10:45-11:00 TuB09.2
A Sparsity-Aware QR Decomposition Algorithm for Efficient Cooperative Localization, pp. 799-806.
Zhou, Ke
Roumeliotis, Stergios
Univ. of Minnesota

11:00-11:15 TuB09.3
Prorok, Amanda
Gonon, Lukas
Martinoli, Alcherio
EPFL ETH Zurich EPFL

11:15-11:30 TuB09.4
Orientation Only Loop-Closing with Closed-Form Trajectory Bending, pp. 815-821.
Dubbelman, Gijs
Browning, Brett
Hansen, Peter
Dias, M. Bernardine

11:30-11:45 TuB09.5
Capping Computation Time and Storage Requirements for Appearance-Based Localization with CAT– SLAM, pp. 822-827.
Maddern, William
Milford, Michael J
Wyeth, Gordon
Queensland Univ. of Tech. Queensland Univ. of Tech. Queensland Univ. of Tech.

11:45-12:00 TuB09.6
Improving the Accuracy of EKF-Based Visual-Inertial Odometry, pp. 828-835.
Li, Mingyang
Univ. of California, Riverside
TuB110
Interactive Session TuB-1 (Interactive Session)
Chair: Kosuge, Kazuhiro
Co-Chair: Aloimonos, Yiannis
10:30-11:00 TuB110.1
Walking Trajectory Generation for Humanoid Robots with Compliant Joints: Experimentation with COMAN Humanoid, pp. 836-841.
Li, Zhibin
Tsagarakis, Nikolaos
Caldwell, Darwin G.

10:30-11:00 TuB110.2
Unstructured Human Activity Detection from RGBD Images, pp. 842-849.
Sung, Jaeyong
Ponce, Colin
Selman, Bart
Saxena, Ashutosh

10:30-11:00 TuB110.3
Lee, Sohee
Sobotka, Marion
Buss, Martin
Park, Frank

10:30-11:00 TuB110.4
Robinette, Paul
Veia, Patricio
Howard, Ayanna

10:30-11:00 TuB110.5
Implementation of an Embodied General Reinforcement Learner on a Serial Link Manipulator, pp. 862-869.
Malone, Nicholas
Rohrer, Brandon R.
Tapia, Lydia
Lumia, Ron
Wood, John

TuB210
Interactive Session TuB-2 (Interactive Session)
Chair: Kosuge, Kazuhiro
Co-Chair: Aloimonos, Yiannis
11:00-11:30 TuB210.1
Haq, Abdul
Aoustin, Yannick
Chevallereau, Christine

11:00-11:30 TuB210.2
What Are We Doing Here? Egocentric Activity Recognition on the Move for Contextual Mapping, pp. 877-882.
Sundaram, Sudeep
Mayol, Walterio

11:00-11:30 TuB210.3
ZMP Stabilization of Rapid Mobile Manipulator, pp. 883-888.
Choi, Dongil
Oh, Jun Ho
Korea Advanced Inst. of Sci. and Tech.
11:00-11:30 TuB210.4
Attachment
Twigg, Jeffrey
Army Res. Lab.
Fink, Jonathan
ARL
Yu, Paul
ARL
Sadler, Brian
Army Res. Lab.

Improvisational Goal-Oriented Action Recommendation under Incomplete Knowledge Base, pp. 896-903.
Lim, Gi Hyun
Hanyang Univ.
Suh, Il Hong
Hanyang Univ.
11:00-11:30 TuB210.5

Interactive Session TuB-3 (Interactive Session)
Chair: Kosuge, Kazuhiro
Tohoku Univ.
Co-Chair: Aloimonos, Yiannis
Univ. of Maryland
TuB310
Ballroom D
11:30-12:00 TuB310.1
Manabe, Ryoichi
Okayama Univ.
Suzumori, Koichi
Okayama Univ.
Wakimoto, Shuichif
Okayama Univ.

