

Conference Program

Wuhan, China

December 29-31, China

2023 12th International Conference on Transportation and Traffic Engineering (ICTTE 2023)

Sponsored by



武漢理工大學

Wuhan University of Technology

Hosted by



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2023 2nd International Conference on Mechanical Engineering and Power Engineering (MEPE 2023)

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General Information

Conference Venue: Wuhan Huatian Hotel 武汉华天大酒店

- 1) No.7, Xudong Street, Wuchang District, Wuhan, China 武汉市武昌区徐东大街7号
Tel: +86-15107159729 Ms. Ke



Friday, December 29, 2023: Hotel Lobby (酒店大堂)

Saturday, December 30, 2023: 4F Wuhan Hall B (武汉 B 厅) / 3F Wuchang A Hall (武昌 A 厅) & Wuchang C Hall (武昌 C 厅)

Access to Wuhan Huatian Hotel

Access from Tianhe International Airport (天河国际机场)

40 miles

By Metro: Line 2-Line 8-Xudong Station C, D Exit

By Taxi: 35min

地铁：乘坐地铁 2 号线至宏图大道站转地铁 8 号线徐东站下车，C 或 D 出口

出租车：约 35 分钟

Access from Wuchang Station (武昌火车站，武汉火车站)

12 miles

By Metro: Line 4-Line 8-Xudong Station C, D Exit

By Taxi: 25min

地铁：乘坐地铁 4 号线至岳家嘴站转地铁 8 号线至徐东站下车，C 或 D 出口

出租车：约 25 分钟

Access from Hankou Station (汉口火车站)

16 miles

By Metro: Line 4-Line 3-Line 8-Xudong Station C, D Exit

By Taxi: 25min

地铁：乘坐地铁 2 号线至范湖站转地铁 3 号线至赵家条站转地铁 8 号线徐东站下车，C 或 D 出口

出租车：约 25 分钟



2) Onsite Registration

Registration desk (Hotel Lobby 酒店大堂) → Inform the staff your paper ID → Sign-in → Claim your conference kit.

3) Devices Provided by the Organizer

Laptops (with MS-Office & Adobe Reader) / Projectors & Screen / Laser Sticks

4) Materials Provided by the Presenter

Oral Session: Slides (pptx or pdf version). Format 16:9 is preferred.

Official language: English.

5) Duration of Each Presentation

Keynote Speech: 35min, including Q&A / Invited Speech: 20min, including Q&A / Oral Session: 10min, including Q&A


6) Notice

※ Please wear your delegate badge (name tag) for all the conference activities. Lending your participant card to others is not allowed.

※ Please take good care of your valuables at any time during the conference. The conference organizer does not assume any responsibility for the loss of personal belongings of the participants during conference day.

※ **UTC+8. Beijing Local Time. Please be aware of time difference between this and your region/country.**

7) Online Presentation Tips

 zoom Zoom Download	Meeting ID	Link
	Room A: 839 2206 4488 Room B: 839 5170 1097	https://us02web.zoom.us/j/83922064488 https://us02web.zoom.us/j/83951701097

Note:

We recommend that you install the Zoom platform on your computer before the conference starts. New users can participate in the Zoom meeting without registration.

Participants who are going to do an online presentation are required to join the rehearsal in Zoom on [Friday, Dec. 29 2023](#) Duration: 3min apiece. Feel free to leave after you finish the test.

◆ Name Setting

Keynote Speaker: KN-Name

Invited Speaker: IS-Name

Committee: Position-Name

Author: Paper ID-Name

Delegate: Delegate-Name

◆ Useful Links

◇ [Conference Banner](#)

◇ [Zoom Background](#)



Welcome Message

We are pleased to welcome you to 2023 12th International Conference on Transportation and Traffic Engineering (ICTTE 2023) and 2023 2nd International Conference on Mechanical Engineering and Power Engineering (MEPE 2023). The conference is scheduled during December 29-31, 2023, in Wuhan, sponsored by sponsored by Wuhan University of Technology (China), hosted by School of Navigation (WUT, China).

The annual international conference is aimed to bring together the researchers, experts, and scholars around the world to exchange their research results and address open issues in fields of Transportation and Traffic Engineering with Mechanical Engineering and Power Engineering. We hope ICTTE 2023 and MEPE 2023 would be able to achieve its objective in providing an effective forum for academicians, researchers, and practitioners to advancing knowledge, research, and technology for humanity.

This year's program will consist of 4 keynote speeches from Prof. Wei Fan (University of North Carolina at Charlotte, USA), Prof. Guangquan Lu (Beihang University, China), Prof. Dewei Li (Beijing Jiaotong University, China), Prof. IM Namkyun (Mokpo National maritime University, South Korea), Prof. Yong Ma (Wuhan University of Technology, China), 7 invited speeches from Prof. Junmin Yi (Xiamen University of Technology, China), Prof. Hongguo Shi (Southwest Jiaotong University, China), Assoc. Prof. Yunhui Huang (Wuhan University of Technology, China), Assoc. Prof. Sicong Zhu (Beijing Jiaotong University, China), Dr. Shangbo Wang (The University of HongKong, China), Dr. Ke Zhang (Tsinghua University, China), Dr. Bin Mei (Dalian Maritime University, China), 4 onsite sessions and 3 online sessions.

It is pleasing to note that the agenda of this conference covers a wide range of interesting topics related to all theoretical and practical aspects, but not limited to urban transportation mode selection and travel prediction; low carbon based transportation and path optimization; intelligent logistics information system and transportation services; functional materials and intelligent control systems etc.

We would like to deeply express our heartfelt appreciation to all our delegates, keynote speakers, invited speakers, session chairs as well as all the committee members involved in the technical evaluation of conference papers and in the conference organization for your time, effort, and great contributions. Apart from that, we'd like to extend our thanks to all the authors and external reviewers for your contribution. It is your high competence, enthusiasm, valuable time and expertise that have enabled us to prepare the final program with high quality and make the conference a great success.

I wish to thank all attendees for participating in the conference and hope you have a fruitful and memorable experience at ICTTE 2023 & MEPE 2023!

Finally, we wish you a very successful conference! Hope you will enjoy your stay to Wuhan!

