2025 International Conference on Electrical Drives, Power Electronics & Engineering (EDPEE 2025)

Athens, Greece 26-28 March 2025

Pages 1-729



IEEE Catalog Number: ISBN:

CFP25UU2-POD 979-8-3315-1132-6

Copyright © 2025 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:
 CFP25UU2-POD

 ISBN (Print-On-Demand):
 979-8-3315-1132-6

 ISBN (Online):
 979-8-3315-1131-9

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



2025 International Conference on Electrical Drives, Power Electronics & Engineering (EDPEE)

EDPEE 2025

Table of Contents

essage from the Program Committeexxx	wi
OPEE 2025	
nstruction of a Public Opinion Analysis and Revenue Prediction Model for Enterprises sed on KOL Factors	. 1
ploration on Active Safety Guidance Mode of UAV Carrying Multifunctional Sensors in ansmission Line Construction	. 8
smic Action Prediction of Structures Based on Deep Feedforward Neural Networks	14
timization and Application of Grape Disease Identification Algorithm Based on Deep arning	20
search on Risk Assessment and Simulation Training 3D Model in Fire Rescue Skill Training Chuansong Wu (China Fire and Rescue Institute, China) and Jiangping Liu (China Fire and Rescue Institute, China)	27
search on Intelligent Building Environment Control and Automation System Based on ernet of Things	32
Study on Momentum Prediction of Tennis Players Based on Logistic Regression Model and IMA Model	39
tware Defined Network (SDN) Controller for 5G Networks	44

Research on Momentum Quantification Based on Genetic Algorithm Optimising Neural Networks .49 Yuhan Wan (Northwest A&F University, China), Xiaozi Ying (Northwest A&F University, China), Jianing Sun (Northwest A&F University, China), and Zhengxuan Mao (Northwest A&F University, China)	•
Research on Intelligent Parsing and Key Parameter Extraction Algorithm of Collaborative Exception Log in Multi-System Environment	
Research on Cargo Volume Prediction Based on Prophet-RF Model	,
Research on Optimization of Stacking Hoisting Construction of Assembled Steel Structure Based on Differential Evolution Particle Swarm Optimization	
Research on a Multi Frequency Common Mode Voltage Signal Injection Method	
Research on Water Conservancy Information Processing and Analysis Methods Based on Machine Learning	1
Optimization of Sulfate Resistance Performance of Concrete under Dry-Wet Cycles Based on PSO Algorithm	
Research on Application of Large Model in Intelligent Fault Diagnosis of Power Equipment	

The Application of CT Scanning in Visual Plugging Evaluation	95
Yang Chuan (Experimental Testing and Research Institute of Petro China	
Tarim Oilfield Branch, China; Xinjiang Key Laboratory of Ultra-deep	
Oil and Gas, China; CNPC, China), Ye Yan (Experimental Testing and	
Research Institute of Petro China Tarim Oilfield Branch, China;	
Xinjiang Key Laboratory of Ultra-deep Oil and Gas, China; CNPC,	
China), Wang Ruixue (Experimental Testing and Research Institute of	
Petro China Tarim Oilfield Branch, China; Xinjiang Key Laboratory of	
Ultra-deep Oil and Gas, China; CNPC, China), Tian Ming (Experimental	
Testing and Research Institute of Petro China Tarim Oilfield Branch,	
China; Xinjiang Key Laboratory of Ultra-deep Oil and Gas, China; CNPC,	
China), Zou Shengli (Experimental Testing and Research Institute of	
Petro China Tarim Oilfield Branch, China; Xinjiang Key Laboratory of	
Ultra-deep Oil and Gas, China; CNPC, China), Liu Dongni (Experimental	
Testing and Research Institute of Petro China Tarim Oilfield Branch,	
China; Xinjiang Key Laboratory of Ultra-deep Oil and Gas, China; CNPC,	
China), Wang Shuang (China University of Petroleum (Beijing), China),	
and Guo Fuliang (China University of Petroleum (Beijing), China)	
Construction of Power System Fault Prediction Model Based on Deep Convolution Neural Network	102
Zizheng Shen (Guangxi Power Grid Co., Ltd, China), Jiayi Yang (Guangxi	102
Power Grid Co., Ltd, China), Chao Huang (Guangxi Power Grid Co., Ltd,	
China), Liandian Jiang (Guangxi Power Grid Co., Ltd, China), and Jian	
Wang (Shandong University, China)	
Research on Intelligent Water Management Detection Based on the K-Means Clustering	100
Algorithm Claim (Constant Maintein (Table) China (Koffee Coi	108
Zhijia Huang (Guangdong University of Technology, China), Kefan Cai	
(Guangdong University of Technology, China), and Jinzi Li (Guangdong	
University of Technology, China)	
Optimization Algorithm Design and Application Research of Power Market Congestion Management	114
Guocheng Wang (North China Branch of State Grid Corporation of China,	
China), Dengyi Huang (North China Branch of State Grid Corporation of	
China, China), and Jing Liu (Beijing Tsintergy Technical Co., Ltd.,	
China)	
Decision Making Techniques for Smart Engineering Project Management Based on Random Fores	
Algorithm	121
Tongfei Xia (State Grid Fujian Information & Telecommunication	
Company, China), He Gong (State Grid Fujian Information &	
Telecommunication Company, China), Ke Li (State Grid Fujian	
Information & Telecommunication Company, China), Rao Fu (State Grid	
Fujian Information & Telecommunication Company, China), Hui Huang	
(State Grid Fujian Information & Telecommunication Company, China),	
and Long Chen (State Grid Fujian Information & Telecommunication	
Company, China)	