A Model and Formal Analysis of Braitenberg Vehicles 2 and 3, pp. 910-915.
Rano, Inaki
Ruhr-Univ.
11:30-12:00 TuB310.2

Visual Servoing Control of a 9-DoF WMRA to Perform ADL Tasks, pp. 916-922.
Pence, William
Univ. of South Florida
Farelo, Fabian
Univ. of South Florida
Alqasemi, Redwan
Univ. of South Florida
Sun, Yu
Univ. of South Florida
Dubey, Rajiv
Univ. of South Florida
11:30-12:00 TuB310.3

An Online Stair-Climbing Control Method for a Transformable Tracked Robot, pp. 923-929.
Li, Nan
Shenyang Inst. of Automation, Chinese Acad.
Ma, Shugen
Ritsumeikan Univ.
Li, Bin
Shenyang Inst. of Automation
Wang, Minghui
Shenyang Inst. of Automation
Wang, Yuechao
Shenyang Inst. of Automation
11:30-12:00 TuB310.4

Monitoring of Manipulation Activities for a Service Robot Using Supervised Learning, pp. 930-935.
Ruehl, Steffen Wilhelm
Res. Center for Information Tech. (FZI)
Xue, Zhixing
FZI
Dillmann, Rüdiger
KIT Karlsruhe Inst. for Tech.
11:30-12:00 TuB310.5

Autonomy and Vision for UAVs (Regular Session)
Chair: Scherer, Sebastian
Carnegie Mellon Univ.
Co-Chair: Hesch, Joel
Univ. of Minnesota
TuC01
Meeting Room 1 (Mini-sota)
14:30-14:45 TuC01.1
Melnyk, Igor
Univ. of Minnesota
Hesch, Joel
Univ. of Minnesota
Roumeliotis, Stergios
Univ. of Minnesota
### TuC01.2


- Han, Kyuseo  
  Purdue Univ.  
- Aeschliman, Chad  
  Purdue Univ.  
- Park, Johnny  
  Purdue Univ.  
- Kak, Avinash  
  Purdue Univ.  
- Kwon, Hyukseong  
  US Air Force Acad.  
- Peck, Daniel  
  US Air Force Acad.

### TuC01.3

**First Results in Autonomous Landing and Obstacle Avoidance by a Full-Scale Helicopter**, pp. 951-956.

- Scherer, Sebastian  
  Carnegie Mellon Univ.  
- Chamberlain, Lyle  
  Carnegie Mellon Univ.  
- Singh, Sanjiv  
  Carnegie Mellon Univ.

### TuC01.4


- Weiss, Stephan  
  ETH Zurich  
- Achtelik, Markus W.  
  ETH Zurich, Autonomous Systems Lab.  
- Lynen, Simon  
  ETH Zurich  
- Chli, Margarita  
  ETH Zurich  
- Siegwart, Roland  
  ETH Zurich

### TuC01.5


- Hung, Calvin  
  Univ. of Sydney  
- Bryson, Mitch  
  Univ. of Sydney  
- Sukkarieh, Salah  
  Univ. of Sydney

### TuC01.6


- Lee, Daewon  
  Seoul National Univ.  
- Ryan, Tyler  
  Seoul National Univ.  
- Kim, H. Jin  
  Seoul National Univ.
15:15-15:30 TuC02.4
Hornung, Armin
Bennewitz, Maren
Univ. of Freiburg
Univ. of Freiburg

15:30-15:45 TuC02.5
Dominant Sources of Variability in Passive Walking, pp. 1003-1010. Attachment
Nanayakkara, Thrishantha
Byl, Katie
Liu, Hongbin
Song, Xiaojing
Villabona, Tim
King's Coll. Univ. of London
UCSB
King's Coll. London
King's Coll. London
Massachusetts Inst. of Tech.

15:45-16:00 TuC02.6
First Steps Toward Underactuated Human-Inspired Bipedal Robotic Walking, pp. 1011-1017. Attachment
Ames, Aaron
Texas A&M Univ.

TuC03
Haptics (Regular Session)
Meeting Room 3 (Mak'to)
Chair: Lee, Dongheui
Co-Chair: Xiao, Jing
Co-Chair: Tech. Univ. Munich
Co-Chair: UNC-Charlotte

14:30-14:45 TuC03.1
A Compact Tactile Display Suitable for Integration in VR and Teleoperation, pp. 1018-1024.
Sarakoglou, Ioannis
Tsagarakis, Nikolaos
Caldwell, Darwin G.
Istituto Italiano di Tecnologia
Istituto Italiano di Tecnologia
Italian Inst. of Tech.

