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Table of Contents

SP1-1	Doctorate Academic Forum on Robotics (I)	
	An Improved Point Cloud Segmentation Method Based on Multi-scale Fusion Strategy	1
	Zhiyuan Wang, Xuezhi Xiang	
	3D Hand Pose Estimation and Shape Reconstruction based on Multi-task Learning	7
	Jiye Wang, Xiaoming Luan	
	Pseudo-label Assisted Optimization of Multi-branch Network for Cross-domain Person	
	Re-identification Re-identification	13
	Zhengyang Wang, Shuxiang Guo, Xue Shang, Xiufen Ye	
	FEUWNet: A Fast and Effective Baseline for Underwater Image Enhancement	19
	Xinkui Mei, Xiufen Ye, Junting Wang, Shengya Zhao	
	A Gesture Recognition and Drone Control System based on Residual Neural Network	25
	Rui Wang, Chengjiao Sun	
	Research on Adaptive Density Normalized Crowd Counting Algorithm	31
	Hui Wang, Wenqiu Hu, Zhiqiang Wang, Zihang Gao, Chao Sun	
SP2-1	Doctorate Academic Forum on Robotics (II)	
	Fatigue Analysis of Leg Structure of a Natatores-Like Amphibious Robot	36
	Yan Niu, Liwei Shi, Shuxiang Guo	
	ASV Finite-time-formation Control Based on an Improved Extended State Observer and	
	Saturation Functions	41
	Fengxu Guan, Rui Hu, Zipeng Yang, Ruixuan Di	
	Research of Combined Rudder and Fin Stabilizer Control Strategy for Ship	49
	Lihua Liang, Quancheng Cheng, Pengfei Cai, Jianfeng Li, Zhiwen Le, Yinling Jiang	
	Fixed-time Disturbance Observer-based Cooperative Control for Multiple Dynamic	
	Positioning Vessels under Directed Topologies	55
	Benwei Zhang, Guoqing Xia, Zheda Ren	
	Multi-Agent Task Planning Algorithm Based on Region Parameter Sharing	61
	Wen Zhang, Qing Weng, Kun Li, Xianchao Cao, Jing Wang	
	A Research of Voxel-Based Amygdala Genetic Network Based on Improved Label	
	Propagation Algorithm	67
	Lingfei Wang, Yuxin Li, Jin Li, Wenjie Liu	

MA1-P Poster Session (Intelligent Mechatronics and Automation)

Multi-confidence Measure Combined with PCA for Focus Measurement Combination in	
Shape from Focus	73
Jiqiang Chen, Yuezong Wang	
Design of a PMSM Speed Regulation System Based on an Improved GWO Algorithm	79
Jingyi Zhu, Wanlu Zhu, Pengfei Zhi, Haifeng Wei	
<u>Design of An Automated Injection System Based on Dorsal Hand Vessel Recognition</u> Wenjin Wang, Qi Zhang, Hui Jiang, Huachong Luo, Bincheng Zhang	85
An Improved Variable Window Detection Method for Exoskeleton Assistive Timing	90
Lei Sun, Rundong Lu	
Plastic optical fiber tapered sensor for breathing sensing	95
Youkui Zhang, Mingda Zhao, Haiwei Zhang, Zhihong Chen, Lifang Xue	
Developing Digital twin for Transforming CNC machine to Industry 4.0 for Remote	
<u>Monitoring</u>	100
Suma Varshini Borra, Hemanth Guntipally, Shashank Vuppugalla, Faiz Iqbal, Janardhan Vistapalli	
Quantifying the Cardiopulmonary Rhythm Locking by the Ratio of Heart Rate to	
Respiratory Rate in Healthy Subjects during Different Sleep Stages	106
Yanjun Li, Lin Li, Geqiang Zhou, Jinzhong Song, Chuang Yu, Guoqiang Gong, Xinming Yu, Linghao Xiong	
OTFS Channel Estimation Based on EP-MUSIC Algorithm	112
Yuchen Zhang, Youwei Li, Dongyue Cao	
Design and Implementation of Medium and Low Frequency Long Baseline Positioning	
<u>System</u>	118
Jucheng Zhang, Zongqi Fu, Yunfeng Han, Cuie Zheng	
Research and Design of Child Monitoring System based on GPS and RFID	124
Cheng Cheng, Zufeng Zhang, Haiqing Gu, Baoyi Zhang, Qiang Li, Shihao Li, Xu Han	
Trajectory planning for robot arm based on the Improved Mixture of Motors Primitives	129
Shuo Wang, Yinlong Yuan, Hongyu Shi, Yongyan Zhong	
A forest fire detection method based on adaptive feature fusion module	135
Jingguo Liu, Jingzhou Song, Xiaochuan Li	
Research on Intelligent Segmentation Processing and Navigation Area Optimization	141

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Bing Li, Mingze Li, Zhigang Qi

Research on virtual training system of robot-assisted surgery based on Unity3D	146
Ling Zhu, Guoxian Cao, Yuan Guo	
New Pulse High-frequency Signal Injection without Position Sensor Control	151
Wei Liu, Pengfei Zhi, Qitong Xue, Wanlu Zhu, Bin Wang	
An Surface Defect Extraction of Component Scratches Algorithm Based on Gaussian	
<u>Filter</u>	157
Hao Li, Niansong Zhang, Aimin Wang	
Sensor Subsets Selection for ASPN Based on Environment Awareness	163
Chunzhi Liu, Wei Gao, Shiwei Fan, Ya Zhang, Qingxin Wang, Guangmin Li, Yanyan Wang	
Research on the Advantages of Nonlinear Algorithm for Magnetic Positioning of	
Capsule Robot	171
Qiang Fu, Dongdong Zhao, Zufeng Zhang, Bailong Duan	
Structural Design of Rubber Roll Rice Huller	176
Bozhuo Jiang	
Multiple sets of high-precision inertial navigation information fusion strategy based on	
confidence analysis	181
Tian Qiu, Yuxin Zhao, Yueyang Ben, Liang Hou, Kun Wang, Rui Zhang	
Study on The Limit Size Determination Method of The Inlet Hole of The Limiting Current	
Oxygen Sensor	189
Min Chen, Shuai Ni, Zhibo Geng, Xiaomei Xie, Lei Li	
Research on GA-BCC Algorithm for Process Cost Consumption Standards Establishing	194
Xiaoke Guo, Niansong Zhang, Aimin Wang	
Design of an Improved Stator Flux Observer Based on a Super-twisting Algorithm	199
Kaiqi Zhao, Pengda Zhou, Tianyu Zhu, Yang Liu	
Uncertainty Treatment of Integrated Energy System Based on Scenario Reduction	
<u>Method</u>	205
Caiwei Wang, Yanjuan Wu, Peizhi Cong, Yuzhe He	
Chaos Suppression of Power System Based on Finite-time Adaptive Sliding Mode	
<u>Control</u>	210
Hongjun Wang, Shuyi Li, Hui Zhao, Youjun Yue	
Energy Efficiency Prediction Model of Suction Hopper Dredger Based on Correlation	216

Analysis and Convolutional Neural Network	
Jinyue Zhang, Liheng Chen, Daqing Qin	
3D Semantic Segmentation Based on Improved Residual Block Point-Voxel Feature	
Fusion Network	222
Xitai Zheng, Mingliang Liu	
Research on Stress Concentration Optimization of Unconventional B-Type Sleeve for Oil Pipeline	227
Hao Zhang, Zhibo Guo, Shuhui Zhang	
Research on Trajectory Planning Algorithm for Intelligence Robot Cutting-Grinding Zhigang Wang, Niansong Zhang, Aimin Wang	233
<u>Vision-based Runway Detection and Landing for Unmanned Aerial Vehicle Enhanced</u> <u>Autonomy</u> <i>Kyriacos Tsapparellas, Nickolay Jelev, Jonathon Waters, Sabine Brunswicker, Lyudmila S Mihaylova</i>	239
Gaze Following Based on Attention Mechanism Yanzhao Li, Jin Li, Xiaona Zhang	247
Research on a method of real-time combination of BDS clock corrections Mengxiao Zhang, Liang Li, Fuxin Yang, Jie Zhang	252
Realization of Flying Capacitor Inverter Three-Level Inverter Based on DSP Code Generation Wei Li, Wenqiang Yang, Yuefan Wang, Xiaoyong Ma, Zhongda Wang	257
Automatic Case Generation of Variation Testing in Navigation Software Based on the Genetic Algorithm Qi Shao	263
Elderly Helper Detection based on R2-yolov5 Lei Wang, Yi Wang, Jin Wu	269
Multiple Control Surface Coordinated Allocation Strategy for Hovercraft Sailing on Polar Region Chengjie Wu, Le Zha, Shihai Lv, Song Gao	274
Semantic Segmentation of Liver Magnetic Resonance Images Based on Hybrid Attention Mechanism	279

Zhang Chenghao, Li Jin, Wang Lingfei, Zhang Yu, Wang Peng

Transformation of Industry 3.0 CNC Machines to Industry 4.0 Machines: Sensor

285

Selection and Integration

Vallapureddy Aneesh Reddy, Vanga Vamshi Krishna, Annamaneedi Charishma, Faiz Iqbal, Janardhan Vistapalli

A 2D-Laser-based Pedestrian Detector for Mobile Robots via Self-Supervised Transfer	
<u>Learning</u>	291
Wenfei Hu, Shuai Fang, Yi Wang, Dingsheng Luo	
A Multi-source Information Fusion Method for Mobile Robot Visual-inertial Navigation	296
Changzhen Xu, Sen Zhang, Kaice Jiang	
A Real-time Detection Technology for High-precision Installation of LNG Carriers'	
Insulation panels	302
Jianjun Yao, Xu Wang, Tianci Xu, Jiajia Li, Yuanwei Zhao	
Sonar Electronic Platform System Design	308
Yunfeng Han, Runfeng Zhao, Jucheng Zhang, Cuie Zheng	
The Cooperative Positioning Method of MUUVs Based on Adaptive CKF	314
Jian Yang, Tao Luo, Shile Wei, Yabo Wang, Honghua Wang	
A Single-Frame Face Anti-Spoofing Algorithm With Circular CDC and Multi-Scale	
Spatial Attention	319
Shan He, Enzeng Dong, Jigang Tong, Sen Yang, Xuehui Liang, Wenyu Li	
Review of Digital Twin Technology Development and Application Prospect in Inertial	
<u>Technology</u>	324
Aiqi Liang, Tingjun Wang, Lei Wang, Wen Zhang, Yongyi Ren	
Design, Characterization, and Optimization of the Soft Bellows Pneumatic Actuator	331
Liang Liang, Lijun Meng, Huichen Ma	
Investigation on the machining performance of a hole-making 6R serial robot	336
Dongang Liu, Jinming Wu	
Design of a Class-D Multi-Bridge Arm Wideband Sonar Transmitter	341
Yunfeng Han, Xuan Zhao, Jucheng Zhang, Cuie Zheng	
Study on Intelligent Manufacturing System of Discrete Machining Shop	346
Chenglong Yu, Zong Zong, Kemin Li	
Differential Enhancement and Commonality Fusion for RGBT Tracking	351
Jianrong Yang, Enzeng Dong, Jigang Tong, Sen Yang, Zufeng Zhang, Wenyu Li	
Research on bearing-only target tracking of UUV under underwater strong noise	
<u>disturbance</u>	357

