

IEEE TRANSACTIONS ON ROBOTICS

A PUBLICATION OF THE IEEE ROBOTICS AND AUTOMATION SOCIETY

FEBRUARY 2023

VOLUME 39

NUMBER 1

ITREAE

(ISSN 1552-3098)

REGULAR PAPERS

Algorithms and Systems for Manipulating Multiple Objects	Z. Pan, A. Zeng, Y. Li, J. Yu, and K. Hauser	2
Partially Observable Markov Decision Processes in Robotics: A Survey	M. Lauri, D. Hsu, and J. Pajarinen	21
POMDP Planning Under Object Composition Uncertainty: Application to Robotic Manipulation	J. Pajarinen, J. Lundell, and V. Kyrki	41
Enabling Visual Action Planning for Object Manipulation Through Latent Space Roadmap	M. Lippi, P. Poklukar, M. C. Welle, A. Varava, H. Yin, A. Marino, and D. Kragic	57
Model Predictive Interaction Control for Robotic Manipulation Tasks	T. Gold, A. Völz, and K. Graichen	76
Real-Time Robust Receding Horizon Planning Using Hamilton–Jacobi Reachability Analysis	H. Seo, D. Lee, C. Y. Son, I. Jang, C. J. Tomlin, and H. J. Kim	90
Efficient Path Planning in Narrow Passages for Robots With Ellipsoidal Components	S. Ruan, K. L. Poblete, H. Wu, Q. Ma, and G. S. Chirikjian	110
Scaling Multimodal Planning: Using Experience and Informing Discrete Search	Z. Kingston and L. E. Kavraki	128
Probabilistic Network Topology Prediction for Active Planning: An Adaptive Algorithm and Application	L. Zhang, Z. Zhang, R. Siegwart, and J. J. Chung	147
Sampling-Based Planning for Retrieving Near-Cylindrical Objects in Cluttered Scenes Using Hierarchical Graphs	H. Tian, C. Song, C. Wang, X. Zhang, and J. Pan	165
Direct Collocation Methods for Trajectory Optimization in Constrained Robotic Systems	R. Bordalba, T. Schoels, L. Ros, J. M. Porta, and M. Diehl	183
Trajectory Optimization of Chance-Constrained Nonlinear Stochastic Systems for Motion Planning Under Uncertainty	Y. K. Nakka and S.-J. Chung	203
Self-Triggered Coverage Control for Mobile Sensors	E. J. Rodríguez-Seda, X. Xu, J. M. Olm, A. Dòria-Cerezo, and Y. Diaz-Mercado	223
Long-Horizon Multirobot Rearrangement Planning for Construction Assembly	V. N. Hartmann, A. Orthey, D. Driess, O. S. Oguz, and M. Toussaint	239
Intelligent Physical Attack Against Mobile Robots With Obstacle-Avoidance	Y. Li, J. He, C. Chen, and X. Guan	253
SOFT2: Stereo Visual Odometry for Road Vehicles Based on a Point-to-Epipolar-Line Metric	I. Cvišić, I. Marković, and I. Petrović	273
Dynam-SLAM: An Accurate, Robust Stereo Visual-Inertial SLAM Method in Dynamic Environments	H. Yin, S. Li, Y. Tao, J. Guo, and B. Huang	289
VILENS: Visual, Inertial, Lidar, and Leg Odometry for All-Terrain Legged Robots	D. Wisth, M. Camurri, and M. Fallon	309
Learning Ergonomic Control in Human–Robot Symbiotic Walking	G. Clark and H. B. Amor	327
Driveable Space of Rehabilitation Robot for Physical Human–Robot Interaction: Definition and an Expanding Method ..	W. Wang, X. Liang, S. Liu, T. Lin, P. Zhang, Z. Lv, J. Wang, and Z.-G. Hou	343
Characterizing Multidimensional Capacitive Servoing for Physical Human–Robot Interaction	Z. Erickson, H. M. Clever, V. Gangaram, E. Xing, G. Turk, C. K. Liu, and C. C. Kemp	357

(Contents Continued on Page 1)