14:45-15:00 TuC03.2
Risk-Sensitive Optimal Feedback Control for Haptic Assistance, pp. 1025-1031.
Medina Hernandez, Jose Ramon
Lee, Dongheui
Hirche, Sandra
Tech. Univ. München
Tech. Univ. Munich
Tech. Univ. München

15:00-15:15 TuC03.3
Robles, Jose
Sguerri, Matthew
Rorie, Conrad
Vu, Kim-Phuong
Struybel, Thomas
Marayong, Panadda
California State Univ. Long Beach
California State Univ. Long Beach
California State Univ. Long Beach
California State Univ. Long Beach
California State Univ. Long Beach
California State Univ. Long Beach

15:15-15:30 TuC03.4
Wearable Haptic Device for Cutaneous Force and Slip Speed Display, pp. 1038-1043.
Damian, Dana
Ludersdorfer, Marvin
Kim, Yeongmi
Hernandez Arieta, Alejandro
Pfeifer, Rolf
Okamura, Allison M.
Univ. of Zurich
Univ. of Applied Sciences Deggendorf
ETH Zurich
Noser Engineering
Univ. of Zurich
Stanford Univ.

15:30-15:45 TuC03.5
Development of a Haptic Interface Using MR Fluid for Displaying Cutting Forces of Soft Tissues, pp. 1044-1049. Attachment
Tsujita, Tepppei
Ohara, Manabu
Sase, Kazuya
Konno, Atsushi
Nakayama, Masano
Abe, Koyu
Tohoku Univ.
Tohoku Univ.
Tohoku Univ.
Tohoku Univ.
Tohoku Univ.
Tohoku Univ.

14:30-14:45 TuC03.1
A Compact Tactile Display Suitable for Integration in VR and Teleoperation, pp. 1018-1024.
Sarakoglou, Ioannis
Tsagarakis, Nikolaos
Caldwell, Darwin G.
Istituto Italiano di Tecnologia
Istituto Italiano di Tecnologia
Italian Inst. of Tech.

14:45-15:00 TuC03.2
Risk-Sensitive Optimal Feedback Control for Haptic Assistance, pp. 1025-1031.
Medina Hernandez, Jose Ramon
Lee, Dongheui
Hirche, Sandra
Tech. Univ. München
Tech. Univ. Munich
Tech. Univ. München

15:00-15:15 TuC03.3
Robles, Jose
Sguerri, Matthew
Rorie, Conrad
Vu, Kim-Phuong
Struybel, Thomas
Marayong, Panadda
California State Univ. Long Beach
California State Univ. Long Beach
California State Univ. Long Beach
California State Univ. Long Beach
California State Univ. Long Beach
California State Univ. Long Beach

15:15-15:30 TuC03.4
Wearable Haptic Device for Cutaneous Force and Slip Speed Display, pp. 1038-1043.
Damian, Dana
Ludersdorfer, Marvin
Kim, Yeongmi
Hernandez Arieta, Alejandro
Pfeifer, Rolf
Okamura, Allison M.
Univ. of Zurich
Univ. of Applied Sciences Deggendorf
ETH Zurich
Noser Engineering
Univ. of Zurich
Stanford Univ.

15:30-15:45 TuC03.5
Development of a Haptic Interface Using MR Fluid for Displaying Cutting Forces of Soft Tissues, pp. 1044-1049. Attachment
Tsujita, Tepppei
Ohara, Manabu
Sase, Kazuya
Konno, Atsushi
Nakayama, Masano
Abe, Koyu
Tohoku Univ.
Tohoku Univ.
Tohoku Univ.
Tohoku Univ.
Tohoku Univ.
Tohoku Univ.
### TuC04