Aodi You, Hongjian Wang, Hongzhi Liu, Mengwei Zhangsun, Yanbin Zhang, Ridong Jin	
Research on Electromagnetic Compatibility in the Design	
of Battery Management System	363
Bo Sun, Linyong Xiong, Xiaozhe Liu, Hongliang Zhu	
Intelligent Question Answering Technology in Electric Power Field Based on Knowledge	
Graphs and Improved Editing Distance Fusion	369
Lu Zhang, Xianglong Li, Jie Zhuo, Siyue Lu, Tianqi Qiu	
Research on video-based moving object tracking	375
Yang Cong, Zhuang Li, Jun Liang, Peng Liu	
Adaptive neural control of Supercavitated vehicles base on LMI	380
Xinhua Zhao, Kang Wang, Yujie Xu	
A Comparison of Differential Kinematics and Machine Learning Approaches in Motion	
Planning for Intra-operative Cardiac Ultrasound Robots	386
Haichuan Lin, Yiping Xie, Xilong Hou, Chen Chen, Shuangyi Wang	
Research on AGV Path Planning Technology for Manufacturing Workshop	392
Yong Feng, Bo Huang	
A CMOS Concentration of Tea Polyphenols to Frequency Converter for Applications of	
Sensing the Concentration of Tea Polyphenols	398
Cheng-Ta Chiang, Sheng-Min Wu, Zi-Xuan Huang, Jyh-Cheng Chen	
Development of A Smart Interfacing Dashboard Between Management and Shop-Floor	
for Industry 3.0 Machines and Small and Medium Enterprises (SME)	403
Shashank Vuppugalla, Hemanth Guntipally, Suma Varshini Borra, Faiz Iqbal, Janardhan	
Vistapalli	
Modelling and control of upper limb rehabilitation system based on variable stiffness	
<u>joints</u>	409
Qiang Fu, Yaxin Wang, Zufeng Zhang, Bailong Duan	
Attention-based Insulator Defect Detection	414
Siwen Sun, Wanpeng Li, Changjiang Song, Xiaodan Cong, Lei Ding	
INS/GNSS/UWB/OD Robust Navigation Algorithm Based on Factor Graph	420
Yuliang Jin, Siyuan Liu, Fei Yu, Ya Zhang, Shiwei Fan	
Motion Control Method and Simulation of Intestinal Robot Based on Fuzzy Control	428
Shuang Yang, Liang Zheng, You Tang, Yan Liu	
Path Planning for Amphibious Robots based on Multi-optimization Strategy A* Algorithm	433

Qiang Fu, Chunyu Mu, Chunjie Wang, Zufeng Zhang, Hanyu Zhao	
Variable Impedance Control for Force Tracking Based on PILCO in Uncertain	
<u>Environment</u>	439
Zicheng Dong, Hui Shao, He Huang	
A Preliminary Study of Vibration Feedback for Robot-assisted Endovascular Surgery	445
Xinming Li, Shuxiang Guo	
Study on the Creative Design of Tourism Products in Industrial Culture	450
Ying Zhang, Zhigang Kan, Dongyu Qu	
Online Evaluation Of The Effectiveness Of Combined Navigation Filtering Results And	
Study Of Parameter Availability	455
Xu Bo, Bai Jing, Zang Junbo	
Control Strategy of Permanent Magnet Synchronous Motor and Brushed DC Servo	
Motor Based on ADRC	461
Liang Liu, Haikui Liu, Guangyin Nie, Yang Gao	
Premilitary Performance Evaluation of Model-mediated Telerehabilitation System with	
Task Stiffness Estimation	467
Ziyi Yang, Shuxiang Guo	
A Control Method of Robotic Arm Based on Improved Deep Deterministic Policy	
<u>Gradient</u>	473
Yanpeng Shao, Haibo Zhou, Shuaishuai Zhao, Xiaoyan Fan, Jiayi Jiang	
Evaluation of Detection System for Bioinspired Spherical Underwater Robots Based on	
the Pressure Sensor Array	479
Chunying Li, Shuxiang Guo	
Ultrasonic Testing Method of Damage Degree of JHL-3 Substitute Material	485
Qinxue Pan, Xiaoyou Zhou, Xiaoyu Xu, Haoshen Yu, Jiaqi Xu	
MPC based planar tracking control of autonomous underwater vehicle	491
Wei Xie, Changlong Si, Hui Ma, Chengpeng Hao	
Hydrodynamic Analysis of a Novel Bionic Amphibious Spherical Robot	496
Yan Liu, Liang Zheng, You Tang, Shuang Yang	
Research on anchoring and actuation of a novel magnetically driven laparoscopic robot	501
Ming Wang, Ping Xu, Yiming Liu, Dong Xu, Qishuang Ma	
A Review of Vision SLAM-based Closed-loop Inspection	507
Jianghong Wang, Feng Yang	

	Position-Level Dynamic Coupling Analysis of Dual-Arm Underwater Vehicle Manipulator	
	<u>System</u>	513
	Le Huang, Yanhui Wei, Taiming Wang, Tianhao Lu	
MP1-1	Intelligent Mechatronics and Applications (I)	
	A Primary-secondary Approach to Mitigate the Effects of Force Fight Between Parallel	
	Redundant Electromechanical Actuators	519
	Dragan Jovanovic, Guangjun Liu	
	Faster Implementation of the Dynamic Window Approach via Polar Voordinate	
	<u>Transformation</u>	525
	Ziang Lin, Ryo Taguchi	
	An Inter-turn Fault tolerant current control of a Five-Phase Servo Motor Based on	
	angle-wise subdivision modeling	531
	Runze Lu, Bing Tian, Jiasongyu Hu	
	The Advantage of Using Traffic Rules for Motion Prediction in Intersections (TRMPI)	537
	Isa Moazen, Paolo Burgio	
	Development of a Lightweight Real-Time Application for Dynamic Hand Gesture	
	Recognition	543
	Oluwaleke Yusuf, Maki Habib	
	Glass Detection in Simultaneous Localization and Mapping of Mobile Robot Based on	
	RGB-D Camera	549
	Yin Zhao, Haoyang Li, Shengjian Jiang, Hongze Li, Zheng Zhang, Hang Zhu	
MP2-1	Intelligent Mechatronics and Applications (II)	
	An Adaptive CUSUM Approach for Automating Sleep Apnoea Analysis Based on Pulse	
	and Oximetry Data	557
	Dongjin Yang, Eishaan Bhargava, Heather Elphick, Lyudmila S. Mihaylova	
	Sensorless control of PMSMs based on an adaptive ST-SMO and suppressing	
	zero-current clamp phenomenon	563
	Jiasongyu Hu, Bing Tian, Runze Lu	
	Manipulability maximization in constrained inverse kinematics of surgical robots	569
	Jacinto Colan, Ana Davila, Yasuhisa Hasegawa	
	Correction Control of Needle Deflection Based on Kernel Extreme Learning Machine	575
	Zhengnan Jiang, Mingyang Lv, Ziwen Wang, Baoliang Zhao, Long Lei, Gang Yu,	
	Bing Li, Ying Hu	

	An Adaptive Kalman Filter for SINS/GNSS Integrated Navigation with Inaccurate	
	Process Noise Covariance Matrix Coefficient	581
	Fengchi Zhu, Siqing Zhang, Yulong Huang	
	Multi-Cyborg Insect-Linked Formation for Object Transportation	588
	Kotaro Yamamoto, Mochammad Ariyanto, Chowdhury Mohammad Masum Refat,	
	Keisuke Morishima	
MP3-1	Control Theory and Applications (I)	
	Longitudinal Landing Risk Situation Model and Suppression Based on Cloud Model and	
	MPC	594
	Lipeng Wang, Ruotong Cao, Donghui Yuan, Qiuyu Zhang, Yue Liu	
	Fixed-time Trajectory Tracking Control for Underactuated Surface Vehicle Based on	
	Sliding Mode and Neural Network	600
	Guihua Xia, Wenxu Zhu	
	Speed Synchronization Control of Paver Traveling Motor Based on Optimized Fuzzy	
	Adaptive PID	606
	Zheng Tang, Jianjun Shen, Feng Jia, Xiaohan Feng	
	Enhanced Multi-scale Transformer Network for Temporal Action Localization	612
	Hang Yin, Xuezhi Xiang	
	Fast Terminal Sliding Mode Control for Accuracy Motion Tracking of Electro-Hydraulic	
	Servo System Based on Online Trajectory Planning	618
	Cheng Dong, Xie Hui, Tang Yu, Shen Gang	
	Optimal Capacity Allocation of Hybrid Energy Storage System for Offshore Wind Power	
	Platform Based on Improved Particle Swarm Algorithm	623
	Bing Fu, Pei Jiang	
MP1-2	Intelligent Mechatronics and Applications (III)	
	Active/Semi-Active Suspension System Control Based on Electromagnetic Damper	629
	Jiayi Wang, Xiaohua Zhang, Kaixin Cheng, Ze Li, Jinhui Xia	
	Hierarchical Reinforcement Learning-based Mapless Navigation with Predictive	
	Exploration Worthiness	636
	Yan Gao, Ze Ji, Jing Wu, Changyun Wei, Raphael Grech	
	A Mobile Manipulation System for Automated Replenishment in the Field of Unmanned	
	<u>Retail</u>	644
	Dayou Li, Pengkun Wei, Chenkun Zhao, Shuo Yang, Yibin Li, Wei Zhang	