Best regards,

Conference Organizing Committee

ICTTE 2023

Ms. Kristen Zhang

Email: ictte2016@vip.163.com

MEPE 2023

Ms. Rachel Cao

Email: mepe_conf@yeah.net



Conference Committee

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Conference Committee EPE 2023

www.mepe.org

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Dr. Sita Anisah Sholihah, Institut Transportasi dan Logistik Trisakti, Indonesia
Dr. Meiryani, Bina Nusantara University, Indonesia



Agenda Overview (UTC+8)

Friday, December 29, 2023

Onsite Registration	13:30-17:00	Lobby (Wuhan Huatian Hotel)
Zoom Test for online presenters	13:30-16:00	<u>Room A: 839 2206 4488</u>

Zoom Test Timetable

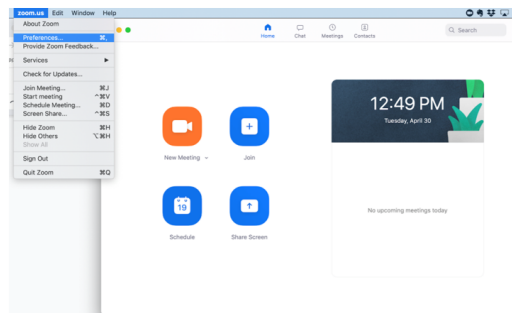
- ✦ Participants who are going to do an online presentation are required to join the rehearsal in Zoom on **Friday, December 29, 2023**. Duration: 3min apiece. Feel free to leave after you finish the test.
- ✦ We will test control panel including screen sharing, audio, video and "Raise Hand" feature, etc. Please get your presentation slides and computer equipment prepared beforehand.

13:30-14:00	E204 E205 E206 E217 E218 E308 E355 E340 E208
14:00-14:30	E323 E307 E325 E334 E338 E345 E357 E394
14:30-15:00	E309 E304 E319 E342 E344 E356 E377 E388
15:00-16:00	Alternative time for participants who are unavailable at allocated time. Other online participants, includes but not limited to keynote speaker, invited speaker, session chair, committee member, delegate.

Zoom Guidance

You can join the meeting without sign-in process. Just put the meeting ID and join us.

URL: <https://zoom.us/download>



Each meeting has a unique 9, 10, or 11-digit number called a **meeting ID** that will be required to join a Zoom meeting.

For any questions on the meeting day, you can text privately to "Assistant" for help.



Audio muted and video off (both indicated by a red slash).

Click to open the Participants box. This will allow you to "Raise Hand".

To share screen or contents.

Click to open the Chat box. This will allow you to chat with Hosts and Participants.



Saturday, December 30, 2023

Chairman:	4F Wuhan Hall B (武汉 B 厅) Room A: 839 2206 4488
8:50-9:00	Opening Remarks
9:00-9:35	Keynote Speech I: A General Driving Behavior Model Based on Risk Homeostasis <i>Prof. Guangquan Lu</i> , Beihang University, China
9:35-10:10	Keynote Speech II: Equity-Based Traffic Signal Control under Connected Vehicle Environment: Deep Reinforcement Learning Approach <i>Prof. Wei Fan</i> , University of North Carolina at Charlotte, USA (Online)
10:10-10:40	Group Photo & Coffee Break (4F Open Space)
10:40-11:15	Keynote Speech III: Recent Advances towards Intelligent Mobility Service in Railway <i>Prof. Dewei Li</i> , Beijing Jiaotong University, China
11:15-11:50	Keynote Speech IV: Introduction of Hydrographic Information (Nautical Charts) Standard Development for MASS in Korea <i>Prof. IM Namkyun</i> , Mokpo National maritime University, South Korea (Online)
11:50-12:25	Keynote Speech V: Intelligent Path Planning for Ocean-going Ship in the Pirate Area Considering the Real Marine Environment <i>Prof. Yong Ma</i> , Wuhan University of Technology, China
12:25-13:30	Lunch (4F, Silver Tower Restaurant 银塔餐厅)

Parallel Session (Onsite)

Onsite Session 1-Urban Transportation Mode Selection and Travel Prediction	3F, Wuchang Hall A (武昌 A 厅)
13:30-15:50	<i>Chairman: Assoc. Prof. Sicong Zhu, Beijing Jiaotong University, China</i> <i>Invited Talk-Assoc. Prof. Sicong Zhu; Dr. Shangbo Wang</i> E347 E332 E337 E343 E369 E370 E380 E396-A E398-A E1004
Onsite Session 2-Low Carbon Based Transportation and Path Optimization	3F, Wuchang Hall C (武昌 C 厅)
13:30-15:50	<i>Chairman: Prof. Junmin Yi, Xiamen University of Technology, China</i> <i>Invited Talk-Prof. Junmin Yi; Dr. Ke Zhang; Dr. Bin Mei</i> E306-A E326 E375 E384 E391 E331 E397-A E393
15:50-16:10	Coffee Break (3F Open Space)
Onsite Session 3-Intelligent Logistics Information System and Transportation Services	3F, Wuchang Hall A (武昌 A 厅)
16:10-18:00	<i>Chairman: Dr. Zhi Yuan, Wuhan University of Technology, China</i> E301 E1001 E361 E372 E379 E389 E303 E324 E335 E322 E219
Onsite Session 4-Functional Materials and Intelligent Control Systems	3F, Wuchang Hall C (武昌 C 厅)
16:10-18:20	<i>Chairman: Assoc. Prof. Yunhui Huang, Wuhan University of Technology, China</i> <i>Invited Talk-Assoc. Prof. Yunhui Huang</i> E364 E330 E202 E203 E210 E213 E214 E215 E216 E315 E201-A
18:30-20:00	Dinner (4F, Silver Tower Restaurant 银塔餐厅)



Parallel Session (Online)
Online Session 1-Design and Control of Intelligent Mechanical Systems
Room A: 839 2206 4488

13:30-15:00

Chairman: Dr. Kai Yan, The Second Research Institute of CAAC, China
 E204 E205 E206 E217 E218 E308 E355 E340 E208

Online Session 2-Urban Transportation Modes, Transportation Capacity Assessment, and Traffic Safety Management
Room B: 839 5170 1097

13:30-15:10

Chairman: Assoc. Prof. Yanyi Chen, Wuhan University of Technology, China
Invited Talk-Prof. Hongguo Shi
 E323 E307 E325 E334 E338 E345 E357 E394

15:10-15:30

Break Time

Online Session 3-Traffic Signal Control, Road Network Construction, and Image Analysis in Transportation Systems
Room A: 839 2206 4488

