f. Robotic Hand with Soft Fingertips
John Fasoulas, Michael Sfakiotakis

Industrial Applications 1, 17:00-18:20, Divona 1

- 265 Dynamic Collision Avoidance of Industrial Cooperating Robots Using Virtual Force Fields
Alexander Winkler, Jozef Suchý
- 271 Obstacle Detection in an Unstructured Industrial Robotic System: Comparison of Hidden Markov Model and Expert System
Knut Berg Kaldestad, Geir Hovland, David A. Anisi
- 277 Increasing the Accuracy for a Piezo-Actuated Micro Manipulator for Industrial Robots Using Model-Based Nonlinear Control
Björn Olofsson, Olof Sörnmo, Ulrich Schneider, Marc Barho, Anders Robertsson, Rolf Johansson
- 283 Method to Estimate the Position and Orientation of a Triaxial Accelerometer Mounted to an Industrial Manipulator
Patrik Axelsson, Mikael Norrlöf

Manipulation 1, 17:00-18:20, Divona 2

- 289 Towards Unknown Objects Manipulation
Qiang Li, Robert Haschke, Helge Ritter, Bram Bolder
- 295 A Prescribed Performance Referential Control for Human Like Reaching Movement of Redundant Arms
Zoe Doulgeri, Paschalis Karalis
- 301 Heuristic Machine-Learning Approach to the Control of an Anthropomorphic Robot Arm
Predrag Milosavljevic, Kosta Jovanovic, Nenad Bascarevic, Veljko Potkonjak, Owen Holland
- 307 Control of a Lower Mobility Dual Arm System
Philip Long, Wisama Khalil, Stéphane Caro

Multi Robot 1, 17:00-18:20, Asimon

- 313 Multi-Robot Exploration and Mapping with a Rotating 3D Scanner
Mohammad Al-khawaldah, Andreas Nüchter
- 319 Enhanced Connectivity Maintenance for Multi-Robot Systems
Lorenzo Sabattini, Andrea Gasparri, Cristian Secchi, Nikhil Chopra

- 325 A Graph-Based Algorithm for Robotic MANETs Coordination in Disaster Areas
Riccardo Falconi, Claudio Melchiorri
- 331 A Navigation Strategy for Multi-Robot Systems Based on Particle Swarm Optimization Techniques
Raffaele Grandi, Riccardo Falconi, Claudio Melchiorri

Motion planning 1, 17:00-18:20, Bokar

- 337 ? af[a` B'S` ` [` YaXZV6agT`VZ[] FdVWfE S] WDaTaf
Krzysztof Tchoń, Janusz Jakubiak
- 343 DaTgef A` Ž[` VA TefSUV6WWW[a` ge[` YDS` YW6SfSXdDWf[hW@Sh[YSf[a`
José Miguel Vilca Ventura, Lounis Adouane, Youcef Mezouar
- 349 7XU[W;` fMbaSfWfZ`S[` aX? aT[`WDaTafeTSeWa` AUghS` Uk9dqV? Sbe
Marija Đakulović, Mijo Čikeš, Ivan Petrović
- 355 5a` da^S@Sh[YSf[a` aS` 3gfa` _ ge? a`VDJai [k` SUAefSUV6WWW[a` `V3VSbf[hWBSfZ 8[` V[` Y3`YadfZ_
Lutfi Mutlu, Erol Uyar

Day 2: September 6, 2012

Haptic Interaction, 10:30-12:30, Divona 1

- 361 Robust Haptic Teleoperation by FPGA
Aleš Hace, Marko Franc
- 367 Haptic Display by a Side-Faced-Type Multi-Fingered Haptic Interface
Takahiro Endo, Hisashi Aoyama, Shinobu Nakagawa, Haruhisa Kawasaki
- 373 High Performance and Stable Teleoperation under Bounded Operator and Environment Dynamics
César Augusto López Martínez, René van de Molengraft, Maarten Steinbuch
- 380 Navigating in 3D Immersive Environments: a VirCa usability study
Gabor Sziebig, Trond Are Øritsland
- 385 Teleoperation in Presence of Uncertainties: A Constraint-Based Approach
Gianni Borghesan, Bert Willaert, Tinne De Laet, Joris De Schutter
- 393 On the H2 Decentralized Controller Synthesis for Delayed Bilateral Teleoperation Systems
Jang Ho Cho, Maxim Kristalny