	Tactile Imprint Simulation of GelStereo Visuotactile Sensors	650
	Shaowei Cui, Yu Wang, Shuo Wang, Qian Li, Rui Wang, Chaofan Zhang	
	Underwater Image Enhancement Algorithm Based on Transformer and Convolutional	
	<u>Network</u>	657
	Chengtao Cai, Jiaying Chen, Zhengkun Luan	
	A 3D Reconstruction Method for Sheet Parts Using Binocular Camera	663
	Jianjun Yao, Chen Qian, Geyang Yu, Yikun Zhang	
MP2-2	Intelligent Mechatronics and Applications (IV)	
	Development of a Robotic Hand Glove System for Secure Grasp with Al Wireless	
	Sensor Data	669
	Ahmed Almassri, Ken'ichi Koyanagi, Chikamune Wada, Keiichi Horio, Wan Zuha	
	Wan Hasan	
	Development and Evaluation of Inverted Docking Station for Small Quadrotor UAV	675
	Sudam Chamikara De Silva, Maroay Phlernjai	
	An SMA Wire-based Tendon Actuator and its Application on Robotic Fingers	681
	Renke Liu, Hideyuki Sawada	
	Development of a Portable Psychological Support Robot System	687
	Qin Zhang, Canbin Huang	
	Development of a Soft Leg-Wheel Hybrid Module Inspired by Bacterial Flagella	693
	Changlong Ye, Zhanpeng Liu, Suyang Yu, Yinchao Wang	
	Depth Dependence Removal in RGB-D Semantic Segmentation Model	699
	Tiyu Fang, Zhiyuan Wei, Lin Zhang, Xiaolei Li, Wei Zhang	
MP3-2	Modelling, Simulation Techniques and Methodoligies (I)	
	Modeling of Remotely Operated Vehicle (ROV) Operations for Aquaculture	705
	Martin Skaldebø, Herman B. Amundsen, Biao Su, Eleni Kelasidi	
	A Deep Learning-Based Model for Secondary Prediction on Deep-Sea Collector Plumes	713
	Zhou Xinyuan, Yang Yaomin, Ren Yue, Gao Xiangxing, Wang Hongliang, Gao Wei	
	Support Capability Evaluation of Ship Power System Based on Combined Weights and	
	Fuzzy Operators	719
	Peng Shang, Yanhua Sun, Yuan Lin, Tongtong Peng, Jiale Tian, Jian Zhou	
	Dynamic characteristics of a dual-rotor system subject to foundation excitation	725
	Shengyuan Li, Huan Zhang, Yaxu Quan, Jianxin Wang, Xuedong Wang	

	Vibration Characteristics Analysis of Transformer Core Faults Based on Multy-Physical	
	Field Coupling	731
	Binghui Gao, Chunjie Wang, Lei Ren, Peng Chen	
	Closed-Loop Simulation Test Method for Autonomous Vehicles Based on Adversarial	
	<u>Scenarios</u>	737
	Xiaokun Zheng, Huawei Liang, Zhiyuan Li, Chen Hua, Qiong Wu	
MP1-3	Medical, Biomedical and Rehabilitation System (I)	
	Error-state Kalman Filter-Based Heave Motion Fusion Method of Unmanned Surface	
	<u>Vessel</u>	743
	Liang-yue Ling, Li-nan Wang, Cong-yi Liu	
	Stabilization of T-S Fuzzy Nonlinear Systems by Intermittent Control	749
	Kun Li, Yuming Feng	
	A Multimodal Recognition on Human Lying Posture	754
	Siqi Huang, Jihao Liu, Kejia Sun, Weixin Yan, Yanzheng Zhao, Haitao Song	
	Trajectory Planning for Capacitated Vehicle Routing Problem: A Deep Reinforcement	
	Learning Approach	760
	Xin Fan, Yan Zhou, Cong-Yi Liu	
	A Novel Steerable Catheter for Vascular Interventional Surgery	766
	Yonggan Yan, Shuxiang Guo, Chuqiao Lyu, Duohao Zhao, Zhijun Lin	
	Design of an Embedded Leg Capsule Robot	772
	Yihui Wang, Tao Xue, Jing Wang, Yimuranjiang Yueliwasi	
MP2-3	Medical, Biomedical and Rehabilitation System (II)	
	Real Time Detection and Tracking of Guide Wire/Catheter for Interventional	
	Embolization Robot based on Deep Learning	778
	Ziyang Mei, Haoyun Wang, Si Pan, Hongyu Chen, Jiayi Wei, Qian Zhang,	
	Jingsong Mao, Gang Liu, Yang Zhao	
	Research On Force Feedback Controller Of Interventional Robot Based On Pneumatic	
	<u>Drive</u>	784
	Xuan Liu, Gongfei Lou, Jianhua Zhang, Yan Zhao	
	Design of a Differential Modular Joint-based Nursing Manipulator and its Digital Twin	
	<u>System</u>	790
	Chengfang Guang, Sheng Bao, Minghui He, Ruiqing Luo, Liang Du, Jianjun Yuan	
	Event-Triggered Scheme on Appointed-Time Leader-Following Consensus of	796

	Multi-Agent Systems with Prescribed Performance Hongfei Wang, Wenfeng Hu	
	Research on Robust Current Control Algorithm for Permanent Magnet Synchronous Motor Based on Extended State Observer	802
	Xiaofei Ding, Bin Qi, Bowen Zhang, Khuram Shahzad, Songyuan Zhang	002
	Machine Learning Classification of Riemannian Tangent Spaces Based on MI-BCI	807
	Chunli Zhao, Enzeng Dong, Jigang Tong, Sen Yang, Shengzhi Du	
MP3-3	Medical, Biomedical and Rehabilitation System (III)	
	A classification method for ECG signals based on convolutional neural network Yuan Yang, Jin Guo, Fengze Lyu, Shuxiang Guo	813
	<u>Disturbance Compensation Based Force and Position Control of Prosthesis Finger</u> <u>Actuated by Shape Memory Alloy</u>	819
	Xiaoguang Li, Yueming Wang, Pengfei Zhu, Yuxiang Xu	
	<u>Unmanned Vehicle Target Tracking Method Based on Dubins and Constant Bearing</u> Guidance	826
	Yuxuan Zhong, Jianjian Liu, Zihao Wang, Junhan Huang, Lingzhi Bao	0_0
	Two-photon 3D-printing of a Micro Continuum Actuator with the Integrated Tendon	833
	Hongyu Zhao, Min Ye, Xiaopu Wang	
	Design and Implementation of Performance Test Platform for Proportional Solenoid	
	<u>Valve of Ventilator</u>	839
	Longying Ye, Mingkang Tang, Peipei Zhang, Kesheng Wang	
	Action Primitive Classification of Sewing Operations toward Training Unskilled Workers Akihisa Ishikawa, Naoki Hiratsuka, Yutaka Takase, Solvi Arnold, Kimitoshi Yamazaki	845
MD4 4		
MP1-4	Robot Navigation and Control Algorithm (I)	
	A Novel IMU-Based 6-DOF Pose Tracking Method for Parallel-Mechanism-Based <u>Ultrasound Robot</u>	852
	Zhaokun Deng, Xilong Hou, Pengcheng Zhang, Mingrui Hao, Chen Chen, Shuangyi Wang	
	A Robust Observer-Based Nonlinear Trajectory Tracking Control Strategy for a	
	Quadrotor with a Suspended Payload	858
	Hongwen Li, Xingke Hou, Jixin Gao, Yongsheng Lv, Jianjun Sha, Hang Zhong	
	Model Predictive Control Method of AUV Based on Lie Group Theory	865
	Ronghao Zhang, Xinhua Zhao, Hanwen Zhou, Xiufen Ye	

	Study on Terminal Flexibility Control Strategy for the Rope Driven Serpentine Robotic	
	<u>Arm</u>	871
	Chenhui Hua, Yaling Tian, Xiaolin Dai, Guangbing Peng	
	Virtual Passive Bipedal Walking Based on Model Reference Adaptive Control	877
	Bofeng Qi, Aiqun Zheng, Lishen Pu, Yixuan Liu, Zhiming Zhang, Chunquan Xu	
	A Novel Capsule Robot Drive Module with Translational Motion Functions	883
	Long Yao, Shuxiang Guo	
MP2-4	Robot Navigation and Control Algorithm (II)	
	A DDPG-Based Method of Autonomous Catheter Navigation in Virtual Environment	889
	Wei Tian, Jian Guo, Shuxiang Guo, Qiang Fu	
	A Cooperative Localization Method for Multiple Unmanned Underwater Vehicles Based	
	on Improved Factor Graph	894
	Zheping Yan, Zhengkun Luan, Jianbo Liu, Wen Xing	
	A LiDAR Inertial Odometry Based on Adaptive Voxel Grid Filter for Indoor and Outdoor	
	Mixed Environments	900
	Jixin Gao, Jianjun Sha, Hongwen Li, Mingyang Guo	
	LC-GVINS: A Robust, Accurate, Monocular Visual-Inertial-GNSS SLAM with Loop	
	Closure	905
	Xiuzhi Li, Lei Zhang, Xiangyin Zhang, Zhenyu Jiao	
	Design of a Desktop Upper Limb Rehabilitation Robot	911
	Guanghong Tao, Lin Chen, Changlong Ye, Jingxin Peng	
	An Improved Transformer Few Shot Fault Diagnosis Method for Integrated Navigation	
	based on Generative Adversarial Network	917
	Ruozhang Liu, Ya Zhang, Shiwei Fan, Yuliang Jin, Fei Yu, Kun Guo	
MP3-4	Robot Navigation and Control Algorithm (III)	
	A Motion Planning Method for an Autonomous Underwater Vehicle with Kinematic	
	<u>Constraints</u>	923
	Qipeng Liang, Xinhua Zhao, Xiufen Ye	
	Research on Fusion Path Planning Method Based on UWB Positioning	929
	Minghao Liu, Shuizhong Zou, Xingyun Fu, Chunyan Xie	
	AUV Local Path Planning Based on Fusion of Improved DWA and RRT Algorithms	935
	Juan Li, Zihao Zhang	