15:30-16:50

Chairman: TBA
 E309 E304 E319 E342 E344 E356 E377 E388


Keynote Speaker (UTC+8)

Saturday December 30, 2023

9:00-9:35

4F Wuhan Hall B (武汉 B 厅)

Room A: 839 2206 4488



Prof. Guangquan Lu
Beihang University, China

Speech Title: A General Driving Behavior Model Based on Risk Homeostasis

Abstract: As traditional driver behavior/vehicle dynamics models rely on specific scenarios and cannot address the challenges caused by the explosive growth of the scenarios, a unified driving behavior model is constructed based on field theory in this study. This model mainly contains three parts: environment constraint description model, path planning model and motion planning model. First, the traffic elements are divided into three categories: moving objects, static environmental elements and dynamic traffic control information. Their corresponding risk field functions are constructed separately. Additionally, a unified path planning model is developed based on third-order Bézier curve. This model can simultaneously describe the travel paths of vehicles in both lane-changing and intersection scenarios with different shapes and sizes. Subsequently, a unified motion planning model is constructed by combining risk homeostasis theory and preview-follower theory, two theories describing the driver's motion decision mechanism. Finally, this model is applied to car-following, lane-changing, signalized intersection entrance lane and unsignalized intersection scenarios to model different types of driving behavior. The validity of the model is proved by comparing the simulation results with naturalistic driving data.

Guangquan Lu, Ph.D., is a professor and associate dean of the School of Transportation Science and Engineering of Beihang University, a project leader of the National Key R&D Program, a member of the Traffic Engineering Teaching Guidance Committee of the Ministry of Education, a member of the council of China Road Transport Associations, a member of the council of China Road Safety Association and a member of the council of China Institute of Communications Education. He received the B.Sc. degree from Harbin Institute of Technology, Harbin, China, in 1996, and the M.Sc. and Ph.D. degrees from Jilin University, Changchun, China, in 2001 and 2004, respectively. His research interests include road traffic safety, driving behavior, and V2V control.



Keynote Speaker (UTC+8)

Saturday December 30, 2023

9:35-10:10

4F Wuhan Hall B (武汉 B厅)

Room A: 839 2206 4488



Prof. Wei Fan
University of North Carolina at Charlotte, USA

Speech Title: Equity-Based Traffic Signal Control under Connected Vehicle Environment: Deep Reinforcement Learning Approach

Abstract: Transit Signal Priority (TSP) is a traffic signal control strategy that can provide priority to transit vehicles and thus improve transit service and enhance transportation equity. Conventional TSP strategies often ignore the fluctuation of passenger occupancy in transit vehicles, leading to sub-optimal solutions for the entire system. The use of Connected Vehicle (CV) technology enables the adoption of a more equitable objective in optimizing traffic signals, such as person delay, by allowing real-time information on passenger occupancy to be obtained. In this study, a deep reinforcement learning algorithm, deep Q-network (DQN), is applied to develop a traffic signal controller that minimizes the equity-based metric, i.e., average person delay. The proposed DQN controller is tested in a simulation environment modeled after a real-world intersection and compared with pretimed and actuated controllers. Results show that the proposed DQN controller has the best performance in terms of average person delay. Compared to the baseline, it reduces the average person delay by 18.77% in peak hours and 23.37% in off-peak hours. Furthermore, it also results in decreased average delays for both buses and cars. The sensitivity analysis results indicate that the proposed controller has the potential for practical applications, as it can effectively handle some dynamic changes.

Dr. Wei (David) Fan currently serves as a full professor in the Department of Civil and Environmental Engineering and a Distinguished Scholar in the William States Lee College of Engineering (LCoEN) at The University of North Carolina at Charlotte. He is also the Director of the USDOT University Transportation Center for Advanced Multimodal Mobility Solutions and Education. Dr. Fan holds a Ph.D. (May 2004) in Civil Engineering – Transportation from the University of Texas at Austin. Dr. Fan serves as the Editor-in-Chief of International Journal of Transportation Science and Technology, a handling editor on the Transportation Research Record (TRR) inaugural editorial board, an associate editor of IEEE Transactions – Intelligent Transportation Systems, and an associate editor of ASCE Journal of Transportation Engineering, Part A: Systems while also serving as a member of two other transportation journal editorial boards. Dr. Fan also serves as a member on the National Science Foundation (NSF) review panels, the National Cooperative Highway Research Program (NCHRP) panels, the Transit Cooperative Research Program (TCRP) panel, as well as a member on three American Society of Civil Engineers (ASCE) committees and three Transportation Research Board (TRB) committees.

Dr. Fan has been and is involved in many sponsored projects with a total of over 17.35 million dollars in funding, having been a principal or co-principal investigator on many research studies for the U. S. Department of Transportation (USDOT), Federal Highway Administration (FHWA), NCHRP, SHRP2 Education Connection, Texas Department of Transportation (TxDOT) and North Carolina Department of Transportation (NCDOT). He has published 121 peer-reviewed journal articles thus far, and many proceeding papers and technical reports on big data analytics in transportation, connected and autonomous vehicles, shared mobility and multimodal transportation, traffic system operation and control, and transportation system analysis and network modeling. He is a registered professional engineer in Texas.



Keynote Speaker (UTC+8)

Saturday December 30, 2023

10:40-11:15

4F Wuhan Hall B (武汉 B 厅)

Room A: 839 2206 4488



Prof. Dewei Li
Beijing Jiaotong University, China

Speech Title: Recent Advances towards Intelligent Mobility Service in Railway

Abstract: Intelligent transportation has been a mega trend in but not limited to railway field. This talk will introduce recent development on how intelligent technologies are used in railway passenger transportation in recent years. From demand side, supply side to service side, cases to improve the efficiency as well as customer satisfaction will be introduced. Also, challenges will be put forward. Hopefully, it can give some insight for other transportation field.

Dr. Dewei Li is a professor in the Department of traffic and transportation in Beijing Jiaotong University. He is a PhD supervisor and has been rated as an outstanding teacher in the university. He serves as a reviewer of National Nature and Science Foundation of China, member of Transportation Research Board, COTA, Chair of Alliance of Universities in International Union of Railways, scientific committee member of World High Speed Rail Congress and UIC Covid-19 Taskforce. He is also vice secretary of Expert and academic committee in China Association of Metros. He serves as a guest editor of urban rail transit, and reviewers in most of the top journals in transportation field such as Transportation Research Part B/C, IEEE ITS, Journal of The China Railway Society etc. His research interests include demand management, capacity management, scheduling, facility location, railway optimization, pedestrian simulation etc. He took charge of over 50 national and province level R&D projects. He was awarded 4 times by China railway society, and Beijing Municipal Science & Technology Commission for his contribution in transportation field. He was also awarded for his teaching experience. He published hundreds of papers in many professional journals and conferences, and authored 5 professional books in transportation field. He is entitled as "Outstanding Youth in Beijing". He obtained tens of patent for invention and software copyright certificates.