**Micro - Nanoscale Automation (Regular Session)**

**Chair:** Popa, Dan  
**Co-Chair:** Sun, Yu  
**Location:** Meeting Room 4 (Chief Wabasha)

<table>
<thead>
<tr>
<th>Time</th>
<th>Title</th>
<th>Authors</th>
</tr>
</thead>
</table>
| 14:30-14:45 | Dynamic Region Control for Robot-Assisted Cell Manipulation Using Optical Tweezers, pp. 1057-1062. | Li, Xiang  
Cheah, C. C.  
Nanyang Tech. Univ. |
| 14:45-15:00 | Automated Nanomanipulation for Nano Device Construction, pp. 1063-1068. | Zhang, Yanliang  
Li, Jason  
To, Steve  
Zhang, Yong  
Ye, Xutao  
Sun, Yu  
MathWorks  
Univ. of Toronto  
Univ. of Toronto  
Univ. of Toronto  
Univ. of Toronto  |
| 15:00-15:15 | Parallel Teleoperation of Holographic Optical Tweezers Using Multi-Touch User Interface, pp. 1069-1074. | Onda, Kazuhsa  
Arai, Fumihito  
Nagoya Univ.  |
MacLachlan, Robert A.  
Lobes, Louis A.  
Riviere, Cameron  
Carnegie Mellon University  
Carnegie Mellon University  
Dept. of Ophthalmology, Univ. of Pittsburgh Medical Center,  
Carnegie Mellon Univ.  |
| 15:30-15:45 | Holonomic 5-DOF Magnetic Control of 1D Nanostructures, pp. 1081-1086. | Schuerle, Simone  
Peyer, Kathrin Eva  
Kratochvil, Bradley  
Nelson, Bradley J.  
ETH Zurich  
ETH Zurich  
ETH Zurich  
ETH Zurich  |
| 15:45-16:00 | Interval Analysis for Robot Precision Evaluation, pp. 1087-1092. | Pac, Muhammed Rasid  
Popa, Dan  
The Univ. of Texas at Arlington  |

### TuC05

**Multi-Robot Systems 1 (Regular Session)**

**Chair:** Sukhatme, Gaurav  
**Co-Chair:** Martinoli, Alcherio  
**Location:** Meeting Room 5 (Ska)

<table>
<thead>
<tr>
<th>Time</th>
<th>Title</th>
<th>Authors</th>
</tr>
</thead>
</table>
| 14:30-14:45 | Fully Distributed Scalable Smoothing and Mapping with Robust Multi-Robot Data Association, pp. 1093-1100. | Cunningham, Alexander  
Georgia Inst. of Tech.  |
Collaborative 3D Localization of Robots from Relative Pose Measurements Using Gradient Descent on Manifolds, pp. 1101-1106.
Knuth, Joseph  
Barooah, Prabir

Distributed Source Seeking by Cooperative Robots: All-To-All and Limited Communications, pp. 1107-1112.
Li, Shuai  
Guo, Yi

Antonelli, Gianluca  
Marino, Alessandro  
Chiaverini, Stefano

On Localization Uncertainty in an Autonomous Inspection, pp. 1119-1124.
Feigl, Jan  
Krajnik, Tomas  
Vonasek, VojaTech  
Preucil, Libor

Probabilistic Spatial Mapping and Curve Tracking in Distributed Multi-Agent Systems, pp. 1125-1130.
Williams, Ryan  
Sukhatme, Gaurav

Biologically Inspired Robotics (Invited Session)
Chair: von der Emde, Gerhard  
Co-Chair: Boyer, Frédéric

Morel, Yannick  
Porez, Mathieu  
Ispeert, Auke

Localization of Small Objects with Electric Sense Based on Kalman Filter, pp. 1137-1142.
Lebastard, Vincent  
Chevallereau, Christine  
Girin, Alexis  
Boyer, Frédéric  
Gossiaux, Pol Bernard

von der Emde, Gerhard  
Gebhardt, Kristina  
Behr, Katharina

Mintchev, Stefano
TuC06.5

Lebastard, Vincent
Boyer, Frédéric
Chevallereau, Christine
Servagent, Noël
Ec. des Mines de Nantes
15:30-15:45

TuC06.6

Chevallereau, Christine
Boyer, Frédéric
Lebastard, Vincent
Benachenhou, Mohamed
CNRS
Ec. des Mines de Nantes
15:45-16:00

TuC07

Climbing Robots (Regular Session)
Chair: Shapiro, Amir Ben Gurion Univ. of the Negev
Co-Chair: Spenko, Matthew Illinois Inst. of Tech.
14:30-14:45

TuC07.1

Turker, Korhan
Sharf, Inna
Trentini, Michael
McGill Univ.
McGill Univ.
Defence Res. and Development Canada
14:45-15:00

TuC07.2

Fast Accessible Rescue Device by Using a Flexible Sliding Actuator, pp. 1175-1180. Attachment
Tsukagoshi, Hideyuki
Tokyo Inst. of Tech.
15:00-15:15

