

2024 International Conference on Industrial IoT, Big Data and Supply Chain (IIoTBDSC 2024)

**Wuhan, China
20-22 September 2024**



**IEEE Catalog Number: CFP24CZ5-POD
ISBN: 979-8-3315-3982-5**

**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:	CFP24CZ5-POD
ISBN (Print-On-Demand):	979-8-3315-3982-5
ISBN (Online):	979-8-3315-3981-8

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

CURRAN ASSOCIATES INC.
proceedings
.com

2024 International Conference on Industrial IoT, Big Data and Supply Chain (IIoTBDSC) **IIoTBDSC 2024**

Table of Contents

Message from the General Chair	xiv
Message from the Program Chair	xv
Organizing Committee	xvi
Program Committee	xvii
Reviewers	xx
Sponsor, Supporters, and Contributing Organizations	xxii

Session I: Industrial Internet of Things (IIoT) Fundamentals and Applications

Elasticity Evaluation of Modern Construction Supply Chain Based on Interval Intuitionistic Fuzzy Numbers	1
<i>Gang Li (Jiangxi University of Finance and Economics, China), Yiyang Liang (Jiangxi University of Finance and Economics, China), Ya Wang (Jiangxi University of Finance and Economics, China), and Yufei Fu (Macau University of Science and Technology, China)</i>	
Design and Implementation of IoT-Based Smart Home System	7
<i>Hufa Wu (Zhejiang Dahua Technology Co., Ltd.)</i>	
Deep Neural Networks for Garbage Classification	12
<i>Hongli Ren (Taiyuan University of Technology, China), Haodong Liu (Taiyuan University of Technology, China), and Jiayao Qin (Taiyuan University of Technology, China)</i>	
Research and Application of Road Transportation Accident Related Incomplete Information Supplementation Based on Improved ROUTIDA Algorithm	18
<i>Hongli Liu (Ministry of Transport, P.R.China), Qiang Chen (Baotou Transportation Bureau, P.R.China), and Wei Zhou (Ministry of Transport, P.R.China)</i>	
A Novel Five-Dimensional Chaotic System for Medical Image Encryption with X-Axis Projection	25
<i>Zeben Zhuang (People's Hospital of Fengjie, China) and Zhiben Zhuang (Huaihua University, China)</i>	

Behavior Analysis and Safety Management of Workers in Limited Space Based on Machine Learning	33
<i>Qifeng Luo (China Southern Power Grid Corporation, China), Jiehong Ye (China Southern Power Grid Corporation, China), Jingming Liang (China Southern Power Grid Corporation, China), and Qiang Zhou (Shandong University of Technology, China)</i>	
Intelligent Optimization of Material Supply Chain via Machine Learning	39
<i>Zhe Li (State Grid Heze Power Supply Company, China), Yiqiang Zhang (State Grid Heze Power Supply Company, China), Hanshu Bi (State Grid Heze Power Supply Company, China), Hongli Guan (State Grid Heze Power Supply Company, China), and Zhiyuan Li (State Grid Heze Power Supply Company, China)</i>	
Enhancing Sentiment Analysis Accuracy with Reinforcement Learning: The ReinforceSentOpt Model	45
<i>Zixing Yang (State Grid Corporation of China, China), Wei Han (State Grid Corporation of China, China), Qing Zhu (State Grid Corporation of China, China), Liangfei Sun (State Grid Corporation of China, China), Changhai Wang (State Grid Corporation of China, China), Huimin Zhang (State Grid Corporation of China, China), Ziyong Li (State Grid Corporation of China, China), Jiaqi Shi (State Grid Corporation of China, China), and Haoming Peng (State Grid Corporation of China, China)</i>	
Application of Deep Learning Technology in Intelligent Decision Support and Risk Warning of Information Management System	51
<i>Ge Song (WuXi Vocational Institute of Commerce, China)</i>	
Design of an Immersive Experience Emotion Recognition and Analysis System Based on Deep Learning	57
<i>Fei Wang (Hubei University of Technology, China)</i>	
Procurement Budget Forecasting of Low-Value Consumables in Colleges and Universities Based on Machine Learning	62
<i>Fenfang Liu (Wuhan Technology and Business University, China)</i>	
Optimization and Implementation of Deep Learning Algorithm in Power Dispatch Speech Recognition	68
<i>Mingshu Song (State Grid Xinjiang Electric Power Company Limited, China), Xiaolei Ma (State Grid Xinjiang Electric Power Company Limited, China), Pengfei Duan (State Grid Xinjiang Electric Power Company Limited, China), Yandong Yang (State Grid Xinjiang Electric Power Company Limited, China), and Qiang Zhou (Shandong University of Technology, China)</i>	
Digital Twin-Based Safety Monitoring and Evaluation System for the Datengxia Water Control Hub Project	74
<i>Bin Liu (Guangxi Datengxia Gorge Water Conservancy Development Co. Ltd., China), Qibin Liang (Pearl River Water Resources Research Institute, China), and Jiali Yang (Pearl River Water Resources Research Institute, China)</i>	
Financial Time Series Analysis and IPO Pricing Model Based on Machine Learning	79
<i>Xiangbin He (Guangdong University of Science and Technology, China)</i>	