Keynote Speaker (UTC+8)

Saturday December 30, 2023

11:15-11:50

4F Wuhan Hall B (武汉 B 厅)

Room A: 839 2206 4488



Prof. IM Namkyun

Mokpo National maritime University, South Korea

Speech Title: Introduction of Hydrographic Information (Nautical Charts) Standard Development for MASS in Korea

Abstract: Recently the Korean government initiated the "Development of Hydrographic Information Standard for MASS" project to respond to the advancement of smart vessels. Currently, research on the development of Maritime Autonomous Surface Ship (MASS) is actively underway worldwide. However, there is insufficient research on Hydrographic information (Nautical Charts) that will be used when MASS vessels are actually commercialized and operational in the future. The current standard for Hydrographic information (Nautical Charts) used in conventional vessels is based on S-57, and a transition to the S-100 series standard is planned for the future. However, as this Hydrographic information (Nautical Charts) is primarily developed for navigation officers and human use, there is a growing demand for a novel concept of Hydrographic information suitable for Unmanned Surface Vessels (USVs) like MASS when they emerge. This study aims to propose and develop various concepts of Hydrographic information with a focus on developing Hydrographic information designed for MASS, departing from the existing concepts of Hydrographic information.

Nam-Kyun Im received the M.Sc. degree in navigation science from Korea Maritime University, in 1992, and the Ph.D. degree in naval architecture and ocean engineering from Osaka University, Japan, in 2002. He was at the Ship and Ocean Research Center of Samsung Heavy Industry around three years. He is currently a Professor with Mokpo National Maritime University. His research interests include ship automatic control study, ship maneuvering simulation and its applications, marine traffic simulation, ship free running model, and marine/ship environmental issues.



Keynote Speaker (UTC+8)

Saturday December 30, 2023

11:50-12:25

4F Wuhan Hall B (武汉 B 厅)

Room A: 839 2206 4488



Prof. Yong Ma
Wuhan University of Technology, China

Speech Title: Intelligent Path Planning for Ocean-going Ship in the Pirate Area Considering the Real Marine Environment

Abstract: Referring to the development strategy of the Maritime Silk Road, the path planning for ocean-going ship has always been a key concern. With the frequent pirate accidents in the Red Sea and other places, the safety of shipping has been seriously affected. This talk tends to introduce our work on path planning in the pirate area for Ocean-going Ships. Concretely, an integrating strategy for ENC and other maritime information is designed to reconstruct the real marine environment. Then, a hybrid probabilistic roadmap (HPRM) algorithm for ship route planning in pirate activity area is presented. Our HPRM algorithm consists of the improved learning phase and the enhanced exploration phase, which significantly improves the efficiency. To achieve safe and reliable local path planning in complex marine environment, we propose an algorithm based on the level set equation (LSD). This algorithm utilizes wind, flow and other relevant information to optimize the path for safety. Experiments validate the effectiveness of our work.

Dr. Yong Ma received his Ph.D. in Control Science & Engineering from Huazhong University of Technology (HUST) in 2012. Currently, Prof. Yong Ma is the Deputy Dean of School of Navigation, WUT. His research interests including theory and technology of ship intelligent navigation, maritime security by using intelligent technology. He has hosted over 10 national and provincial projects and is supported by the National Excellent Youth Foundation of the NSFC. He was awarded the first prize of the China Industry-University-Research Cooperation Innovation Achievement Award in 2023, and received the China Patent Excellence Award in 2022.



Invited Speaker (UTC+8)

Saturday December 30, 2023

13:30-13:50

3F Wuchang Hall A (武昌 A 厅)



Assoc. Prof. Sicong Zhu
Beijing Jiaotong University, China

Speech Title: Traffic Engineering Problem Based Learning through Microscopic Simulation Progame Rapid Prototyping –A Case Study of Car Following

Abstract: This paper presents an integrated educational module to study traffic engineering at microscale level for undergraduate. When dealing with a complex transportation system, the education program should cultivate students' transportation major knowledge and integrate it with essential skills from other engineering domains. A fusion of ADDIE (Analyze, Design, Develop, Implement, and Evaluate) and Rapid Prototyping is proposed for instructional design. The integrated module is designed to develop a miniature car following simulation on agent based theory. The Rapid Prototyping activities foster deductive learning through the simulation package development followed by result analysis. Both products and learning processes are delivered with self-evidence of programming skills and solid traffic flow knowledge. Feedback from participating students has been positive, indicating the achievement of the planned learning objectives and better mastery of engineering practices. The Technology Acceptance Model (TAM) survey demonstrates that the participants pay more attention to the perceived ease of use, leading to the intention to use in the environment of Rapid Prototyping.

Sicong Zhu is an associate professor in the School of transportation & traffic at the Beijing Jiaotong University where he has been a faculty member since 2015.

Sicong completed his Ph.D. at The University of Queensland, Australia and his undergraduate studies at the Tongji University, China. His research interests lie in the area of traffic environmental study, ranging from gaseous pollutants modeling to particulate matter monitoring. He has collaborated actively with researchers in several other disciplines of traffic engineering, particularly in the field of ITS.



Saturday December 30, 2023

13:50-14:10

3F Wuchang Hall A (武昌 A 厅)



Dr. Shangbo Wang
The University of HongKong, China

Speech Title: Vehicle Localization and Tracking by using Low-Cost Roadside Millimeter-Wave Radar

Abstract: This study develops a vehicle localization and tracking system based on a 24 GHz roadside MMW (Millimeter_x005fWave) radar. To mitigate MUJ (Multipath Interference) caused by signal reflection in complex environment, this research proposes an integrated system that combines preprocessing, clustering, and trajectory estimation. A vehicle-tailored preprocessing algorithm is used to filter the raw data to reduce the algorithm complexity, followed by applying DBSCAN (Density-Based Spatial Clustering of Applications with Noise) algorithm to handle unknown target counts in multi-vehicle scenarios. Then, an innovative arc matching algorithm collaborates with the radar to estimate vehicle trajectories. Experimental results show that both Root Mean Square Error (RMS) and Mean Absolute Error (MAE) of vehicle trajectory matching are below 0.051 meters and have 67% target detection accuracy.

