

# **2023 IEEE 8th International Conference on Intelligent Transportation Engineering (ICITE 2023)**

**Beijing, China  
28-30 October 2023**



**IEEE Catalog Number: CFP23G01-POD  
ISBN: 979-8-3503-1422-9**

**Copyright © 2023 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:	CFP23G01-POD
ISBN (Print-On-Demand):	979-8-3503-1422-9
ISBN (Online):	979-8-3503-1421-2

**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](mailto:curran@proceedings.com)  
Web: [www.proceedings.com](http://www.proceedings.com)

CURRAN ASSOCIATES INC.  
**proceedings**  
.com

# 2023 IEEE the 8th International Conference on Power and Renewable Energy

## Table of Contents

Preface.....	x
Conference Committees.....	xi

---

### ✧ Traffic Feature Recognition and Signal Control

Applications of Machine Learning in Rail Transit Signalling System and Its Independent Safety Assessment Method .....	1
<i>Guantao Hu, Jian Han</i>	
Traffic management optimization based on generalized benders decomposition(GBD): a case study of traffic signal control.....	5
<i>Yiming Zhang</i>	
Optimizing Intersection Signal Via Reinforcement Learning for Cooperative Adaptive Cruise Control .....	10
<i>Shu Yang, Rui Yuan, Miao Wang, Liang Sun, Jingyuan Wu</i>	
The Case Study of Dalian Metro Line 3 Signaling System Transformation .....	16
<i>Jing Ma, Kejun Zhang, Shan Chen, Kun Zhang, Ping Gao, Zhifan Hu</i>	
Incremental Reinforcement Learning with Prioritized Sweeping for Traffic Signal Control .....	21
<i>Gurseerat Kaur Rattan, Zhenyu Mao, Jialong Li, Mingyue Zhang, Kenji Tei</i>	
Using instance segmentation model for multi-object tracking of motorcycles on signalized intersection approaches..	29
<i>Wachira Wichitphongsa, Nopadon Kronprasert</i>	
Intelligent Traffic Signal Control Strategy Based on Rainbow Algorithm .....	35
<i>Die MA, Jushang OU, Yanni JU</i>	
Study on Key Technologies in Signaling Systems for Urban Rail Transit Interoperability.....	41
<i>Xiaofei Gao, Shusong Yang, Dongdong Liu, Bin Zhou</i>	

### ✧ Traffic Flow Prediction and Analysis

What is the best design goal for a DBSS: Throughput, dock availability or user dissatisfaction? .....	46
<i>Wenya Cui, Jingyan Wang, Yong Zhang</i>	
Traffic Flow Prediction Method Based on Fast Statistics of Traffic Flow and Graph Convolutional Network .....	54
<i>Dan Jiang, Qun Hou, Xin Liu, Shidi Gao</i>	
Traffic Flow Prediction Based on Sparrow Search Algorithm Optimized Neural Network using Intelligent Connected Vehicle Data .....	60
<i>Wei Tan, Guangfei Yang, Xu Gao, Yang Yang, Wangkun Liu, Peng Cao</i>	