Research on Fault Diagnosis Technology of Low-Voltage Distributed Photovoltaic Grid Connection Based on Machine Learning	128
Application of Artificial Intelligence in Power Data Governance and Quality Control	135
Research on Dynamic Optimization Design Method of Mechanical Structure Based on MATLAB Simulation Yanlei Zhao (Shandong Jianzhu University, China), Lingtao Fan (Shandong Jianzhu University, China), Yanjun Guo (Shandong Jianzhu University, China), Jiahui Xia (Shandong Jianzhu University, China), and Congyang Wang (Shandong Jianzhu University, China)	140
Research and Application of Full Lifecycle Management Strategies for Power Data	146
Image Processing Technology and Algorithm for Microstructure Evolution of Aluminum Alloy Wire Weigang Zheng (Electric Power Research Institute of State Grid Liaoning Electric Power Co., Ltd., China), Qirui Fan (Electric Power Research Institute of State Grid Liaoning Electric Power Co., Ltd., China), Shicong Sun (Electric Power Research Institute of State Grid Liaoning Electric Power Co., Ltd., China), Hong Tang (Electric Power Research Institute of State Grid Liaoning Electric Power Co., Ltd., China), Guanhua Li (Electric Power Research Institute of State Grid Liaoning Electric Power Co., Ltd., China), Yuxiao Zhou (Electric Power Research Institute of State Grid Liaoning Electric Power Co., Ltd., China), and Jiaqi Li (Electric Power Research Institute of State Grid Liaoning Electric Power Co., Ltd., China)	151
A Study of Race Momentum Prediction Based on LSTM Modeling	156
Design and Implementation of Feature Fusion Algorithm for Natural Language Processing Based on BERT Zhenqian Liao (Lanzhou University, China), Jiaqi Cao (Hebei University of Technology, China), Can Su (Xizang Minzu University, China), Zixu Zhang (Tianjin Chengjian University, China), and Peiming Qing (ChangSha Normal University, China)	163
Computational Fluid Dynamics Study of Artificial Surf Pools	169

Fault Diagnosis and Maintenance Strategy of Electrical Automation Equipment Qiwang Chen (Jilin Technical Normal University, China), Jiahe Zhao (Jilin Technical Normal University, China), Mingze Li (Jilin Technical Normal University, China), Yiming Han (Jilin Technical Normal University, China), Jie Cheng (Jilin Technical Normal University, China), Zhaotong Ge (Jilin Technical Normal University, China), Shilong Liu (Shenyang University of Technology, China), and Ningchuang Xia (Liaoning University of Technology, China)	175
Flood Hazard Prediction Model Based on K-Means Clustering Analysis and AdaBoost Regression Model	182
Integration and Application of Artificial Intelligence Algorithm in Electrical Automation Control System Fajia Guan (Yantai Vocational College of Culture and Tourism, China)	187
Tennis Player Momentum Prediction Based on Logistic Regression and Decision Tree Models Xiaowen Zhang (Northwestern Polytechnical University, China) and Jingzhou Li (Northwestern Polytechnical University, China)	194
Research on Fusion Algorithm of Machine Learning and Oilfield Fluid Property Estimation *Junsong Guo (Daqing Oilfield Co., Ltd., China)*	200
Research on the Optimization of Cycling Strategy Based on Dynamic Programming and Genetic Algorithm	206
Intelligent Decision Support System Based on BIM in Power Grid Engineering Lizhong Qi (State Grid Economic and Technological Research Institute Co., Ltd., China), Su Zhang (State Grid Economic and Technological Research Institute Co., Ltd., China), Jingguo Rong (State Grid Economic and Technological Research Institute Co., Ltd., China), and Yaping Zhang (State Grid Economic and Technological Research Institute Co., Ltd., China)	211
Research on the Interactive Model of Sensor Network in Environmental Responsive Art Design Dongyang Liu (Changchun University of Architecture and Civil Engineering, China)	217
Research on Automatic Storage System of State Grid Hangzhou Smart Power Logistics Park Based on Internet of Things	223
Research on Steel Product Quality Prediction Based on Random Forest and Gradient Boosting Machine Jinqi Du (Shenyang University of Chemical Technology, China), Xin Liu (Shenyang University of Chemical Technology, China), Zhuang Sun (Shenyang University of Chemical Technology, China), Yixin Yang (Shenyang University of Chemical Technology, China), Hao Lv (Shenyang University of Chemical Technology, China), and Haozhi Kang (Shenyang University of Chemical Technology, China)	228

Semantic Understanding Model in Computer Natural Language Processing	234
Coordinated Optimization of Solar and Wind Energy Storage in Industrial Parks Based on Linear Programming and Mixed Integer Programming Models Yuzhou Zeng (Chongqing College of International Business and Economics, China)	239
Application and Algorithm Implementation of Multi Objective Linear Programming in Enterprise Cost Control Defang Wang (Lanzhou Resources & Environment Voc-Tech University, China)	.245
Research on the Cooperative Optimization Method for the Integration of Vehicle-Pile-Grid Ziqiang Tan (Southern Power Grid Guangxi Electric Vehicle Service Co., Ltd, China), Liang Guo (Guangdong Power Grid Limited Liability Company Jiangmen Power Supply Bureau, China), Mengxuan Yan (Guangdong Power Grid Limited Liability Company Jiangmen Power Supply Bureau, China), Weijie Huang (Guangdong Power Grid Limited Liability Company Jiangmen Power Supply Bureau, China), and Xionghui He (Guangdong Power Grid Limited Liability Company Jiangmen Power Supply Bureau, China)	251
Rapid Drawing of Bridge Channel for Electrical Specialty Based on 3DE Platform Bingjie Li (Northwest Engineering Corporation Limited, China), Feng Jing (Northwest Engineering Corporation Limited, China), Xizhe Li (Northwest Engineering Corporation Limited, China), Jie Yang (Northwest Engineering Corporation Limited, China), and Zhijian Li (Xi'an Anto Computer Network System Integration Co., Ltd, China)	256
Research on the Multi-Dimensional Optimization of Flexible Load under the Dual Carbon Goal Zhang Haijing (State Grid Shandong Electric Power Company Marketing Service Center (Metering Center), China), Liu Jiyan (State Grid Shandong Electric Power Company Marketing Department, China), Feng Yankun (State Grid Shandong Electric Power Company Marketing Service Center (Metering Center), China), Zhang Jialu (State Grid Shandong Electric Power Company Marketing Service Center (Metering Center), China), and Pan Guangxu (State Grid Rizhao Power Supply Company, China)	261
Research on Magnetic Flux Leakage Detection Data Analysis and Corrosion Defect Identification Model for Boiler Water Walls Based on Deep Learning	267

