

Yongqi Dong



<https://yongqidong.github.io/>

Research Group Leader and Senior PostDoc Researcher (TV-L E-14.2) @ RWTH Aachen

Guest Researcher @ Delft University of Technology

Chair of IEEE ITSS Technical Committee on [Automated Mobility in Mixed Traffic](#)

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EDUCATIONAL BACKGROUND

Doctor of Philosophy, Department of Transport & Planning, **Delft University of Technology (TU Delft)** Dec.2019-May.2025

Thesis: [Safe, Efficient, and Socially Compliant Automated Driving: Sensing, Anomaly Detection, Planning and Control](#)

Advisors: Prof.dr.ir. [Bart van Arem](#) and Dr.ir. [Haneen Farah](#)

Visiting PhD Researcher, Department of Mechanical Engineering, **University of California, Berkeley** May.2023-Oct.2023

Topic: Towards Socially Compliant Automated Driving Modelling and Conceptual Design

Advisor: Prof. [Masayoshi Tomizuka](#) (Life Fellow of [IEEE](#) and [ASME](#); Fellow of the [IFAC](#))

Master of Control Science and Engineering, Department of Automation, **Tsinghua University** Sep.2014-Jul.2017

Minor: Master Project for Improving Ability in Big Data

Thesis: *Data-Driven Analysis on Group Behaviors of Taxi Drivers and Ridesourcing Drivers*

Nominated for Tsinghua University Outstanding Master's Thesis Dissertation

Advisors: Prof. [Li Li](#) (*IEEE Fellow*) and Prof. [Zuo Zhang](#)

Bachelor of Telecommunication Engineering Sep.2010-Jul.2014

School of Electronic and Information Engineering, **Beijing Jiaotong University**

GPA: 91.5/100 | Rank: 1/202 | Postgraduate Recommendation to Tsinghua University without Examination

Thesis: *Design of vehicle-mounted data acquisition & communication unit for the WMN-based locomotive remote control*
Outstanding Undergraduate Thesis

PUBLICATIONS

([Google Scholar](#) ID: [L2kD-DwAAAAJ](#). The superscript [#] indicates equal contribution, * indicates corresponding authors.)

Key Journal Publications:

- 1. **Dong, Y.**, Patil, S., Van Arem, B., & Farah, H. (2023). A Hybrid Spatial-temporal Deep Learning Architecture for Lane Detection. *Computer-Aided Civil and Infrastructure Engineering*, 38(1), 67-86. <https://doi.org/10.1111/mice.12829> [Top Q1, IF: 8.5, SJR: 2.972, CiteScore: 17.6]
- 2. **Dong, Y.**, Wang, S., Li, L., Zhang, Z. (2018). An Empirical Study on Travel Patterns of Internet Based Ride-Sharing. *Transportation Research Part C: Emerging Technologies*, 86, 1-22. <https://doi.org/10.1016/j.trc.2017.10.022> [Highly cited; Top Q1, IF: 7.6, SJR: 2.86, CiteScore: 15.8]
- 3. **Dong, Y.**, Farah, H., & Van Arem, B. (2025). Towards Developing Socially-Compliant Automated Vehicles: Advances, Expert Insights, and a Conceptual Framework. (Accepted by *Communications in Transportation Research* [Top Q1, IF: 12.5, SJR: 2.836, CiteScore: 15.2] and by 104th TRB Annual Meeting (TRB 2025) for presentation, and presented at the 4th Symposium on Management of Future Motorway and Urban Traffic Systems (MFTS)), [Preprint](#)
- 4. Li, R.[#], & **Dong, Y.^{*,#}** (2023). Robust Lane Detection Through Self Pre-Training With Masked Sequential Autoencoders and Fine-Tuning With Customized PolyLoss. *IEEE Transactions on Intelligent Transportation Systems*, vol. 24, no. 12, pp. 14121-14132. <https://doi.org/10.1109/TITS.2023.3305015> (Joint first author and corresponding author) [Top Q1, IF: 7.9, SJR: 2.58, CiteScore: 14.8]
- 5. **Dong, Y.^{*,#}**, Zhang, L.[#], Farah, H., Zgonnikov, A., & Van Arem, B. (2025). Data-driven Semi-supervised Machine Learning with Safety Indicators for Abnormal Driving Behavior Detection. *Transportation Research Record: Journal of the Transportation Research Board*, 1-16. <https://doi.org/10.1177/03611981241306752>
- 6. **Dong, Y.^{*,#}**, Lu, X.[#], Li, R., Song, W., Van Arem, B., & Farah, H. (2025). Intelligent Anomaly Detection for Lane

Rendering Using Transformer with Self-Supervised Pre-Training and Customized Fine-Tuning. *Transportation Research Record: Journal of the Transportation Research Board*, 1-16. <https://doi.org/10.1177/03611981251333341> (accepted by and presented at [TRB2024](#))