Robot control 2, 10:30-12:30, Divona 2

- 399 Four-State Trajectory-Tracking Control Law for Wheeled Mobile Robots
Sašo Blažič
- 405 The Serret-Frenet Parametrization in a Control of a Mobile Manipulator of (nh, H) Type
Alicja Mazur, Joanna Płaskonka
- 411 Command Generation Techniques for a Pin Array Using the SVD and the SNMF
Ryder Winck, Jingu Kim, Wayne J. Book, Haesun Park
- 417 Mobile Robot Control Using a Cloud of Particles
Jorge Augusto Vasconcelos Alves, Walter Fetter Lages
- 423 A Proposal of Manipulability Based Model Predictive Control for the Parallelogram Linkage
Ryota Ishibashi, ShiSheng Zou, Kazuya Kawaguchi, Naoyuki Takesue, Akira Kojima
- 429 Super-Twisting Sliding Modes Tracking Control of a Nonholonomic Wheeled Mobile Robot
Ebrahim Samer Elyoussef, Edson De Pieri, Ubirajara F. Moreno, Marc Jungers

Invited Session: Adaptive Robotic Ecologies, 10:30-12:30, Asimon

- 435 A General Purpose Distributed Learning Model for Robotic Ecologies
Davide Bacciu, Stefano Chessa, Claudio Gallicchio, Alessandro Lenzi, Alessio Micheli, Susanna Pelagatti
- 441 Design of an Ecology of Activity-Aware Cells in Ambient Intelligence Environments
Alberto Calatroni, Daniel Roggen, Gerhard Tröster
- 447 Development of Cognitive Capabilities for Smart Home Using a Self-Organizing Fuzzy Neural Network
Anjan Kumar Ray, Gang Leng, T.M. McGinnity, Sonya Coleman, Liam Maguire
- 455 Robotic Ecologies for Deep Space Outposts
Gerard McKee, Blesson Varghese
- 461 Robots That Create Alternative Plans against Failures
C. Ugur Usug, Dogan Altan, Sanem Sariel-Talay
- 467 Service Ecologies for Home/Building Automation
Mario Caruso, Claudio Di Ciccio, Ettore Iacomussi, Eirini Kaldeli, Alexander Lazovik, Massimo Mecella

Invited Session: Human Models and Humanoid Robot Control, 10:30-12:30, Bokar

- 473 Control of a Single Degree of Freedom Noise Rejecting - Variable Impedance Actuator
Francesco Nori, Bastien Berret, Luca Fiorio, Alberto Parmiggiani, Giulio Sandini
- 479 Whole-Body Torques for Generating Complex Movements in Humans and Humanoids
Layale Saab, Nicolas Mansard, Philippe Souères, Jean-Yves Fourquet, Manish Sreenivasa, Yoshihiko Nakamura
- 485 Partial Human Data in Design of Human-Like Walking Control in Humanoid Robotics
David Galdeano, Vincent Bonnet, Moussâb Bennehar, Philippe Fraitse, Ahmed Chemori
- 491 Design of Powered Orthosis Based on 3D Neuro-Musculo-Skeletal Human Model
Goro Obinata, Chikara Nagai, Youngwoo Kim, Yoshiho Uchiyama, Kazunori Hase
- 498 Optimization-Based Walking Generation for Humanoid Robot
Kai Henning Koch, Katja Mombaur, Philippe Souères