Association between Rock Properties and Drill Bit Wear Based on Improved Genetic Algorithm and Deep Learning	273
Lianbin Xia (Engineering Technology Research Institute of Southwest Oil and Gas Field Company, China), Fei He (Engineering Technology Research Institute of Southwest Oil and Gas Field Company, China), Yatian Li (Engineering Technology Research Institute of Southwest Oil and Gas Field Company, China), Yueyao Luo (Engineering Technology Research Institute of Southwest Oil and Gas Field Company, China), Wenshuai Xu (Engineering Technology Research Institute of Southwest Oil and Gas Field Company, China), and Yuting Zhang (Engineering Technology Research Institute of Southwest Oil and Gas Field Company, China)	
Size Optimization of Coal Pillar in Working Face Area Based on Genetic and White Crown Chicken Hybrid Optimization Algorithm	279
Numerical Simulation Algorithm of Incompressible Optical Fluid Motion Based on Data Assimilation and Its Application	284
Research on Supplier Intelligent Portrait Construction Technology Based on Blockchain	290
Research on Multi-Objective Decision-Making Model of Transmission and Distribution Price Reform on Power Grid Asset Allocation Optimization	294
Research on the Risk Quantification Model of the Connection between Power Trading and Spot Market in the Medium and Long Term	299
Integration of Data Desensitization and Encryption Technologies in the Information Security Protection System of Power Grid Enterprises Based on Autonomous and Controllable Control Zhengyan Huang (Guangxi Power Grid Co., Ltd., China), Songyao Feng (Guangxi Power Grid Co., Ltd., China), Junhao Song (Guangxi Power Grid Co., Ltd., China), Xuexia Quan (Guangxi Power Grid Co., Ltd., China), and Xuhua Ai (Guangxi Power Grid Co., Ltd., China)	304

Research on the Strategy for Arranging Power Outage Plans in Electric Power Dispatching	.0
Construction of Building BIM Forward Design System Based on BP Neural Network Algorithm 31 Wei Li (Binzhou Architectural Design Institute Co. LTD, China)	l 4
A Study of the Lanternfish System Based on the Lotka-Volterra Model and the GAILSE Model 32 Jinhao Tan (Southwestern University of Finance and Economics, China), Yixin Yang (Southwestern University of Finance and Economics, China), and Shijie Hu (Southwestern University of Finance and Economics, China)	20
Research on Fault Diagnosis and Prediction Model of Intelligent Manufacturing System Based on Deep Learning	26
Research on Momentum Evaluation Based on Entropy Weighting Method and Logistic Regression 331 Yifei Yang (Beijing Jiaotong University, China) and Leyan Zhang (Beijing Jiaotong University, China)	
Research on Benchmarking Management Decision Support Model Based on Multi-Objective Optimization	37
Research on Tournament Influencing Factors Based on Logistic Regression Modeling and AHP 34 Jixuan Shi (Huaqiao University, China), Jianqiao Xu (Huaqiao University, China), Zixin Deng (Huaqiao University, China), and Xiaodong Shi (CRRC Corporation Limited, China)	! 2
Construction and Simulation Analysis of Multi Physics Field Coupling Model for Lithium Battery Energy Storage Station	19
Research on the Integration of Intelligent Human-Computer Interaction in Educational Game Design	56

Design of Optimization System for Relay Protection Setting of Distribution Network Based on Improved Genetic Algorithm
Xiaoyan Qi (State Grid Shandong Electric Power Co., Ltd. Laiwu Power Supply Company, China), Fanmin Meng (State Grid Shandong Electric Power Co., Ltd. Laiwu Power Supply Company, China), Shuangquan Jiang (Shandong Rongfu New Information Technology Co., Ltd., China), Tao Wang (State Grid Shandong Electric Power Co., Ltd. Laiwu Power Supply Company, China), Mingyang Sui (State Grid Shandong Electric Power Co., Ltd. Laiwu Power Supply Company, China), and Qiuhua Hou (State Grid Shandong Electric Power Co., Ltd. Laiwu Power Supply Company, China)
Model Research on the Accuracy of Enterprise Value Prediction Based on Machine Learning Algorithm Optimization
Monitoring and Analysis Technology of Digital Operation of Power Grid Enterprises Based on Big Data
Research on Entrepreneurial Project Evaluation Model Driven by Random Forest Algorithm and Big Data
Research on the Application of Artificial Intelligence in Automatic Generation of Digital Teaching Resources
Research on Urban and Rural Land Use Planning Based on Multi Objective Optimization Algorithm
Research on Intelligent Processing and Pattern Recognition Technology of Civil Engineering Monitoring Data
Fatigue Life Prediction Technology of Metal Structural Materials Based on Deep Learning
Research on Application of Intelligent Algorithm for Structural Health Monitoring of Onshore Assembled Wind Power Mixing Tower

Research on the Prediction of the Nuclear Weapons Based on Gray Predictive Model and Regression Model
Dantong Zhang (Jinan University, China) Path Planning and Decision Model for Intelligent Robots Based on Reinforcement Learning418 Jiaxuan Hang (Dehua County Zhongke Ceramics Intelligent Equipment Research Institute, China) and Changtian Zhang (Kunshan Intelligent Equipment Research Institute, China)
Research on Ethanol-Coupled Preparation of C4 Olefins Based on Multi-Model Combination and Genetic Algorithm
Investigation and Implementation of a ZigBee-Based Online Temperature Monitoring System for the Ring Main Unit Elbow Cable Head
Design and Algorithm Optimization of Nuclear Radiation Monitoring System Based on Wireless Sensor Network
Global Temperature Analysis Based on ARIMA Model and Pearson's Correlation Coefficient 443 Zeyu Zhang (Beijing Forestry University, China), Jiayue Xiong (Beijing Forestry University, China), Bin Xiao (Beijing Jiaotong University, China), and Yiguo Qin (Beijing Forestry University, China)
Low Voltage Substation Line Loss Analysis and Phase Identification Based on Big Data and Intelligent Algorithms
Design and Optimization of English Teaching System Based on Virtual Reality Technology and Computer Algorithms
Information Design and Application of Smart Construction Site Monitoring System for Municipal Engineering Based on AIoT