Traffic Flow Data Imputation Based on Feature Fusion Attention Imputation Network.....	66
<i>Shuang Li, Xianglong Luo, Jiayu Yang, Zhongcheng Xu, Ruochen Liu</i>	
Overflow research of a new hybrid traffic flow considering routing .....	72
<i>Pengtao Shen, Jie Jiao, Yong Zhang</i>	
✧ <b>Vision-Based Traffic Environment Monitoring and Detection Technologies</b>	
Intelligent Guidance Method and System for Driving Safety in Curves Under Slippery and Low Visibility Conditions .....	80
<i>Si yuan Hao, Nale Zhao, Ni Zhou, Jiahui Li, Ruiche Liu, Chengwu Jiao</i>	
Feature Recognition of Air Traffic Congestion Based on Spatio-temporal Correlation .....	85
<i>Shilin Jin, Jintao Wang, Yulong Yin, Ruilin Zhao</i>	
Lane Detection Method Based on Instance Segmentation of Bi-ATT Network .....	89
<i>Peirong Hu, Kun Xu, Jia Qiao, Zhanwen Liu</i>	
Improving Highway Pavement Defect Detection via Swin transformer Integrated TOOD Model.....	95
<i>Yi Zhao, Buyun Zhou, Liang Wang, Yong An</i>	
Improvement based on CenterNet and application of traffic scenarios.....	101
<i>Fahui Pan, Ge Gao, Xinbo Mao, Rong Chen, Shuo Liu, Shibo Hu</i>	
Measurement Method and Experiment of Binocular Camera Based on GA-BP Neural Network.....	107
<i>Bing Sun, Dandan Liu, Yisheng Liu, Zhidan Chen</i>	
Modified vehicle recognition method based on attribute fusion and fuzzy product quantization.....	113
<i>Kun Peng, Qun Hou, Xin Liu</i>	
Spatial-Consistency based Unsupervised Domain Adaptive 3D Object Detection with Roadside LiDAR.....	120
<i>Zhong Guo, Yafei Wang, Xulei Liu, Bowen Wang, Shuai Wang, Yan Li</i>	
Experimental Study on the Impact of Snowfall on the Perception Ability of Vehicle LiDAR.....	126
<i>Chenghao Sun, Shaojie Jin, Haijin Fan, Wuqi Wang, Xiangmo Zhao, Pengpeng Sun</i>	
Research on Identification Method of Ship Docking Area Based on AIS .....	132
<i>Feng Zhang, Jingsong Ye, Zandi Shang</i>	
Cross-Country Traffic Sign Understanding via Attention Enhanced Unsupervised Domain Adaptation.....	137
<i>Yi Zhao, Liang Wang, Buyun Zhou</i>	
An analysis of traffic factors in foggy environment based on principal component analysis method .....	142
<i>Cheng Liu, Bo Wu</i>	
Lane detection method based on MCA-UFLD.....	146
<i>Lingyun Han, Kun Xu, Wensheng Hu, Zhanwen Liu</i>	
✧ <b>Data-Driven Intelligent Traffic Management System Design and Application</b>	
Data Security Testing Method of Intelligent and Connected Vehicles Based on Typical Scenarios .....	153
<i>Haojie Ji, Jingyan Wang, Liyong Wang, Guowei Sun, Long Jin, Junzhe Fang</i>	

Design of a Distributed UAV Traffic Management System for Smart Air Service .....	160
<i>Meiliwen WU, Renli LV, Xiangmin GUAN</i>	
Data Security Risk Assessment Method of Intelligent and Connected Vehicles Based on Data Security Classification and Grading .....	165
<i>Liyong Wang, Long Jin, Haojie Ji, Jingyan Wang, Yupeng Chen, Junzhe Fang</i>	
Diff-TIP: A Diffusion Model-based Unified Framework for Spatio-temporal Traffic Data Imputation and Prediction .....	172
<i>Shaokang Cheng, Shiru Qu, Junxi Zhang</i>	
Detecting Abnormal Record in Automotive Maintenance Data Based on Deep Sparse Auto-encoder .....	179
<i>Fanghua Chen, Gang Zhou, Xin Geng, Jinrui Zhang</i>	
Empirical Study on Influencing factor of Park&Ride Usage in Tourist Areas using a Mobile Application.....	185
<i>Yiping Le, Yuto Yaeda, Shota Kobayashi, Saizo Aoyagi</i>	
Optimization of Electric Taxi Charging Scheduling Strategy for Online Dispatching Order .....	190
<i>Shaojun Gan, Yuanyang Zhao, Yanxia Wang</i>	
A Method for Creating Metro Maps by Integrating Multiple Unreliable Data Sources.....	196
<i>Guiyou Wang, Ye Li, Xiaoka Yang, Mingxi Zhao, Jie Pei, Yangjiang Sun</i>	
A probabilistic model for long-term trajectory prediction in multi-agent systems .....	202
<i>Haonan Cui, Jianyu Zhou</i>	
<b>✧ Urban Traffic Pattern and Transportation Capacity Assessment</b>	
Study on the Accessibility of China's Air Transportation Network .....	209
<i>CONG FU, TIANWEI GUO</i>	
Research on Bathtub Models of Urban Traffic with Different Velocity-Density Relation .....	214
<i>Chuan-Lin Zhao, Hai-Juan Wu</i>	
Urban Public Transportation Accessibility Defects Mining Based on Multi-source Data Fusion .....	220
<i>Hongfei Jia, Bo Zhuang, Ke Nie, Qiuyang Huang, Ruiyi Wu, Mengru Li</i>	
Parking management evolutionary game analysis between government and bike sharing enterprises in the context of smart cities.....	226
<i>Xiaoping Wu, Haoyang Sun, Shan Zhou</i>	
A multi-trip customized bus network design model.....	232
<i>Qi Wang, Peng Wu</i>	
Exploring the Acceptance of Robotaxi Technology Among the Elderly Based on An Extended Technology Acceptance Model .....	237
<i>Huaxin Zhang, Wencan Gao</i>	
Research on Traffic Congestion Warning Method Based on Data modeling.....	242
<i>Chunyao Zhong, Qunlong Huang, Zeping An, Shigui Luo, Hu Meng, Yunfeng Wei</i>	
Game models for taxi decision-making considering online ride-hailing competition in airport .....	248
<i>Bingqing Wang, YuFeng Gao, Ailing Huang, Yanling Sang</i>	