- 7. Farah, H., Postigo, I., Reddy, N., **Dong, Y.**, Rydergren, C., Raju, N., & Olstam, J. (2022). Modeling Automated Driving in Microscopic Traffic Simulations for Traffic Performance Evaluations: Aspects to Consider and State of the Practice. *IEEE Transactions on Intelligent Transportation Systems*, 24(6), 6558-6574. <https://doi.org/10.1109/TITS.2022.3200176> [Top Q1, IF:7.9, SJR:2.58, CiteScore: 14.8]
- 8. Berge, S. H., De Winter, J., Dodou, D., Afghari, A. P., Papadimitriou, E., Reddy, N., **Dong, Y.**, Raju, N., & Farah, H. (2025). Understanding Cyclists' Perception of Driverless Vehicles through Eye-Tracking and Interviews. *Transportation Research Part F: Traffic Psychology and Behaviour*, 109, 399-420. <https://doi.org/10.1016/j.trf.2024.11.015> [Top Q1, IF:3.5, SJR:1.262, CiteScore: 7.6]
- 9. Liu, W., Song, L., **Dong, Y.**, Zhang, X., & Xu, L. (2025). Unified Model Predictive Control Method of Automated Vehicles for Lane Changing and Lane Keeping Maneuvers. *Journal of Intelligent Transportation Systems*, 1-21. <https://doi.org/10.1080/15472450.2025.2479235>

Key Conference Proceeding Publications & Presentations:

- 1. Huang, Y.[#], **Dong, Y.^{*,#}**, Tang, Y.^{*}, & García-Hernandez, A. (2025). A Self-Supervised Transformer for Unusable Shared Bike Detection. **Accepted** by the 2025 IEEE International Conference on Intelligent Transportation Systems (ITSC 2025), [Preprint](#)
- 2. **Dong, Y.**, Liu, C., Wang, Y., & Fu, Zh. (2024). Towards Understanding Worldwide Cross-cultural Differences in Implicit Driving Cues: Review, Comparative Analysis, and Research Roadmap. *2024 IEEE 27th International Conference on Intelligent Transportation Systems (ITSC)*, Edmonton, AB, Canada, 2024, pp. 1569-1575. <http://dx.doi.org/10.1109/ITSC58415.2024.10919561>
- 3. Zhang, L.[#], **Dong, Y.^{*,#}**, Farah, H., & Van Arem, B. (2023). Social-aware Planning and Control for Automated Vehicles based on Driving Risk Field and Model Predictive Contouring Control: Driving through Roundabouts as a Case Study. 2023 IEEE International Conference on Systems, Man, and Cybernetics (SMC), Honolulu, Oahu, HI, USA, 2023, pp. 3297-3304. <http://dx.doi.org/10.1109/SMC53992.2023.10394462>. (Co-first author and corresponding author, accepted and presented at *TRB's 2023 Automated Road Transportation Symposium*), [Demo video](#)
- 4. **Dong, Y.**, Detema, T., Wassenaar, V., Van de Weg, J., Kopar, T., & Suleman, H. (2023). Comprehensive Comparison of Deep Reinforcement Learning for Automated Driving on Various Driving Maneuvers with Simulation. *2023 IEEE 26th International Conference on Intelligent Transportation Systems (ITSC)*, Bilbao, Spain, 2023, pp. 6165-6170, <http://dx.doi.org/10.1109/ITSC57777.2023.10422159>
- 5. **Dong, Y.^{*,#}**, Patil, S.[#], Farah, H., & Hellendoorn, J. (2023). Sequential Neural Network Model with Spatial-Temporal Attention Mechanism for Robust Lane Detection Using Multi Continuous Image Frames (**Presented at the Transportation Research Board (TRB) 102nd annual meeting TRB 2023**). [TRBAM-23-04409 poster](#)
- 6. Yuan, H., Li, P., Van Arem, B., Kang, L., Farah, H., & **Dong, Y.^{*}** (2023). Safe, Efficient, Comfort, and Energy-saving Automated Driving through Roundabout Based on Deep Reinforcement Learning. *2023 IEEE 26th International Conference on Intelligent Transportation Systems (ITSC)*, Bilbao, Spain, 2023, pp. 6074-6079, <http://dx.doi.org/10.1109/ITSC57777.2023.10422488> (Corresponding author and PI)
- 7. Xue, C.[#], **Dong, Y.[#]**, Liu, J.^{*}, Liao, Y., & Li, L. (2023). Design of the Reverse Logistics System for Medical Waste Recycling Part I: System Architecture and Disposal Site Selection Algorithm. *2023 IEEE 26th International Conference on Intelligent Transportation Systems (ITSC)*, Bilbao, Spain, 2023, pp. 1741-1746, <http://dx.doi.org/10.1109/ITSC57777.2023.10422624> (Co-first author)
- 8. Xue, C.[#], **Dong, Y.[#]**, Liu, J.^{*}, Liao, Y., & Li, L. (2023). Design of the Reverse Logistics System for Medical Waste Recycling Part II: Route Optimization with Case Study under COVID-19 Pandemic. *2023 IEEE 26th International Conference on Intelligent Transportation Systems (ITSC)*, Bilbao, Spain, 2023, pp. 4011-4017. <http://dx.doi.org/10.1109/ITSC57777.2023.10422236> (Co-first author)
- 9. **Dong, Y.^{*}**, Chen, K., Peng, Y., & Ma, Z. (2022). Comparative Study on Supervised versus Semi-supervised Machine

