

2020 IEEE International Conference on Energy Internet (ICEI 2020)

**Sydney, Australia
24 – 28 August 2020**



**IEEE Catalog Number: CFP20D74-POD
ISBN: 978-1-6654-2321-2**

**Copyright © 2020 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:	CFP20D74-POD
ISBN (Print-On-Demand):	978-1-6654-2321-2
ISBN (Online):	978-0-7381-0500-0

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

2020 IEEE International Conference on Energy Internet (ICEI) **ICEI 2020**

Table of Contents

Message from the Chairs .xi.....
Conference Organizers .xii.....
Keynotes .xiii.....
Sponsors .xvi.....

Session 1: Stability, Security, and Efficiency of Power System in Energy Internet

Cluster Feature Based Multivariate Data Analysis and Recovery Method for Renewable Energy Operation and Control .1.....
Yi Li (State Key Laboratory of Advanced Power Transmission Technology [Global Energy Internet Research Institute Co. Ltd]), Tongxun Wang (State Key Laboratory of Advanced Power Transmission Technology [Global Energy Internet Research Institute Co. Ltd]), Meng Tan (State Key Laboratory of Advanced Power Transmission Technology [Global Energy Internet Research Institute Co. Ltd]), Yaqiong Li (State Key Laboratory of Advanced Power Transmission Technology [Global Energy Internet Research Institute Co. Ltd]), and Zhixian Pi (State Grid Information & Telecommunication Group Co., Ltd)

Research on Sensitivity Audit Scheme of Encrypted Data in Power Business .6.....
Peiming Xu (Electric Power Research Institute, CSG, Guangzhou, P.R. China), Lin Chen (Electric Power Research Institute, CSG, Guangzhou, P.R. China), Yixin Jiang (Electric Power Research Institute, CSG, Guangzhou, P.R. China), Qiangqiang Sun (Shenzhen Power Supply Co., Ltd, Shenzhen, P.R. China), and Hao Chen (Shenzhen Power Supply Co., Ltd, Shenzhen, P.R. China)

Steady-State Power Quality Anomaly Recognition Based on Time Series Trend .11.....	
	<i>Song Guo (State Grid Electric Power Research Institute Wuhan Efficiency Evaluation Company Limited, NARI Group Corporation/State Grid Electric Power Research Institute), Pengpai Feng (State Grid Electric Power Research Institute Wuhan Efficiency Evaluation Company Limited, NARI Group Corporation/State Grid Electric Power Research Institute), Zhipeng Zhong (Xiamen Power Supply Company of State Grid Fujian Electric Power Co. Ltd), Wenqing Li (State Grid Electric Power Research Institute Wuhan Efficiency Evaluation Company Limited, NARI Group Corporation/State Grid Electric Power Research Institute), Chenguan Xu (State Grid Electric Power Research Institute Wuhan Efficiency Evaluation Company Limited, NARI Group Corporation/State Grid Electric Power Research Institute), Meng Yu (State Grid Electric Power Research Institute Wuhan Efficiency Evaluation Company Limited, NARI Group Corporation/State Grid Electric Power Research Institute), Yuantong You (Xiamen Power Supply Company of State Grid Fujian Electric Power Co. Ltd), Yongbing Tang (Xiamen Power Supply Company of State Grid Fujian Electric Power Co. Ltd), and Wenxu Yao (College of Electrical Engineering and Automation of Fuzhou University)</i>
Power Grid Risky IP Identification Algorithm Based on Hybrid Genetic Ensemble Learning .17.....	
	<i>Yixin Jiang (Electric Power Research Institute, CSG, Guangzhou, P.R. China), Lin Chen (Electric Power Research Institute, CSG, Guangzhou, P.R. China), Xiaoyun Kuang (Electric Power Research Institute, CSG, Guangzhou, P.R. China), Aidong Xu (Electric Power Research Institute, CSG, Guangzhou, P.R. China), and Yiwei Yang (Guangdong Provincial Key Laboratory of Power System Network Security, Guangzhou, P.R. China)</i>
An Overview: Data Security Mechanism of Power Terminal in Edge Computing .22.....	
	<i>Yixin Jiang (China Southern Power Grid Company Limited, China), Yunan Zhang (China Southern Power Grid Company Limited, China), Aidong Xu (China Southern Power Grid Company Limited, China), Xiaoyun Kuang (China Southern Power Grid Company Limited, China), Jiaxiao Meng (China Southern Power Grid Company Limited, China), and Hongshan Chu (China Southern Power Grid Company Limited, China)</i>
Voltage Sag Mitigation Strategy for Industrial Users Based on Process Electrical Characteristics-Physical Attribute .28.....	
	<i>Mingwen Zhuang (Putian Power Supply Company of State Grid Fujian Electric Power Co., Ltd. Putian, China), Jingteng Chen (Putian Power Supply Company of State Grid Fujian Electric Power Co., Ltd. Putian, China), Minhui Wu (State Grid Fujian Electric Power Co., Ltd. Fuzhou, China), Songyong Xiao (Putian Power Supply Company of State Grid Fujian Electric Power Co., Ltd. Putian, China), Fang Chen (Putian Power Supply Company of State Grid Fujian Electric Power Co., Ltd. Putian, China), and Weiming Li (Maintenance and Test Center of CSG EHV Power Transmission Company Guangzhou, China)</i>

