

2023 IEEE/ASME International Conference on Advanced Intelligent Mechatronics (AIM 2023)

**Seattle, Washington, USA
28-30 June 2023**

Pages 1-675



**IEEE Catalog Number: CFP23775-POD
ISBN: 978-1-6654-7634-8**

**Copyright © 2023 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:	CFP23775-POD
ISBN (Print-On-Demand):	978-1-6654-7634-8
ISBN (Online):	978-1-6654-7633-1
ISSN:	2159-6247

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

MorphoGear: An UAV with Multi-Limb Morphogenetic Gear for Rough-Terrain Locomotion.....	11
<i>Mikhail Martynov, Zhanibek Darush, Aleksey Fedoseev, Dzmitry Tsetserukou</i>	
Multi-Objective Co-Design for Mission-Specific Development of Unmanned Aerial Systems	17
<i>Jolan Wauters, Tom Lefebvre, Guillaume Crevecoeur</i>	
Design and Control of a Ground-Aerial Dual Actuator Monocopter (G-ADAM).....	25
<i>Brian Leonard Suhadi, Timothy Wong Zhi Heng, Shane Kyi Hla Win, Luke Soe Thura Win, Shaohui Foong</i>	
Vertical Take-Off and Landing Fixed-Wing Designed for Autonomous Missions	33
<i>Krzysztof Lewandowski, Jakub Tomczak, Jakub Zeifert, Szymon Nowacki, Marcel Król, Dawid Rudy, Jacek Grzybowski, Pawel Piórkowski, Roman Czyba, Marcin Lemanowicz, Piotr Czekalski</i>	
Soft Continuum Robot Airbag Integrated with Passive Walker for Fall Mitigation	40
<i>Jacob Thompson, Ian D. Walker</i>	
A Survey on the Current Trends and Applications of Design Optimization for Compliant and Soft Robotics.....	47
<i>Seshagopalan Thorapalli Muralidharan, Georgios Andrikopoulos, Lei Feng</i>	
Study on Soft Robotic Pinniped Locomotion	65
<i>Dimuthu D. K. Arachchige, Tanmay Varshney, Umer Huzaiifa, Iyad Kanj, Thrishantha Nanayakkara, Yue Chen, Hunter B. Gilbert, Isuru S. Godage</i>	
Independent Tendons Increase Stiffness of Continuum Robots Without Actuator Coupling	72
<i>Parsa Molaei, Nekita A. Pitts, Hunter B. Gilbert</i>	
A High-Bandwidth Closed-Loop MEMS Force Sensor with System Dynamics Adjustment	79
<i>Diyako Dadkhah, S. O. Reza Moheimani</i>	
AFM Microcantilever with On-Chip Electrothermal and Piezoelectric Transducers: Z-Axis Control and Standalone Operation.....	94
<i>Hazhir Mahmoodi Nasrabadi, Nastaran Nikooienejad, K. S. Vikrant, S. O. Reza Moheimani</i>	
Data-Driven Robust Acoustic Noise Filtering for Atomic Force Microscope Image	99
<i>Jiarong Chen, Qingze Zou</i>	
Ensemble Control for Manipulating Multiple Nanowires in Fluid Suspension Using External Electrical Fields.....	105
<i>Juan Wu, Kaiyan Yu</i>	
Admittance-Based Non-Singular Terminal Sliding Mode Control of Multiple Cooperative Manipulators.....	111
<i>Lucas Wan, Ya-Jun Pan, Qiguang Chen</i>	
A Digital Twin Framework for Virtual Re-Commissioning of Work-Drive Systems Using CAD-Based Motion Co-Simulation	119
<i>Rémy Carlier, Joris Gillis, Erwin Rademakers, Gianni Borghesan, Pieter De Clercq, Chris Ganseman, Kurt Stockman, Jeroen D. M. De Kooning</i>	