Study on Green Transportation Behaviors in Beijing, Tokyo, and Klang Valley based on Theory of Planned Behavior .....	255
<i>Youfu Zheng, Yida Chai, Yiping Le, Huapu Lu</i>	
A bi-objective bi-level programming for connected bus lane reservation.....	261
<i>Yinhui Xie, Peng Wu</i>	
Analysis on Acceptance of Carbon Credit System as an Incentive for Choosing Green Travel Modes with Structural Equation Modeling .....	267
<i>Lei Gong, Tianxu Wang, Zhanjie Cai, Tian Lei, Baicheng Li, Guoyong Lin</i>	
<b>✧ Smart Road Network Development and Operations Management in Smart Cities</b>	
Bandwidth Optimization Models for Passenger Cars and Buses in an Unclosed Traffic Network.....	276
<i>Binbin Jing, Quan Shi, Qiang Wu, Cong Huang</i>	
Research on Topological Characteristic and Resilience of Metro Network Based on Hypergraph .....	286
<i>Kun Tang, Tian Xu, Tangyi Guo</i>	
Self-Adaptation Strainer Block Detection for Heating Ventilation and Air Conditioning System of Urban Metro Transportation.....	292
<i>Fan Zhang, Hongtao Ni, Yucheng Huang</i>	
Modeling Merging in Dense and Mixed Traffic Game with Sympathy .....	297
<i>Chaoyi Wang, Zhuping Wang</i>	
Vertiport Design of Urban Air Mobility for eVTOL Aircraft .....	303
<i>Zhiguo Xiong, Xiaobo Xiao, Yilian Cao, Quanshan Chen</i>	
3D Modelling of a Distribution Room Based on CAD Drawings.....	309
<i>Zhifeng Zhang, Tong Sun, Zhe Zhao, Xiao Cui</i>	
<b>✧ Smart Highway and Road Infrastructure Development</b>	
Exploring the State-of-the-Practices in Smart Expressway: Multi-country Comparison.....	315
<i>Song Yang, Yueyi Yang, Xinghua Li, Ziqi Yang, Yuntao Guo, Chao Yang</i>	
Refined Improvement Method of Expressway Safety Facilities Based on Risk Assessment Model .....	321
<i>Zongyuan Ding, Yifeng Tang, Guanyun Wang, Xiaofeng Li</i>	
Simulation and Evaluation of Typical Scenarios of Smart Expressway Based on Multi-level Traffic Cooperative Control Strategy.....	326
<i>Jing He, Jicheng Yang, Jing Zhao, Peiyuan Jia, Yantao Li, Huan Wang</i>	
Research on Multi-objective Optimization of Municipal Road Construction Management .....	336
<i>Jingyu Tao, Haihua Yuan, Yixuan Chen, Donghui Jiang, Yanni Ju</i>	
Research on Road Surface Slippery State Dynamic Evaluation Model of Long Highway Tunnels.....	343
<i>Ruiche Liu, Chengwu Jiao, Nale Zhao, Ming Sun, Jiahui Li, Siyuan Hao</i>	
Illuminating Transport and Roads to Reduce Accidents and Lighting Requirements: Exploring the Potential of Glow-in-the-Dark Paint .....	348
<i>Muhammad Jawad Sajid</i>	