Recommendation and Election Expert System for Rotating Machinery Fault Diagnosis Based on the Combination of Rules and Examples .34.....	
	<i>Xiaofeng He (Jiangsu Fangtian Power Technology Co., Ltd. Nanjing, China), Xiaofeng Liu (Jiangsu Fangtian Power Technology Co., Ltd. Nanjing, China), Xiulian Lu (Jiangsu Fangtian Power Technology Co., Ltd. Nanjing, China), Lipeng He (Jiangsu Fangtian Power Technology Co., Ltd. Nanjing, China), Yunxiang Ma (Jiangsu Fangtian Power Technology Co., Ltd. Nanjing, China), Shengtao Sun (School of Energy and Power Engineering Huazhong University of Science and Technology Wuhan, China), and Tao Yang (School of Energy and Power Engineering Huazhong University of Science and Technology Wuhan, China)</i>
Sensitivity Analysis-Based Control Parameters Optimization for MMC-Based DC Distribution Systems .40.....	
	<i>Jialing Liu (Xi'an Jiaotong University), Wansong Liu (Xi'an Jiaotong University), and Boyu Qin (Xi'an Jiaotong University)</i>
Modelling of Short-Term Memory Effect in Electric Double Layer Capacitor with Graphene-Based Electrode .45.....	
	<i>Ke Ma (Tianjin University of Technology, China), Ruowei Zhang (Xi'an Jiaotong University, China), and Boyu Qin (Xi'an Jiaotong University, China)</i>

Session 2: Architecture and System Design of Energy Internet

Energy-Use Internet and Friendly Interaction with Power Grid: A Perspective .50.....	
	<i>Xingying Chen (Hohai University)</i>
A Blockchain-Based Distributed Controllable Electricity Transaction Match System .56.....	
	<i>Songpu Ai (MingByte Technology (Qingdao) Co., Ltd), Diankai Hu (MingByte Technology (Qingdao) Co., Ltd), Jian Guo (Tsinghua University), Yunpeng Jiang (MingByte Technology (Qingdao) Co., Ltd), Chunming Rong (University of Stavanger), and Junwei Cao (Tsinghua University)</i>
Federated Learning-Based Ultra-Short term Load Forecasting in Power Internet of Things .63.....	
	<i>JianBin Li (North China Electric Power University), YuQi Ren (North China Electric Power University), SuWan Fang (North China Electric Power University), KunChang Li (North China Electric Power University), and MingYu Sun (North China Electric Power University)</i>
A Case Study of Developing an Intelligent Management System for Energy Internet .69.....	
	<i>Lian Chi (Nanjing University of Information Science & Technology, China), Zezheng Zhao (The University of Sydney, Australia), Chunqiu Xia (The University of Sydney, Australia), and Xiaomin Chang (The University of Sydney, Australia)</i>
Digital-Twin Based Power Supply System Modeling and Analysis for Urban Rail Transportation.74	
	<i>Jian Guo (Beijing National Research Center for Information Science and Technology), Xiaobo Wu (National Innovation Center of High Speed Train, China), Hong Liang (Beijing National Research Center for Information Science and Technology), Junfeng Hu (Beijing National Research Center for Information Science and Technology), and Baoming Liu (National Innovation Center of High Speed Train, China)</i>