Error Diffusion Based Feedforward Height Control for Inkjet 3D Printing.....	125
<i>Yumeng Wu, George Chiu</i>	
Flatness-Based MPC Using B-Splines Transcription with Application to a Pusher-Slider System.....	132
<i>Thomas Neve, Tom Lefebvre, Sander De Witte, Guillaume Crevecoeur</i>	
Simulation of Particle Motion on Rotating Cone Feeder for a Multihead Weigher Based on Dynamic Friction Modeling	138
<i>Julia Isabel Hartmann, Michael Olbrich, Marcus Hamann, Christoph Ament</i>	
Low-Cost, Accurate Robotic Harvesting System for Existing Mushroom Farms	144
<i>Panagiotis Mavridis, Nikolaos Mavrikis, Athanasios Mastrogeorgiou, Panagiotis Chatzakos</i>	
Robot End-Effector for Fabric Folding	150
<i>Akira Seino, Junya Terayama, Fuyuki Tokuda, Akinari Kobayashi, Kazuhiro Kosuge</i>	
CoboShell Robot for Automatic Scallop Shelling Process: Concepts and Applications	157
<i>Othman Lakkhal, Abdelkader Belarouci, Xinrui Yang, Taha Chettibi, Rochdi Merzouki</i>	
Design and Prototyping of a Miniature Gripper with Decoupled Wrist and Rolling Capabilities for Robotic Surgery.....	164
<i>Mohamed Sallam, Giuseppe Andrea Fontanelli, Fanny Ficuciello</i>	
Haptic Interface Design for a Novel Wheelchair Simulator Using Linear Time-Varying MPC Framework.....	172
<i>A. Ait-Ghezala, C. Sentouh, T. Bentaleb, P. Pudlo, T. Poulain, G. Conreur</i>	
Point-Based 3D Virtual Fixture Generating for Image-Guided and Robot-Assisted Surgery in Orthopedics*	179
<i>Teng Li, Armin Badre, Hamid D. Taghirad, Mahdi Tavakoli</i>	
Biplane Transrectal Ultrasound Probe Calibration Using Dual-Arm Robotic System with Multi- DOF End-Effectors.....	187
<i>Jing Xiong, Qiangyun Li, Faizan Ahmad, Changfu Xu, Hao Deng, Zeyang Xia</i>	
Development of Orthopedic Haptic Drill for Spinal Surgery with Penetration Detection Scheme Based on Viscosity Estimation	194
<i>Shunya Takano, Tomoyuki Shimono, Takuya Matsunaga, Mitsuru Yagi, Kouhei Ohnishi, Masaya Nakamura, Yuichiro Mima, Kento Yamanouchi, Go Ikeda</i>	
Strategy for Haptic-Based Guidance of Soft Magnetic Particles in the Cochlea.....	201
<i>Ahmed Chah, Hanaa Elfakir, Meziane Larbi, Karim Belharet</i>	
ExSLeR: Development of a Robotic Arm for Human Skill Learning	209
<i>Deokjin Lee, Kiyoun Choi, Junyoung Kim, Wonbum Yun, Taehoon Kim, Kanghyun Nam, Sehoon Oh</i>	
Mitigate Inertia for Wrist and Forearm Towards Safe Interaction in 5-DOF Cable-Driven Robot Arm.....	215
<i>Van Pho Nguyen, Sunil Bohra Dhyam, Chi Cuong Hoang, Boon Siew Han, Jing Yuan Tan, Wai Tuck Chow</i>	
Kinodynamic Motion Planning for Robotic Arms Based on Learned Motion Primitives from Demonstrations.....	221
<i>Joshua A. Ashley, Daniel J. Kennedy, Biyun Xie</i>	

Encrypted Coordinate Transformation Via Parallelized Somewhat Homomorphic Encryption for Robotic Teleoperation.....	228
<i>Hyuk Bin Kwon, Shane Kosieradzki, Jacob Blevins, Jun Ueda</i>	
Design and Development of Compliant Anatomical Palmar Mechanism (CAPM) to Adaptively Reconfigure Precision/Power Grasps	234
<i>Ivy Chang, Kok-Meng Lee</i>	
Quasi-Static State Feedback Output Tracking for a Slung Load System with Rotor Drag Compensation: PX4 SITL Validation	241
<i>Zifei Jiang, Alan F. Lynch</i>	
Path-Following Control for a Slung Load System.....	247
<i>Mohamed Al Lawati, Alan F. Lynch</i>	
Design and Control of a Stable Invertible Coaxial Actuated Rotorcraft (SICARO).....	255
<i>Emmanuel Tang, Wei Jun Ang, Kian Wee Tan, Shaohui Foong</i>	
Safe Residual Reinforcement Learning for Helicopter Aerial Refueling	263
<i>Damsara Jayarathne, Santiago Paternain, Sandipan Mishra</i>	
Terrain-Blind Humanoid Walking on Rough Terrain with Trajectory Optimization and Biarticular Springs.....	278
<i>Mustafa Melih Pelit, Masaki Yamakita</i>	
Alternative Locomotion Modalities for Lunar Rover.....	287
<i>Naphasthanan Phornpimonchoke, Sittiphol Koosermmit, Ashira Tanakijchumroon, Ronnapree Chaichaowarat</i>	
A Wheel to Leg Transformation Strategy in a Leg-Wheel Transformable Robot	293
<i>Hua-Yu Wang, Liang-Jie Chen, Wei-Shun Yu, Pei-Chun Lin</i>	
A Hybrid Impedance and Admittance Control Strategy for a Shape-Transformable Leg-Wheel.....	299
<i>Yuan-Cheng Zhuang, Yu-Ju Liu, Wei-Shun Yu, Pei-Chun Lin</i>	
Boundary Tracking Control for an Unstable Wave Equation with Boundary Uncertainties: A Backstepping Adaptive NN Approach.....	305
<i>Jingting Zhang, Yan Gu, Wei Zeng, Chengzhi Yuan</i>	
Disturbance-Observer-Based Admittance Control and Its Application to Safe Contact Regulation*	311
<i>Kosuke Shikata, Seiichiro Katsura</i>	
Design, Modeling, and Parametric Analysis of a Syringe Pump for Soft Pneumatic Actuators.....	317
<i>Wu-Te Yang, Motohiro Hirao, Masayoshi Tomizuka</i>	
Prediction-Based Control for Uncertain Systems with Input Time Delay and Disturbance	323
<i>Seong-Min Lee, Hungsun Son</i>	
Adaptive Feedforward Control Using a Gaussian Process and a Recursive Least Squares Algorithm for a Hydraulic Axial Piston Pump.....	329
<i>Martin Oberdorfer, Sebastian Schroeter, Oliver Sawodny</i>	
Stability Margins of Heavy-Lifting Machines with a Telescoping Boom and Jib	335
<i>Christopher Adams, William Singhose</i>	
Design and Control of the Portable Upper-Limb Elbow-Forearm Exoskeleton for ADL Assistance.....	343
<i>Hilary HY Cheng, Thomas M. Kwok, Haoyong Yu</i>	

