## **2022 IEEE International** Conference on Sensing, Diagnostics, Prognostics, and Control (SDPC 2022)

**Chongqing, China** 5 – 7 August 2022



**IEEE Catalog Number: CFP22L29-POD ISBN**:

978-1-6654-6987-6

## 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:
 CFP22L29-POD

 ISBN (Print-On-Demand):
 978-1-6654-6987-6

 ISBN (Online):
 978-1-6654-6986-9

## **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**

3	Reconstructions of Strain Distribution along FBG Sensor Using GWO Algorithm and Interrelated Simulation Verification  Meng Zhang, Weifang Zhang, Jingyan Wang, Xiao Xiong, Yao Cheng, Xinqi Lv	1
7	Path Planning and Tracking Control for Unmanned Vehicle Using Multi-dimensional Taylor Network  Chenlong Li, Xiaoshuang Ma, Changshun Yuan, Feng Wang, Wenliang Chen, Chen Liu	6
12	Preliminary Idea of Rocket Fault Diagnose Driven by Digital Twin Han Wenting, Cheng Long, Han Wenjing, Yang Linyu, Zhao Yubin	10
15	Review of Magnetic Bearing Control Method  Han Wenjing, Cai Yuanwen, Han Wenting, Ying Zengyuan, Yu Chunmiao, Zhao Yubin	16
21	Research on Diesel Engine Bearing Fault Diagnosis based on Vibration Signal Yingshun Li, Shuofei Liu, Aina Wang, Zhannan Guo	23
24	Silhouette Coefficient Regularization Based Adversarial Domain Adaptation Network for Fault Diagnosis of Rotating Machinery Zixu Chen, Wennian Yu, Xiaoxi Ding, Yimin Shao	29
38	A Maintenance Decision Framework based on Multi-task Learning from the Perspective of Application  Bing Huang, Liang Cao, Jinglin Wang, Tianmin Shan, Lan Huang	36
40	Bearing Fault Feature Enhancement and Extraction using Generalized Demodulation Guided by Ridge Scale Factor Probability Distribution Kangning Liu, Juanjuan Shi, Changqing Shen, Zhongkui Zhu	43
41	Research on Multi-type Abnormal Data Preprocessing Method of Wind Turbine based on Data Identification  Yanlong Liu, Mingyu Xu, Wanlin Guan, Xiaoguang Chen, Xinghua Mu, Baiyue Song, Nan Cai	48
45	Bearing fault feature extraction measure using multi-layer noise reduction technology  Yang Le, Cao Liang, Wang Jinglin, Yao Xiaohan, Shen Yong, Wu Yingjian	53
46	Fault diagnosis of aviation bearing based on enhanced multi fractional domain feature  Yujing Huang, Zhi Xu, Tianmin Shan, Liang Cao, Jinglin Wang, Yong Shen	57
47	Detection Algorithm of QRS Wave and R Peak based on Adaptive Energy Segmentation  Huahua Liang, Pan Yang, Hao Chen	62

53	A health self-sensing framework for electromechanical equipment using encoder signal Shudong Ou, Sen Li, Changqing Wu, Mourui Luo, Ming Zhao	67
55	Association Analysis of Fault Measuring Points based on New Link Prediction Shangtian Zhang, Tianmin Shan, Liang Cao, Jinglin Wang, Conglin Yuan, Zhi Xu, Lan Huang	71
59	Unsupervised Graph Contrastive Learning-based Anomaly Detection Method for Rotating Machinery Chaoying Yang, Xiangyu Zeng, Jie Liu, Kaibo Zhou, Shangwan Wei	76
60	Fault Diagnosis of Rolling Bearing based on VMD Feature Energy Reconstruction and ADE-ELM  Xiaohan Yao, Jinglin Wang, Liang Cao, Le Yang, Yong Shen, Yingjian Wu	81
62	Remaining Useful Life Prediction of Electromechanical Equipment based on Particle Filter and LSTM  Ning Yang, Chunyue Gu, Yanping Huang, Pengfei Wen, Shuai Zhao, Shuaiwen Feng, Shaowei Chen	87
71	Planetary Gearbox Fault Diagnosis based on Dynamic Adversarial Network Zhenguo Jie, Jinglin Wang, Tianmin Shan, Liang Cao, Zhi Xu, Shangtian Zhang, Lijing Chen, Yong Shen, Lan Huang	92
72	Design of Satellite Power Supply Fault Simulation System  Jifeng Xiao, Kuibin Zhang, Guangquan Zhao, Meng Wang, Yongning Zhang	98
73	Domain Adversarial Transfer Learning for Bearing Fault Diagnosis based on Data Fusion and Attention Wenbo Hou, Chunlin Zhang, Yanfeng Wang, Fangyi Wan, Jie Liu	105
77	Combination of SGDD and Multiple Time Scale CNN for Bearing Fault Diagnosis  Ying Ye, Bohan Jin, Yixiang Huang	110
82	Study for Requirements Analysis Method of Aviation Equipment Test and Diagnosis  Yingjian Zhao, Xueting Hu	116
95	An Improved Anti-Noise Network for Bearing Fault Diagnosis under Noisy Environment Chaoyang Weng, Baochun Lu, Wei Sun	120
99	Few-shot Multi-domain Fault Diagnosis for Planetary Gearbox in Nuclear Circulating Water Pump	126