Shangbo Wang (S'17 – M'18) joined the Xi'an Jiaotong Liverpool University in 2020 as an Assistant Professor. He obtained his Dr.-Ing and PhD degrees from University of Duisburg-Essen, Germany and University of Technology Sydney in 2014 and 2019, respectively. Before that, he worked by the University of Sydney, Continental AG, Lindau, Siemens AG, Munich as a postdoctoral research fellow, radar engineer and development engineer, respectively. He has authored and coauthored more than 30 papers in leading international journal and conference papers, including IEEE Transactions on Intelligent Transportation Systems, IEEE Transactions on Signal Processing etc. His research interest mainly includes intelligent transportation systems, wireless communications, radar signal processing, wireless localization techniques, machine learning, deep reinforcement learning and its applications in transportation systems. He has obtained multiple academic awards, including Jiangsu Yong Talent Program, Hubei Yong Talent Program, Texas Instruments Excellence in Signal Processing Award, Australian Research Council full scholarship etc.



Saturday December 30, 2023

13:30-13:50

3F Wuchang Hall C (武昌 C 厅)



Prof. Junmin Yi
Xiamen University of Technology, China

Speech Title: When Routing-Packing Problem Meets Split-delivery and Cubic Cargoes with Special Dimensions

Abstract: The class of Vehicle Routing Problem and Packing Problem both have a separated history of studies for decades, and they have been the hot issues in the field of logistics and operations research. In order to address the practical need for distributing and transporting lightweight but packaged cubic cargoes, the integrated Vehicle Routing Problem with Three-dimensional Loading Constraints (3L-CVRP) has been targeted since 2006. Over the years, researchers have concentrated on this complex NP-hard integrated problem and its variations, using various algorithms and experiments. A total of eight sets of instances from both academic and industrial sources have been used in numerical experiments, involving up to 850 customers, 29,580 boxes, and up to 356 boxes per customer.

On the other way, traditionally most of the Vehicle Routing Problems care the vehicle capacity in weight or volume, and the entire demand of each customer must be delivered by one vehicle during one visit. Nevertheless, in the Split-Delivery VRP (SDVRP) this limit is broken and the demand of a customer can be delivered by two or more vehicles. Both numerical experiments with solution methods and theoretical results in the One-dimensional weight or volume prove that large savings in terms of travel distance can be obtained if splitting deliveries is allowed.

However, when the split-delivery is extended to the VRP with 3D loading constraints, it involves not only the increase in geometrical dimensions but also numerous constraints related to containers, items, cargo, and load. The practical packing and loading of these cargo boxes have to contend with these constraints. Our numerical experiments are conducted using many sets of instances with both industrial and academic origins, and recently on those cargoes, especially in size with one dimension extra-large or extra-small such as a high square pillar or a large HDTV set. If the managerial costs raised from multiple visits to one customer with these intentionally-divided delivery can be ignored, the results prove that splitting deliveries can be beneficial not only in the one-dimensional case but also in the 3D case. However, the balancing of cost saving from split-delivery vs cost rising from break of the one-visit-per-customer limit has not yet been studied.

Junmin Yi obtained his PhD from Nanjing University and served as a guest researcher at the Norwegian University of Science and Technology and Otto von Guericke University of Magdeburg, Germany. He has teaching and research interests in Logistics Engineering and Management, Container Transportation Management, Operational Research and its Application. Dr. Yi has been the principal investigator of an NSFC research grant and several Fujian Provincial grants. He has authored over 30 papers in refereed journals and conferences, as well as two popular textbooks for university students. Currently, his research is focused on routing, packing, and systems optimization for logistics and transportation.



Saturday December 30, 2023

13:50-14:10

3F Wuchang Hall C (武昌 C 厅)



Dr. Ke Zhang
Tsinghua University, China

Speech Title: Deep Reinforcement Learning for Vehicle Routing Problems with Real-world Constraints

Abstract: In the realm of on-demand transportation services, the provision of high-quality and efficient transportation holds significant economic and social importance. Traditional approaches for vehicle routing problem often rely on exact models and heuristic methods. However, these methods might struggle to strike the right balance between computation time and solution quality. The demands of real-world scenarios necessitate algorithms that are not only efficient and robust but also capable of handling large-scale problems effectively. In recent years, the rapid development of machine learning has introduced new possibilities for tackling these challenges. Reinforcement learning-based algorithms can learn valuable insights from customer information and execute customer selection decisions at each time step to minimize overall route costs. Learning-based algorithms can generate high-quality solutions within seconds when deploying well-trained model online, following extensive offline learning. Nevertheless, this research field still faces several challenges, such as time window information extraction, multi-vehicle decisions optimization, and training convergence. This report will primarily focus on introducing recent advancements in this field.

Dr. Ke Zhang receives the Ph.D. degree from Tsinghua University, and serves as a postdoctoral researcher currently. His research interests include intelligent transportation system, and data-driven mobility services. He has published 10+ papers as the first author, and won the Excellent Ph.D. thesis from Tsinghua University, COTA Best Paper Award.



Saturday December 30, 2023

14:10-14:30

3F Wuchang Hall C (武昌 C 厅)



Dr. Bin Mei
Dalian Maritime University, China

Speech Title: Limit navigation parameters of autonomous ship in harbor

Abstract: With the increasing integration of autonomous technologies in maritime transportation, the safe and efficient navigation of autonomous ships within harbors has become a critical concern. This study explores the implementation of limitations on navigation parameters to enhance the safety and precision of autonomous vessels during harbor maneuvers. Focusing on factors such as speed, trajectory, and proximity to other vessels and infrastructure, the research aims to establish a comprehensive framework for constraining navigation parameters. By leveraging advanced sensor technologies, optimization algorithms, and real-time data processing, the proposed system seeks to optimize the autonomous ship's decision-making process, mitigate collision risks, and ensure compliance with local regulations. The findings of this study contribute to the ongoing discourse on the responsible deployment of autonomous maritime technologies, emphasizing the importance of tailored navigation parameters to foster safe and efficient operations in harbor environments.