Development of Soft Pneumatic Actuator Based Wrist Exoskeleton for Assistive Motion.....	359
<i>Inderjeet Singh, Veysel Erel, Yixin Gu, Alexandra R. Lindsay, Rita M. Patterson, Chad Swank, Muthu B. J. Wijesundara</i>	
Design and Development of a Lightweight, High-Torque, and Cost-Effective Hip Exoskeleton	367
<i>Jose Esquivel Patricio, Mojtaba Sharifi, Dhurba Shrestha, Sai Hein Si Thu, Eric Kwan</i>	
Compliant Finray-Effect Gripper for High-Speed Robotic Assembly of Electrical Components	375
<i>Richard Matthias Hartisch, Kevin Haninger</i>	
Optimal Cosserat-Based Deformation Control for Robotic Manipulation of Linear Objects	381
<i>Artinian Azad, Huet Quentin, Ben Amar Faiz, Perdereau Véronique</i>	
Development of a Long Flexible Manipulator Utilizing the Motions of Twining and Tightening to Enhance Holding Ability	389
<i>Shotaro Shimegi, Keitaro Ishibashi, Toshihiro Usami, Hiroyuki Ishii</i>	
Six-Bar Pulley-Guided Node Based Prismatic Tensegrity Robot Form-Finding Analysis and Experiment	395
<i>Azamat Yeshmukhametov, Aisulu Tileukulova, Koichi Koganezawa</i>	
Development of an Autonomous, Explainable, Robust Robotic System for Electric Vehicle Battery Disassembly.....	409
<i>Yisheng Zhang, Hengwei Zhang, Zhigang Wang, Shengmin Zhang, Huaicheng Li, Ming Chen</i>	
Optimal and Adaptive Engine Switch Control for a Parallel Hybrid Electric Vehicle Using a Computationally Efficient Actor-Critic Method.....	416
<i>Tong Liu, Kaige Tan, Wenyao Zhu, Lei Feng</i>	
Proposal of On-Board Camera-Based Driving Force Control Method for Autonomous Electric Vehicles	424
<i>Takumi Ueno, Hugo Pousseur, Binh Minh Nguyen, Alessandro Correa Victorino, Hiroshi Fujimoto</i>	
An Efficient Hybrid Deep Learning Approach for Accurate Remaining EV Range Prediction	430
<i>Magdy Abdullah Eissa, Pinggen Chen</i>	
A Linkage-Based Gripper Design with Optimized Data Transmission for Aerial Pick-And-Place Tasks.....	446
<i>Sean Smith, Scott Buchanan, Ya-Jun Pan</i>	
Static-Equilibrium Oriented Interaction Force Modeling and Control of Aerial Manipulation with Uni-Directional Thrust Multirotors	452
<i>Tong Hui, Matteo Fumagalli</i>	
A Tilttable Airframe Multirotor UAV Designed for Omnidirectional Aerial Manipulation.....	460
<i>Hannibal Paul, Ricardo Rosales Martinez, Borwonpob Sumetheeprasit, Kazuhiro Shimonomura</i>	
Null-Space-Based Adaptive Control for Aerial Manipulators on Cooperatively Transporting Cable-Suspended Objects	466
<i>Te-Kang Hung, Yen-Chen Liu, Chen En Lee</i>	
Multi-Camera Visual Predictive Control Strategy for Mobile Manipulators.....	476
<i>H. Bildstein, A. Durand-Petiteville, V. Cadenat</i>	