TuC07.3

Design Considerations for Attachment and Detachment in Robot Climbing with Hot Melt Adhesives, pp. 1181-1186. Attachment
Wang, Liyu
Neuschafer, Fabian
Bernat, Remo
lida, Fumiya
Bio-Inspired Robotics Lab, ETH Zurich
Department of Mechanical and Process Engineering, ETH Zurich
Department of Mechanical and Process Engineering, ETH Zurich
ETH Zurich
15:15-15:30

TuC07.4

Ruffatto III, Donald
Spenko, Matthew
Illinois Inst. of Tech.
Illinois Inst. of Tech.
15:30-15:45

TuC07.5

Stable Open-Loop Brachiation on a Vertical Wall, pp. 1193-1199. Attachment
Rosa, Nelson
Barber, Adam
Gregg, Robert D.
Lynch, Kevin
Northwestern Univ.
Northwestern Univ.
Northwestern Univ.
Northwestern Univ.
15:45-16:00

TuC07.6

System and Design of Clothbot: A Robot for Flexible Clothes Climbing, pp. 1200-1205. Attachment
Liu, Yuanyuan
Wu, Xinyu
Shenzhen Inst. of Advanced Tech.
Shenzhen Inst. of Advanced Tech.
Human Detection and Tracking (Regular Session)

Chair: Trahanias, Panos
Co-Chair: Alempijevic, Alen

TuC08.1
Iterative Pedestrian Segmentation and Pose Tracking under a Probabilistic Framework, pp. 1206-1211.
Li, Yanli
Zhou, Zhong
Wu, Wei

TuC08.2
A Connectionist-Based Approach for Human Action Identification, pp. 1212-1217.
Al Azrai, Rami
Lee, C. S. George

TuC08.3
Using Dempster's Rule of Combination to Robustly Estimate Pointed Targets, pp. 1218-1225.
Pateraki, Maria
Baltzakis, Haris
Trahanias, Panos

TuC08.4
Head-To-Shoulder Signature for Person Recognition, pp. 1226-1231.
Kirchner, Nathan
Alempijevic, Alen
Virgona, Alexander Joseph

TuC08.5
Bigram-Based Natural Language Model and Statistical Motion Symbol Model for Scalable Language of Humanoid Robots, pp. 1232-1237.
Takano, Wataru
Nakamura, Yoshihiko

TuC08.6
Cognitive Active Vision for Human Identification, pp. 1238-1245.
Utsumi, Yuzuko
Sommertade, Eric
Bellotto, Nicola
Reid, Ian

Mapping (Regular Session)

Chair: Kim, Jonghyuk
Co-Chair: Paz, Lina Maria

TuC09.1
Decomposable Bundle Adjustment Using a Junction Tree, pp. 1246-1253.
Pinies, Pedro
Paz, Lina Maria
Haner, Sebastian
Heyden, Anders

TuC09.2
Towards a Robust Back-End for Pose Graph SLAM, pp. 1254-1261.
Sunderhauf, Niko
<table>
<thead>
<tr>
<th>Time</th>
<th>Session</th>
<th>Title</th>
<th>Authors</th>
</tr>
</thead>
<tbody>
<tr>
<td>15:00-15:15</td>
<td>TuC09.3</td>
<td>An Incremental Trust-Region Method for Robust Online Sparse Least-Squares Estimation, pp. 1262-1269.</td>
<td>Protzel, Peter Chemnitz Univ. of Tech.</td>
</tr>
<tr>
<td>15:30-15:45</td>
<td>TuC09.5</td>
<td>Multi-Agent Deterministic Graph Mapping Via Robot Rendezvous, pp. 1278-1283.</td>
<td>Berger, Cyrille Linköping Univ.</td>
</tr>
<tr>
<td>15:45-16:00</td>
<td>TuC09.6</td>
<td>The RoboEarth Language: Representing and Exchanging Knowledge about Actions, Objects, and Environments, pp. 1284-1289.</td>
<td>Tenorth, Moritz TU München</td>
</tr>
</tbody>
</table>