Humanoid, 14:10-16:10, Divona 1

- 505 Backflips Performed by Humanoid Robots Based on Extended Linear Inverted Pendulum Mode
Gun-Woo Park, Jong Hyeon Park
- 511 A Mechanical Realization of Musculo-Skeletal System -Control of Joint Angle and Joint Stiffness
Koichi Koganezawa, Gaku Takami, Masakaki Watanabe
- 518 Effects of Ankle Elasticity on Dynamic Biped Walking
Yuta Hanazawa, Masaki Yamakita
- 524 Human-And-Humanoid Motion - Distinguish between Safe and Risky Mode
Veljko Potkonjak, Marija Tomic, Aleksandar Rodic, Vesna Antoska
- 530 Online Walking Pattern Generation for a Humanoid That Uses Estimated Actual Velocity of the Robot
Koichi Nishiwaki, Satoshi Kagami
- 536 Bipedal Locomotion Primitive Learning, Control and Prediction from Human Data
Kai Hu, Dongheui Lee

Force Control, 14:10-16:10, Divona 2

- 543 Increasing Time-Efficiency and Accuracy of Robotic Machining Processes Using Model-Based Adaptive Force Control
Olof Sörnmo, Björn Olofsson, Anders Robertsson, Rolf Johansson
- 549 Robotic Assembly Using a Singularity-Free Orientation Representation Based on Quaternions
Andreas Stolt, Magnus Linderöth, Anders Robertsson, Rolf Johansson

- 555 On Robust Position/Force Control of Robot Manipulators with Constraint Uncertainties
Cumhur Baspinar
- 561 Adaptation of Force Control Parameters in Robotic Assembly
Andreas Stolt, Magnus Linderöth, Anders Robertsson, Rolf Johansson
- 567 Energy Shaping Control for a Class of Underactuated Euler-Lagrange Systems
Alin Albu-Schäffer, Christian Ott, Florian Petit
- 576 Development of the Fragmented-Motion-Segment Concept for Flexible Joint Robots to Raise Energy Efficiency in Handling Tasks
Lars Böhme, Jozef Suchý

Advanced Sensor Applications, 14:10-16:10, Asimon

- 584 Maintenance Analysis of Rotating and Moving Machines Using 3D Vibration Animation
Annamária R. Várkonyi-Kóczy, József Z. Szabó, István Nagy, Imre J. Rudas
- 590 A Novel Polypyrrole-Based Sensor for Robotics Applications
Arief Tjahyono, Kean Aw, Jadranka Travas-Sejdic
- 594 Increasing the Precision of Reconstructed 3D Model of Indoor Robot Environment by Elimination of Problematic Points
Dinko Osmanković, Jasmin Velagić
- 598 Robust Registration of Narrow-Field-Of-View Range Images
Stefan May, Rainer Koch, Robert Scherlipp, Andreas Nüchter
- 604 Mutual Calibration for 3D Thermal Mapping
Dorit Borrmann, Hassan Afzal, Jan Elseberg, Andreas Nüchter
- 610 Bias Estimation and Calibration of a Pair of Laser Range Sensors
Srećko Jurić-Kavelj, Ivan Petrović

Motion Planning 2, 14:10-16:10, Bokar

- 615 Mobile Robot Navigation Using Hybrid Simplified Map with Relationships between Places and Grid Maps
Satoshi Yamanaka, Kazuyuki Morioka
- 621 Mobile Robot Navigation and Obstacles Avoidance Based on Planning and Re-Planning Algorithm
Mehdi Mouad, Lounis Adouane, Djamel Khadraoui, Philippe Martinet
- 628 Online Trajectory Generation for Mobile Robots with Kinodynamic Constraints and Embedded Control Systems
Marcello Bonfe, Cristian Secchi, Enea Scioni
- 635 Dynamic Trajectory Generation for Serial Elastic Actuated Robots
Florian Petit, Dominic Lakatos, Werner Friedl, Alin Albu-Schäffer
- 643 Stabilizing Control for a Wheeled Robot Following a Curvilinear Path
Alexander Pesterev
- 649 Stochastic Search Strategies in 2D Using Agents with Limited Perception
David Puljiz, Maja Varga, Stjepan Bogdan