Enhancing Indoor Auto-Steering for AMRs Through RGB and Depth Fusion	483
<i>Chi-Hsuan Lee, Chih-Hung G. Li</i>	
Real-Time Visual-Servo Navigation for Map-Free Self-Driving in Unstructured Outdoor Environments.....	489
<i>Ho-Feng Chang, Chih-Hung G. Li</i>	
Full Vehicle Experimental Testing of Semi-Active Suspension Equipped with Magnetorheological Dampers	495
<i>Tiancheng Xu, Huixing Wang, Yancheng Li, Dengxin Leng, Hanou Xu</i>	
Semi-Active Magnetorheological Suspension of a Full-Vehicle Model Based on Combined Vertical and Attitude Control	501
<i>Peng Lyv, Dingxin Leng, Yancheng Li, Tiancheng Xu, Wang Huixing, Hanou Xu</i>	
Development of a Magnetorheological Elastomer Actuator for a Mixed Reality Haptic Glove	507
<i>Matthew Daniel Christie, Taine Fredericksen, Weihua Li</i>	
Vibration Control of Semi-Active Suspension with Cam Mechanism-Based Nonlinear Stiffness Structure	511
<i>Zehua Cai, Donghong Ning</i>	
A Fully 3D Printed, Multi-Material, and High Operating Temperature Electromagnetic Actuator.....	517
<i>Sebastian Mettes, Justin Bates, Kenneth W. Allen, Yi C. Mazumdar</i>	
Design and Control of 3-DOF Reluctance-Force-Type Magnetic Levitator Module for Fine- Positioning Short-Stroke Stage.....	525
<i>Hyeong Min Yoon, Jae Woo Jung, Eun Kyu Kim, Jeong Min Park, Jong Min Sung, Jun Young Yoon</i>	
The Development of a Novel Coil Gun with Permanent Magnet.....	531
<i>Bingxuan Cheng</i>	
Multiple Magnet Independent Levitation and Motion Control Using a Single Coil Array	537
<i>Peter Berkelman, Steven Kang</i>	
Analytical Design Methodology Based on Distributed Current Source Models for Parametric Study of a Three-DOF Planar Motor	543
<i>Zixin Que, Kok-Meng Lee</i>	
Design and Control of PM-Biased Bi-Stable Latching Actuator for Low-Power Micropump.....	549
<i>Eun Kyu Kim, Bo Min Kang, Hyo Geon Lee, Hyeong Min Yoon, Jae Hyun Kim, Jae Woo Jung, Jun Young Yoon</i>	
A Review of Optomechatronic Ecosystem	555
<i>Sam Zhang</i>	
Extrinsic Calibration of 2D Millimetre-Wavelength Radar Pairs Using Ego-Velocity Estimates	559
<i>Qilong Cheng, Emmett Wise, Jonathan Kelly</i>	
A Self-Organized Maps Ground Extract Method Based on Principal Component Analysis	567
<i>Yu Yao, Yunhua Li, Tao Qin</i>	
Spectro-Temporal Recurrent Neural Network for Robotic Slip Detection with Piezoelectric Tactile Sensor	573
<i>Théo Ayrat, Saïfeddine Aloui, Mathieu Grossard</i>	

Design and Implementation of Bending Force Sensor Featuring Printed Circuit Board.....	579
<i>I-Wen Hsieh, Yu-Chi Chen, Shao-Kang Hung</i>	
A Reliable Kinematic Measurement of Upper Limb Exoskeleton for VR Therapy with Visual-Inertial Sensors.....	584
<i>Thomas M. Kwok, Tong Li, Haoyong Yu</i>	
Neural Network Learning of Robot Dynamic Uncertainties and Observer-Based External Disturbance Estimation for Impedance Control *	591
<i>Teng Li, Armin Badre, Hamid D. Taghirad, Mahdi Tavakoli</i>	
Modulation of Joint Stiffness for Controlling the Cartesian Stiffness of a 2-DOF Planar Robotic Arm for Rehabilitation	598
<i>Thanapol Tantagunninat, Narakorn Wongkaewcharoen, Khemwutta Pornpipatsakul, Rada Chuengpichanwanich, Ronnapee Chaichaowarat</i>	
Precise Torque Control in High Temperature with Heat Transfer Model Based Torque Constant Compensation Algorithm.....	604
<i>Jimin Youn, Hyeonjun Kim, Taeyeon Kim, Kyoungchul Kong</i>	
Prediction Accuracy and Model Robustness of Neural Network-Based Ground Reaction Force Estimators.....	609
<i>Mohamed Abdelhady, Thomas C. Bulea, Wael Abouelwafa, Dan Simon</i>	
A Methodology for Early Design Specifications of Robotic Grippers	616
<i>Jonatan Martín Escorcia-Hernández, Mathieu Grossard, Florian Gosselin</i>	
An Iterative Method for Solving the Inverse Kinematic Problem of Three-Joints Robotic Fingers with Distal Coupling.....	623
<i>Jonatan Martín Escorcia-Hernández, Mathieu Grossard, Florian Gosselin, Clémence Dubois</i>	
Serial Chain Hinge Support for Soft, Robust and Effective Grasp.....	629
<i>Dario Stuhne, Jelena Vuletic, Marsela Car, Matko Orsag</i>	
Dynamic Manipulation Like Normal-Type Pen Spinning by a High-Speed Robot Hand and a High-Speed Vision System	636
<i>Shoma Nakatani, Yuji Yamakawa</i>	
STAR-2: A Soft Twisted-String-Actuated Anthropomorphic Robotic Gripper: Design, Fabrication, and Preliminary Testing.....	643
<i>Aaron Baker, Claire Foy, Steven Swanbeck, Revanth Konda, Jun Zhang</i>	
Application of Support Vector Machine for Near Real-Time Health Structural Diagnosis for Drones.....	649
<i>Wei-Hsiang Lai, Yih-Rong Liang, Carlos Rene Cristales Cardona, De-Li Cheng</i>	
Panoramic Image-Based Aerial Localization Using Synthetic Data Via Photogrammetric Reconstruction.....	656
<i>Danial Sufiyan, Ying Hong Pheh, Luke Soe Thura Win, Shane Kyi Hla Win, U-Xuan Tan, Shaohui Foong</i>	
Wind Vector Estimation Considering Difference of Propeller Model Characteristics for Fully Actuated Drone.....	663
<i>Manto Kamiya, Sakahisa Nagai, Hiroshi Fujimoto</i>	
Aerial Deployment of Novel Gravity-Assisted Ground Penetrating Sensors Using Nature-Inspired Platform.....	669
<i>Shane Kyi Hla Win, Kristabel Lim, Brian Leonard Suhadi, Danial Sufiyan, Shaohui Foong</i>	