**TuC110**

**Interactive Session TuC-1 (Interactive Session)**

<table>
<thead>
<tr>
<th>Time</th>
<th>Session</th>
<th>Title</th>
<th>Authors</th>
</tr>
</thead>
<tbody>
<tr>
<td>14:30-15:00</td>
<td>TuC110.1</td>
<td>On Combining Visual SLAM and Dense Scene Flow to Increase the Robustness of Localization and Mapping In Dynamic Environments, pp. 1290-1297. Attachment</td>
<td>Fernandez Alcantarilla, Pablo Univ. of Alcala</td>
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<td>Yebes, Torres, José Javier Pol. school. Univ. of Alcala</td>
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<td>Almazán, Javier Unal. of Alcalá</td>
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<td>Bergasa, Luis Miguel Unal. of Alcalá</td>
</tr>
<tr>
<td>14:30-15:00</td>
<td>TuC110.2</td>
<td>A Learned Feature Descriptor for Object Recognition in RGB-D Data, pp. 1288-1303.</td>
<td>Blum, Manuel Albert-Ludwigs-Univ. Freiburg</td>
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<td>Sprinzenberg, Jost Tobias Albert-Ludwigs-Univ. of Freiburg</td>
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<td>Wülfing, Jan Albert-Ludwigs-Univ. Freiburg</td>
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<td>Riedmiller, Martin Albert-Ludwigs-Univ. Freiburg</td>
</tr>
<tr>
<td>14:30-15:00</td>
<td>TuC110.3</td>
<td>A Flexible Visual Inspection System Combining Pose Estimation and Visual Servo Approaches, pp. 1304-1309.</td>
<td>Zang, Chuantao Tohoku Univ.</td>
</tr>
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<td>Hashimoto, Koichi Tohoku Univ.</td>
</tr>
<tr>
<td>14:30-15:00</td>
<td>TuC110.4</td>
<td>SIGVerse - a Cloud Computing Architecture Simulation Platform for Social Human-Robot Interaction, pp. 1310-1315.</td>
<td>Tan, Jeffrey Too Chuan National Inst. of Informatics</td>
</tr>
<tr>
<td></td>
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<td>Inamura, Tetsunari National Inst. of Informatics</td>
</tr>
<tr>
<td>14:30-15:00</td>
<td>TuC110.5</td>
<td>Generating Optimal Trajectory of Humanoid Arm That Minimizes Torque Variation Using Differential Dynamic Programming, pp. 1316-1321.</td>
<td>Park, In-Won KAIST</td>
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<td>Hong, Young-Dee KAIST</td>
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<td>Lee, Bum-Joo Myongji Univ.</td>
</tr>
</tbody>
</table>
TuC210

Interactive Session TuC-2 (Interactive Session)

Chair: Siciliano, Bruno
Co-Chair: Blum, Manuel

15:00-15:30 TuC210.1


Chair: Apostolopoulos, Ilias
Co-Chair: Falah, Navid

15:00-15:30 TuC210.2

Detection-Based Object Labelling in 3D Scenes, pp. 1330-1337.

Chair: Lai, Kevin
Co-Chair: Bo, Liefeng

15:00-15:30 TuC210.3

Generation of Independent Contact Regions on Objects Reconstructed from Noisy Real-World Range Data, pp. 1338-1344.

Chair: Charusta, Krzysztof
Co-Chair: Stoyanov, Todor

15:00-15:30 TuC210.4


Chair: Sivalingam, Ravishankar
Co-Chair: Cherian, Anoop

15:00-15:30 TuC210.5

Numerical Computation of Manipulator Singularities, pp. 1351-1358.

Chair: Bohigas, Oriol
Co-Chair: Zlatanov, Dimitar

TuC310

Interactive Session TuC-3 (Interactive Session)

Chair: Siciliano, Bruno
Co-Chair: Blum, Manuel

15:30-16:00 TuC310.1

15:30-16:00  TuC310.2

Occlusion-Aware Reconstruction and Manipulation of 3D Articulated Objects, pp. 1365-1371. Attachment
Huang, Xiaoxia
Walker, Ian
Birchfield, Stan

15:30-16:00  TuC310.3

Two Ball Juggling with High-Speed Hand-Arm and High-Speed Vision System, pp. 1372-1377.
Kizaki, Takahiro
Namiki, Akio

15:30-16:00  TuC310.4

Online 3D Tracking of Human Arms with a Single Camera, pp. 1378-1383.
Tu, Ming-Han
Huang, Cheng-Ming
Fu, Li-Chen

