

2019 IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS 2019)

**Macau, China
3 – 8 November 2019**

Pages 1-797



**IEEE Catalog Number: CFP19IRO-POD
ISBN: 978-1-7281-4005-6**

**Copyright © 2019 by the Institute of Electrical and Electronics Engineers, Inc.
All Rights Reserved**

Copyright and Reprint Permissions: Abstracting is permitted with credit to the source. Libraries are permitted to photocopy beyond the limit of U.S. copyright law for private use of patrons those articles in this volume that carry a code at the bottom of the first page, provided the per-copy fee indicated in the code is paid through Copyright Clearance Center, 222 Rosewood Drive, Danvers, MA 01923.

For other copying, reprint or republication permission, write to IEEE Copyrights Manager, IEEE Service Center, 445 Hoes Lane, Piscataway, NJ 08854. All rights reserved.

****** This is a print representation of what appears in the IEEE Digital Library. Some format issues inherent in the e-media version may also appear in this print version.***

IEEE Catalog Number:	CFP19IRO-POD
ISBN (Print-On-Demand):	978-1-7281-4005-6
ISBN (Online):	978-1-7281-4004-9
ISSN:	2153-0858

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) 758-2633
E-mail: curran@proceedings.com
Web: www.proceedings.com

CURRAN ASSOCIATES INC.
proceedings
.com

TABLE OF CONTENTS

A NOVEL ROBUST APPROACH FOR CORRESPONDENCE-FREE EXTRINSIC CALIBRATION	1
<i>Xiao Hu ; Daniel Olesen ; Knudsen Per</i>	
AUTOMATIC CALIBRATION OF MULTIPLE 3D LIDARS IN URBAN ENVIRONMENTS	7
<i>Jianhao Jiao ; Yang Yu ; Qinghai Liao ; Haoyang Ye ; Rui Fan ; Ming Liu</i>	
MODEL FREE CALIBRATION OF WHEELED ROBOTS USING GAUSSIAN PROCESS	13
<i>Mohan Krishna Nutalapati ; Lavish Arora ; Anway Bose ; Ketan Rajawat ; Rajesh M Hegde</i>	
A ROBUST EXTRINSIC CALIBRATION FRAMEWORK FOR VEHICLES WITH UNSCALED SENSORS	20
<i>Celyn Walters ; Oscar Mendez ; Simon Hadfield ; Richard Bowden</i>	
DEEPCONTROL: ENERGY-EFFICIENT CONTROL OF A QUADROTOR USING A DEEP NEURAL NETWORK	27
<i>Pratyush Varshney ; Gajendra Nagar ; Indranil Saha</i>	
INFORMED REGION SELECTION FOR EFFICIENT UAV-BASED OBJECT DETECTORS: ALTITUDE-AWARE VEHICLE DETECTION WITH CYCAR DATASET	35
<i>Alexandros Kouris ; Christos Kyrkou ; Christos-Savvas Bouganis</i>	
SIM-TO-(MULTI)-REAL: TRANSFER OF LOW-LEVEL ROBUST CONTROL POLICIES TO MULTIPLE QUADROTORS	43
<i>Artem Molchanov ; Tao Chen ; Wolfgang Hönig ; James A. Preiss ; Nora Ayanian ; Gaurav S. Sukhatme</i>	
A CONVOLUTIONAL NEURAL NETWORK FEATURE DETECTION APPROACH TO AUTONOMOUS QUADROTOR INDOOR NAVIGATION	51
<i>Adriano Garcia ; Sandeep S. Mittal ; Edward Kiewra ; Kanad Ghose</i>	
LONG RANGE NEURAL NAVIGATION POLICIES FOR THE REAL WORLD	59
<i>Ayzaan Wahid ; Alexander Toshev ; Marek Fiser ; Tsang-Wei Edward Lee</i>	
UNCERTAINTY-AWARE IMITATION LEARNING USING KERNELIZED MOVEMENT PRIMITIVES	67
<i>João Silvério ; Yanlong Huang ; Fares J. Abu-Dakka ; Leonel Rozo ; Darwin G. Caldwell</i>	
HIGH-DIMENSIONAL MOTION SEGMENTATION BY VARIATIONAL AUTOENCODER AND GAUSSIAN PROCESSES	75
<i>Masatoshi Nagano ; Tomoaki Nakamura ; Takayuki Nagai ; Daichi Mochihashi ; Ichiro Kobayashi ; Wataru Takano</i>	
LEARNING BARRIER FUNCTIONS FOR CONSTRAINED MOTION PLANNING WITH DYNAMICAL SYSTEMS	82
<i>Matteo Saveriano ; Dongheui Lee</i>	
ACTIVE LEARNING OF REWARD DYNAMICS FROM HIERARCHICAL QUERIES	90
<i>Chandrayee Basu ; Erdem Biyik ; Zhixun He ; Mukesh Singhal ; Dorsa Sadigh</i>	
NEURAL-LEARNING TRAJECTORY TRACKING CONTROL OF FLEXIBLE-JOINT ROBOT MANIPULATORS WITH UNKNOWN DYNAMICS	98
<i>Shuyang Chen ; John T. Wen</i>	
PLANNING REACTIVE MANIPULATION IN DYNAMIC ENVIRONMENTS	106
<i>Philipp S. Schmitt ; Florian Wirnshofer ; Kai M. Wurm ; Georg V. Wichert ; Wolfram Burgard</i>	
BOUNDED-ERROR LQR-TREES	114
<i>Barrett Ames ; George Konidaris</i>	
INTERACTION-AWARE DECISION MAKING WITH ADAPTIVE STRATEGIES UNDER MERGING SCENARIOS	121
<i>Yeping Hu ; Alireza Nakhaei ; Masayoshi Tomizuka ; Kikuo Fujimura</i>	
LAMBDA-FIELD: A CONTINUOUS COUNTERPART OF THE BAYESIAN OCCUPANCY GRID FOR RISK ASSESSMENT	129
<i>Johann Laconte ; Christophe Debain ; Roland Chapuis ; François Pomerleau ; Romuald Aufrère</i>	
ONLINE ACTIVE SAFETY FOR ROBOTIC MANIPULATORS	135
<i>Andrew Singletary ; Petter Nilsson ; Thomas Gurriet ; Aaron D. Ames</i>	
DISC: A LARGE-SCALE VIRTUAL DATASET FOR SIMULATING DISASTER SCENARIOS	141
<i>Hae-Gon Jeon ; Sunghoon Im ; Byeong-Uk Lee ; Dong-Geol Choi ; Martial Hebert ; In So Kweon</i>	
THE ROLE OF ROBOT PAYLOAD IN THE SAFETY MAP FRAMEWORK	149
<i>Mazin Hamad ; Nico Mansfeld ; Saeed Abdolshah ; Sami Haddadin</i>	
CONCEPT AND VALIDATION OF A LARGE-SCALE HUMAN-MACHINE SAFETY SYSTEM BASED ON REAL-TIME UWB INDOOR LOCALIZATION	155
<i>Wei Wang ; Zhuoqi Zeng ; Wan Ding ; Huajun Yu ; Hannes Rose</i>	

SMALL-SCALE COMPLIANT DUAL ARM WITH TAIL FOR WINGED AERIAL ROBOTS	162
<i>Alejandro Suarez ; Manuel Perez ; Guillermo Heredia ; Anibal Ollero</i>	
DESIGN AND IMPLEMENTATION OF A CONTACT AERIAL MANIPULATOR SYSTEM FOR GLASS-WALL INSPECTION TASKS	169
<i>Xiangdong Meng ; Yuqing He ; Jianda Han</i>	
ACHIEVEMENT OF ONLINE AGILE MANIPULATION TASK FOR AERIAL TRANSFORMABLE MULTILINK ROBOT	175
<i>Fan Shi ; Moju Zhao ; Tomoki Anzai ; Keita Ito ; Xiangyu Chen ; Kei Okada ; Masayuki Inaba</i>	
TOWARDS A ROBUST AERIAL CINEMATOGRAPHY PLATFORM: LOCALIZING AND TRACKING MOVING TARGETS IN UNSTRUCTURED ENVIRONMENTS	183
<i>Rogério Bonatti ; Cherie Ho ; Wenshan Wang ; Sanjiban Choudhury ; Sebastian Scherer</i>	
AERIAL ANIMAL BIOMETRICS: INDIVIDUAL FRIESIAN CATTLE RECOVERY AND VISUAL IDENTIFICATION VIA AN AUTONOMOUS UAV WITH ONBOARD DEEP INFERENCE	191
<i>William Andrew ; Colin Greatwood ; Tilo Burghardt</i>	
GEOMETRIC AND PHYSICAL CONSTRAINTS FOR DRONE-BASED HEAD PLANE CROWD DENSITY ESTIMATION	198
<i>Weizhe Liu ; Krzysztof Lis ; Mathieu Salzmann ; Pascal Fua</i>	
INFRASTRUCTURE-FREE NLOS OBSTACLE DETECTION FOR AUTONOMOUS CARS	204
<i>Felix Naser ; Igor Gilitschenski ; Alexander Amini ; Christina Liao ; Guy Rosman ; Sertac Karaman ; Daniela Rus</i>	
ACTION RECOGNITION BASED ON 3D SKELETON AND RGB FRAME FUSION	212
<i>Guiyu Liu ; Jiuchao Qian ; Fei Wen ; Xiaoguang Zhu ; Rendong Ying ; Peilin Liu</i>	
ESTIMATING METRIC SCALE VISUAL ODOMETRY FROM VIDEOS USING 3D CONVOLUTIONAL NETWORKS	219
<i>Alexander S. Koumis ; James A. Preiss ; Gaurav S. Sukhatme</i>	
UNSUPERVISED TRAFFIC ACCIDENT DETECTION IN FIRST-PERSON VIDEOS	227
<i>Yu Yao ; Mingze Xu ; Yuchen Wang ; David J. Crandall ; Ella M. Atkins</i>	
VEHICULAR MULTI-CAMERA SENSOR SYSTEM FOR AUTOMATED VISUAL INSPECTION OF ELECTRIC POWER DISTRIBUTION EQUIPMENT	235
<i>Jinsun Park ; Ukcheol Shin ; Gyumin Shim ; Kyungdon Joo ; Francois Rameau ; Junhyeok Kim ; Dong-Geol Choi ; In So Kweon</i>	
REPRESENTATION LEARNING VIA PARALLEL SUBSET RECONSTRUCTION FOR 3D POINT CLOUD GENERATION	243
<i>Kohei Matsuzaki ; Kazuyuki Tasaka</i>	
IDENTIFYING OPPORTUNITIES FOR RELATIONSHIP-FOCUSED ROBOTIC INTERVENTIONS IN STRAINED HIERARCHICAL RELATIONSHIPS	251
<i>Michael J. Pettinati ; Ronald C. Arkin</i>	
FAST ADAPTATION WITH META-REINFORCEMENT LEARNING FOR TRUST MODELLING IN HUMAN-ROBOT INTERACTION	259
<i>Yuan Gao ; Elena Sibirtseva ; Ginevra Castellano ; Danica Kragic</i>	
ARE YOU WITH ME? DETERMINING THE ASSOCIATION OF INDIVIDUALS AND THE COLLECTIVE SOCIAL SPACE	267
<i>Alan D. G. Silva ; Douglas G. Macharet</i>	
ARE YOU HEARING OR LISTENING? THE EFFECT OF TASK PERFORMANCE IN VERBAL BEHAVIOR WITH SMART SPEAKER	273
<i>Chaewon Park ; Jongsuk Choi ; Jee Eun Sung ; Yoonseob Lim</i>	
THE ROBOT SHOW MUST GO ON: EFFECTIVE RESPONSES TO ROBOT FAILURES	279
<i>Abrar Fallatah ; Jeremy Urann ; Heather Knight</i>	
RIGHT OF WAY, ASSERTIVENESS AND SOCIAL RECOGNITION IN HUMAN-ROBOT DOORWAY INTERACTION	287
<i>Jack Thomas ; Richard Vaughan</i>	
ACTIVE SLAM USING CONNECTIVITY GRAPHS AS PRIORS	294
<i>Alberto Soragna ; Marco Baldini ; Dominik Joho ; Rainer Kümmerle ; Giorgio Grisetti</i>	
MAP-AWARE SLAM WITH SPARSE MAP FEATURES	301
<i>Patrick Burger ; Benjamin Naujoks ; Hans-Joachim Wuensche</i>	
RISE-SLAM: A RESOURCE-AWARE INVERSE SCHMIDT ESTIMATOR FOR SLAM	308
<i>Tong Ke ; Kejian J. Wu ; Stergios I. Roumeliotis</i>	
BETTER LOST IN TRANSITION THAN LOST IN SPACE: SLAM STATE MACHINE	316
<i>Mirco Colosi ; Sebastian Haug ; Peter Biber ; Kai O. Arras ; Giorgio Grisetti</i>	
STEREO VISUAL INERTIAL LIDAR SIMULTANEOUS LOCALIZATION AND MAPPING	324
<i>Weizhao Shao ; Srinivasan Vijayarangan ; Cong Li ; George Kantor</i>	

FAST AND INCREMENTAL LOOP CLOSURE DETECTION USING PROXIMITY GRAPHS.....	332
<i>Shan An ; Guangfu Che ; Fangru Zhou ; Xianglong Liu ; Xin Ma ; Yu Chen</i>	
AN OPEN-SOURCE 7-AXIS, ROBOTIC PLATFORM TO ENABLE DEXTEROUS PROCEDURES WITHIN CT SCANNERS.....	340
<i>Dimitri A. Schreiber ; Daniel B. Shak ; Alexander M. Norbush ; Michael C. Yip</i>	
A HANDHELD MASTER CONTROLLER FOR ROBOT-ASSISTED MICROSURGERY	348
<i>Dandan Zhang ; Yao Guo ; Junhong Chen ; Jindong Liu ; Guang-Zhong Yang</i>	
DESIGN AND VERIFICATION OF A PORTABLE MASTER MANIPULATOR BASED ON AN EFFECTIVE WORKSPACE ANALYSIS FRAMEWORK.....	355
<i>Dandan Zhang ; Jindong Liu ; Lin Zhang ; Guang-Zhong Yang</i>	
MACRO-MICRO MULTI-ARM ROBOT FOR SINGLE-PORT ACCESS SURGERY	363
<i>T. Vandebroek ; M. Ourak ; C. Grujthuijsen ; A. Javaux ; J. Legrand ; T. Vercauteren ; S. Ourselin ; J. Deprest ; E. Vander Poorten</i>	
REAL-TIME MONITORING OF HUMAN TASK ADVANCEMENT.....	371
<i>Riccardo Maderna ; Paolo Lanfredini ; Andrea Maria Zanchettin ; Paolo Rocco</i>	
DEEP ORIENTATION: FAST AND ROBUST UPPER BODY ORIENTATION ESTIMATION FOR MOBILE ROBOTIC APPLICATIONS.....	379
<i>Benjamin Lewandowski ; Daniel Seichter ; Tim Wengefeld ; Lennard Pfennig ; Helge Drumm ; Horst-Michael Gross</i>	
WEARABLE ACTIVITY RECOGNITION FOR ROBUST HUMAN-ROBOT TEAMING IN SAFETY-CRITICAL ENVIRONMENTS VIA HYBRID NEURAL NETWORKS.....	387
<i>Andrea E. Frank ; Alyssa Kubota ; Laurel D. Riek</i>	
NORMAL DISTRIBUTION MIXTURE MATCHING BASED MODEL FREE OBJECT TRACKING USING 2D LIDAR.....	393
<i>Baehoon Choi ; Hyunggi Jo ; Euntae Kim</i>	
PRIVACY-PRESERVING ROBOT VISION WITH ANONYMIZED FACES BY EXTREME LOW RESOLUTION.....	400
<i>Myeung Un Kim ; Harim Lee ; Hyun Jong Yang ; Michael S. Ryoo</i>	
DENSEPEDS: PEDESTRIAN TRACKING IN DENSE CROWDS USING FRONT-RVO AND SPARSE FEATURES.....	406
<i>Rohan Chandra ; Uttaran Bhattacharya ; Aniket Bera ; Dinesh Manocha</i>	
TIP MODEL: A COMBINATION OF UNSTABLE SUBSYSTEMS FOR LATERAL BALANCE IN WALKING.....	414
<i>Vahid Firouzi ; Andre Seyfarth ; Maziar A. Sharbafi</i>	
AVOIDING OBSTACLES DURING PUSH RECOVERY USING REAL-TIME VISION FEEDBACK.....	421
<i>Hyobin Jeong ; Joon-Ha Kim ; Okkee Sim ; Jun-Ho Oh</i>	
EFFECT OF PLANNING PERIOD ON MPC-BASED NAVIGATION FOR A BIPED ROBOT IN A CROWD.....	429
<i>Matteo Ciocca ; Pierre-Brice Wieber ; Thierry Fraichard</i>	
UNIFIED BALANCE CONTROL FOR BIPED ROBOTS INCLUDING MODIFICATION OF FOOTSTEPS WITH ANGULAR MOMENTUM AND FALLING DETECTION BASED ON CAPTURABILITY.....	435
<i>Yuta Kojio ; Yasuhiro Ishiguro ; Kim-Ngoc-Khanh Nguyen ; Fumihito Sugai ; Yohei Kakiuchi ; Kei Okada ; Masayuki Inaba</i>	
ONLINE RELATIVE FOOTSTEP OPTIMIZATION FOR LEGGED ROBOTS DYNAMIC WALKING USING DISCRETE-TIME MODEL PREDICTIVE CONTROL.....	443
<i>Songyan Xin ; Romeo Orsolino ; Nikos Tsagarakis</i>	
TIME-DELAY COMPENSATION USING ENERGY TANK FOR SATELLITE DYNAMICS ROBOTIC SIMULATORS.....	451
<i>Marco De Stefano ; Luca Vezzadini ; Cristian Secchi</i>	
A SWEEPING AND GRINDING METHODS COMBINED HYBRID SAMPLER FOR ASTEROID EXPLORATION.....	459
<i>Chengcheng Dong ; Jun Zhang ; Chaojun Jiang ; Fanzhang Huang ; Xi Lu ; Fan Huang ; Aiguo Song</i>	
NON-MYOPIC PLANETARY EXPLORATION COMBINING IN SITU AND REMOTE MEASUREMENTS.....	466
<i>Suhit Kodgule ; Alberto Candela ; David Wettergreen</i>	
IMPROVED PLANETARY ROVER INERTIAL NAVIGATION AND WHEEL ODOMETRY PERFORMANCE THROUGH PERIODIC USE OF ZERO-TYPE CONSTRAINTS.....	474
<i>Cagri Kilic ; Jason N. Gross ; Nicholas Ohi ; Ryan Watson ; Jared Strader ; Thomas Swiger ; Scott Harper ; Yu Gu</i>	

MODELING AND FORCE CONTROL OF A TERRAMECHANICAL WHEEL-SOIL CONTACT FOR A ROBOTIC MANIPULATOR USED IN THE PLANETARY ROVER DESIGN PROCESS	482
<i>Jan Wachter ; Ralf Mikut ; Fabian Buse</i>	
PREDICTIVE INVERSE KINEMATICS: OPTIMIZING FUTURE TRAJECTORY THROUGH IMPLICIT TIME INTEGRATION AND FUTURE JACOBIAN ESTIMATION	488
<i>Ko Ayusawa ; Wael Suleiman ; Eiichi Yoshida</i>	
VIRTUAL REGION BASED MULTI-ROBOT PATH PLANNING IN AN UNKNOWN OCCLUDED ENVIRONMENT	496
<i>Dibyendu Roy ; Arijit Chowdhury ; Madhubanti Maitra ; Samar Bhattacharya</i>	
FAST TRAJECTORY PLANNING FOR MULTIPLE QUADROTORs USING RELATIVE SAFE FLIGHT CORRIDOR.....	504
<i>Jungwon Park ; H. Jin Kim</i>	
ROBOT LEARNING OF SHIFTING OBJECTS FOR GRASPING IN CLUTTERED ENVIRONMENTS	512
<i>Lars Berscheid ; Pascal Meißner ; Torsten Kröger</i>	
DEEP REINFORCEMENT LEARNING FOR ROBOTIC PUSHING AND PICKING IN CLUTTERED ENVIRONMENT	519
<i>Yuhong Deng ; Xiaofeng Guo ; Yixuan Wei ; Kai Lu ; Bin Fang ; Di Guo ; Huaping Liu ; Fuchun Sun</i>	
VISION-BASED AUTOMATIC CONTROL OF A 5-FINGERED ASSISTIVE ROBOTIC MANIPULATOR FOR ACTIVITIES OF DAILY LIVING	527
<i>Chen Wang ; Daniel Freer ; Jindong Liu ; Guang-Zhong Yang</i>	
RECALLING CANDIDATES OF GRASPING METHOD FROM AN OBJECT IMAGE USING NEURAL NETWORK	534
<i>Makoto Sanada ; Tadashi Matsuo ; Nobutaka Shimada ; Yoshiaki Shirai</i>	
DOMAIN-INDEPENDENT UNSUPERVISED DETECTION OF GRASP REGIONS TO GRASP NOVEL OBJECTS	540
<i>Siddhartha Vibhu Pharswan ; Mohit Vohra ; Ashish Kumar ; Laxmidhar Behera</i>	
NEAR-CONTACT GRASPING STRATEGIES FROM AWKWARD POSES: WHEN SIMPLY CLOSING YOUR FINGERS IS NOT ENOUGH.....	546
<i>Yi Heng Ong ; John Morrow ; Yu Qiu ; Kartik Gupta ; Ravi Balasubramanian ; Cindy Grimm</i>	
AUTOMATED MACRO-MICRO MANIPULATION FOR ROBOTIC MICROINJECTION WITH COMPUTER VISION	552
<i>Huipeng Zhang ; Liying Su ; Hongmiao Wei ; Yueqing Yu ; Xuping Zhang</i>	
A ROBOTIC SURGERY APPROACH TO MITOCHONDRIAL TRANSFER AMONGST SINGLE CELLS.....	559
<i>Adnan Shakoor ; Mingyang Xie ; Fei Pan ; Wendi Gao ; Jiayu Sun ; Dong Sun</i>	
A MAGNETICALLY TRANSDUCED WHISKER FOR ANGULAR DISPLACEMENT AND MOMENT SENSING	565
<i>Suhan Kim ; Camilo Velez ; Dinesh K. Patel ; Sarah Bergbreiter</i>	
ACTIVE WHISKER PLACEMENT AND EXPLORATION FOR RAPID OBJECT RECOGNITION.....	572
<i>Martin J. Pearson ; Mohammed Salman</i>	
ON-CHIP THREE-DIMENSION CELL ROTATION USING WHIRLING FLOWS GENERATED BY OSCILLATING ASYMMETRICAL MICROSTRUCTURES.....	578
<i>Bin Song ; Yanmin Feng ; Qiang Zhou ; Lin Feng</i>	
LOW-COST SONAR NAVIGATION SYSTEM	584
<i>Tiziano Guadagnino ; Bartolomeo Della Corte ; Giorgio Grisetti</i>	
OUTLIER-ROBUST STATE ESTIMATION FOR HUMANOID ROBOTS.....	590
<i>Stylianos Piperakis ; Dimitrios Kanoulas ; Nikos G. Tsagarakis ; Panos Trahanias</i>	
ROBUST OUTDOOR SELF-LOCALIZATION IN CHANGING ENVIRONMENTS.....	598
<i>Muhammad Haris ; Mathias Franzius ; Ute Bauer-Wersing</i>	
A MODEL-BASED HUMAN ACTIVITY RECOGNITION FOR HUMAN-ROBOT COLLABORATION	604
<i>Sang Uk Lee ; Andreas Hofmann ; Brian Williams</i>	
AUGMENTING KNOWLEDGE THROUGH STATISTICAL, GOAL-ORIENTED HUMAN-ROBOT DIALOG.....	612
<i>Saeid Amiri ; Sujay Bajracharya ; Cihangir Goktolgal ; Jesse Thomason ; Shiqi Zhang</i>	
INVERSE DYNAMICS MODELING OF ROBOTIC MANIPULATOR WITH HIERARCHICAL RECURRENT NETWORK.....	619
<i>Pengfei Sun ; Zhenzhou Shao ; Ying Qu ; Yong Guan ; Jindong Tan</i>	
BAYESIAN OPTIMIZATION FOR POLICY SEARCH IN HIGH-DIMENSIONAL SYSTEMS VIA AUTOMATIC DOMAIN SELECTION	625
<i>Lukas P. Fröhlich ; Edgar D. Klenske ; Christian G. Daniel ; Melanie N. Zeilinger</i>	

LONG-TERM PREDICTION OF MOTION TRAJECTORIES USING PATH HOMOLOGY CLUSTERS	633
<i>J. Frederico Carvalho ; Mikael Vejdemo-Johansson ; Florian T. Pokorny ; Danica Kragic</i>	
FEEDBACK-BASED FABRIC STRIP FOLDING	641
<i>Vladimír Petrík ; Ville Kyrki</i>	
GUINEA FOWL JUMPING ROBOT WITH BALANCE CONTROL MECHANISM: MODELING, SIMULATION, AND EXPERIMENT RESULTS	647
<i>Myeongjin Kim ; Dongwon Yun</i>	
CARPIE: A SOFT, MECHANICALLY-RECONFIGURABLE WORM ROBOT	655
<i>Pouya Ahmadian ; Rainier F. Natividad ; Chen-Hua Yeow</i>	
A SPRING-AIDED TWO-DIMENSIONAL ELECTROMECHANICAL SPINE ARCHITECTURE FOR BIO-INSPIRED ROBOTS	661
<i>Bonhyun Ku ; Sunyu Wang ; Arijit Banerjee</i>	
EFFECT OF ARM SWINGING AND TRUNK TWISTING ON BIPEDAL LOCOMOTION	667
<i>Ryo Onishi ; Ryoma Kitamura ; Takashi Takuma ; Wataru Kase</i>	
PROTO-OBJECT BASED SALIENCY FOR EVENT-DRIVEN CAMERAS	673
<i>Massimiliano Iacono ; Giulia D'Angelo ; Arren Glover ; Vadim Tikhonoff ; Ernst Niebur ; Chiara Bartolozzi</i>	
TASK-SPECIFIC SELF-BODY CONTROLLER ACQUISITION BY MUSCULOSKELETAL HUMANOID: APPLICATION TO PEDAL CONTROL IN AUTONOMOUS DRIVING	681
<i>Kento Kawaharazuka ; Kei Tsuzuki ; Shogo Makino ; Moritaka Onitsuka ; Koki Shinjo ; Yuki Asano ; Kei Okada ; Koji Kawasaki ; Masayuki Inaba</i>	
ESKO6D - A BINOCULAR AND RGB-D DATASET OF STORED KITCHEN OBJECTS WITH 6D POSES	687
<i>Jesse Richter-Klug ; Constantin Wellhausen ; Udo Frese</i>	
POSE ESTIMATION FOR OMNI-DIRECTIONAL CAMERAS USING SINUSOID FITTING	694
<i>Haofei Kuang ; Qingwen Xu ; Xiaoling Long ; Sören Schwertfeger</i>	
REGION-WISE POLYNOMIAL REGRESSION FOR 3D MOBILE GAZE ESTIMATION	701
<i>Dan Su ; You Fu Li ; Hao Chen</i>	
3D RECONSTRUCTION BY SINGLE CAMERA OMNIDIRECTIONAL MULTI-STEREO SYSTEM	708
<i>Shuya Chen ; Zhiyu Xiang ; Nan Zoul ; Yiman Chen ; Chengyu Qiao</i>	
EFFICIENT ENVIRONMENT GUIDED APPROACH FOR EXPLORATION OF COMPLEX ENVIRONMENTS	715
<i>Daniel Butters ; Emil T. Jonasson ; Robert Stuart-Smith ; Vijay M. Pawar</i>	
SIAMESE CONVOLUTIONAL NEURAL NETWORK FOR SUB-MILLIMETER-ACCURATE CAMERA POSE ESTIMATION AND VISUAL SERVOING	721
<i>Cunjun Yu ; Zhongang Cai ; Hung Pham ; Quang-Cuong Pham</i>	
INFER: INTERMEDIATE REPRESENTATIONS FOR FUTURE PREDICTION	728
<i>Shashank Srikanth ; Junaid Ahmed Ansari ; R. Karnik Ram ; Sarthak Sharma ; J. Krishna Murthy ; K. Madhava Krishna</i>	
END-TO-END DRIVING MODEL FOR STEERING CONTROL OF AUTONOMOUS VEHICLES WITH FUTURE SPATIOTEMPORAL FEATURES	736
<i>Tianhao Wu ; Ao Luo ; Rui Huang ; Hong Cheng ; Yang Zhao</i>	
A CONVOLUTIONAL NETWORK FOR JOINT DERAINING AND DEHAZING FROM A SINGLE IMAGE FOR AUTONOMOUS DRIVING IN RAIN	742
<i>Hao Sun ; Marcelo H. Ang ; Daniela Rus</i>	
IMPROVING LEARNING-BASED EGO-MOTION ESTIMATION WITH HOMOMORPHISM-BASED LOSSES AND DRIFT CORRECTION	750
<i>Xiangwei Wang ; Daniel Maturana ; Shichao Yang ; Wenshan Wang ; Qijun Chen ; Sebastian Scherer</i>	
META-LEARNING FOR MULTI-OBJECTIVE REINFORCEMENT LEARNING	757
<i>Xi Chen ; Ali Ghadirzadeh ; Mårten Björkman ; Patric Jensfelt</i>	
A COMPARATIVE ANALYSIS ON THE USE OF AUTOENCODERS FOR ROBOT SECURITY ANOMALY DETECTION	764
<i>Matteo Olivato ; Omar Cotugno ; Lorenzo Brigato ; Domenico Bloisi ; Alessandro Farinelli ; Luca Iocchi</i>	
FAST AND SAFE POLICY ADAPTATION VIA ALIGNMENT-BASED TRANSFER	770
<i>Jigang Kim ; Seungwon Choi ; H. Jin Kim</i>	
ROBOTIC TRACKING CONTROL WITH KERNEL TRICK-BASED REINFORCEMENT LEARNING	777
<i>Yazhou Hu ; Wenxue Wang ; Hao Liu ; Lianqing Liu</i>	
GRAPH-BASED DESIGN OF HIERARCHICAL REINFORCEMENT LEARNING AGENTS	783
<i>Davide Tateo ; Idil Su Erdenlig ; Andrea Bonarini</i>	