A Supervisory Learning Control Framework for Autonomous & Real-Time Task Planning for an Underactuated Cooperative Robotic Task	676
<i>Sander De Witte, Tom Lefebvre, Thijs Van Hauwermeiren, Guillaume Crevecoeur</i>	
Dynamics Analysis and Simulation of an Open-Chain Tetrahedral Robot.....	684
<i>Yubin Wang, Zhenjun Shen, Qian Yang, Yichen Bao, Dongdong Chen</i>	
Study on Omnidirectional Cooperative Transport System Using Multiple Dual-Wheeled Mobile Robots with Active-Caster Control.....	690
<i>Yu Arai, Masayoshi Wada</i>	
A Feasible Study on the Model Predictive Control for Docking Approach of Small Spacecraft Using Thrusters and a Control Moment Gyro	696
<i>Katsuyoshi Tsujita</i>	
Pose Estimation Based on Point Pair Features with Optimized Voting and Verification Strategies	703
<i>Gaoming Chen, Ao Gao, Wenhang Liu, Chao Liu, Zhenhua Xiong</i>	
BiSPD-YOLO: Surface Defect Detection Method for Small Features and Low-Resolution Images.....	709
<i>Sixu Yan, Gaoming Chen, Ao Gao, Chao Liu, Zhenhua Xiong</i>	
Image Foreground Segmentation Based on Small Data Set for Visual Servo Applications	715
<i>Yan Luo, Gaoming Chen, Chao Liu, Zhenhua Xiong</i>	
Copy and Paste Augmentation for Deformable Wiring Harness Bags Segmentation.....	721
<i>Bare Luka Žagar, Alessio Caporali, Amadeusz Szymko, Piotr Kicki, Krzysztof Walas, Gianluca Palli, Alois C Knoll</i>	
Convolutional Neural Network Based Denoising for Digital Image Correlation Reconstructing High-Fidelity Deformation Field.....	727
<i>Bangyan Niu, Jingjing Ji</i>	
A Vision-Based Shared Autonomy Framework for Deformable Linear Objects Manipulation	733
<i>Davide Chiaravalli, Alessio Caporali, Anna Friz, Roberto Meattini, Gianluca Palli</i>	
Motion Decoupling for Cable-Driven Serial Robots Based on a Noncircular Pulley	739
<i>Jinsai Cheng, Tao Shen</i>	
Adaptive Extended State Observer-Based Terminal Sliding Mode Control for PMSM System with Uncertainties.....	746
<i>Yuxiang Ma, Yunhua Li, Tao Qin</i>	
A Novel Series Elastic Actuator with Variable Stiffness	760
<i>Chao Wang, Zhenhong Li, Bo Sheng, Manoj Sivan, Zhi-Qiang Zhang, Gu-Qiang Li, Sheng Quan Xie</i>	
OpenPneu: Compact Platform for Pneumatic Actuation with Multi-Channels	765
<i>Yingjun Tian, Renbo Su, Xilong Wang, Nur Banu Altin, Guoxin Fang, Charlie C. L. Wang</i>	
Torque Model and Drive Method for Developing Closed-Loop Orientation Control of Spherical Brushless Direct Current Motor	771
<i>Sangheon Lee, Hungsun Son</i>	
A Study of Hand Function in Stroke Patients Using Kinematic Metrics.....	777
<i>Bo Sheng, Jianyu Zhao, Junjun Zheng, Chaoqun Duan, Sheng Quan Xie, Jing Tao</i>	