15:30-16:00  TuC310.5

Casimir Based Impedance Control, pp. 1384-1391.
Sakai, Satoru
Stramigioli, Stefano

Tu01

16:30-16:45  TuD01.1

Finger Flexion Force Sensor Based on Volar Displacement of Flexor Tendon, pp. 1392-1397.
Heo, Pilwon
Kim, Jung

16:45-17:00  TuD01.2

A Compact Two DOF Magneto-Elastomeric Force Sensor for a Running Quadruped, pp. 1398-1403.
Ananthanarayanan, Arvind
Foong, Shaohui
Kim, Sangbae

17:00-17:15  TuD01.3

Ohka, Masahiro
Matsunaga, Takuya
Nojima, Yu
Noda, Daiji
Hattori, Tadashi

17:15-17:30  TuD01.4

A Computationally Fast Algorithm for Local Contact Shape and Pose Classification Using a Tactile Array Sensor, pp. 1410-1415.
Liu, Hongbin
Song, Xiaojing
Naneyakkara, Thrishantha
Seneviratne, Lakmal
Althoefer, Kaspar

17:30-17:45  TuD01.5

Analysis of the Trade-Off between Resolution and Bandwidth for a Nanoforce Sensor Based on Diamagnetic Levitation, pp. 1416-1421.
An Investigation of the Use of Linear Polarizers to Measure Force and Torque in Optical 6-DOF Force/Torque Sensors for Dexterous Manipulators, pp. 1422-1427.

TuD02

Humanoid Motion Planning and Control (Regular Session)

Chair: Park, Frank
Co-Chair: Khatib, Oussama

16:30-16:45

TuD02.1 Controlling the Planar Motion of a Heavy Object by Pushing with a Humanoid Robot Using Dual-Arm Force Control, pp. 1428-1435. Attachment

Nozawa, Shunichi
Kakluchi, Yohei
Okada, Kei
Inaba, Masayuki

16:45-17:00

TuD02.2 Hopping at the Resonance Frequency: A Pattern Generation Technique for Bipedal Robots with Elastic Joints, pp. 1436-1443.

Ugurlu, Barkan
Saglia, Jody Alessandro
Tsagarakis, Nikolaos
Caldwell, Darwin G.

17:00-17:15

TuD02.3 Humanoid Motion Optimization Via Nonlinear Dimension Reduction, pp. 1444-1449.

Kang, Hyuk
Park, Frank

17:15-17:30

TuD02.4 A Neuromorphic Model of Bipedal Locomotion Based on Principles of Human Neuromuscular Architecture, pp. 1450-1455.

Attachment

Klein, Theresa
Lewis, M. Anthony

17:30-17:45

TuD02.5 Walking Control of Fully Actuated Robots Based on the Bipedal SLIP Model, pp. 1456-1463.

Garofalo, Gianluca
Ott, Christian
Albu-Schaffer, Alin

17:45-18:00

TuD02.6 Muscle Force Transmission to Operational Space Accelerations During Elite Golf Swings, pp. 1464-1469.

Demircan, Emel
Besier, Thor F.
Khatib, Oussama

TuD03

Cable-Driven Mechanisms (Regular Session)

Chair: Gosselin, Clement
Co-Chair: Ozawa, Ryuta

16:30-16:45

TuD03.1 Novel Equilibrium-Point Control of Agonist-Antagonist System with Pneumatic Artificial Muscles, pp. 1470-1475.
Dynamic Trajectory Planning of a Two-DOF Cable-Suspended Parallel Robot, pp. 1476-1481.

Gosselin, Clement
Ren, Ping
Foucault, Simon


Mustafa, Shabbir Kurbanhusen
Agrawal, Sunil

Development of a MR-Compatible Cable-Driven Manipulator: Design and Technological Issues, pp. 1488-1494.

Abdelaziz, Salih
Esteveny, Laure
Barbá, Laurent
Renaud, Pierre
Bayle, Bernard
de Mathelin, Michel

Application of Unscented Kalman Filter to a Cable Driven Surgical Robot: A Simulation Study, pp. 1495-1500.

Ramadurai, Srikrishnan
Nia Kosari, Sina
King, H. Hawkeye
Chizeck, Howard
Hannaford, Blake

Joint Control of Tendon-Driven Mechanisms with Branching Tendons, pp. 1501-1507.