Text Sentiment Classification Algorithm Based on BiLSTM Deep Learning	83
<i>Weiwei Gong (Nanchang Institute of Technology, China)</i>	
A Study of Internet Users' Heterogeneity Based on Large Language Models	88
<i>Lihui Song (People's Public Security University of China, China), Haobo Zhang (People's Public Security University of China, China), and Nan Jia (People's Public Security University of China, China)</i>	
Stm32-Based Home Environment Monitoring and Model Prediction System	94
<i>Wangxin Wu (Shanghai Polytechnic University, China) and Zheng Jian (Shanghai Polytechnic University, China)</i>	
Social Security Event Prediction Based on Machine Learning	100
<i>Chang Li (Guangdong University of Foreign Studies, China) and Tianye Jin (Northeastern University, USA)</i>	
Financial Fraud Detection System Combining Generative Adversarial Networks and Deep Learning	105
<i>Ruibo Wu (University of California, CA)</i>	
Research on Fault Arc Detection Based on Deep Learning	111
<i>Mingjun Liu (Huanggang Power Supply Company, China), Li Cao (Huanggang Power Supply Company, China), Zhiyu Xi (Huanggang Power Supply Company, China), Min Ye (Huanggang Power Supply Company, China), Jiali Xia (Huanggang Power Supply Company, China), Jian Li (Huanggang Power Supply Company, China), and Qi Xu (Huanggang Power Supply Company, China)</i>	

Session II: Big Data Research and Multi-Discipline Services

Development of Xi'an Tourism Data Prediction Model Based on Machine Learning	116
<i>Hongtao Ao (University of Sydney, Australia)</i>	
The Correlation Between Individualism Level and the Trend of using Rare Characters in Personal Names: An Exploration Based on Big Data	121
<i>Jielin Deng (Chinese Academy of Sciences, China; University of Chinese Academy of Sciences, China), Xiaohua Huang (Chinese Academy of Sciences, China; University of Chinese Academy of Sciences, China), and Xiaopeng Ren (Chinese Academy of Sciences, China; University of Chinese Academy of Sciences, China)</i>	
Big Data-Driven Financial Risk Management: Application of Association Rule Mining Technology in Anomaly Detection	127
<i>Chongyan Zhang (Nanning University, China)</i>	
Application of Time Series Analysis in Predicting Industrial Data Security Events	132
<i>Caiyun Liu (National Industrial Information Security Development Research Center, China), Yan Sun (National Industrial Information Security Development Research Center, China), and Yitong Liu (National Industrial Information Security Development Research Center, China)</i>	
Efficiency Evaluation of Digital Talent Resource Allocation for Manufacturing	138
<i>Dan Yuan (Guangdong University of Science and Technology, China), Yijun Zhang (Guangdong University of Science and Technology, China), and Jinliang Wang (Guangdong University of Science and Technology, China)</i>	