Understanding and Controlling the Sensitivity of Event Cameras in Responding to Static Objects	783
<i>Qiyao Gao, Xiaoyang Sun, Zhitao Yu, Xu Chen</i>	
Design, Fabrication, and Characterisation of a Novel Piezoimpedal Tactile Sensor for Use in Soft-Prosthetic Devices	787
<i>Thomas Searle, Vitor Sencadas, Gursel Alici</i>	
Modeling of Interface Loads for EOD Suit Wearers	793
<i>Yuan Gao, Stephanie Epstein, Murat Inalpolat, Yi-Ning Wu, Yan Gu</i>	
Comparison Analysis of Thermistor and RTD for Energy Transfer Station Application	800
<i>Mashhood Zafar, Bin Wei</i>	
Model-Based Estimation of Mental Workload in Drivers Using Pupil Size Measurements	815
<i>Prarthana Pillai, Balakumar Balasingam, Francesco N. Biondi</i>	
The Pinch Sensor: An Input Device for In-Hand Manipulation with the Index Finger and Thumb	822
<i>Cong Wang, Deepak Vungarala, Kevin Navarro, Neel Adwani, Tao Han</i>	
Non-Invasive Feedback for Prosthetic Arms: A Conceptual Design of a Wearable Haptic Armband	828
<i>Sudhir Solomon Zhuwawu, Ahmed B. Zaki, Mahmoud El-Samanty, Victor Parque, Haitham El-Hussieny</i>	
Biometric Signature Authentication with Low Cost Embedded Stylus	834
<i>Divas Subedi, Digesh Chitrakar, Isabella Yung, Yicheng Zhu, Yun-Hsuan Su, Kevin Huang</i>	
STAD-FEBTE, a Shallow and Supervised Framework for Time Series Anomaly Detection by Automatic Feature Engineering, Balancing, and Tree-Based Ensembles: An Industrial Case Study	840
<i>M. A. Zakeri Harandi, Chen Li, Casper Schou, Sigurd L. Villumsen, Simon Bøgh, Ole Madsen</i>	
A Robust Wavelet-Integrated Residual Network for Fault Diagnosis of Machines with Adversarial Training	847
<i>Xiwei Li, Yaguo Lei, Xiang Li, Bin Yang</i>	
Deep Learning Based Time-Frequency Image Enhancement Method for Machinery Health Monitoring	852
<i>Madhurjya D. Choudhury, Kelly Blincoe, Jaspreet S. Dhupia</i>	
A Framework to Support Failure Cause Identification in Manufacturing Systems Through Generalization of Past FMEAs	858
<i>Sho Okazaki, Shouhei Shirafuji, Toshinori Yasui, Jun Ota</i>	
Transfer Learning Enhanced Full Waveform Inversion	866
<i>Stefan Kollmannsberger, Divya Singh, Leon Herrmann</i>	
Segmentation of Fatigue Cracks in Ancillary Steel Structures Using Deep Learning Convolutional Neural Networks	872
<i>Faezeh Jafari, Sattar Dorafshan, Naima Kaabouch</i>	
A Robotic System of Systems for Human-Robot Collaboration in Search and Rescue Operations	878
<i>Teng Hooi Chan, James Kusuma Dewa Halim, Kian Wee Tan, Emmanuel Tang, Wei Jun Ang, Jin Yuan Tan, Samuel Cheong, Hoan-Nghia Ho, Benson Kuan, Muhammad Shalihan, Ran Liu, Gim Song Soh, Chau Yuen, U-Xuan Tan, Lionel Heng, Shaohui Foong</i>	
A Novel Human-Machine Collaboration Approach for Autonomous Driving with Hand Gesture-Based Guidance	886
<i>Yiran Zhang, Zhongxu Hu, Chen Lv</i>	

Human-Robot Interactive Disassembly Planning in Industry 5.0.....	891
<i>Shanhe Lou, Runjia Tan, Yiran Zhang, Chen Lv</i>	
Musculoskeletal Model Construction of Deep Squat Using Low-Cost Inertial Measurement Units	896
<i>Guohui Wang, Yu Chen, Minda Wang, Yifan Wang</i>	
ARMoR: Amphibious Robot for Mobility in Real-World Applications.....	910
<i>Matthew G. Hammond, Kiju Lee</i>	
Energy Efficient Depth Control for Underwater Devices Using Soft and Hard Actuators.....	916
<i>Denizcan Koc, Wenyu Zuo, Fathi Ghorbel, Zheng Chen</i>	
Bio-Mimetic Autonomous Underwater Vehicle Control Using Time Delayed Estimation Technique	930
<i>Abdullah Algethami, Rajasree Sarkar, Syed Muhammad Amrr, Arunava Banerjee</i>	
Constrained Model Predictive Control of Variable Buoyancy Device	936
<i>Muhammad Umar Masood, Theophilus Kaaya, Zheng Chen</i>	
Novel Rigid-Wing Bi-Directional Sailboat Design and Method of Sailing.....	942
<i>Luke Soe Thura Win, Shane Kyi Hla Win, Danial Sufiyan, Shaohui Foong</i>	
Optimal Multisine Perturbations for Improved Dynamic System Identification Using a Mechanical Platform: A Preliminary Simulation Study.....	948
<i>Yingxin Qiu, Mengnan Wu, Lena H. Ting, Jun Ueda</i>	
Multi-Axis Manipulator Kinematic Calibration Using a Novel Linearized Finite Screw Deviation Model	954
<i>Jaehyung Kim, Min Cheol Lee</i>	
Optimal 2nd Order LTI System Identification.....	960
<i>Leo Stocco</i>	
Solving Stochastic Inverse Problems with Stochastic BayesFlow	966
<i>Yi Zhang, Lars Mikelsons</i>	
A New Torque Estimation Method Based on Equivalent Efficiency Model and BP Neural Network of Mechatronic Integrated Joint.....	973
<i>Junjie Dai, Xin Yang, Chin-Yin Chen, Guilin Yang, Han Chen</i>	
Data-Driven Identification of Stochastic System Dynamics Under Partial Observability Using Physics-Based Model Priors with Application to Acrobot	979
<i>Victor Vantilborgh, Tom Lefebvre, Guillaume Crevecoeur</i>	
Developing a Two-Roll Wire Straightener	996
<i>Wei-Chen Lee, Kun-Chung Huang</i>	
Tension Ripple-Free Dancer Control of a Web Processing Machine.....	1002
<i>Jasper De Viaene, Yentl Thielemans, Arul K. Mathivanan, Jeroen D. M. De Kooning, Kurt Stockman</i>	
System Identification and Force Estimation of a Grinding Tool	1008
<i>Shang-Ya Siao, Yu-Lin Chu, Pei-Chun Lin</i>	
Geometry-Agnostic Melt-Pool Homogenization of Laser Powder Bed Fusion Through Reinforcement Learning	1014
<i>Bumsoo Park, Sandipan Mishra</i>	