Other Journal and Conference Publications:

- 1. Lingam, S. N., De Winter, J., **Dong, Y.**, Tsapi, A., Van Arem, B., & Farah, H. (2024). eHMI on the Vehicle or on the Infrastructure? A Driving Simulator Study. *European Journal of Transport and Infrastructure Research*, 24(2), 1–24. <https://doi.org/10.59490/ejtr.2024.24.2.7273> [Journal]
- 2. Huang, Y.[#], **Dong, Y.^{#,*}**, Tang, Y., & Li, L. (2024). Leverage Multi-source Traffic Demand Data Fusion with Transformer Model for Urban Parking Prediction. **Accepted** by [the 28th International Conference of Hong Kong Society For Transportation Studies \(HKSTS 2024\)](#) and the [Conference in Emerging Technologies in Transportation Systems \(TRC-30\)](#) for presentation, [Preprint](#) [Conference]
- 3. **Dong, Y.^{#,*}**, Chen, K.[#], & Ma, Z. (2023). Comparative Study on Semi-Supervised Learning Applied for Anomaly Detection in Hydraulic Condition Monitoring System. *2023 IEEE International Conference on Systems, Man, and Cybernetics (SMC)*, Honolulu, Oahu, HI, USA, 2023, pp. 1702-1708, <http://dx.doi.org/10.1109/SMC53992.2023.10394193> [Conference]
- 4. Raju, N., Schakel, W., Reddy, N., **Dong, Y.**, & Farah, H. (2022). Car-Following Properties of a Commercial Adaptive Cruise Control System: A Pilot Field Test. *Transportation Research Record: Journal of the Transportation Research Board*, 2676(7), 128-143. <https://doi.org/10.1177/03611981221077085> [Journal]
- 5. **Dong, Y.**, Yang, Z., Yue, Y., Pei, X., & Zhang, Z. (2018). Revealing Travel Patterns of Sharing-bikes in a Spatial-temporal Manner Using Non-negative Matrix Factorization Method. In *CICTP 2018: Intelligence, Connectivity, and Mobility* (pp. 1665-1674). Reston, VA: American Society of Civil Engineers. <https://doi.org/10.1061/9780784481523.165> [Conference]
- 6. Yue, Y., Pei, X., Yang, Z., **Dong, Y.**, & Yao, D. (2018). A Trip Building and Chaining Methodology Using Traffic Surveillance Data. In *CICTP 2018: Intelligence, Connectivity, and Mobility* (pp. 2254-2262). Reston, VA: American Society of Civil Engineers. <https://doi.org/10.1061/9780784481523.224> [Conference]
- 7. **Dong, Y.**, Zhang, Z., Fu, R., Xie, N. (2016). Revealing New York Taxi Drivers' Operation Patterns Focusing on the Revenue Aspect. (2016) In *12th World Congress on Intelligent Control and Automation (WCICA)*, (pp. 1052-1057). IEEE. <https://doi.org/10.1109/WCICA.2016.7578771> [Conference]
- 8. **Dong, Y.**, Ruan, H., Cai, T., Peng, J, and Wang ,W. (2013). Using LED to Demonstrate the Composition of Simple Harmonic Motions and Five Polarization States of Light. *Physics Experimentation*, 11, 45-48 [Journal in Chinese]

Under Review and Working Papers:

- 1. Patil, S.[#], **Dong, Y.^{#,*}**, Farah, H., & Hellendoorn, J. (2025). Efficient Sequential Neural Network based on Spatial-Temporal Attention and Linear LSTM for Robust Lane Detection Using Multi-frame Images. (Joint first author and corresponding author, **Under Review** by *IEEE Transactions on Intelligent Vehicles*), [Preprint](#)
- 2. **Dong, Y.**, Saadeh, B., Kemper, D., & García-Hernandez, A. (2025). Developing Socially Compliant Automated Vehicles in Mixed Traffic: Findings from A Questionnaire Survey. *To be submitted to Transportation Research Part F: Traffic Psychology and Behaviour*.
- 3. **Dong, Y.^{#,*}**, Reyna, C.F.[#], Klunder, G., Liao, F., & Rasouli, S. (2025). Benchmarking Emerging and Established Traffic Microsimulation Platforms for Dynamic Speed Limit Applications: A Comparative Study on Dutch Motorways. (Joint first author, corresponding author, abstract **accepted** by the *29th International Conference of Hong Kong Society for Transportation Studies*, to be submitted to *Transportation Research Part C: Emerging Technologies*)
- 4. Ji, J.[#], Lu, R.[#], Belkessa, L., **Dong, Y.**, Wang, L., Madadi, B., Varotto, S., Saunier, N., MacFarlane, G., & Wu, C. (2025). Exploring Artifacts Availability in Transportation Research Using Large Language Models. **Accepted** by the *2025 Transportation Research Symposium (TRS)* (**presented**), the *2025 International Symposium on Transportation Data & Modelling (ISTDM)*, and the *2025 Modelling Mobility Conference (MoMo)* for presentation; to be submitted to *Transportation Research Part C: Emerging Technologies*.
- 5. Zhang, Y., **Dong, Y.^{*}** (2025). Optimization of coordinated flow restriction and skip-stopping schemes for urban rail