Industrial Applications 2, 16:40-18:00, Divona 1

- 654 Joint Level Collision Avoidance for Industrial Robots
Balázs Dániel, Péter Korondi, Trygve Thomassen
- 658 Force Control of Redundant Industrial Robots with an Approach for Singularity Avoidance Using Extended Task Space Formulation (ETSF)
Audun Rønning Sanderud, Fredrik Reme, Trygve Thomassen
- 663 Integrating an Anti-Collision System Based on Laser Time-Of-Flight Sensor in an Industrial Robot Controller
Alberto Barcellini, Luca Bascetta, Marco Raymo, Paolo Rocco, Andrea Maria Zanchettin, Anders Robertsson

- 669 Multi-Robot Assembly of High-Performance Aerospace Components
Lars Tingelstad, Alvaro Capellan, Trygve Thomessen, Terje K. Lien

Multi Robot 2, 16:40-18:00, Divona 2

- 675 Altruistic Distributed Target Allocation for Stable Navigation in Formation of Multi-Robot System
Ahmed Benzerrouk, Lounis Adouane, Philippe Martinet
- 681 Potential Function Based Multi-Agent Formation Control in 3D Space
Marko Bunić, Stjepan Bogdan
- 689 Distributed Configuration Discovery for Modular Wheeled Mobile Robots
Christoph Gruber, Michael Hofbauer
- 697 A Timing Control Model for H-R Synchronization
Roy Someshwar, Joachim Meyer, Yael Edan

Manipulation 2, 16:40-18:00, Asimon

- 703 Cartesian Impedance Control of a UAV with a Robotic Arm
Vincenzo Lippiello, Fabio Ruggiero
- 709 On Human-Robot Co-Manipulation for Handling Tasks: Modeling and Control Strategy
Sarra Jlassi, Sami Tliba, Yacine Chitour
- 715 Dynamic Analysis and Computer Aided Control of a Tripod Parallel Manipulator
Erol Uyar, Lutfi Mutlu

Medical Robots, 16:40-18:00, Bokar

- 721 Knowledge-based System for Port Placement and Robot Setup Optimization in Minimally Invasive Surgery
Oliver Weede, Markus Mehrwald, Heinz Wörn
- 728 Calibration Method of the Human-Body Segment Inertial Parameters Using Inverse Dynamics, LS Technique and a Priori Anatomical Values
Gentiane Venture, Maxime Gautier
- 734 A Biased Extended Kalman Filter for Indoor Localization of a Mobile Agent Using Low-Cost IMU and UWB Wireless Sensor Network
Alessandro Benini, Adriano Mancini, Alessio Marinelli, Sauro Longhi
- 740 Beating Heart Motion Compensation Using Active Observers and Disturbance Estimation
Pedro Moreira, Chao Liu, Nabil Zemiti, Philippe Pognet

Day 3: September 7, 2012

Robot Design, 10:30-12:50, Asimon

- 746 HUMI - a Mobile Robot for Landmine Detection
Peter Kopacek, T. Magyar, Lukas Silberbauer
- 752 Hitting Back-Spin Balls by Robotic Table Tennis System Based on Physical Models of Ball Motion
Akira Nakashima, Junko Nonomura, Chungfang Liu, Yoshikazu Hayakawa
- 760 DeWaLoP In-Pipe Robot Embedded System
Luis Mateos, Markus Vincze
- 766 Circle Fitting Based Pile Positioning and Machine Pose Estimation from Range Data for Pile Driver Navigation
Takeshi Sasaki, Hiroshi Kawahara, Fumihiko Inoue, Hideki Hashimoto
- 772 DSF (Dieless Sheet Forming) of Corsettes
J. Somló, Péter Tamás, I. Paniti, J. Molnár