Session 3: The Application of Big Data Techniques in Energy Internet

- Noise Level Estimation in Energy Internet Based on Artificial Neural Network .80.....
*Yangyang Ming (Tsinghua University), Junwei Cao (Tsinghua University),
and Haochen Hua (Hohai University)*
- Deep Learning Detection Method of Encrypted Malicious Traffic for Power Grid .86.....
*Lin Chen (Electric Power Research Institute, CSG, Guangzhou, P.R.
China), Yixin Jiang (Electric Power Research Institute, CSG,
Guangzhou, P.R. China), Xiaoyun Kuang (Guangdong Provincial Key
Laboratory of Power System Network Security, Guangzhou, P.R. China),
and Aidong Xu (Guangdong Provincial Key Laboratory of Power System
Network Security, Guangzhou, P.R. China)*
- A Robust Identification Method for Transmission Line Parameters Based on BP Neural Network
and Modified SCADA Data .92.....
*Min Lu (Electric Power Dispatching Control Center, State Grid Zhejiang
Electric Power Company), Xueqi Jin (Electric Power Dispatching Control
Center, State Grid Zhejiang Electric Power Company), Xiaozhong Wang
(Huzhou Power Supply Company, State Grid Zhejiang Electric Power
Company), Yan Xu (Huzhou Power Supply Company, State Grid Zhejiang
Electric Power Company), Yangyingfu Wang (Huzhou Power Supply Company,
State Grid Zhejiang Electric Power Company), He Kong (State Key
Laboratory of Alternate Electrical Power System with Renewable Energy
Source, North China Electric Power University), Lei Gu (State Key
Laboratory of Alternate Electrical Power System with Renewable Energy
Source, North China Electric Power University), Kaiyang Luo (State Key
Laboratory of Alternate Electrical Power System with Renewable Energy
Source, North China Electric Power University), and Ancheng Xue (State
Key Laboratory of Alternate Electrical Power System with Renewable
Energy Source, North China Electric Power University)*

Session 4: Management, Control, and Scheduling of Power System in Energy Internet

- Research on the Impact of the Frequency Deviation of the Crystal Oscillator on PMU
Measurement in Steady State Condition .98.....
*Wen Xiong (Guangzhou Power Supply Bureau, Guangdong Power Grid Ltd.),
Shuang Leng (State Key Laboratory of Alternate Electrical Power System
with Renewable Energy Source, North China Electric Power University),
Guoen Wei (Guangzhou Power Supply Bureau, Guangdong Power Grid Ltd.),
Zhiyong Yuan (Distribution Department of Electric Power Research
Institute, China Southern Power Grid.), Quan Xu (Distribution
Department of Electric Power Research Institute, China Southern Power
Grid), Shaofan Zhang (Guangzhou Power Supply Bureau, Guangdong Power
Grid Ltd.), Feiyang Xu (State Key Laboratory of Alternate Electrical
Power System with Renewable Energy Source, North China Electric Power
University), Wenwei Chen (Guangzhou Power Supply Bureau, Guangdong
Power Grid Ltd.), and Ancheng Xue (State Key Laboratory of Alternate
Electrical Power System with Renewable Energy Source, North China
Electric Power University)*

