2022 International Conference on Automation, Robotics and Computer Engineering (ICARCE 2022)

Virtual Conference
16 December 2022

IEEE Catalog Number: CFP22CL6-POD
ISBN: 978-1-6654-7549-5

Copyright © 2022 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: CFP22CL6-POD
ISBN (Print-On-Demand): 978-1-6654-7549-5
ISBN (Online): 978-1-6654-7548-8

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

TABLE OF CONTENTS

Ship Remote Driving and Monitoring Platform Architecture Construction Research..... 1
Chunxu Li, Jianan Luo, Jie Wen

Dual-Path Multi-Level Feature Fusion Network for Semantic Segmentation of Remote Sensing Image..... 6
Zhisheng Lie, Shasha Ren, Qiong Liu

Research and Development Trend of Knowledge Graph Construction Technology 11
Hao Chen, Yang Bai, Miaomiao Wei

Management Strategies for Monocrystalline SiC Substrate Production Lines Under Downtime Disturbances..... 16
Xisheng Zhu, Dan Zhang, Wenhao Ai, Weidong Fu, Dunwen Zuo

A Novel RUL Prediction Method for Bearing Using IPVMD-LSTM..... 21
Shuangqing Lin, Kui Liang, Na An, Shiyu Peng

Advances in the Study and Application of Robotic Navigation Technology in Pedicle Screw Fixation..... 28
Hui Chen, Xiangfu Wang

Atomic Information Entropy Selection Based Generalized Orthogonal Matching Pursuit Algorithm..... 33
Bibo Yue, Yang Liu, Zhijie Yang

Improved Gray Wolf Optimization (GWO) Algorithm for Path Planning..... 38
Yongsheng Guan, Ye Yuan, Feng Yang

A Graph Neural Network with Type-Feature Attention for Node Classification on Heterogeneous Graphs 46
Kang Chen, Xueying Li, Tao Gong, Dehong Qiu

Crack Detection of Electrical Equipment Based on Improved GoogLeNet 51
Yihui Zhang, Yin Zhang, Lihua Wang, Xuan Dong, Yijie Li, Hang Sun, Xiaomei Yang

Fuse GPS Course Angle with Quaternion to Improve GPS/IMU-Based Velocity Estimation Accuracy..... 58
Liangxin Yuan, Hao Chen, Yuan Wang, Xiaomin Lian

Enhanced Adaptive Combined Ant Colony Algorithm..... 66
Zelin Yao, Can Liu, Yu Wei, Xinyu Lian, Zehua Yang

Autonomous Navigation of UAV in Dynamic Unstructured Environments Via Hierarchical Reinforcement Learning..... 72
Kai Kou, Gang Yang, Wenqi Zhang, Chenyi Wang, Yuan Yao, Xingshe Zhou

Research on Application of Personalized Recommendation Technology in Adaptive Learning System Based on Java Programming..... 77
Xiangmei Zhao

Recognition of Macrofungi by Convolutional Neural Networks with Attention Mechanism 81
Yonggong Han, Wenbin Liao, Jianxin Wang

Seismic Random Noise Attenuation Via Noise Assisted-Multivariate EMD Based MSSA 85
Weida Ni, Yihuai Lou, Xiaolu Xu, Zhigang Shan, Shouzhong Xue, Wei Wang

Research on Collision Avoidance Path Planning of Dual Manipulator Robot Based on Fusion Algorithm 90
Chenyang Sun, Xiangjun Liu, Runjie Shen

Closed-Loop Individual-Specific EEG Neurofeedback for Emotion Regulation 96
Xiaotong Liu, Jiayuan Zhao, Siyu Wang, Guangying Pei, Shintaro Funahashi, Tianyi Yan

Research on Intention Perception Algorithm of Exoskeleton Based on Multi-Sensor Information Fusion 100
Xiaoqing Yuan, Tao Wu, Huan Zou, Xiangbin Ye

Enterprise Pollution Emission Monitoring System Based on Deep Learning of Power Data 105
Lin Zhao, Hui Wang, Zhen-Yu Zhang, Shu-Ming Feng, Wei Gu, Xuan-Xuan Shi, Jia-Wei Miao

Development of a Framework for Data-Driven Modeling with Cloud Services in the Process Industry 110
Dominik Polke, Florian Diepers, Elmar Ahle, Dirk Söffker

Flight Delay Prediction Method Based on LSTM 116
Jialin Liu, Jiajia Zhao, Yifeng Lu, Yue Wu

An Interval Shrinking Trust Region Algorithm for GNSS/eLoran Pseudorange Fusion Positioning Initialization 120
Kaiqi Liu, Wenhe Yan, Jiangbin Yuan, Zaihui Xiao, Chaozhong Yang, Yu Hua