Bin MEI is engaged in ship maneuvering motion modeling, marine traffic planning and management, and marine traffic safety guarantee and support technology. He was honored the excellent paper in China Navigation Science and Technology from China Institute of Navigation, also reviews for several SCI journals.

Personal page: <https://nvc.dlmu.edu.cn/info/1063/2422.htm>



Saturday December 30, 2023

16:10-16:30

3F Wuchang Hall C (武昌 C 厅)



Assoc. Prof. Yunhui Huang
Wuhan University of Technology, China

Speech Title: Stability Analysis of Grid-Forming VSC Connected to Low Impedance Grid

Abstract: With the rapid increase of new energy penetration represented by wind power and photovoltaic in the new power system, grid-forming converter, as a key equipment for high-proportion new energy access to the grid, has become a hot spot of current research. The intermittent and uncertain characteristics of new energy make the power grid must have higher frequency support capability, but also bring more oscillation and stability problems.

This presentation investigates the stability analysis of grid-forming VSC connected to low impedance grid. The dynamic model of the grid-forming converter connected to the AC grid is established to characterize the dynamics of the internal potential-inertia, damping component and synchronous component, and the stability mechanism of the grid-forming converter connected to low impedance grid is revealed. The analysis results show that the terminal voltage control loop of the grid-forming converter will introduce significant additional negative damping components, which reduces the stability of the system. Finally, the theoretical analysis results are verified by experiment in the hardware-in-the-loop test platform.

Yunhui Huang is an associate professor at the School of Automation, Wuhan University of Technology. His research interests include stability and control of power systems. He has presided over National Natural Science Foundation, Natural Science Foundation of Hubei Province, 4 special funds for central universities, 2 open funds for State key laboratories, more than 10 national grid science and technology projects, and participated in a number of national vertical science and technology projects. He has published 38 academic papers and won 8 national invention patents, of which 11 papers were included in SCI, 19 papers were included in EI, the number of citations was 647 times, the highest citation of a single paper was 194 times, and one paper was selected as the best paper Section (top10%) of the IEEE PES Annual Meeting. In terms of awards and talent plans, he was selected into the outstanding Doctor list of Yangzhou "Green Yang Jinfeng Plan" in 2017, won the Best Report Award of the second ICET Conference in 2019, and the third prize of Science and Technology Progress Award of State Grid Xinyuan Company in 2021. The students under my guidance won the second prize of the Academic Annual Meeting of Wuhan Power Supply Society in 2019, the Best Report Award of the Fifth MEPE Conference in 2022, and the Best Report Award of the Ninth EECR Conference in 2023. It has been listed in the world's top 2% top Scientists List in 2022 and 2023 and the annual Scientific Influence list in China (including Hong Kong, Macao and Taiwan) in the field of electrical and electronic engineering.



Saturday December 30, 2023

13:30-13:50

Room B: 839 5170 1097

Prof. Hongguo Shi
Southwest Jiaotong University, China

Speech Title: Research on state dependent differentiation field model based on pedestrian micro motion characteristics

Abstract: It is of great theoretical and practical significance to study the micro movement and behavior of pedestrians in the channel. Based on the cellular automata model, this paper proposes a state related differentiated field model by improving the speed difference, changing selection probability of the right side walking preference, reflecting the state correlation of pedestrian decision-making, and building the differentiated conflict resolution mechanism in different directions. Through a channel simulation program, the original model and the improved model are compared and verified. The verification shows that the improved field model can describe accurately the behavior of pedestrian following, layering and self-organization in the channel, and has good application value.

Hongguo Shi (1974), from Henan. PhD, Professor, Master's Supervisor. Doctoral degree obtained in Transportation Planning and Management from Southwest Jiaotong University in January 2007. Research directions include: transportation planning, transportation organization and train operation optimization.

I have led research on more than 20 projects, including the National Natural Science Foundation of China and the National Railway Corporation and others, and have received 2 awards. The urban rail transit train traction calculation system as one research finding has won the third prize of the Science and Technology Progress Award from the Sichuan Provincial Department of Construction. The key technology for early warning of wind disasters on high-speed railways in difficult mountainous areas, has won the first prize of Science and Technology Progress Award from the Second China Railway Engineering Group. Being authorized 4 patents; Published 3 books and over 60 papers in domestic and foreign journals.

Personal page: https://faculty.swjtu.edu.cn/shihongguo/zh_CN/index.htm



Onsite Session 1 (UTC+8)

Urban Transportation Mode Selection and Travel Prediction

**13:30-15:50/Saturday December 30, 2023
3F, Wuchang Hall A (武昌 A 厅)**

Chairman: Assoc. Prof. Sicong Zhu, Beijing Jiaotong University, China

Invited Talk 13:30-13:50	Traffic Engineering Problem Based Learning through Microscopic Simulation Programme Rapid Prototyping –A Case Study of Car Following Assoc. Prof. Sicong Zhu , Beijing Jiaotong University, China
Invited Talk 13:50-14:10	Vehicle Localization and Tracking by using Low-Cost Roadside Millimeter-Wave Radar Dr. Shangbo Wang , The University of HongKong, China
E347 14:10-14:20	Automatic Route Selection of Railway Station Based on Genetic Algorithm Kun Yang , Southwest Jiaotong University, China
E332 14:20-14:30	Heterogeneity analysis of passengers' choice behavior between demand responsive train and traditional fixed train Han Gao , Beijing Jiaotong University, China
E337 14:30-14:40	Risk Assessment of Urban Rail Transit Based on Fuzzy Consistent Matrix and Analytic Hierarchy Process Yang Liu , Southwest Jiaotong University, China
E343 14:40-14:50	An Approach to Point Cloud and Image Fusion Based on Geometric Features in Water Environment Wanchang Liu , Shanghai Maritime University, China
E369 14:50-15:00	Research on Travel Predictability of Conventional Public Transport User Based on Smart Card Data Yitong Chen , Tongji University, China
E370 15:00-15:10	Differential toll effect prediction and scheme development based on the network model Yuxuan Zhao , Hebei University of Technology, China
E380 15:10-15:20	Modelling commuting mode choice behaviour with the consideration of the effects of COVID-19: a case study in Belgium Xin Meng , Beijing Jiaotong University, China
E396-A 15:20-15:30	Exploring the Cycling Dynamics of Dockless Shared Bikes in Wuhan, China: A Multi-scale Spatial Analysis Meng Liu , Wuhan Institute of Technology, China
E398-A 15:30-15:40	Research on the layout correlation of public service facilities in Wuhan under the background of big data Yan Zhu , Wuhan Institute of Technology, China
E1004 15:40-15:50	Comparison and Selection of Passenger Transportation Technology Schemes for Cruise Terminals with Large Water Level Differences Lijun He , Wuhan University of Technology, China