Song Wang, Wei Cheng, Yilong Liu, Xuefeng Chen, Rongyong Zhang, Qian Huang, Yifan Zhi

100	Supervised Contrastive Learning with Multi-scale Attention Mechanism for Fault Diagnosis of Bearing under Variable Operating Conditions  Shushuai Xie, Wei Cheng, Zelin Nie, Xuefeng Chen	132
104	A Baseline Modeling Method for UAV Condition Monitoring based on Multiple Flight Data  Jinyu Gu, Benkuan Wang, Datong Liu	139
105	Dictionary Learning-based Intelligent Recognition Method Towards Machinery Fault Diagnostics Yun Kong, Fulei Chu	145
108	Digital power system data transmission framework and configuration design Hanyong Hao, Jinkui Huang, Fucai Luo, Shipeng Zhang, Chu Wang, Zhongfeng Wang	150
109	A design of a data deterministic interaction framework for improving digital twin power systems  Wenliang Liu, Fucai Luo, Jinkui Huang, Chu Wang, Zhongfeng Wang	156
114	Analysis of Degradation Characteristics of Hard Disk Drives in Accelerated Aging Tests and Exploration of PHM Methods  Linghui Meng, Chengquan Zhang, Ming Dong, Bo Hou	162
116	Reliability Allocation of Sonar based on Fuzzy Hierarchy Method  Qihai Liang	166
119	Determination of particle size of sodium carnallite ore in potash fertilizer production  Yi Li, Hongjun Zhang, Xiaodong Hao	170
122	A Cross-domain Bearing Fault Diagnosis Method towards Unbalanced Data based on Universal Domain Adaptation Pei Wang, Jie Liu, Jianzhong Zhou, Peng Chen, Ran Duan, Tianyu Zhang	174
123	WSN Coverage Optimization based on Hybrid Strategy Sparrow Search Algorithm Shangfei Zhao, Liwan Chen, Die Zeng, Jun Ou, Hao Cui	179
124	IoT Based Equipment Health Management Platform for Process Industry Tianshu Wu, Hongpeng Yin, Peng Wu, Haodong Zhang, Mingfu Zhao	184
129	A soft gripper integrated with mechanically-prestressed soft actuators  Zefeng Xu, Linkai Hu, Yitong Zhou	190
132	Design and Test of an Embedded System for Remote Elastic-band Resistance Training Monitoring based on the Internet of Things Taojin Xu, Dingfang Wang, Jianyin Yan, Lihe Hu, Yuhang Guo, Xiaoran Wang, Yongjian Li	195
135	An Optimized Grey Wolf Algorithm Die Zeng, Liwan Chen, Shangfei Zhao, Jun Ou, Hao Yuan, Tianwen Wu	200

136	Rolling bearing fault diagnosis utilizing pearson's correlation coefficient optimizing variational mode decomposition based deep learning model Qilin Hou, Ying Liu, Peipei Guo, Chentong Shao, Liang Cao, Lan Huang	206
137	Non-Contact Current Measurement Method for Multiconductor Systems based on Tunnel Magnetoresistance Sensor Array Xiaohu Liu, Wei He, Zheng Xu	214
144	Research on Heterogeneous Network Data Interaction Mechanism of Intelligent Manufacturing Huan Wang, Jun Zhang, Honggang Bi, Hui Li	219
145	GKFCR: An Improved Clustering Routing Algorithm for Wireless Sensor Networks Hongbing Li, Jun Ou, Hao Cui, Shangfei Zhao, Die Zeng, Yuning Wang	222
149	Calibration Scheme of Coil Sensors for Eddy Current Inspection  Jiangbo Huang, Haowen Wang, Shanqiang Qin, Zhihong Fu, Chengjun Wang	228
153	A Multi-Feature Stereo Visual Odometry Using Manhattan Constraints in Structural Environment Ning Wang, Decheng Wu, Rui Li, Xiaojie Wang	235
156	Trust Based Iot Access Control Using Blockchain Rui Sun, Gongguo Zhang, Hong Tang	240
157	Design of Household Photovoltaic Power Generation System Tai An, Jianhua Liu, Songquan Wang, Darong Huang, Mingzhu Tang, Shenghui Guo	246
163	Malicious Domain Name Detection Based on Knowledge Graph Zengbo Dong, Xi Chen, Jianbin Zhao, Shaokang Zhao, Junying Wu	251
165	Prediction of Coaxial Cable Electromagnetic Effect Based on Decision Tree Algorithm  Xuan Cao, Mengxue Li, Haipeng Wang	257
168	Predicting Gasoline RON Loss By Machine Learning Limin Liu, Zhen Chen, Yongsheng Wang, Guangwen Liu	261
171	A Prediction Model for Quality of Red Wine through Explainable Artificial Intelligence  Jiaojiao Chen, Rujia Li, Jianping Yang	268
177	Multi-Level Voltage Control Strategy for Rural Distribution Network based on System Theory  Min Wu, Fusheng Wei, Yongzhi Cai	273
179	Sentiment Research based on Neural Network in University Public Opinion Tang Xiaoning, Liang Juntong	279