stations considering platform carrying capacity (**Presented** at the Transportation Research Board (TRB) 102nd annual meeting, TRB 2023, **Under Review** by Journal of Advanced Transportation). [TRBAM-23-04413 poster](#), [Preprint](#)

- 6. Zhang, Y., **Dong, Y.***, Evans, C., Rinaldi, M., Shyrokau, B., & Farah, H. (2025). Cooperative Planning and Control for Connected and Automated Vehicles' On-ramp Merging in Mixed Traffic via Value Decomposition-based Multiagent Deep Reinforcement Learning. (Abstract **accepted** by the 29th International Conference of Hong Kong Society for Transportation Studies, to be submitted to Transportation Research Part C: Emerging Technologies)
- 7. [The Age of Smart Integrated Transportation: Practice in the Digital Transformation of Transportation Industry](#) [M]. Publishing House of Electronics Industry. [Involved as **reviewer** and **expert editor** for Preface, Chapters 1 & 13]

Open resource repository:

- [Datasets, Simulation Platforms, and Relevant Publications on Emerging Mixed Traffic of AVs and HDVs](#)
- List of open datasets and codes: <https://data.4tu.nl/search?search=Yongqi+Dong>

PATENTS & SOFTWARE COPYRIGHTS

✧ European and Dutch Patent:

- **Dong, Y.**, & Li, R. (2024). Automated Lane Detection (Dutch Patent No. [NL2033551](#)). Netherlands: Netherlands Patent Office.
- **Dong, Y.**, Zhang, L., Farah, H., & Van Arem, B. (2025). Socially-compliant Automated Driving in Mixed Traffic (Dutch Patent No. NL2035943, submitted & filed, OCT-23-056).

✧ Chinese Invention Patent:

- Ruan, H., **Dong, Y.**, Wang, W., & Wang, F. (2016). Intelligent Demonstration Instrument of Simple Harmonic Oscillation Composition and Five Polarization States of Light (Chinese Patent No. [CN103236211B](#)). China: China National Intellectual Property Administration.

✧ Software copyright:

- Spatial-Temporal Attention Integrated Sequential Neural Network Model for Vision-based Robust Lane Detection ([i-DEPOT 142731](#), **approved & registered**)
- Vision-Based Lane Detection System with Self-supervised Pre-training Through Masked Sequential Auto-encoders (Computer Software Copyright Registration in China, 2024SR1350911, **approved & registered**)

ACADEMIC SERVICES

Ambassador IEEE Western European Students and Young Professionals (WESYP) 2025	Jul.2025-Present
Guest Editor (Special Issue) IEEE Transactions on Intelligent Transportation Systems Special Issue: <i>Automated Driving in Mixed Traffic: From Sensing to Planning and Control</i> (In preparation)	Jul.2025-Present
Technical Committee (Chair) Automated Mobility in Mixed Traffic IEEE ITSS Establishing and chairing the interdisciplinary community: " Automated Mobility in Mixed Traffic "	Mar.2025-Present
IEEE ITSS New Initiatives Project Principal Investigator (PI) IEEE ITSS Project: <i>Promoting interdisciplinary research toward the deployment of automated vehicles in mixed traffic</i>	Mar.2024-Mar.2025
Workshop Organizer (Primary coordinator) 27 th IEEE ITSC 2024, Edmonton, Canada Workshop title: Automated Mobility in Emerging Mixed Traffic	Sep.24, 2024
Workshop Organizer (Second coordinator) 26 th IEEE ITSC 2023, Bilbao, Bizkaia, Spain Workshop title: Data-driven and Empirical Research for Emerging Mixed Traffic of Automated Vehicles and Human-driven Vehicles	Sep.24, 2023
Workshop Organizer (Primary coordinator) IEEE IV 2023, Anchorage, USA Workshop title: Development of Socially-compliant Driving Behavior for Automated Vehicles to Enhance Safety and Efficiency in Mixed Traffic	Jun.04, 2023
IEEE TCoS Seeding Project Leader (PI) 2023 IEEE TAB Committee on Standards (TCoS) seed funding Project title: <i>Enhancing the deployment of socially-compliant automated vehicles in mixed traffic</i> (website)	