Onsite Session 2 (UTC+8)

Low Carbon Based Transportation and Path Optimization

**13:30-15:50/Saturday December 30, 2023
3F, Wuchang Hall C (武昌 C 厅)**

Chairman: Prof. Junmin Yi, Xiamen University of Technology, China

Invited Talk 13:30-13:50	When Routing-Packing Problem Meets Split-delivery and Cubic Cargoes with Special Dimensions Prof. Junmin Yi , Xiamen University of Technology, China
Invited Talk 13:50-14:10	Deep Reinforcement Learning for Vehicle Routing Problems with Real-world Constraints Dr. Ke Zhang , Tsinghua University, China
Invited Talk 14:10-14:30	Limit navigation parameters of autonomous ship in harbor Dr. Bin Mei , Dalian Maritime University, China
E306-A 14:30-14:40	Multiclass capacitated traffic assignment problem under mixed traffic with autonomous vehicles Qi Zhong , Tsinghua University, China
E326 14:40-14:50	Improving container shipping profitability by implementing target show-up rate and dead freight Yujia JIANG , Nanjing University of Science & Technology, China
E375 14:50-15:00	Simulation Optimisation Study of E-commerce Automated Stereo Warehouse Layout Based on Flexsim Yihan Wang , Liaoning Technical University, China
E384 15:00-15:10	Research on vehicle routing optimization in multiple distribution centers based on improved particle swarm algorithm Fu Jiang , Liaoning Technical University, China
E391 15:10-15:20	A study of grey wolf optimisation algorithm based on lens imaging learning strategy for solving vehicle path problems with capacity constraints Xu Ruize , Liaoning Technical University, China
E331 15:20-15:30	The Level of Labor Quotas for Commercial Automobile Ro-Ro Terminals Based on TOPSIS Yuxin Wang , Wuhan University of Technology, China
E397-A 15:30-15:40	Exploring Spatial Heterogeneity of Factors Influencing Railway Transit Station Ridership from An Extensive TOD Perspective Lingyue Li , Wuhan Institute of Technology, China
E393 15:40-15:50	Green Cold Chain Vehicle Path Optimisation Considering Carbon Emissions Lijing Zhang , Liaoning University of Engineering and Technology, China



Onsite Session 3 (UTC+8)

Intelligent Logistics Information System and Transportation Services

**16:10-18:00/Saturday December 30, 2023
3F, Wuchang Hall A (武昌 A 厅)**

Chairman: Dr. Zhi Yuan, Wuhan University of Technology, China

E301 16:10-16:20	The Construction Path and Practical Exploration of "Near Zero Carbon Port" Yi Zhang , Tianjin Research Institute for Water Transport Engineering, Ministry of Transport, Tianjin, China
E1001 16:20-16:30	A Method for Analyzing the Development Trend of Waterway Transportation Based on Text Mining of Maritime Laws and Regulations Wenhai Li , Wuhan University of Technology, China
E361 16:30-16:40	Research on the Collaborative Development of Digital Logistics, New Urbanization, and Ecological Environment Governance: Taking the Yangtze River Delta Region as an Example Tongtong Mu , Liaoning Technical University, China
E372 16:40-16:50	Evaluation of Port Logistics Competitiveness based on partial order set Yue LV , Liaoning Technical University, China
E379 16:50-17:00	Impact of Smart City Pilots on the Development of the Urban Logistics Industry--Quasi-natural Experiment Based on 220 Cities in China Xiaotong Zhao , Liaoning Technical University, China
E389 17:00-17:10	Research on Home Appliance E-commerce Logistics and Transportation Services Based on Customer Satisfaction Liuying Song , Liaoning Technical University, China
E303 17:10-17:20	Spatio-temporal evolution of major port efficiency in Zhejiang Province under the background of "Belt and Road" Ziyao Cheng , Wuhan University of Technology, China
E324 17:20-17:30	Coupling and Coordination of Road Freight and Economic Development in Beijing-Tianjin-Hebei City Cluster Yuanjia Guan , Wuhan University of Technology, China
E335 17:30-17:40	Research on the Evaluation of Green Development level of Large Automated Container Ports Yipei Zhang , Wuhan University of Technology, China
E322 17:40-17:50	Research on Prediction of Product Completion Time in Assembly Workshop Based on SOA-RF Shan Wu , Wuhan University of Technology, China
E219 17:50-18:00	The Application of Intelligent Sorting Equipment in Warehouse Logistics Chenggong Zhai , Army Logistics Academy, China



Onsite Session 4 (UTC+8)

Functional Materials and Intelligent Control Systems

**16:10-18:20/Saturday December 30, 2023
3F, Wuchang Hall C (武昌 C 厅)**

Chairman: Assoc. Prof. Yunhui Huang, Wuhan University of Technology, China

Invited Talk 16:10-16:30	Stability Analysis of Grid-Forming VSC Connected to Low Impedance Grid Assoc. Prof. Yunhui Huang , Wuhan University of Technology, China
E364 16:30-16:40	Faulty fire dynamic risk analysis of EMU high-voltage traction system with integrated DEMATEL-ISM-DBN Yuchen Zhang , Graduate Department, China Academy of Railway Sciences Group Co., China
E330 16:40-16:50	Election Theory of Ship Reference Model and Its Application in Motion Modeling Baochen Duan , Dalian Maritime University, China
E202 16:50-17:00	Study on the dynamic model of pole machine roll stability Pan Jianbing , State Grid Jiangxi Electric Power Co., LTD. Electric power Research Institute, China
E203 17:00-17:10	Frequency Combs and Stochastic Responses in A Curved Microbeam Featuring 2:1 Internal Resonance Penghui Song , Shanghai Jiaotong University, China
E210 17:10-17:20	Analysis of mechanical properties of a quick locking structure based on simulation and experiment Jianbin Feng , Harbin Institute of Technology, China
E213 17:20-17:30	Research on Impact of Harmonics on Vibration Characteristics of GIS in Power Grid Wenzhao Wang , Xi'an Jiaotong University, China
E214 17:30-17:40	Research on milling performance of AlCoCrFeNi high entropy alloy Wang Pengjia , Beijing Information Science & Technology University, China
E216 17:40-17:50	An improved bond-based peridynamics model based on quasi-brittle material mechanics Herong Ying , Southeast University, China
E215 17:50-18:00	Finite element simulation study of cutting thickness in micro-milling of Ti-22Al-25Nb alloy Wang Pengjia , Beijing Information Science & Technology University, China
E315 18:00-18:10	Thermal Stability Control for High-Speed Trains Under Limited Heat Dissipation Condition Yiyang Tian , Southwest Jiaotong University, China
E201-A 18:10-18:20	Research on 1-DOF Controlled Magnetic Bearing for Artificial Kidney Pump Xiaoyou Zhang , Nippon Institute of Technology, Japan



