Yongqi Dong

https://yongqidong.github.io/

Ph.D. Researcher | Delft University of Technology

Email: Y.Dong-4@tudelft.nl | **TEL**: (+31) 0616619399 / (+1) 5109711107

EDUCATIONAL BACKGROUND

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

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

Ph.D. Researcher, Department of Transport and Planning, **Delft University of Technology** (**TU Delft)** Dec.2019-Present

Thesis: Expanding the Operational Design Domain of Automated Vehicles in Mixed Traffic with Artificial Intelligence (*Safe, Efficient, and Socially Compliant Automated Driving: Sensing, Planning, and Control*)

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

Bachelor of Telecommunication Engineering

School of Electronic and Information Engineering, **Beijing Jiaotong University** Sep.2010-Jul.2014

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

Thesis: Design of vehicle-mounted data acquisition and communication unit for the WMN based locomotive remote control

Outstanding Undergraduate Thesis

PUBLICATIONS & PATENTS

- **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 **[Q1**, ***IF*:9.6, *SJR*:2.962]**
- **Dong, Y.**, van Arem, B., & Farah, H. (2024). Safe and Socially-compliant Automated Driving through Integrating Deep Reinforcement Learning with SVO and MPCC (In preparation, to be submitted to *the Proceedings of the National Academy of Sciences, PNAS*)
- **Dong, Y.**, Farah, H., & van Arem, B. (2023). Towards Developing Socially-Compliant Automated Vehicles: State of the Practice, Experts Expectations, and a Conceptual Framework (**Accepted** by *the 4th Symposium on Management of Future Motorway and Urban Traffic Systems 2022 (MFTS2022)*, to be submitted to Journal of *Transport Reviews*).
- 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, doi: https://doi.org/10.1109/TITS.2023.3305015. (Joint first author and corresponding author)
- Patil, S.[#], **Dong, Y.**[#,*], Farah, H, & Hellendoorn, J. (2023). Sequential Neural Network Model with Spatial-Temporal Attention Mechanism for Robust Lane Detection Using Multi Continuous Image Frames (Joint first author and corresponding author, Journal of *Transportation Research Part C*: *Emerging Technologies*, ***Under Review***), Preprint
- 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

- **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.
- Lingam, N., de Winter, J., **Dong, Y.**, Tsapi, A., van Arem, B., & Farah, H. (2023). eHMI on the vehicle or just a traffic light? A driving simulator study (Journal of *Accident Analysis & Prevention*, ***Under Review***), Preprint
- **Dong, Y.**[#,*], Lu, X.[#], Li, R., Song, W., van Arem, B., & Farah, H. (2023). Intelligent Anomaly Detection for Lane Rendering Using Transformer with Self-Supervised Pre-Training and Customized Fine-Tuning (**Accepted** by *the 2023 23rd COTA International Conference of Transportation Professionals*, **accepted** by TRB2024 and ***under second-round review*** by *Transportation Research Record: Journal of the Transportation Research Board*, **minor revision**), Preprint
- **Dong, Y.**[#,*], Li, R.[#], Farah, H. (2023). Robust Lane Detection through Self Pre-training with Masked Sequential Autoencoders and Fine-tuning with Customized PolyLoss (**Presented** at the *Transportation Research Board (TRB) 102nd annual meeting TRB 2023*). TRBAM-23-02979 poster, Preprint
- Zhang, Y., **Dong, Y.**[*] (2023). 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 *Transportation Research Record: Journal of the Transportation Research Board*). TRBAM-23-04413 poster, Preprint
- **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
- Liu, W., Zhang, X., **Dong, Y.**, Xu, L. (2023). A Unified Model Predictive Control Method of Automated Vehicles for Lane Changing and Lane Keeping Maneuvers (***Under Review*** by *IEEE Transactions on Intelligent Vehicles*)
- **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
- 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)
- Zhang, L.[#], **Dong, Y.**[#,*], Farah, H., Zgonnikov, A., & van Arem, B. (2023). Data-driven Semi-supervised Machine Learning with Surrogate Safety Measures for Abnormal Driving Behavior Detection, (**Accepted** & presented at *the 35th annual meeting of International Co-operation on Theories and Concepts in Traffic Safety*, **accepted** by TRBAM2024, ***under second-round review*** by *Journal of Transportation Research Board*, **minor revision**), Preprint
- Berge, B., de Winter, J., Dodou, D., Pooyan Afghari, A., Papadimitriou, E., Reddy, N., **Dong, Y.**, Raju, N., & Farah, H., (2023). Understanding cyclists' perception of driverless vehicles through eye-tracking and interviews (**Accepted** for presentation at *the 35th annual meeting of International Co-operation on Theories and Concepts in Traffic safety (ICTCT Catania 2023)*, under review by Journal of *Safety Science*), Preprint
- 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)