VARIABLE IMPEDANCE CONTROL IN END-EFFECTOR SPACE: AN ACTION SPACE FOR REINFORCEMENT LEARNING IN CONTACT-RICH TASKS	790
<i>Roberto Martín-Martín ; Michelle A. Lee ; Rachel Gardner ; Silvio Savarese ; Jeannette Bohg ; Animesh Garg</i>	
MOTION DECOUPLING AND COMPOSITION VIA REDUCED ORDER MODEL OPTIMIZATION FOR DYNAMIC HUMANOID WALKING WITH CLF-QP BASED ACTIVE FORCE CONTROL	798
<i>Xiaobin Xiong ; Aaron D. Ames</i>	
EARLY FUSION FOR GOAL DIRECTED ROBOTIC VISION.....	805
<i>Aaron Walsman ; Yonatan Bisk ; Saadia Gabriel ; Dipendra Misra ; Yoav Artzi ; Yejin Choi ; Dieter Fox</i>	
ADVANCED AUTONOMY ON A LOW-COST EDUCATIONAL DRONE PLATFORM.....	812
<i>Luke Eller ; Théo Guérin ; Baichuan Huang ; Garrett Warren ; Sophie Yang ; Josh Roy ; Stefanie Tellex</i>	
GOAL-DIRECTED BEHAVIOR UNDER VARIATIONAL PREDICTIVE CODING: DYNAMIC ORGANIZATION OF VISUAL ATTENTION AND WORKING MEMORY	820
<i>Minju Jung ; Takazumi Matsumoto ; Jun Tani</i>	
SCALING ROBOT SUPERVISION TO HUNDREDS OF HOURS WITH ROBOTURK: ROBOTIC MANIPULATION DATASET THROUGH HUMAN REASONING AND DEXTERITY.....	828
<i>Ajay Mandlekar ; Jonathan Booher ; Max Spero ; Albert Tung ; Anshit Gupta ; Yuke Zhu ; Animesh Garg ; Silvio Savarese ; Li Fei-Fei</i>	
ROBOT LEARNING VIA HUMAN ADVERSARIAL GAMES	836
<i>Jiali Duan ; Qian Wang ; Lerrel Pinto ; C.-C. Jay Kuo ; Stefanos Nikolaidis</i>	
PLANNING BEYOND THE SENSING HORIZON USING A LEARNED CONTEXT	844
<i>Michael Everett ; Justin Miller ; Jonathan P. How</i>	
RESPONSIVE JOINT ATTENTION IN HUMAN-ROBOT INTERACTION	852
<i>André Pereira ; Catharine Oertel ; Leonor Fermoselle ; Joe Mendelson ; Joakim Gustafson</i>	
DEEP DIVE INTO FACES: POSE & ILLUMINATION INVARIANT MULTI-FACE EMOTION RECOGNITION SYSTEM.....	860
<i>Suchitra Saxena ; Shikha Tripathi ; T S B Sudarshan</i>	
ENTHUSIASTIC ROBOTS MAKE BETTER CONTACT.....	866
<i>Elie Saad ; Joost Broekens ; Mark A. Neerinx ; Koen V. Hindriks</i>	
ENTROPIC RISK MEASURE IN POLICY SEARCH	873
<i>David Nass ; Boris Belousov ; Jan Peters</i>	
CAN A ROBOT BECOME A MOVIE DIRECTOR? LEARNING ARTISTIC PRINCIPLES FOR AERIAL CINEMATOGRAPHY	879
<i>Mirko Gschwindt ; Efe Camci ; Rogerio Bonatti ; Wenshan Wang ; Erdal Kayacan ; Sebastian Scherer</i>	
ONLINE TRAJECTORY GENERATION OF A MAV FOR CHASING A MOVING TARGET IN 3D DENSE ENVIRONMENTS	887
<i>Boseong Felipe Jeon ; H. Jin Kim</i>	
THERMAL-INERTIAL ODOMETRY FOR AUTONOMOUS FLIGHT THROUGHOUT THE NIGHT.....	894
<i>Jeff Delaune ; Robert Hewitt ; Laura Lytle ; Cristina Sorice ; Rohan Thakker ; Larry Matthies</i>	
TIMEPIX RADIATION DETECTOR FOR AUTONOMOUS RADIATION LOCALIZATION AND MAPPING BY MICRO UNMANNED VEHICLES.....	901
<i>Tomas Baca ; Martin Jilek ; Petr Manek ; Petr Stibinger ; Vladimir Linhart ; Jan Jakubek ; Martin Saska</i>	
FLEXIBLE TRINOCULAR: NON-RIGID MULTI-CAMERA-IMU DENSE RECONSTRUCTION FOR UAV NAVIGATION AND MAPPING	909
<i>Timo Hinzmann ; Cesar Cadena ; Juan Nieto ; Roland Siegwart</i>	
PATH PLANNING WITH INCREMENTAL ROADMAP UPDATE FOR VISIBILITY-BASED TARGET TRACKING	915
<i>Guillermo J. Laguna ; Sourabh Bhattacharya</i>	
CAMERA EXPOSURE CONTROL FOR ROBUST ROBOT VISION WITH NOISE-AWARE IMAGE QUALITY ASSESSMENT.....	921
<i>Ukcheol Shin ; Jinsun Park ; Gyumin Shim ; Francois Rameau ; In So Kweon</i>	
VISUAL DOMAIN ADAPTATION EXPLOITING CONFIDENCE-SAMPLES.....	929
<i>Song Tang ; Yunfeng Ji ; Jianzhi Lyu ; Jinpeng Mi ; Qingdu Li ; Jianwei Zhang</i>	
LEARNING RESIDUAL FLOW AS DYNAMIC MOTION FROM STEREO VIDEOS.....	936
<i>Seokju Lee ; Sunghoon Im ; Stephen Lin ; In So Kweon</i>	
GROUNDING LANGUAGE ATTRIBUTES TO OBJECTS USING BAYESIAN EIGENOBJECTS	943
<i>Vanya Cohen ; Benjamin Burchfiel ; Thao Nguyen ; Nakul Gopalan ; Stefanie Tellex ; George Konidaris</i>	
METRIC MONOCULAR LOCALIZATION USING SIGNED DISTANCE FIELDS	951
<i>Huaiyang Huang ; Yuxiang Sun ; Haoyang Ye ; Ming Liu</i>	

PERCEPTION AS PREDICTION USING GENERAL VALUE FUNCTIONS IN AUTONOMOUS DRIVING APPLICATIONS	958
<i>Daniel Graves ; Kasra Rezaee ; Sean Scheideman</i>	
EXPERIENCE REUSE WITH PROBABILISTIC MOVEMENT PRIMITIVES	966
<i>Svenja Stark ; Jan Peters ; Elmar Rueckert</i>	
SEQLPD: SEQUENCE MATCHING ENHANCED LOOP-CLOSURE DETECTION BASED ON LARGE-SCALE POINT CLOUD DESCRIPTION FOR SELF-DRIVING VEHICLES	974
<i>Zhe Liu ; Chuangzhe Suo ; Shunbo Zhou ; Fan Xu ; Huanshu Wei ; Wen Chen ; Hesheng Wang ; Xinwu Liang ; Yun-Hui Liu</i>	
BELIEF SPACE METAREASONING FOR EXCEPTION RECOVERY	980
<i>Justin Svegliato ; Kyle Hollins Wray ; Stefan J. Witwicki ; Joydeep Biswas ; Shlomo Zilberstein</i>	
IVOA: INTROSPECTIVE VISION FOR OBSTACLE AVOIDANCE	986
<i>Sadegh Rabiee ; Joydeep Biswas</i>	
CAN A SOCIAL ROBOT ENCOURAGE CHILDREN'S SELF-STUDY?	992
<i>Risa Maeda ; Jani Even ; Takayuki Kanda</i>	
PERCEPTION OF PEDESTRIAN AVOIDANCE STRATEGIES OF A SELF-BALANCING MOBILE ROBOT	999
<i>Shih-Yun Lo ; Katsu Yamane ; Ken-Ichiro Sugiyama</i>	
A DEEP LEARNING APPROACH FOR MULTI-VIEW ENGAGEMENT ESTIMATION OF CHILDREN IN A CHILD-ROBOT JOINT ATTENTION TASK	1007
<i>Jack Hadfield ; Georgia Chalvatzaki ; Petros Koutras ; Mehdi Khamassi ; Costas S. Tzafestas ; Petros Maragos</i>	
EVALUATING THE ACCEPTABILITY OF ASSISTIVE ROBOTS FOR EARLY DETECTION OF MILD COGNITIVE IMPAIRMENT	1013
<i>Matteo Luperto ; Marta Romeo ; Francesca Lunardini ; Nicola Basilico ; Carlo Abbate ; Ray Jones ; Angelo Cangelosi ; Simona Ferrante ; N. Alberto Borghese</i>	
A METHOD FOR GUIDING A PERSON COMBINING ROBOT MOVEMENT AND PROJECTION	1021
<i>Aki Tamai ; Tetsushi Ikeda ; Satoshi Iwaki</i>	
FREE-SPACE FEATURES: GLOBAL LOCALIZATION IN 2D LASER SLAM USING DISTANCE FUNCTION MAPS	1027
<i>Alexander Millane ; Helen Oleynikova ; Juan Nieto ; Roland Siegwart ; César Cadena</i>	
EIGEN-FACTORS: PLANE ESTIMATION FOR MULTI-FRAME AND TIME-CONTINUOUS POINT CLOUD ALIGNMENT	1034
<i>Gonzalo Ferrer</i>	
A ROBUST LASER-INERTIAL ODOMETRY AND MAPPING METHOD FOR LARGE-SCALE HIGHWAY ENVIRONMENTS	1041
<i>Shibo Zhao ; Zheng Fang ; Haolai Li ; Sebastian Scherer</i>	
DEGENERACY-AWARE FACTORS WITH APPLICATIONS TO UNDERWATER SLAM	1049
<i>Akshay Hinduja ; Bing-Jui Ho ; Michael Kaess</i>	
ON THE TUNABLE SPARSE GRAPH SOLVER FOR POSE GRAPH OPTIMIZATION IN VISUAL SLAM PROBLEMS	1056
<i>Chieh Chou ; Di Wang ; Dezhen Song ; Timothy A. Davis</i>	
RADAR LOCALIZATION AND MAPPING FOR INDOOR DISASTER ENVIRONMENTS VIA MULTI-MODAL REGISTRATION TO PRIOR LIDAR MAP	1063
<i>Yeong Sang Park ; Joowan Kim ; Ayoung Kim</i>	
SETUP AND METHOD FOR REMOTE CENTER OF MOTION POSITIONING GUIDANCE DURING ROBOT-ASSISTED SURGERY	1071
<i>Jonas Smits ; Dominiek Reynaerts ; Emmanuel Vander Poorten</i>	
TWIN KINEMATICS APPROACH FOR ROBOTIC-ASSISTED TELE-ECHOGRAPHY	1079
<i>Luis Santos ; Rui Cortesão ; João Quintas</i>	
SEMI-AUTONOMOUS INTERVENTIONAL MANIPULATION USING PNEUMATICALLY ATTACHABLE FLEXIBLE RAILS	1087
<i>C. D' Ettore ; A. Stilli ; G. Dwyer ; J. B. Neves ; M. Tran ; D. Stoyanov</i>	
OPTIMIZING MOTION-PLANNING PROBLEM SETUP VIA BOUNDED EVALUATION WITH APPLICATION TO FOLLOWING SURGICAL TRAJECTORIES	1095
<i>Sherdil Niyaz ; Alan Kuntz ; Oren Salzman ; Ron Alterovitz ; Siddhartha S. Srinivasa</i>	
GENERALIZED MULTIPLE CORRELATION COEFFICIENT AS A SIMILARITY MEASUREMENT BETWEEN TRAJECTORIES	1103
<i>Julen Urain ; Jan Peters</i>	
EXPLORING LOW-LEVEL AND HIGH-LEVEL TRANSFER LEARNING FOR MULTI-TASK FACIAL RECOGNITION WITH A SEMI-SUPERVISED NEURAL NETWORK	1110
<i>Pablo Barros ; Erik Fliesswasser ; Matthias Kerzel ; Stefan Wermter</i>	

A SYSTEMATIC COMPARISON OF AFFECTIVE ROBOT EXPRESSION MODALITIES	1117
<i>Morten Roed Frederiksen ; Kasper Stoy</i>	
TOWARDS MORE REALISTIC HUMAN-ROBOT CONVERSATION: A SEQ2SEQ-BASED BODY GESTURE INTERACTION SYSTEM	1125
<i>Minjie Hua ; Fuyuan Shi ; Yibing Nan ; Kai Wang ; Hao Chen ; Shiguo Lian</i>	
VIRTUAL-MASS-ELLIPSOID INVERTED PENDULUM MODEL AND ITS APPLICATIONS TO 3D BIPEDAL LOCOMOTION ON UNEVEN TERRAINS	1133
<i>Kaixuan Guan ; Ko Yamamoto ; Yoshihiko Nakamura</i>	
PERIODIC TRAJECTORY PLANNING AND ROBUST OUTPUT ZEROING CONTROL FOR UNDERACTUATED BIPEDAL ROBOTS WITH PREDICTED DISTURBANCES	1139
<i>Rin Takano ; Junho Chang ; Masaki Yamakita</i>	
LEARNING FOOTSTEP PLANNING ON IRREGULAR SURFACES WITH PARTIAL PLACEMENTS	1145
<i>Germán Castro ; Claude Sammut</i>	
A ROBUST BIPED LOCOMOTION BASED ON LINEAR-QUADRATIC-GAUSSIAN CONTROLLER AND DIVERGENT COMPONENT OF MOTION	1153
<i>Mohammadreza Kasaei ; Nuno Lau ; Artur Pereira</i>	
GENERALIZED CONTACT CONSTRAINTS OF HYBRID TRAJECTORY OPTIMIZATION FOR DIFFERENT TERRAINS AND ANALYSIS OF SENSITIVITY TO RANDOMIZED INITIAL GUESSES	1159
<i>Kenneth Chao ; Pilwon Hur</i>	
DESIGN OF AN ADHESION-AWARE FAÇADE CLEANING ROBOT	1165
<i>M. A. Viraj J. Muthugala ; M. Vega-Heredia ; A. Vengadesh ; G. Sriharsha ; Mohan Rajesh Elara</i>	
A NOVEL CAPABILITIES OF QUADRUPED ROBOT MOVING THROUGH VERTICAL LADDER WITHOUT HANDRAIL SUPPORT	1172
<i>Azhar Aulia Saputra ; Yuichiro Toda ; Naoyuki Takesue ; Naoyuki Kubota</i>	
ADAPTIVE VISION-BASED CONTROL FOR ROPE-CLIMBING ROBOT MANIPULATOR	1178
<i>Guangli Sun ; Xiang Li ; Peng Li ; Linzhu Yue ; Zhen Yu ; Yang Zhou ; Yun-Hui Liu</i>	
ON MODEL-BASED ADHESION CONTROL OF A VORTEX CLIMBING ROBOT	1184
<i>George Andrikopoulos ; Andreas Papadimitriou ; Angelica Brusell ; George Nikolakopoulos</i>	
AN INTERACTIVE PHYSICALLY-BASED MODEL FOR ACTIVE SUCTION PHENOMENON SIMULATION	1190
<i>Antonin Bernardin ; Christian Duriez ; Maud Marchal</i>	
COVERAGE PATH PLANNING USING PATH PRIMITIVE SAMPLING AND PRIMITIVE COVERAGE GRAPH FOR VISUAL INSPECTION	1196
<i>Wei Jing ; Di Deng ; Zhe Xiao ; Yong Liu ; Kenji Shimada</i>	
SAMPLING-BASED MOTION PLANNING OF 3D SOLID OBJECTS GUIDED BY MULTIPLE APPROXIMATE SOLUTIONS	1204
<i>Vojtech Vonásek ; Robert Penigka</i>	
LEGO: LEVERAGING EXPERIENCE IN ROADMAP GENERATION FOR SAMPLING-BASED PLANNING	1212
<i>Rahul Kumar ; Aditya Mandalika ; Sanjiban Choudhury ; Siddhartha Srinivasa</i>	
VOLUMETRIC TREE*: ADAPTIVE SPARSE GRAPH FOR EFFECTIVE EXPLORATION OF HOMOTOPY CLASSES	1220
<i>Donghyuk Kim ; Mincheul Kang ; Sung-Eui Yoon</i>	
MULTILEVEL INCREMENTAL ROADMAP SPANNERS FOR REACTIVE MOTION PLANNING	1228
<i>Jeffrey Ichnowski ; Ron Alterovitz</i>	
MT-RRT: A GENERAL PURPOSE MULTITHREADING LIBRARY FOR PATH PLANNING	1234
<i>Andrea Casalino ; Andrea Maria Zanchettin ; Paolo Rocco</i>	
GENERATING GRASP POSES FOR A HIGH-DOF GRIPPER USING NEURAL NETWORKS	1242
<i>Min Liu ; Zherong Pan ; Kai Xu ; Kanishka Ganguly ; Dinesh Manocha</i>	
ROBUST GRASP PLANNING OVER UNCERTAIN SHAPE COMPLETIONS	1250
<i>Jens Lundell ; Francesco Verdoja ; Ville Kyrki</i>	
PARTIAL CAGING: A CLEARANCE-BASED DEFINITION AND DEEP LEARNING	1257
<i>Anastasiia Varava ; Michael C. Welle ; Jeffrey Mahler ; Ken Goldberg ; Danica Kragic ; Florian T. Pokorny</i>	
GRASPING UNKNOWN OBJECTS BASED ON GRIPPER WORKSPACE SPHERES	1265
<i>Mohamed Sorour ; Khaled Elgeneidy ; Aravinda Srinivasan ; Marc Hanheide ; Gerhard Neumann</i>	
OPTIMIZATION MODEL FOR PLANNING PRECISION GRASPS WITH MULTI-FINGERED HANDS	1272
<i>Yongxiang Fan ; Xinghao Zhu ; Masayoshi Tomizuka</i>	

AUTOMATED SORTING OF RARE CELLS BASED ON AUTOFOCUSING VISUAL FEEDBACK IN FLUORESCENCE MICROSCOPY	1279
<i>Kailun Bai ; Huaping Wang ; Qing Shi ; Zhiqiang Zheng ; Juan Cui ; Tao Sun ; Qiang Huang ; Paolo Dario ; Toshio Fukuda</i>	
3D MICROMANIPULATION OF PARTICLE SWARM USING A HEXAPOLE MAGNETIC TWEEZER	1285
<i>Xiao Zhang ; Louis William Rogowski ; Min Jun Kim</i>	
MAGNETIC-NEEDLE-ASSISTED MICROMANIPULATION OF DYNAMICALLY SELF-ASSEMBLED MAGNETIC DROPLETS FOR CARGO TRANSPORTATION	1291
<i>Qianqian Wang ; Xingzhou Du ; Fengtong Ji ; Li Zhang</i>	
VISION-BASED MAGNETIC PLATFORM FOR ACTUATOR POSITIONING AND WIRELESS CONTROL OF MICROROBOTS	1297
<i>Azaddien Zarrouk ; Karim Belharet ; Omar Tahri</i>	
ROBOT LOCALIZATION VIA ODOMETRY-ASSISTED ULTRA-WIDEBAND RANGING WITH STOCHASTIC GUARANTEES	1303
<i>Valerio Magnago ; Pablo Corbalán ; Gian Pietro Picco ; Luigi Palopoli ; Daniele Fontanelli</i>	
SPARSE-3D LIDAR OUTDOOR MAP-BASED AUTONOMOUS VEHICLE LOCALIZATION	1310
<i>Syed Zeeshan Ahmed ; Vincensius Billy Saputra ; Saurab Verma ; Kun Zhang ; Albertus Hendrawan Adiwahono</i>	
MOBILE ROBOT LOCALIZATION WITH REINFORCEMENT LEARNING MAP UPDATE DECISION AIDED BY AN ABSOLUTE INDOOR POSITIONING SYSTEM	1316
<i>Luis Garrote ; Miguel Torres ; Tiago Barros ; João Perdiz ; Cristiano Premebida ; Urbano J. Nunes</i>	
GLFP: GLOBAL LOCALIZATION FROM A FLOOR PLAN	1323
<i>Xipeng Wang ; Ryan J. Marcotte ; Edwin Olson</i>	
PLANNING IN STOCHASTIC ENVIRONMENTS WITH GOAL UNCERTAINTY	1329
<i>Sandhya Saisubramanian ; Kyle Hollins Wray ; Luis Pineda ; Shlomo Zilberstein</i>	
ADAPTIVE OUTCOME SELECTION FOR PLANNING WITH REDUCED MODELS	1335
<i>Sandhya Saisubramanian ; Shlomo Zilbertsein</i>	
FAST RUN-TIME MONITORING, REPLANNING, AND RECOVERY FOR SAFE AUTONOMOUS SYSTEM OPERATIONS	1341
<i>Esen Yel ; Nicola Bezzo</i>	
COOPERATIVE SCHEDULE-DRIVEN INTERSECTION CONTROL WITH CONNECTED AND AUTONOMOUS VEHICLES	1348
<i>Hsu-Chieh Hu ; Stephen F. Smith ; Rick Goldstein</i>	
TOWARD MODEL-BASED BENCHMARKING OF ROBOT COMPONENTS	1354
<i>Gianluca Bardaro ; Mohamed El-Shamouly ; Giulio Fontana ; Ramez Awad ; Matteo Matteucci</i>	
LIFELONG FEDERATED REINFORCEMENT LEARNING: A LEARNING ARCHITECTURE FOR NAVIGATION IN CLOUD ROBOTIC SYSTEMS	1360
<i>Boyi Liu ; Lujia Wang ; Ming Liu</i>	
STUDY ON ELASTIC ELEMENTS ALLOCATION FOR ENERGY-EFFICIENT ROBOTIC CHEETAH LEG	1368
<i>Ivan I. Borisov ; Ivan A. Kulagin ; Anastasiya E. Larkina ; Artem A. Egorov ; Sergey A. Kolyubin ; Stefano Stramigioli</i>	
A NOVEL SMALL-SCALE TURTLE-INSPIRED AMPHIBIOUS SPHERICAL ROBOT	1374
<i>Huiming Xing ; Shuxiang Guo ; Livei Shi ; Xihuan Hou ; Yu Liu ; Huikang Liu ; Yao Hu ; Debin Xia ; Zan Li</i>	
DECENTRALIZED COORDINATION MECHANISM BETWEEN NECK AND LIMBS FOR EFFICIENT QUADRUPEDAL WALKING	1380
<i>Akira Fukuhara ; Shura Suzuki ; Takeshi Kano ; Akio Ishiguro</i>	
EFFECTS OF A BIO-MIMICKED FLAPPING PATH ON PROPULSION EFFICIENCY OF TWO-SEGMENTAL FISH ROBOTS	1386
<i>Majid Abedinzadeh Shahri ; Ali Rouhollahi ; Majid Nili Ahmadabadi</i>	
DIRECTIONAL TSDF: MODELING SURFACE ORIENTATION FOR COHERENT MESHES	1392
<i>Malte Splietker ; Sven Behnke</i>	
MONOCULAR DEPTH ESTIMATION IN NEW ENVIRONMENTS WITH ABSOLUTE SCALE	1400
<i>Tom Roussel ; Luc Van Eycken ; Tinne Tuytelaars</i>	
FRUSTUM CONVNET: SLIDING FRUSTUMS TO AGGREGATE LOCAL POINT-WISE FEATURES FOR AMODAL 3D OBJECT DETECTION	1407
<i>Zhixin Wang ; Kui Jia</i>	
PIECEWISE RIGID SCENE FLOW WITH IMPLICIT MOTION SEGMENTATION	1415
<i>Andreas Görlitz ; Jonas Geiping ; Andreas Kolb</i>	
PPR-NET: POINT-WISE POSE REGRESSION NETWORK FOR INSTANCE SEGMENTATION AND 6D POSE ESTIMATION IN BIN-PICKING SCENARIOS	1423
<i>Zhikai Dong ; Sicheng Liu ; Tao Zhou ; Hui Cheng ; Long Zeng ; Xingyao Yu ; Houde Liu</i>	

AFFORDANCE LEARNING FOR END-TO-END VISUOMOTOR ROBOT CONTROL	1431
<i>Aleksi Hämmäläinen ; Karol Arndt ; Ali Ghadirzadeh ; Ville Kyrki</i>	
PIXEL-ATTENTIVE POLICY GRADIENT FOR MULTI-FINGERED GRASPING IN CLUTTERED SCENES	1439
<i>Bohan Wu ; Ireñaiyo Akinola ; Peter K. Allen</i>	
THE COSTAR BLOCK STACKING DATASET: LEARNING WITH WORKSPACE CONSTRAINTS	1447
<i>Andrew Hundt ; Varun Jain ; Chia-Hung Lin ; Chris Paxton ; Gregory D. Hager</i>	
LEARNING ACTIONS FROM HUMAN DEMONSTRATION VIDEO FOR ROBOTIC MANIPULATION	1455
<i>Shuo Yang ; Wei Zhang ; Weizhi Lu ; Hesheng Wang ; Yibin Li</i>	
LEARNING VIRTUAL GRASP WITH FAILED DEMONSTRATIONS VIA BAYESIAN INVERSE REINFORCEMENT LEARNING	1462
<i>Xu Xie ; Changyang Li ; Chi Zhang ; Yixin Zhu ; Song-Chun Zhu</i>	
HIERARCHICAL REINFORCEMENT LEARNING FOR CONCURRENT DISCOVERY OF COMPOUND AND COMPOSABLE POLICIES	1468
<i>Domingo Esteban ; Leonel Rozo ; Darwin G. Caldwell</i>	
ACTIVE INVERSE MODEL LEARNING WITH ERROR AND REACHABLE SET ESTIMATES	1476
<i>Danny Driess ; Syn Schmitt ; Marc Toussaint</i>	
ACTIVE INCREMENTAL LEARNING OF A CONTEXTUAL SKILL MODEL	1484
<i>Murtaza Hazara ; Xiaopu Li ; Ville Kyrki</i>	
ONLINE SYSTEM IDENTIFICATION ALGORITHM WITHOUT PERSISTENT EXCITATION FOR ROBOTIC SYSTEMS: APPLICATION TO RECONFIGURABLE AUTONOMOUS VESSELS	1490
<i>Erkan Kayacan ; Shinkyu Park ; Carlo Ratti ; Daniela Rus</i>	
LEARNING TO ESTIMATE CENTERS OF MASS OF ARBITRARY OBJECTS	1498
<i>Sean McGovern ; Huitan Mao ; Jing Xiao</i>	
TOWARDS A ROBOT ARCHITECTURE FOR SITUATED LIFELONG OBJECT LEARNING	1504
<i>Jose L. Part ; Oliver Lemon</i>	
SVIN2: AN UNDERWATER SLAM SYSTEM USING SONAR, VISUAL, INERTIAL, AND DEPTH SENSOR	1511
<i>Sharmin Rahman ; Alberto Quattrini Li ; Ioannis Rekleitis</i>	
MAPPING FOR PLANETARY ROVERS FROM TERRAMECHANICS PERSPECTIVE	1519
<i>Ruyi Zhou ; Liang Ding ; Haibo Gao ; Wenhao Feng ; Zongquan Deng ; Nan Li</i>	
A REAL-TIME DYNAMIC SIMULATOR AND AN ASSOCIATED FRONT-END REPRESENTATION FORMAT FOR SIMULATING COMPLEX ROBOTS AND ENVIRONMENTS	1525
<i>Adnan Munawar ; Yan Wang ; Radian Gondokaryono ; Gregory S. Fischer</i>	
INTEGER PROGRAMMING AS A GENERAL SOLUTION METHODOLOGY FOR PATH-BASED OPTIMIZATION IN ROBOTICS: PRINCIPLES, BEST PRACTICES, AND APPLICATIONS	1533
<i>Shuai D. Han ; Jingjin Yu</i>	
FLEXIBLE LAYOUTS FOR FIDUCIAL TAGS	1541
<i>Maximilian Krogus ; Acshi Haggemiller ; Edwin Olson</i>	
EFFICIENT AND GUARANTEED PLANAR POSE GRAPH OPTIMIZATION USING THE COMPLEX NUMBER REPRESENTATION	1547
<i>Taasha Fan ; Hanlin Wang ; Michael Rubenstein ; Todd Murphey</i>	
DEVELOPMENT OF A STEEL BRIDGE CLIMBING ROBOT	1555
<i>Son Thanh Nguyen ; Hung Manh La</i>	
OPTIMIZATION BASED MOTION PLANNING FOR MULTI-LIMBED VERTICAL CLIMBING ROBOTS	1561
<i>Xuan Lin ; Jingwen Zhang ; Junjie Shen ; Gabriel Fernandez ; Dennis W Hong</i>	
LANDING OF A MULTIROTOR AERIAL VEHICLE ON AN UNEVEN SURFACE USING MULTIPLE ON-BOARD MANIPULATORS	1569
<i>Hannibal Paul ; Ryo Miyazaki ; Robert Ladig ; Kazuhiro Shimonomura</i>	
FASTER: FAST AND SAFE TRAJECTORY PLANNER FOR FLIGHTS IN UNKNOWN ENVIRONMENTS	1577
<i>Jesus Tordesillas ; Brett T. Lopez ; Jonathan P. How</i>	
RECONFIGURATION MOTION PLANNING FOR VARIABLE TOPOLOGY TRUSS	1584
<i>Chao Liu ; Mark Yim</i>	
AIR TO GROUND COLLABORATION FOR ENERGY-EFFICIENT PATH PLANNING FOR GROUND ROBOTS	1592
<i>Minghan Wei ; Volkan Isler</i>	

MOTOR-PROPELLER MATCHING OF AERIAL PROPULSION SYSTEMS FOR DIRECT AERIAL-AQUATIC OPERATION	1598
<i>Yu Herng Tan ; Ben M. Chen</i>	
TRAJECTORY ESTIMATION FOR GEO-FENCING APPLICATIONS ON SMALL-SIZE FIXED-WING UAVS	1606
<i>Mirco Theile ; Simon Yu ; Or D. Dantsker ; Marco Caccamo</i>	
MULTI-SENSOR 6-DOF LOCALIZATION FOR AERIAL ROBOTS IN COMPLEX GNSS-DENIED ENVIRONMENTS	1613
<i>J. L. Paneque ; J. R. Martínez-De Dios ; A. Ollero</i>	
TEACHING A DRONE TO ACCOMPANY A PERSON FROM DEMONSTRATIONS USING NON-LINEAR ASFM	1620
<i>Anaís Garrell ; Carles Coll ; René Alquézar ; Alberto Sanfeliu</i>	
MONOCULAR OUTDOOR SEMANTIC MAPPING WITH A MULTI-TASK NETWORK	1627
<i>Yucan Bai ; Lei Fan ; Ziyu Pan ; Long Chen</i>	
SEEING BEHIND THINGS: EXTENDING SEMANTIC SEGMENTATION TO OCCLUDED REGIONS	1633
<i>Pulak Purkait ; Christopher Zach ; Ian Reid</i>	
EMPOWERED OPTICAL INSPECTION BY USING ROBOTIC MANIPULATOR IN INDUSTRIAL APPLICATIONS	1641
<i>Alessandro Galdelli ; Daniele Proietti Pagnotta ; Adriano Mancini ; Alessandro Freddi ; Andrea Monteriù ; Emanuele Frontoni</i>	
SIMULTANEOUS DRONE LOCALISATION AND WIND TURBINE MODEL FITTING DURING AUTONOMOUS SURFACE INSPECTION	1649
<i>Oliver Moolan-Feroze ; Konstantinos Karachalios ; Dimitrios N. Nikolaidis ; Andrew Calway</i>	
COMBINED OPTIMIZATION OF GRIPPER FINGER DESIGN AND POSE ESTIMATION PROCESSES FOR ADVANCED INDUSTRIAL ASSEMBLY	1657
<i>Frederik Hagelskjær ; Aljaž Kramberger ; Adam Wolniakowski ; Thusius Rajeeth Savarimuthu ; Norbert Krüger</i>	
RAPID ESTIMATION OF OPTICAL PROPERTIES FOR SIMULATION-BASED EVALUATION OF POSE ESTIMATION PERFORMANCE	1665
<i>Thorbjørn Mosekjær Iversen ; Jakob Wilm ; Dirk Kraft</i>	
DEEP MULTI-TASK LEARNING FOR ANOMALOUS DRIVING DETECTION USING CAN BUS SCALAR SENSOR DATA	1673
<i>Vidyasagar Sadhu ; Teruhisa Misu ; Dario Pompili</i>	
SAFE PATH PLANNING WITH GAUSSIAN PROCESS REGULATED RISK MAP	1679
<i>Hongliang Guo ; Zehui Meng ; Zefan Huang ; Leong Wei Kang ; Ziyue Chen ; Malika Meghjani ; Marcelo Ang ; Daniela Rus</i>	
ARTICULATED MULTI-PERSPECTIVE CAMERAS AND THEIR APPLICATION TO TRUCK MOTION ESTIMATION	1687
<i>Xin Peng ; Jiadi Cui ; Laurent Kneip</i>	
AGENT PRIORITIZATION FOR AUTONOMOUS NAVIGATION	1695
<i>Khaled S. Refaat ; Kai Ding ; Natalia Ponomareva ; Stéphane Ross</i>	
RINS-W: ROBUST INERTIAL NAVIGATION SYSTEM ON WHEELS	1703
<i>Martin Brossard ; Axel Barrau ; Silvere Bonnabel</i>	
DEEP PREDICTIVE AUTONOMOUS DRIVING USING MULTI-AGENT JOINT TRAJECTORY PREDICTION AND TRAFFIC RULES	1711
<i>Kyunghoon Cho ; Timothy Ha ; Gunmin Lee ; Songhwai Oh</i>	
PEOPLE'S V-FORMATION AND SIDE-BY-SIDE MODEL ADAPTED TO ACCOMPANY GROUPS OF PEOPLE BY SOCIAL ROBOTS	1717
<i>Ely Repiso ; Francesco Zanlungo ; Takayuki Kanda ; Anaís Garrell ; Alberto Sanfeliu</i>	
DELIVERING COGNITIVE BEHAVIORAL THERAPY USING A CONVERSATIONAL SOCIAL ROBOT	1724
<i>Francesca Dino ; Rohola Zandie ; Hojjat Abdollahi ; Sarah Schoeder ; Mohammad H. Mahoor</i>	
PERSON-FOLLOWING FOR TELEPRESENCE ROBOTS USING WEB CAMERAS	1731
<i>Xianda Cheng ; Yunde Jia ; Jingyu Su ; Yuwei Wu</i>	
CHEATING WITH ROBOTS: HOW AT EASE DO THEY MAKE US FEEL?	1737
<i>Sofia Petisca ; Francisco Esteves ; Ana Paiva</i>	
EXPLORING LOGICAL CONSISTENCY AND VIEWPORT SENSITIVITY IN COMPOSITIONAL VQA MODELS	1743
<i>Gabriela Sejnova ; Michal Vavrecka ; Michael Tesar ; Radoslav Skoviera</i>	
ON DATA SHARING STRATEGY FOR DECENTRALIZED COLLABORATIVE VISUAL-INERTIAL SIMULTANEOUS LOCALIZATION AND MAPPING	1749
<i>Rodolphe Dubois ; Alexandre Eudes ; Vincent Frémont</i>	