Ecological Impacts of Lanternfish Based on Logistic and Lotka-Volterra Modeling	465
Numerical Simulation Study on Gob-Side Entry Retaining Technology with High Water Filling Combined with Top Cutting and Pressure Relief in Coal Mining	471
Research on Intelligent Hull Design Algorithm in Ship Optimization and Energy Saving Technology	478
Automated Sampling and Detection System for High Precision Functional Enzyme Component Analysis	483
Tennis Match Trend Prediction Model Based on Bi-LSTM Model Mingzheng Li (Hubei University of Technology, China), Yuwen Li (Hubei University of Technology, China), Shuo Wang (Hubei University of Technology, China), Boxuan Li (Hubei University of Technology, China), Yingjie Zhang (The Hong Kong Polytechnic University, China), and Baohua Tan (Hubei University of Technology, China)	489
Research on Network Information Security Situation Awareness and Prediction Model Based on Deep Learning	496
Application of Data-Driven Deep Learning Method in Thrust Prediction of Solid Rocket Motor Pang Wang (Northwestern Polytechnical University, China), Peijin Liu (Northwestern Polytechnical University, China), and Wen Ao (Northwestern Polytechnical University, China)	502
Research on SHN Model Adjustment Method Based on K-Means Clustering and Gray Prediction Algorithm Kangwei Peng (Hunan Normal University, China), Zhenfei Gong (Hunan Normal University, China), and Yinuo Liu (Hunan Normal University, China)	507
Simulaton Analysis and Design of Static and Dynamic Characteristics of Crabapple Shell Separator	513
Construction of Intelligent Dispatch Platform for Smart Mining	517

Application and Algorithm Implementation of High Dynamic Range Images in Graphic Design 52 Derong Li (Lanzhou Petrochemical University of Vocational Technology, China)	.2
Test System for Computer Intelligent Simulation of Athlete's Physical Adaptation Ability to the Environment	27
Design and Implementation of Autonomous Code Sweeping Inventory System for Logistics and Warehousing Scenarios	2
The Optimal Travel Path Model Based on Greedy and Genetic Algorithm	7
Multi-Agent Cooperative Control Strategy and Algorithm Design in Smart Community	.2
Optimizing the Classification and Identification Process of Archaeological Relics by Image Recognition Algorithm	.9
Research on ESG Excess Returns Based on Machine Learning and Cloud Computing	5
Image Recognition and Decision Algorithm for Highway Foggy Driving Safety Assistance System	0
Research on the Optimization of Insurance Decision-Making Model Based on CRITIC-Entropy Method and Improved K-Means Algorithm	16
 Image Processing and Diagnostic Technology for Macroscopic Characteristics of Electrical Corrosion of Railway Freight Car Bearings	2

LSTM and ARIMA Based Modelling for Arid Environment Studies	78
Design and Application of Energy Internet Optimization Algorithm for Carbon Neutralization 58 Wang Chuyue (Aquinas International Academy, USA)	36
Momentum Study Based on Principal Component Analysis and GCPN-R Predictive Models 59 Haotian Chen (Ningbo University, China), Shihan Wang (Ningbo University, China), and Yan Ma (Ningbo University, China))3
Remote Monitoring and Intelligent Maintenance of Mechatronics System Based on Internet of Things)ç
Jia Mi (Ordos Vocational College of Eco-environment, China), Min Liu (Ordos Vocational College of Eco-environment, China), and Ting Du (Ordos Vocational College of Eco-environment, China)	
Identification and Prediction of Key Factors Influencing Carbon Emissions Based on the STIRPAT Model and IPNEG-BP Neural Network)4
Application Model of Multi-Sensor Data Fusion in Mechatronics Equipment)9
Construction of Intelligent Decision Model of Mechatronics System Based on Fuzzy Logic	15
Bias Electricity Settlement Based on MapReduce Parallel Computing	<u>2</u> 2
Intelligent Tennis Ball Pick-Up Trolley Based on Visual Recognition	28
Exploration of Dynamic Drag Test Method for Brake Assembly of New Energy Vehicles	34

Research on "Air-Space-Ground" Stereoscopic Perception Technology and Patrol Applications or Transmission Lines	639
Jinhu Liu (Zhuhai Power Supply Bureau of Guangdong Power Grid Co., Ltd., China), Lin Chen (Zhuhai Power Supply Bureau of Guangdong Power Grid Co., Ltd., China), Di Li (Zhuhai Power Supply Bureau of Guangdong Power Grid Co., Ltd., China), Yongfa Zhou (Zhuhai Power Supply Bureau of Guangdong Power Grid Co., Ltd., China), Chunzhou Huang (Zhuhai Power Supply Bureau of Guangdong Power Grid Co., Ltd., China), and Jinyong Lin (Zhuhai Power Supply Bureau of Guangdong Power Grid Co., Ltd., China)	
Wentao Li (Beijing North-Star Technology Development Co., Ltd, China), Zhenhua Wang (Beijing North-Star Technology Development Co., Ltd, China), Huijuan Huo (State Grid Economic and Technological Research Institute Co., Ltd., China), Shuo Wang (State Grid Economic and Technological Research Institute Co., Ltd., China), Liqun Zhang (State Grid Hebei Electric Power Co., Ltd. Construction Company, China), and Gang Wang (State Grid Hebei Electric Power Co., Ltd. Construction Company, China)	546
Research on Intelligent Monitoring and Adjustment Algorithm of Training Load of College Basketball Players	551
Research on the Application of Computer Algorithms in Modelling and Dynamic Simulation of Complex Systems	656
Research on Application of Deep Learning Algorithm in Photoelectric Imaging Pattern Recognition	661
Research on Optimization of Distributed Energy Storage Investment in Multi-Market Power Systems	666
Design of Industrial Inspection System Based on Machine Vision and Research on Image Processing Algorithm	673
A Study of the State of Motion Based on Archimedean Solenoids and Nonlinear Programming 6 Xiaoyu Feng (Harbin Engineering University, China), Meng Guo (Harbin Engineering University, China), and Taiyu Niu (Harbin Engineering University, China)	579