	Research on Trajectory Planning for multiple straight lines in Cartesian Space Lei Huang, Daiwei Feng, Dagui Huang, Xiaolei Dong, Dingxin Huang	942
	DRL-based path planning and obstacle avoidance of autonomous underwater vehicle Di Wu, Zhaolong Feng, Dongdong Hou, Rui Liu, Yufei Yin	948
	Research on Dynamic Planning Method for Safe Path of UUV in Complex Fishing Net Deployed Waters Honghan Zhang, Yabo Wang, Juan Li, Yinsong Qu, Zheping Yan	954
MP1-5	Manupulator Control and Manipulation (I)	
	Development of a Novel Leader Device with Haptic Feedback for Vascular Interventional Surgery Xiaoliang Jin, Aiguo Song, Lifeng Zhu	960
	An End-Effector with Winding and Scooping Functions for Handling Thin and Long Fabric Sheet Yuzhe Zhu, Motoki Hirayama, Kimitoshi Yamazaki	965
	A Dual-Arm Manipulation System for Unfolding and Folding Rectangular Cloth Yusuke Kuribayashi, Yuta Yoshioka, Keisuke Onda, Takahiro Yamazaki, Tiancheng Wu, Solvi Arnold, Yutaka Takase, Kimitoshi Yamazaki	972
	A Model-Data Compound Driven Method For Compensating Robot Tracking Error Pai Peng, Qi Liu, Bin Li, Wei Peng, Xinjie Wang, Jinyuan Wang	979
	Design of a Novel Force Controlled Polishing Device Based on a Coupled Active-Passive Compliant Mechanism Zhiyun He, Jian Li, Yisheng Guan, Chuanwu Cai, Yufeng Yang, Tao Zhang	986
	Fuzzy Adaptive Compliance Control Method for Charging Manipulator Jinhao Huang, Shengjia Chen, Wenxu Zheng, Peiyuan Su, Jinkun Li, Jixuan Zheng, Yi Liang, Hanzhen Xiao, Yi Peng, Zhifeng Huang	992
MP2-5	Manupulator Control and Manipulation (II)	
	Wrist Angle Estimation Using Depth Sensor and Convolutional Neural Network for Grasping with Trans-humeral Prosthesis Ryosuke Nonaka, Yasuharu Koike	998
	Inverse Kinematics of a Reconfigurable Space manipulator Based on the Closed-Loop Algorithm Zhiyuan Zhao, Xiaohang Yang, Zichun Xu, Yuntao Li, Zhonglai Tian, Jingdong Zhao	1003
	Optimal Exciting Trajectories for Identifying Dynamic Parameters of Serial Robots	1009

	Ruiqing Luo, Sheng Bao, Liang Du, Zhengtao Hu, Yukun Liu, Jianjun Yuan	
	Attitude Prediction of Space Station Manipulator Transferring Cargo Spacecraft Dongyu Liu, Jixin Shi, Zhihong Wu, Dong Pan	1015
	Research on Control Method of Photovoltaic Inverter Based on PIR Fanrong Meng, Qingsheng Liao, Meng Wang, Jinshuo Liu	1021
	Robot Arm Configuration Self-Awareness via Interacting with Environment Wenfei Hu, Yifan Yuan, Yi Wang, Dingsheng Luo	1027
MP3-5	Manupulator Control and Manipulation (III)	
	Model-Based Reinforcement Learning for Position Control of Continuum Manipulators Actuated by Pneumatic Artificial Muscles Zhenzhuo Yan, Xifeng Gao, Yifan Li, Pengyue Zhao, Zongquan Deng	1032
	Design of Control System for Lower Limb Rehabilitation Robot on the Healthy Side sEMG Signal	1038
	Shiqin Yu, Jian Guo, Shuxiang Guo, Qiang Fu	
	<u>Tracking Control for Serial Spherical Robotic Manipulators with Uncertain Dynamics</u> <i>Bowen Chen, Dapeng Tian</i>	1044
	Study on Autonomous Surgical Control System of The Vascular Interventional Surgical Robot Based on Catheter Tip Location Tracking Zhimin Feng, Jian Guo, Shuxiang Guo, Qiang Fu	1050
	Force Feedback Bilateral Control of Multi-DOF Cooperative Manipulator: Design and Realization Xu Deng, Dapeng Tian	1056
	Adaptive Impedance Control in Dynamic Environment Based on Nonlinear Tracking Differentiator Chunfang Liu, Changfeng Li, Jun Li	1062
MP1-6	Os:Ocean Intelligent Equipment and Instruments (I)	
	Integrated Navigation of SINS DVL SSS Based on FGO Lin Zhang, Yanbin Gao	1068
	BMFLC Algorithm for Ship Heave Measurement Based on Frequency Estimation Huhe Chen, Guangchun Li, Zichen Zhao, Yuntao Han	1076
	<u>LiDAR Simulator for Autonomous Driving in Ocean Scenes</u> <i>Qiuyu Zhang, Lipeng Wang, Hao Meng, Wen Zhang</i>	1082

	MIMU error calibration method of turntable free platform based on improved genetic	
	<u>algorithm</u>	1088
	Zixuan Ning, Ya Zhang, Xiaofeng Wei, Yanyan Wang, Longkang Chang, Kun Guo	
	A System-Level Calibration and Integrated Navigation Technology of HRG-based	
	SINSDVL System for Underwater Vehicles	1096
	Jianxiong Wei, Fei Yu, Ya Zhang, Shiwei Fan, Longkang Chang, Kun Guo	
	Novel Observer-Based Robust Guaranteed Cost Controller Design for Supercavitating	
	Vehicle with Nonlinear Fin Model	1102
	Tianle Liu, Tao Bai, Yuntao Han	
MP2-6	Os:Ocean Intelligent Equipment and Instruments (II)	
	Fatigue Driving Detection of EEG Signals by LSTM Deep Neural Network with LPSD	
	and DE	1108
	Hao Zhang, Enzeng Dong, Jigang Tong, Sen Yang, Shengzhi Du	
	Self-propelled Model Heading Control Based on Linear Active Disturbance Rejection	
	<u>Control</u>	1113
	Wen-yu Wang, Qing Zhang, Zhuo Dai, Zi-hao Liu	
	Parameter Tuning of PID Heading Controller for Self Navigation Model Based on	
	Improved Particle Swarm Optimization	1119
	Zi-hao Liu, Qing Zhang, Xing-Yu Kan, Wen-yu Wang	
	NLOS Error Suppression Method based on UWB Indoor Positioning	1125
	Qing Zhang, Xiao-chuan Cheng, Kexin Wang, Zhi-wei Cao, Yong Hong	
	The Performance Evaluation of Static Obstacle Recognition by Underwater Pressure	
	Characteristics for Underwater Spherical Robot	1131
	Ao Li, Shuxiang Guo	
	Collaborative Searching Strategy for Multi-Amphibious Spherical Robots in 3D	
	underwater environments	1137
	Shilong Feng, Shuxiang Guo, Dan Yang, Ao Li, He Yin, Meng Liu	
MP3-6	Os:Ocean Intelligent Equipment and Instruments (III)	
	Development of a Slave Manipulator for Vascular Interventional Surgery Robotic	
	<u>System</u>	1143
	Chaochao Shi, Hidenori Ishihara	
	Nonsingular fast terminal sliding mode control of manipulator trajectory tracking based	
	on adaptive finite-time disturbance observer	1149

	Jun Nie, Lichao Hao, Guihua Zhang, Qiang Li, Xinyu Zhang	
	Improvement of Intention Estimation Method for Leader-Follower Robot	1155
	Zihang LYU, Ken'ichi KOYANAGI, Fengyu LI, Takuya TSUKAGOSHI,	
	Kentaro NODA, Toru OSHIMA	
	An Information Fusion Algorithm for INS/DVL/USBL Integrated Navigation System	
	Based on Delay State Unscented Kalman Filter	1161
	Xi Wang, Yanhui Wei, Hong Shao	
	Ocean Wave Active Compensation Algorithm For Offshore Gangway Based on	
	Optimized RBF Neural Network	1167
	Helong Zhang, Yanhui Wei, Yueyue Wang, Fei Song, Yixin Cao	
	The fusion-based Path Planning for Near Seabed Autonomous Underwater Vehicles	1173
	Tianlong Yang, Yanhui Wei, Yongkang Hou, Tian Yu	
MP1-7	Mobile Robot Systems (I)	
	Safe and Efficient Motion Planning for Material Transportation Robots considering	
	Intention Prediction of Obstacles	1179
	Guang Yang, Shuoyu Wang, Hajime Okamura, Yasuhiro Ueda, Toshiaki Yasui,	
	Tetsuya Yamada, Yuki Miyazawa, Satomi Yoshida, Yuta Inada, Shingo Ino,	
	Kazuo Okuhata, Yoshinobu Mizobuchi	
	Research on Underwater Robust Object Detection Method Based on Improved	
	YOLOv5s	1185
	Peng Li, Ang Zhao, Yibing Fan, Zhenwei Pei	
	An AUV Path Planning Method Based on Improved APF-RRT*	1190
	Chenxi Xie, Yang Wang, Yinfeng Liu, Zaiyang Li, Jialin Zhu, Jixing Qin	
	Coupling Task Allocation for Heterogeneous AUVs with Communication Constraints	1196
	Juan Li, Cong Lin	
	Dynamic Load Adaptive Control for Quadruped Robots Based on Model Prediction	1202
	Zewei Luo, Jian Li, Peng Liang	
	Fault Diagnosis Strategy Based on Information Entropy and Heuristic Particle Swarm	
	Optimization Algorithm	1209
	Bin Feng, Zhulin Zong, Weihao Wang	
MP2-7	Mobile Robot Systems (II)	
	A Motion Classification Algorithm of Lower-Limb Rehabilitation Robot	1215
	Peng Zhao, Mingda Miao, Pengfei Zhang, Kaiyuan Liu, Yige Li, Xueshan Gao	