COLLABORATIVE HUMAN AUGMENTED SLAM	1757
<i>Abbas Sidaoui ; Imad H. Elhaji ; Daniel Asmar</i>	
COOPERATIVE RANGE-ONLY SLAM BASED ON SUM OF GAUSSIAN FILTER IN DYNAMIC ENVIRONMENTS	1765
<i>Jung-Hee Kim ; Doik Kim</i>	
DECENTRALIZED VISUAL-INERTIAL LOCALIZATION AND MAPPING ON MOBILE DEVICES FOR AUGMENTED REALITY	1771
<i>Kourosh Sartipi ; Ryan C. Dutoit ; Christopher B. Cobar ; Stergios I. Roumeliotis</i>	
MULTI-VEHICLE COOPERATIVE LOCAL MAPPING USING SPLIT COVARIANCE INTERSECTION FILTER	1779
<i>Hao Li ; Ming Yang</i>	
COMMUNICATION CONSTRAINED CLOUD-BASED LONG-TERM VISUAL LOCALIZATION IN REAL TIME	1785
<i>Xiaqing Ding ; Yue Wang ; Li Tang ; Huan Yin ; Rong Xiong</i>	
MODEL-LESS ACTIVE COMPLIANCE FOR CONTINUUM ROBOTS USING RECURRENT NEURAL NETWORKS	1793
<i>David Jakes ; Zongyuan Ge ; Liao Wu</i>	
AUTONOMOUS STEERING OF CONCENTRIC TUBE ROBOTS FOR ENHANCED FORCE/VELOCITY MANIPULABILITY	1800
<i>Mohsen Khadem ; John O'Neill ; Zisos Mitros ; Lyndon Da Cruz ; Christos Bergeles</i>	
PLANNING HIGH-QUALITY MOTIONS FOR CONCENTRIC TUBE ROBOTS IN POINT CLOUDS VIA PARALLEL SAMPLING AND OPTIMIZATION	1808
<i>Alan Kuntz ; Mengyu Fu ; Ron Alterovitz</i>	
A TAXONOMY FOR CHARACTERIZING MODES OF INTERACTIONS IN GOAL-DRIVEN, HUMAN-ROBOT TEAMS	1816
<i>Priyam Parashar ; Lindsay M. Sanneman ; Julie A. Shah ; Henrik I. Christensen</i>	
UNIFIED HUMAN-ROBOT SHARED CONTROL WITH APPLICATION TO HAPTIC TELEMANIPULATION	1824
<i>Cheong Min Ting Samuel ; Keng Peng Tee</i>	
DISCRETE N-DIMENSIONAL ENTROPY OF BEHAVIOR: DNDEB	1830
<i>Michael Young ; Mahdieh Nejati Javaremi ; Brenna D. Argall</i>	
ON MODELING THE EFFECTS OF AUDITORY ANNOYANCE ON DRIVING STYLE AND PASSENGER COMFORT	1837
<i>Edson Araujo ; Michal Gregor ; Isabella Huang ; Erickson R. Nascimento ; Ruzena Bajcsy</i>	
PHYSICAL FATIGUE ANALYSIS OF ASSISTIVE ROBOT TELEOPERATION VIA WHOLE-BODY MOTION MAPPING	1843
<i>Tsung-Chi Lin ; Achyuthan Unni Krishnan ; Zhi Li</i>	
JISAP: JOINT INFERENCE FOR SURGEON ATTRIBUTES PREDICTION DURING ROBOT-ASSISTED SURGERY	1849
<i>Tian Zhou ; Jackie S. Cha ; Glebys T. Gonzalez ; Chandru P. Sundaram ; Juan P. Wachs ; Denny Yu</i>	
MULTI-CONTACT STABILIZATION OF A HUMANOID ROBOT FOR REALIZING DYNAMIC CONTACT TRANSITIONS ON NON-COPLANAR SURFACES	1855
<i>Mitsuharu Morisawa ; Mehdi Benallegue ; Rafael Cisneros ; Iori Kumagai ; Adrien Escande ; Kenji Kaneko ; Fumio Kanehiro</i>	
NONLINEAR OPTIMIZATION OF STEP DURATION AND STEP LOCATION	1862
<i>Jiatao Ding ; Xiaohui Xiao ; Nikos Tsagarakis</i>	
TOWARD A BIPEDAL ROBOT WITH VARIABLE GAIT STYLES: SAGITTAL FORCES ANALYSIS IN A PLANAR SIMULATION AND A PROTOTYPE BALL-TRAY MECHANISM	1869
<i>U. Huzaifa ; C. Fuller ; J. Schultz ; A. Lavieris</i>	
IMPLEMENTATION OF A NATURAL DYNAMIC CONTROLLER ON AN UNDER-ACTUATED COMPASS-BIPED ROBOT	1876
<i>Ron Hartston ; Rea Yakar ; Reuven Katz ; Miriam Zacksenhouse</i>	
STABILITY AND GAIT SWITCHING OF UNDERACTUATED BIPED WALKERS	1882
<i>Martin Fevre ; Hai Lin ; James P. Schmedeler</i>	
PRINTING-WHILE-MOVING: A NEW PARADIGM FOR LARGE-SCALE ROBOTIC 3D PRINTING	1889
<i>Mehmet Efe Tiryaki ; Xu Zhang ; Quang-Cuong Pham</i>	
WHOLE-BODY MOTION PLANNING FOR WALKING EXCAVATORS	1895
<i>Edo Jelavic ; Marco Hutter</i>	

A FULLY-INTEGRATED SENSING AND CONTROL SYSTEM FOR HIGH-ACCURACY MOBILE ROBOTIC BUILDING CONSTRUCTION	1903
<i>Abel Gavel ; Hermann Blum ; Johannes Pankert ; Koen Krämer ; Luca Bartolomei ; Selen Ercan ; Farbod Farshidian ; Margarita Chli ; Fabio Gramazio ; Roland Siegwart ; Marco Hutter ; Timothy Sandy</i>	
COMPACT REACHABILITY MAP FOR EXCAVATOR MOTION PLANNING	1911
<i>Yajue Yang ; Liangjun Zhang ; Xinjing Cheng ; Jia Pan ; Ruigang Yang</i>	
APPLICATION OF DIGGING CONTROL BASED ON THE CENTER-OF-MASS VELOCITY OF THE ATTACHMENT OF A HYDRAULIC EXCAVATOR	1917
<i>Masatoshi Kozui ; Toru Yamamoto ; Kazushige Koivai ; Koji Yamashita ; Yoichiro Yamazaki</i>	
YOUWASPS: TOWARDS AUTONOMOUS MULTI-ROBOT MOBILE DEPOSITION FOR CONSTRUCTION	1923
<i>Julius Sustarevas ; Benjamin K. X. Tan ; David Gerber ; Robert Stuart-Smith ; Vijay M. Pawar</i>	
COMPUTING A MINIMAL SET OF T-SPANNING MOTION PRIMITIVES FOR LATTICE PLANNERS	1931
<i>Alexander Botros ; Stephen L. Smith</i>	
A DYNAMIC OPTIMIZATION APPROACH FOR SLOSHING FREE TRANSPORT OF LIQUID FILLED CONTAINERS USING AN INDUSTRIAL ROBOT	1939
<i>Jan Reinhold ; Manuel Amersdorfer ; Thomas Meurer</i>	
ONLINE MOTION PLANNING OVER MULTIPLE HOMOTOPY CLASSES WITH GAUSSIAN PROCESS INFERENCE	1945
<i>Keshav Kolar ; Sahit Chintalapudi ; Byron Boots ; Mustafa Mukadam</i>	
ESCAPING LOCAL MINIMA IN SEARCH-BASED PLANNING USING SOFT DUPLICATE DETECTION	1952
<i>Wei Du ; Sung-Kyun Kim ; Oren Salzman ; Maxim Likhachev</i>	
LEARNING TO GRASP ARBITRARY HOUSEHOLD OBJECTS FROM A SINGLE DEMONSTRATION	1959
<i>Elias De Coninck ; Tim Verbelen ; Pieter Van Molle ; Pieter Simoens ; Bart Dhoedt Idlab</i>	
A CONVEX-COMBINATORIAL MODEL FOR PLANAR CAGING	1965
<i>Bernardo Aceituno-Cabezas ; Hongkai Dai ; Alberto Rodriguez</i>	
CONTACTGRASP: FUNCTIONAL MULTI-FINGER GRASP SYNTHESIS FROM CONTACT	1973
<i>Samarth Brahmabhatt ; Ankur Handa ; James Hays ; Dieter Fox</i>	
OBJECT SINGULATION BY NONLINEAR PUSHING FOR ROBOTIC GRASPING	1981
<i>Jongsoon Won ; Youngbin Park ; Byung-Ju Yi ; Il Hong Suh</i>	
DESIGN AND DEVELOPMENT OF COMPACTLY FOLDING PARALLEL OPEN-CLOSE GRIPPER WITH WIDE STROKE	1987
<i>Akinari Kobayashi ; Jun Kinugawa ; Shogo Arai ; Kazuhiro Kosuge</i>	
COMPARING SWIMMING PERFORMANCES OF FLEXIBLE AND HELICAL MAGNETIC SWIMMERS	1994
<i>Ali Oulmas ; Johan E. Quispe ; Nicolas Andreff ; Stéphane Régnier</i>	
AUTOMATIC CELL ASSEMBLY BY TWO-FINGERED MICROHAND	2000
<i>Junnan Chen ; Xiaoming Liu ; Shengnan Dong ; Pengyun Li ; Xiaoqing Tang ; Dan Liu ; Masaru Kojima ; Qiang Huang ; Tatsuo Arai</i>	
ATOMIC FORCE MICROSCOPE TIP LOCALIZATION AND TRACKING THROUGH DEEP LEARNING BASED VISION INSIDE AN ELECTRON MICROSCOPE	2006
<i>Shuai Liang ; Mokrane Boudaoud ; Catherine Achard ; Weibin Rong ; Stéphane Régnier</i>	
EXPERIMENTAL STUDY ON MICROFLUIDIC MIXING WITH TRAPEZOIDAL OBSTACLES IN A 1000-FOLD SPAN OF REYNOLDS NUMBER	2012
<i>Xin-Yu Lin ; Hiroaki Ito ; Makoto Kaneko ; Chia-Hung Dylan Tsai</i>	
VISUAL-INERTIAL ODOMETRY WITH POINT AND LINE FEATURES	2018
<i>Yulin Yang ; Patrick Geneva ; Kevin Eickenhoff ; Guoquan Huang</i>	
VISION-AIDED LOCALIZATION FOR GROUND ROBOTS	2026
<i>Mingming Zhang ; Yiming Chen ; Mingyang Li</i>	
ROLLING-SHUTTER MODELLING FOR DIRECT VISUAL-INERTIAL ODOMETRY	2033
<i>David Schubert ; Nikolaus Demmel ; Lukas Von Stumberg ; Vladyslav Usenko ; Daniel Cremers</i>	
DISCOMAN: DATASET OF INDOOR SCENES FOR ODOMETRY, MAPPING AND NAVIGATION	2041
<i>Pavel Kirsanov ; Airat Gaskarov ; Filipp Konokhov ; Konstantin Sofiiuk ; Anna Vorontsova ; Igor Slinko ; Dmitry Zhukov ; Sergey Bykov ; Olga Barinova ; Anton Konushin</i>	
2-ENTITY RANSAC FOR ROBUST VISUAL LOCALIZATION IN CHANGING ENVIRONMENT	2049
<i>Yanmei Jiao ; Yue Wang ; Bo Fu ; Xiaqing Ding ; Qimeng Tan ; Lei Chen ; Rong Xiong</i>	

VILIVO: VIRTUAL LIDAR-VISUAL ODOMETRY FOR AN AUTONOMOUS VEHICLE WITH A MULTI-CAMERA SYSTEM	2057
<i>Zhenzhen Xiang ; Jingrui Yu ; Jie Li ; Jianbo Su</i>	
HUMANOID ROBOT NEXT BEST VIEW PLANNING UNDER OCCLUSIONS USING BODY MOVEMENT PRIMITIVES	2064
<i>Riccardo Monica ; Jacopo Aleotti ; Davide Piccinini</i>	
COVERAGE SAMPLING PLANNER FOR UAV-ENABLED ENVIRONMENTAL EXPLORATION AND FIELD MAPPING	2072
<i>Teng Li ; Chaoqun Wang ; Meng Max Q.-H. ; Clarence W. De Silva</i>	
APPROXIMATING C_{FREE} SPACE TOPOLOGY BY CONSTRUCTING VIETORIS-RIPS COMPLEX	2080
<i>Aakriti Upadhyay ; Weifu Wang ; Chinwe Ekenna</i>	
OPTIMAL TEMPORAL LOGIC PLANNING WITH CASCADING SOFT CONSTRAINTS	2087
<i>Hazhar Rahmani ; Jason M. O’Kane</i>	
ACCELERATING THE CONSTRUCTION OF BOUNDARIES OF FEASIBILITY IN THREE CLASSES OF ROBOT DESIGN PROBLEMS	2095
<i>Shervin Ghasemlou ; Jason M. O’Kane</i>	
ARTIFICIAL LATERAL LINE BASED LONGITUDINAL SEPARATION SENSING FOR TWO SWIMMING ROBOTIC FISH WITH LEADER-FOLLOWER FORMATION	2102
<i>Xingwen Zheng ; Manyi Wang ; Junzheng Zheng ; Runyu Tian ; Minglei Xiong ; Guangming Xie</i>	
COMMON DIMENSIONAL AUTOENCODER FOR LEARNING REDUNDANT MUSCLE-POSTURE MAPPINGS OF COMPLEX MUSCULOSKELETAL ROBOTS	2108
<i>Hiroaki Masuda ; Ame Hitzmann ; Koh Hosoda ; Shuhei Ikemoto</i>	
MOTION PLANNING FOR A CONTINUUM ROBOTIC MOBILE LAMP: DEFINING AND NAVIGATING THE CONFIGURATION SPACE	2114
<i>Zachary Hawks ; Chase Frazelle ; Keith E. Green ; Ian D. Walker</i>	
AN APPROACH OF FACILITATED INVESTIGATION OF ACTIVE SELF-HEALING TENSION TRANSMISSION SYSTEM ORIENTED FOR LEGGED ROBOTS	2122
<i>Shinsuke Nakashima ; Takuma Shirai ; Kento Kawaharazuka ; Yuki Asano ; Yohei Kakiuchi ; Kei Okada ; Masayuki Inaba</i>	
LARGE-SCALE 6D OBJECT POSE ESTIMATION DATASET FOR INDUSTRIAL BIN-PICKING	2128
<i>Kilian Kleeberger ; Christian Landgraf ; Marco F. Huber</i>	
SEEING BEYOND APPEARANCE - MAPPING REAL IMAGES INTO GEOMETRICAL DOMAINS FOR UNSUPERVISED CAD-BASED RECOGNITION	2134
<i>Benjamin Planche ; Sergey Zakharov ; Ziyang Wu ; Andreas Hutter ; Harald Kosch ; Slobodan Ilic</i>	
ADAPTIVE LOSS BALANCING FOR MULTITASK LEARNING OF OBJECT INSTANCE RECOGNITION AND 3D POSE ESTIMATION	2142
<i>Takashi Hosono ; Yuuna Hoshi ; Jun Shimamura ; Atsushi Sagata</i>	
THE IMPACT OF DOMAIN RANDOMIZATION ON OBJECT DETECTION: A CASE STUDY ON PARAMETRIC SHAPES AND SYNTHETIC TEXTURES	2148
<i>Atabak Dehban ; João Borrego ; Rui Figueiredo ; Plinio Moreno ; Alexandre Bernardino ; José Santos-Victor</i>	
OBJECT PROPOSAL ALGORITHMS IN THE WILD: ARE THEY GENERALIZABLE TO ROBOT PERCEPTION?	2156
<i>Darren M. Chan ; Laurel D. Riek</i>	
PRECISE CORRENTROPY-BASED 3D OBJECT MODELLING WITH GEOMETRICAL TRAFFIC PRIOR	2163
<i>Di Wang ; Jianru Xue ; Wei Zhan ; Yinghan Jin ; Nanning Zheng ; Masayoshi Tomizuka</i>	
A BI-DIRECTIONAL MULTIPLE TIMESCALES LSTM MODEL FOR GROUNDING OF ACTIONS AND VERBS	2169
<i>Alexandre Antunes ; Alban Laflaquiere ; Tetsuya Ogata ; Angelo Cangelosi</i>	
VISUAL-BASED AUTONOMOUS DRIVING DEPLOYMENT FROM A STOCHASTIC AND UNCERTAINTY-AWARE PERSPECTIVE	2177
<i>Lei Tai ; Peng Yun ; Yuying Chen ; Congcong Liu ; Haoyang Ye ; Ming Liu</i>	
SAMPLE EFFICIENT INTERACTIVE END-TO-END DEEP LEARNING FOR SELF-DRIVING CARS WITH SELECTIVE MULTI-CLASS SAFE DATASET AGGREGATION	2184
<i>Yunus Bicer ; Ali Alizadeh ; Nazim Kemal Ure ; Ahmetcan Erdogan ; Orkun Kizilirmak</i>	
CONTINUOUS RELAXATION OF SYMBOLIC PLANNER FOR ONE-SHOT IMITATION LEARNING	2190
<i>De-An Huang ; Danfei Xu ; Yuke Zhu ; Animesh Garg ; Silvio Savarese ; Li Fei-Fei ; Juan Carlos Niebles</i>	
ONE-SHOT COMPOSITION OF VISION-BASED SKILLS FROM DEMONSTRATION	2198
<i>Tianhe Yu ; Pieter Abbeel ; Sergey Levine ; Chelsea Finn</i>	

LEARNING TO AUGMENT SYNTHETIC IMAGES FOR SIM2REAL POLICY TRANSFER	2206
<i>Alexander Pashevich ; Robin Strudel ; Igor Kalevatykh ; Ivan Laptev ; Cordelia Schmid</i>	
DRIVING WITH STYLE: INVERSE REINFORCEMENT LEARNING IN GENERAL-PURPOSE PLANNING FOR AUTOMATED DRIVING	2213
<i>Sascha Rosbach ; Vinit James ; Simon Großjohann ; Silviu Homoceanu ; Stefan Roth</i>	
IMPROVING LOCAL TRAJECTORY OPTIMISATION USING PROBABILISTIC MOVEMENT PRIMITIVES	2221
<i>Rb Ashith Shyam ; Peter Lightbody ; Gautham Das ; Pengcheng Liu ; Sebastian Gomez-Gonzalez ; Gerhard Neumann</i>	
LEARNING TO SEQUENCE MULTIPLE TASKS WITH COMPETING CONSTRAINTS	2227
<i>Anqing Duan ; Raffaello Camoriano ; Diego Ferigo ; Yanlong Huang ; Daniele Calandriello ; Lorenzo Rosasco ; Daniele Pucci</i>	
IMPROVED LEARNING ACCURACY FOR LEARNING STABLE CONTROL FROM HUMAN DEMONSTRATIONS	2234
<i>Shaokun Jin ; Zhiyang Wang ; Yongsheng Ou ; Yimin Zhou</i>	
LEARNING TO EXPLORE IN MOTION AND INTERACTION TASKS	2241
<i>Miroslav Bogdanovic ; Ludovic Righetti</i>	
TRAINING IN TASK SPACE TO SPEED UP AND GUIDE REINFORCEMENT LEARNING	2248
<i>Guillaume Bellegarda ; Katie Byl</i>	
DESIGN OF LOW-PROFILE COMPLIANT TRANSMISSION MECHANISMS	2255
<i>Frederic H. Giraud ; Zhenishbek Zhakypov ; Jamie Paik</i>	
DESIGN AND ANALYSIS OF A NEW 3-DOF ACTIVE-TYPE CONSTANT-FORCE COMPLIANT PARALLEL STAGE	2263
<i>Xiaozhi Zhang ; Qingsong Xu ; Yuzhang Wei</i>	
ROFICOM – FIRST OPEN-HARDWARE CONNECTOR FOR METAMORPHIC ROBOTS	2269
<i>Jan Mrázek ; Jiri Barnat</i>	
DEVELOPMENT OF A CONTINUOUS VERTICAL-PULLING AUTOMATIC DOFFING ROBOT FOR THE RING SPINNING	2275
<i>Wenzeng Zhang ; Sicheng Yang ; Chao Luo ; Siyun Liu ; Hong Fu</i>	
BASIC PERFORMANCE OF PLANAR OMNIDIRECTIONAL CRAWLER DURING DIRECTION SWITCHING USING DISTURBANCE DEGREE OF GROUND EVALUATION METHOD	2281
<i>Eri Takane ; Kenjiro Tadakuma ; Tori Shimizu ; Sosuke Hayashi ; Masahiro Watanabe ; Shingo Kagami ; Keiji Nagatani ; Masashi Konyo ; Satoshi Tadokoro</i>	
ROBUST IMPEDANCE SHAPING OF REDUNDANT TELEOPERATORS WITH TIME-DELAY VIA SLIDING MODE CONTROL	2289
<i>Davide Nicolis ; Fabio Allevi ; Paolo Rocco</i>	
DESIGN OF A SEMI-HUMANOID TELEPRESENCE ROBOT FOR PLANT DISASTER RESPONSE AND PREVENTION	2297
<i>Irvin Steve Cardenas ; Jong-Hoon Kim</i>	
PRELIMINARY EVALUATION OF AN ORBITAL CAMERA FOR TELEOPERATION OF REMOTE MANIPULATORS	2303
<i>Mohammed Talha ; Rustam Stolkin</i>	
TELEOPERATED HEXAPOD ROBOT FOR IMITATION LEARNING TASK TRAINING	2311
<i>Austin Gurley</i>	
TOWARD A HUMAN-MACHINE INTERFACE BASED ON ELECTRICAL IMPEDANCE TOMOGRAPHY FOR ROBOTIC MANIPULATOR CONTROL	2317
<i>Enhao Zheng ; Yuhua Li ; Qining Wang ; Hong Qiao</i>	
FORCE FIELD-BASED INDIRECT MANIPULATION OF UAV FLIGHT TRAJECTORIES	2324
<i>Werner Alexander Isop ; Friedrich Fraundorfer</i>	
OBSERVABILITY ANALYSIS OF POSITION ESTIMATION FOR QUADROTORS WITH MODIFIED DYNAMICS AND RANGE MEASUREMENTS	2332
<i>Eranga Fernando ; Oscar De Silva ; George K. I. Mann ; Raymond G. Gosine</i>	
DISTURBANCE ESTIMATION AND REJECTION FOR HIGH-PRECISION MULTIROTOR POSITION CONTROL	2338
<i>Daniel Hentzen ; Thomas Stastny ; Roland Siegwart ; Roland Brockers</i>	
MAXIMUM LIKELIHOOD PATH PLANNING FOR FAST AERIAL MANEUVERS AND COLLISION AVOIDANCE	2346
<i>Ji Zhang ; Chen Hu ; Rushat Gupta Chadha ; Sanjiv Singh</i>	
AERIAL ROBOT CONTROL IN CLOSE PROXIMITY TO CEILING: A FORCE ESTIMATION-BASED NONLINEAR MPC	2354
<i>Basaran Bahadır Kocer ; Mehmet Efe Tiryaki ; Mahardhika Pratama ; Tegoeh Tjahjowidodo ; Gerald Gim Lee Seet</i>	

DESIGN, MODELING AND CONTROL OF FULLY ACTUATED 2D TRANSFORMABLE AERIAL ROBOT WITH 1 DOF THRUST VECTORABLE LINK MODULE	2361
<i>Tomoki Anzai ; Moju Zhao ; Masaki Murooka ; Fan Shi ; Kei Okada ; Masayuki Inaba</i>	
RESFLOW: MULTI-TASKING OF SEQUENTIALLY POOLING SPATIOTEMPORAL FEATURES FOR ACTION RECOGNITION AND OPTICAL FLOW ESTIMATION.....	2368
<i>Tso-Hsin Yeh ; Chuan Kuo ; An-Sheng Liu ; Yu-Hung Liu ; Yu-Huan Yang ; Zi-Jun Li ; Jui-Ting Shen ; Li-Chen Fu</i>	
DEEP NEURAL NETWORK BASED VISUAL INSPECTION WITH 3D METRIC MEASUREMENT OF CONCRETE DEFECTS USING WALL-CLIMBING ROBOT	2374
<i>Liang Yang ; Bing Li ; Guoyong Yang ; Yong Chang ; Zhaoming Liu ; Biao Jiang ; Jizhong Xiaol</i>	
DEVELOPMENT OF AN AUTONOMOUS SANDING ROBOT WITH STRUCTURED-LIGHT TECHNOLOGY	2380
<i>Yingxin Huo ; Diancheng Chen ; Xiang Li ; Peng Li ; Yun-Hui Liu</i>	
CONTINUOUS CLOSE-RANGE 3D OBJECT POSE ESTIMATION.....	2386
<i>Bjarne Grossmann ; Francesco Rovida ; Volker Kruger</i>	
REINFORCEMENT LEARNING BOAT AUTOPILOT: A SAMPLE-EFFICIENT AND MODEL PREDICTIVE CONTROL BASED APPROACH.....	2393
<i>Yunduan Cui ; Shigeki Osaki ; Takamitsu Matsubara</i>	
MONOCULAR PLAN VIEW NETWORKS FOR AUTONOMOUS DRIVING	2401
<i>Dequan Wang ; Coline Devlin ; Qi-Zhi Cai ; Philipp Krähenbühl ; Trevor Darrell</i>	
DEEP IMITATION LEARNING FOR AUTONOMOUS DRIVING IN GENERIC URBAN SCENARIOS WITH ENHANCED SAFETY	2409
<i>Jiangu Chen ; Bodi Yuan ; Masayoshi Tomizuka</i>	
CONTEXT AND INTENTION AWARE PLANNING FOR URBAN DRIVING	2416
<i>Malika Meghjani ; Yuanfu Luo ; Qi Heng Ho ; Panpan Cai ; Shashwat Verma ; Daniela Rus ; David Hsu</i>	
NEURAL NETWORK BASED HETEROGENEOUS SENSOR FUSION FOR ROBOT MOTION PLANNING.....	2424
<i>Bijo Sebastian ; Hailin Ren ; Pinhas Ben-Tzvi</i>	
MODELLING AND DYNAMIC TRACKING CONTROL OF INDUSTRIAL VEHICLES WITH TRACTOR-TRAILER STRUCTURE	2430
<i>Hongchao Zhao ; Zhe Liu ; Zhiqiang Li ; Shunbo Zhou ; Wen Chen ; Chuanzhe Suo ; Yun-Hui Liu</i>	
MULTI-LAYER ENVIRONMENTAL AFFORDANCE MAP FOR ROBUST INDOOR LOCALIZATION, EVENT DETECTION AND SOCIAL FRIENDLY NAVIGATION	2436
<i>Ping-Tsang Wu ; Chee-An Yu ; Shao-Hung Chan ; Ming-Li Chiang ; Li-Chen Fu</i>	
A MULTI-CHANNEL EMBEDDED DSP CLOSED-LOOP CONTROL SYSTEM FOR MUSICAL ROBOTS	2442
<i>Jason Long ; Jim Murphy ; Dale A. Carnegie ; Ajay Kapur</i>	
ENDOSCOPIC BI-MANUAL ROBOTIC INSTRUMENT DESIGN USING A GENETIC ALGORITHM	2450
<i>Andreas Schmitz ; Pierre Berthet-Rayne ; Guang-Zhong Yang</i>	
HYSTERESIS COMPENSATOR WITH LEARNING-BASED POSE ESTIMATION FOR A FLEXIBLE ENDOSCOPIC SURGERY ROBOT	2458
<i>Donghoon Baek ; Ju-Hwan Seo ; Joonhwan Kim ; Dong-Soo Kwon</i>	
6-AXIS HYBRID SENSING AND ESTIMATION OF TIP FORCES/TORQUES ON A HYPER-REDUNDANT ROBOTIC SURGICAL INSTRUMENT	2465
<i>Nural Yilmaz ; Merve Bazman ; Alaa Alassi ; Berke Gur ; Ugur Tumerdem</i>	
TOWARDS THE DESIGN AND DEVELOPMENT OF A PEDIATRIC NEUROENDOSCOPE TOOL	2473
<i>Yash Chitalia ; Seokhwan Jeong ; Ji Bok ; Vinh Nguyen ; Shreyes Melkote ; Joshua J. Chern ; Jaydev P. Desai</i>	
TOWARDS ERGONOMIC CONTROL OF COLLABORATIVE EFFORT IN MULTI-HUMAN MOBILE-ROBOT TEAMS.....	2480
<i>Wansoo Kim ; Marta Lorenzini ; Pietro Balatti ; Yuqiang Wu ; Arash Ajoudani</i>	
REBELLION AND OBEDIENCE: THE EFFECTS OF INTENTION PREDICTION IN COOPERATIVE HANDHELD ROBOTS	2487
<i>Janis Stolzenwald ; Walterio W. Mayol-Cuevas</i>	
TOWARDS EXPLAINABLE SHARED CONTROL USING AUGMENTED REALITY	2495
<i>Mark Zolotas ; Yiannis Demiris</i>	
ONLINE PERFORMANCE PREDICTION AND PROFILING OF HUMAN ACTIVITIES BY OBSERVATION.....	2502
<i>Emmanouil Hourdakias ; Michail Maniadakis ; Panos Trahanias</i>	