Smart Agriculture Environment Monitoring and Intelligent Early Warning System Based on Internet of Things	686
Qiuhuang Chen (Hangzhou Suli Technology Co., Ltd, China), Enke Tang (Hangzhou Suli Technology Co., Ltd, China), and Pengcheng Yu (Hangzhou Suli Technology Co., Ltd, China)	,,,,
Electrical Power System Network Security Situational Awareness and Protection Based on Deep Learning	691
A Study of Systematic Scale Change Based on Random Forest and Gradient Boosting Decision Trees	697
Chongrui Wang (Capital University of Economics and Business, China), Hao Gui (Capital University of Economics and Business, China), and Jinlin Li (Capital University of Economics and Business, China)	
Artificial Intelligence Based Network Security Threat Detection and Response Mechanism for Electric Power System	704
Dynamic Response of Bicycle to Collision with Road Bump	709
Algorithm for Optimizing the Layout of Sensor Networks in the Safety Monitoring of Hydraulic Engineering	714
Research on HyperWorks Algorithm Optimization for Lightweight Simulation of Automobile Frame	719
Performance Evaluation and Optimization of Mathematical Optimization Algorithms in Large-Scale Data Processing and Analysis	724
Research on Strategies for Optimising Complex Systems Based on Monte Carlo Algorithms	730

Construction of Knowledge Map Based on Large Model and Decision Support of Power System	
Wei Liu (Institute of Software Chinese Academy of Sciences, China),	735
Wei Dong (Institute of Software Chinese Academy of Sciences, China),	
Huan Xu (Institute of Software Chinese Academy of Sciences, China),	
and Yun Bai (Institute of Software Chinese Academy of Sciences, China)	
Analysis of Helical Structures Based on Simulated Annealing Algorithms and Geometric	740
Constraints	742
University - Hong Kong Baptist University United International College, China), and Xuanling Wang (Beijing Normal University - Hong Kong Baptist University United International College, China)	
Research on Artificial Intelligence Based Airport Intelligent Security Check Business	
Monitoring and Management Platform	751
Limited, China), Haiping Ren (Beijing Capital International Airport Company Limited, China), and Yang Zhao (Beijing Capital International Airport Company Limited, China)	
Computer Simulation Analysis of SDDC Pile Deformation Based on FLAC3D	756
Research on the State Monitoring System of Ship Lock Electrical Equipment Based on Internet of Things Technology	761
Gang Zhang (Three Gorges Navigation Authority, China), Sishun Shui (Three Gorges Navigation Authority, China), and Ziwei Zhang (Three Gorges Navigation Authority, China)	
Motion Study of Multibody Systems Based on Multi-Objective Optimisation and Collision Detection	765
Application and Performance Analysis of Machine Vision Algorithms in Intelligent	
Manufacturing	770
Huade University, China)	
	776
Jinchen Ren (Soochow University, China)	
Performance Improvement of RFID System Based on Optimization Algorithm	783
Research on Archimedes' Spiral Motion Based on Computer Simulation Technology	789

Design of a Drug Development Tomography System Based on Multi-Modal Data Fusion	794
Construction and Optimization of Early Warning System for Frequent Blackouts in Active Distribution Network Based on Machine Learning Algorithm Jianxiong Gan (State Grid Information&Telecommunication Group Company Ltd, China), Hongbo Ma (Sgit-Uni (Qingdao) Cloud Data Technology Co.Ltd, China), Fengchang Sun (State Grid Information&Telecommunication Group Company Ltd, China), Mengran Fang (Sgit-Uni (Qingdao) Cloud Data Technology Co.Ltd, China), and Guangliang Chen (Sgit-Uni (Qingdao) Cloud Data Technology Co.Ltd, China)	799
Research on the Application of Efficient Parallel Algorithm in Large-Scale Data Processing	804
Research on Genetic Algorithm Optimization of Agricultural Robot Picking Task Planning Tianyu Liao (Guangxi City Vocational University College of Intelligent Engineering, China) and Shiping Deng (Guangxi City Vocational University College of Intelligent Engineering, China)	810
Multi-Objective Fault Recovery Model of Active Distribution Network Considering Randomness of Distributed Generation	816
Effect Assessment and Optimization Pathway of Micro-Bubble Low-Density Water-Based Well Control Fluid in Kekeya Oilfield Based on Data Mining	821
Algorithm Optimization of AI Agent in Customer Behavior Prediction Based on Large Model Haizhi Wei (Kexun Jialian Information Technology Co., Ltd, China)	826
Optimization of Subway Three-Phase PWM Rectifier Combining Sliding Mode Variable Structure Control and Passivity-Based Control	832
Data Fusion Algorithm of Electromagnetic Wave and Ultrasonic Wave in Non-Contact Visual Detection of 10kv Distribution Lines	838

Research on Feature Extraction and Identification of Acoustic Defects of GIS Equipment Based on Deep Learning	43
Qiongling Shang (Baise Power Supply Bureau of Guangxi Grid Co., Ltd, China), Bangchao Zhu (Baise Power Supply Bureau of Guangxi Grid Co., Ltd, China), and Jie Li (Baise Power Supply Bureau of Guangxi Grid Co., Ltd, China)	
The Role of Deep Learning-Based Maritime Image Recognition Technology in Ship Collision Avoidance Decision-Making	48
Dynamic Behavior Analysis and Control of Welding Pool Based on Machine Learning	53
Study on Optimization of Hole Location and Blasting Parameters of Carbon Dioxide Gas Explosion Assisted by Machine Learning	58
Application of Artificial Intelligence in Fault Detection and Isolation of Power System	63
Real-Time Monitoring and Fault Diagnosis Method of Distribution Network State Based on Digital Twinning Technology	68
Power System Load Forecasting and Energy Management Model Based on Data-Driven	74
Design and Implementation of Machine Learning Algorithm in UAV Intelligent Control	79