Online Session 1 (UTC+8)

Design and Control of Intelligent Mechanical Systems

13:30-15:00/Saturday December 30, 2023

Room A: 839 2206 4488

Chairman: Dr. Kai Yan, The Second Research Institute of CAAC, China

E204 13:30-13:40	Automated Calculation Plugin for Local Stress in Pressure Vessel Nozzles Hangchao Fan , Xinjiang University, China
E205 13:40-13:50	An Analysis of the Different Methods of Peeling Fruits in Order to Compare the Impact on Their Quality Carlos Miguel Perez Calderon , Universidad Continental, Perú
E206 13:50-14:00	Design of a cold bending machine to recover leaf springs from vehicles with a capacity of 20tons Angel Williams Quincho-Cusi , Universidad Continental, Perú
E217 14:00-14:10	Mechanical desing of an exoskeleton for wrist rehabilitation Ruth Alejandra Bastidas Alva , Universidad Continental, Perú
E218 14:10-14:20	Compost generator that increases nutrients and accelerates degradation of organic wastes Percy Aquilino Benites Bravo , Universidad Continental, Perú
E308 14:20-14:30	A recommended crash risk prediction model for freeway segment considering heterogeneous effects Chengqian Li , Beijing University of Technology, China
E355 14:30-14:40	A framework for unmanned equipment performance upgrade in civil airport at early stage Kai Yan , The Second Research Institute of CAAC, China
E340 14:40-14:50	Research on the Implementation and Testing of Blockchain-based Information Sharing System for Emergency Material Distribution Jinjin Fei , Xi'an University of Posts and Telecommunications, China
E208 14:50-15:00	Research on the Layout of Electric Vehicle Charging Stations on Jiangsu Intercity Expressway (G15) Hengfei Wu , Jiangsu Province Nantong Industrial and Trade Technician College, China. Mapua University, Philippines.



Online Session 2 (UTC+8)

Urban Transportation Modes, Transportation Capacity Assessment, and Traffic Safety Management

13:30-15:10/Saturday December 30, 2023
Room B: 839 5170 1097

Chairman: Assoc. Prof. Yanyi Chen, Wuhan University of Technology, China

Invited Talk 13:30-13:50	Research on state dependent differentiation field model based on pedestrian micro motion characteristics Prof. Hongguo Shi , Southwest Jiaotong University, China
E323 13:50-14:00	Evaluation of road performance and deicing effect of high-elastic/salt-storage asphalt pavement SUN Ming-zhi , Research Institute of Highway Ministry of Transport, China
E307 14:00-14:10	Dynamic assessment of vulnerability of emergency logistics system under the major disasters Mengzhen Cheng , Xi'an University of Posts and Telecommunications, China
E325 14:10-14:20	Prediction of Peak Carbon Emissions from Transportation in Shandong Province under the "Dual Carbon" Goal Wenke Du , Shandong Jiaotong University, China
E334 14:20-14:30	Research on Emergency Control of Highway Traffic under Traffic Hazard-Foggy Weather Qing Yun Cao , Beijing University of Technology, China
E338 14:30-14:40	Carbon reduction pathways and cost analysis of railway under TIMES model Xinxin Dai , Beijing Jiaotong University, China
E345 14:40-14:50	Risk assessment of water traffic accidents considering coupling effects Kaixuan Zhang , Dalian Maritime University, China
E357 14:50-15:00	Enhancing Travel Resilience: Integrating Alternative Path-Based Robustness Metric in Route Optimization Jean-Claude Lebègue , Sopra Steria, France; University of Toulouse, France
E394 15:00-15:10	Railway Passenger Kilometers Forecasting with Combined Multi-Grey BP Neural Network Model Yingsi Huang , Beijing Jiaotong University, China



Online Session 3 (UTC+8)

Traffic Signal Control, Road Network Construction, and Image Analysis in Transportation Systems

15:30-16:50/Saturday December 30, 2023

Room A: 839 2206 4488

Chairman: TBA

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|-----------------------------|---|
| <p>E309
15:30-15:40</p> | <p>Research on the operation organization mode of multi-level rail transit network based on accessibility
Zekun Song, China Urban Construction Design & Research Institute Co. Ltd, China</p> |
| <p>E304
15:40-15:50</p> | <p>A Nonlinear Optimization-Based Bus OD Matrix Prediction Model under Information Deficiency
Jinjie Yang, Chongqing Institute of Green and Intelligent Technology, Chinese Academy of Sciences, China</p> |
| <p>E319
15:50-16:00</p> | <p>Research on Fuel Consumption Calculation Based on QAR and ACR Data
Fengfeng Liu, Civil Aviation of China, China</p> |
| <p>E342
16:00-16:10</p> | <p>DWGCN: A Route Recommendation Model Based on DeepWalk -Graph Convolutional network
Jian Yang, North China University of Technology, China</p> |
| <p>E344
16:10-16:20</p> | <p>Deep learning and training of vehicle detection based on improved YOLOv5
Zhongyu Chen, Southeast University, China</p> |
| <p>E356
16:20-16:30</p> | <p>Automatic Testing for The Computer Interlocking System and Test Sequence Optimisation
Xuguang Huang, Southwest Jiaotong University, China</p> |
| <p>E377
16:30-16:40</p> | <p>Research on the Assessment Method of Urban Airspace Zoning Based on Obstacle Threat Levels
Chunyun He, Nanjing University of Aeronautics and Astronautics, China</p> |
| <p>E388
16:40-16:50</p> | <p>Sensor Placement for Freeway Traffic State Estimation based on System Observability
Shaoyin Meng, ITS Branch, ZheJiang Communications Investment Group Co., Ltd., China</p> |