- 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)
- Huang, Y., **Dong, Y.**[*] (2024). Prediction of Parking Space Availability through Fusing Multi-source Heterogeneous Demanding Data with Transformer (Co-first author and corresponding author, in preparation for Journal of *IEEE Transactions on Intelligent Transportation Systems*)
- Yang, C., **Dong, Y.**[*] (2024). Robust Lane Detection using Image Sequential Attention Based Transformer Model with Elaborated Positional Encoding (Corresponding author, in preparation for Journal of *IEEE Transactions on Intelligent Transportation Systems*)
- Wu, G., **Dong, Y.**[*] (2024). Sequential Multimodal Deep Learning for Anomaly Detection in Weakly-Labeled Videos (Corresponding author, in preparation for Journal of *IEEE Transactions on Robotics*)
- **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
- 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*, 2022, https://doi.org/10.1109/TITS.2022.3200176
- 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*, https://doi.org/10.1177/03611981221077085
- **Dong, Y.**, Wang, Sh., 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; **Q1**, ***IF*:8.3, *SJR*:2.882]**
- **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
- 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
- **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
- **Dong, Y.**, Wang, Sh., Li, L., (2017) Uncovering Influence of On-Demand Ride Service on Emission Reduction and Energy Conservation through PHEM Model. [work paper]
- **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

- 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 Automated Vehicles and Human-driven Vehicles

✧ ***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, Publication Patent Number CN103236211B, Publication Patent Date: 2016.07.06

✧ ***European Patent:***

- Automated lane detection through self pre-training with masked sequential auto-encoders, fine-tuning with customised PolyLoss, and post-processing with clustering and curve fitting (IDF OCT-22-060, submitted & **filed**)
- 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**)

✧ ***Software copyright:*** Spatial-Temporal Attention Integrated Sequential Neural Network Model for Vision-based Robust Lane Detection Using Multi Continuous Image Frames (i-DEPOT 142731, Submitted & **filed**)

RESEARCH EXPERIENCE

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

Advisors: Dr.ir. Haneen Farah and Prof.dr.ir. Bart van Arem

- **Data-driven 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 peculiarities identification, recognition, and prediction
  - Implemented Deep Reinforcement Learning (DRL) models for safe, reliable, and socially-compliant automated driving under challenging manoeuvres involving both longitudinal and lateral control
  - Gaze behaviour of road users when interacting with an automated vehicle at an intersection

Research outputs:

- A Hybrid Spatial-temporal Deep Learning Architecture for Lane Detection (Published in *CACIE*)
- Robust Lane Detection through Self Pre-training with Masked Sequential Autoencoders and Fine-tuning with Customized PolyLoss (Published in *IEEE Transactions on ITS*, Accepted by TRB 2023 for presentation)
- Aspects to Consider for Modeling Automated Driving in Microscopic Traffic Simulations: State of the Practice and Research Needs. (Published in *IEEE Transactions on ITS*)
- Car-Following Properties of a Commercial Adaptive Cruise Control System- A Pilot Field Test. (Published on *Transportation Research Record: Journal of the Transportation Research Board*)
- Sequential Neural Network Model with Spatial-Temporal Attention Mechanism for Robust Lane Detection Using Multi Continuous Image Frames (Under review by *TR_C*, Accepted by TRB 2023 for presentation)
- Towards Developing Socially-Compliant Automated Vehicles: State of the Practice, Experts Expectations, and a Conceptual Framework (Accepted by MFTS 2022, to be submitted to Journal of Transport Reviews)
- 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 (accepted by IEEE-SMC 2023)
- Intelligent Anomaly Detection for Lane Rendering Using Transformer with Self-Supervised Pre-Training and Customized Fine-Tuning (accepted by CICTP 2023 and TRB 2024).
- Safe, Efficient, and Social Compliant Autonomous Driving based on Deep Reinforcement Learning (Accepted by IEEE-ITSC 2023)
- European Patent: Robust lane detection method through self pre-training with masked sequential auto-encoders and fine-tuning with customised PolyLoss (OCT-22-060, N2033551, submitted & filed)
- European Patent: 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 and filed)