Ad-hoc Journal Reviewer Services

- ✦ International Journal of Computer Vision (**IF: 19.5**; Top AI journal)
- ✦ IEEE Intelligent Transportation Systems Magazine
- ✦ IEEE Transactions on Intelligent Transportation Systems
- ✦ IEEE Open Journal of Intelligent Transportation Systems
- ✦ Transportation Letters: The International Journal of Transportation Research
- ✦ Journal of Intelligent Transportation Systems: Technology, Planning, and Operations
- ✦ Journal of Transportation Research Record: Journal of the Transportation Research Board
- ✦ International Journal of Human-Computer Interaction
- ✦ Journal of Advanced Transportation
- ✦ Scientific Reports
- ✦ Applied Ergonomics
- ✦ Discover Artificial Intelligence
- ✦ Signal, Image and Video Processing
- ✦ European Transport Research Review
- ✦ Engineering Applications of Artificial Intelligence
- ✦ International Journal of Computational Intelligence Systems
- ✦ ASCE-ASME Journal of Risk and Uncertainty in Engineering Systems, Part A: Civil Engineering

Ad-hoc Conference Reviewer Services

- ✦ IEEE Intelligent Vehicles Symposium (IV) | Associate editor
- ✦ IEEE Intelligent Transportation Systems Conference (ITSC)
- ✦ Transportation Research Board (TRB) Annual Meeting
- ✦ World Congress on Intelligent Control and Automation (WCICA)
- ✦ COTA International Conference of Transportation Professionals (CICTP)
- ✦ The International Symposium on Transport Network Resilience (INSTR)

THESIS SUPERVISION

Bashar Saadeh MSc. in Traffic Engineering and Mobility, RWTH Aachen University	Nov.2024-Jul.2025
Thesis title: Developing socially compliant automated vehicles in mixed traffic: Insights from questionnaire-based survey	
Yuteng Zhang Master of Science in Transport, Infrastructure & Logistics, TU Delft	Jan.2024-Nov.2024
Thesis title: Coordinated Planning and Control for Connected and Automated Vehicles' On-ramp Merging in Mixed Traffic Through Value Decomposition-based Multiagent Deep Reinforcement Learning	
Cesar Flores Reyna MSc. in Sustainable Mobility Transitions, EIT, TU/Eindhoven	Jan.2024-Nov.2024
Thesis title: Investigating a Benchmarking Framework for the Large-Scale Micro Simulator (LSMS) Platform in Freeways under Dynamic Speed Limits	
Mathijs den Otter MSc. in Civil Engineering–Transport and Planning, TU Delft	Sep.2022-Dec.2023
Thesis title: Impact of Improved Lane Marking Properties on the Performance of Lane Keeping Assistance Systems in Varying Circumstances	
Lanxin Zhang MSc. in Civil Engineering–Transport and Planning, TU Delft	Oct.2022-Jun.2023
Thesis title: Semi-supervised Machine Learning for Abnormal Driving Behavior Detection	
Henan Yuan Bachelor in Traffic and Transportation, BJTU & TUDelft TTE	Oct.2022-Jun.2023
Thesis title: Deep Reinforcement Learning for Driving through Roundabouts	
Shiva Nischal Lingam MSc. in Civil Engineering–Transport and Planning, TU Delft	Jan.2021-Nov.2021
Thesis title: Effects of External Human Machine Interfaces on Automated Vehicles' Communicative Interactions With Human Drivers (Cum Laude) Won 2 nd Cuperusprijs prize of KIVI	
Sandeep Patil MSc. in Mechanical Engineering (Vehicular Engineering), TU Delft	Oct.2020-Aug.2021

Thesis title: [Lane Detection using SpatioTemporal Attention](#)

Eline van der Kooij | MSc. in Transport, Infrastructure & Logistics, TU Delft

Jul.2020-May.2021

Thesis title: [Visibility of Lane Markings for Machine Vision](#)

Sanny Toonen | Bachelor of Science in Civil Engineering-Transport and Planning, TU Delft Jul.2020-May.2021

Thesis title: [Lane Recognition for Automated Vehicles](#)

TEACHING ACTIVITIES

Project supervisor, Instructor | EEMCS, TU Delft

Nov.2022-Feb.2024

Courses: [Interdisciplinary Advanced AI Project \(IFEEMCS520200\)](#); [Capstone Applied AI Project \(T13150TU\)](#)
[Fundamentals of Artificial Intelligence Programme \(IFEEMCS520100\)](#)

Teaching Assistant, Instructor | TU Delft and BJTU joint bachelor program

Mar.2022 & Mar.2023

Course: Advanced Lecture "Trends in Transportation" 2022 & 2023

Lecturer | DakeOffer online Platform

Mar.2020-Jun.2020 & Nov.2020-Jan.2021

Course: Introduction to Big Data and Artificial Intelligence: Fundamentals and Practice

Teaching Assistant | Transport and Planning, TU Delft

Apr.2020-Aug.2020 & Apr.2021-Aug.2021

Course: [CIE5805 – Intelligent Vehicles for Safe and Efficient Traffic](#)