An Industrial Applicable Approach Towards Design Optimization of a Reciprocating Mechanism: An Emergency Ventilator Case Study	1020
<i>Abdelmajid Ben Yahya, Nick Van Oosterwyck, Jan Herregodts, Stijn Herregodts, Simon Houwen, Bart Vanwalleghem, Stijn Derammelaere</i>	
Sensitivity Analysis Framework for the Evaluation of Modular Drivetrain Architectures	1027
<i>David Van Os, Théo Tuerlinckx, Hendrik Vansompel, Peter Sergeant, Koen Laurijssen, Kurt Stockman</i>	
Towards Task Tailored Articulated Robot Designs.....	1033
<i>Tom Lefebvre, Jolan Wauters, Frederik Ostyn, Guillaume Crevecoeur</i>	
Single- And Multi-Degree-Of-Freedom Servo Trajectory Generation: An Optimization Framework, Implementation, and Examples	1040
<i>Layne Clemen, Cory J. Rupp</i>	
Continuous Dynamic Wireless Power Transfer for Circular Roadway with Optimal Load: Design and Analysis	1048
<i>Chen-En Lee, Sheng-Feng Lin, Yen-Chen Liu</i>	
Actuator Placement in Adaptive Structures for Static Compensation – Minimizing Displacements Versus Minimizing Actuator Forces	1055
<i>Fabian Friz, Amelie Zeller, Michael Böhm, Oliver Sawodny</i>	
Interactive Task Encoding System for Learning-From-Observation	1061
<i>Naoki Wake, Atsushi Kanehira, Kazuhiro Sasabuchi, Jun Takamatsu, Katsushi Ikeuchi</i>	
Brain Computer Interfaces for Supervisory Controls of Unmanned Aerial Vehicles *	1067
<i>Zhuming Bi, Yanfei Liu, Emmanuel Quaye, Chaomin Luo</i>	
Predictive Assistive Motion Generation Based on Human Intent for Human-Collaborative Robots	1073
<i>Naoki Ichimura, Jun Ishikawa</i>	
Improving Human Positioning Control of Oscillatory Systems	1080
<i>Man Wo Lui, Daniel Kotten, Enea Dushaj, William Singhose</i>	
Generating Synthetic Data Using a Knowledge-Based Framework for Autonomous Productions	1086
<i>Oliver Petrovic, David Leander Dias Duarte, Werner Herfs</i>	
Reduced-Order Nominal Model Design and Validation for Task Space DOB-Based Motion Control of an Industrial Robot.....	1095
<i>Kangwagye Samuel, Kevin Haninger, Sehoon Oh, Chan Lee</i>	
Identification and Reduction Method of Normal-Direction Force Ripple in Permanent Magnet Linear Synchronous Motor.....	1102
<i>Yoon Sik Kwon, Sangmin Lee, Jun Young Yoon</i>	
Multi-Axis Active Vibration Suppression for Wafer Transfer Systems	1108
<i>Jiajie Qiu, Hongjin Kim, Fangzhou Xia, Kamal Youcef-Toumi</i>	
Validation of Feedforward Disturbance Cancellation for the PSS3 HDD Benchmark Problem for Dual Stage Actuators	1115
<i>Yuma Tanaka, Jun Ishikawa</i>	
Experimental Comparison of Manual and Automated Crane Control Through Obstacle Fields.....	1121
<i>Tyler Rome, Christopher Adams, William Singhose</i>	