FOOT WITH A CORE-SHELL STRUCTURAL SIX-AXIS FORCE SENSOR FOR PEDAL DEPRESSING AND RECOVERING FROM FOOT SLIPPING DURING PEDAL PUSHING TOWARD AUTONOMOUS DRIVING BY HUMANOIDS	2508
<i>Koki Shinjo ; Kento Kawaharaduka ; Yuki Asano ; Shinsuke Nakashima ; Shogo Makino ; Moritaka Onitsuka ; Kei Tsuzuki ; Kei Okada ; Koji Kawasaki ; Masayuki Inaba</i>	
HUMANOID ROBOT'S FORCE-BASED HEAVY MANIPULATION TASKS WITH TORQUE-CONTROLLED ARMS AND WRIST FORCE SENSORS	2514
<i>Shintaro Komatsu ; Yuya Nagamatsu ; Tatsuya Ishikawa ; Takuma Shirai ; Kunio Kojima ; Yohei Kakiuchi ; Fumihito Sugai ; Kei Okada ; Masayuki Inaba</i>	
OPERATIONAL SPACE CONTROL FRAMEWORK FOR TORQUE CONTROLLED HUMANOID ROBOTS WITH JOINT ELASTICITY	2522
<i>Jaesug Jung ; Donghyeon Kim ; Jaeheung Park</i>	
AUTONOMOUS HYBRID GROUND/AERIAL MOBILITY IN UNKNOWN ENVIRONMENTS	2529
<i>David D. Fan ; Rohan Thakker ; Tara Bartlett ; Meriem Ben Miled ; Leon Kim ; Evangelos Theodorou ; Ali-Akbar Agha-Mohammadi</i>	
AN APPROXIMATION-FREE SIMPLE CONTROL SCHEME FOR UNCERTAIN QUADROTOR SYSTEMS: THEORY AND VALIDATIONS	2537
<i>Gang Wang ; Weixin Yang ; Na Zhao ; Peng Li ; Yantao Shen ; Chaoli Wang</i>	
LOCAL POSE OPTIMIZATION WITH AN ATTENTION-BASED NEURAL NETWORK	2543
<i>Yiling Liu ; Hesheng Wang ; Fan Xu ; Yong Wang ; Weidong Chen ; Qirong Tang</i>	
LEARNING STATE-DEPENDENT, SENSOR MEASUREMENT MODELS FOR LOCALIZATION	2549
<i>Troi Williams ; Yu Sun</i>	
RIVERINE COVERAGE WITH AN AUTONOMOUS SURFACE VEHICLE OVER KNOWN ENVIRONMENTS	2557
<i>Nare Karapetyan ; Adam Braude ; Jason Moulton ; Joshua A. Burstein ; Scott White ; Jason M. O'Kane ; Ioannis Rekleitis</i>	
GRAPH-BASED PATH PLANNING FOR AUTONOMOUS ROBOTIC EXPLORATION IN SUBTERRANEAN ENVIRONMENTS	2564
<i>Tung Dang ; Frank Mascarih ; Shehryar Khattak ; Christos Papachristos ; Kostas Alexis</i>	
ASYNCHRONOUS BEHAVIOR TREES WITH MEMORY AIMED AT AERIAL VEHICLES WITH REDUNDANCY IN FLIGHT CONTROLLER	2572
<i>Evgenii Saffronov ; Michael Vilzmann ; Dzmitry Tsetserukou ; Konstantin Kondak</i>	
TIMED-ELASTIC SMOOTH CURVE OPTIMIZATION FOR MOBILE-BASE MOTION PLANNING	2578
<i>Jérémie Deray ; Bence Magyar ; Joan Solà ; Juan Andrade-Cetto</i>	
ROBUST TRAJECTORY PLANNING FOR A MULTIROTOR AGAINST DISTURBANCE BASED ON HAMILTON-JACOBI REACHABILITY ANALYSIS	2585
<i>Hoseong Seo ; Donggun Lee ; Clark Youngdong Son ; Claire J. Tomlin ; H. Jin Kim</i>	
DYNAMIC FLEX-AND-FLIP MANIPULATION OF DEFORMABLE LINEAR OBJECTS	2593
<i>Chunli Jiang ; Abdullah Nazir ; Ghasem Abbasnejad ; Jungwon Seo</i>	
AN ASSISTED TELEMANIPULATION APPROACH: COMBINING AUTONOMOUS GRASP PLANNING WITH HAPTIC CUES	2599
<i>Maxime Adjigble ; Naresh Marturi ; Valerio Ortenzi ; Rustam Stolkin</i>	
ROBOT FINGER WITH REMOTE CENTER OF MOTION MECHANISM FOR COVERING JOINTS WITH THICK SKIN	2607
<i>Chin Cheng Hsu ; Alexander Schmitz ; Kosuke Kusayanagi ; Shigeki Sugano</i>	
SPIRAL ZIPPER MANIPULATOR FOR AERIAL GRASPING AND MANIPULATION	2614
<i>Chao Liu ; Abhraneel Bera ; Thulani Tsabedze ; Daniel Edgar ; Mark Yim</i>	
HARMONIOUS SAMPLING FOR MOBILE MANIPULATION PLANNING	2620
<i>Mincheul Kang ; Donghyuk Kim ; Sung-Eui Yoon</i>	
FAST FREE-VIEWPOINT VIDEO SYNTHESIS ALGORITHM FOR SPORTS SCENES	2628
<i>Jun Chen ; Ryosuke Watanabe ; Keisuke Nonaka ; Tomoaki Konno ; Hiroshi Sankoh ; Sei Naito</i>	
TOWARD AN EFFICIENT HYBRID INTERACTION PARADIGM FOR OBJECT MANIPULATION IN OPTICAL SEE-THROUGH MIXED REALITY	2635
<i>Zhenliang Zhang ; Dongdong Weng ; Jie Guo ; Yue Liu ; Yongtian Wang</i>	
AN AUGMENTED REALITY INTERFACE FOR HUMAN-ROBOT INTERACTION IN UNCONSTRAINED ENVIRONMENTS	2641
<i>Sonia Mary Chacko ; Vikram Kapila</i>	
EVALUATION SYSTEM FOR HYDRAULIC EXCAVATOR OPERATION SKILL USING REMOTE CONTROLLED EXCAVATOR AND VIRTUAL REALITY	2648
<i>Ryota Sekizuka ; Masaru Ito ; Seiji Saiki ; Yoichiro Yamazaki ; Yuichi Kurita</i>	
MULTI-HAND DIRECT MANIPULATION OF COMPLEX CONSTRAINED VIRTUAL OBJECTS	2654
<i>Jun-Sik Kim ; Myunghwan Jeon ; Jung-Min Park</i>	

RONET: REAL-TIME RANGE-ONLY INDOOR LOCALIZATION VIA STACKED BIDIRECTIONAL LSTM WITH RESIDUAL ATTENTION	2660
<i>Hyungtae Lim ; Changgwe Park ; Hyun Myung</i>	
DEEPPCO: END-TO-END POINT CLOUD ODOMETRY THROUGH DEEP PARALLEL NEURAL NETWORK	2667
<i>Wei Wang ; Muhammad Risqi U. Saputra ; Peijun Zhao ; Pedro Gusmao ; Bo Yang ; Changhao Chen ; Andrew Markham ; Niki Trigoni</i>	
OREOS: ORIENTED RECOGNITION OF 3D POINT CLOUDS IN OUTDOOR SCENARIOS	2674
<i>Lukas Schaupp ; Mathias Bürki ; Renaud Dubé ; Roland Siegart ; Cesar Cadena</i>	
ABSOLUTE LOCALIZATION THROUGH ORBITAL MAPS AND SURFACE PERSPECTIVE IMAGERY: A SYNTHETIC LUNAR DATASET AND NEURAL NETWORK APPROACH	2681
<i>Benjamin Wu ; Ross W. K. Potter ; Philippe Ludvig ; Andrew S. Chung ; Timothy Seabrook</i>	
FILTER EARLY, MATCH LATE: IMPROVING NETWORK-BASED VISUAL PLACE RECOGNITION	2687
<i>Stephen Hausler ; Adam Jacobson ; Michael Milford</i>	
COOPERATIVE DECENTRALISED CIRCUMNAVIGATION WITH APPLICATION TO ALGAL BLOOM TRACKING	2695
<i>Joana Fonseca ; Jieqiang Wei ; Karl H. Johansson ; Tor Ane Johansen</i>	
LAZY COMPILATION OF VARIANTS OF MULTI-ROBOT PATH PLANNING WITH SATISFIABILITY MODULO THEORY (SMT) APPROACH	2701
<i>Pavel Surynek</i>	
BEBOT: BERNSTEIN POLYNOMIAL TOOLKIT FOR TRAJECTORY GENERATION	2707
<i>Calvin Kielas-Jensen ; Venanzio Cichella</i>	
TRUST BUT VERIFY: A DISTRIBUTED ALGORITHM FOR MULTI-ROBOT WIREFRAME EXPLORATION AND MAPPING	2713
<i>Adam Caccavale ; Mac Schwager</i>	
PATH PLANNING FOR SURGERY ROBOT WITH BIDIRECTIONAL CONTINUOUS TREE SEARCH AND NEURAL NETWORK	2721
<i>Rui-Jian Huang ; Gui-Bin Bian ; Chen Xin ; Zhen Li ; Zeng-Guang Hou</i>	
HEURISTIC-BASED MULTIPLE MOBILE DEPOTS ROUTE PLANNING FOR RECHARGING PERSISTENT SURVEILLANCE ROBOTS	2727
<i>Yifan Ding ; Wenhao Luo ; Katia Sycara</i>	
SEEKING THE ANALYTICAL APPROXIMATION OF THE STANCE DYNAMICS OF THE 3D SPRING-LOADED INVERTED PENDULUM MODEL BY USING PERTURBATION APPROACH	2733
<i>Haitao Yu ; Shengjun Wang ; Kaizheng Shan ; Jun Li ; Lixian Zhang ; Haibo Gao</i>	
DEVELOPMENT OF AN ADAPTIVE HEXAPOD ROBOT BASED ON FOLLOW-THE-CONTACT-POINT GAIT CONTROL AND TIMEKEEPER CONTROL	2740
<i>Yuki Murata ; Shinkichi Inagaki ; Tatsuya Suzuki</i>	
DESIGN, MODELING AND TESTING OF A FLAGELLUM-INSPIRED SOFT UNDERWATER PROPELLER EXPLOITING PASSIVE ELASTICITY	2747
<i>Marcello Calisti ; Francesco Giorgio-Serchi ; Cesare Stefanini ; Madiha Farman ; Irfan Hussain ; Costanza Armanini ; Dongming Gan ; Lakmal Seneviratne ; Federico Renda</i>	
CHARACTERIZING ENVIRONMENTAL INTERACTIONS FOR SOFT GROWING ROBOTS	2754
<i>David A. Haggerty ; Nicholas D. Naclerio ; Elliot W. Hawkes</i>	
A MULTIMODAL SOFT CRAWLING-CLIMBING ROBOT WITH THE CONTROLLABLE HORIZONTAL PLANE TO SLOPE TRANSITION	2762
<i>Yifan Zhang ; Lisen Ge ; Jiang Zou ; Haipeng Xu ; Guoying Gu</i>	
EFFECTS OF LIMB MORPHOLOGY ON TRANSIENT LOCOMOTION IN QUADRUPED ROBOTS	2768
<i>Leanne Raw ; Callen Fisher ; Amir Patel</i>	
THE MASTR1325 DATASET FOR TRAINING DEEP USV OBSTACLE DETECTION MODELS	2776
<i>Borja Bovcon ; Jon Muhovic ; Janez Perš ; Matej Kristan</i>	
DYNAMIC DENSITY TOPOLOGICAL STRUCTURE GENERATION FOR REAL-TIME LADDER AFFORDANCE DETECTION	2784
<i>Azhar Aulia Saputra ; Wei Hong Chin ; Yuichiro Toda ; Naoyuki Takesue ; Naoyuki Kubota</i>	
EPN: EDGE-AWARE POINTNET FOR OBJECT RECOGNITION FROM MULTI-VIEW 2.5D POINT CLOUDS	2790
<i>Syeda Mariam Ahmed ; Pan Liang ; Chee Meng Chew</i>	
REAL-TIME 6D OBJECT POSE ESTIMATION ON CPU	2796
<i>Yoshinori Konishi ; Kosuke Hattori ; Manabu Hashimoto</i>	

IMPROVING 3D OBJECT DETECTION FOR PEDESTRIANS WITH VIRTUAL MULTI-VIEW SYNTHESIS ORIENTATION ESTIMATION.....	2804
<i>Jason Ku ; Alex D. Pon ; Sean Walsh ; Steven L. Waslander</i>	
PASS3D: PRECISE AND ACCELERATED SEMANTIC SEGMENTATION FOR 3D POINT CLOUD.....	2812
<i>Xin Kong ; Guangyao Zhai ; Baoquan Zhong ; Yong Liu</i>	
TENDENCYRL: MULTI-STAGE DISCRIMINATIVE HINTS FOR EFFICIENT GOAL-ORIENTED REVERSE CURRICULUM LEARNING	2819
<i>Chen Wang ; Junfeng Ding ; Xiangyu Chen ; Zelin Ye ; Jialu Wang ; Ziruo Cai ; Cewu Lu</i>	
STRUCTURED REWARD SHAPING USING SIGNAL TEMPORAL LOGIC SPECIFICATIONS.....	2826
<i>Anand Balakrishnan ; Jyotirmoy V. Deshmukh</i>	
TRAJECTORY OPTIMIZATION FOR UNKNOWN CONSTRAINED SYSTEMS USING REINFORCEMENT LEARNING	2832
<i>Kei Ota ; Devesh K. Jha ; Tomoaki Oiki ; Mamoru Miura ; Takashi Nammoto ; Daniel Nikovski ; Toshisada Mariyama</i>	
SIM-TO-REAL TRANSFER FOR BIPED LOCOMOTION.....	2840
<i>Wenhao Yu ; Visak Cv Kumar ; Greg Turk ; C. Karen Liu</i>	
FROM PIXELS TO BUILDINGS: END-TO-END PROBABILISTIC DEEP NETWORKS FOR LARGE-SCALE SEMANTIC MAPPING	2848
<i>Kaiyu Zheng ; Andrzej Pronobis</i>	
OPTIMAL SOLVING OF CONSTRAINED PATH-PLANNING PROBLEMS WITH GRAPH CONVOLUTIONAL NETWORKS AND OPTIMIZED TREE SEARCH	2856
<i>Kevin Osanlou ; Andrei Bursuc ; Christophe Guettier ; Tristan Cazenave ; Eric Jacopin</i>	
FLYING THROUGH A NARROW GAP USING NEURAL NETWORK: AN END-TO-END PLANNING AND CONTROL APPROACH.....	2863
<i>Jiarong Lin ; Luqi Wang ; Fei Gao ; Shaojie Shen ; Fu Zhang</i>	
COMPARISON OF DEEP REINFORCEMENT LEARNING POLICIES TO FORMAL METHODS FOR MOVING OBSTACLE AVOIDANCE.....	2871
<i>Arpit Garg ; Hao-Tien Lewis Chiang ; Satomi Sugaya ; Aleksandra Faust ; Lydia Tapia</i>	
FAST MOTION PLANNING VIA FREE C-SPACE ESTIMATION BASED ON DEEP NEURAL NETWORK.....	2879
<i>Xiang Li ; Qixin Cao ; Mingjing Sun ; Ganggang Yang</i>	
ADAPTIVE DEEP PATH: EFFICIENT COVERAGE OF A KNOWN ENVIRONMENT UNDER VARIOUS CONFIGURATIONS	2886
<i>Xin Chen ; Thomas M. Tucker ; Thomas R. Kurfess ; Richard Vuduc</i>	
ADJUSTING WEIGHT OF ACTION DECISION IN EXPLORATION FOR LOGISTICS WAREHOUSE PICKING LEARNING	2894
<i>Kato Yusuke ; Nakamura Tomoaki ; Nagai Takayuki ; Yamanobe Natsuki ; Nagata Kazuyuki ; Ozawa Jun</i>	
3-DOF GRAVITY COMPENSATION MECHANISM FOR ROBOT WAISTS WITH THE VARIATIONS OF CENTER OF MASS	2902
<i>Seong-Ho Yun ; Jiwon Seo ; Junsuk Yoon ; Hansol Song ; Yun-Soo Kim ; Yong-Jae Kim</i>	
WALL-MOUNTED ROBOT ARM EQUIPPED WITH 3-DOF ROLL-PITCH-PITCH COUNTERBALANCE MECHANISM	2908
<i>Won-Bum Lee ; Byung-Yoon Moon ; Tae-Jung Kim ; Jae-Bok Song</i>	
A NOVEL 4-DOF ROBOTIC LINK MECHANISM WITH E-COSMO: KINEMATICS BASED TORQUE ANALYSIS.....	2914
<i>Jaeyong Lee ; Jaeho Noh ; Sungon Lee ; Woosung Yang</i>	
DESIGN OF COMPACT VARIABLE GRAVITY COMPENSATOR (CVGC) BASED ON CAM AND VARIABLE PIVOT OF A LEVER MECHANISM.....	2920
<i>Jehyeok Kim ; Junyoung Moon ; Jongwon Kim ; Giuk Lee</i>	
UNSTRUCTURED TERRAIN NAVIGATION AND TOPOGRAPHIC MAPPING WITH A LOW-COST MOBILE CUBOID ROBOT	2926
<i>Andrew S. Morgan ; Robert L. Baines ; Hayley McClintock ; Brian Scassellati</i>	
AN INTUITIVE, AFFORDANCES ORIENTED TELEMANIPULATION FRAMEWORK FOR A DUAL ROBOT ARM HAND SYSTEM: ON THE EXECUTION OF BIMANUAL TASKS	2932
<i>Gal Gorjup ; Anany Dwivedi ; Nathan Elangovan ; Minas Liarokapis</i>	
HAPTIC-GUIDED SHARED CONTROL FOR NEEDLE GRASPING OPTIMIZATION IN MINIMALLY INVASIVE ROBOTIC SURGERY	2938
<i>Mario Selvaggio ; Amir M. Ghalamzan E ; Rocco Moccia ; Fanny Ficuciello ; Bruno Siciliano</i>	
CONNECTIVITY-PRESERVING SWARM TELEOPERATION WITH A TREE NETWORK.....	2945
<i>Yuan Yang ; Daniela Constantinescu ; Yang Shi</i>	

A VR SYSTEM FOR IMMERSIVE TELEOPERATION AND LIVE EXPLORATION WITH A MOBILE ROBOT	2951
<i>Patrick Stotko ; Stefan Krumpfen ; Max Schwarz ; Christian Lenz ; Sven Behnke ; Reinhard Klein ; Michael Weimann</i>	
FLIGHT RECOVERY OF MAVS WITH COMPROMISED IMU.....	2959
<i>Zhan Tu ; Fan Fei ; Matthew Eagon ; Dongyan Xu ; Xinyan Deng</i>	
2D CONTOUR FOLLOWING WITH AN UNMANNED AERIAL MANIPULATOR: TOWARDS TACTILE-BASED AERIAL NAVIGATION	2966
<i>Salua Hamaza ; Ioannis Georgilas ; Thomas Richardson</i>	
HYBRID FORCE/MOTION CONTROL AND IMPLEMENTATION OF AN AERIAL MANIPULATOR TOWARDS SUSTAINED CONTACT OPERATIONS.....	2972
<i>Xiangdong Meng ; Yuqing He ; Jianda Han</i>	
RETRIEVAL-BASED LOCALIZATION BASED ON DOMAIN-INVARIANT FEATURE LEARNING UNDER CHANGING ENVIRONMENTS.....	2978
<i>Hanjiang Hu ; Hesheng Wang ; Zhe Liu ; Chenguang Yang ; Weidong Chen ; Le Xie</i>	
LEARNING EVENT-BASED HEIGHT FROM PLANE AND PARALLAX.....	2984
<i>Kenneth Chaney ; Alex Zihao Zhu ; Kostas Daniilidis</i>	
ATTENTION-BASED HIERARCHICAL DEEP REINFORCEMENT LEARNING FOR LANE CHANGE BEHAVIORS IN AUTONOMOUS DRIVING.....	2991
<i>Yilun Chen ; Chiyu Dong ; Praveen Palanisamy ; Priyantha Mudalige ; Katharina Muelling ; John M. Dolan</i>	
IMPROVED EXPLORATION THROUGH LATENT TRAJECTORY OPTIMIZATION IN DEEP DETERMINISTIC POLICY GRADIENT.....	2998
<i>Kevin Sebastian Luck ; Mel Vecerik ; Simon Stepputtis ; Heni Ben Amor ; Jonathan Scholz</i>	
A DEEP LEARNING APPROACH FOR ROBUST CORRIDOR FOLLOWING	3006
<i>Vishnu Sashank Dorbala ; A. H. Abdul Hafez ; C. V. Jawahar</i>	
A FRAMEWORK FOR DEPTH ESTIMATION AND RELATIVE LOCALIZATION OF GROUND ROBOTS USING COMPUTER VISION.....	3013
<i>Rômulo T. Rodrigues ; Pedro Miraldo ; Dimos V. Dimarogonas ; A. Pedro Aguiar</i>	
STOCHASTIC PATH PLANNING FOR AUTONOMOUS UNDERWATER GLIDERS WITH SAFETY CONSTRAINTS.....	3019
<i>Chanyeol Yoo ; Stuart Anstee ; Robert Fitch</i>	
VIRTUAL LANE BOUNDARY GENERATION FOR HUMAN-COMPATIBLE AUTONOMOUS DRIVING: A TIGHT COUPLING BETWEEN PERCEPTION AND PLANNING.....	3027
<i>Binbin Li ; Dezhen Song ; Ankit Ramchandani ; Hsin-Min Cheng ; Di Wang ; Yiliang Xu ; Baifan Chen</i>	
DEVELOPMENT OF A NAVIGATION ALGORITHM FOR OPTIMAL PATH PLANNING FOR AUTONOMOUS ELECTRIC VEHICLES.....	3034
<i>Marco Dinges ; Daniel Schilberg ; Stephan Ciethier</i>	
DID YOU MISS THE SIGN? A FALSE NEGATIVE ALARM SYSTEM FOR TRAFFIC SIGN DETECTORS	3042
<i>Quazi Marufur Rahman ; Niko Sünderhauf ; Feras Dayoub</i>	
LIDAR BASED NAVIGABLE REGION DETECTION FOR UNMANNED SURFACE VEHICLES.....	3048
<i>Xiangtong Yao ; Yunxiao Shan ; Jieling Li ; Donghui Ma ; Kai Huang</i>	
DEMPSTER SHAFER GRID-BASED HYBRID FUSION OF VIRTUAL LANES FOR AUTONOMOUS DRIVING	3054
<i>Ferit Uzer ; Rachid Bennokhtar ; Salma Moujtahid ; Xavier Perrotton</i>	
DEGENERACY IN SELF-CALIBRATION REVISITED AND A DEEP LEARNING SOLUTION FOR UNCALIBRATED SLAM.....	3060
<i>Bingbing Zhuang ; Quoc-Huy Tran ; Gim Hee Lee ; Loong Fah Cheong ; Manmohan Chandraker</i>	
DEEP SUPERVISED HASHING WITH SIMILAR HIERARCHY FOR PLACE RECOGNITION.....	3068
<i>Lang Wu ; Yihong Wu</i>	
ROBUST LOOP CLOSURE DETECTION BASED ON BAG OF SUPERPOINTS AND GRAPH VERIFICATION	3074
<i>Haosong Yue ; Jinyu Miao ; Yue Yu ; Weihai Chen ; Changyun Wen</i>	
LEARNING LOCAL FEATURE DESCRIPTOR WITH MOTION ATTRIBUTE FOR VISION-BASED LOCALIZATION.....	3081
<i>Yafei Song ; Di Zhu ; Jia Li ; Yonghong Tian ; Mingyang Li</i>	
DEEPCONET: DEEP OBSERVATION CLASSIFICATION AND RANGING BIAS REGRESSION FOR RADIO POSITIONING SYSTEMS	3089
<i>Sahib Singh Dhanjal ; Maani Ghaffari ; Ryan M. Eustice</i>	
SKILL INTERACTION CATEGORIES FOR COMMUNICATION IN FLEXIBLE HUMAN-ROBOT TEAMS.....	3097
<i>Dominik Riedelbauch ; Stephan Schweizer ; Dominik Henrich</i>	

AN ASSISTIVE LOW-VISION PLATFORM THAT AUGMENTS SPATIAL COGNITION THROUGH PROPRIOCEPTIVE GUIDANCE: POINT-TO-TELL-AND-TOUCH	3104
<i>Wenjun Gui ; Bingyu Li ; Shuaihang Yuan ; John-Ross Rizzo ; Lakshay Sharma ; Chen Feng ; Anthony Tzes ; Yi Fang</i>	
ADAPTIVE SWEEP VOLUMES GENERATION FOR HUMAN-ROBOT COEXISTENCE USING GAUSSIAN PROCESSES	3110
<i>Andrea Casalino ; Alberto Brameri ; Andrea Maria Zanchettin ; Paolo Rocco</i>	
DEVELOPMENT OF AN ARM CURL MACHINE WITH VARIABLE RESISTANCE USING PNEUMATIC ARTIFICIAL RUBBER MUSCLE	3117
<i>Tomoya Nakanishi ; Toshihiro Kawase ; Junya Aizawa ; Shintaro Yoshida ; Shingo Ohno ; Ryo Sakurai ; Tetsuro Miyazaki ; Takahiro Kanno ; Kenji Kawashima</i>	
FOLLOW THE ROBOT: MODELING COUPLED HUMAN-ROBOT DYADS DURING NAVIGATION	3123
<i>Amal Nanavati ; Xiang Zhi Tan ; Joe Connolly ; Aaron Steinfeld</i>	
GENERATING A KEY POSE SEQUENCE BASED ON KINEMATICS AND STATICS OPTIMIZATION FOR MANIPULATING A HEAVY OBJECT BY A HUMANOID ROBOT	3131
<i>Riku Shigematsu ; Masaki Murooka ; Yohei Kakiuchi ; Kei Okada ; Masayuki Inaba</i>	
WHOLE-BODY CONTROL OF HUMANOID ROBOT IN 3D MULTI-CONTACT UNDER CONTACT WRENCH CONSTRAINTS INCLUDING JOINT LOAD REDUCTION WITH SELF-COLLISION AND INTERNAL WRENCH DISTRIBUTION	3139
<i>Naoki Hiraoka ; Masaki Murooka ; Hideaki Ito ; Iori Yanokura ; Kei Okada ; Masayuki Inaba</i>	
SYNCHRONIZING VIRTUAL CONSTRAINTS AND PREVIEW CONTROLLER: A WALKING PATTERN GENERATOR FOR THE HUMANOID ROBOT COMAN+	3147
<i>Francesco Ruscelli ; Arturo Laurenzi ; Enrico Mingo Hoffman ; Nikos G. Tsagarakis</i>	
A RING NETWORK PROTOCOL FOR ARTICULATED ROBOTS	3153
<i>Ryusuke Ishizaki ; Takeshi Misumi ; Takahide Yoshiike</i>	
3D MOVE TO SEE: MULTI-PERSPECTIVE VISUAL SERVOING TOWARDS THE NEXT BEST VIEW WITHIN UNSTRUCTURED AND OCCLUDED ENVIRONMENTS	3161
<i>Chris Lehnert ; Dorian Tsai ; Anders Eriksson ; Chris McCool</i>	
FOREST TREE DETECTION AND SEGMENTATION USING HIGH RESOLUTION AIRBORNE LIDAR	3169
<i>Lloyd Windrim ; Mitch Bryson</i>	
MANIPULATION PURPOSE UNDERWATER AGENT VEHICLE FOR GHOST NET RECOVERY MISSION	3176
<i>Juhwan Kim ; Taesik Kim ; Jason Kim ; Son-Cheol Yu</i>	
SELF-MODELING TRACKING CONTROL OF CRAWLER FIRE FIGHTING ROBOT BASED ON CAUSAL NETWORK	3182
<i>Wenkai Chang ; Peng Li ; Caiyun Yang ; Tao Lu ; Yinghao Cai ; Shuo Wang</i>	
SIM-TO-REAL LEARNING FOR CASUALTY DETECTION FROM GROUND PROJECTED POINT CLOUD DATA	3189
<i>Roni Permana Saputra ; Nemanja Rakicevic ; Petar Kormushev</i>	
ADAPTIVE TRAJECTORY PLANNING AND OPTIMIZATION AT LIMITS OF HANDLING	3197
<i>Lars Svensson ; Monimoy Bujarbaruah ; Nitin R. Kapania ; Martin Törngren</i>	
JOINTLY LEARNABLE BEHAVIOR AND TRAJECTORY PLANNING FOR SELF-DRIVING VEHICLES	3204
<i>Abbas Sadat ; Mengye Ren ; Andrei Pokrovsky ; Yen-Chen Lin ; Ersin Yumer ; Raquel Urtasun</i>	
NEURAL PATH PLANNING: FIXED TIME, NEAR-OPTIMAL PATH GENERATION VIA ORACLE IMITATION	3212
<i>Mayur J. Bency ; Ahmed H. Qureshi ; Michael C. Yip</i>	
LEARNING THE SCOPE OF APPLICABILITY FOR TASK PLANNING KNOWLEDGE IN EXPERIENCE-BASED PLANNING DOMAINS	3220
<i>Vahid Mokhtari ; Roman Manevich ; Luis Seabra Lopes ; Armando J. Pinho</i>	
LEARNING TO ESTIMATE POSE AND SHAPE OF HAND-HELD OBJECTS FROM RGB IMAGES	3227
<i>Mia Kokic ; Danica Kragic ; Jeannette Bohg</i>	
GRIP: GENERATIVE ROBUST INFERENCE AND PERCEPTION FOR SEMANTIC ROBOT MANIPULATION IN ADVERSARIAL ENVIRONMENTS	3235
<i>Xiaotong Chen ; Rui Chen ; Zhiqiang Sui ; Zhefan Ye ; Yanqi Liu ; R. Iris Bahar ; Odest Chadwicke Jenkins</i>	
GQ-STN: OPTIMIZING ONE-SHOT GRASP DETECTION BASED ON ROBUSTNESS CLASSIFIER	3243
<i>Alexandre Gariépy ; Jean-Christophe Ruel ; Brahim Chaib-Draa ; Philippe Giguère</i>	

