Yongqi Dong

https://yongqidong.github.io/

Researcher and Research Group Leader @ RWTH Aachen University

Ph.D. Researcher @ Delft University of Technology

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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: *Socially Compliant Automated Driving via Deep Reinforcement Learning and Model-based Social-aware MPC*

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 Thesis Dissertation

Advisors: Prof. Li Li 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, Experts 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*. https://doi.org/10.1177/03611981251333341 (**accepted** by and presented at TRB2024), Preprint

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. 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

2. **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

3. **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

4. 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)

5. 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)

6. 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)

7. **Dong, Y.**[*], Chen, K., Peng, Y., & Ma, Z. (2022). Comparative Study on Supervised versus Semi-supervised Machine Learning for Anomaly Detection of In-vehicle CAN Network. *2022 IEEE 25th International Conference on Intelligent Transportation Systems (ITSC)*, 2022, pp. 2914-2919, https://doi.org/10.1109/ITSC55140.2022.9922235

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/ejtir.2024.24.2.7273 *[Journal]*

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. Accepted by and presented at *the 2024 IEEE 27th International Conference on Intelligent Transportation Systems (ITSC)*, Preprint *[Conference]*

3. 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]*

4. **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]*

5. 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]*

6. **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]*

7. 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]*

8. **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]*

9. **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. **Dong, Y.**, Van Arem, B., & Farah, H. (2025). Safe and Socially-compliant Automated Driving through Integrating Multi-Agent Reinforcement Learning with SVO and MPCC (In preparation, to be submitted to *the Proceedings of the National Academy of Sciences, PNAS*)

2. 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

3. **Dong, Y.**[#,*], Reyna, C.F.[#], Klunder, G., Liao, F., & Rasouli, S. (2025). A Benchmarking Framework for Traffic Microsimulation Platforms: Case Study on Dutch Motorways with Dynamic Speed Limits. (Joint first author and corresponding author, *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 *International Symposium on Transportation Data & Modelling (ISTDM) 2025*

5. Wu, C., Ji, J., Lu, R., Madadi, B., **Dong, Y.**, Varotto, S., Belkessa, L., Saunier, N., MacFarlane, G., Wang, L., Ghosh, B. (2025). Measuring Availability Features for Reproducibility in Transportation Research, to be submitted to *Transportation Research Part C*: *Emerging Technologies*, **Accepted** by *Transportation Research Symposium* for

presentation

6. 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

7. Zhang, Y., **Dong, Y.**[*]., Evans, C., Rinaldi, M., Shyrokau, B., & Farah, H. (2025). Coordinated Planning and Control for Connected and Automated Vehicles' On-ramp Merging in Mixed Traffic Through Value Decomposition-based Multiagent Deep Reinforcement Learning. (Corresponding author, *to be submitted* to *Transportation Research Part C: Emerging Technologies*)

8. The Age of Smart Integrated Transportation: Practice of 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. Automated lane detection (IDF OCT-22-060, **granted** on May 25, 2024, Patent number 2033551)

- Socially compliant Planning and Control for Automated Vehicles using Model-backend Deep Reinforcement Learning with Driving Risk Field and Model Predictive Contouring Control (OCT-23-056, N2035943, Submitted & **filed**)

❖ *Chinese Invention Patent:*

- Intelligent Demonstration Instrument of Simple Harmonic Oscillation Composition and Five Polarization States of Light, Application ID: 201310123700.5, Date: 2013.08.07, Patent Number **CN103236211B**, **Publication** Date: 2016.07.06

❖ *Software copyright:*

- Spatial-Temporal Attention Integrated Sequential Neural Network Model for Vision-based Robust Lane Detection Using Multi Continuous Image Frames (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

Technical Committee (Chair) | Automated Mobility in Mixed Traffic | IEEE ITSS   Mar.2025-Present

Establishing and chairing the interdisciplinary community: "Automated Mobility in Mixed Traffic"

IEEE ITSS New Initiatives Project Principal Investigator (PI) | IEEE ITSS   Mar.2024-Present

