2024 3rd International Conference on Energy and Power Engineering, Control Engineering (EPECE 2024)

Chengdu, China 23-25 February 2024



IEEE Catalog Number: ISBN:

CFP24VS4-POD 979-8-3503-6610-5

Copyright © 2024 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:
 CFP24VS4-POD

 ISBN (Print-On-Demand):
 979-8-3503-6610-5

 ISBN (Online):
 979-8-3503-6609-9

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



2024 3rd International Conference on Energy and Power Engineering, Control Engineering (EPECE) EPECE 2024

Table of Contents

Preface Organizing Committee	
Integrated Energy Application and Circuit Modeling	
Simulation of Predictive Maintenance Model of Power Enterprise Equipment Based on Deep Learning Algorithm Biao Zhang (State Grid Information&Telecommunication Accenture Information Technology CO., LTD, China) and Qinghua Wu (State Grid Information&Telecommunication Accenture Information Technology CO., LTD, China)	1
User Side Power Supply Full Path Online Monitoring Method Based on Machine Vision Fechnology	5
Application of Artificial Intelligence Technology in Digital Transformation of Power Grid Cui Li (State Grid Fujian Electric Power Research Institute, China), Fei Wu (State Grid Fujian Electric Power CO., LTD., China), Zhuolin Chen (State Grid Fujian Electric Power Research Institute, China), and Deming He (State Grid Fujian Electric Power CO., LTD., China)	9
Research on Ventilation and Noise Reduction Technology for Substations Based on Deep Learning	14

Application of T-S Neural Network and Coupling Coordination Degree Model in the Research of Development Trend of New Energy Automobile Industry
Visual Damage Detection Technology for Conveyor Belts in Coal-Fired Power Plants
Using PCA to Design an Anomaly Monitoring System for Power Grid Cryptographic Equipment 30 Liang Yin (Electric Power Research Institute of State Grid Ningxia Electric Power Co., Ltd, China), Ning Mi (Electric Power Research Institute of State Grid Ningxia Electric Power Co., Ltd., China), Zhiyan Ning (NARI Group Corporation(State Grid Electric Power Research Institute), Beijing Kedong Electric Power Control System Co., Ltd., China), Yingjian Gao (NARI Group Corporation(State Grid Electric Power Research Institute), Beijing Kedong Electric Power Control System Co., Ltd., China), Tiejun Zheng (Electric Power Research Institute of State Grid Ningxia Electric Power Co., Ltd, China), Hongjie Zhang (Electric Power Research Institute of State Grid Ningxia Electric Power Co., Ltd, China), Yuanzhe Lv (Xidian University, China), Xuan Wang (Xidian University, China), and Xingwen Zhao (Xidian University, China)
Incremental Cost-Driven Analysis Model of Power Grid Based on Multi-Dimensional Penetration Mode of New Energy
Battery Health Management Based on Digital Twin Technology

Design of a Remote Monitoring System for Tool Inventory Based on Multi Terminal Control of	99
Server Network Nodes Anjun Fu (China Southern Power Grid Digital PowerGrid Technology (Guangdong) Co., Ltd, China), Zhuojia Xu (Guangdong Power Grid Corporation, China), Juliang He (China Southern Power Grid Digital PowerGrid Technology (Guangdong) Co., Ltd, China), Youhao Sun (China Southern Power Grid Digital PowerGrid Technology (Guangdong) Co., Ltd, China), and Dan Wu (China Southern Power Grid Digital PowerGrid Technology (Guangdong) Co., Ltd, China)	99
Development of Space Project Management and Control System Based on Electronic Information	
Engineering Weiguo Xiang (Beijing Institute of Space Electromechanical Research, China), Ying Zhang (Beijing Institute of Space Electromechanical Research, China), Xu Zhang (Beijing Institute of Space Electromechanical Research, China), Ziyang Han (Beijing Institute of Space Electromechanical Research, China), Qian Zhang (Beijing Institute of Space Electromechanical Research, China), and Guoyang Gao (Beijing Institute of Space Electromechanical Research, China)	. 103
Tunnel Ventilation Control System Based on Lévy Flight Dynamics Improved Particle Swarm Optimization Algorithm	. 108
A Power Prediction Model using Bi LSTM Network for a Hybrid Electrical Vehicle	. 115
Pan Tilt Control System Based on MCU	. 122
Research on Hybrid Vehicle Energy Management Strategy Based on Fuzzy Control	. 127
Research and Design of Intelligent Hydropower SCADA Zheng Li (Yalong River Hydropower Development Company Ltd., China), Yuhang Wang (Nari Group Corporation/State Grid Electric Power Research Institute, China), Boyu Wang (Yalong River Hydropower Development Company Ltd., China), and Huan Zhang (Nari Group Corporation/State Grid Electric Power Research Institute, China)	.132