MULTI-STEP PICK-AND-PLACE TASKS USING OBJECT-CENTRIC DENSE CORRESPONDENCES	3251
<i>Chun-Yu Chai ; Keng-Fu Hsu ; Shiao-Li Tsao</i>	
SELF-SUPERVISED TRANSFER LEARNING FOR INSTANCE SEGMENTATION THROUGH PHYSICAL INTERACTION	3259
<i>Andreas Eitel ; Nico Hauff ; Wolfram Burgard</i>	
INERTIAL-BASED MOTION CAPTURING AND SMART TRAINING SYSTEM.....	3266
<i>Jens Windau ; Laurent Itti</i>	
DEVELOPMENT OF ADJUSTABLE KNEE ASSIST DEVICE FOR WEARABLE ROBOT BASED ON LINKAGE AND ROLLING JOINT	3274
<i>Byungjune Choi ; Younbaek Lee ; Jongwon Lee ; Minhyung Lee ; Bokman Lim ; Young Jin Park ; Kyungrock Kim ; Yong-Jae Kim ; Youngbo Shim</i>	
ADAPTIVE ASSIST-AS-NEEDED CONTROL BASED ON ACTOR-CRITIC REINFORCEMENT LEARNING.....	3282
<i>Yufeng Zhang ; Shuai Li ; Karen J. Nolan ; Damiano Zanotto</i>	
SEGREGATION AND FLOW OF MODULES IN A ROBOT SWARM UTILISING THE BRAZIL NUT EFFECT	3288
<i>Devvrat Joshi ; Masahiro Shimizu ; Koh Hosoda</i>	
SELF-ORGANIZED ADAPTIVE PATHS IN MULTI-ROBOT MANUFACTURING: RECONFIGURABLE AND PATTERN-INDEPENDENT FIBRE DEPLOYMENT	3294
<i>Catriona Eschke ; Mary Katherine Heinrich ; Mostafa Wahby ; Heiko Haman</i>	
CLONE SWARMS: LEARNING TO PREDICT AND CONTROL MULTI-ROBOT SYSTEMS BY IMITATION	3300
<i>Siyu Zhou ; Mariano J. Phielipp ; Jorge A. Sefair ; Sara I. Walker ; Heni Ben Amor</i>	
PLASTICITY IN COLLECTIVE DECISION-MAKING FOR ROBOTS: CREATING GLOBAL REFERENCE FRAMES, DETECTING DYNAMIC ENVIRONMENTS, AND PREVENTING LOCK-INS	3308
<i>Mohammad Divband Soorati ; Maximilian Krome ; Marco Mora-Mendoza ; Javad Ghofrani ; Heiko Hamann</i>	
NON-UNIFORM ROBOT DENSITIES IN VIBRATION DRIVEN SWARMS USING PHASE SEPARATION THEORY	3314
<i>Siddharth Mayya ; Gennaro Notomista ; Dylan Shell ; Seth Hutchinson ; Magnus Egerstedt</i>	
CONSTRAINED HETEROGENEOUS VEHICLE PATH PLANNING FOR LARGE-AREA COVERAGE	3321
<i>Di Deng ; Wei Jing ; Yuhe Fu ; Ziyin Huang ; Jiahong Liu ; Kenji Shimada</i>	
COMBINING STOCHASTIC OPTIMIZATION AND FRONTIERS FOR AERIAL MULTI-ROBOT EXPLORATION OF 3D TERRAINS.....	3329
<i>Alessandro Renzaglia ; Jilles Dibangoye ; Vincent Le Doze ; Olivier Simonin</i>	
OPTIMAL TEMPORAL LOGIC PLANNING FOR MULTI-ROBOT SYSTEMS IN UNCERTAIN SEMANTIC MAPS	3335
<i>Yiannis Kantaros ; George J. Pappas</i>	
MULTI ROBOT ROUTE PLANNING (MRRP): EXTENDED SPATIAL-TEMPORAL PRIORITIZED PLANNING	3341
<i>Benjamin Binder ; Florian Beck ; Felix König ; Markus Bader</i>	
AN OPTIMAL ALGORITHM TO SOLVE THE COMBINED TASK ALLOCATION AND PATH FINDING PROBLEM.....	3348
<i>Christian Henkel ; Jannik Abbenseth ; Marc Toussaint</i>	
SCHEDULING OF MOBILE WORKSTATIONS FOR OVERLAPPING PRODUCTION TIME AND DELIVERY TIME	3355
<i>Dohee Lee ; Tsz-Chiu Au</i>	
WORD2VEC TO BEHAVIOR: MORPHOLOGY FACILITATES THE GROUNDING OF LANGUAGE IN MACHINES	3361
<i>David Matthews ; Sam Kriegman ; Collin Cappelle ; Josh Bongard</i>	
COMBINING SPIKING MOTOR PRIMITIVES WITH A BEHAVIOUR-BASED ARCHITECTURE TO MODEL LOCOMOTION FOR SIX-LEGGED ROBOTS.....	3369
<i>J. Camilo Vasquez Tieck ; Jacqueline Rutschke ; Jacques Kaiser ; Martin Schulze ; Timothee Buettner ; Daniel Reichard ; Arne Roennau ; Rüdiger Dillmann</i>	
A MULTICLASS EEG SIGNAL CLASSIFICATION MODEL USING SPATIAL FEATURE EXTRACTION AND XGBOOST ALGORITHM.....	3377
<i>Anurag Tiwari ; Amrita Chaturvedi</i>	
SPIKING NEURAL NETWORK ON NEUROMORPHIC HARDWARE FOR ENERGY-EFFICIENT UNIDIMENSIONAL SLAM.....	3384
<i>Guangzhi Tang ; Arpit Shah ; Konstantinos P. Michmizos</i>	

LEARNING TOPOMETRIC SEMANTIC MAPS FROM OCCUPANCY GRIDS	3390
<i>Markus Hiller ; Chen Qiu ; Florian Particke ; Christian Hofmann ; Jörn Thelecke</i>	
DEDUCE: DIVERSE SCENE DETECTION METHODS IN UNSEEN CHALLENGING ENVIRONMENTS	3398
<i>Anwesan Pal ; Carlos Nieto-Granda ; Henrik I. Christensen</i>	
PANOPTICFUSION: ONLINE VOLUMETRIC SEMANTIC MAPPING AT THE LEVEL OF STUFF AND THINGS	3405
<i>Gaku Narita ; Takashi Seno ; Tomoya Ishikawa ; Yohsuke Kaji</i>	
RANGENET ++: FAST AND ACCURATE LIDAR SEMANTIC SEGMENTATION	3413
<i>Andres Milioto ; Ignacio Vizzo ; Jens Behley ; Cyrill Stachniss</i>	
AUTOMATIC SPATIAL TEMPLATE GENERATION FOR REALISTIC 3D MODELING OF LARGE-SCALE INDOOR SPACES	3421
<i>Janghun Hyeon ; Hyunga Choi ; Joohyung Kim ; Bumchul Jang ; Jaehyeon Kang ; Nakju Doh</i>	
IMPROVING ROBOT SUCCESS DETECTION USING STATIC OBJECT DATA	3429
<i>Rosario Scalise ; Jesse Thomason ; Yonatan Bisk ; Siddhartha Srinivasa</i>	
STOCHASTIC SAMPLING SIMULATION FOR PEDESTRIAN TRAJECTORY PREDICTION	3436
<i>Cyrus Anderson ; Xiaoxiao Du ; Ram Vasudevan ; Matthew Johnson-Roberson</i>	
LEARNING MULTIPLE SENSORIMOTOR UNITS TO COMPLETE COMPOUND TASKS USING AN RNN WITH MULTIPLE ATTRACTORS	3444
<i>Kei Kase ; Ryoichi Nakajo ; Hiroki Mori ; Tetsuya Ogata</i>	
A NOVEL APPROACH FOR OUTLIER DETECTION AND ROBUST SENSORY DATA MODEL LEARNING	3450
<i>Francesco Cursi ; Guang-Zhong Yang</i>	
DEEP LEARNING OF PROPRIOCEPTIVE MODELS FOR ROBOTIC FORCE ESTIMATION	3458
<i>Erik Berger ; Daniel Eger Passos ; Steve Grehl ; Heni Ben Amor ; Bernhard Jung</i>	
OMNIPUSH: ACCURATE, DIVERSE, REAL-WORLD DATASET OF PUSHING DYNAMICS WITH RGB-D VIDEO	3465
<i>Maria Bauza ; Ferran Alet ; Yen-Chen Lin ; Tomás Lozano-Pérez ; Leslie P. Kaelbling ; Phillip Isola ; Alberto Rodriguez</i>	
ADAPTIVE LEADER-FOLLOWER FORMATION CONTROL AND OBSTACLE AVOIDANCE VIA DEEP REINFORCEMENT LEARNING	3473
<i>Yanlin Zhou ; Fan Lu ; George Pu ; Xiyao Ma ; Runhan Sun ; Hsi-Yuan Chen ; Xiaolin Li</i>	
IMPROVING TASK-PARAMETERISED MOVEMENT LEARNING GENERALISATION WITH FRAME-WEIGHTED TRAJECTORY GENERATION	3481
<i>Aran Sena ; Brendan Michael ; Matthew Howard</i>	
LEARNING MULTIMODAL REPRESENTATIONS FOR SAMPLE-EFFICIENT RECOGNITION OF HUMAN ACTIONS	3488
<i>Miguel Vasco ; Francisco S. Melo ; David Martins De Matos ; Ana Paiva ; Tetsunari Inamura</i>	
REINFORCEMENT LEARNING OF TRAJECTORY DISTRIBUTIONS: APPLICATIONS IN ASSISTED TELEOPERATION AND MOTION PLANNING	3494
<i>Marco Ewerton ; Guilherme Maeda ; Dorothea Koert ; Zlatko Kolev ; Masaki Takahashi ; Jan Peters</i>	
LEARNING VIA-POINT MOVEMENT PRIMITIVES WITH INTER- AND EXTRAPOLATION CAPABILITIES	3501
<i>You Zhou ; Jianfeng Gao ; Tamim Asfour</i>	
CONTACT SKILL IMITATION LEARNING FOR ROBOT-INDEPENDENT ASSEMBLY PROGRAMMING	3509
<i>Stefan Scherzinger ; Arne Roennau ; Rüdiger Dillmann</i>	
COMBINED TASK AND ACTION LEARNING FROM HUMAN DEMONSTRATIONS FOR MOBILE MANIPULATION APPLICATIONS	3517
<i>Tim Welschhold ; Nichola Abdo ; Christian Dornhege ; Wolfram Burgard</i>	
DESIGN OF ROBOT LEG WITH VARIABLE REDUCTION RATIO CROSSED FOUR-BAR LINKAGE MECHANISM	3525
<i>Kohei Tomishiro ; Ryuki Sato ; Yasuji Harada ; Aiguo Ming ; Fei Meng ; Huaxin Liu ; Xuxiao Fan ; Xuechao Chen ; Zhangguo Yu ; Qiang Huang</i>	
WLR-II, A HOSE-LESS HYDRAULIC WHEEL-LEGGED ROBOT	3531
<i>Xu Li ; Haitao Zhou ; Songyuan Zhang ; Haibo Feng ; Yili Fu</i>	
AN IN-PIPE INSPECTION MODULE WITH AN OMNIDIRECTIONAL BENT-PIPE SELF-ADAPTATION MECHANISM USING A JOINT TORQUE CONTROL	3539
<i>Atsushi Kakogawa ; Shugen Ma</i>	
CONFIGURATION MODELING OF A SOFT ROBOTIC ELEMENT WITH SELECTABLE BENDING AXES	3545
<i>Emily A. Allen ; Brandon C. Townsend ; John P. Swensen</i>	

LAMINATED FOAM-BASED SOFT ACTUATOR FOR ACTUATABLE FLEXIBLE STRUCTURE	3551
<i>Yasuyuki Yamada ; Taro Nakamura</i>	
ADAPTIVE UNSCENTED KALMAN FILTER-BASED DISTURBANCE REJECTION WITH APPLICATION TO HIGH PRECISION HYDRAULIC ROBOTIC CONTROL	3557
<i>Peng Lu ; Timothy Sandy ; Jonas Buchli</i>	
TOWARDS A NATURAL MOTION GENERATOR: A PIPELINE TO CONTROL A HUMANOID BASED ON MOTION DATA	3565
<i>Sungjoon Choi ; Joohyung Kim</i>	
ONLINE TRAJECTORY GENERATION: REACTIVE CONTROL WITH RETURN INSIDE AN ADMISSIBLE KINEMATIC DOMAIN	3573
<i>Kevin Desormeaux ; Daniel Sidobre</i>	
ROBUST UAV POSITION AND ATTITUDE ESTIMATION USING MULTIPLE GNSS RECEIVERS FOR LASER-BASED 3D MAPPING	3579
<i>Taro Suzuki ; Daichi Inoue ; Yoshiharu Amano</i>	
UAV LANDING AT AN UNKNOWN LOCATION MARKED BY A RADIO BEACON	3586
<i>Nikolaos Stefanos ; Haluk Bayram ; Volkan Isler</i>	
BOUNDARY EFFECT-AWARE VISUAL TRACKING FOR UAV WITH ONLINE ENHANCED BACKGROUND LEARNING AND MULTI-FRAME CONSENSUS VERIFICATION	3592
<i>Changhong Fu ; Ziyuan Huang ; Yiming Li ; Ran Duan ; Peng Lu</i>	
FIESTA: FAST INCREMENTAL EUCLIDEAN DISTANCE FIELDS FOR ONLINE MOTION PLANNING OF AERIAL ROBOTS	3600
<i>Luxin Han ; Fei Gao ; Boyu Zhou ; Shaojie Shen</i>	
A COMPARISON OF VISUAL SERVOING FROM FEATURES VELOCITY AND ACCELERATION INTERACTION MODELS	3608
<i>Franco Fusco ; Olivier Kermorgant ; Philippe Martinet</i>	
HYBRID VISUAL SERVOING FOR AUTONOMOUS ROBOTIC LASER TATTOO REMOVAL	3614
<i>Veronica Penza ; Damiano Salerno ; Alperen Acemoglu ; Jesús Ortiz ; Leonardo S. Mattos</i>	
POSITION-BASED MONOCULAR VISUAL SERVOING OF AN UNKNOWN TARGET USING ONLINE SELF-SUPERVISED LEARNING	3620
<i>Chungkeun Lee ; Hoseong Seo ; H. Jin Kim</i>	
GAUSSIAN MIXTURE MODEL (GMM) BASED OBJECT DETECTION AND TRACKING USING DYNAMIC PATCH ESTIMATION	3627
<i>Vishnu Anand ; Durgakant Pushp ; Rishin Raj ; Kaushik Das</i>	
ROBUST HAND-EYE CALIBRATION VIA ITERATIVELY RE-WEIGHTED RANK-CONSTRAINED SEMI-DEFINITE PROGRAMMING	3635
<i>Chinmay Samant ; Adlane Habed ; Michel De Mathelin ; Laurent Goffin</i>	
ROBUST AND EFFICIENT VEHICLES MOTION ESTIMATION WITH LOW-COST MULTI-CAMERA AND ODOMETER-GYROSCOPE	3643
<i>Wenlong Ye ; Renjie Zheng ; Fangqiang Zhang ; Zizhou Ouyang ; Yong Liu</i>	
TOWARDS GENERALIZING SENSORIMOTOR CONTROL ACROSS WEATHER CONDITIONS	3650
<i>Qadeer Khan ; Patrick Wenzel ; Daniel Cremers ; Laura Leal-Taixé</i>	
LEARNING 2D TO 3D LIFTING FOR OBJECT DETECTION IN 3D FOR AUTONOMOUS VEHICLES	3657
<i>Siddharth Srivastava ; Frederic Jurie ; Gaurav Sharma</i>	
COBRA: COLLABORATIVE BOT WITH MULTI-ROTOR ACTUATION	3665
<i>Camilo Ordonez ; Oscar Chuy ; Tomas Fajardo</i>	
MODEL PREDICTIVE CONTROL BASED DYNAMIC PATH TRACKING OF A FOUR-WHEEL STEERING MOBILE ROBOT	3671
<i>Mohamed Fnadi ; Frédéric Plumet ; Faiz Benamar</i>	
ON ENHANCING GROUND SURFACE DETECTION FROM SPARSE LIDAR POINT CLOUD	3677
<i>Bo Li</i>	
SUMA++: EFFICIENT LIDAR-BASED SEMANTIC SLAM	3683
<i>Xieyuanli Chen ; Andres Milioto ; Emanuele Palazzolo ; Philippe Giguère ; Jens Behley ; Cyrill Stachniss</i>	
CALC2.0: COMBINING APPEARANCE, SEMANTIC AND GEOMETRIC INFORMATION FOR ROBUST AND EFFICIENT VISUAL LOOP CLOSURE	3691
<i>Nathaniel Merrill ; Guoquan Huang</i>	
SEMANTICALLY ASSISTED LOOP CLOSURE IN SLAM USING NDT HISTOGRAMS	3699
<i>Anestis Zaganidis ; Alexandros Zernitev ; Tom Duckett ; Grzegorz Cielniak</i>	
CAMERA POSE ESTIMATION WITH SEMANTIC 3D MODEL	3706
<i>Vincent Gaudillière ; Gilles Simon ; Marie-Odile Berger</i>	

SYNTHESIZING ROBOT MANIPULATION PROGRAMS FROM A SINGLE OBSERVED HUMAN DEMONSTRATION	3714
<i>Justin Huang ; Dieter Fox ; Maya Cakmak</i>	
A MULTI-DOF HUMAN-POWERED ROBOT USING REGENERATIVE CLUTCHES AND CONSTANT-FORCE SPRINGS	3722
<i>Yusuke Sugahara ; Kohei Tsukamoto ; Mitsuru Endo ; Jun Okamoto ; Daisuke Matsuura ; Yukio Takeda</i>	
INFERENCE OF USER-INTENTION IN REMOTE ROBOT WHEELCHAIR ASSISTANCE USING MULTIMODAL INTERFACES	3729
<i>Vinicius Schettino ; Yiannis Demiris</i>	
LEARNING VIRTUAL BORDERS THROUGH SEMANTIC SCENE UNDERSTANDING AND AUGMENTED REALITY	3736
<i>Dennis Sprute ; Philipp Viertel ; Klaus Tönnies ; Matthias König</i>	
PEDESTRIAN DENSITY PREDICTION FOR EFFICIENT MOBILE ROBOT EXPLORATION	3744
<i>Marc Patrick Zapf ; Motoaki Kawanabe ; Luis Yoichi Morales Saiki</i>	
JOINT TORQUE ESTIMATION TOWARD DYNAMIC AND COMPLIANT CONTROL FOR GEAR-DRIVEN TORQUE SENSORLESS QUADRUPED ROBOT	3752
<i>Bingchen Jin ; Caiming Sun ; Aidong Zhang ; Ning Ding ; Jing Lin ; Ganyu Deng ; Zuwen Zhu ; Zhenglong Sun</i>	
ORBIT CHARACTERIZATION, STABILIZATION AND COMPOSITION ON 3D UNDERACTUATED BIPEDAL WALKING VIA HYBRID PASSIVE LINEAR INVERTED PENDULUM MODEL	3760
<i>Xiaobin Xiong ; Aaron D. Ames</i>	
AGILE STANDING-UP CONTROL OF HUMANOIDS: ENERGY-BASED REACTIVE CONTACT WRENCH OPTIMIZATION WITH STRICT DYNAMIC CONSISTENCY	3768
<i>Yisoo Lee ; Nikos Tsagarakis ; Jinh Lee</i>	
A TWO-DOF BIPEDAL ROBOT UTILIZING THE REULEAUX TRIANGLE DRIVE MECHANISM	3776
<i>Jiteng Yang ; Wael Saab ; Pinhas Ben-Tzyi</i>	
ON TRAINING FLEXIBLE ROBOTS USING DEEP REINFORCEMENT LEARNING	3782
<i>Zach Dwiell ; Madhavun Candadai ; Mariano Phielipp</i>	
A 3D STATIC MODELING METHOD AND EXPERIMENTAL VERIFICATION OF CONTINUUM ROBOTS BASED ON PSEUDO-RIGID BODY THEORY	3788
<i>Shaoping Huang ; Deshan Meng ; Xueqian Wang ; Bin Liang ; Weining Lu</i>	
ENERGY-EFFICIENT LOCOMOTION STRATEGIES AND PERFORMANCE BENCHMARKS USING POINT MASS TENSEGRITY DYNAMICS	3794
<i>Brian M. Cera ; Anthony A. Thompson ; Alice M. Agogino</i>	
ACTUATION AND STIFFENING IN FLUID-DRIVEN SOFT ROBOTS USING LOW-MELTING-POINT MATERIAL	3800
<i>Jan Peters ; Erin Nolan ; Mats Wiese ; Mark Miodownik ; Sarah Spurgeon ; Alberto Arezzo ; Annika Raatz ; Helge A. Wurdemann</i>	
DESIGN OF SOFT FLEXIBLE WIRE-DRIVEN FINGER MECHANISM FOR CONTACT PRESSURE DISTRIBUTION	3807
<i>Toshinori Hirose ; Yohei Kakiuchi ; Kei Okada ; Masayuki Inaba</i>	
MULTI-CONTROLLER MULTI-OBJECTIVE LOCOMOTION PLANNING FOR LEGGED ROBOTS	3814
<i>Martim Brandão ; Maurice Fallon ; Ioannis Havoutis</i>	
RAPID TRAJECTORY OPTIMIZATION USING C-FROST WITH ILLUSTRATION ON A CASSIE-SERIES DYNAMIC WALKING BIPED	3822
<i>Ayonga Hereid ; Omar Harib ; Ross Hartley ; Yukai Gong ; Jessie W. Grizzle</i>	
FEEDBACK MPC FOR TORQUE-CONTROLLED LEGGED ROBOTS	3830
<i>Ruben Grandia ; Farbod Farshidian ; René Ranftl ; Marco Hutter</i>	
VARIABLE CONFIGURATION PLANNER FOR LEGGED-ROLLING OBSTACLE NEGOTIATION LOCOMOTION: APPLICATION ON THE CENTAURO ROBOT	3838
<i>Vignesh Sushrutha Raghavan ; Dimitrios Kanoulas ; Arturo Laurenzi ; Darwin G. Caldwell ; Nikos G. Tsagarakis</i>	
WHOLE-BODY MOTION AND LANDING FORCE CONTROL FOR QUADRUPEDAL STAIR CLIMBING	3846
<i>Young Hun Lee ; Yoon Haeng Lee ; Hyunyong Lee ; Hansol Kang ; Yong Bum Kim ; Jun Hyuk Lee ; Luong Tin Phan ; Sungmoon Jin ; Hyungpil Moon ; Ja Choon Koo ; Hyouk Ryeol Choi</i>	
LEARNING REAL-TIME CLOSED LOOP ROBOTIC REACHING FROM MONOCULAR VISION BY EXPLOITING A CONTROL LYAPUNOV FUNCTION STRUCTURE	3852
<i>Zheyu Zhuang ; Jürgen Leitner ; Robert Mahony</i>	

POSE-AWARE PLACEMENT OF OBJECTS WITH SEMANTIC LABELS - BRANDNAME-BASED AFFORDANCE PREDICTION AND COOPERATIVE DUAL-ARM ACTIVE MANIPULATION	3860
<i>Yung-Shan Su ; Shao-Huang Lu ; Po-Sheng Ser ; Wei-Ting Hsu ; Wei-Cheng Lai ; Biao Xie ; Hong-Ming Huang ; Teng-Yok Lee ; Hung-Wen Chen ; Lap-Fai Yu ; Hsueh-Cheng Wang</i>	
ROI-BASED ROBOTIC GRASP DETECTION FOR OBJECT OVERLAPPING SCENES	3868
<i>Hanbo Zhang ; Xuguang Lan ; Site Bai ; Xinwen Zhou ; Zhiqiang Tian ; Nanning Zheng</i>	
GLASSLOC: PLENOPTIC GRASP POSE DETECTION IN TRANSPARENT CLUTTER	3876
<i>Zheming Zhou ; Tianyang Pan ; Shiyu Wu ; Haonan Chang ; Odest Chadwicke Jenkins</i>	
LEARNING OBJECT MODELS FOR NON-PREHENSILE MANIPULATION	3884
<i>Siddharth Sanan ; Mason Bretan ; Larry Heck</i>	
DISASTER RESPONSE ROBOT'S AUTONOMOUS MANIPULATION OF VALVES IN DISASTER SITES BASED ON VISUAL ANALYSES OF RGBD IMAGES	3890
<i>Keishi Nishikawa ; Asaki Imai ; Kazuya Miyakawa ; Takuya Kanda ; Takashi Matsuzawa ; Kenji Hashimoto ; Atsuo Takanishi ; Hiroyuki Ogata ; Jun Ohya</i>	
DEVELOPMENT OF LOAD WEIGHT AND HEIGHT CLASSIFIER IN LIFTING-UP TASK USING BODY MOTION METRICS	3898
<i>Naoya Ishibashi ; Fumitake Fujii</i>	
AUGMENTED REALITY CONTROLLED SMART WHEELCHAIR USING DYNAMIC SIGNIFIERS FOR AFFORDANCE REPRESENTATION	3904
<i>Rodrigo Chacón-Quesada ; Yiannis Demiris</i>	
TOWARD A BALLBOT FOR PHYSICALLY LEADING PEOPLE: A HUMAN-CENTERED APPROACH	3911
<i>Zhongyu Li ; Ralph Hollis</i>	
VOICE-CONTROLLED FLEXIBLE EXOTENDON (FLEXOTENDON) GLOVE FOR HAND REHABILITATION	3918
<i>Phillip Tran ; Seokhwan Jeong ; Jaydev P. Desai</i>	
SCAFFOLD-BASED ASYNCHRONOUS DISTRIBUTED SELF-RECONFIGURATION BY CONTINUOUS MODULE FLOW	3924
<i>Pierre Thalamy ; Benoît Piranda ; Frédéric Lassabe ; Julien Bourgeois</i>	
DECENTRALIZED POSE CONTROL OF MODULAR RECONFIGURABLE ROBOTS OPERATING IN LIQUID ENVIRONMENTS	3931
<i>João V. Amorim Marques ; Anil Özdemir ; Matthew J. Doyle ; Daniela Rus ; Roderich Groß</i>	
DECENTRALIZED CONTROL FOR 3D M-BLOCKS FOR PATH FOLLOWING, LINE FORMATION, AND LIGHT GRADIENT AGGREGATION	3938
<i>John W. Romanishin ; John Mamish ; Daniela Rus</i>	
TIME-VARYING GRAPH PATROLLING AGAINST ATTACKERS WITH LOCALLY LIMITED AND IMPERFECT OBSERVATION MODELS	3945
<i>Carlos Diaz Alvarenga ; Nicola Basilico ; Stefano Carpin</i>	
HTETRAN – A POLYABOLO INSPIRED SELF RECONFIGURABLE TILING ROBOT	3953
<i>Prabakaran Veeerajagadheswar ; Vinu Sivanantham ; Manojkumar Devarassu ; Mohan Rajesh Elara</i>	
AN AUTONOMOUS EXPLORATION ALGORITHM USING ENVIRONMENT-ROBOT INTERACTED TRAVERSABILITY ANALYSIS	3961
<i>Yujie Tang ; Jun Cai ; Meng Chen ; Xuejiao Yan ; Yangmin Xie</i>	
AUTONOMOUS SAFE LOCOMOTION SYSTEM FOR BIPEDAL ROBOT APPLYING VISION AND SOLE REACTION FORCE TO FOOTSTEP PLANNING	3967
<i>Yuki Omori ; Yuta Kojio ; Tatsuya Ishikawa ; Kunio Kojima ; Fumihito Sugai ; Yohei Kakiuchi ; Kei Okada ; Masayuki Inaba</i>	
VIRTUAL MAPS FOR AUTONOMOUS EXPLORATION WITH POSE SLAM	3975
<i>Jinkun Wang ; Tixiao Shan ; Brendan Englot</i>	
WITH PROXIMITY SERVOING TOWARDS SAFE HUMAN-ROBOT-INTERACTION	3983
<i>Yitao Ding ; Felix Wilhelm ; Leonhard Faulhammer ; Ulrike Thomas</i>	
MAXIMUM INFORMATION BOUNDS FOR PLANNING ACTIVE SENSING TRAJECTORIES	3989
<i>Brent Schlotfeldt ; Nikolay Atanasov ; George J. Pappas</i>	
DISTRIBUTED DYNAMIC SENSOR ASSIGNMENT OF MULTIPLE MOBILE TARGETS	3997
<i>Eduardo Montijano ; Danilo Tardioli ; Alejandro R. Mosteo</i>	
OPERATION OF A PNEUMATIC SOFT MANIPULATOR USING A WEARABLE INTERFACE WITH FLEXIBLE STRAIN SENSORS	4003
<i>Hiroki Hagihara ; Shuichi Wakimoto ; Takefumi Kanda ; Shota Furukawa</i>	
AUTOMATIC ANNOTATION FOR SEMANTIC SEGMENTATION IN INDOOR SCENES	4009
<i>Md Alimoor Reza ; Akshay U. Naik ; Kai Chen ; David J. Crandall</i>	

SIMULTANEOUS TRANSPARENT AND NON-TRANSPARENT OBJECT SEGMENTATION WITH MULTISPECTRAL SCENES	4016
<i>Atsuro Okazawa ; Tomoyuki Takahata ; Tatsuya Harada</i>	
LOCALIZATION AND MAPPING USING INSTANCE-SPECIFIC MESH MODELS	4024
<i>Qiaojun Feng ; Yue Meng ; Mo Shan ; Nikolay Atanasov</i>	
LEARNING TO GENERATE UNAMBIGUOUS SPATIAL REFERRING EXPRESSIONS FOR REAL-WORLD ENVIRONMENTS	4031
<i>Fethiye Irmak Dogan ; Sinan Kalkan ; Iolanda Leite</i>	
A RUGD DATASET FOR AUTONOMOUS NAVIGATION AND VISUAL PERCEPTION IN UNSTRUCTURED OUTDOOR ENVIRONMENTS	4039
<i>Maggie Wigness ; Sungmin Eum ; John G. Rogers ; David Han ; Heesung Kwon</i>	
EXPLORE, APPROACH, AND TERMINATE: EVALUATING SUBTASKS IN ACTIVE VISUAL OBJECT SEARCH BASED ON DEEP REINFORCEMENT LEARNING	4047
<i>Jan Fabian Schmid ; Mikko Lauri ; Simone Frintrop</i>	
DOT-TO-DOT: EXPLAINABLE HIERARCHICAL REINFORCEMENT LEARNING FOR ROBOTIC MANIPULATION	4053
<i>Benjamin Beyret ; Ali Shafti ; A. Aldo Faisal</i>	
MULTI-AGENT IMAGE CLASSIFICATION VIA REINFORCEMENT LEARNING	4059
<i>Hossein K. Mousavi ; Mohammadreza Nazari ; Martin Takác ; Nader Motee</i>	
SOFT ACTION PARTICLE DEEP REINFORCEMENT LEARNING FOR A CONTINUOUS ACTION SPACE	4067
<i>Minjae Kang ; Kyungjae Lee ; Songhwa Oh</i>	
DEEP GENERATIVE MODELING OF LIDAR DATA	4073
<i>Lucas Caccia ; Herke Van Hoof ; Aaron Courville ; Joelle Pineau</i>	
ENSEMBLEDAGGER: A BAYESIAN APPROACH TO SAFE IMITATION LEARNING	4080
<i>Kunal Menda ; Katherine Driggs-Campbell ; Mykel J. Kochenderfer</i>	
AN AUTOMATED LEARNING-BASED PROCEDURE FOR LARGE-SCALE VEHICLE DYNAMICS MODELING ON BAIDU APOLLO PLATFORM	4088
<i>Jiaxuan Xu ; Qi Luo ; Kecheng Xu ; Xiangquan Xiao ; Siyang Yu ; Jiangtao Hu ; Jinghao Miao ; Jingao Wang</i>	
MOBILE ROBOT LEARNING FROM HUMAN DEMONSTRATIONS WITH NONLINEAR MODEL PREDICTIVE CONTROL	4096
<i>Yingbai Hu ; Guang Chen ; Xiangyu Ning ; Jinhu Dong ; Shu Liu ; Alois Knoll</i>	
TOWARDS REVERSIBLE DYNAMIC MOVEMENT PRIMITIVES	4102
<i>Iñigo Iturrate ; Christoffer Sloth ; Aljaž Kramberger ; Henrik Gordon Petersen ; Esben Hallundbæk Østergaard ; Thiusius Rajeeth Savarimuthu</i>	
LEARNING INTERACTIVE BEHAVIORS FOR MUSCULOSKELETAL ROBOTS USING BAYESIAN INTERACTION PRIMITIVES	4110
<i>Joseph Campbell ; Arne Hitzmann ; Simon Stepputtis ; Shuhei Ikemoto ; Koh Hosoda ; Heni Ben Amor</i>	
SAMPLE-EFFICIENT DEEP REINFORCEMENT LEARNING WITH IMAGINARY ROLLOUTS FOR HUMAN-ROBOT INTERACTION	4118
<i>Mohammad Thabet ; Massimiliano Patacchiola ; Angelo Cangelosi</i>	
A-EXP4: ONLINE SOCIAL POLICY LEARNING FOR ADAPTIVE ROBOT-PEDESTRIAN INTERACTION	4125
<i>Pengju Jin ; Eshed Ohn-Bar ; Kris Kitani ; Chieko Asakawa</i>	
HAPTICUBE: A COMPACT 5-DOF FINGER-WEARABLE TACTILE INTERFACE	4133
<i>Byeongkyu Lim ; Keehoon Kim ; Sang-Rok Oh ; Donghyun Hwang</i>	
A STUDY OF A CLASS OF VIBRATION-DRIVEN ROBOTS: MODELING, ANALYSIS, CONTROL AND DESIGN OF THE BRUSHBOT	4140
<i>Gennaro Notomista ; Siddharth Mayya ; Anirban Mazumdar ; Seth Hutchinson ; Magnus Egerstedt</i>	
DEVELOPMENT OF JOINT MODULE WITH TWO-SPEED GEAR TRANSMISSION AND JOINT LOCK MECHANISM DURING DRIVING FOR TASK ADAPTABLE ROBOT	4146
<i>Tasuku Makabe ; Takuma Shirai ; Yuya Nagamatsu ; Kento Kawaharazuka ; Fumihito Sugai ; Kei Okada ; Masayuki Inaba</i>	
A MOBILE EXTENDABLE ROBOT ARM: SINGULARITY ANALYSIS AND DESIGN	4154
<i>Seiichi Teshigawara ; H. Harry Asada</i>	
A SIMPLE APPROACH ON GLOBAL CONTROL OF A CLASS OF UNDERACTUATED MECHANICAL ROBOTIC SYSTEMS	4162
<i>Tan Chen ; Bill Goodwine</i>	
EXECUTING UNDERSPECIFIED ACTIONS IN REAL WORLD BASED ON ONLINE PROJECTION	4169
<i>Gayane Kazhoyan ; Michael Beetz</i>	