Project: *Promoting interdisciplinary research toward the deployment of automated vehicles in mixed traffic*

Workshop Organizer (Primary coordinator) | 27th IEEE ITSC 2024, Edmonton, Canada   Sep.24, 2024

Workshop title: Automated Mobility in Emerging Mixed Traffic

Workshop Organizer (Second coordinator) | 26th IEEE ITSC 2023, Bilbao, Bizkaia, Spain   Sep. 24, 2023

Workshop title: Data-driven and Empirical Research for Emerging Mixed Traffic of Automated Vehicles and Human-driven Vehicles

Workshop Organizer (Primary coordinator) | IEEE IV 2023, Anchorage, USA   Jun.4, 2023

Workshop title: Development of Socially-compliant Driving Behavior for Automated Vehicles to Enhance Safety and Efficiency in Mixed Traffic

IEEE TCoS Seeding Project Leader (PI) | 2023 IEEE TAB Committee on Standards (TCoS) seed funding

Project title: *Enhancing the deployment of socially-compliant automated vehicles in mixed traffic* (website)

Ad-hoc Journal Reviewer Services

- International Journal of Computer Vision (**IF: 19.5**; Top AI journal)

- 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
- European Transport Research Review
- 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

Yuteng Zhang | Master of Science in Transport, Infrastructure & Logistics   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 | Master of Science in Sustainable Mobility Transitions, EIT, TU/e 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 | Master of Science in Civil Engineering–Transport and Planning   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 | Master of Science in Civil Engineering–Transport and Planning   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 | Master of Science in Civil Engineering–Transport and Planning Jan.2021-Nov.2021

   Thesis title: [Effects of External Human Machine Interfaces on Automated Vehicles' Communicative Interactions With Human Drivers (Cum Laude)](#) | Won 2nd [Cuperusprijs prieze of KIVI](#)

Sandeep Patil | Master of Science in Mechanical Engineering (Vehicular Engineering)   Oct.2020-Aug.2021

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

Eline van der Kooij | Master of Science in Transport, Infrastructure & Logistics   Jul.2020-May.2021

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

Sanny Toonen | Bachelor of Science in Civil Engineering–Transport and Planning   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: Fundamental 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, *DFG Research Unit Proposal*)
- **Realistic Modelling of Cycling Behavior and Interaction with Other Road Users in Mixed Traffic**
  (PI, *DFG Package Proposal*)
- **Parameter-Efficient Fine-Tuning of Pretrained Multimodal Large Vision Model (LVM) for Privacy-preserving Traffic Anomaly Detection with Thermal Imaging**

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 hard driving scenes
  - Incorporated spatial-temporal attention for automated vehicles' perception
  - Designed reliable data-driven algorithms for anomalies and abnormal behaviors 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

- ✦ **Socially Compliant Automated Driving through DRL and Model-based Social-aware MPC**
  - ➢ Reviewed State-of-the-art Socially Compliant Automated Driving Methods in Literature
  - ➢ Developed Model-enhance Multi-agent Deep Reinforcement Learning with Social-aware MPC

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: Use CNN-LSTM-Dense Concatenated model 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, XGBoost models to predict stock movements with news data
  - ➢ Deep reinforcement learning in traffic control: DQN, A3C, and PPO methods
  - ➢ Real-time Road Surface Condition (RSC) Monitoring: Adopt CNN to RSC image classification

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, Postdoctoral Associate Bat-hen NAHMIAS-BIRAN

- ✦ **Constructing a model tackling the taxi roaming (taxi service) problem, to be embedded into the** *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 ridesourcing** *vs.* **traditional taxi based on machine learning and big data analytics**
  - ➢ Uncovered the differences between taxi service and ridesourcing 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 ridesourcing 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 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

Junior 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**: 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 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 in conferences and organized workshops

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

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

Research Assistant | Transport Big Data Analytics | **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

Carryout service data analysis 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-June.2024

  - Responsible 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 project
  - *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