	R-Taichi: A Quadruped Robot with Deformed Wheels	1221
	Tengyuan Ma, Haoning Cheng, Zihan Cheng, Cunkai Wang, Mingyu Duan,	
	Nanqing Jiang, Hemiao Wang, Senge Yao	
	Innovative Design and Simulation of a Jumping Bipedal Robot with Leg-Wheel	
	<u>Transformation</u>	1227
	Yongchang Yang, Runtian Zhu, Ye Li, Yunzhu Zhang, Binghao Ye, Boguang Liu	
	Structural Design and Experiment of a Small Wheel-legged Mobile Robot with Variable	
	Configuration	1233
	Xiulong Cui, Jizhuang Fan, Zhihui Dong, Yue Ou, Jie Zhao	
	Design and Simulation of a Cormorant-inspired Amphibious Robot	1239
	Yuanrui Wang, Zeyong Xu, Mofu Lei, Zijie Cheng, Xinhua Zhao, Huiming Xing, Yanhui Wei	
	A New Indoor Unmanned Vehicle Navigation System Based on the combination of Lidar	
	and IMU	1245
	Ruihui Zhu, Baoguo Yu	
MP3-7	Space Robotics and Mechatronics	
	Design and Kinematics Analysis of Solid Surface Deployable Antenna Deployment	
	Mechanism Based on Bennett Linkages	1251
	Hao Li, Xiaofei Ma, Tonglong Huo, Huanxiao Li, Di Wu	
	Design and Simulation of a Small and Agile Aquatic-Aerial Vehicle	1257
	Zeyong Xu, Dexin Xu, Yuanrui Wang, Jianqiao Liu, Huiming Xing, Yanhui Wei	
	Aerodynamic Analysis and Deployment Mechanism of A Foldable Mars Quadrotor	1263
	Kaijie Zhu, Dewei Tang, Qiquan Quan, Kaiyi Wang, Yachao Dong, Zongquan Deng	
	Mechanism Design of a Multi-functional Drilling End-effector for Extraterrestrial Regolith	
	Sampling	1269
	Haonan Deng, Jiabin Liu, Riyue Wu, Minhui Ye, Jiawei Dong, Tao Zhang	
	Investigation of Aerodynamic Performance of Coaxial Rotors for Mars Rrotorcraft	1275
	Pengyue Zhao, Xifeng Gao, Zhenzhuo Yan, Yifan Li, Jianwei Wu, Zongquan Deng	
	Observer-based Saturated Control for Dynamic Positioning Ship with Mismatched	
	Disturbance and Input MRS	1281
	Kun Liang, Peng Lu, Yu Chen, Yi Wang, Zhaoyu Liu, Zhengxiang Ma, Wenli Zhang	
TA1-1	Control Theory and Applications(II)	
	Brushless DC motor optimization based on direct torque control	1287

	Ruoqi Gao,Xuliang Yao, Qi Guan, Hai He	
	The Global Motion Control of First-order Rotary Parallel Double Inverted Pendulum	1293
	Lipeng Liu, Xiaohua Zhang, Yuanbo Guo	
	Fault diagnosis strategy for radar system based on sub-module testability modeling Bin Feng, Zhulin Zong, Weihao Wang	1299
	Leader-Following Consensus for a Class of Nonlinear State Time-delays Multiagent	
	Systems	1304
	Weiwei Guang, Hai Shen, Xin Wang	
TP1-1	Control Theory and Applications(III)	
	AUV 3D Path Following Control under Unknown Current	1309
	Juan Li, Huadong Zhang	
	Ultra-wideband localization algorithm based on butterfly particle filtering	1316
	Tang Sumin, Huang Bo	
	Filtered-x least mean square/power normalized fourth algorithm (FXLMS/PF) for active	
	noise control	1322
	Min Chen, Yihang Guo, Zhibo Geng, Lei Li	
	Research on Composite Control Strategy of Off-Grid PV Inverter under Nonlinear	
	Asymmetric Load	1328
	Qiang Zhang, Meirong Wang, Haotian Sun	
	Study on Control Strategy of the Vascular Interventional Surgical Robot Based on	
	<u>LADRC</u>	1334
	Wenqiang Zhang, Jian Guo, Shuxiang Guo, Qiang Fu	
	Underactuated Autonomous Underwater Vehicle Trajectory Tracking Control in Three	
	<u>Dimensions Based on Fractional Order Sliding Mode</u>	1340
	Juan Li, Shanshan Li	
TP2-1	Control Theory and Applications(IV)	
	Frequency Response Calculation Approach for Linear Singular Systems with Time	
	<u>Delay</u>	1346
	Yanwen Liu, Shilong Liu, Shuai Zhao	
	A New Multiple State Estimation Cooperative Positioning Method Based on	
	MEMS/Underwater Acoustic Ranging for Multiple UUVs	1352
	Qingxin Wang, Wei Gao, Shiwei Fan, Ya Zhang, Guangmin Li, Yanyan Wang, Kun Guo	

	Adaptive Fixed-Time Attitude Tracking Control in Reentry Phase for Reusable Launch	
	<u>Vehicle</u>	1358
	Guoxin Qu, Litao Zhang, Xige Zhang	
	Trajectory Tracking Control for Flapping-wing UAV Based on Model-Free Predictive	
	Control	1365
	Xuguang Liu, Yuean Wu, Changping Du, Jiahao Yu, Yao Zheng	
	Adaptive Event-Triggered Integral Sliding Mode Depth Control of Unmanned	
	Underwater Vehicles under Unknown Environmental Disturbance	1373
	Xun Zhang, Huijun Chen, Sibo Yao, Wen Xing, Huiying Yang	
	Model Predictive Control with Block Matrix for Unmanned Surface Vehicles Trajectory	
	Tracking	1379
	Huixuan Fu, Wenjing Yao, Chao Peng, Yuchao Wang	
TA1-2	Modelling, Simulation Techniques and Methodoligies(II)	
	Real-time scheduling strategy for electric vehicles based on sliding window	
	transmission optimization	1385
	Peizhi Cong, Yanjuan Wu, Caiwei Wang	
	Research on Ultrasonic Vibration Assisted Thread Milling Processing Simulation of	
	<u>CFRP</u>	1390
	Yu Zhang, Niansong Zhang, Aimin Wang, Yu Fu	
	Two-Dimensional Dynamics CFD Simulation of Voith-Schneider Cycloidal Propeller	1395
	Ziyi Liu, Han Yan, Zehua Shi, Dan Xia	
	Calibration and 3D Measurement Methods for Stereo Structured Light System	1401
	Kuaile Zhang, Xianfeng Wang, Hongquan Zhang, Tao Liu	
TP1-2	Modelling, Simulation Techniques and Methodoligies(III)	
	Chaotic Time Series Prediction of Multi-Dimensional Transformer Based on Bionic	
	Reconfigurable Three-Dimensional Scanning Robot	1407
	Xiaofei Ji, He Xu, Zhuowen Zhao, Jiaqiang Zhou	
	Gait Planning and Simulation of 3-RRP Legged Mobile Robot	1413
	Jinyuan Wang, Bin Li, Yue Ma, Xinjie Wang, Pai Peng, Wei Peng	
	Structural design and simulation analysis of an orthodontic wire bending robot	1419
	Han Liu, Jingang Jiang, Yanze Li, Yongde Zhang	
	An Automatic Measurement System for Ulna Bone Morphological Parameters Based on	
	3D Slicer Software	1425

	Ping Ji, Yagang Wang , Daofeng Wang	
	DVL Modeling Using a RVM based on Artificial Bee Colony Algorithm in SINS/DVL	1431
	Bo Zhao, Wei Gao, Xiuwei Xia, Xiaofeng Wei	
	YOLOv7-based land and underwater target detection and recognition	1437
	Jieren Li, Liwei Shi, Shuxiang Guo	
TP2-2	Industrial Manufacturing Process and Automation	
	Segmentation of Skeleton Ultrasound Images Based on MMA-SUISNet	1443
	Shiyu Ding, Jin Li, Kuan Luan	
	Best Bordering Algorithm for complexly shaped Blocks in Shipbuilding	1449
	Yiyan Wang, Qifan Luo, Kunhuan He, Jinming Zhang, Aimin Wang	
	Capability Scheduling and Allocation of Manufacturing Resources for Network	
	Cooperative Supply	1454
	Chao Zhao, Niansong Zhang, Aimin Wang	
	A Parameter Fluctuation Impact Analysis Algorithm for The Control of Sealing	
	Performance Stability	1460
	Lin Qiu, Niansong Zhang, Aimin Wang	
	A Novel Acupuncture Needle Based on FBG for Quantitative Evaluation of Expert	
	Manipulations	1466
	Zhihang Yuan, Linshuai Zhang, Tao Jiang, Shuoxin Gu, Lin Xu, Yujie Zhang, Peng Zeng	
	Research on the Air Gap Magnetic Field of Permanent Magnet Synchronous Motor for	
	High-speed Compressor	1472
	Hao Lin, Ling Li, Leiming Song, Xiaojun Hu, Haipeng Geng, Lie Yu	
TA1-3	Human-System Interaction and Interface (I)	
	Optimization of a Piezoelectric Bending Beam-based Human Knee Energy Harvester	1478
	Haisu Liao, Yidi Wang, Qiuyu Shi, Ruisen Huang, Fei Gao	
	A Demonstration-Based Instruction System for Handling Manipulation of Deformable	
	Objects With Overlaying Hand Postures and Contact Forces	1484
	Yutaka Takase, Tomohiro Shintani, Kimitoshi Yamazaki	
	Task planning of Robotic Grasping for Deep-Container Environment Based on Dynamic	
	Space Constraints RRTC Algorithm	1491
	Yan Xu, Yaqiu Liu, Xun Liu, Lin Zhang, Peibo Li	
	Self-supervised Monocular Depth Estimation with Multi-scale Feature Fusion	1497

Qiannan Yan, Xuezhi Xiang

TP1-3	Human-System Interaction and Interface (II)	
	Development and Evaluation of a Passive Upper Limb Exoskeleton System for	
	Overhead Operations	1503
	Lufeng Chen, Xianchao Zhou, Liang Zheng, Hongqin Xie, Hong Cheng, Jing Qiu	
	Safety Management System for Factory Workers using UWB Indoor Positioning and	
	Wearable Vibrotactile Guidance: Morocco Case Study	1509
	Sofya Sellak, Oumayma Haberchad, Salma Ibenyahia, Yassine Salih-Alj	
	A Heuristic Motion Planning Method based on Human Intention for Teleoperation	
	<u>Systems</u>	1515
	Panhong Zhang, Tao Ni	
	Multi-objective Optimization of Spatial Curved Acoustic Metasurface by Genetic	
	<u>Algorithm</u>	1521
	Xiaozhen Huang, Min Yang, Xu Peng, Xiaoyao Zhao, Min Chen, Xiaomei Xie	
	3D/6DOF Particle Filtering Location Algorithm Based on GPU Parallel Acceleration	1527
	Yuhang Yang, Weimin Zhang, Fangxing Li, Di Zhang, Yonghui Liu	
	Real-Time Human Motion Capture Based on BiRNN and Inertial Sensor	1533
	Dexin Xu, Zhaohua Wang, Xiaowei Zhu	
TP2-3	Cad/Cam/Cae and Manufacturing Systems	
	Simulation Efficiency Optimization Method of Flank Milling for Nondevelopable Ruled	
	Surface Based on Cutting Contact Conditions	1539
	Yanyu Chen, Liwen Guan	
	Research on Parametric Design of Two Types of B-type Sleeves for Oil Pipeline	1545
	Wenying Hui, Jianzhuang Niu, Wenbin Hui, Yi Gao	
	Dynamical Modeling and Numerical Simulation of Water Discharge Process of	
	Spherical Objects	1551
	Lin Zhong, Jiawei Dong, Jiabin Liu, Wei Wang, Riyue Wu, Shuqi Wang, Tao Zhang	
	An Approach of Assembly Deviation Analysis based on Jacobian Model and Skin Model	
	<u>Shapes</u>	1557
	Tuanhui Shen, Cong Lu	
	Dimensional Synthesis and Static/dynamic Analysis of a Robot in Automobile Hubs	
	Polishing	1563
	Long Chen, Manru Xi, Yue Ma, Bin Li, Qi Liu, Changrui Li	