Teaching Assistant | Department of Automation, Tsinghua University

Sep.2016-Jan.2017

Course: Data Ethics

Teaching and Lab Assistant | Electrical and Electronic Lab Center, Tsinghua University

Mar.2015-Jul.2016

Courses: Advanced Labs in Electronic Technology, Fundamentals of Electronics Power Technology

RSI Tutor | Center for Excellence in Education, USA

Jul.2017-Aug.2017

Research writing and presentation tutor for the 2017 Research Science Institute Program at Tsinghua University

Undergraduate Counselor (Class 2012) | School of EIE, Beijing Jiaotong University

Jul.2012-Jul.2014

TALKS & PRESENTATIONS

Promoting Diversity and Leadership in ITS | IEEE WiE/YP Workshop & Forum, Cairo, Egypt Nov.21.2023

Presentation topic: Resource Repository: Datasets, Simulation Platforms, and Relevant Publications for Emerging Mixed Traffic of Automated Vehicles and Human-driven Vehicles

Automated Round Transportation | TRB ARTS 2023, San Francisco, USA

Jul.12.2023

Presentation topic: Social-aware Planning and Control for Automated Vehicles Based on Driving Risk Field and Model Predictive Contouring Control: Driving through Roundabouts as a Case Study

AI Applications in Transportation Planning | TRB 2023, Washington D.C., USA

Jan.11.2023

Presentation topics: (1) Robust Lane Detection through Self Pre-training with Masked Sequential Autoencoders and Fine-tuning with Customized PolyLoss
(2) Sequential Neural Network Model with Spatial-Temporal Attention Mechanism for Robust Lane Detection Using Multi Continuous Image Frames

Research into Urban Rail Transit Operations and Design | TRB 2023, Washington D.C., USA Jan.11.2023

Presentation topic: Optimization of Coordinated Flow Restriction and Skip-Stopping Schemes for Urban Rail Stations Considering Platform Carrying Capacity

Connected and Automated Vehicles | MFTS 2022, Dresden, Germany

Dec.01.2022

Presentation topic: Towards Developing Socially-Compliant Automated Vehicles: State of the Practice, Experts Expectations, and a Conceptual Framework

Automated mobility | IEEE ITSS Young Professionals Fellowship Symposium, Chania, Greece Nov.25.2022

Presentation topic: Multi-goal Proactive Traffic Management for Mixed Traffic of Automated Vehicles (AVs) and Human-Driven Vehicles (HDVs) Using Explainable Physics-Informed Artificial Intelligence

AI, Security, Privacy and Safety Systems in ITS Applications | ITSC2022, Macow, China

Oct.08.2022

Presentation topic: Comparative Study on Supervised vs Semi-supervised ML for Anomaly Detection of CAN Network

Research on AI and Advancing Computing Applications | TRB 2022, Washington D.C., USA Jan.12.2022
Presentation topic: A Hybrid Spatial-temporal Sequence-to-one Neural Network Model for Lane Detection

Challenges of Automated Vehicles and Traffic | University of Győr, Hungary May.28.2021
Talk topic: Deep Learning for Automated Vehicles' Operational Design Domain: Problems, Challenges, and Case Studies

SAMEN User Committee Annual Meeting | Dutch Research Council (NWO), Delft, Netherlands Jan.28.2021
Talk topic: Data-driven Research for Automated Vehicles' Operational Design Domain: A Case Study on Perception

Intelligence, Connectivity, and Mobility | COTA CICTP 2018, Tsinghua University, China Jul.07.2018
Presentation topic: Revealing Travel Patterns of Sharing Bikes in A Spatial-Temporal Manner Using the NFM Method

World Congress on Intelligent Control and Automation | IEEE WCICA 2016, Guilin, China Jun.12.2016
Presentation topic: Revealing New York Taxi Drivers' Operation Patterns Focusing on the Revenue Aspect

HONORS & AWARDS

- ❖ [Chinese CSC Award for Outstanding Self-financed Students Abroad \(6,000 \\$\)](#)
- ❖ TU Delft-Transport Institute Interdisciplinary Research Award (10,500 €)
- ❖ 2023 IEEE TAB Committee on Standards (TCoS) seed funding (6,000 \$)
- ❖ 2024 IEEE ITSS New Initiatives Proposal Funding (5,000 \$)
- ❖ IEEE ITSS Young Professionals Fellowship (Twice)
- ❖ Erasmus + mobility Grants (Three times)
- ❖ Outstanding College Graduates of Beijing (Top 1‰)
- ❖ National Scholarship (Top 1%)
- ❖ First Class Tsinghua University RONG Scholarship
- ❖ Second-Class Merit Scholarship for Masters Tsinghua University
- ❖ Merit Student (Four times)
- ❖ First-Class Academic Fellowship (Top 1%, Twice)
- ❖ Second Prize in the 2012 & 2013 Undergraduate Electronic Design Contest in Beijing
- ❖ Bronze award in "Challenge Cup" Entrepreneurship Design Contest in Beijing
- ❖ First Prize in Freescale Cup University Students Intelligent Car Race (Rank 2nd)
- ❖ Second Prize in the Physical Experiment Competition in Beijing
- ❖ 2019 Microsoft Discover AI Challenge: *Sustainable Life* | [Data-Driven All-in-one Shared Mobility](#) | Top (10%)