GENERAL HAND GUIDANCE FRAMEWORK USING MICROSOFT HOLOLENS	4177
<i>David Puljiz ; Erik Stöhr ; Katharina S. Riesterer ; Björn Hein ; Torsten Kröger</i>	
SPECIFICATION-BASED MANEUVERING OF QUADCOPTERS THROUGH HOOPS	4183
<i>Christopher Banks ; Kyle Slovak ; Samuel Coogan ; Magnus Egerstedt</i>	
ON FLYING BACKWARDS: PREVENTING RUN-AWAY OF SMALL, LOW-SPEED, FIXED-WING UAVS IN STRONG WINDS	4190
<i>Thomas Stastny ; Roland Siegart</i>	
PRECISION MODELING AND OPTIMALLY-SAFE DESIGN OF QUADCOPTERS FOR CONTROLLED CRASH LANDING IN CASE OF ROTOR FAILURE	4198
<i>Mojtaba Hedayatpour ; Mehran Mehrandezh ; Farrokh Janabi-Sharifi</i>	
DESIGN OF A BALLISTICALLY-LAUNCHED FOLDABLE MULTIROTOR	4204
<i>Daniel Pastor ; Jacob Izraelevitz ; Paul Nadan ; Amanda Bouman ; Joel Burdick ; Brett Kennedy</i>	
AN AUTONOMOUS QUADROTOR SYSTEM FOR ROBUST HIGH-SPEED FLIGHT THROUGH CLUTTERED ENVIRONMENTS WITHOUT GPS	4211
<i>Marc Rigter ; Benjamin Morrell ; Robert G. Reid ; Gene B. Merewether ; Theodore Tzanetos ; Vinay Rajur ; Kc Wong ; Larry H. Matthies</i>	
BENCHMARKING AND WORKLOAD ANALYSIS OF ROBOT DYNAMICS ALGORITHMS	4219
<i>Sabrina M. Neuman ; Twan Koolen ; Jules Drean ; Jason E. Miller ; Srinivas Devadas</i>	
SIMITATE: A HYBRID IMITATION LEARNING BENCHMARK	4227
<i>Raphael Memmesheimer ; Ivanna Kramer ; Viktor Seib ; Dietrich Paulus</i>	
N-MERCI: A NEW METRIC TO EVALUATE THE CORRELATION BETWEEN PREDICTIVE UNCERTAINTY AND TRUE ERROR	4234
<i>Michel Moukari ; Loïc Simon ; Sylvaine Picard ; Frédéric Jurie</i>	
A BENCHMARK FOR VISUAL-INERTIAL ODOMETRY SYSTEMS EMPLOYING ONBOARD ILLUMINATION	4240
<i>Mike Kasper ; Steve McGuire ; Christoffer Heckman</i>	
SYSTEMATIC BENCHMARKING FOR REPRODUCIBILITY OF COMPUTER VISION ALGORITHMS FOR REAL-TIME SYSTEMS: THE EXAMPLE OF OPTIC FLOW ESTIMATION	4248
<i>Björnborg Nguyen ; Christian Berger ; Ola Benderius</i>	
MODELING, LEARNING AND PREDICTION OF LONGITUDINAL BEHAVIORS OF HUMAN-DRIVEN VEHICLES BY INCORPORATING INTERNAL HUMAN DECISIONMAKING PROCESS USING INVERSE MODEL PREDICTIVE CONTROL	4254
<i>Longxiang Guo ; Yunyi Jia</i>	
TALK TO THE VEHICLE: LANGUAGE CONDITIONED AUTONOMOUS NAVIGATION OF SELF DRIVING CARS	4260
<i>N. N. Sriram ; Tirth Maniar ; Jayaganesh Kalyanasundaram ; Vineet Gandhi ; Brojeshwar Bhowmick ; K Madhava Krishna</i>	
ROBOT LOCALIZATION IN FLOOR PLANS USING A ROOM LAYOUT EDGE EXTRACTION NETWORK	4267
<i>Federico Boniardi ; Abhinav Valada ; Rohit Mohan ; Tim Caselitz ; Wolfram Burgard</i>	
FUSING LIDAR DATA AND AERIAL IMAGERY WITH PERSPECTIVE CORRECTION FOR PRECISE LOCALIZATION IN URBAN CANYONS	4274
<i>Jonghwi Kim ; Jinwhan Kim</i>	
EXPLOITING SPARSE SEMANTIC HD MAPS FOR SELF-DRIVING VEHICLE LOCALIZATION	4280
<i>Wei-Chiu Ma ; Ignacio Tartavull ; Ioan Andrei Bârsan ; Shenlong Wang ; Min Bai ; Gellert Mattyus ; Namdar Homayounfar ; Shrinidhi Kowshika Lakshmikanth ; Andrei Pokrovsky ; Raquel Urtasun</i>	
FLAME: FEATURE-LIKELIHOOD BASED MAPPING AND LOCALIZATION FOR AUTONOMOUS VEHICLES	4288
<i>Su Pang ; Daniel Kent ; Daniel Morris ; Hayder Radha</i>	
AUDIO-VISUAL SENSING FROM A QUADCOPTER: DATASET AND BASELINES FOR SOURCE LOCALIZATION AND SOUND ENHANCEMENT	4296
<i>Lin Wang ; Ricardo Sanchez-Matilla ; Andrea Cavallaro</i>	
BELIEF-DRIVEN CONTROL POLICY OF A DRONE WITH MICROPHONES FOR MULTIPLE SOUND SOURCE SEARCH	4302
<i>Kenshiro Yamada ; Makoto Kumon ; Tomonari Furukawa</i>	
MAKING SENSE OF AUDIO VIBRATION FOR LIQUID HEIGHT ESTIMATION IN ROBOTIC POURING	4309
<i>Hongzhuo Liang ; Shuang Li ; Xiaojian Ma ; Norman Hendrich ; Timo Gerkmann ; Fuchun Sun ; Jianwei Zhang</i>	
ENVIRONMENTAL SOUND SEGMENTATION UTILIZING MASK U-NET	4316
<i>Yui Sudo ; Katsutoshi Itoyama ; Kenji Nishida ; Kazuhiro Nakadai</i>	

CAN A ROBOT HEAR THE SHAPE AND DIMENSIONS OF A ROOM?	4322
<i>Linh Nguyen ; Jaime Valls Miro ; Xiaojun Qiu</i>	
FAST AND ROBUST 3-D SOUND SOURCE LOCALIZATION WITH DSVD-PHAT	4328
<i>François Grondin ; James Glass</i>	
ACCELERATED VISUAL INERTIAL NAVIGATION VIA FRAGMENTED STRUCTURE UPDATES	4334
<i>Yehonathan Litman ; Ya Wang ; Ji Liu</i>	
LONG-TERM VISUAL INERTIAL SLAM BASED ON TIME SERIES MAP PREDICTION	4340
<i>Bowen Song ; Weidong Chen ; Jingchuan Wang ; Hesheng Wang</i>	
DATA FLOW ORB-SLAM FOR REAL-TIME PERFORMANCE ON EMBEDDED GPU BOARDS	4346
<i>Stefano Aldegheri ; Nicola Bombieri ; Domenico D. Bloisi ; Alessandro Farinelli</i>	
A ROBUST STEREO SEMI-DIRECT SLAM SYSTEM BASED ON HYBRID PYRAMID	4352
<i>Xiangrui Zhao ; Renjie Zheng ; Wenlong Ye ; Yong Liu</i>	
OUTLIER-ROBUST SPATIAL PERCEPTION: HARDNESS, GENERAL-PURPOSE ALGORITHMS, AND GUARANTEES	4359
<i>Vasileios Tzoumas ; Pasquale Antonante ; Luca Carlone</i>	
VISUAL-INERTIAL ODOMETRY TIGHTLY COUPLED WITH WHEEL ENCODER ADOPTING ROBUST INITIALIZATION AND ONLINE EXTRINSIC CALIBRATION	4367
<i>Jinxu Liu ; Wei Gao ; Zhanyi Hu</i>	
HAPTIC GUIDANCE FOR ROBOT-ASSISTED ENDOVASCULAR PROCEDURES: IMPLEMENTATION AND EVALUATION ON SURGICAL SIMULATOR	4374
<i>M. B. Molinero ; G. Dagnino ; J. Liu ; W. Chi ; M. E. M. K. Abdelaziz ; T. M. Y. Kwok ; C. Riga ; G. Z. Yang</i>	
ROBOTIC ULTRASOUND FOR CATHETER NAVIGATION IN ENDOVASCULAR PROCEDURES	4380
<i>Fernanda Langsch ; Salvatore Virga ; Javier Esteban ; Rüdiger Göbl ; Nassir Navab</i>	
TOWARD A VERSATILE ROBOTIC PLATFORM FOR FLUOROSCOPY AND MRI-GUIDED ENDOVASCULAR INTERVENTIONS: A PRE-CLINICAL STUDY	4387
<i>Mohamed E. M. K. Abdelaziz ; Dennis Kundrat ; Marco Pupillo ; Giulio Dagnino ; Trevor M. Y. Kwok ; Wenqiang Chi ; Vincent Groenhuis ; Françoise J. Siepel ; Celia Riga ; Stefano Stramigioli ; Guang-Zhong Yang</i>	
RECONSTRUCTING ENDOVASCULAR CATHETER INTERACTION FORCES IN 3D USING MULTICORE OPTICAL SHAPE SENSORS	4395
<i>Christoff M. Heunis ; Vincenza Belfiore ; Marilena Vendittelli ; Sarthak Misra</i>	
HUMAN-ROBOT VISUAL INTERFACE FOR 3D STEERING OF A FLEXIBLE, BIOINSPIRED NEEDLE FOR NEUROSURGERY	4402
<i>Eloise Matheson ; Riccardo Secoli ; Stefano Galvan ; Ferdinando Rodriguez Y Baena</i>	
MAGNETIC NEEDLE STEERING MODEL IDENTIFICATION USING EXPECTATION-MAXIMIZATION	4408
<i>Richard L. Pratt ; Andrew J. Petruska</i>	
LOOK FURTHER TO RECOGNIZE BETTER: LEARNING SHARED TOPICS AND CATEGORY-SPECIFIC DICTIONARIES FOR OPEN-ENDED 3D OBJECT RECOGNITION	4414
<i>S. Hamidreza Kasaei</i>	
FAST PERCEPTION, PLANNING, AND EXECUTION FOR A ROBOTIC BUTLER: WHEELED HUMANOID M-HUBO	4420
<i>Moonyoung Lee ; Yujin Heo ; Jinyong Park ; Hyun-Dae Yang ; Ho-Deok Jang ; Philipp Benz ; Hyunsub Park ; In So Kweon ; Jun-Ho Oh</i>	
CONTINUOUS MODELING OF AFFORDANCES IN A SYMBOLIC KNOWLEDGE BASE	4428
<i>Asil Kaan Bozcuoglu ; Yuki Furuta ; Kei Okada ; Michael Beetz ; Masayuki Inaba</i>	
TOWARDS JUMPING LOCOMOTION FOR QUADRUPED ROBOTS ON THE MOON	4435
<i>Hendrik Kolvenbach ; Elias Hampp ; Patrick Barton ; Radek Zenkl ; Marco Hutter</i>	
NEURAL CONTROL WITH AN ARTIFICIAL HORMONE SYSTEM FOR ENERGY-EFFICIENT COMPLIANT TERRAIN LOCOMOTION AND ADAPTATION OF WALKING ROBOTS	4443
<i>Jettanan Homchanthanakul ; Potiwat Ngamkajornwiwat ; Pitiwut Teerakittikul ; Poramate Manoonpong</i>	
ANKLE TORQUE DURING MID-STANCE DOES NOT LOWER ENERGY REQUIREMENTS OF STEADY GAITS	4451
<i>Mike Hector ; Kevin Green ; Burak Sencer ; Jonathan Hurst</i>	
FIRST STEPS TOWARDS FULL MODEL BASED MOTION PLANNING AND CONTROL OF QUADRUPEDS: A HYBRID ZERO DYNAMICS APPROACH	4458
<i>Wen-Loong Ma ; Kaveh Akbari Hamed ; Aaron D. Ames</i>	
A DENSITY MAP ESTIMATION MODEL WITH DROPBLOCK REGULARIZATION FOR CLUSTERED-FRUIT COUNTING	4464
<i>Xiaochun Mai ; Xiao Jia ; Xiaoling Deng ; Max Q.-H. Meng</i>	

DESIGN, MODELLING AND CONTROL OF A NOVEL AGRICULTURAL ROBOT WITH INTERLOCK DRIVE SYSTEM.....	4472
<i>David Reiser ; Volker Nannen ; Gero Hubel ; Hans W. Griepentrog</i>	
FLOWER INTERACTION SUBSYSTEM FOR A PRECISION POLLINATION ROBOT.....	4478
<i>Jared Strader ; Jennifer Nguyen ; Christopher Tatsch ; Yixin Du ; Kyle Lassak ; Benjamin Buzzo ; Ryan Watson ; Henry Cerbone ; Nicholas Ohi ; Chizhao Yang ; Yu Gu</i>	
AUTOMATED BOXWOOD TOPIARY TRIMMING WITH A ROBOTIC ARM AND INTEGRATED STEREO VISION.....	4486
<i>Dejan Kaljaca ; Nikolaus Mayer ; Bastiaan Vroegindeweij ; Angelo Mencarelli ; Eldert Van Henten ; Thomas Brox</i>	
DUAL-ARM ASSEMBLY PLANNING CONSIDERING GRAVITATIONAL CONSTRAINTS.....	4494
<i>Ryota Moriyama ; Weiwei Wan ; Kensuke Harada</i>	
CONTEXT-DEPENDENT SEARCH FOR GENERATING PATHS FOR REDUNDANT MANIPULATORS IN CLUTTERED ENVIRONMENTS.....	4501
<i>Pradeep Rajendran ; Shantanu Thakar ; Ariyan M. Kabir ; Brual C. Shah ; Satyandra K. Gupta</i>	
REPRESENTING ROBOT TASK PLANS AS ROBUST LOGICAL-DYNAMICAL SYSTEMS.....	4508
<i>Chris Paxton ; Nathan Ratliff ; Clemens Eppner ; Dieter Fox</i>	
MANIPULATION MOTION TAXONOMY AND CODING FOR ROBOTS.....	4516
<i>David Paulius ; Yongqiang Huang ; Jason Meloncon ; Yu Sun</i>	
A PASSIVE CLOSING, TENDON DRIVEN, ADAPTIVE ROBOT HAND FOR ULTRA-FAST, AERIAL GRASPING AND PERCHING.....	4522
<i>Andrew McLaren ; Zak Fitzgerald ; Geng Gao ; Minas Liarokapis</i>	
DESIGN OF A 3-DOF LINKAGE-DRIVEN UNDERACTUATED FINGER FOR MULTIPLE GRASPING.....	4528
<i>Long Kang ; Jong-Tae Seo ; Dukchan Yoon ; Sang-Hwa Kim ; Il Hong Suh ; Byung-Ju Yi</i>	
PAPER-BASED MODULAR ORIGAMI GRIPPER.....	4534
<i>Ratchatida Phummapooti ; Natthanicha Jamroonpan ; Pongsakorn Polchankajorn ; Eakkachai Pengwang ; Thavida Maneewarn</i>	
DESIGN OF A NOVEL GRIPPER SYSTEM WITH 3D- AND INKJET-PRINTED MULTIMODAL SENSORS FOR AUTOMATED GRASPING OF A FORESTRY ROBOT.....	4540
<i>Lisa-Marie Faller ; Christian Stetco ; Hubert Zangl</i>	
EMPLOYING WHOLE-BODY CONTROL IN ASSISTIVE ROBOTICS.....	4548
<i>Maged Iskandar ; Gabriel Quere ; Annette Hagengruber ; Alexander Dietrich ; Jörn Vogel</i>	
STUDY ON STUMBLES OF THE ELDERLY FROM A DEPTH PERCEPTION DEPENDENCY TEST.....	4556
<i>Emiko Uchiyama ; Toshihiro Mino ; Hiroki Obara ; Tomoki Tanaka ; Wataru Takano ; Yoshihiko Nakamura ; Katsuya Iijima</i>	
ENERGY-BASED ADAPTIVE CONTROL AND LEARNING FOR PATIENT-AWARE REHABILITATION.....	4562
<i>Erfan Shahriari ; Dinmukhamed Zardykhan ; Alexander Koenig ; Elisabeth Jensen ; Sami Haddadin</i>	
MODELING, SIMULATION AND EXPERIMENTAL VALIDATION OF A TENDON-DRIVEN SOFT-ARM ROBOT CONFIGURATION - A CONTINUUM MECHANICS METHOD.....	4570
<i>Nikolaos Charalampous Chairopoulos ; Panagiotis Vartholomeos ; Evangelos Papadopoulos</i>	
MODEL SIMPLIFICATION FOR DYNAMIC CONTROL OF SERIES-PARALLEL HYBRID ROBOTS - A REPRESENTATIVE STUDY ON THE EFFECTS OF NEGLECTED DYNAMICS SHIVESH.....	4576
<i>Shivesh Kumar ; Julius Martensen ; Andreas Mueller ; Frank Kirchner</i>	
DESIGN AND COMPARATIVE ANALYSIS OF 1D HOPPING ROBOTS.....	4584
<i>Eric Ambrose ; Noel Csomay-Shanklin ; Yizhar Or ; Aaron Ames</i>	
DETECTING LAYERED STRUCTURES OF PARTIALLY OCCLUDED OBJECTS FOR BIN PICKING.....	4592
<i>Yusuke Inagaki ; Ryosuke Araki ; Takayoshi Yamashita ; Hironobu Fujiyoshi</i>	
QUICKLY INSERTING PEGS INTO UNCERTAIN HOLES USING MULTI-VIEW IMAGES AND DEEP NETWORK TRAINED ON SYNTHETIC DATA.....	4598
<i>Joshua C. Triyonoputro ; Weiwei Wan ; Kensuke Harada</i>	
INCHWORM-INSPIRED SOFT CLIMBING ROBOT USING MICROSPINE ARRAYS.....	4606
<i>Qiqiang Hu ; Erbao Dong ; Gang Cheng ; Hu Jin ; Jie Yang ; Dong Sun</i>	
A PARALLEL GRIPPER WITH A UNIVERSAL FINGERTIP DEVICE USING OPTICAL SENSING AND JAMMING TRANSITION FOR MAINTAINING STABLE GRASPS.....	4612
<i>Tatsuya Sakuma ; Elaine Phillips ; Gustavo Alfonso Garcia Ricardez ; Ming Ding ; Jun Takamatsu ; Tsukasa Ogasawara</i>	

RAPID DESIGN OF MECHANICAL LOGIC BASED ON QUASI-STATIC ELECTROMECHANICAL MODELING	4618
<i>Wenzhong Yan ; Yunchen Yu ; Ankur Mehta</i>	
DESIGN AND CHARACTERIZATION OF A FULLY AUTONOMOUS UNDER-ACTUATED SOFT BATOID-LIKE ROBOT.....	4624
<i>T. V. Truong ; V. K. Viswanathan ; V. S. Joseph ; P. Valdivia Y Alvarado</i>	
AUTONOMOUS LANDING ON PIPES USING SOFT GRIPPER FOR INSPECTION AND MAINTENANCE IN OUTDOOR ENVIRONMENTS	4630
<i>P. Ramon-Soria ; A. E. Gomez-Tamm ; F. J. Garcia-Rubiales ; B. C. Arrue ; A. Ollero</i>	
LIC-FUSION: LIDAR-INERTIAL-CAMERA ODOMETRY	4638
<i>Xingxing Zuo ; Patrick Geneva ; Woosik Lee ; Yong Liu ; Guoquan Huang</i>	
3D POINT CLOUD DATA ACQUISITION USING A SYNCHRONIZED IN-AIR IMAGING SONAR SENSOR NETWORK	4645
<i>Robin Kerstens ; Dennis Laurijssen ; Girmi Schouten ; Jan Steckel</i>	
TRANSFERABLE TRIAL-MINIMIZING PROGRESSIVE PEG-IN-HOLE MODEL	4652
<i>Junfeng Ding ; Chen Wang ; Cewu Lu</i>	
END-TO-END SENSORIMOTOR CONTROL PROBLEMS OF AUVS WITH DEEP REINFORCEMENT LEARNING	4659
<i>Hui Wu ; Shiji Song ; Yachu Hsu ; Keyou You ; Cheng Wu</i>	
PRECISION POURING INTO UNKNOWN CONTAINERS BY SERVICE ROBOTS	4665
<i>Chenyu Dong ; Masaru Takizawa ; Shunsuke Kudoh ; Takashi Suehiro</i>	
RESOLVING ELEVATION AMBIGUITY IN 1-D RADAR ARRAY MEASUREMENTS USING DEEP LEARNING	4673
<i>Jayakrishnan Unnikrishnan ; Urs Niesen</i>	
DOUBLE REFINEMENT NETWORK FOR EFFICIENT MONOCULAR DEPTH ESTIMATION.....	4679
<i>Nikita Durasov ; Mikhail Romanov ; Valeriya Bubnova ; Pavel Bogomolov ; Anton Konushin</i>	
3D LIDAR AND STEREO FUSION USING STEREO MATCHING NETWORK WITH CONDITIONAL COST VOLUME NORMALIZATION.....	4685
<i>Tsun-Hsuan Wang ; Hou-Ning Hu ; Chieh Hubert Lin ; Yi-Hsuan Tsai ; Wei-Chen Chiu ; Min Sun</i>	
GENERATE WHAT YOU CAN'T SEE - A VIEW-DEPENDENT IMAGE GENERATION	4693
<i>Karol Piaskowski ; Rafal Staszak ; Dominik Belter</i>	
DLD: A DEEP LEARNING BASED LINE DESCRIPTOR FOR LINE FEATURE MATCHING.....	4700
<i>Manuel Lange ; Fabian Schweinfurth ; Andreas Schilling</i>	
ADAPTIVE ADVERSARIAL VIDEOS ON ROADSIDE BILLBOARDS: DYNAMICALLY MODIFYING TRAJECTORIES OF AUTONOMOUS VEHICLES	4706
<i>Naman Patel ; Prashanth Krishnamurthy ; Siddharth Garg ; Farshad Khorrani</i>	
SPECIFYING AND SYNTHESIZING HUMAN-ROBOT HANDOVERS.....	4712
<i>Alap Kshirsagar ; Hadas Kress-Gazit ; Guy Hoffman</i>	
UNDERACTUATED GRIPPER WITH FOREARM ROLL ESTIMATION FOR HUMAN LIMBS MANIPULATION IN RESCUE ROBOTICS.....	4719
<i>Juan M. Gandarias ; Francisco Pastor ; Antonio J. Muñoz-Ramírez ; Alfonso J. García-Cerezo ; Jesús M. Gómez-De-Gabriel</i>	
AN EXPERIMENTAL STUDY OF PARAMETERS INFLUENCING PHYSICAL HUMAN-ROBOT NEGOTIATION IN COMANIPULATIVE TRACKING TASK.....	4725
<i>Lucas Roche ; Anish Monachan ; Ludovic Saint-Bauzel</i>	
PREDICTION OF HUMAN ARM TARGET FOR ROBOT REACHING MOVEMENTS	4732
<i>Chiara Talignani Landi ; Yujiao Cheng ; Federica Ferraguti ; Marcello Bonfè ; Cristian Secchi ; Masayoshi Tomizuka</i>	
HUMAN INTENTION INFERENCE AND ON-LINE HUMAN HAND MOTION PREDICTION FOR HUMAN-ROBOT COLLABORATION	4740
<i>Ren. C Luo ; Licong Mai</i>	
EFFECT OF VIBRATION ON TWISTED STRING ACTUATION THROUGH CONDUIT AT HIGH BENDING ANGLES	4747
<i>Donghyee Lee ; Igor Gaponov ; Jee-Hwan Ryu</i>	
IMPROVED MECHANICAL DESIGN AND SIMPLIFIED MOTION PLANNING OF HYBRID ACTIVE AND PASSIVE CABLE-DRIVEN SEGMENTED MANIPULATOR WITH COUPLED MOTION.....	4753
<i>Tianliang Liu ; Zonggao Mu ; Wenfu Xu ; Taiwei Yang ; Kailing You ; Haiming Fu ; Yangmin Li</i>	
A COMPARISON OF ACTION SPACES FOR LEARNING MANIPULATION TASKS	4759
<i>Patrick Varin ; Lev Grossman ; Scott Kuindersma</i>	
GLOBAL VISION-BASED IMPEDANCE CONTROL FOR ROBOTIC WALL POLISHING.....	4766
<i>Yang Zhou ; Xiang Li ; Linzhu Yue ; Linhai Gui ; Guangli Sun ; Xin Jiang ; Yun-Hui Liu</i>	

ONLINE OPTIMAL IMPEDANCE PLANNING FOR LEGGED ROBOTS	4772
<i>Franco Angelini ; Guiyang Xin ; Wouter J. Wolfslag ; Carlo Tiseo ; Michael Mistry ; Manolo Garabini ; Antonio Bicchi ; Sethu Vijayakumar</i>	
ROBUST, COMPLIANT ASSEMBLY WITH ELASTIC PARTS AND MODEL UNCERTAINTY	4780
<i>Florian Wirthshofer ; Philipp S. Schmitt ; Philine Meister ; Georg V. Wichert ; Wolfram Burgard</i>	
AN INTERACTIVE INDOOR DRONE ASSISTANT	4788
<i>Tino Fuhrman ; David Schneider ; Felix Altenberg ; Tung Nguyen ; Simon Blasen ; Stefan Constantin ; Alex Waibe</i>	
DEVELOPMENT OF MICRO ULTRASONIC ACTUATOR AND MICRO ROTOR BLADE FOR MICRO AERIAL VEHICLE	4794
<i>Eric Tan Kai Chiang ; Tomoaki Mashimo</i>	
COOPERATIVE AUDIO-VISUAL SYSTEM FOR LOCALIZING SMALL AERIAL ROBOTS	4800
<i>Jose Rosa ; Meysam Basiri</i>	
DESIGN AND TAKE-OFF FLIGHT OF A SAMARA-INSPIRED REVOLVING-WING ROBOT	4806
<i>Songnan Bai ; Pakpong Chirarattananon</i>	
THE “SMELLICOPTER,” A BIO-HYBRID ODOR LOCALIZING NANO AIR VEHICLE	4813
<i>Melanie J. Anderson ; Joseph G. Sullivan ; Jennifer L. Talley ; Kevin M. Brink ; Sawyer B. Fuller ; Thomas L. Daniel</i>	
SELF-SUPERVISED 3D SHAPE AND VIEWPOINT ESTIMATION FROM SINGLE IMAGES FOR ROBOTICS	4819
<i>Oier Mees ; Maxim Tatarchenko ; Thomas Brox ; Wolfram Burgard</i>	
INFERRING DISTRIBUTIONS OVER DEPTH FROM A SINGLE IMAGE	4826
<i>Gengshan Yang ; Peiyun Hu ; Deva Ramanan</i>	
THE RGB-D TRIATHLON: TOWARDS AGILE VISUAL TOOLBOXES FOR ROBOTS	4833
<i>Fabio Cermelli ; Massimiliano Mancini ; Elisa Ricci ; Barbara Caputo</i>	
EV-IMO: MOTION SEGMENTATION DATASET AND LEARNING PIPELINE FOR EVENT CAMERAS	4841
<i>Anton Mitrokhin ; Chengxi Ye ; Cornelia Fermüller ; Yiannis Aloimonos ; Tobi Delbruck</i>	
AN OBJECT ATTRIBUTE GUIDED FRAMEWORK FOR ROBOT LEARNING MANIPULATIONS FROM HUMAN DEMONSTRATION VIDEOS	4849
<i>Qixiang Zhang ; Junhong Chen ; Dayong Liang ; Huaping Liu ; Xiaojing Zhou ; Zihan Ye ; Wenyin Liu</i>	
LEARNING FROM DEMONSTRATION BASED ON A MECHANISM TO UTILIZE AN OBJECT’S INVISIBILITY	4856
<i>Kotaro Nagahama ; Kimitoshi Yamazaki</i>	
SHARING IS CARING: SOCIALLY-COMPLIANT AUTONOMOUS INTERSECTION NEGOTIATION	4864
<i>Noam Buckman ; Alyssa Pierson ; Wilko Schwarting ; Sertac Karaman ; Daniela Rus</i>	
TWO-VIEW FUSION BASED CONVOLUTIONAL NEURAL NETWORK FOR URBAN ROAD DETECTION	4872
<i>Shuo Gu ; Yigong Zhang ; Jian Yang ; Jose M. Alvarez ; Hui Kong</i>	
CONDITIONAL GENERATIVE NEURAL SYSTEM FOR PROBABILISTIC TRAJECTORY PREDICTION	4878
<i>Jiachen Li ; Hengbo Ma ; Masayoshi Tomizuka</i>	
SEMANTIC MATES: INTUITIVE GEOMETRIC CONSTRAINTS FOR EFFICIENT ASSEMBLY SPECIFICATIONS	4885
<i>Fabian Wildgrube ; Alexander Perzylo ; Markus Rickert ; Alois Knoll</i>	
A BEHAVIOR TREE COGNITIVE ASSISTANT SYSTEM FOR EMERGENCY MEDICAL SERVICES	4893
<i>Sile Shu ; Sarah Preum ; Haydon M. Pitchford ; Ronald D. Williams ; John Stankovic ; Homa Alemzadeh</i>	
ENABLING HUMAN-LIKE TASK IDENTIFICATION FROM NATURAL CONVERSATION	4901
<i>Pradip Pramanick ; Chayan Sarkar ; P Balamuralidhar ; Ajay Kattepur ; Indrajit Bhattacharya ; Arpan Pal</i>	
TORSO-MOUNTED VIBROTACTILE INTERFACE TO EXPERIMENTALLY INDUCE ILLUSORY OWN-BODY PERCEPTIONS	4909
<i>Atena Fadaei Jouybari ; Giulio Rognini ; Masayuki Hara ; Hannes Bleuler ; Olaf Blanke</i>	
GAZE-BASED INTENTION ANTICIPATION OVER DRIVING MANOEUVRES IN SEMI-AUTONOMOUS VEHICLES	4915
<i>Min Wu ; Tyron Louw ; Morteza Lahijanian ; Wenjie Ruan ; Xiaowei Huang ; Natasha Merat ; Marta Kwiatkowska</i>	
A PROBABILISTIC APPROACH TO HUMAN-ROBOT COMMUNICATION	4922
<i>Elizabeth Cha ; Emily Meschke ; Terrence Fong ; Maja J Mataric</i>	
FA-HARRIS: A FAST AND ASYNCHRONOUS CORNER DETECTOR FOR EVENT CAMERAS	4928
<i>Ruoxiang Li ; Dianxi Shi ; Yongjun Zhang ; Kaiyue Li ; Ruihao Li</i>	