The Generation Method of Simulation Scenario Sample Space Based on Sensitivity Analysis of Meta-Model 126
Jing An, Wei Liu, Wanting Rong, Haoliang Qi

3D Reconstruction of Astronomical Site Selection Based on Multi-Source Remote Sensing 131
Xinhua Huang, Haocheng Liu, Qingkai Meng

Joint Distribution and Class-Based Data Augmentation for Wildlife Detection 135
Yunhao Pan, Chenhong Sui, Fuhao Jiang, Guobin Yang, Ankang Zang, Shengwen Zhou

Lightweight Conv-Swin Transformer for Wildlife Detection 140
Guobin Yang, Chenhong Sui, Fuhao Jiang, Yunhao Pan, Ankang Zang, Jian Hu

Research on Intelligent Agricultural Meteorological Information Monitoring and Alarm System 145
Kaiyi Liu, Hengyuan Kang, Mingrui Lan, Fan Zhang, Linlin Wan, Hongmei Zhang

Infrared Image Captioning Based on Unsupervised Learning and Reinforcement Learning 149
Chenjun Gao, Ganghui Bian, Yanzhi Dong, Xiaohu Yuan, Huaping Liu

Design and Analysis of Intelligent Robot Arm for FAST Operation and Maintenance 153
Hongxi Ren, Ligang Qiang, Lin Li, Taokang Xiao, Dingan Song, Zhiyuan Zhang

3D Gated Imaging Using a Unet Model 159
Siqing Zhang, Xiaoquan Liu

Semi-Supervised Fingerprint Construction and Localization System for Large Indoor Area 164
Min Gao, Yuanyuan Fei, Zhouhong Wang, Chunming Ma, Li Luo

Solar Filament Segmentation Based on AA-UNet 171
Ya-Na Wu, Dan Liu, Xiang-Chun Liu

Six-Degree-Of-Freedom Robot Trajectory Planning Based on MATLAB 176
Zhengyang He, Jingcheng Li

Research on Worldview-3 Panchromatic and Shortwave Infrared Image Fusion Method 179
Qian Wang, Ying Bao

Knowledge Base Personalized Updation Based on User Profile 184
Beiting Yi, Zhenhua Liu

YOLO-BTM: A Novel Shuttlecock Detection Method for Embedded Badminton Robots 191
Yimin Zhang, Chuxuan Chen, Ronglin Hu

A Novel Index-Based Assessment Method for Rural Homestead Utilization 197
Chengquan Xu, Youwen Liu, Shaofei Jin

A Study on the Classification of Subclasses of Glass Artifacts Based on Feature Selection 202
Jiamei Jiang, Xuhan Li, Xingyu Hao, Tao Liu, Ruofeng Qiu, Qunfeng Miao

Natural Language Understanding for Chinese-Based Service Robots 207
Ganghui Bian, Chenjun Gao, Wenkai Che, Dong Yanzhi, Xiaohu Yuan, Huaping Liu

Design Method of Mode Transition Control Law for TBCC Engine 210
Yongliang Zhang, Lingcong Nie, Bingqiang Yu, Feng Lu, Jinquan Huang

Multivariable Generalized Predictive Control Method for Aero-Engine 215
Yuzhu Zhang, Yongliang Zhang, Lingcong Nie, Jinquan Huang, Feng Lu

Kinematics Analysis of a Fully Driven Single Pendulum Spherical Mobile Robot 219
Minggang Li, Hanxu Sun, Long Ma, Ping Sun

Fruit Recognition Using Color Statistics 225
Qiang He, Kangli Xia, Hui Pan

Modified Unscented Kalman Filter for Relative Navition of Space Target Acquisition, Tracking and Control 229
Jianbing Kang, Ai Zhang, Zhaoxin Shi, Yuanming Miao, Xin Zhao, Chao Zhang

Design and Implementation of Wireless Motion Sensor Node System 234
Gang Dong, Chengyong Li

UAV Reconnaissance Task Allocation with Reinforcement Learning and Genetic Algorithm 238
Shan Gao, Lei Zuo, Shi Xiong Bao

Northern Cthulhu Algorithm Optimized VMD Combined with SVM for Fault Diagnosis 241
Dengxue Cao, Luyi Liu, Wei Lin

Speech Recognition Model of Civil Aviation Radiotelephony Communication Based on Improved Conformer 246
Zewei Xiao, Guimin Jia, Bo Shi