RESEARCH EXPERIENCE

AI & Automated Mobility Group | Institute of Highway Engineering | RWTH Aachen University Jun.2024-Present

- **AI-Enhanced Hierarchical Multi-objects Driving Risk Field Model Integrating Physics-Based and Human Perception-Based Approaches with Drivers' Distraction** (PI, [Individual DFG](#))
- **Explainable Mathematics-Enhanced AI Model for Multi-Modal Urban Traffic Prediction and Simulation** (Co-PI and coordinator, [DFG Research Unit Proposal](#))
- **Realistic Modelling of Cycling Behavior and Interaction with Other Road Users in Mixed Traffic** (PI and coordinator, [DFG Package Proposal](#))
- **Parameter-Efficient Fine-Tuning of Pretrained Multimodal Large Vision Model (LVM) for Privacy-Preserving Traffic Anomaly Detection with Thermal Imaging**
- **Digital Twin for Cycling Interaction in Mixed Traffic: A Multi-Sensor Data Fusion and VR Simulation Approach with CycleScene Benchmark** (PI, [mFUND Proposal](#))

Traffic and Transportation Safety Lab | Department of Transport and Planning | TU Delft Dec.2019-Jun.2024

- **Data-driven and AI-based research for expanding Automated Vehicles' Operational Design Domain in mixed traffic** (part of [SAMEN](#) project)

- Developed a hybrid sequence-to-one model for lane detection in extremely difficult driving scenes
- Incorporated spatial-temporal attention for automated vehicles' perception
- Designed reliable data-driven algorithms for anomaly and abnormal behavior prediction
- Implemented Deep Reinforcement Learning (DRL) models for safe, reliable, and socially compliant automated driving under challenging maneuvers involving both longitudinal and lateral control
- Gaze behavior of road users when interacting with an automated vehicle at an intersection: *Understanding cyclists' perception of driverless vehicles through eye-tracking and interviews*

Mechanical Systems Control (MSC) Lab | Department of Mechanical Engineering | UC Berkeley May.2023-Oct.2023

Advisor: Prof. [Masayoshi Tomizuka](#) (Life Fellow of [IEEE](#) and [ASME](#); Fellow of the [IFAC](#))

➤ **Socially Compliant Automated Driving through DRL and Model-based Social-aware MPC**

- Reviewed state-of-the-art socially compliant automated driving methods in the literature
- Developed model-enhanced multi-agent deep reinforcement learning

Waterloo Artificial Intelligence Institute | Faculty of Engineering | University of Waterloo May.2018-Sep.2019

➤ **Applied Machine Learning, Artificial Intelligence, and Big Data Research**

- 2018 Railroad Problem Solving Contest: Exploring deep learning to forecast train delays
- A Deep Learning Framework for Traffic Forecasting: Exploring GCN joint with LSTM to predict traffic flow
- Data-driven Anomaly Detection (Unsupervised): Auto-Encoder, Hierarchical Extreme Learning Machines
- Kaggle Competition: Employ LSTM, LightGBM, and XGBoost to predict stock movements with news data
- Deep Reinforcement Learning for Car Racing Control in Simulation: DQN, A3C, and PPO

Singapore-MIT Alliance for Research and Technology (SMART)

Aug.2016-Sep.2016

Future Urban Mobility (FM) IRG | Project: *SimMobility* | Topic: Taxi Roaming

Advisors: Prof. [Moshe BEN-AKIVA](#) (Member of [National Academy of Engineering](#)), Dr. [Bat-hen NAHMIAS-BIRAN](#)

➤ **Constructing a model tackling the taxi roaming (taxi service) problem, embedded into *SimMobility* platform**

- Proposed one advisable solution of cruising along hotspots through a cell-based logit-opportunity model improved by a data-driven method
- Participated in building the architecture of the final model embedded in *SimMobility*

Intelligent Transportation Laboratory, Tsinghua National Laboratory for Information Science and Technology

(TNList) | Advisors: Prof. [Zuo Zhang](#) and Prof. [Li Li](#) (*IEEE Fellow*)

Sep.2014-May.2018

Transportation Research based on machine learning and data-driven methods

➤ **Revealing New York taxi drivers' operation patterns focusing on revenue**

- Developed a method for classifying drivers into 3 groups based on their revenue: top, ordinary, low earner
- Excavated the population operation patterns of different taxi driver groups through big data analytics

➤ **Influence of on-demand ride-sourcing vs. traditional taxi based on machine learning and big data analytics**