## ✧ Autonomous Driving Simulation and Intelligent Driving Perception

Driver Environmental Perception and Behavior Modeling Based on Visual .....	354
<i>Minghao Liu, Longxi Luo, Jiahao Mei, Yu Chen</i>	
Scheduling Problem of Modular Autonomous Bus.....	360
<i>Xiaolong Luo, Hui Zhao</i>	
Research on Design of Auditory Cues for Passive Control Switch for Level 3 Automated Vehicles .....	365
<i>Wenying Guan, Jiaming Du, Xiqiao Zhang, Jinyu Shi</i>	
Detecting the Impacts of Mixed Traffic Flow with Connected Automated and Human-driven vehicles on Safety and Efficiency of Expressway Off-Ramp Areas via the TOPSIS-Entropy Method.....	371
<i>Ye Zhi, Zhengping Zhang, Wenhui Zhou</i>	
A Study on Influencing Factors and Common Rules for Decision-Making in Moral Dilemmas of Autonomous Vehicles under China Region .....	377
<i>Yinhao Wang, Junyou Zhang, Shufeng Wang, Li Li, Yuyan Wang</i>	
A Driving Style Recognition Method for Battery Electric Vehicle Drivers.....	383
<i>Fuhai Cui, Xinkuang Wang, Zhongcheng Wu</i>	
ROMOT: An Online One-Shot Framework for Roadside multiple Object Tracking .....	390
<i>Qi Shen, Yuyang Yao, Ping Wang</i>	
Decision Model of Lane Changing for Autonomous Vehicles Considering Weather Influence.....	396
<i>Yuxin Xu, Gifu Guan, Yongshun Yu, Zhendong Liu, Zhenyi Kang</i>	
Driving Fixation Prediction Model via a Hybrid Encoding-Decoding Network with transformer .....	401
<i>Sichen Wang, Zifeng Li, Shihui Ji, Pengcheng Du, Tao Deng</i>	
Impact Analysis of Autonomous Vehicle Hybridization on Urban Road Network Capacity .....	407
<i>Yuanrui Li, Hui Zhao</i>	
Can ChatGPT Obey the Traffic Regulations? Evaluating ChatGPT's Performance on Driving-license Written Test .....	412
<i>Shanmin Zhou, Jialong Li, Mingyue Zhang, Daisuke Saito, Hironori Washizaki, Kenji Tei</i>	

## ✧ Vehicle Operations Control and Emergency Response Strategies

Parametric Identification of Ship Maneuvering Model Based on Multi-Innovation Unscented Kalman Filtering .....	420
<i>Qinghao Li, Junsheng Ren, Yan Hua</i>	
Maximizing Parking Operation Revenue via Joint Control of Channels and Overselling .....	426
<i>Liru Hua, Fei Meng, Cuilan Liang, Shu Yang, Liang Sun, Jingyuan Wu</i>	
Research on Emergency Rescue Route Optimization based on Adaptive Genetic Algorithm.....	432
<i>Jiacheng Li, Hongyi Du, Masato Noto, Lei Li</i>	
Fixed-time predefined performance platoon formation control of automated vehicles with uncertain disturbances...	439
<i>Yifei Zhang, Yang Sun, Tian Chen, Zewei Zheng, Ming Zhu</i>	
A novel hybrid car-following model combining kinetic dynamics and deep learning networks .....	445
<i>Pan Han, Dongyao Jia, Jie Sun, Shangbo Wang</i>	