Dynamic Interference Detection and Suppression in Electronic Countermeasures Systems Based on Machine Learning	. 885
Jiajia Guo (Shanghai Aerospace Electronic Technology Institute, China), Yongpeng Li (Shanghai Aerospace Electronic Technology Institute, China), and Junzhuo Liu (Shanghai Aerospace Electronic Technology Institute, China)	
Research on Time Delay Estimation Algorithm of GIS Partial Discharge Signal Based on Higher-Order Cumulant and Bispectrum Estimation	. 889
Guangxi Grid Co., Ltd, China) Analysis of the Impact of Intelligent Navigation System on Transportation Efficiency Chen Liu (Tianjin Transportation Technical College, China)	. 894
Innovative Practice of Sensor Fusion Technology and Intelligent Algorithm in Fitness Effect Evaluation	. 899
Huanzhuan Wu (Guangdong Jiangmen Chinese Medicine College, China) and Zhaozhang Ouyang (Jiangmen Polytechnic, China)	. 677
Risk Identification and Response of Low-Voltage Operation and Distribution Integration Site	. 906
User Behavior Analysis and Algorithm Optimization in Interactive Product Design	911
Mechanical Structure Design and Computer Simulation Based on Topology Optimization	. 917
Optimization of Yield Based on Machine Learning and PF-SOA Algorithm Jingyi Zhou (Jimei University, China), Yuan Chen (Northeast Agricultural University, China), Siyuan Shao (Lappeenranta-Lahti University of Technology, Finland), Huanxi Liu (Naval University of Engineering), and Chengyue Li (Shantou University, China)	. 921
Research on Environmental Monitoring System Based on Wireless Sensor Network	. 928
Research on Water Level Adjustment Based on Markov Analysis Method and Differential Multivariate Regression Model	. 932

desearch on Big Data Analysis and Visualization Technology under Software Flexible	938
ramework	936
Lesearch on the Optimal Planting Plan Model Based on Improved Genetic Algorithm	943
ault Detection Method Based on Machine Learning in Ship Lock Automation Control	949
Study on Multi-Objective Decision Optimization Based on the NSGA-II Algorithm	952
lesearch on Machine Learning-Based Mechanical Structure Optimization Design Method	959
Lesearch on Multi-Stage Decision Optimization Based on Monte Carlo Simulation and Deep Q-Network Algorithm	964
Lesearch on Real-Time Monitoring System of Substation Construction Status Based on Internet of Things	972
Limited, China) Lesearch on Dual-Objective Robust Optimization Based on Monte Carlo Simulation and imulated Annealing Algorithm Lihua Lan (Guilin University of Technology, China), Hanping Huang (Guilin University of Technology, China), Fupei Ning (Guilin University of Technology, China), Yanbin Zheng (Guilin University of Technology, China), and Qin Yang (Guilin University of Technology, China) China)	978
Optimizing Total Factor Productivity Measurement for Power Grid Enterprises using Machine learning Algorithms	983
application of GraphSAGE in Financial Fraud Detection within Dynamic Social Networks Iiajun Tang (Yunnan University, China)	989

Research on Big Data Processing and Intelligent Analysis Algorithm in Electric Power	0.4
Enterprise Information Platform	74
Real-Time Stress Prediction of Robotic Arms Based on Random Forest Agent Model	3 9
Research on Integration Technology of Information Platform for School-Enterprise Cooperation in Electric Power Enterprises Based on SOA Architecture)4
Research on Joint Path Optimization Based on Inverse Kinematics Model and Genetic Algorithm	11
Design and Optimization of Signal Filtering and Dynamic Modeling Algorithm for Soil and Water Conservation Online Monitoring System in Pumped Storage Engineering	20
YOLOv5-GoldSOSA: Integrating Gold-YOLO and RCS-OSA for an Enhanced Flame Detection System	
Zichen Zhao (Beijing University of Civil Engineering and Architecture, China)	25

Research on Model Compression and Efficient Inference Algorithm for Deep Neural Networks 1036 Xiaomei Li (Weifang Engineering Vocational College, China), Mei Tang (Weifang Engineering Vocational College, China), and Shan Xiao (Weifang Engineering Vocational College, China)
Underwater Image Enhancement: Comparison Between UDnet and GAN Models
Deployment and Optimization Strategy of Machine Learning Model Based on Cloud Computing 1040
Yimeng Lyu (CCTEG Coal Mining Research Institute, China)
Multidimensional Data Analysis and Algorithm Optimization of Power System Network Security Protection
Design and Demonstration of Tobacco Pest Monitoring System Based on Visual Recognition Technology
Research on Signal Processing Technology of Intelligent Reflection-Assisted Millimeter Wave Large-Scale MIMO System
Real-Time Fault Detection and Disaster Recovery Response System of Information System Based on Neural Network
Collaborative Optimization Control Algorithm for Ground Source Heat Pump System and Building Energy Efficiency
Research on Data-Driven Optimization Algorithm for Machining Parameters of CNC Lathe 1075 Yidi Wang (China General Technology Group machine tool Engineering Research Institute Co., LTD., China), Yongsheng Zhou (Jilin University, China), Xuena Sun (China General Technology Group machine tool Engineering Research Institute Co., LTD., China), Zhongwen Cheng (China General Technology Group machine tool Engineering Research Institute Co., LTD., China), and Jingyang Na (China General Technology Group machine tool Engineering Research Institute Co., LTD., China)

Research on Energy Management and Scheduling Algorithm of Lithium Battery Energy Storage System Based on Artificial Intelligence
Development of Road Recognition and Navigation Algorithm for Smart Cars Based on Machine Vision
Prediction of Performance Degradation in Lithium-ion Battery Energy Storage Systems Based on Machine Learning
Terrain Change Detection and Mapping Data Updating Method Based on Computer Vision 1096 Linbo Xu (Chongqing Botu Survey and Planning Co., Ltd, China)
Research on Data Acquisition and Processing Algorithms in Energy Management System of Intelligent Buildings
Machine Vision Algorithm for Indoor Environment Perception and Intelligent Lighting Design 1107 Wenlong Xu (Sichuan Technology and Business University, China)
Mechanism of Transmission Line Icing in High Altitude Area and Optimization of De-Icing Technology Algorithm
Athletes' Action Recognition and Optimization Strategy Based on Deep Learning
Design of Equipment Monitoring System and Anomaly Detection Model for Thermal Power Plants Assisted by AR
Research and Application of Control Algorithm for Robot Intelligent Seam Tracking System 1130 Hongle Zhang (Gansu Institute of Mechanical&Electrical Engineering, China), Qingchun Li (Gansu Institute of Mechanical&Electrical Engineering, China), Dong Chen (Gansu Institute of Mechanical&Electrical Engineering, China), Xiaojun Li (Gansu Institute of Mechanical&Electrical Engineering, China), and Yukai Wang (Tianshui Metalforming Machine Tool (Group) Co., Ltd, China)