- Uncovered the differences between taxi service and ride-sourcing using big data analysis and clustering
- Applied non-negative matrix factorization (NMF) to obtain basis patterns of Taxi, Hitch, and Express service

➤ **Influence of on-demand ride-sourcing on vehicle emissions with big data analytics and PHEM model**

➤ **Fundamental research on intelligent parking guidance and recommendations based on machine learning**

- Forecast models of travel time to parking lots (*Random Forest*); Guidance & optimization models for parking
- Personalized recommendation research on parking (Collaborative Filtering and Content-based algorithm)

➤ **Study on key technology in Intelligent Vehicle Infrastructure Cooperative Systems (IVICS) (863 Program)**

- Contributed to the design report of the basic technical framework and the overall demonstration of IVICS

The Freescale Cup College Students Intelligent Car Race: Intelligent car that can follow

Jun.2012-Jun.2013

specific trajectories based on image processing, pattern recognition, and PID controller

- **Hardware Aspect:** Designed the signal acquisition circuit and the core control circuit based on MC9S12XS256
- **Software Aspect:** Developed specific control strategies/algorithms for intelligent cars to follow given trajectories
- **Actuator:** Customized specific steering linkage, applied and tuned PID algorithms to control diversion and speed

WORKING EXPERIENCE

Research Group Leader | AI & Automated Mobility Group | **RWTH Aachen University** Jun.2024-Present

- **Research** proposal initialization, preparation, and writing: German Research Foundation ([DFG](#)) and [mFUND](#)
- **(Co-) PI and coordinator:** main responder and drafter for **three** DFG research proposals
- **Lead** the group and supervise the PhD/MSc students
- **Teaching** support for *Road Planning II* and *Machine Learning in Civil Engineering* (master's level)

PhD Researcher | [TTS Lab](#) | Department of Transport & Planning | **TU Delft** Dec.2019-Jun.2024

- Carried out PhD research work under the Dutch Research Council (NWO) funded [SAMEN](#) project
- Provided teaching assistance and evaluation support for various courses and supervised seven MSc students
- Published scientific papers and patents, presented research works at conferences, and organized workshops

Visiting PhD Researcher | [MSC Lab](#) | Department of Mechanical Engineering | **UC Berkeley** May.2023-Oct.2023

- Carried out the literature review and research work related to Socially Compliant Automated Driving

Research Assistant | Waterloo Artificial Intelligence Institute | **University of Waterloo** May.2018-Sep.2019

- Carried out research work related to applied Machine Learning, Artificial Intelligence, and Big Data in Transportation

Research Assistant | Transport Data Analyst | **ITS Lab, TNList @ Tsinghua University** Aug.2017-May.2018

- Cross-domain data fusion for full-time trip chain reconstruction and anomaly detection
- City computing: Applying NMF methods to evaluate indicators describing urban function, land use, mobility, etc.
- Revealing collective travel patterns of *Shared Mobility* in a spatial-temporal manner

Data Analyst & Project Manager | Beijing Gooagoo Technical Service Co., Ltd. Jul.2016-Aug.2016

- Integral process of Big Data Analytics: Crawled carryout service data using Python crawler; executed data storage, data analysis, and data processing in a relational database (MySQL); visualization, clustering, and web application

Commentator | China International Congress on Intelligent & Connected Vehicles (CICV) Oct.2015-Oct.2015

- Introduced the i-VICS systems to audiences; received executives from automobile manufacturers BMW, Volvo, VW

LEADERSHIP & VOLUNTEER EXPERIENCE

Webmaster | **Traffic and Transportation Safety (TTS) Lab Website, TU Delft** Mar.2020-Jun.2024

- Responsible for and volunteering for the [TTS Lab website](#) development and maintenance

Project Leader | **Asian Youth Center:** Leadership Development Training Program for Masters Jul.2015-Aug.2016

- Responsible for activities and competitions between overseas and Chinese students in the Asian Youth Center
- **Volunteer Leader** in the 5th Joint School Symposium for the Asian Youth Center Project

iTalk Group Leader | International Department, Tsinghua University Postgraduate Association Oct.2014-Oct.2015

- Committed to speech in English given by students or alumni stars, held a special performance for overseas students

Volunteer | National Doctor Forum on Traffic and Transportation Engineering, Beijing Jiaotong University Jun.2011

SKILLS & MISCELLANEOUS

- Programming: Python (TensorFlow, PyTorch, Keras), Matlab, R, C/C++, Java, VHDL | Database: MySQL
- AI Certificates: [Deep Learning](#), [Deep Reinforcement Learning](#), [TRAIL Research School Diploma](#)
- Hardware circuit design: Altium Designer | Software development on Linux and Windows
- Big data analytics and visualization methods | Cross-domain Data Fusion | Data-driven anomaly/fraud detection
- Languages: Chinese (Native); English (Professional); Dutch (Elementary)
- Hobbies: **Tai Chi, Kung Fu, Meditation**, Yoga, Chess, Reading, Mountain Hiking