Classification Method of Big Data for Non-Formatted Equipment Combat Training Support	144
<i>Shan Sun (Wuhan University of Technology, China) and Chengjie Zhu (Soochow University, China)</i>	
A Time Series Sales Data Forecasting Model Based on TCN and Its Three Variants	152
<i>Sian Chen (North China University of Technology, China)</i>	
Application of Big Data Analysis Model in Intelligent Logistics	160
<i>Ke Tang (Chengdu college Of University Of Electronic Science And Technology of China, China)</i>	
Evaluation of Highway Transportation Service Quality Based on Big Data	166
<i>Yuchen Zhang (China National Institute of Standardization, China), Xingyao Zhou (China National Institute of Standardization, China), Fujun Wan (China National Institute of Standardization, China), and Qi Wang (China National Institute of Standardization, China)</i>	
Design of Large-Scale Public Sentiment Analysis System Based on Transformer Architecture	172
<i>Zixing Yang (State Grid Corporation of China, China), Wei Han (State Grid Corporation of China, China), Qing Zhu (State Grid Corporation of China, China), Liangfei Sun (State Grid Corporation of China, China), Changhai Wang (State Grid Corporation of China, China), Huimin Zhang (State Grid Corporation of China, China), Ziyong Li (State Grid Corporation of China, China), Jiaqi Shi (State Grid Corporation of China, China), and Xiaolong Li (State Grid Corporation of China, China)</i>	
Innovative Strategies for Biological Resource Management and Sustainable Development in the Era of Big Data	178
<i>Shuxiang Yang (Wuhan Donghu University, China)</i>	
Analysis of the Evolution of Police-Related Public Opinion Based on Multi-Source Online Public Opinion Big Data	185
<i>Xinyang Wang (People's Public Security University of China, China), Zichun Meng (People's Public Security University of China, China), and Nan Jia (People's Public Security University of China, China)</i>	
Optimization of a Big Data-Driven Public Security Policy and Regulation Q&A System	191
<i>Kejun Li (People's Public Security University of China, China), Yifei Shen (People's Public Security University of China, China), and Nan Jia (People's Public Security University of China, China)</i>	
Anomaly Detection Methods for Nonparametric Fitting Gaussian Mixture Distributions for Data Features	197
<i>Jun Zeng (Qinghai Normal University, China) and Yinghua Tong (Qinghai Normal University, China)</i>	
Research on Big Data Automatic Mining Method of High-Dimensional Text Based on Machine Learning	207
<i>Guofeng Dong (Sichuan Provincial Big Data Center, China), Sihang Wang (Sichuan Provincial Government Affairs Service and Public Resources Exchange Service Center, China), Renjun Wen (China Comservice Enrising Information Technology Co., Ltd., China), and Yu Guo (Sichuan Provincial Big Data Center, China)</i>	
Optimized LSTM Time Series Prediction Model for Industrial Big Data	212
<i>Yangzhi Li (China University of Geosciences, China)</i>	

Big Data-Driven Scientific and Technological Innovation Mechanism Optimization and Decision Support System	217
<i>Fangyu Gao (China Electric Equipment Group, China), Di Chen (China Electric Equipment Group, China), Shuai Yang (China Electric Equipment Group, China), Zhenghu Hao (China Electric Equipment Group Science and Technology Research Institute, China), Qiong Wu (Beijing State Grid Fuda Technology Development Co., Ltd., China), and Xu Zhang (Beijing State Grid Fuda Technology Development Co., Ltd., China)</i>	
Cold Chain Food Safety Detection Technology Combined with Data Mining Technology	222
<i>Gan-Hong Chen (Guangdong Meizhou Vocational and Technical College, China), Jingxian Yang (Guangdong Meizhou Vocational and Technical College, China), and Yong Liu (Guangdong Meizhou Vocational and Technical College, China)</i>	
Data Mining and Prediction Algorithms for Takeout Purchase Behavior	227
<i>Ying Li (Sino-Anglian Joint postdoctoral research station, China)</i>	
Knowledge Recommendation Model of Business English Teaching Based on Intelligent Data Mining Technology	233
<i>Tingting Liang (Hunan College of Foreign Studies, China)</i>	
Object Detection: A Comprehensive Toolkit for Advanced Object Detection	239
<i>Junjie Ouyang (University of Southern California, United States)</i>	