Intelligent Operation and Maintenance Model and Optimization Algorithm for Electrical Equipment in Thermal Power Plants Integrated with Augmented Reality Technology	1136
Numerical Analysis and Algorithm Optimization of the Effect of Concentrated Gas Cannon on the Inverse Thermosphere Jun Zhang (Urumqi Meteorological Bureau, China), Yuanyuan Li (Xinjiang Weather Modification Office, China), Chaocheng Su (Urumqi Meteorological Bureau, China), Bin Li (Xinjiang Weather Modification Engineering Technology Research Center, China), Jinyan Lu (Changji Meteorological Bureau, China), Yang Zhang (Urumqi Meteorological Bureau, China), and Shihan Zhang (Urumqi New Oriental Technical School, China)	1142
Research on Data Privacy Protection Algorithm of Smart Grid Based on Full Homomorphic Encryption	1148
	1155
Optical Modulator Mode Analysis Based on Lithium Niobate Thin Film	1160
Application and Optimization of Deep Learning in Semantic Recognition of Communication Signals Hao Meng (College of Electronic Engineering National University of Defense Technology, China), Yingke Lei (College of Electronic Engineering National University of Defense Technology, China), Changming Liu (Tongfang Electronic Technology Company, Ltd, China), Hu Jin (College of Electronic Engineering National University of Defense Technology, China), Jin Wang (College of Electronic Engineering National University of Defense Technology, China), and Fei Teng (College of Electronic Engineering National University of Defense Technology, China)	1165
Realization of Full Homomorphic Encryption Algorithm Based on FPGA in Power Grid Data Protection	1170

Optimization Study on the Flow Passage Cross-Section of Proton Exchange Membrane Electrolysis Tanks
Chaoying Zhan (Wuhan University of Technology, China; Xianhu Laboratory, China) and Congda Xiao (Wuhan University of Technology, China; Xianhu Laboratory, China)
Research on Smart Product Design and User Interaction Experience Enhancement Methods Based on Internet of Things
Unmanned Vehicle Navigation Obstacle Detection and Avoidance System Based on Deep Learning 1187 Hao Yang (Xi'an North Electro-optic Science & Technology Defense Co. Ltd, China; The Northeast Agricultural University, China), Liang Wang (Xi'an North Electro-optic Science & Technology Defense Co. Ltd, China), Yingbai Chen (Xi'an North Electro-optic Science & Technology Defense Co. Ltd, China), Kai Zhang (Xi'an North Electro-optic Science & Technology Defense Co. Ltd, China), and Han Fei (Xi'an North Electro-optic Science & Technology Defense Co. Ltd, China)
Fault Prediction and Maintenance Strategy of Motor Drive System Based on Data Mining
Research on Fault Diagnosis and Predictive Maintenance of Electrical Automation System Based on Deep Learning
Intelligent Control and Electronic Information Processing Optimization Algorithm for Industrial Automation
Real-Time Data Acquisition and Digital Twin Model Synchronization Technology of Wind-Solar Electrolysis Hydrogen Production System Based on Internet of Things
Application of MEMS Sensor Data Fusion in Athlete Physical Training
Algorithm Design and Simulation Analysis of Performance Optimization of Terrestrial Digital TV Transmission System

Reinforcement Learning Algorithm for Junction Temperature Control of Automotive LED Chips Yahong Xiao (Hunan Automotive Engineering Vocational University, China) and Xianming Zhu (Hunan Automotive Engineering Vocational University, China)	1227
Calculation Method of Line Loss in Low-Voltage Substation Based on K-Means++ and Elman Neural Network Jiefeng Pan (State Grid Zhejiang Electric Power Co., Ltd. Yuyao City Power Supply, China), Fei Geng (State Grid Zhejiang Electric Power Co., Ltd. Ningbo City Power Supply, China), and Yuqian Zhang (State Grid Zhejiang Electric Power Co., Ltd. Yuyao City Power Supply, China)	1233
Research on Intelligent Decision-Making Algorithm and Optimization Method in Information Security Risk Management of Power Supply Enterprises	1239
A Dynamic Scheduling Method Based on Critical Path Task Insertion	1244
Analysis and Optimization of Flight Stability of Unmanned Airship Lift Body Configuration Based on Computer Algorithms Shaofan Hu (Shandong business institute, China), Mengxiao Wei (Shandong business institute, China), Lele Li (Shandong business institute, China), Zihan Cao (Shandong business institute, China), and Yongwang Jiang (Shandong business institute, China)	1249
Design and Algorithm Optimization of Intelligent and Orderly Power Consumption Control on User Side	1255
Research on Intelligent Monitoring and Prediction Model of Vibration Direction of Conventional Island Steam Turbine Shafting	1261
Research on Optimization Framework of Key Communication Network Routing Strategy Driven & Graph Structure Data	

Research on Vibration Law and Fault Prediction of Conventional Island Steam Turbine Shafting Based on Data Mining	'2
Security Risk Identification Model of Power Grid Software Supply Chain Based on Data Mining Yifei Wan (Guangxi Power Exchange Center Co. Ltd, China), Lijuan Qin (Guangxi Power Exchange Center Co. Ltd, China), Jianrong Qin (Guangxi Power Exchange Center Co. Ltd, China), and Rong Zheng (Guangxi Power Exchange Center Co. Ltd, China)	7
A Fault Diagnosis and Prediction Model for Power Equipment in Cigarette Factories Based on Deep Learning	3
Experimental Analysis of the Influence of the Internal Hardware Layout of the Desktop Terminal Chassis on Electromagnetic Interference	18
Research on Sports Action Recognition and Intelligent Feedback System Based on Convolutional Neural Network	4
Simulation Research on Mathematical Model of Network Node Matching Problem Based on Fuzzy Mathematics	19
Research on Intelligent Matching Algorithm of Substation Naming Duplicate Checking System 130 Chen Gong (Shenzhen Power Supply Co., Ltd., China), Yixuan Weng (Shenzhen Power Supply Co., Ltd., China), Hongxin Li (Shenzhen Power Supply Co., Ltd., China), Zhaohe Zhou (Shenzhen Power Supply Co., Ltd., China), Chao Zhang (Shenzhen Power Supply Co., Ltd., China), and Ruoyu Gu (Shenzhen Power Supply Co., Ltd., China)	4
Data Collection and AI Analysis Processing Technology Based on Digital Twins	19
Collaborative Control Algorithm for Multiple Flexible Loads in Demand Side Energy Management System	.5
Algorithm Design and Testing for Environmental Adaptability in Virtual Reality	.1