- 777 Control of NI SbRIO-9631 Prototype Robot on the Basis of Hand Movement
Géza Husi, Péter Tamás Szemes

Adaptive Control, 10:30-12:50, Bokar

- 781 Velocity Control of a Spherical Rolling Robot Using a Grey-PID Type Fuzzy Controller with an Adaptive Step Size
Erkan Kayacan, Erdal Kayacan, Herman Ramon, Wouter Saeys
- 787 Performance Results of Qualitative Optical Flow Processing Integrated in Fuzzy Logic-Based Behavioral Mobile Robot Control
Ngoc Anh Mai, Klaus Janschek
- 794 On-Line Dynamic Model Learning for Manipulator Control
Joseph Sun de la Cruz, Ergun Caliskan, Dana Kulić, William Owen, Elizabeth A. Croft
- 800 Anti-Windup Adaptive Law for Euler-Lagrange Systems with Actuator Saturation
Mitsuru Kanamori
- 806 Global Adaptive Regulation of Robot Manipulators with Bounded Inputs
Daniela Juanita López-Araujo, Arturo Zavala-Río, Victor Santibáñez, Fernando Reyes Cortes
- 814 Neuro-Fuzzy Control with a Novel Training Method Based-on Sliding Mode Control Theory: Application to Tractor Dynamics
Erdal Kayacan, Erkan Kayacan, Herman Ramon, Wouter Saeys

Invited Session, Mobile Manipulation for Household Applications, 10:30-12:50, Elafiti 4

- 820 A Multi Objective Control Approach to Online Dual Arm Manipulation
Petter Ögren, Christian Smith, Yiannis Karayiannidis, Danica Kragić
- 826 Adaptive Force/Velocity Control for Opening Unknown Doors
Yiannis Karayiannidis, Christian Smith, Petter Ögren, Danica Kragić
- 832 Force-Sensorless and Bimanual Human-Robot Comanipulation
Dominick Vanthienen, Tinne De Laet, Wilm Decré, Herman Bruyninckx, Joris DeSchutter
- 840 Global Impedance Control of Dual-Arm Manipulation for Safe Interaction
Hamid Sadeghian, Fanny Ficuciello, Luigi Villani, Mahdi Keshmiri
- 846 Cooperative Object Path Following Control by means of Mobile Manipulators: a Switched Systems Approach
Johan Markdahl, Yiannis Karayiannidis, Xiaoming Hu
- 852 Task-Based Grasp Adaptation on a Humanoid Robot
Jeannette Bohg, Kai Welke, Beatriz León, Martin Do, Dan Song, Walter Wohlking, Marianna Madry, Aitor Aldóma, Markus Przybylski, Tamim Asfour, Higinio Martí, Danica Kragić, Antonio Morales, Markus Vincze
- 860 Shape Based Learning for Grasping Novel Objects in Cluttered Scenes
David Fischinger, Markus Vincze

Telem Manipulation, 10:30-12:50, Divona 2

- 866 Task and User-Centered Design of a Human-Robot System for Gas Leak Detection: From Requirements Analysis to Prototypical Realization
Jens Hegenberg, Liubov Cramar, Ludger Schmidt
- 872 Human-Robot Cooperative Precision Spraying: Collaboration Levels and Optimization Function
Ron Berenstein, Yael Edan
- 878 Kinect-Based Robot Teleoperation by Velocities Control in the Joint/Cartesian Frames
Goran Vasiljević, Nikola Jagodin, Zdenko Kovačić
- 884 Multimodal Human-Machine Interface for Remote Operation of Robot Systems
Trygve Thomessen, Tomasz Kosicki

- 889 Evaluation of Tele-Navigation System using Command Data Compensation and Field Test in Izu-oshima Volcanic Island, Japan
Yasuharu Kunii, Ryota Karitani, Tomotaka Uekusa
- 895 Dynamic Update of a Virtual Cell for Programming and Safe Monitoring of an Industrial Robot
Andrea Ferraro, Marina Indri, Ivan Lazzero