A YOLOv5-Based Target Detection Algorithm Design 252
Li Xu, Dengxue Cao, Wei Lin

Aging Condition Evaluation of Oil Paper Insulation Based on Adaboost Algorithm 257
Yongqin Ke, Min Li, He Zhuang

Computer Aided Research on Efficient Simulation Prediction and Anti-Deformation Suppression Method for Aviation Panel Riveting Deformation 262
Yonggang Chen, Yonggang Kang, Tianyu Wang, Huan Xiao

Oil Paper Insulation State Evaluation Method Integrating Fuzzy K-Nearest Neighbor and D-S Proof Theory 270
Guangyong Chen, Yongqin Ke

Initial Alignment Method of Human Soft Strapdown Base Based on NKF-FRKF 274
Xiao Su Zhang, Qing Li, Zhong Su, Guo Dong Fu

Performance Analysis on Vibe Detection of Moving Object 280
Qiang Liu, Zhongmin Li, Shiji Li

Design and Implementation of Android-Based Smart Classroom Control System 285
Chenxi Jiang, Yan Yang, Baoping Han

Research on Transmission Line Defect Detection Based on Adaptive Federated Learning 290
Hansheng Cai, Gang Liu, Ziqi Zeng, Fangming Deng

Design and Implementation of Manipulator Based on Arduino 294
Xi Zhang, Yan Yang, Zhanyong Wei, Baoping Han

Analysis of Research Status and Development Trend of Industrial Robot Based on Knowledge Map 298
Lanping Li, Yu Zhao, Yuzhe Xu

Rural Sewage Automatic Monitoring System Based on the Internet of Things 303
Yuan Shi

Realization of Fuzzy Control in an Auto Focusing System 306
Fengchao Liang, Xiaolin Zhao, Shuang Tan, Jiankai Fan, Tingting Yu, Zhe Lin

Research on Rural Water-Saving Intelligent Irrigation System Based on Internet of Things 310
Mengxia He

Water Monitoring System Based on Computer Control 313
Lixin Zhao

Adaptive Genetic Algorithm Based Particle Swarm Optimization for Industrial Robotic Arm Obstacle Avoidance Trajectory Optimization 317
Yu Chen, Liping Chen, Jianwan Ding

Design and Implementation of MobileRobot Navigation System Based on ROS Platform 321
Zhenzhen Jin, Weihua Zhou

Analysis of the Methods of Solving the Firing Data on Move 325
Huahuan Zhu, Xiaoyu Zhang

Sliding Mode Control of Buck Converter Using ESO 330
Jianning Lu, Yilin Wu, Dengxue Cao

Soc Design of Intelligent Recognition Based on RISC-V 335
Zhilai Ge, Penghao Xiao, Mengxue Li, Haipeng Wang

An Effective GNSS Fault Detection and Exclusion Algorithm for Tightly Coupled GNSS/INS/Vision Integration Via Factor Graph Optimization 339
Haitao Jiang, Tuan Li, Chuang Shi

Human-Robot Collaboration Using Monte Carlo Tree Search 344
Feng Yao, Huailin Zhao, Huaping Liu

Maximum Temperature Prediction Based on GPS and Meteorological Data by Using Neural Network 347
Shenzheng Zuo, Renjie Cai, Yan Wang, Enrui Hu, Lingzhi Liu, Yibo Guo

Adaptive Position and Attitude Trajectory Tracking Control for a Quadrotor UAV 352
Yi-Xuan Tian, Chen Li, Wen-Tao Yu, Jing-Jing Xiong

Dynamic Reversible Data Hiding for Edge Contrast Enhancement of Medical Image 357
Xiyuan Jiang, Zihan Tang, Bo Ou, Jianqin Xiong

A Two-Phase Type Identification and Subclass Classification Model for Glass Artifacts 363
Yutong Li, Zerui Xu, Mizi Sun, Tao Liu, Zhe Chen, Ruofeng Qiu

An Improved Optimal Trajectory Planning Method of Six-Axis Robotic Manipulators Along Prescribed Path Constraints 368
Ziyao Xiong, Liping Chen, Jianwan Ding

A Meter Replacing Assist Device Without Power Outages Based on SCR Bypass 374
Kai Chen, Kun Peng, Yue Zhu, Wenhui Shi, Yewei Jie, Zhongjie Wang, Jiafeng Sheng, Jiahan Tang

An End-To-End Uyghur Speech Recognition Based on Multi-Task Learning 381
Chuang Liu, Qiong Li, Zhiwei You

Grad-RAR: An Adaptive Sampling Method Based on Residual Gradient for Physical-Informed Neural Networks 387
Yanbing Liu, Liping Chen, Jianwan Ding