Algorithm Application of BIM Technology in Building Carbon Emission Monitoring and Control. Yufang Wang (Xiamen Institute of Technology, China) and Kun Yang (Quanzhou City Residential Construction and Development Co., Ltd., China)	1326
Research on Optimal Control System of Building Decoration Energy Consumption Based on Internet of Things	1332
Wei Wu (Fushun Vocational and Technical College, China)	
Research on Model Compression and Efficient Inference Algorithms for Deep Neural Networks . Shuangshuang Yang (Qingdao City University, China), Qiuxue Ouyang (Qingdao City University, China), Chaojie Wang (Qingdao City University, China), Yingying Li (Qingdao City University, China), and Conghan Zhong (Qingdao City University, China)	1338
Research on Optimal Design of Bionic Flapping-Wing Aircraft Driver Based on MEMS	1343
Design and Assessment of Reinforcement Learning Algorithms for End-to-End Autonomous Driving Learning	1349
Damage Detection and Evaluation Model of Offshore Engineering Structures Based on Machine Learning Fugui Yuan (Guangdong Baiyun University, China) and E Zhou (Guangdong Baiyun University, China)	1355
A Dual-Channel Metal Detection Method Based on RIME Optimization Algorithm	1361
Research on Electronic Management and Application of Urban Drainage Facility Information Data Wanhui Zhang (Guangzhou Installation Group Co., Ltd., China; Guangzhou Construction Co., Ltd., China), Guangzhi Zhang (Guangzhou Installation Group Co., Ltd., China), Songyuan Zheng (Guangdong Digital Smart Design Co., Ltd., China), Lijuan Peng (Guangzhou Installation Group Co., Ltd., China), and Xiaoyu Li (Guangdong Digital Smart Design Co., Ltd., China)	1366
Design and Optimization of Agricultural Machinery Autonomous Control System Integrating TRIZ Method and Internet of Things Technology	1371

Algorithm Development and Software Tool Application of Power Market Risk Assessment	377
Research and Implementation of Distributed Algorithm for Cooperative Control of Multiple UAVs	383
Yan Yan (Shanghai Electromechanical Engineering Institute, China) and Xiaotian Qin (Shanghai Electromechanical Engineering Institute, China)	
Intelligent Control and Algorithm Optimization of Overhead Conductor Peeling Device	388
Construction of Multidimensional Analysis Model of Power Data and Financial Data Fusion 13 Xingjia Yuan (Guangdong Power Grid Co., Ltd., CSG., China), Chao Liu (Guangdong Power Grid Co., Ltd., CSG., China), Xiaofan Zhao (Guangdong Power Grid Co., Ltd., CSG., China), Shirong Zou (Guangdong Power Grid Co., Ltd., CSG., China), and Xueqing Liang (Guangdong Power Grid Co., Ltd., CSG., China)	393
Intelligent Information Management and Resource Allocation Optimization Model Based on Artificial Intelligence	397
Intelligent Maintenance and Life Prediction of Electrical Equipment Based on Machine Learning	404
Research on Fluctuation Recognition and Short-Term Forecasting of New Energy Power Generation Based on ICEEMD-VMD and Bi-LSTM	410
Research on Suppression and Optimization Algorithm of Tuned Mass Damper for Dynamic Response of Wind Power Mixing Tower in Complex Environment	416

Design and Implementation of Intelligent Substation Intelligent Operation and Maintenance System Based on Internet of Things Technology	. 1422
Research on Automatic Identification and Monitoring System of New Power System Construction Based on Computer Vision Yong Zhang (State Grid Jibei Electric Power Co.Ltd. Chengde Power Supply Company, China), Yang Liu (State Grid Jibei Electric Power Co.Ltd. Chengde Power Supply Company, China), Yan Li (State Grid Jibei Electric Power Co.Ltd. Chengde Power Supply Company, China), and Qingze Kong (State Grid Jibei Electric Power Co.Ltd. Chengde Power Supply Company, China)	. 1428
Algorithm Application and Performance Improvement of Multi-Sensor Fusion in Pressure Pipeline Inspection Baolin Liu (China Special Equipment Inspection & Research Institute, China; Technology Innovation Center of Risk Prevention and Control of Refining and Chemical Equipment for State Market Regulation, China), Li Hu (China Special Equipment Inspection & Research Institute, China; Technology Innovation Center of Risk Prevention and Control of Refining and Chemical Equipment for State Market Regulation, China), Jianhuo Liang (China Special Equipment Inspection & Research Institute, China; Technology Innovation Center of Risk Prevention and Control of Refining and Chemical Equipment for State Market Regulation, China), and Guiyang Wang (China Special Equipment Inspection & Research Institute, China; Technology Innovation Center of Risk Prevention and Control of Refining and Chemical Equipment for State Market Regulation, China)	. 1434
Stability Analysis and Optimization Strategy of PLC Ship Lock System Based on Fuzzy Logic Control	. 1439
Research on Large-Scale Data Mining and Machine Learning Model for Accurate Prediction Min Chen (Chongqing Vocational and Technical University of Mechatronics, China), Shang Yu (Chongqing Vocational and Technical University of Mechatronics, China), and Yongsheng Deng (Chongqing Vocational and Technical University of Mechatronics, China)	. 1444

Optimization and Implementation of Path Planning Algorithm for Industrial Robots for	
Intelligent Manufacturing1	1449
Jinlong Li (Gansu Institute of Mechanical&Electrical Engineering,	
China), Ruifang Shi (Gansu Institute of Mechanical&Electrical	
Engineering, China), Yue Wang (Gansu Institute of	
Mechanical&Electrical Engineering, China), and Haifeng Chen (Gansu	
Institute of Mechanical&Electrical Engineering, China)	

Author Index