Evaluation of Voltage Sag Severity in Provincial Power Grid .103.....	
	<i>Mingwen Zhuang (Putian Power Supply Company of State Grid Fujian Electric Power Co., Ltd.), Jingteng Chen (Putian Power Supply Company of State Grid Fujian Electric Power Co., Ltd.), Minhui Wu (State Grid Fujian Electric Power Co., Ltd.), Huibin Li (Putian Power Supply Company of State Grid Fujian Electric Power Co., Ltd.), Liqian Lin (Putian Power Supply Company of State Grid Fujian Electric Power Co., Ltd.), and Jianxun Wang (College of Electrical Engineering and Automation, Fuzhou University)</i>
A Collaborative Control Strategy of Thermostatically Controlled Loads Considering Communication Delay .109.....	
	<i>Xu Lu (State Grid East Inner Mongolia Electric Power Co. Ltd., Inner Mongolia, China), Weifeng Nie (State Grid East Inner Mongolia Electric Power Co. Ltd., Inner Mongolia, China), Shaonan Chang (School of Electric and Electronic Engineering, North China Electric Power University, Beijing, China), and Ting Huang (School of Electric and Electronic Engineering, North China Electric Power University, Beijing, China)</i>

Session 5: Energy Market/Energy Trading and Economical Optimization of Energy Internet

dTASD: A Novel Online Detection Method for Anomalous State of Dry-Type Transformer .115.....	
	<i>Chao Wang (Tsinghua University), Zhaoguo Wang (Tsinghua University), Lei Tao (Power Dispatching Automation Technology [China Electric Power Research Institute]), Ruili Ye (Power Dispatching Automation Technology [China Electric Power Research Institute]), Yan Wang (Power Dispatching Automation Technology [China Electric Power Research Institute]), Lin Xie (Power Dispatching Automation Technology [China Electric Power Research Institute]), and Yibo Xue (Tsinghua University)</i>
Distributed Multi-Factor Electricity Transaction Match Mechanism Based on Blockchain .121.....	
	<i>Songpu Ai (MingByte Technology (Qingdao) Co., Ltd), Diankai Hu (MingByte Technology (Qingdao) Co., Ltd), Jian Guo (Tsinghua University), Yunpeng Jiang (MingByte Technology (Qingdao) Co., Ltd), Chunming Rong (University of Stavanger), and Junwei Cao (Tsinghua University)</i>

Session 6: Internet of Things (IOT) Application Oriented Technologies

Exploring the Influence of Noise in Speech Emotion Recognition Devices for Internet of Thing .128.....	
	<i>Mingke Xu (Nanjing Tech University), Fan Zhang (IBM Watson Group), Jiannan Yang (Nanjing Tech University), and Samee U. Khan (Mississippi State University)</i>
Multi-Granular BERT: An Interpretable Model Applicable to Internet-of-Thing Devices .134.....	
	<i>Sihao Xu (Nanjing Tech University, China), Wei Zhang (IBM Research AI, USA), and Fan Zhang (IBM Watson Group, USA)</i>

Power Reduction for an Active Suspension System in a Quarter Car Model using MPC .140.....
Jayesh Narayan (Swinburne University), Saman Asghari Gorji (Queensland University of Technology), and Mehran Motamed Ektesabi (Swinburne University)

Analysis of Influence of Uneven Air Gap of Hydro-generator on Magnetic Field Strength and Rotor Magnetic Pole Stress Change .147.....
Qi Sun (The 54th Research Institute of China Electronics Technology Group Corporation, China), Chenyuan Ma (Xi'an Thermal Power Research Institute Co. Ltd., China), Song Xiao (The 54th Research Institute of China Electronics Technology Group Corporation, China), Litao Niu (Xi'an Thermal Power Research Institute Co. Ltd., China), Jianguo Pu (Xi'an Thermal Power Research Institute Co. Ltd., China), and Yiyang Wu (Xi'an Thermal Power Research Institute Co. Ltd., China)

Author Index 153.