Session III: Supply Chain Fundamentals

Application of Intelligent Internet of Things Tourism System in Tourism Attractiveness Evaluation and Application Effect Analysis	244
<i>Tingting Sun (Shandong Business Institute, China)</i>	
A Study on Improving Procurement Efficiency of Medical Consumables Based on the SPD Supply Chain Management Model	250
<i>Jiechao Chen (Anhui Zhongji Guoji Medical Technology Co, China), Jiaqing Miao (The First Affiliated Hospital of Sun Yat-sen University, China), Donglan Yu (The First Affiliated Hospital of Sun Yat-sen University, China), Lihua Wu (The First Affiliated Hospital of Sun Yat-sen University, China), Jiawen Tan (The First Affiliated Hospital of Sun Yat-sen University, China), Yuyao Wang (The First Affiliated Hospital of Sun Yat-sen University, China), and Wenze Luo (Institute for Hospital Management of Tsinghua University, China)</i>	
Impact of Consumer Behavior and Marketing on Supply Chain Low-Carbon Innovation	259
<i>Dong Zhang (Guangdong University of Science and Technology, China) and Xuming Zhang (Guangdong University of Science and Technology, China)</i>	
A Study on the Rapid Classification of Medical Consumable Supply Chains Based on K-Means Clustering	268
<i>Haobin Luo (University of Southampton, UK), Jiaqing Miao (The First Affiliated Hospital of Sun Yat-sen University, China), Jiechao Chen (Anhui Zhongji Guoji Medical Technology Co, China), Hongbin Feng (Sun Yat-sen University, China), Jia Guo (Southern Medical University Third Hospital, China), and Yingmin Tian (Guangzhou Xinhua University, China)</i>	

The Impact of Digital Finance on High-Quality Enterprise Total Factor Productivity -A Comprehensive Study by Supply Chain Finance Mechanisms	274
<i>Jiechao Chen (Anhui Zhongji Guoji Medical Technology Co, China), Jiaqing Miao (The First Affiliated Hospital of Sun Yat-sen University, China), Haobin Luo (University of Southampton, UK), Wenzhe Luo (Institute for Hospital Management of Tsinghua University, China), and Xinye Sha (Columbia University, USA)</i>	
Personalized Tourism Route Planning System Combined with Internet of Things Technology	281
<i>Yuting Liu (Qingdao Ocean Shipping Mariners College, China)</i>	
Design of Cloud-Based Supply Chain Management Platform for Manufacturing Enterprises	286
<i>Luming Cheng (AVIC Chengdu Aircraft Industrial (Group) Co., Ltd)</i>	
Application of Artificial Intelligence and Decision Support System in Green Supply Chain Management	291
<i>Qi Chang (Guangdong University of Science and Technology, China) and Liangzheng Zhang (City University of Macau, China)</i>	

Session IV Advanced Supply Chain and IIoT-BD Integration

Demand Forecast of Cold Chain Logistics of Fresh Agricultural Products Based on Deep Learning	296
<i>Hongyan Li (Shanghai Maritime University, China)</i>	
Design of Internet of Things-Based Escalator Condition Monitoring and Early Warning System.....	301
<i>Xi-Yang Jiang (Special equipment safety supervision inspection institute of Jiangsu province, People's Republic of China), Hong-Bing Yuan (Nanjing University of Science and Technology, People's Republic of China), Zhuang-Zhuang Zhang (Nanjing University of Science and Technology, China), Bing-Yu Chen (Nanjing University of Science and Technology, People's Republic of China), and Yi-Fei Tong (Nanjing University of Science and Technology, People's Republic of China)</i>	
The Application of Blockchain Technology in Hospital Information Management and Security	307
<i>Hua Feng (Beijing Information Technology College, China)</i>	
Optimization and Implementation of Intelligent Scheduling Algorithms in the Civil Aviation Supply Chain	314
<i>Pei Zhang (Civil Aviation Flight University of China, China)</i>	
Design of Telemedicine System Based on Internet of Things Technology	319
<i>Jieyu Qiu (Xi'an Jiaotong-Liverpool University, China)</i>	