	Vertical Deformation Optimization for the Screed of Pavers Based on ABAQUS and	
	<u>Isight</u>	1569
	Xiaohan Feng, Feng Jia, Jianjun Shen, Zheng Tang	
TA1-4	Recognition(Signal and Image Processing) (I)	
	Face Micro-expression Recognition Based on Online Sequence Limit Learning Machine	1575
	Qitong Xue, Pengfei Zhi, Wei Liu, Wanlu Zhu, Bin Wang	
	A Small Target Detection Algorithm For Aerial Images	1581
	Hui Wang, Guangdong Li, Pengyi Guo, Lijun Yu	
	Dense-Cascade Neural Network for Thermal and Visible Image Registration	1587
	Jiahao Xu, Xiufen Ye	
	Based on Hybrid Densenet-121 with Support Vector Machine Algorithm for Lettuce and	
	<u>Chili</u>	1593
	Yuzhe He, Yanjuan Wu, Caiwei Wang	
TP1-4	Recognition(Signal and Image Processing) (II)	
	Deep Learning-Based System for Real-Time Face Tracking and Expression	
	Recognition	1598
	Shuyao Zhang, Renke Liu, Hideyuki Sawada	
	Fusion Scan Context: A Global Descriptor Fusing Altitude, Intensity and Density for	
	Place Recognition	1604
	Haotian Deng , Zhongcai Pei , Zhiyong Tang , Jinhui Zhang,Jianbing Yang	
	Multilevel Decomposition Time Aggregation Graph Convolution Networks for	
	Skeleton-Based Action Recognition	1611
	Wenhua Li, Enzeng Dong, Jigang Tong, Sen Yang, Zufeng Zhang, Wenyu Li	
	A Global Perception Attention-based Network for Point Cloud Completion	1616
	Fengyong Wu, Enzeng Dong, Jigang Tong, Sen Yang, Wenyu Li	
	Lightweight Network for Masked Face Recognition Based on Improved Dual Attention	4004
	Mechanism Vilin Thong Vivoi Bong Vilio Cuo	1621
	Yilin Zhang, Xiwei Peng, Yujie Guo	
	Tool cutting state recognition technology based on machining data characteristics	1627
	Guangjun Xie, Niansong Zhang, Aimin Wang, Kang Wang	
TP2-4	Object Detection(Vision System, Robotic Vision)	
	Segmentation of Marine Targets Instance Based on Improved Mask R-CNN	1633

	Dexin Xu, Xiaowei Zhu, Zhaohua Wang	
	EEG Motor Imagery Classification Based on Sliding Window and Attention	1638
	Jinke Zhao, Mingliang Liu	
	Contextual and Lightweight Network for Underwater Object Detection with Self-Attention	
	<u>Mechanism</u>	1644
	Yiqi Zhang, Tao Liu, Xiuping Yu	
	MAN: Mix-domain attentional single-stage object detection network with multiple	
	attention mechanisms	1650
	Lei Sun, Yun Han, Xinxiang Gong, Shuaiyu Jin	
	FSC-YOLOv5s: A target detection algorithm for aerial infrared scenes	1656
	Mingyang Guo, Jianjun Sha, Yanheng Wang, Jixin Gao	
	Point Density-aware Channel-wise Transformer for LiDAR 3D Object Detection	1662
	Fanhang Yang, Enzeng Dong, Jigang Tong, Sen Yang, Shengzhi Du	
TA1-5	Neuro, Fuzzy, and Intelligent Control (I)	
	A Real-Time Prediction Method for Ship Heave Motion Using Conv-Bi-LSTM Model	1668
	Baojin Ping, Wei Gao, Ya Zhang, Shiwei Fan, Xiaofeng Wei	
	An Antimisalignment Wireless Voltage Source for Industrial Robots Applying	
	Voltage-Doubler Rectifier	1675
	Jian Cui, Jing Feng, Tianyi Zhang, Zhi Bie, Guo Wei	
	Research on energy storage control strategy of photovoltaic microgrid based on fuzzy	
	active disturbance rejection control	1680
	Xuesong Zhou, Jizhong Tao, Youjie Ma, Shuyi Li	
	Marine diesel engine fault diagnosis based on deep learning	1686
	Tongyu Hou, Defu Zhang, Wei Zhu, Guohua Shen, Dayang An	
TP1-5	Neuro, Fuzzy, and Intelligent Control (II)	
	Source-free domain adaptation network for rolling bearing fault diagnosis	1691
	Yuanfei Wang, Feng Jia, Jianjun Shen, Lifei Hao	
	Linear active disturbance rejection control of phase-shifted full-bridge converter based	
	on improved particle swarm optimization algorithm	1697
	Hongsen Wang, Yanjuan Wu	
	Structural Optimization Analysis of Autonomous Wave Energy Converter Based on	
	Maximum Power Output	1702

	Ming Lei, Wanshun Heng, Xuexiao Zhang, Yujie Xu	
	Adaptive Motion Control of Non-affine Unmanned Hovercraft Under Asymmetries	
	Constraints	1708
	Lijing Dong, Peng Li, Weiwei Feng	
	Hull deformation angle measurement algorithm based on improved particle swarm	
	optimization inertia matching	1714
	Xiaofeng Wei, Fei Yu, Shiwei Fan, Ya Zhang, Zixuan Ning, Wen Xing, Feng Shen	
	Preliminary Bilateral Upper Limb Rehabilitation System Based on sEMG and Muscle	
	<u>Tone</u>	1720
	Hanze Wang, Shuxiang Guo, He Li, Dongdong Bu	
TP2-5	Os:Advanced Control Systems and Techniques In Electrical Engineering	
	Research on improved buck three-phase harmonic injection rectifier	1726
	Xuliang Yao, Yi Yang, He Ma, Jingfang Wang	
	Research on Key Problems of Synchronous Control of Hydraulic System Based on	
	Particle Swarm Fuzzy PID	1732
	Xianhui Liu, Zhengnan Shan , Fan Yang , Jianqiang Li	
	Electromagnetic Force Waves of Permanent Magnet Synchronous Motor Considering	
	<u>Eccentricity</u>	1738
	Zhaopeng Sun, Lei Cheng, Qi Wei, Wanyou Li, Depeng Zeng	
	Adaptive Control for Stochastic Nonlinear Systems with Input Saturation Based on	
	Multi-dimensional Taylor Network	1744
	Xiao-Yi Zheng, Hong-Sen Yan	
	Pedestrian Multi-Object Tracking with Bottleneck Transformer and Enhanced Feature	
	Fusion Value	1750
	Xinyao Wang, Xuezhi Xiang	
	Research on Motion Mode Conversion Control of Wheel-legged Biped Robot	1756
	Yili Fu, Xu Li, Xinyu Dong	
TA1-6	Sensor Design and Novel Sensing Sytems (I)	
	A CMOS Sulfur Dioxide Concentration to Time Period Converter for Measuring Sulfur	
	Dioxide Concentration in Food Applications	1763
	Cheng-Ta Chiang, Yi-Cheng Wu, Shu-Huan Yang, Jyh-Cheng Chen	
	IoT Healthcare System based on ESP32 for Smart Home	1768
	Songsheng Li	

	Research on wind tunnel test data prediction and fault diagnosis technology based on	
	machine learning	1773
	Liu Boya, Wang Jianfeng, Liu mingyuan, Yan gengwei	
	A Quantitative Detection Approach for Microcrack in High Steel Pipeline By Motion	
	Induced Eddy Current Technique	1780
	Yating Yu, Wei Yang, Yali Lu, Lai Wei, Fenglong Wang	
TP1-6	Sensor Design and Novel Sensing Sytems (II)	
	Pavement Diseases Detection Using Improved YOLOv5	1786
	Zhanpeng Huang, Xin Chen, Honghui Liu, Guoxu Qin, Bo Lu, Mingzhu Wei, Xiaomei Xie	
	Implementation of Novel Temperature Drift Errors Precise Estimation System for	
	Capacitive MEMS Accelerometers	1792
	Bing Qi, Jingyu Ge, Weiqi Sun	
	Research on Optical Power Attenuation Compensation Algorithm of φ-OTDR System	1798
	Yinhao Liu, Baofeng Zhang, Zhili Zhang	
	Influence of the Case of the Limiting Current Oxygen Sensor on the Steady-state	
	Temperature of the Sensor	1804
	Min Chen, Shuai Ni, Xiaomei Xie, Min Yang, Lei Li	
	EAU-Net++: An Efficient Segmentation Network for Ultrasound Vessel Images	1809
	Xianzhuang Xu, Kuan Luan,Jinglong Liu	
	Two-Path Augmented Directional Context Aware Ultrasound Image Segmentation	1815
	Yuhan Song, Armagan Elibol, Nak Young Chong	
TP2-6	Multple Robot and Distrubuted Systems	
	An Optimised Robot Swarm Flocking with Genetic Algorithm	1823
	Mazen Bahaidarah, Ognjen Marjanovic, Fatemeh Rekabi-Bana, Farshad Arvin	
	A Leader-Follower Trajectory Planning Approach for Cooperative Robotic System in	
	Automated Fiber Placement	1829
	Ningyu Zhu, Wen-Fang Xie, Henghua Shen	
	Research on Target Encirclement Strategy of Amphibious Spherical Robots in 3D	
	<u>Underwater Environments</u>	1835
	Dan Yang, Liwei Shi, Shuxiang Guo, Shilong Feng	
	Attention-Based Grayscale Image Colorization	1841
	Lei Sun, Dongjie Ju, Shi Ke	