Multi-Fidelity Deep Neural Network Surrogate Model for Aerodynamic Shape Prediction Based
on Multi-Task Learning
A Power Control Design Method for Lunar Surface Adapting to Large Dynamics
Gas Concentration Prediction of Power System Based on EMA-Autoformer
Intelligent Vehicle Lateral and Longitudinal Decoupled Dynamic Modeling and Control System Simulation Based on GRU-FNN
Simulation Analysis of Steam Drum Water Level System Based on Fuzzy PID Control
The Application of Dynamic Simulation and PID Control in the Kinematic Analysis of Suspended Crane
Artificial Intelligence and Integrated Automation
Intelligent Control Method for Airport Road Construction Project Progress Based on BIM
Automatic Optimization of PID Control Software Parameters Based on Machine Learning
Research on Obstacle Avoidance of Indoor Robot Based on Predictive Control Algorithm

Research on the Application of RTK High-Precision UAV Differential Positioning Technology	
in Power Transmission Lines	. 182
Tianjun Wang (State Grid Xinjiang Electric Power Co., Ltd. Hami Power	
Supply Company, China), Jingfeng Xiao (State Grid Xinjiang Electric	
Power Co., Ltd. Hami Power Supply Company, China), Xin Wang (State	
Grid Xinjiang Information and Telecommunication Company, China), Yang	
Li (State Grid Xinjiang Electric Power Co., Ltd. Hami Power Supply	
Company, China), Yao Ma (State Grid Xinjiang Information and	
Telecommunication Company, China), and Hui Chen (State Grid Xinjiang	
Electric Power Co., Ltd. Hami Power Supply Company, China)	
Research on Three-Dimensional Visualization Technology Based on Electric Power	
Meta-Universe Technology	187
Bin Zhang (State Grid Ecommerce Technology Co., Ltd, China), Ximing	. 107
Sun (State Grid Ecommerce Technology Co., Ltd, China), Yong Li (State	
Grid Ecommerce Technology Co., Ltd, China), Xiaoming Li (State Grid	
Ecommerce Technology Co., Ltd, China), Ruoxi Geng (State Grid	
Elec-Ease Digital Technology (Xiong'an) Co., Ltd., China), Hao Chen	
(State Grid Elec-Ease Digital Technology (Xiong'an) Co., Ltd., China),	
and Yi Hao (State Grid Ecommerce Technology Co., Ltd, China)	
•	
The Fusion of Deep Reinforcement Learning and Edge Computing for Real-Time Monitoring and	
Control Optimization in IoT Environments	193
Jingyu Xu (Northern Arizona University, USA), Weixiang Wan (University	
of Electronic Science and Technology of China, China), Linying Pan	
(Trine university, USA), Wenjian Sun (Yantai University, Japan), and	
Yuxiang Liu (Northwestern University, USA)	
An Adaptive Defect Detection Method for Underground Cables Pipelines Based on Deep	
Learning	197
Jingjing Bai (State Grid Yancheng Power Supply Company, China), Xinyu	177
Han (State Grid Yancheng Power Supply Company, China), Yunpen Cheng	
(State Grid Yancheng Power Supply Company, China), Xingming Feng	
(State Grid Yancheng Power Supply Company, China), and Chengwei Qian	
(State Grid Yancheng Power Supply Company, China)	
Fuzzy PID Control for sit-and-reach Trainer Based on Magneto-Rheological Damper	201
Wei He (University of Science Technology of China, P. R. China; Hefei	
Institutes of Physical Science, Chinese Academy of Sciences, P. R.	
China), Hao Li (Hefei Institutes of Physical Science, Chinese Academy	
of Sciences, P. R. China), Tingting Ma (Hefei Institutes of Physical	
Science, Chinese Academy of Sciences, P. R. China), Yibo Zhao (Hefei	
Institutes of Physical Science, Chinese Academy of Sciences, P. R.	
China), Xinyan Zhao (Hefei Institutes of Physical Science, Chinese	
Academy of Sciences, P. R. China), and Quanjun Song (Hefei Institutes	
of Physical Science, Chinese Academy of Sciences, P. R. China)	

Simulation of Temperature Control for Spacecraft Thermal Test Based on Simulink Tao Wang (Beijing Institute of Spacecraft Environment Engineering, China), Weiwei Luo (China Academy of Space Technology, China), Xi Zhu (Beijing Institute of Spacecraft Environment Engineering, China), Bin Shen (Beijing Institute of Spacecraft Environment Engineering, China), Yue Zheng (Beijing Institute of Spacecraft Environment Engineering, China), Jing Wen (Beijing Institute of Spacecraft Environment Engineering, China), and Ling Zhu (Beijing Institute of Spacecraft Environment Engineering, China)	206
Path Tracking Control of Autonomous Vehicle Based on MPC	211
Control Accuracy Calculation of Flap & Slat System of Civil Aircraft	217
Crowdsourced Label Truth Inference Algorithm for Power Line Component	222
Research on Improving Vehicle Stability Control Using Enhanced LQR Method	227
Personality Prediction for State Grid E-Learning Text Based on Neural Networks with Attention Mechanism Han Zhang (State Grid of China Technology College, China), Guangpeng Liu (State Grid of China Technology College, China), Yanheng Zhao (State Grid of China Technology College, China), Zhimin Shao (State Grid Shandong Electric Power Company, China), Kai Zhang (State Grid Shandong Electric Power Company, China), and Jiejian Han (Shandong Luruan Digital Technology Co., Ltd, China)	232
Research on Link Layer Vulnerability of Master-Slave Scheduling in Industrial Control Network Based on Stochastic Petri Net	239
Author Index	245