RAPID AND ROBUST MONOCULAR VISUAL-INERTIAL INITIALIZATION WITH GRAVITY ESTIMATION VIA VERTICAL EDGES	4935
<i>Jinyu Li ; Hujun Bao ; Guofeng Zhang</i>	
A UNIFIED FORMULATION FOR VISUAL ODOMETRY	4942
<i>Georges Younes ; Daniel Asmar ; John Zelek</i>	
AN EFFICIENT AND ACCURATE ALGORITHM FOR THE PERSPECTIVE-N-POINT PROBLEM	4950
<i>Lipu Zhou ; Michael Kaess</i>	
ORBSLAM-ATLAS: A ROBUST AND ACCURATE MULTI-MAP SYSTEM	4958
<i>Richard Elvira ; Juan D. Tardós ; J. M. M. Montiel</i>	
AN ASYNCHRONOUS MULTI-BODY SIMULATION FRAMEWORK FOR REAL-TIME DYNAMICS, HAPTICS AND LEARNING WITH APPLICATION TO SURGICAL ROBOTS	4965
<i>Adnan Munawar ; Gregory S. Fischer</i>	
PNS: A PERSPECTIVE-N-SPHERES ALGORITHM FOR LAPAROSCOPE CALIBRATION IN MINIMALLY INVASIVE SURGERY	4973
<i>Mario Aricò ; Guillaume Morel</i>	
TOWARDS A GENERIC IN VIVO IN SITU CAMERA LENS CLEANING MODULE FOR LAPAROSCOPIC SURGERY	4979
<i>Xiaolong Liu ; Hui Liu ; Jindong Tan</i>	
3D PRINTED SINGLE INCISION LAPAROSCOPIC MANIPULATOR SYSTEM ADAPTED TO THE REQUIRED FORCES IN LAPAROSCOPIC SURGERY	4985
<i>Sandra V. Brecht ; Matthias Stock ; Jens-Uwe Stolzenburg ; Tim C. Lueth</i>	
ON THE EFFECT OF SEMIELLIPTICAL FOOT SHAPE ON THE ENERGETIC EFFICIENCY OF PASSIVE BIPEDAL GAIT	4991
<i>Aikaterini Smyrli ; Mehdi Ghiassi ; Andrés Kecskeméthy ; Evangelos Papadopoulos</i>	
IMPLEMENTING REGULARIZED PREDICTIVE CONTROL FOR SIMULTANEOUS REAL-TIME FOOTSTEP AND GROUND REACTION FORCE OPTIMIZATION	4997
<i>Gerardo Bledt ; Sangbae Kim</i>	
MOVING ONTO HIGH STEPS FOR A FOUR-LIMBED ROBOT WITH TORSO CONTACT	5005
<i>T. Matsuzawa ; T. Matsubara ; K. Namura ; X. Sun ; A. Imai ; M. Ohkawara ; S. Kimura ; K. Kumagai ; K. Yamaguchi ; H. Naito ; T. Sato ; K. Terae ; M. Murakami ; S. Yoshida ; A. Takamishi ; K. Hashimoto</i>	
ROBOT: AN AUTONOMOUS SURFACE VEHICLE FOR URBAN WATERWAYS	5013
<i>Wei Wang ; Banti Gheneti ; Luis A. Mateos ; Fabio Duarte ; Carlo Ratti ; Daniela Rus</i>	
CONTROL AND PERCEPTION FRAMEWORK FOR DEEP SEA MINING EXPLORATION	5021
<i>Carlotta Sartore ; Ricard Campos ; Josep Quintana ; Enrico Simetti ; Rafael Garcia ; Giuseppe Casalino</i>	
ONLINE PLANNING FOR AUTONOMOUS UNDERWATER VEHICLES PERFORMING INFORMATION GATHERING TASKS IN LARGE SUBSEA ENVIRONMENTS	5027
<i>Harun Yetkin ; James McMahon ; Nicholas Topin ; Artur Wolek ; Zachary Waters ; Daniel J. Stilwell</i>	
PERFORMANCE GUARANTEES FOR RECEDING HORIZON SEARCH WITH TERMINAL COST	5035
<i>Benjamin Biggs ; Daniel J. Stilwell ; Harun Yetkin ; James McMahon</i>	
TOWARDS AUTONOMOUS INDUSTRIAL-SCALE BATHYMETRIC SURVEYING	5042
<i>Ignacio Torroba ; Nils Bore ; John Folkesson</i>	
REACTIVE INTERACTION THROUGH BODY MOTION AND THE PHASE-STATE-MACHINE	5048
<i>Raphael Deimel</i>	
ANALYSIS AND EXPLOITATION OF SYNCHRONIZED PARALLEL EXECUTIONS IN BEHAVIOR TREES	5056
<i>Michele Colledanchise ; Lorenzo Natale</i>	
A BEHAVIOR DRIVEN APPROACH FOR SAMPLING RARE EVENT SITUATIONS FOR AUTONOMOUS VEHICLES	5064
<i>Atrisha Sarkar ; Krzysztof Czamecki</i>	
CONSTRUCTING A HIGHLY INTERACTIVE VEHICLE MOTION DATASET	5072
<i>Wei Zhan ; Liting Sun ; Di Wang ; Yinghan Jin ; Masayoshi Tomizuka</i>	
INTRODUCING A SCALABLE AND MODULAR CONTROL FRAMEWORK FOR LOW-COST MONOCULAR ROBOTS IN HAZARDOUS ENVIRONMENTS	5078
<i>Hazel M. Taylor ; Christian Dondrup ; Katrin S. Lohan</i>	
TASK-ORIENTED GRASPING IN OBJECT STACKING SCENES WITH CRF-BASED SEMANTIC MODEL	5084
<i>Chenjie Yang ; Xuguang Lan ; Hanbo Zhang ; Nanning Zheng</i>	
A MULTI-TASK CONVOLUTIONAL NEURAL NETWORK FOR AUTONOMOUS ROBOTIC GRASPING IN OBJECT STACKING SCENES	5092
<i>Hanbo Zhang ; Xuguang Lan ; Site Bai ; Lipeng Wan ; Chenjie Yang ; Nanning Zheng</i>	

OCCLUSION-ROBUST DEFORMABLE OBJECT TRACKING WITHOUT PHYSICS SIMULATION	5100
<i>Cheng Chi ; Dmitry Berenson</i>	
CURVED-VOXEL CLUSTERING FOR ACCURATE SEGMENTATION OF 3D LIDAR POINT CLOUDS WITH REAL-TIME PERFORMANCE	5108
<i>Seungcheol Park ; Shuyu Wang ; Hunjung Lim ; U Kang</i>	
CABLE-DRIVEN 4-DOF UPPER LIMB REHABILITATION ROBOT	5114
<i>Ke Shi ; Aiguo Song ; Ye Li ; Dapeng Chen ; Huijun Li</i>	
APPLYING THE INTERACTION OF WALKING-EMOTION TO AN ASSISTIVE DEVICE FOR REHABILITATION AND EXERCISE	5122
<i>Jyun Rong Zhuang ; Guan Yu Wu ; Hee Hyol Lee ; Eiichiro Tanaka</i>	
UPPER LIMB MOTION SIMULATION ALGORITHM FOR PROSTHESIS PRESCRIPTION AND TRAINING	5128
<i>Dimitrios Menychtas ; Stephanie L. Carey ; Redwan Alqasemi ; Rajiv V. Dubey</i>	
MULTI-ROBOT ASSEMBLY SEQUENCING VIA DISCRETE OPTIMIZATION	5135
<i>Preston Culbertson ; Saptarshi Bandyopadhyay ; Mac Schwager</i>	
IGNORANCE IS NOT BLISS: AN ANALYSIS OF CENTRAL-PLACE FORAGING ALGORITHMS	5143
<i>Abhinav Aggarwal ; Diksha Gupta ; William F. Vining ; G. Matthew Fricke ; Melanie E. Moses</i>	
RESILIENCE BY RECONFIGURATION: EXPLOITING HETEROGENEITY IN ROBOT TEAMS	5151
<i>Ragesh K. Ramachandran ; James A. Preiss ; Gaurav S. Sukhatme</i>	
CENTRALIZED CONTROL ARCHITECTURE FOR COOPERATIVE OBJECT TRANSPORTATION USING MULTIPLE OMNIDIRECTIONAL AGVS	5159
<i>Firhan Huzaeifa ; Yen-Chen Liu</i>	
RANGE-LIMITED, DISTRIBUTED ALGORITHMS ON HIGHER-ORDER VORONOI PARTITIONS IN MULTI-ROBOT SYSTEMS	5166
<i>Lingxuan Kong ; Qingchen Liu ; Changbin Brad Yu</i>	
CRITERIA FOR MAINTAINING DESIRED CONTACTS FOR QUASI-STATIC SYSTEMS	5172
<i>Yifan Hou ; Matthew T. Mason</i>	
LEARNING PHYSICS-BASED MANIPULATION IN CLUTTER: COMBINING IMAGE-BASED GENERALIZATION AND LOOK-AHEAD PLANNING	5179
<i>Wissam Bejjani ; Mehmet R. Dogar ; Matteo Leonetti</i>	
HOMOGRAPHY-BASED DEEP VISUAL SERVOING METHODS FOR PLANAR GRASPS	5187
<i>Austin S. Wang ; Wuming Zhang ; Daniel Troniak ; Jacky Liang ; Oliver Kroemer</i>	
OBJECT REARRANGEMENT WITH NESTED NONPREHENSILE MANIPULATION ACTIONS	5195
<i>Changkyu Song ; Abdeslam Boularias</i>	
ROBUST DEFORMATION MODEL APPROXIMATION FOR ROBOTIC CABLE MANIPULATION	5203
<i>Shiyu Jin ; Changhao Wang ; Masayoshi Tomizuka</i>	
LOCAL ONLINE MOTOR BABBLING: LEARNING MOTOR ABUNDANCE OF A MUSCULOSKELETAL ROBOT ARM	5211
<i>Zinan Liu ; Arne Hitzmann ; Shuhei Ikemoto ; Svenja Stark ; Jan Peters ; Koh Hosoda</i>	
ITERATIVE LEARNING CONTROL FOR FAST AND ACCURATE POSITION TRACKING WITH AN ARTICULATED SOFT ROBOTIC ARM	5219
<i>Matthias Hofer ; Lukas Spannagl ; Raffaello D'Andrea</i>	
COUPLING DISTURBANCE COMPENSATED MIMO CONTROL OF PARALLEL ANKLE REHABILITATION ROBOT ACTUATED BY PNEUMATIC MUSCLES	5225
<i>Jie Zuo ; Wei Meng ; Quan Liu ; Qingsong Ai ; Sheng Q. Xie ; Zude Zhou</i>	
PROPOSAL OF A PERISTALTIC MOTION TYPE DUCT CLEANING ROBOT FOR TRAVELING IN A FLEXIBLE PIPE	5231
<i>F. Ito ; T. Kawaguchi ; M. Kamata ; Y. Yamada ; T. Nakamura</i>	
DYNAMIC CONTROL OF SOFT ROBOTS WITH INTERNAL CONSTRAINTS IN THE PRESENCE OF OBSTACLES	5239
<i>Cosimo Della Santina ; Antonio Bicchi ; Daniela Rus</i>	
CLOSED-FORM EQUATIONS AND EXPERIMENTAL VERIFICATION FOR SOFT ROBOT ARM BASED ON COSSERAT THEORY	5247
<i>Lizhou Niu ; Liang Ding ; Haibo Gao ; Yang Su ; Zongquan Deng ; Zhen Liu</i>	
ROBUST HIGH ACCURACY VISUAL-INERTIAL-LASER SLAM SYSTEM	5253
<i>Zengyuan Wang ; Jianhua Zhang ; Shengyong Chen ; Conger Yuan ; Jingqian Zhang ; Jianwei Zhang</i>	
COVARIANCE PRE-INTEGRATION FOR DELAYED MEASUREMENTS IN MULTI-SENSOR FUSION	5259
<i>Eren Allak ; Roland Jung ; Stephan Weiss</i>	

NON-PARAMETRIC MIXED-MANIFOLD PRODUCTS USING MULTISCALE KERNEL DENSITIES	5267
<i>Dehann Fourie ; Pedro Vaz Teixeira ; John Leonard</i>	
PERCEPTION SYSTEM DESIGN FOR LOW-COST COMMERCIAL GROUND ROBOTS: SENSOR CONFIGURATIONS, CALIBRATION, LOCALIZATION AND MAPPING	5274
<i>Yiming Chen ; Mingming Zhang ; Dongsheng Hong ; Chengcheng Deng ; Mingyang Li</i>	
DEEP SENSOR FUSION FOR REAL-TIME ODOMETRY ESTIMATION	5282
<i>Michelle Valente ; Cyril Joly ; Anaud De La Fortelle</i>	
ANGLE OF ARRIVAL ESTIMATION BASED ON CHANNEL IMPULSE RESPONSE MEASUREMENTS	5289
<i>Anton Ledergerber ; Michael Hamer ; Raffaello D'Andrea</i>	
STATE REPRESENTATION LEARNING WITH ROBOTIC PRIORS FOR PARTIALLY OBSERVABLE ENVIRONMENTS	5296
<i>Marco Morik ; Divyam Rastogi ; Rico Jonschkowski ; Oliver Brock</i>	
ONE-SHOT OBJECT LOCALIZATION USING LEARNED VISUAL CUES VIA SIAMESE NETWORKS	5303
<i>Sagar Gubbi Venkatesh ; Bharadwaj Amrutur</i>	
DEEP LEARNING-BASED MUTUAL DETECTION AND COLLABORATIVE LOCALIZATION FOR MOBILE ROBOT FLEETS USING SOLELY 2D LIDAR SENSORS	5309
<i>Robin Dietrich ; Stefan Dörr</i>	
RGB-TO-TSDF: DIRECT TSDF PREDICTION FROM A SINGLE RGB IMAGE FOR DENSE 3D RECONSTRUCTION	5317
<i>Hanjun Kim ; Jiyou Moon ; Beomhee Lee</i>	
COLLABORATIVE ROBOT ASSISTANT FOR THE ERGONOMIC MANIPULATION OF CUMBERSOME OBJECTS	5324
<i>Andrea Maria Zanchettin ; Elio Lotano ; Paolo Rocco</i>	
FAST HANDOVERS WITH A ROBOT CHARACTER: SMALL SENSORIMOTOR DELAYS IMPROVE PERCEIVED QUALITIES	5330
<i>Matthew K. X. J. Pan ; Espen Knoop ; Moritz Bächer ; Günter Niemeyer</i>	
OBSTACLE AVOIDANCE USING A CAPACITIVE SKIN FOR SAFE HUMAN-ROBOT INTERACTION	5337
<i>Kamal-Eddine M'Colo ; Bruno Luong ; André Crosnier ; Christian Néel ; Philippe Fraisse</i>	
COMPLEX STIFFNESS MODEL OF PHYSICAL HUMAN-ROBOT INTERACTION: IMPLICATIONS FOR CONTROL OF PERFORMANCE AUGMENTATION EXOSKELETONS	5343
<i>Binghan He ; Huang Huang ; Gray C. Thomas ; Luis Sentis</i>	
A MULTIMODAL HUMAN-ROBOT INTERACTION MANAGER FOR ASSISTIVE ROBOTS	5351
<i>Bahareh Abbasi ; Natawut Monaikul ; Zhanibek Rysbek ; Barbara Di Eugenio ; Miloš Žefran</i>	
KINEMATICS, DESIGN AND EXPERIMENTAL VALIDATION OF A NOVEL PARALLEL ROBOT FOR TWO-FINGERED DEXTEROUS MANIPULATION	5358
<i>Wissem Haouas ; Guillaume J. Laurent ; Sébastien Thibaud ; Redwan Dahmouche</i>	
INFLUENCE OF PARAMETERS UNCERTAINTIES ON THE POSITIONING OF CABLE-DRIVEN PARALLEL ROBOTS	5364
<i>J-P. Merlet</i>	
A NEW TIME-VARYING FEEDBACK RISE CONTROL OF PKMS: THEORY AND APPLICATION	5370
<i>Hussein Saïed ; Ahmed Chemori ; Mohamed Bouri ; Maher El Rafei ; Clovis Francis ; Francois Pierrot</i>	
TRACKING CONTROL OF FULLY-CONSTRAINED CABLE-DRIVEN PARALLEL ROBOTS USING ADAPTIVE DYNAMIC PROGRAMMING	5376
<i>Shuai Li ; Damiano Zanotto</i>	
OPTIMIZATION BASED TRAJECTORY PLANNING OF MOBILE CABLE-DRIVEN PARALLEL ROBOTS	5383
<i>Tahir Rasheed ; Philip Long ; Adolfo Suarez Roos ; Stéphane Caro</i>	
INVERSE KINEMATICS AND SENSITIVITY MINIMIZATION OF AN N-STACK STEWART PLATFORM	5389
<i>David Balaban ; John Cooper ; Erik Komendera</i>	
TRAJECTORY PLANNING FOR A BAT-LIKE FLAPPING WING ROBOT	5395
<i>Jonathan Hoff ; Usman Syed ; Alireza Ramezani ; Seth Hutchinson</i>	
CONTACT-IMPLICIT TRAJECTORY OPTIMIZATION FOR DYNAMIC OBJECT MANIPULATION	5401
<i>Jean-Pierre Sleiman ; Jan Carius ; Ruben Grandia ; Martin Wermelinger ; Marco Hutter</i>	
LEARNING Q-NETWORK FOR ACTIVE INFORMATION ACQUISITION	5409
<i>Heejin Jeong ; Brent Schlotfeldt ; Hamed Hassani ; Manfred Morari ; Daniel D. Lee ; George J. Pappas</i>	

CHANCE-CONSTRAINED TRAJECTORY OPTIMIZATION FOR NON-LINEAR SYSTEMS WITH UNKNOWN STOCHASTIC DYNAMICS	5415
<i>Onur Celik ; Hany Abdulsamad ; Jan Peters</i>	
PD BASED ROBUST QUADRATIC PROGRAMS FOR ROBOTIC SYSTEMS	5421
<i>Shishir Kolathaya ; Sushant Veer</i>	
TIME SERIES MOTION GENERATION CONSIDERING LONG SHORT-TERM MOTION	5429
<i>Kazuki Fujimoto ; Sho Sakaino ; Toshiaki Tsuji</i>	
LEARNING SINGULARITY AVOIDANCE	5436
<i>Jeevan Manavalan ; Matthew Howard</i>	
CASCADED GAUSSIAN PROCESSES FOR DATA-EFFICIENT ROBOT DYNAMICS LEARNING	5442
<i>Sahand Rezaei-Shoshtari ; David Meger ; Inna Sharf</i>	
EPISODIC LEARNING WITH CONTROL LYAPUNOV FUNCTIONS FOR UNCERTAIN ROBOTIC SYSTEMS	5449
<i>Andrew J. Taylor ; Victor D. Dorobantu ; Hoang M. Le ; Yisong Yue ; Aaron D. Ames</i>	
ACTIVE INFRARED CODED TARGET DESIGN AND POSE ESTIMATION FOR MULTIPLE OBJECTS	5456
<i>Xudong Yan ; Heng Deng ; Quan Quan</i>	
ROBUST REAL-TIME RGB-D VISUAL ODOMETRY IN DYNAMIC ENVIRONMENTS VIA RIGID MOTION MODEL	5462
<i>Sangil Lee ; Clark Youngdong Son ; H. Jin Kim</i>	
VISUAL-INERTIAL ON-BOARD THROW-AND-GO INITIALIZATION FOR MICRO AIR VEHICLES	5470
<i>Martin Scheiber ; Jeff Delaune ; Roland Brockers ; Stephan Weiss</i>	
DEEPIO: SELF-SUPERVISED DEEP LEARNING OF MONOCULAR VISUAL INERTIAL ODOMETRY USING 3D GEOMETRIC CONSTRAINTS	5477
<i>Liming Han ; Yimin Lin ; Guoguang Du ; Shiguo Lian</i>	
LINE-BASED ABSOLUTE AND RELATIVE CAMERA POSE ESTIMATION IN STRUCTURED ENVIRONMENTS	5485
<i>Haoang Li ; Ji Zhao ; Jean-Charles Bazin ; Wen Chen ; Kai Chen ; Yun-Hui Liu</i>	
EXTENDING MONOCULAR VISUAL ODOMETRY TO STEREO CAMERA SYSTEMS BY SCALE OPTIMIZATION	5492
<i>Jiawei Mo ; Junaed Sattar</i>	
DESK: A ROBOTIC ACTIVITY DATASET FOR DEXTEROUS SURGICAL SKILLS TRANSFER TO MEDICAL ROBOTS	5499
<i>Naveen Madapana ; Md Masudur Rahman ; Natalia Sanchez-Tamayo ; Mythra V. Balakuntala ; Glebys Gonzalez ; Jyothsna Padmakumar Bindu ; L. N. Vishnunandan Venkatesh ; Xingguang Zhang ; Juan Barragan Noguera ; Thomas Low ; Richard M. Voyles ; Yexiang Xue ; Juan Wachs</i>	
RESEARCH ON FINITE GROUND EFFECT OF A ROTOR	5506
<i>Xinkuang Wang ; Yong Liu ; Chengwei Huang</i>	
FLIGHTGOGGLES: PHOTOREALISTIC SENSOR SIMULATION FOR PERCEPTION-DRIVEN ROBOTICS USING PHOTOGRAMMETRY AND VIRTUAL REALITY	5512
<i>Winter Guerra ; Ezra Tal ; Varun Murali ; Gilhyun Ryou ; Sertac Karaman</i>	
A MODEL FOR SIMULATING THE ROBOTIC PUSHING OF DIRT	5520
<i>Samuel Rodriguez ; Zixiu Su ; Jiazhen Yu</i>	
ERGODIC FLOCKING	5528
<i>Conan Veitch ; Duncan Render ; Alex Aravind</i>	
PASSIVE MODEL REDUCTION AND SWITCHING FOR FAST SOFT OBJECT SIMULATION WITH INTERMITTENT CONTACTS	5534
<i>Jaemin Yoon ; Ilkwon Hong ; Dongjun Lee</i>	
THE STABILITY OF HUMAN SUPERVISORY CONTROL OPERATOR BEHAVIORAL MODELS USING HIDDEN MARKOV MODELS	5542
<i>Haibei Zhu ; Mary L. Cummings</i>	
MEASURING ENGAGEMENT ELICITED BY EYE CONTACT IN HUMAN-ROBOT INTERACTION	5550
<i>K Kompatsiari ; F Ciardo ; D De Tommaso ; A Wykowska</i>	
CAN USER-CENTERED REINFORCEMENT LEARNING ALLOW A ROBOT TO ATTRACT PASSERSBY WITHOUT CAUSING DISCOMFORT?	5557
<i>Yasunori Ozaki ; Tatsuya Ishihara ; Narimune Matsumura ; Tadashi Nunobiki</i>	
ROBOTS THAT TAKE ADVANTAGE OF HUMAN TRUST	5564
<i>Dylan P. Losey ; Dorsa Sadigh</i>	

MULTIMODAL UNCERTAINTY REDUCTION FOR INTENTION RECOGNITION IN HUMAN-ROBOT INTERACTION	5572
<i>Susanne Trick ; Dorothea Koert ; Jan Peters ; Constantin A. Rothkopf</i>	
DENSE 3D RECONSTRUCTION FOR VISUAL TUNNEL INSPECTION USING UNMANNED AERIAL VEHICLE	5580
<i>Ramanpreet Singh Pahwa ; Kennard Yanting Chan ; Jiamin Bai ; Vincensius Billy Saputra ; Minh N. Do ; Shaohui Foong</i>	
PREDICTIVE AND ADAPTIVE MAPS FOR LONG-TERM VISUAL NAVIGATION IN CHANGING ENVIRONMENTS	5588
<i>Lucie Halodová ; Eliška Dvorráková ; Filip Majer ; Tomáš Vintr ; Oscar Martinez Mozos ; Feras Dayoub ; Tomáš Krajník</i>	
LANE MARKING LEARNING BASED ON CROWDSOURCED DATA	5595
<i>David Pannen ; Martin Liebner ; Wolfram Burgard</i>	
CROWD-SOURCED SEMANTIC EDGE MAPPING FOR AUTONOMOUS VEHICLES	5602
<i>Markus Herb ; Tobias Weiherer ; Nassir Navab ; Federico Tombari</i>	
PERMANENT MAGNETS BASED ACTUATOR FOR MICROROBOTS NAVIGATION	5609
<i>Manel Abbes ; Karim Belharet ; Hassen Mekki ; Gerard Poisson</i>	
OPTICAL COHERENCE TOMOGRAPHY GUIDED ROBOTIC DEVICE FOR AUTONOMOUS NEEDLE INSERTION IN CORNEA TRANSPLANT SURGERY	5615
<i>S. Guo ; N. R. Sarfaraz ; W. Gensheimer ; A. Krieger ; J. U. Kang</i>	
TOWARD IMPROVING PATIENT SAFETY AND SURGEON COMFORT IN A SYNERGIC ROBOT-ASSISTED EYE SURGERY: A COMPARATIVE STUDY	5622
<i>Ali Ebrahimi ; Farshid Alambeigi ; Ingrid E. Zimmer-Galler ; Peter Gehlbach ; Russell H. Taylor ; Iulian Iordachita</i>	
A NOVEL SEMI-AUTONOMOUS CONTROL FRAMEWORK FOR RETINA CONFOCAL ENDOMICROSCOPY SCANNING	5630
<i>Zhaoshuo Li ; Mahya Shahbazi ; Niravkumar Patel ; Eimear O' Sullivan ; Haojie Zhang ; Khushi Vyas ; Preetham Chalasani ; Peter L. Gehlbach ; Iulian Iordachita ; Guang-Zhong Yang ; Russell H. Taylor</i>	
A COMPACT LASER-STEERING END-EFFECTOR FOR TRANSORAL ROBOTIC SURGERY	5638
<i>Simon A. Bothner ; Peter A. York ; Phillip C. Song ; Robert J. Wood</i>	
ARMCL: ARM CONTACT POINT LOCALIZATION VIA MONTE CARLO LOCALIZATION	5644
<i>Adrian Zwiener ; Richard Hanten ; Cotnelia Schulz ; Andreas Zell</i>	
PREDICTING GRASP SUCCESS WITH A SOFT SENSING SKIN AND SHAPE-MEMORY ACTUATED GRIPPER	5651
<i>Iulian Zimmer ; Tess Hellebrekers ; Tamim Asfour ; Carmel Majidi ; Oliver Kroemer</i>	
FORMATION OF PVDF PIEZOELECTRIC FILM ON 3D BELLOWS SURFACE OF ROBOTIC SUCTION CUP FOR PROVIDING FORCE SENSING ABILITY -FEASIBILITY STUDY ON TWO METHODS OF DIP-COATING AND LAMINATION-	5659
<i>Seiji Aoyagi ; Tatsuki Morita ; Takuto Shintani ; Hiroki Takise ; Tomokazu Takahashi ; Masato Suzuki</i>	
HAPTIC PERCEPTION OF LIQUIDS ENCLOSED IN CONTAINERS	5665
<i>Carolyn Matl ; Robert Matthew ; Ruzena Bajcsy</i>	
MINIATURIZATION OF MR SAFE PNEUMATIC ROTATIONAL STEPPER MOTORS	5673
<i>Vincent Groenhuis ; Françoise J. Siepel ; Stefano Stramigioli</i>	
CLOSED-LOOP FORCE CONTROL OF A PNEUMATIC GRIPPER ACTUATED BY TWO PRESSURE REGULATORS	5680
<i>Rocco A. Romeo ; Luca Fiorio ; Edwin J. Avila-Mireles ; Ferdinando Cannella ; Giorgio Metta ; Daniele Pucci</i>	
EXPERIMENTAL VALIDATION OF HYDRAULIC INTERLOCKING DRIVE SYSTEM FOR BIPED HUMANOID ROBOT	5686
<i>J. Shimizu ; T. Otani ; H. Mizukami ; K. Hashimoto ; A. Takanishi</i>	
ENERGY HARVESTING ACROSS TEMPORAL TEMPERATURE GRADIENTS USING VAPORIZATION	5693
<i>Charles Xiao ; Nicholas D. Naclerio ; Elliot W. Hawkes</i>	
KINEMATIC MODELING OF A SOFT PNEUMATIC ACTUATOR USING CUBIC HERMITE SPLINES	5699
<i>Mats Wiese ; Kenneth Rüstmann ; Annika Raatzl</i>	
REAL-TIME MODEL-BASED IMAGE COLOR CORRECTION FOR UNDERWATER ROBOTS	5706
<i>Monika Roznere ; Alberto Quattrini Li</i>	
PASSIVE INVERTED ULTRA-SHORT BASELINE (PIUSBL) LOCALIZATION: AN EXPERIMENTAL EVALUATION OF ACCURACY	5712
<i>Nicholas R. Rypkema ; Henrik Schmidt</i>	
CONCURRENT FLOW-BASED LOCALIZATION AND MAPPING IN TIME-INVARIANT FLOW FIELDS	5720
<i>Zhuoyuan Song ; Kamran Mohseni</i>	