Sawada, Daisuke
Ozawa, Ryuta

Object Motion-Decoupled Internal Force Control for a Compliant Multifingered Hand, pp. 1508-1513.

Prattichizzo, Domenico
Malvezzi, Monica
Wimboeck, Thomas
Aggravi, Marco

Robust, Inexpensive Resonant Frequency Based Contact Detection for Robotic Manipulators, pp. 1514-1519.

Backus, Spencer
Dollar, Aaron


Roberts, Dustyn
Poon, Jack
Patrick, Daniella
Learning Grasping Force from Demonstration, pp. 1526-1531.
Lin, Yun
Ren, Shaogang
Clevenger, Matthew
Sun, Yu

Revised Force Control Using a Compliant Sensor with a Position Controlled Robot, pp. 1532-1537.
Lange, Friedrich
Jehle, Claudius
Suppa, Michael
Hirzinger, Gerd

Force Controlled Robotic Assembly without a Force Sensor, pp. 1538-1543.
Stoit, Andreas
Linderoth, Magnus
Robertsson, Anders
Johansson, Rolf

Distributed Value Functions for Multi-Robot Exploration, pp. 1544-1550.
Matignon, Laetitia
Jeannipierre, Laurent
Mouaddib, Abdel-Illah

Wang, Hua
Guo, Yi

Distributed Formation Control of Unicycle Robots, pp. 1564-1569.
Sadowska, Anna
Kostic, Dragan
van de Wouw, Nathan
Huijbrets, Henri
Nijmeijer, Hendrik

Multi-Level Formation Roadmaps for Collision-Free Dynamic Shape Changes with Non-Holonomic Teams, pp. 1570-1575.
Krontiris, Athanasios
Louis, Sushil
Bekris, Kostas E.

An Unscented Model Predictive Control Approach to the Formation Control of Nonholonomic Mobile Robots, pp. 1576-1582.
Farrokhsiar, Morteza
Najjaran, Homayoun
<table>
<thead>
<tr>
<th>Time</th>
<th>Session</th>
<th>Title</th>
<th>Authors</th>
</tr>
</thead>
<tbody>
<tr>
<td>16:30-16:45</td>
<td>TuD06.1</td>
<td>A New Hand-Held Force-Amplifying Device for Micromanipulation, pp. 1583-1588.</td>
<td>Payne, Christopher, Tun Latt, Win, Yang, Guang-Zhong (Imperial Coll. London)</td>
</tr>
<tr>
<td>16:45-17:00</td>
<td>TuD06.2</td>
<td>An Optical Actuation System and Curvature Sensor for a MR-Compatible Active Needle, pp. 1589-1594.</td>
<td>Ryu, Seok Chang, Quak, Zhan Fan, Renaud, Pierre, Black, Richard J., Daniel, Bruce, Cutkosky, Mark (Stanford Univ.)</td>
</tr>
<tr>
<td>17:00-17:15</td>
<td>TuD06.3</td>
<td>Semi-Automatic Needle Steering System with Robotic Manipulator, pp. 1595-1600.</td>
<td>Bernardes, Mariana Costa, Adorno, Bruno Vilhena, Poignet, Philippe, Borges, Geovany Araujo (Univ. of Montpellier 2 / CNRS - LIRMM, Federal Univ. of Minas Gerais (UFMG), LIRMM UMR 5506 CNRS UM2, Univ. de Brasilia)</td>
</tr>
<tr>
<td>17:15-17:30</td>
<td>TuD06.4</td>
<td>Torsional Dynamics Compensation Enhances Robotic Control of Tip-Steerable Needles, pp. 1601-1606.</td>
<td>Swensen, John, Cowan, Noah J. (Johns Hopkins Univ.)</td>
</tr>
<tr>
<td>17:30-17:45</td>
<td>TuD06.5</td>
<td>The Impact of Interaction Model on Stability and Transparency in Bilateral Teleoperation for Medical Applications, pp. 1607-1613</td>
<td>Sanchez Secades, Luis Alonso, Le, Minh-Quyen, Liu, Chao, Zemiti, Nabil, Poignet, Philippe (Lab. d'Informatique, de Robotique et de Microélectronique, INSA de Lyon, LIRMM (UMR5506), CNRS, France, Univ. Montpellier II - CNRS UMR 5506, LIRMM UMR 5506 CNRS UM2)</td>
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