A Multi-DoF Exoskeleton Haptic Device for the Grasping of a Compliant Object Adapting to a User's Motion Using Jamming Transitions	<i>R. Michikawa, T. Endo, and F. Matsuno</i>	373
Power-Based Velocity-Domain Variable Structure Passivity Signature Control for Physical Human-(Tele)Robot Interaction	<i>P. Paik, S. Thudi, and S. F. Atashzad</i>	386
Soft Modular Climbing Robots	<i>Q. Hu, E. Dong, and D. Sun</i>	399
Global Model Learning for Large Deformation Control of Elastic Deformable Linear Objects: An Efficient and Adaptive Approach	<i>M. Yu, K. Lv, H. Zhong, S. Song, and X. Li</i>	417
Adaptive Helical Rolling of a Snake Robot to a Straight Pipe With Irregular Cross-Sectional Shape	<i>T. Takemori, M. Tanaka, and F. Matsuno</i>	437
A Novel Actuation Strategy for an Agile Bioinspired FWAV Performing a Morphing-Coupled Wingbeat Pattern	<i>A. Chen, B. Song, Z. Wang, D. Xue, and K. Liu</i>	452
Design of a New Bio-Inspired Dual-Axis Compliant Micromanipulator With Millimeter Strokes	<i>Z. Lyu and Q. Xu</i>	470
An Anthropomorphic Robotic Finger With Innate Human-Finger-Like Biomechanical Advantages Part I: Design, Ligamentous Joint, and Extensor Mechanism	<i>Y. Zhu, G. Wei, L. Ren, Z. Luo, and J. Shang</i>	485
An Anthropomorphic Robotic Finger With Innate Human-Finger-Like Biomechanical Advantages Part II: Flexible Tendon Sheath and Grasping Demonstration	<i>Y. Zhu, G. Wei, L. Ren, Z. Luo, and J. Shang</i>	505
Tombo Propeller: Bioinspired Deformable Structure Toward Collision-Accommodated Control for Drones	<i>S. T. Bui, Q. K. Luu, D. Q. Nguyen, N. D. M. Le, G. Loianno, and V. A. Ho</i>	521
Design and Control of a Midair-Reconfigurable Quadcopter Using Unactuated Hinges	<i>N. Bucki, J. Tang, and M. W. Mueller</i>	539
Elastic-Actuation Mechanism for Repetitive Hopping Based on Power Modulation and Cyclic Trajectory Generation	<i>W. D. Shin, W. Stewart, M. A. Estrada, A. J. Ijspeert, and D. Floreano</i>	558
Gaussian-Process-Based Control of Underactuated Balance Robots With Guaranteed Performance	<i>K. Chen, J. Yi, and D. Song</i>	572
Controlling Collision-Induced Aggregations in a Swarm of Micro Bristle Robots	<i>Z. Hao, S. Mayya, G. Notomista, S. Hutchinson, M. Egerstedt, and A. Ansari</i>	590
A Switched Systems Approach to Multiagent System Consensus: A Relay-Explorer Perspective	<i>F. M. Zegers, P. Deptula, H.-Y. Chen, A. Isaly, and W. E. Dixon</i>	605
Learning From Human Directional Corrections	<i>W. Jin, T. D. Murphey, Z. Lu, and S. Mou</i>	625
Learning From Sparse Demonstrations	<i>W. Jin, T. D. Murphey, D. Kulić, N. Ezer, and S. Mou</i>	645
Behavior Cloning-Based Robot Active Object Detection With Automatically Generated Data and Revision Method	<i>S. Liu, G. Tian, X. Shao, and S. Liu</i>	665
Joint Estimation of Expertise and Reward Preferences From Human Demonstrations	<i>P. Carreno-Medrano, S. L. Smith, and D. Kulić</i>	681
Multitask Learning for Scalable and Dense Multilayer Bayesian Map Inference	<i>L. Gan, Y. Kim, J. W. Grizzle, J. M. Walls, A. Kim, R. M. Eustice, and M. Ghaffari</i>	699
Distributionally Robust Risk Map for Learning-Based Motion Planning and Control: A Semidefinite Programming Approach	<i>A. Hakobyan and I. Yang</i>	718
Kinematics Modeling and Control of Spherical Rolling Contact Joint and Manipulator	<i>L. Zong, G. Liang, and T. L. Lam</i>	738
Kinematic Redundancy Analysis for $(2n+1)R$ Circular Manipulators	<i>Z. Li, M. Brandstötter, and M. Hofbaur</i>	755
Design of Parallel Variable Stiffness Actuators	<i>C. W. Mathews and D. J. Braun</i>	768
Simulating Underwater Human Motions on the Ground With a Cable-Driven Robotic Platform	<i>A. Rodriguez-Barroso, M. Khan, V. Santamaria, E. Sammarchi, R. Saltaren, and S. Agrawal</i>	783
On the Workspace of Electromagnetic Navigation Systems	<i>Q. Boehler, S. Gervasoni, S. L. Charreyron, C. Chautems, and B. J. Nelson</i>	791
Embedded Magnetic Sensing for Feedback Control of Soft HASEL Actuators	<i>V. Sundaram, K. Ly, B. K. Johnson, M. Naris, M. P. Anderson, J. S. Humbert, N. Correll, and M. Rentschler</i>	808
Distributed Framework Matching	<i>K. Cao, X. Li, and L. Xie</i>	823