180	Minimum error minimax probability machine based residual selection for fault detection  Jianyi Zhou, Ting Xue, Maiying Zhong	284
182	Width Learning-based Phase Identification Method for Low-voltage Distribution Network  Min Wu, Fusheng Wei, Yongzhi Cai	291
185	Research on Autonomous Perception and Decision of Unmanned Equipment Liu Wangding, Zhang Guoning, Zheng Shiming	297
187	Design of avionics ground verification system for flight test Qian Xu, Haibo Gong, Hongxiang Zhu	302
189	Real-time Monitoring Multi-phase Flow using Electrical Impedance Tomography  Xuanxuan Yang, Haofeng Chen, Gang Ma, Xiaojie Wang	306
190	A Three-dimensional Force Measuring Platform with Six-degrees of Freedom Motion Directions  Shengchang Fang, Xuan Wu, Weimian Zhou, Xiaojie Wang	312
191	A Dynamic Multi-exposure Image Fusion Method based on Image Registration  Yang Zuo, Huahua Liang	318
192	An Improved WGAN-Based Fault Diagnosis of Rolling Bearings Chengli Zhao, Lu Zhang, Maiying Zhong	322
193	Automated Road Crack Detection Method based on Visual Transformer with Multi-Head Cross-Attention  Meng Yu, Decheng Wu, Wanyun Rao, Longqi Cheng, Rui Li, Yu Li	328
194	Classification of Forest Point Cloud Considering Relative Elevation and Change of Curvature Using RandLA-Net Long Xiao, Maolin Chen, Xinyi Zhang, Xiangjiang Liu	333
203	Research on shunt conversion technology of multi-channel DVI video signal Haibo Gong, Qian Xu, Hongxiang Zhu	338
206	Research on Optimization of Efficient and Scalable Mutli-Raft Consensus Algorithm for Supply Chain Finance Na Du, Dazhu Yan, Zhihong Liang, Yuxiang Huang, Tiancheng Liu, Cong Zhong	342
208	Identification Method of Dehydration Stage of Washing Machine based on the Fusion of Sound and Vibration signals Yuqing Zhang, Qingshan Liu, Zihan Wang	348
213	Research on Virtual Restoration and 3D Digital of Qutan Temple Mural Ma Yujuan, Liu Xiaojing	353

216	Design and Implementation of Frequency Agile Multistage DDC based on FPGA	358
219	Li Gang, Liu Rumeng, Yuan Shuai, Liu Aiwen, Han Dongjuan, Sun Juan  Design and application of an automated test platform based on image recognition  Hongman Li, Ping Chen, Yihong Liu, Mengyue Liu, Jianliang Wang, Siqi Liu	363
221	Research and Application of Software Defect Prediction Model based on Data Mining  Yan Ran, Shen Xiaomei, Xu Zhaowei	367
225	The Research on Security Model Algorithm in Intelligent Connected Vehicles Shaojun Xiong, Xiangtao Qi	372
228	EdgeCloudBenchmark: A Benchmark Driven by Real Trace to Generate Cloud-Edge Workloads Shilin Wen, Hongjie Deng, Ke Qiu, Rui Han	377
229	Development of an Automatic Recognition Model for Phase Resolved Partial Discharge Patterns in Hydro-Generators  Guillaume Laporte, Ryad Zemouri, M'elanie L'evesque	383
230	Research on Selection and Application Strategies of Intelligent Power Module based on Failure Mechanisms  Wang Zhen, Fang Su, Lei Xiaomin, Xiao Kai, Huang Weiguan, Suo Wenyu	389
231	A Greedy Algorithm-based Cable Fault Diagnosis Method for Avionics Systems  Zhenwei Zhou, Tong Li, Shilie He, Junbin Liu, Linghui Meng, Guanlan Lu	393
234	A Novel Aircraft Secondary Power Fault Prediction Method Research based on Data Mining Liye Cheng, Chen Sun, Wengang Gu, Linghui Meng, Qingyan Zhang	399
237	Deterioration prognostics and forewarning for bearings using an embedded GRU-SVR approach  Yifan Wu, Chuan Li, Jianyu Long	405