Session V: Emerging Areas

Hotel Intelligent Management System Based on Artificial Intelligence Technology	325
<i>Huiying Cong (Shandong Business Institute, China)</i>	
Data Security and Privacy Protection of Technology Achievement Transformation Platform in Vocational Colleges Based on Blockchain	331
<i>Yang Song (Jilin Communications Polytechnic, China)</i>	
Design and Implementation of an AI-Driven Market Analysis System	337
<i>Xinglong Zhang (Business School of Jinan Engineering Polytechnic)</i>	

Risk Identification Method for Power Customer Service Complaints Based on Artificial Intelligence Model	342
<i>Li Zhang (State Grid Customer Service Center, China), Longzhu Zhu (State Grid Customer Service Center, China), Shihui Xu (State Grid Customer Service Center, China), Meicui Qin (State Grid Customer Service Center, China), Junfeng Li (State Grid Hubei Electric Power Co.Ltd, China), and Bo Liu (State Grid Customer Service Center, China)</i>	
Design and Development of Physical Education Teaching Evaluation Mode Introducing Artificial Intelligence	348
<i>Qingke Wang (Xuzhou Medical Branch of Jiangsu Union Technical Institute, China) and Jiutang Zhu (Xuzhou Medical Branch of Jiangsu Union Technical Institute, China)</i>	
Application of Intelligent Algorithm to Ill-Conditioned Matrix Correction in RFM Location Solution	353
<i>Xiao Tan (Naval University of Engineering, China), Bing Ji (Naval University of Engineering, China), Yang Gao (Naval University of Engineering, China), and Shaofeng Bian (Naval University of Engineering, China)</i>	
Investigation of a Sports Teaching Performance Evaluation Model Based on Decision Tree Algorithm	359
<i>Deping Gu (Shanghai University of Finance and Economics, China) and Yan Zhang (Shanghai University of Finance and Economics, China)</i>	
Research on the Application of Blockchain Consensus Mechanisms in Federated Learning for Privacy Protection	364
<i>Xuehui Hu (Shanghai Tongtai Information Technology Co., Ltd., China), Xuesen Chu (China Ship Scientific Research Center, China), Huajun Hong (China Ship Scientific Research Center, China), Wei Guo (China Ship Scientific Research Center, China), Tianqi Wu (China Ship Scientific Research Center, China), and Jinku Li (Xidian University, China)</i>	
Optimization of Higher Vocational English Teaching Design Based on Optimizing Apriori Algorithm	369
<i>Yutong Jiang (Yingkou Vocational and Technical College, China)</i>	
Research on Relative Orientation Method of Combined Panoramic Cylindrical Image	375
<i>Yechen Yan (Bohai University, China), Hongxia Cui (Bohai University, China), and Meijun Liu (Bohai University, China)</i>	
Research and Implementation of Assembly Sequence Planning for Array Antennas Based on a Hybrid Algorithm	380
<i>Youwen Jiang (Nanjing University of Science and Technology, China), Ke Li (Nanjing University of Science and Technology, China), Haoxiang Jiang (Nanjing University of Science and Technology, China), Linxun Li (Nanjing University of Science and Technology, China), and Junwen Huang (Nanjing University of Science and Technology, China)</i>	
Application of Deep Learning Algorithm in Virtual Reality Interactive Product Design	385
<i>Chuang Liu (Liuzhou Polytechnic University, China), Guojian Liang (Liuzhou Polytechnic University, China), Baozhen Qin (Liuzhou Polytechnic University, China), and Xiaobin Wei (Liuzhou Polytechnic University, China)</i>	