ADAPTIVE NAVIGATION SCHEME FOR OPTIMAL DEEP-SEA LOCALIZATION USING MULTIMODAL PERCEPTION CUES	5726
<i>Arturo Gomez Chavez ; Qingwen Xu ; Christian A. Mueller ; Sören Schwertfeger ; Andreas Birk</i>	
DUCKIEPOND: AN OPEN EDUCATION AND RESEARCH ENVIRONMENT FOR A FLEET OF AUTONOMOUS MARITIME VEHICLES	5734
<i>Ni-Ching Lin ; Yu-Chieh Hsiao ; Yi-Wei Huang ; Ching-Tung Hung ; Tzu-Kuan Chuang ; Pin-Wei Chen ; Jui-Te Huang ; Chao-Chun Hsu ; Andrea Censi ; Michael Benjamin ; Chi-Fang Chen ; Hsueh-Cheng Wang</i>	
EXPERIMENTAL COMPARISON OF OPEN SOURCE VISUAL-INERTIAL-BASED STATE ESTIMATION ALGORITHMS IN THE UNDERWATER DOMAIN	5742
<i>Bharat Joshi ; Sharmin Rahman ; Michail Kalaitzakis ; Brennan Cain ; James Johnson ; Marios Xanthis ; Nare Karapetyan ; Alan Hernandez ; Alberto Quattrini Li ; Nikolaos Vitzilaios ; Ioannis Rekleitis</i>	
RAPID COLLISION DETECTION FOR MULTICOPTER TRAJECTORIES	5749
<i>Nathan Bucki ; Mark W. Mueller</i>	
FAST TIME-OPTIMAL AVOIDANCE OF MOVING OBSTACLES FOR HIGH-SPEED MAV FLIGHT	5755
<i>Marius Beul ; Sven Behnke</i>	
CONTINUOUS-TIME COLLISION AVOIDANCE FOR TRAJECTORY OPTIMIZATION IN DYNAMIC ENVIRONMENTS	5763
<i>Wolfgang Merkt ; Vladimir Ivan ; Sethu Vijayakumar</i>	
SIMDOP: SIMD OPTIMIZED BOUNDING VOLUME HIERARCHIES FOR COLLISION DETECTION	5771
<i>Toni Tan ; René Weller ; Gabriel Zachmann</i>	
ON THE FEASIBILITY OF MULTI-DEGREE-OF-FREEDOM HAPTIC DEVICES USING PASSIVE ACTUATORS	5779
<i>Maciej Lacki ; Carlos Rossa</i>	
IDENTIFICATION OF RAT ULTRASONIC VOCALIZATIONS FROM MIX SOUNDS OF A ROBOTIC RAT IN A NOISY ENVIRONMENT	5785
<i>Chang Li ; Qing Shi ; Zihang Gao ; Hiroyuki Ishii ; Atsuo Takanishi ; Qiang Huang ; Toshio Fukuda</i>	
COMPONENT MODULARIZED DESIGN OF MUSCULOSKELETAL HUMANOID PLATFORM MUSASHI TO INVESTIGATE LEARNING CONTROL SYSTEMS	5791
<i>Kento Kawaharazuka ; Shogo Makino ; Kei Tsuzuki ; Moritaka Onitsuka ; Yuya Nagamatsu ; Koki Shinjo ; Tasuku Makabe ; Yuki Asano ; Kei Okada ; Koji Kawasaki ; Masayuki Inaba</i>	
DEVELOPMENT OF A LOCATION ESTIMATION SYSTEM FOR MINUTE SOUND SOURCE BY USING HUMAN ACOUSTIC SYSTEM WITH STOCHASTIC RESONANCE	5799
<i>Katsuyoshi Tsujita</i>	
A MULTI-TRAINEE ARCHITECTURE FOR HAPTIC HANDS-ON TRAINING	5805
<i>A. R. Licona ; A. Lelevel ; M. T. Pham ; D. Eberard</i>	
A GEAR-DRIVEN PROSTHETIC HAND WITH MAJOR GRASP FUNCTIONS FOR TODDLERS	5812
<i>Xiaobei Jing ; Xu Yong ; Yuan Kang Shi ; Yoshiko Yabiki ; Yinlai Jiang ; Hiroshi Yokoi ; Guanglin Li</i>	
A VARIABLE STIFFNESS ELBOW JOINT FOR UPPER LIMB PROSTHESIS	5818
<i>Simon Lemerle ; Giorgio Grioli ; Antonio Bicchi ; Manuel G. Catalano</i>	
FEASIBILITY OF GAIT ENTRAINMENT TO HIP MECHANICAL PERTURBATION FOR LOCOMOTOR REHABILITATION	5826
<i>Jongwoo Lee ; Devon Goetz ; Meghan E. Huber ; Neville Hogan</i>	
MRLIFT: A SEMI-ACTIVE LOWER BACK SUPPORT EXOSKELETON BASED ON MR FLUID AND FORCE RETENTION TECHNOLOGY	5832
<i>Modar Hassan ; Maxwell Kennard ; Keisuke Yagi ; Hideki Kadone ; Hiromi Mochiyama ; Kenji Suzuki</i>	
UNDERSTANDING MULTI-ROBOT SYSTEMS: ON THE CONCEPT OF LEGIBILITY	5838
<i>Beatrice Capelli ; Valeria Villani ; Cristian Secchi ; Lorenzo Sabattini</i>	
MINIMUM K-CONNECTIVITY MAINTENANCE FOR ROBUST MULTI-ROBOT SYSTEMS	5845
<i>Wenhao Luo ; Katia Sycara</i>	
CANNOT AVOID PENALTY FOR FLUCTUATING ORDER ARRIVAL RATE? LET'S MINIMIZE	5853
<i>Marichi Agarwal ; Chayan Sarkar</i>	
SAMPLING-BASED MOTION PLANNING FOR AERIAL PICK-AND-PLACE	5861
<i>Hyojin Kim ; Hoseong Seo ; Jongchan Kim ; H. Jin Kim</i>	
FORCE-AND-MOTION CONSTRAINED PLANNING FOR TOOL USE	5868
<i>Rachel Holladay ; Tomás Lozano-Pérez ; Alberto Rodriguez</i>	
OBJECT PLACEMENT PLANNING AND OPTIMIZATION FOR ROBOT MANIPULATORS	5876
<i>Joshua A. Haustein ; Kaiyu Hang ; Johannes Stork ; Danica Kragic</i>	

BIDIRECTIONAL HEURISTIC SEARCH FOR MOTION PLANNING WITH AN EXTEND OPERATOR	5884
<i>Allen Cheng ; Dhruv Mauria Saxena ; Maxim Likhachev</i>	
PIXELS TO PLANS: LEARNING NON-PREHENSILE MANIPULATION BY IMITATING A PLANNER.....	5890
<i>Tarik Tosun ; Eric Mitchell ; Ben Eisner ; Jinwook Huh ; Boram Lee ; Daewon Lee ; Volkan Isler ; H. Sebastian Seung ; Daniel Lee</i>	
EXPLOITING LINEARITY IN DYNAMICS SOLVERS FOR THE DESIGN OF COMPOSABLE ROBOTIC MANIPULATION ARCHITECTURES	5898
<i>Sven Schneider ; Herman Bruyninckx</i>	
DEEP NEURAL NETWORK APPROACH IN ELECTRICAL IMPEDANCE TOMOGRAPHY-BASED REAL-TIME SOFT TACTILE SENSOR	5906
<i>Hyunkyu Park ; Hyosang Lee ; Kyungseo Park ; Sangwoo Mo ; Jung Kim</i>	
MODELING AND IDENTIFICATION FOR THE DESIGN OF A ROTARY SOFT ACTUATOR BASED ON WREN MECHANISM	5912
<i>Thibault Gayral ; Lennart Rubbert ; Pierre Renaud</i>	
MODULAR VOLUMETRIC ACTUATORS USING MOTORIZED AUXETICS.....	5919
<i>Jeffrey Lipton ; Lillian Chin ; Jacob Miske ; Daniela Rus</i>	
MODELLING OF UNIAXIAL EGAIN-BASED STRAIN SENSORS FOR PROPRIOCEPTIVE SENSING OF SOFT ROBOTS	5926
<i>Abdullah Al-Azzawi ; A. Mounir Boudali ; He Kong ; Ali H. Göktogan ; Salah Sukkarieh</i>	
OUTLIER-ROBUST MANIFOLD PRE-INTEGRATION FOR INS/GPS FUSION	5933
<i>Shin-Fang Ch'Ng ; Alireza Khosravian ; Anh-Dzung Doan ; Tat-Jun Chin</i>	
A ROBUST POSITION AND POSTURE MEASUREMENT SYSTEM USING VISUAL MARKERS AND AN INERTIA MEASUREMENT UNIT	5941
<i>Kunihiro Ogata ; Hideyuki Tanaka ; Yoshio Matsumoto</i>	
JOINT VELOCITY AND ACCELERATION ESTIMATION IN SERIAL CHAIN RIGID BODY AND FLEXIBLE JOINT MANIPULATORS.....	5947
<i>Seyed Ali Baradaran Birjandi ; Johannes Kühn ; Sami Haddadin</i>	
BIPED ROBOT PELVIS KINEMATICS ESTIMATION BASED ON THE TOUCH-POINT UPDATING METHOD.....	5954
<i>Hyoin Bae ; Jaesung Oh ; Hyun-Min Joe ; Jun-Ho Oh</i>	
FUSION OF FLUXGATE SENSORS WITH NAVIGATIONAL DATA FOR THE IMPROVEMENT OF THE DETECTION OF UNDERWATER METAL-CONTAINING OBJECTS	5961
<i>D A Frolov ; D A Gromoshinskiy ; A M Korsakov ; A V Bakshiev ; E Yu Smirnova</i>	
TASK-MOTION PLANNING WITH REINFORCEMENT LEARNING FOR ADAPTABLE MOBILE SERVICE ROBOTS.....	5965
<i>Yuqian Jiang ; Fangkai Yang ; Shiqi Zhang ; Peter Stone</i>	
INVERSE OPTIMAL PLANNING FOR AIR TRAFFIC CONTROL	5971
<i>Ekaterina Tolstaya ; Alejandro Ribeiro ; Vijay Kumar ; Ashish Kapoor</i>	
HIERARCHICAL REINFORCEMENT LEARNING FOR QUADRUPED LOCOMOTION	5979
<i>Deepali Jain ; Atil Iscen ; Ken Caluwaerts</i>	
LEARNING SAFE UNLABELED MULTI-ROBOT PLANNING WITH MOTION CONSTRAINTS	5986
<i>Arbaaz Khan ; Chi Zhang ; Shuo Li ; Jiayue Wu ; Brent Schlotfeldt ; Sarah Y. Tang ; Alejandro Ribeiro ; Osbert Bastani ; Vijay Kumar</i>	
DYNAMIC INPUT FOR DEEP REINFORCEMENT LEARNING IN AUTONOMOUS DRIVING	5994
<i>Maria Huegle ; Gabriel Kalweit ; Branka Mirchevska ; Moritz Werling ; Joschka Boedecker</i>	
ADAPTIVE NEURAL ADMITTANCE CONTROL FOR COLLISION AVOIDANCE IN HUMAN-ROBOT COLLABORATIVE TASKS.....	6002
<i>Xinbo Yu ; Wei He ; Chengqian Xue ; Bin Li ; Long Cheng ; Chenguang Yang</i>	
SAFE PHYSICAL HRI: TOWARD A UNIFIED TREATMENT OF SPEED AND SEPARATION MONITORING TOGETHER WITH POWER AND FORCE LIMITING	6008
<i>Petr Svarny ; Michael Tesar ; Jan Kristof Behrens ; Matej Hoffmann</i>	
AN EVALUATION OF ROBOT-TO-HUMAN HANDOVER CONFIGURATIONS FOR COMMERCIAL ROBOTS.....	6016
<i>Robin Rasch ; Sven Wachsmuth ; Matthias König</i>	
INTERACTIVE TRAJECTORY ADAPTATION THROUGH FORCE-GUIDED BAYESIAN OPTIMIZATION	6024
<i>Leonel Rozo</i>	
COLLISION DETECTION AND ISOLATION ON A ROBOT USING JOINT TORQUE SENSING	6032
<i>Joao Bimbo ; Claudio Pacchierotti ; Nikos G. Tsagarakis ; Domenico Prattichizzo</i>	

RELAXING THE CONSERVATISM OF PASSIVITY CONDITION FOR IMPEDANCE CONTROLLED SERIES ELASTIC ACTUATORS.....	6038
<i>Hyunwook Lee ; Jinoh Lee ; Jee-Hwan Ryu ; Sehoon Oh</i>	
FLEXURE MECHANISMS WITH VARIABLE STIFFNESS AND DAMPING USING LAYER JAMMING	6044
<i>Buse Aktas ; Robert D. Howe</i>	
EMPLOYING MAGNETS TO IMPROVE THE FORCE EXERTION CAPABILITIES OF ADAPTIVE ROBOT HANDS IN PRECISION GRASPS	6050
<i>Lucas Gerez ; Geng Gao ; Minas Liarokapis</i>	
TIME-OPTIMAL TRAJECTORY GENERATION FOR DYNAMIC VEHICLES: A BILEVEL OPTIMIZATION APPROACH	6056
<i>Gao Tang ; Weidong Sun ; Kris Hauser</i>	
REAL-TIME QUAD-ROTOR PATH PLANNING USING CONVEX OPTIMIZATION AND COMPOUND STATE-TRIGGERED CONSTRAINTS	6063
<i>Michael Szmuk ; Danylo Malyuta ; Taylor P. Reynolds ; Margaret Skye McEowen ; Behçet Açikmese</i>	
ALTRO: A FAST SOLVER FOR CONSTRAINED TRAJECTORY OPTIMIZATION	6071
<i>Taylor A. Howell ; Brian E. Jackson ; Zachary Manchester</i>	
LEARNING REAL-WORLD ROBOT POLICIES BY DREAMING	6077
<i>Aj Piergiovanni ; Alan Wu ; Michael S. Ryoo</i>	
ACCURATE POURING USING MODEL PREDICTIVE CONTROL ENABLED BY RECURRENT NEURAL NETWORK	6085
<i>Tianze Chen ; Yongqiang Huang ; Yu Sun</i>	
DYNAMIC TASK CONTROL METHOD OF A FLEXIBLE MANIPULATOR USING A DEEP RECURRENT NEURAL NETWORK	6092
<i>Kento Kawaharazuka ; Toru Ogawa ; Cota Nabeshima</i>	
ANALYZING LIQUID POURING SEQUENCES VIA AUDIO-VISUAL NEURAL NETWORKS	6099
<i>Justin Wilson ; Auston Sterling ; Ming C. Lin</i>	
DEEP LAGRANGIAN NETWORKS FOR END-TO-END LEARNING OF ENERGY-BASED CONTROL FOR UNDER-ACTUATED SYSTEMS.....	6107
<i>Michael Lutter ; Kim Listmann ; Jan Peters</i>	
DATA ASSOCIATION AWARE SEMANTIC MAPPING AND LOCALIZATION VIA A VIEWPOINT-DEPENDENT CLASSIFIER MODEL	6115
<i>Vladimir Tchuiev ; Yuri Feldman ; Vadim Indelman</i>	
A GPS-AIDED OMNIDIRECTIONAL VISUAL-INERTIAL STATE ESTIMATOR IN UBIQUITOUS ENVIRONMENTS	6123
<i>Yang Yu ; Wenliang Gao ; Chengju Liu ; Shaojie Shen ; Ming Liu</i>	
GAZE TRAINING BY MODULATED DROPOUT IMPROVES IMITATION LEARNING	6129
<i>Yuying Chen ; Congcong Liu ; Lei Tai ; Ming Liu ; Bertram E. Shi</i>	
LIDAR-FLOW: DENSE SCENE FLOW ESTIMATION FROM SPARSE LIDAR AND STEREO IMAGES.....	6135
<i>Ramy Battrawy ; René Schuster ; Oliver Wasenmüller ; Qing Rao ; Didier Stricker</i>	
TOWARD ACHIEVING FORMAL GUARANTEES FOR HUMAN-AWARE CONTROLLERS IN HUMAN-ROBOT INTERACTIONS	6143
<i>Rachel Schlossman ; Minkyu Kim ; Ufuk Topcu ; Luis Sentis</i>	
ROBOT-BASED MACHINING OF UNMODELED OBJECTS VIA FEATURE DETECTION IN DENSE POINT CLOUDS.....	6150
<i>Dennis Hartmann ; Michael Mende ; Denis Štogl ; Björn Hein ; Torsten Kröger</i>	
MPERL: HARDWARE AND SOFTWARE CO-DESIGN FOR ROBOTIC MANIPULATORS.....	6157
<i>Marcus Pirron ; Damien Zufferey</i>	
ARGUING SECURITY OF AUTONOMOUS ROBOTS	6164
<i>Nico Hochgeschwender ; Gary Cornelius ; Holger Voos</i>	
MUSE: MULTI-SENSOR INTEGRATION STRATEGIES APPLIED TO SEQUENTIAL MONTE CARLO METHODS	6171
<i>Richard Hanten ; Cotnelia Schulz ; Adrian Zwiener ; Andreas Zell</i>	
TZC: EFFICIENT INTER-PROCESS COMMUNICATION FOR ROBOTICS MIDDLEWARE WITH PARTIAL SERIALIZATION	6178
<i>Yu-Ping Wang ; Wende Tan ; Xu-Qiang Hu ; Dinesh Manocha ; Shi-Min Hu</i>	
SITUATION AWARENESS FOR PROACTIVE ROBOTS IN HRI	6186
<i>Chapa Sirithunge ; H. M. Ravindu ; T. Bandara ; A. G. Buddhika ; P. Jayasekara ; D. P. Chandima</i>	

COGNITIVE ROBOTIC ARCHITECTURE FOR SEMI-AUTONOMOUS EXECUTION OF MANIPULATION TASKS IN A SURGICAL ENVIRONMENT	6194
<i>Giacomo De Rossi ; Marco Minelli ; Alessio Sozzi ; Nicola Piccinelli ; Federica Ferraguti ; Francesco Setti ; Marcello Bonfé ; Cristian Secchi ; Riccardo Muradore</i>	
SIMULATION-BASED PHYSICS REASONING FOR CONSISTENT SCENE ESTIMATION IN AN HRI CONTEXT	6201
<i>Yoan Sallami ; Séverin Lemaignan ; Aurélie Clodic ; Rachid Alami</i>	
MAP BASED HUMAN MOTION PREDICTION FOR PEOPLE TRACKING	6209
<i>Florian Beck ; Markus Bader</i>	
REFUSION: 3D RECONSTRUCTION IN DYNAMIC ENVIRONMENTS FOR RGB-D CAMERAS EXPLOITING RESIDUALS	6216
<i>Emanuele Palazzolo ; Jens Behley ; Philipp Lottes ; Philippe Giguère ; Cyrill Stachniss</i>	
GPU ACCELERATED ROBUST SCENE RECONSTRUCTION	6224
<i>Wei Dong ; Jaesik Park ; Yi Yang ; Michael Kaess</i>	
VIEW MANAGEMENT FOR LIFELONG VISUAL MAPS	6232
<i>Nandan Banerjee ; Ryan C. Connolly ; Dimitri Lisin ; Jimmy Briggs ; Mario E. Munich</i>	
ONLINE AND CONSISTENT OCCUPANCY GRID MAPPING FOR PLANNING IN UNKNOWN ENVIRONMENTS	6240
<i>Paloma Sodhi ; Bing-Jui Ho ; Michael Kaess</i>	
INFORMATION FILTER OCCUPANCY MAPPING USING DECOMPOSABLE RADIAL KERNELS	6248
<i>Siwei Guo ; Nikolay A. Atanasov</i>	
TERRAINFUSION: REAL-TIME DIGITAL SURFACE MODEL RECONSTRUCTION BASED ON MONOCULAR SLAM	6256
<i>Wei Wang ; Yong Zhao ; Pengcheng Han ; Pengcheng Zhao ; Shuhui Bu</i>	
ROBUST NON-RIGID POINT SET REGISTRATION ALGORITHM CONSIDERING ANISOTROPIC UNCERTAINTIES BASED ON COHERENT POINT DRIFT	6264
<i>Zhe Min ; Jin Pan ; Ang Zhang ; Max Q.-H. Meng</i>	
MULTICAMERA 3D RECONSTRUCTION OF DYNAMIC SURGICAL CAVITIES: NON-RIGID REGISTRATION AND POINT CLASSIFICATION	6272
<i>Yun-Hsuan Su ; Kevin Huang ; Blake Hannaford</i>	
VISION-BASED VIRTUAL FIXTURES GENERATION FOR ROBOTIC-ASSISTED POLYP DISSECTION PROCEDURES	6280
<i>Rocco Moccia ; Mario Selvaggio ; Luigi Villani ; Bruno Siciliano ; Fanny Ficuciello</i>	
UNSUPERVISED TASK SEGMENTATION APPROACH FOR BIMANUAL SURGICAL TASKS USING SPATIOTEMPORAL AND VARIANCE PROPERTIES	6286
<i>Ya-Yen Tsai ; Yao Guo ; Guang-Zhong Yang</i>	
TACTILE-BASED INSERTION FOR DENSE BOX-PACKING	6293
<i>Siyuan Dong ; Alberto Rodriguez</i>	
TRANSFER LEARNING FOR VISION-BASED TACTILE SENSING	6301
<i>Carmelo Sferrazza ; Raffaello D'Andrea</i>	
BI-MODAL HEMISPHERICAL SENSOR: A UNIFYING SOLUTION FOR THREE AXIS FORCE AND CONTACT ANGLE MEASUREMENT	6308
<i>Meng Yee Michael Chuah ; Lindsay Epstein ; Donghyun Kim ; Juan Romero ; Sangbae Kim</i>	
A2-PIECE SIX-AXIS FORCE/TORQUE SENSOR CAPABLE OF MEASURING LOADS APPLIED TO TOOLS OF COMPLEX SHAPES	6316
<i>Yohan Noh ; Lukas Lindenroth ; Shuangyi Wang ; Richard James Housden ; Anne-Sophie Van Wingerden ; Wanlin Li ; Kawal Rhode</i>	
LEARNING BASED ROBOTIC BIN-PICKING FOR POTENTIALLY TANGLED OBJECTS	6322
<i>Ryo Matsumura ; Yukiyasu Domae ; Weiwei Wan ; Kensuke Harada</i>	
DESIGN OF A GROWING ROBOT INSPIRED BY PLANT GROWTH	6330
<i>Tongxi Yan ; Seiichi Teshigawara ; H. Harry Asada</i>	
DISR: DEEP INFRARED SPECTRAL RESTORATION ALGORITHM FOR ROBOT SENSING AND INTELLIGENT VISUAL TRACKING SYSTEMS	6336
<i>Hai Liu ; You-Fu Li ; Dan Su ; Zhaoli Zhang ; Sannyuya Liu ; Tingting Liu</i>	
EMPIRICAL CHARACTERIZATION OF A HIGH-PERFORMANCE EXTERIOR-ROTOR TYPE BRUSHLESS DC MOTOR AND DRIVE	6342
<i>Ung Hee Lee ; Chen-Wen Pan ; Elliott J. Rouse</i>	
THE ANBOT: AN INTELLIGENT ROBOTIC CO-WORKER FOR INDUSTRIAL ABRASIVE BLASTING	6350
<i>Marc G. Carmichael ; Stefano Aldini ; Richardo Khonasty ; Antony Tran ; Christian Reeks ; Dikai Liu ; Kenneth J. Waldron ; Gamini Dissanayake</i>	

A GENERATIVE MODEL OF UNDERWATER IMAGES FOR ACTIVE LANDMARK DETECTION AND DOCKING	6358
<i>Shuang Liu ; Mete Ozay ; Hongli Xu ; Yang Lin ; Takayuki Okatani</i>	
ELEVATENET: A CONVOLUTIONAL NEURAL NETWORK FOR ESTIMATING THE MISSING DIMENSION IN 2D UNDERWATER SONAR IMAGES.....	6364
<i>Robert Debortoli ; Fuxin Li ; Geoffrey A. Hollinger</i>	
TOWARDS AN OPEN-SOURCE MICRO ROBOT OCEANARIUM: A LOW-COST, MODULAR, AND MOBILE UNDERWATER MOTION-CAPTURE SYSTEM.....	6372
<i>Daniel A Duecker ; Kevin Eusemann ; Edwin Kreuzer</i>	
CONTOUR BASED RECONSTRUCTION OF UNDERWATER STRUCTURES USING SONAR, VISUAL, INERTIAL, AND DEPTH SENSOR.....	6378
<i>Sharmin Rahman ; Alberto Quattrini Li ; Ioannis Rekleitis</i>	
DENSE, SONAR-BASED RECONSTRUCTION OF UNDERWATER SCENES.....	6384
<i>Pedro V. Teixeira ; Dehann Fourie ; Michael Kaess ; John J. Leonard</i>	
WIDE APERTURE IMAGING SONAR RECONSTRUCTION USING GENERATIVE MODELS.....	6391
<i>Eric Westman ; Michael Kaess</i>	
STARNET: PEDESTRIAN TRAJECTORY PREDICTION USING DEEP NEURAL NETWORK IN STAR TOPOLOGY	6399
<i>Yanliang Zhu ; Deheng Qian ; Dongchun Ren ; Huaxia Xia</i>	
FORECASTING TIME-TO-COLLISION FROM MONOCULAR VIDEO: FEASIBILITY, DATASET, AND CHALLENGES	6405
<i>Aashi Manglik ; Xinshuo Weng ; Eshed Ohn-Bar ; Kris M. Kitani</i>	
AN ADAPTIVE VELOCITY OBSTACLE AVOIDANCE ALGORITHM FOR AUTONOMOUS SURFACE VEHICLES.....	6413
<i>Daniel Filipe Campos ; Anibal Matos ; Andry Maykol Pinto</i>	
CONTINUOUS COLLISION DETECTION FOR A ROBOTIC ARM MOUNTED ON A CABLE- DRIVEN PARALLEL ROBOT.....	6421
<i>Diane Bury ; Jean-Baptiste Izard ; Marc Gouttefarde ; Florent Lamiroux</i>	
SPATIOTEMPORAL REPRESENTATION OF DYNAMIC SCENES.....	6427
<i>Darius Burschka</i>	
A PENETRATION METRIC FOR DEFORMING TETRAHEDRA USING OBJECT NORM.....	6435
<i>Jisu Kim ; Young J. Kim</i>	
SEQUENTIAL CLUSTERING FOR TACTILE IMAGE COMPRESSION TO ENABLE DIRECT ADAPTIVE FEEDBACK	6441
<i>Andreas Geier ; Gang Yan ; Tito Pradhono Tomo ; Shun Ogasa ; Sophon Somlor ; Alexander Schmitz ; Shigeki Sugano</i>	
DYNAMIC SPATIOTEMPORAL PATTERN IDENTIFICATION AND ANALYSIS USING A FINGERTIP-BASED ELECTRO-TACTILE DISPLAY ARRAY	6449
<i>Mehdi Rahimi ; Fang Jiang ; Cang Ye ; Yantao Shen</i>	
GENERATING AN IMAGE OF AN OBJECT'S APPEARANCE FROM SOMATOSENSORY INFORMATION DURING HAPTIC EXPLORATION.....	6455
<i>Kento Sekiya ; Yoshiyuki Ohmura ; Yasuo Kuniyoshi</i>	
TELEOPERATING ROBOTS FROM THE INTERNATIONAL SPACE STATION: MICROGRAVITY EFFECTS ON PERFORMANCE WITH FORCE FEEDBACK	6461
<i>Bernhard Weber ; Ribin Balachandran ; Cornelia Riecke ; Freek Stulp ; Martin Stelzer</i>	
HAPTIC SHARED-CONTROL METHODS FOR ROBOTIC CUTTING UNDER NONHOLONOMIC CONSTRAINTS.....	6468
<i>Rahaf Rahal ; Firas Abi-Farraj ; Paolo Robuffo Giordano ; Claudio Pacchierotti</i>	
BP NEURAL NETWORK BASED ON-BOARD TRAINING FOR REAL-TIME LOCOMOTION MODE RECOGNITION IN ROBOTIC TRANSTIBIAL PROSTHESES.....	6475
<i>Dongfang Xu ; Qining Wang</i>	
MINIMAL SENSOR SETUP IN LOWER LIMB EXOSKELETONS FOR MOTION CLASSIFICATION BASED ON MULTI-MODAL SENSOR DATA	6481
<i>Isabel Patzer ; Tamim Asfour</i>	
DESIGN OF A FAIL-SAFE WEARABLE ROBOT WITH NOVEL EXTENDABLE ARMS FOR ERGONOMIC ACCOMMODATION DURING FLOOR WORK	6488
<i>Katie S. Hahm ; H. Harry Asada</i>	
A UNIFIED ACTIVE ASSISTANCE CONTROL FRAMEWORK OF HIP EXOSKELETON FOR WALKING AND BALANCE ASSISTANCE	6494
<i>Shiyin Qiu ; Wei Guo ; Pengfei Wang ; Fei Chen ; Fusheng Zha ; Xin Wang ; Jing Deng</i>	

POLICY DISTILLATION AND VALUE MATCHING IN MULTIAGENT REINFORCEMENT LEARNING.....	6502
<i>Samir Wadhwanja ; Dong-Ki Kim ; Shayegan Omidshafiei ; Jonathan P. How</i>	
COLLABORATIVE MAPPING WITH POSE UNCERTAINTIES USING DIFFERENT RADIO FREQUENCIES AND COMMUNICATION MODULES	6510
<i>Cornelia Schulz ; Richard Hanten ; Matthias Reisenauer ; Andreas Zell</i>	
AN OPTIMIZATION FRAMEWORK FOR SIMULATION AND KINEMATIC CONTROL OF CONSTRAINED COLLABORATIVE MOBILE AGENTS (CCMA) SYSTEM.....	6516
<i>Nitish Kumar ; Stelian Coros</i>	
ROUTING A FLEET OF AUTOMATED VEHICLES IN A CAPACITATED TRANSPORTATION NETWORK.....	6524
<i>Martin Schaefer ; Michal Cáp ; Jan Mrkos ; Jiri Vokrinek</i>	
LEARNING-BASED NONLINEAR MODEL PREDICTIVE CONTROL OF RECONFIGURABLE AUTONOMOUS ROBOTIC BOATS: ROBOATS	6531
<i>Erkan Kayacan ; Shinkyu Park ; Carlo Ratti ; Daniela Rus</i>	
A PRESSURE FIELD MODEL FOR FAST, ROBUST APPROXIMATION OF NET CONTACT FORCE AND MOMENT BETWEEN NOMINALLY RIGID OBJECTS	6539
<i>Ryan Elandt ; Evan Drumwright ; Michael Sherman ; Andy Ruina</i>	
LEARNING BY DEMONSTRATION AND ROBUST CONTROL OF DEXTEROUS IN-HAND ROBOTIC MANIPULATION SKILLS	6547
<i>Gokhan Solak ; Lorenzo Jamone</i>	
ROBOTIC CUTTING OF SOLIDS BASED ON FRACTURE MECHANICS AND FEM	6553
<i>Prajjwal Jamdagani ; Yan-Bin Jia</i>	
FAST MANIPULABILITY MAXIMIZATION USING CONTINUOUS-TIME TRAJECTORY OPTIMIZATION	6559
<i>Filip Maric ; Oliver Limoyo ; Luka Petrovic ; Trevor Ablett ; Ivan Petrovic ; Jonathan Kelly</i>	
A DATA-DRIVEN FRAMEWORK FOR LEARNING DEXTEROUS MANIPULATION OF UNKNOWN OBJECTS	6566
<i>Andrew S. Morgan ; Kaiyu Hang ; Walter G. Bircher ; Aaron M. Dollar</i>	
SOFT POLYMER-ELECTROLYTE-FUEL-CELL TUBE REALIZING AIR-HOSE-FREE THIN MCKIBBEN MUSCLES.....	6574
<i>Hiroyuki Nabae ; Akio Kodaira ; Tetsuya Horiuchi ; Kinji Asaka ; Gen Endo ; Koichi Suzumori</i>	
DEVELOPMENT OF FLEXIBLE DUAL-TYPE PROXIMITY SENSOR WITH RESONANT FREQUENCY FOR ROBOTIC APPLICATIONS	6581
<i>Taeseung Kim ; Jiho Noh ; Tien Dat Nguyen ; Hyouk Ryeol Choi</i>	
SOFT PNEUMATIC HELICAL ACTUATOR WITH HIGH CONTRACTION RATIO.....	6587
<i>Peizheng Yuan ; Ginjiro Kawano ; Hideyuki Tsukagoshi</i>	
BUCKLING-INDUCED SHAPE MORPHING USING DIELECTRIC ELASTOMER ACTUATORS PATTERNED WITH SPATIALLY-VARYING ELECTRODES.....	6593
<i>Feifei Chen ; Kun Liu ; Xiangyang Zhu</i>	
DESIGN, CHARACTERIZATION, AND MECHANICAL PROGRAMMING OF FABRIC-REINFORCED TEXTILE ACTUATORS FOR A SOFT ROBOTIC HAND	6599
<i>Pham H. Nguyen ; Francisco Lopez-Arellano ; Wenlong Zhang ; Panagiotis Polygerinos</i>	
Author Index	