Design of a Novel Modular Serial Pipeline Inspection Robot	1847
Yixin Zhang, Hanli Chen, Lu Wang, Zihao Fu, Shaoping Wang	
A Collision-Free Pedestrian-Following system for Mobile Robots base on path planning	1853
Hong Zhang, Songyan Wang, Ju Huo, Tao Chao	
Biomimetic Systems (I)	
Development of a Humanoid Reading System with Voice Lip Synchronization	1859
Wangcheng Chen, Yisheng Guan, Wenhao Chen, Mingcong Wang, Weichun Xie, Junyu Xie	
A Noval Gait Planning Strategy for Wheel-legged Quadruped Robots	1865
Zhanhao Xu, Buxu Chen, Junjie Chen, Letian Qian, Xin Luo	
A Multimodal Amphibious Turtle-Inspired Robot with Wheel-Leg Composite Propulsion	
<u>Mechanism</u>	1871
Yuxuan Luo, Wenchuan Jia, Yi Sun	
Gear Fault Diagnosis Based on Multi-scale Convolutional Neural Network	1877
Yunxin Yang, Manyi Wang	
Biomimetic Systems (II)	
UAV Path Planning Method based on Quantum Squirrel Search Algorithm	1883
Hongyuan Gao, Haochuan Bai	
A Portable Surgeon's Habits-based Master Manipulator for Vascular Interventional	
Surgery Robots	1888
Duohao Zhao, Shuxiang Guo, Chuqiao Lyu, Yonggan Yan, Zhijun Lin	
Design and Static Analysis of Feet-legs Device of a Natatores-like Amphibious Robot	1894
Xinru Lin, Liwei Shi, Shuxiang Guo	
FPGA-based Real-time Video Quality Enhancement for Unmanned Aerial Vehicle	1900
Yue Lu, Jinglei Li, Qinghai Yang	
Research on Fast Target Detection for X-band Marine Radar Image Based on RBF	
Neural Network	1906
Zhizhong Lu, Yongfeng Mao, Baotian Wen, Yaoyao Fan	
Design and Analysis of a Burrowing Mechanism Inspired by Mole Incisors for Planetary	
<u>Exploration</u>	1912
Hongmin Zheng, Zhaofeng Liang, Hongyu Wei, Chaoqun Xiang, Kun Xu,	
Kunyang Wang, Tao Zhang	

TP2-7	Os:Advanced Motors and Drives In Robotics	
	Design and Optimization of High-Speed Permanent Magnet Synchronous Motors for	
	Electric Spindle Systems	1918
	Guodong Yu, Haoyi Mu, Jibin Zou, Jiubin Tan	
	An Acoustic Levitation Gyroscope Driven by Near-field Ultrasonic Energy	1924
	He Li, Longjie Li, Yuanbo Li, Minyu Wei, Guanzhong Wang, Qingliang Zeng	
	Recursive Least Square Method Based Automatic Balance Control of Active Magnetic	
	<u>Bearings</u>	1930
	Jiming Zou, Fayuan Xie, Wentao Zhang, Yongxiang Xu	
	Design and Characteristic Evaluation of a Novel Clamping Mechanism for Amphibious	
	Spherical Bionic Robots	1935
	Chengchao Gu, Shuxiang Guo, Meng Liu, He Yin, Ao Li	
	A Novel Wearable Master Manipulator for the Remote Vascular Interventional Surgery	1941
	Zhijun Lin, Shuxiang Guo, Yonggan Yan, Chenzhihang Li, Duohao Zhao, Chuqiao Lyu	
	Design of Clutch Units of the Propulsion System for the Three-Dimension Triphibian	
	Robot	1947
	Yingduo Chen, Shuxiang Guo, He Yin, Ao Li, Meng Liu	
WA1-1	Os:Intelligent Navigation and Advanced Information Fusion Technology (I)	
	Proposal of Several Swimming Methods for a Disk-shaped Underwater Robot with an	
	Annular Pectoral Fin Propulsion Mechanism	1953
	Keigo Watanabe, Hiromasa Namba, Xiongshi Xu, Isaku Nagai	
	Research on Two-order SINS Coarse Alignment Method Assisted by DVL in	
	<u>Quasi-static</u>	1959
	Qiuying Wang, Kaiyue Liu, Wenhao Zhou	
	A Robust Bio-Inspired Sensory Orientation Processing Technique for Polarization	
	Compass Overcoming Weak Polarization Characteristics	1965
	Yicheng Wu, Xindong Wu, Chenguang Wang, Huiliang Cao, Chong Shen, Jun Tang, Jun Li	iu
	A Novel 3D Point Clouds Registration Method Without Data Association	1971
	Yu Duan, Jiajun Cheng, Xiaofeng Li, Yulong Huang	
	A Piezoelectric-driven Ultrasonic Drill for Hard Rock in Sea-floor Exploration	1978
	He Li, Minyu Wei, Yuanbo Li, Zhanpeng Zhang, Qingliang Zeng	
	Preliminary Exploration of Haptic-enabled Therapist-in-the-Loop Telerehabilitation	
	System for Exoskeleton-assisted Upper Limb Training	1984

	He Li, Shuxiang Guo, Hanze Wang, Dongdong Bu	
WA2-1	Os:Intelligent Navigation and Advanced Information Fusion Technology (II)	
	Vehicle Incomplete Constraint Algorithm Based on M-estimation	1990
	Qiang Hao, Shiwei Fan, Hongyue Wu, Yong Luo, Zuocheng Wu	
	ANN-NDI-based Quadrotor UAV Large-Angle Maneuver Attitude Controller Design	1996
	Zheng Zhang, Xingwei Li, Lilian Zhang, Xianfa Zhao	
	Autonomous Location of the Welding Workspace in the Box Girder	2002
	Kejia Sun, Jihao Liu, Lin Zhang, Tianrui Zhao, Yanzheng Zhao	
	A Low-Cost Skiing Motion Capture System Based on Monocular RGB Camera and	
	MINS Fusion	2009
	Zibin Zhang, Xiaodan Cong, Xiaoqi Zhang, Xilin Yu, Kaihong Lin, Lianwu Guan	
	Design and Analysis of A Linear Piezoelectric Actuator Based on The Bridge	
	Displacement Amplifier	2015
	Shaolong Deng, Yuntao Li, Hailong Li, Deen Bai	
	Design of MADDPG Capture Algorithm for Multiple UAV Cooperation	2021
	Yuxin Zhang, Enjiao Zhao	
WA1-2	Elements, Structures, and Mechanisms (I)	
	Structure Design and Motion Characteristics Analysis of Modular Robot	2027
	Tao Guanghong, Geng Shixiong, Nie Fuxiang	
	A High-precision Installation Solution of Insulation Panels for LNG Carriers	2033
	Jianjun Yao, Wenxin Zhou, Yuanwei Zhao, Jiajia Li, Tianci Xu	
	Visual Identification Technology for High-precision Installation of LNG Carriers'	
	Insulation Panels	2039
	Jianjun Yao, Jun Jiang, Jiajia Li, Yingzhao Li, Tianci Xu	
	Development of an Omni-directional Lower Limb Rehabilitation Mobile Robot	2045
	Changlong Ye, Yuhui Zhang, Suyang Yu, Dongqi Li	
	Balancing Real-world Interaction and VR Immersion with Al Vision Robotic Arm	2051
	Xiaoran Yang, Yang Zhan, Yukiko Iwasaki, Miaohui Shi, Shijie Tang, Hiroyasu Iwata	
	Study on 6D Pose Estimation System of Occlusion Targets for the Spherical	
	Amphibious Robot based on Neural Network	2058
	Chaofeng Du, Jian Guo, Shuxiang Guo, Qiang Fu	
WA2-2	Elements, Structures, and Mechanisms (II)	

	A Parallel Feature Fusion Network for Simultaneous Bearing Fault Detection and Remaining Useful Life Prediction Haodong Zhang, Liguo Shuai, Sunying Hu	2064
	A Spherical Self-reconfigurable Modular Robot Joint with Electromechanical Connector on Vision-guided Docking Jingzhou Song, Ziao Qin, Yun Wang, Fanxu Kong	2070
	Structure design and kinematics modeling of a new continuum parallel robot Xinjie Wang, Bin Li, Yue Ma, Wei Peng, Pai Peng, Jinyuan Wang	2077
	Study on the maximum allowable unbalance of the high-speed rotor based on the dynamic load capacity of gas foil bearings Jiale Tian, Peng Shang, Jian Zhou, Lie Yu	2084
	Optimal Design of Doubly-Fed Linear Motor for High Speed Maglev Train Based on Improved Genetic Algorithm Zaimin Zhang, Qinghao Ying, Yingan Wang, Minglei Yang, Yogin Wang,	2089
	Zaimin Zhong, Qinghao Xiao, Xiusen Wang, Minglei Yang, Yeqin Wang Classification of EEG signals based on CNN-Transformer model Jianwei Liu, Enzeng Dong, Jigang Tong, Sen Yang, Shengzhi Du	2095
WA1-3	Os:Marine Positioning and Navigation- Development and Challenges (I) Heave measurement algorithm for strapdown inertial Navigation system based on	
	adaptive multiple low-pass filter Xiaofeng Wei, Wei Gao, Ya Zhang, Shiwei Fan, Baojin Ping, Feng Shen	2100
	Investigation on precise adjustment model of the USBL calibration observations for angular misalignment Huimin Liu, Zhen Sun, Zhixi Nie	2107
	Visual Inertial Odometer Based on GNSS Assisted Fusion of Point Line Features in Large Scale Environments	2112
	Chun Jia, Xiaoze Zheng, Xiaohan Wang, Yang Li A detailed stochastic model based on the elevation angle of BDS-3 satellite Chongyang Li, Chun Jia	2117
	Analysis of acoustic ray accessibility for underwater positioning service based on seafloor geodetic network Shuang Zhao, Shuqiang Xue, Zhenjie Wang, Zhixi Nie	2122
	Research on Improved Attentional Video Instance Segmentation Algorithm Wen Zhang, Konghao Mei, Zhexuan Sun, Guangkun Chen, Shengrong Lv	2128