Early Inner Race Fault Detection on a Ball Bearing Setup Using Histogram of Oriented Gradients and Wavelet Subselection	1127
<i>Cedric Van Heck, Jolan Wauters, Tom Staessens, Guillaume Crevecoeur, Ted Ooijevaar</i>	
Sensitivity Analysis of Geometric Parameter Errors for Industrial Robots Based on Random Forest*	1135
<i>Pin Lv, Weihao Shi, Yubin Wang, Ruiyan Li, Dongdong Chen</i>	
DQDWA: Dynamic Weight Coefficients Based on Q-Learning for Dynamic Window Approach Considering Environmental Situations	1141
<i>Masato Kobayashi, Hiroka Zushi, Tomoaki Nakamura, Naoki Motoi</i>	
Transformer for Automated Feedback System Design	1147
<i>Isaac Hughes, John F. O'Brien</i>	
Encrypted Classification for Prevention of Adversarial Perturbation and Individual Identification in Health-Monitoring	1153
<i>Hiroaki Kawase, Waiman Meinhold, Clint Zeagler, Toni P Miles, Jun Ueda</i>	
A Fast Score-Based Method for Robotic Task-Free Point-To-Point Path Learning	1159
<i>Alex Pasquali, Kevin Galassi, Gianluca Palli</i>	
Rhino: An Autonomous Robot for Mapping Underground Mine Environments	1166
<i>Christopher Tatsch, Jonas Amoama Bredu, Dylan Covell, Ihsan Berk Tulu, Yu Gu</i>	
Increasing Mobile Robot Tethered Payload Transport Capacity Through Multipurpose Manipulation	1174
<i>Raymond Kim, Edward Diller, Eemil Harkonen, Anirban Mazumdar</i>	
Modeling Solid-State LiDAR Sensor for Optimization of Area Coverage Deployment	1182
<i>Farsam Farzadpour, Tong Zhang, Xiang Chen</i>	
Rollover Prevention by Quadruped Tracked Mobile Robot	1188
<i>Toyomi Fujita, Shun Sato</i>	
Parameter Identification Related to Vertical Dynamic of a Self-Stabilizing Monorail Vehicle	1196
<i>Martin Griese, Seyed Davood Mousavi, Thomas Schulte</i>	
Automated Backlash Determination on Rack-And-Pinion Drives	1202
<i>Wiebke Zenn, Alexander Keck, Marcus Beck, Sven Herold, Tobias Melz</i>	
Towards Mechatronics Approach of System Design, Verification and Validation for Autonomous Vehicles	1208
<i>Chinmay Samak, Tanmay Samak, Venkat Krovi</i>	
Virtual Reality System Using Explainable AI for Identification of Specific Expert Refinery Inspection Skills	1214
<i>Hiroki Takeuchi, Ryota Takamido, Shinji Kanda, Yasushi Umeda, Hajime Asama, Seiji Kasahara, Seigo Fukumoto, Sunao Tamura, Toshiya Kato, Masahiro Korenaga, Akinobu Sasamura, Misaki Hoshi, Jun Ota</i>	
Prototype of Ball-Like Jumping Robot for Playful Learning	1220
<i>Yuto Sango, Hiroyuki Ishii</i>	

Development of a Nursing Skill Training System Based on Manipulator Variable Admittance Control.....	1226
<i>Yuhao Zhou, Ryota Takamido, Masako Kanai-Pak, Jukai Maeda, Yasuko Kitajima, Mitsuhiro Nakamura, Noriaki Kuwahara, Taiki Ogata, Jun Ota</i>	
On the Design and Development of a Tabletop Robot for Interaction with Children.....	1232
<i>Christos Andreanidis, Johanna Bergsten, Marcel Brümmer, Joel Fröberg, Algot Lindestam, Annie Persson, Fahim Pirmohamed, Maria Sandahl, Seshagopalan Thorapalli Muralidharan, Georgios Andrikopoulos</i>	
A Novel Sidewinding Snake Robot with Non-Zero Slope in Granular Terrains Modeled by DRFM.....	1238
<i>Lei Huang, Hengqiang Ming, Yuehong Yin</i>	
Design and Analysis of a Compliant Mechanism with Variable Stiffness.....	1254
<i>Weipeng Zhang, Peng Yan</i>	
Non-Linear Friction Characterisation of the Unwinding Group in a Web Processing Machine.....	1260
<i>Arul K. Mathivanan, Jasper De Viaene, Yentl Thielemans, Jeroen D. M. De Kooning, Kurt Stockman</i>	
A Parameterized Cubic Bézier Spline-Based Informed RRT* for Non-Holonomic Path Planning	1267
<i>Zifan Fei, Ya-Jun Pan</i>	
Efficient Trajectory Planning and Control for USV with Vessel Dynamics and Differential Flatness.....	1273
<i>Tao Huang, Zhenfeng Xue, Zhe Chen, Yong Liu</i>	
Performance Comparison for Aggregation and Formation of Swarm Robots.....	1290
<i>Emre Yazici, Hakan Temeltas</i>	
Cooperative Time-Optimal Trajectory Generation for a Heterogeneous Group of Redundant Mobile Manipulators*.....	1296
<i>Alice Hierholz, Andreas Gienger, Oliver Sawodny</i>	
Holistic Deep-Reinforcement-Learning-Based Training for Autonomous Navigation in Crowded Environments.....	1302
<i>Linh Kästner, Marvin Meusel, Teham Bhuiyan, Jens Lambrecht</i>	
Motion Profile Optimization in Industrial Robots Using Reinforcement Learning.....	1309
<i>Yunshi Wen, Honglu He, Agung Julius, John T. Wen</i>	
Deformable Fractional Filters.....	1318
<i>Julio Zamora-Esquivel, Anthony Rhodes, Edgar Macias-Garcia, Lama Nachman</i>	
Motion Dynamics Modeling and Fault Detection of a Soft Trunk Robot	1324
<i>Emadodin Jandaghi, Xiaotian Chen, Chengzhi Yuan</i>	
3-D Precision Positioning Based on Deep Comparison Convolutional Neural Networks	1330
<i>Bo-Xu Wen, Chih-Hung G. Li</i>	
Deep Neural Network Design for Improving Stability and Transient Behavior in Impedance Control Applications.....	1336
<i>Jonathon E. Slightam, Antonio D. Griego</i>	

Author Index