Headway-based Bus Bunching Prediction Using LSTM with Attention .....	451
<i>Jie Jiao, Pengtao Shen, Yong Zhang</i>	
Optimal Scheduling of Single-Line Electric Buses with Battery Swapping .....	459
<i>Yuyan Guo, Tao Liu</i>	
Sparse Heterogeneous Interactions for Multi-Modal Trajectory Prediction.....	465
<i>Chunyuai Lei, Linzhen Nie, Zhishuai Yin</i>	
Exploring the Relationship between Vehicle Specifications and Fuel Efficiency using Random Forest Regression and Gradient Boosting Regression Models .....	472
<i>Shicong Ma, Shijian Ma, Marco Chen</i>	
A model for estimating performance of urban emergency under disaster grading.....	477
<i>Bingqi Sun, Xintian Wang, Yong Zhang</i>	
<b>✧ Traffic Safety Management and Urban Services</b>	
Research on the Digitization of Sales and Service Process of Company A's Auto 4S Shop .....	484
<i>Chao Ma, Zhifeng Hu, Jiyang Zhang, Xiaping Huang</i>	
Evolutionary Game Model Construction and Analysis of Government and New Energy Sharing Vehicle Enterprises Considering Driving Range .....	490
<i>Xiaoping Wu, Shan Zhou, Haoyang Sun</i>	
Research on the Evolution of User Needs in MaaS Based on Contradiction and Game Theory .....	496
<i>Lai Zheng, Wenfan Xu, Wei Wei</i>	
Optimization of municipal household waste collection network under the policy of garbage classification.....	502
<i>Lirong Xie, Jianli Shi</i>	
The Test Solution for Digital Key of Connected Car Services in Vehicle HILS .....	511
<i>Jaemin Lee, Dawon Jung, Jeongah Lee, Soyeon Lee, BeomSeop Kim</i>	
<b>✧ Urban Transportation Rail Construction and Operational Model Analysis</b>	
Scheme Design Analysis of Aligned Isolation between a Train Door and a Platform Door in Urban Rail Transit Signaling System .....	516
<i>Xiuxia He, Hui Li, Yu Jiang, Jingshan Shi</i>	
Performance Optimization of Aluminum Fin Heat Sinks for Cooling Power Modules in Railway Transportation Control Equipment .....	522
<i>Yong Zhang, Guobiao Wang, Jian Zheng, Yifan Hao</i>	
Study on Technology of Automatic Generation of Indoor and Outdoor Interlocking Construction Drawing of Signaling System in Urban Rail Transit .....	527
<i>LinLin Hou, Muhuo Zheng, Wei Ding</i>	
A Feature-based Approach for Organizing Spatial Data of Digital Twin Railway .....	533
<i>Zhibo Cheng, Yanhua Wu, Shubao Song, Yongxin Guo, Zhong Luan, Zheqian Liu</i>	
Emulative Training System for Interoperability in Urban Rail Transit.....	540
<i>Xiangyang Wang, Muhuo Zheng, Junkang Wang</i>	



Competitive Pricing of Rail Container Based On Shipper Selection Behavior .....	547
<i>Qiaoning Zhang, Xue Tan</i>	
Research on TACS System Based on Structured Analysis .....	552
<i>Jie Ma, Xiaohu Qin, Xiaopeng Gao</i>	
Research on hybrid network technology of different systems based on safety data transmission of urban rail transit signalling system .....	557
<i>Yunfan Wang, Yun He, Changjun Zhang, Cheng Ji, Feifei Dong, Ruoqi Wan</i>	
Research on Train Energy-saving Running Strategy Based on Genetic Algorithm .....	563
<i>Rui Liu, Chengge Geng</i>	
Research on Urban Rail Transit Station-City Integration Development Model.....	568
<i>Xufei Zhang</i>	
Research on the Digital Twin Platform and Emergency Response Technology for Rail Transit Operation Emergencies .....	574
<i>Xiaoka Yang, Duanqu Wu, Guiyou Wang, Mingxi Zhao, Jie Pei, Yangjiang Sun</i>	
Integrated scheduling of metro fire engines and trains for metro fire rescue .....	579
<i>Shengyi Ji, Kai Zheng, Yong Zhang</i>	
Research on Passenger Trip Classification of Multi-mode Regional Rail Transit System .....	586
<i>Yixuan CHEN, Haihua YUAN, Da LI, Yanni JU</i>	
Author Index	