WA2-3	Os:Marine Positioning and Navigation- Development and Challenges (II)	
	GPS/BDS real-time precise point position based on BDS short message communication	2134
	Guochao Li, Fuxin Yang, Dongxu He, Zhiguo Sun, Jie Zhang, Weiyu Zhao	
	Location Method of GNSS Jamming Source Based on TDOA Passive Detection	
	Technology	2140
	Jian Zhang, Ming Cheng, Fengshou Liu, Huisen Liu, Yuekuan Xin	
	Unmanned Surface Vehicle Path Planning Based on Improved Informed-RRT*	
	<u>algorithm</u>	2145
	Xuehang Lin, Enjiao Zhao, Xingshun Wang	
	Multi-Ship Tracking by Robust Similarity metric	2151
	Hongyu Zhao, Gongming Wei, Yang Xiao, Xianglei Xing	
	Visual SLAM in Dynamic Environments Based on Object Detection and Scene Flow	2157
	Xiuzhi Li, Zhenyu Jiao, Xiangyin Zhang, Lei Zhang	
	Laser Vision for Low-Coupling Indoor Positioning	2163
	Yuhui Cheng, Rui Lin, Weiwei Zhao	
WA1-4	Os: Robot Perception and Control (I)	
	A Survey of Object Goal Navigation: Datasets, Metrics and Methods	2171
	Dewei Wang, Jiaming Chen, Jiyu Cheng	
	Online Monitoring of Reciprocating Compressor Health Conditions	2177
	Yanyang Li, Haiyang Zhao, Yu Zhang	
	Research on the planning method of moving robotic path planning of ant colony	
	optimization algorithms	2182
	Ridong Jin, Hongjian Wang, Yanbin Zhang, Hongzhi Liu, Mengwei Zhangsun, Aodi You	
	Single Image Deraining with Generative Adversarial Network	2189
	Na Li, Songtao Zhou, Peng Wang, Youmei Zhang	
	Fusing Structural and Appearance Features for 3D Layout Estimation	2195
	Weidong Zhang, Xueke Hu, Ying Liu, Yuquan Gan	
	Relative Localization for UAV-UGV Based on Correlation of Bearing and Distance	2201
	Jia Guo, Kang Hu, Jinting Liu	
WA2-4	Os: Robot Perception and Control (II)	
	Indoor Video Layout Estimation Based on Plane Features and Motion Information	2207
	Weidong Zhang, Yulei Qiao	

	An Efficient RRT*-based Path Planning for Mobile Robot with Fast Convergence Rate	2213
	Xianbiao Guo, Aiwei Li, Peng Duan, Lijuan Zhu, Xiaoqing Wang	
	Adaptive Fault Tolerant Control for Safe Autonomous Driving using Learning-based	
	Model Predictive Control	2218
	Yu Lu, Yu Yue, Guoqiang Li, Zhenpo Wang	
	Machine Learning-Based Predictive Maintenance: Using CNN – LSTM network	2224
	Maki K. Habib, Kamal Mohamed	
	Analysis of Vibration Characteristics of Small Variable Frequency Induction Motors	2230
	Defeng Kong, Baozhu Jia, Yannan Gao	
	Research on Underwater Wireless Power and Information Synchronous Transmission	
	<u>Technology</u>	2235
	Yige Ren, Peng Cheng, Hongen Zhang, Shuai Piao	
WA1-5	Os: Intelligent control for complex systems and its applications	
	Coordinated Path Following for Multiple Underactuated Surface Vehicles with Error	
	<u>Constraints</u>	2241
	Yuchao Wang, Yinsong Qu, Jiahao Chen, Yabo Wang, Huixuan Fu	
	Modeling and Control Design for Quadrotor Transporting System With a	
	Cable-Suspended Rigid Payload	2247
	Tianqi Xia, Enzeng Dong, Sen Yang, Jigang Tong, Shengzhi Du	
	Design of a Capsule Robot System for Gastric Hemorrhage Detection using Luminol	2253
	Yuchen Mao, Jian Guo, Shuxiang Guo, Qiang Fu	
	Baseline Load Estimation for Demand Response Based on Blockchain and Neural	
	<u>Networks</u>	2259
	Lei Xi, Chen Wang, Tao Zheng, Kaifeng Zhang	
	Fast Trajectory Path Planning Inspired by Binary Searching Algorithm	2265
	Jianyi Zhu, Xianyu Qi, Yufei Zhao, Bin Lian, Yanpeng Dong, Xiaojun Wang	
	A Vibration Signal Denoising Method Based on Whale Optimization Algorithm and	
	Batch Normalized Convolutional Neural Network	2272
	Yue Wang, Youming Wang, Jiali Han, Yuxi Qin, Feng Ji	
WA2-5	Os: Medical Robots for Minimal Invasive Surgery	
	Nursing Bed Supporting Mechanism Based on Rigid Origami	2277
	Yutong Wang, Jianjun Zhang, Weilin Lv, Shijie Guo	

	Design and simulation of a 2-DOF inchworm linear piezoelectric actuator	2283
	Junhui Shan, Yuntao Li, Hailong Li, Deen Bai	
	Interfacing Mechanism for Actuated Maneuvering of Articulated Laparoscopes using	
	Head Motion	2289
	Nihal Abdurahiman, Jhasketan Padhan, Mohammad Khorasani, Haoran Zhao,	
	Victor M. Baez, Abdulla Al-Ansari, Aaron T. Becker, Nikhil V. Navkar	
	Design of Capsule Robot for Magnetic Gastric Biopsy and Drug Administration	2297
	Zhihui Xu, Zongze Li, Shoubin Liu, Chengzhi Hu	
	Control system design of heterogeneous master-slave robot for fracture reduction	
	surgery of long bone	2303
	Guangqing Song, Jingtao Lei	
	Harmonic Current Suppression Method of Asynchronous Motor Based on Nonzero	
	<u>Vector Pulse Width Modulation</u>	2309
	Hao Hu, Xuliang Yao, Tongzhen Liu, Changjie Song	
WA1-6	Os: Intelligent Navigation and Advanced Information Fusion Technology	
	Path Planning Algorithm Based on RRT-A* in 3D Terrain	2315
	Hongtao Yin, Lixin Zhang	
	Mode Design and Optimization of Quadruped Walking Gait	2320
	Xingcan Xiang, Sunny Yeung, Yudong Zhao, Haibin Lu, Yuhao Lai, Peng Ye	
	A Hierarchical Path Planner Based on Even-order Hyperelliptic Orbital Limit-Cycles	2326
	Shuai Zhou, Xiaosu Xu, Cheng Chi, Shede Liu	
	Distributed Model Predictive Control Framework for Consensus of Multi-Agent System	2332
	Huaqing Li, Lifeng Zheng, Huiwei Wang	
	Visual Servoing Scheme and Nonlinear Model Predictive Control for Micro Quadrotor	
	under Unknown Feature Depth	2337
	Mengmeng Yin, Hao Liu, Fanbiao Li, Chunhua Yang, Weihua Gui	
	Improved Design and Research of a New Type of Bubble Separation Device	2343
	Kaitian Zhang, Jing Liang, Hui Xue, Kang Liu, Mengnan Yao, Qiyue Guo	
WA2-6	Os: Signal Measurement and Process in Automatic Control	
	Gear Fault Detection Method Based on the Improved YOLOv5	2348
	Xin Wan, Manyi Wang	
	Global Path Planning for UUV Based on Grey Wolf-Particle Swarm Optimization	2354

	Liangang Yin, Zheping Yan, Zhonghao Yuan, Qinglin Cui, Jian Xu	
	A Universal Jamming Gripper for Visual-based Grasping in Narrow Spaces	2360
	Xiangdong Meng, Haoyang Xi, Jianda Han, Aiguo Song	
	An Improved Image Enhancement Method for Underwater Robot SLAM	2366
	Yinfeng Liu, Yang Wang, Chenxi Xie, Zichun Guan, Jialin Zhu, Jixing Qin	
	DPL-SLAM: A SLAM System by Deep Learning Point Features and Line Features	
	<u>Integration</u>	2372
	Xilin Yu, Huiqi Gan, Lianwu Guan, Zaizhu Yang, Zibin Zhang, Kaihong Lin	
	Deep Neural Network Based Object Detection Algorithm With Optimized Detection	
	Head For Small Targets	2378
	Yongchang Zhu, Enzeng Dong, Jigang Tong, Sen Yang, Zufeng Zhang, Wenyu Li	
WA1-7	Os: Complex Intelligent Systems: Theory and Applications	
	A Vision-Based Algorithm of Slope Angle Estimation by Using Cooperation of Snake	
	Robots	2383
	Shuai Li, Jian Liu, Wenjun Liu, Ziming Liu, Jingrun Tian, Ruonan Wang, Xuan Xiao,	
	Zengzeng Wang	
	Improved Design and Modeling of a Series Parallel Hybrid Modular Joint for Humanoid	
	<u>Arms</u>	2389
	Wenhao Chen, Jiashu Feng, Yisheng Guan, Wangcheng Chen, Mingcong Wang	
	Research on Robot Technology with Fewer Degree of Free for Detecting and Sorting	
	<u>Station</u>	2395
	Yaling Tian, Yanlian Jiang, Xiaoyan Huang, Junjie Dan, Ji Li, Qiang Wang	
	Eco-Driving Optimization of Hybrid Electric Vehicle based on OSQP and Model	
	Predictive Control under Dynamic Traffic Scenario	2400
	Yeyang Han, Aimin Du, Zhongpan Zhu	
	Research on Intelligent Dynamic Scheduling Algorithm for Automated Guided Vehicles	
	in Container Terminal Based on Deep Reinforcement Learning	2406
	Fei Wang, Zhizhong Lu, Yuying Zhang	
	Study on a Two-layer Path Planning Method of Spherical Multi-robot	2413
	Chenqi Li, Jian Guo, Shuxiang Guo, Qiang Fu	
WA2-7	Ai and Image Processing(Signal and Image Processing)	
	Intelligent interface of the machine based on knowledge graph	2419
	Huanrong Ren, Pingyu Jiang	

Monocular Scene Flow Estimation with Convolution Vision Transformer	2424
Jie Yang, Xuezhi Xiang	
DOA Estimation for Incoherent Wideband Signals with Low Signal-to-noise Ratio	2430
Yuxiu Lin, Kaifei Ji, Xiaomei Xie, Min Chen, Xuesheng Li, Xiaozhen Huang	
An Improved DOA Algorithm for Wideband Coherent Signals	2436
Yuxiu Lin, Chengcheng Xie, Xiaomei Xie, Min Chen, Xuesheng Li	
Automated Electrowetting-based Nanobiopsy System for Adherent Cells	2442
Muyang Ruan, Weikang Hu, Yanmei Ma, Zhen Zhan, Chengzhi Hu	
MR Image Harmonization with Transformer	2448
Dong Han, Rui Yu, Shipeng Li, Jing Wang, Yuzun Yang, Zhixun Zhao,	
Yiming Wei, Shan Cong	