Resource Scheduling and Optimization Strategy in Edge Computing Environment	391
<i>Chuanqi Zhao (China Electric Power Research Institute (CEPRI), China), Lanruo Wang (China Electric Power Research Institute (CEPRI), China), Qizhe Zhang (China Electric Power Research Institute (CEPRI), China), and Rui Song (China Electric Power Research Institute (CEPRI), China)</i>	
Validity Verification of Encrypted Transaction Amounts in Blockchain	396
<i>Yifan Wu (Fuzhou University, Fujian) and Xupeng Zhang (Fuzhou University, Fujian)</i>	
Data Security Algorithm for Public Decision Support System Based on Blockchain Technology	402
<i>Tao Yang (College of Educational Science of Quanzhou Normal University) and Xiaoli Luo (Zhujiang College Of South China Agricultural University)</i>	
Intelligent Recommendation System for Online English Teaching Based on Artificial Intelligence	408
<i>Meng Zheng (Chengdu Neusoft University, China)</i>	
Research on the Design of Core Data Management System for Large-Scale Scientific Research Projects in Enterprises Based on Cloud Computing	414
<i>Chen Hui (China Electric Power Research Institute, China) and Yan Cao (China Electric Power Research Institute, China)</i>	
Research on Algorithm for Detecting Weak Submarine Cable Magnetic Signal Based on SAAFSA-SR Combined with CSASVD	419
<i>Shuyan Wang (Zhejiang University, China), Jianzhong Tang (Zhejiang University, China), Xiang Chen (Zhejiang University, China), and Weilong Song (China North Artificial Intelligence & Innovation Research Institute, China)</i>	
Food Nutrition Optimization and Prediction System Based on Intelligent Algorithm	428
<i>Hanfei Liu (Henan Agricultural University, China)</i>	
Study of Joint Optimization Algorithm for SVR Parameter and Feature Selection Based on Improved AGA	434
<i>Yan Chen (Xiamen University of Technology, China) and Songxian Liu (Xiamen University of Technology, China)</i>	
A Study of Attention-Based YOLOv5 for Forest Fire Detection	442
<i>Zizhen Feng (King's College London, UK)</i>	
Research on the Factors Influencing the Agricultural Supply Chain Resilience in the Context of Digital Economy	448
<i>Fanfan Jia (Guangdong University of Science & Technology, China) and Yanling Qi (Guangdong University of Science & Technology, China)</i>	
Food Safety Traceability Technology and Application Based on Blockchain	455
<i>Gan-Hong Chen (Guangdong Meizhou Vocational and Technical College, China), Yong Liu (Guangdong Meizhou Vocational and Technical College, China), and Jingxian Yang (Guangdong Meizhou Vocational and Technical College, China)</i>	

A New Rapid Evaluation System for Small Satellite Transportation Data	460
<i>Yongqiang Hu (DFH Satellite Co., Ltd., China), Yipeng Zhang (DFH Satellite Co., Ltd., China), Xinyang Li (DFH Satellite Co., Ltd., China), Jiang Qin (DFH Satellite Co., Ltd., China), Sizhou Dong (DFH Satellite Co., Ltd., China), Zhenwei Feng (DFH Satellite Co., Ltd., China), Zhijia Liu (DFH Satellite Co., Ltd., China), Jiang Liu (DFH Satellite Co., Ltd., China), Yujia Ma (DFH Satellite Co., Ltd., China), Yihong Han (DFH Satellite Co., Ltd., China), and Kexia Peng (DFH Satellite Co., Ltd., China)</i>	
Analysis of Factors Influencing the High Quality Development of E-Commerce Logistics in the Digital Economy Environment: A Case Study of Guangdong Province	466
<i>Qingmei Chen (Guangdong University of Science & Technology, China), Xiaocheng Wang (Guangdong University of Science & Technology, China), and Chong Zhang (Guangdong University of Science & Technology, China)</i>	
Author Index	473