An End-To-End Model for Printed Uyghur Text Recognition 392
Zhiwei You, Qiong Li, Chuang Liu

Research on the Detecting Technology of Tiny Capacitance 397
Jing Li, Xuefeng Liu, Huadong Lian

VINS-Mask: A ROI-Mask Feature Tracker for Monocular Visual-Inertial System 401
Jiayuan Sun, Fangwei Song, Luping Ji

Asynchronous Deep Federated Learning Method Based on Local Trainer Data Pollution 406
Yuxin Lu, Xinzhou Cao

Analytical Calculation of Magnetic Field in 2-Pole Parallel Magnetized Permanent Magnet Machines 411
Yanyan Zhang, Songtao Wang, Yimeng Yu, Sisi Chen

Line Segment Probability Alignment Direct Visual Odometer 416
Yuhang Wang, Cong Peng

Frequency Shifting-Based Variational Mode Decomposition Method for Speech Signal Decomposition 420
Wenyang Liu, Weiping Hu, Deli Fu

Research on Obstacle Avoidance Algorithm of Fixed-Wing UAV Swarms Based on Improved Artificial Potential Field 425
Qiping Zhou, Yong Wei, Wei He, Shu Shang, Haibo Fan, Weisong Yin

A Double Node Thin-Film Thermocouples for In-Situ Measurement 429
Rong Ma, Meiju Zhang, Zhongkai Zhang, Manguo Huang, Xiaobo Liang, Jiangjiang Liu, Zhaojun Liu, Bian Tian

Sliding Muscle Surface Control of the Muscle-Driven Musculoskeletal System 433
Yerui Fan, Jianbo Yuan, Yaxiong Wu, Shuai Gan

Design of Image Recognition Monitoring System of Hydrological Monitoring Station Based on Edge Intelligence 439
Liwu Tan, Xianzhe Yao, Yuan Long, Zhizheng Zhang, Zhiwei Li, Yan Li

Knowledge Concept Recommendation Model for MOOCs with Local Sub-Graph Embedding 444
Chengcheng Ju, Yi Zhu, Chenyu Wang

Research on Intelligent Recognition Solution of Tobacco Disease on Android Platform 452
Jingjing Li, Yi Xu, Yapeng Li, Kepei Qi, Feiyong Yu, Shaohua Sun

Dual-Semantic Graph Similarity Learning for Image-Text Matching 456
Wenxin Tan, Hua Ji, Qian Liu, Ming Jin

Cooperative Pursuit in a Non-Closed Bounded Domain 461
Yahong Xing, Gangqi Dong, Zhiqiang Ma, Panfeng Huang

Research on Image Classification Based on Convolutional Neural Network 468
Tianjiao Liu, Jiankui Chen, Xuqing Li

Semantic Segmentation Algorithm of Remote Sensing Images Based on Improved Panoptic 472
Tong Zheng, Liu Liu, Qimeng Chen, Zhong Chen, Longji Yu, Zeyu Zhao

HLA: Harmonized Label Assigner for Two-Stage Oriented Object Detection 477
Qimeng Chen, Tong Zheng, Liu Liu, Longji Yu, Zhong Chen

Underwater Image Enhancement Method Based on Dark Channel Prior and Guided Filtering 482
Haoming Song, Wenlong Xia, Jiaheng Kang, Shenli Zhang, Cheng Ye, Weidong Kang, Teoh Teik Toe

Wavelet De-Noising Method Analysis of Pipeline Magnetic Flux Leakage In-Line Inspection Based on Coefficient of Variation 489
Guannan Shi, Peng Hu, Jinzhong Chen, Chunyu Li, Hanquan Zhou, Yilai Ma

Research on Dynamic Characteristics of Aircraft with Floating Material 494
Juan Zhang, Wenya Yang, Weida Zhu, Lanling Ma, Changyuan Dong

Research on the Design of a Sensor-Based Firefighters Safety Guardian System 499
Yonglin Xiang, Man Wang, Shanshan Liu, Xixi Xiong, Jiaye Luo, Junhui Xiao

Resource-Aware Scheduling Mechanism for Real-Time Tasks in Lightweight Edge Systems 503
Weiwei Miao, Zeng Zeng, Changzhi Teng, Rui Zhang

Robot Skill Learning Algorithm Based on Dynamic Motion Primitive 508
Huaying Liu, Lei Xue

Modeling and Simulation Study of Hydraulic Turbine Governor Based on SIMULINK 514
Haiming Zhang, Jun Liu, Yun Liang

An XML Spatial Camera Telemetry Software Automation Generation Technique 519
Ting Yang

Author Index