- Software copyright: Spatial-Temporal Attention Integrated Sequential Neural Network Model for Vision-based Robust Lane Detection Using Multi Continuous Image Frames (i-DEPOT 142731, submitted and filed)

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

- **Applied Machine Learning, Artificial Intelligence, and Big Data Research**
  - The 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/fraud detection (Unsupervised): Auto-Encoder, Hierarchical Extreme Learning Machines
  - Kaggle Competition: Employ LSTM, LightGBM and 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 Monitoring: Adopt Convolutional Neural Network to RSC image classification
  - Optimized dynamic dispatching and operation algorithm for on-demand shared mobility by deep learning

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 versus traditional taxi based on machine learning and big data analytics**
  - Uncovered the differences between taxi service and ridesourcing using big data analyzing and clustering methods
  - Applied non-negative matrix factorization (NMF) to obtain basis patterns of Taxi, Hitch and Express service
- **Influence of on-demand ridesourcing on vehicle emissions**
  - Applied big data analytics and *PHEM* model to demonstrate how ridesourcing reduced total vehicle emissions
- **Fundamental research on intelligent parking guidance and recommendations based on machine learning**
  - Forecast models of travel time to parking lots (*Random Forest*); Guidance and 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 in China

Design of vehicle-mounted data acquisition and communication unit for the WMN-based locomotive remote control system Jun.2013-Jun.2014

- Designed basic hardware circuits, software, and algorithms to accomplish the analog and digital signal acquisition
- Applied PID control algorithm to control the locomotive's movement

- Commissioned and implemented the CAN bus protocol and Wireless Mesh Network communication

The Freescale Cup College Students Intelligent Car Race: Intelligent car that can follow specific trajectories based on image acquisition and processing, pattern recognition, and PID controller Jun.2012-Jun.2013

- **Hardware Aspect:** Designed the signal acquisition circuit as well as the core control circuit based on MC9S12XS256
- **Software Aspect:** Developed a specific control strategy and algorithm for the intelligent car to follow a given trajectory
- **Actuator:** Customized specific steering linkage and applied different PID algorithms to control diversion and speed

National Innovation Project for College Students: Design of a system to demonstrate the composition of the simple harmonic motions and five polarization states of light by using LEDs May.2012- May.2013

- Designed a system, including the circuits hardware (*Altium Designer*) and control software (*C*), for the demonstration
- Participated in the "Challenge Cup" Entrepreneurship Design Contest in Beijing and won the Bronze award

HONORS & AWARDS

Erasmus + mobility Grants (Three times)
National Scholarship (Top 1%)
IEEE ITSS Young Professionals Fellowship (Twice)
Second-Class Merit Scholarship for Masters Tsinghua University
Outstanding College Graduates of Beijing (Top 1‰)
First-Class Academic Fellowship (Top 1%, Twice)
First Class Tsinghua University RONG Scholarship
Second-Class Academic Fellowship (Top 3%, Once)
School-level Merit Student (Four times)
Second prize of Innovation Awards by the School of Science

Chinese Government 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 $)

- **Selected Contest Awards (More than 10 awards are provincial level or above)**

  Honourable Mention in the Interdisciplinary Contest in Modeling

  Second Prize in the 2012 & 2013 Undergraduate Electronic Design Contest in Beijing

  Second Prize in the Physical Experiment Competition in Beijing

  Bronze award in "Challenge Cup" Entrepreneurship Design Contest in Beijing

  First Prize in Beijing Jiaotong University "Challenge Cup" Entrepreneurship Design Contest

  First Prize in Freescale Cup University Students Intelligent Car Race (Rank **2nd**)

  2019 Microsoft Discover AI Challenge: *Sustainable Life* Top (10%)

THESIS SUPERVISION

Yuteng Zhang | Master of Science in Transport, Infrastructure & Logistics Jan.2024-*ongoing*

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

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 Behaviour 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.2016-Jul.2016

Course: Advanced Labs in Electronic Technology

Teaching and Lab Assistant | Electrical and Electronic Lab Center, Tsinghua University Mar.2015-Jul.2015

Course: 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

PROFESSIONAL SERVICES & EXPERIENCE

Workshop Organizer (Main) | IEEE Intelligent Vehicles Symposium (IV 2023), Anchorage, USA, Jun.4, 2023

Workshop title: Development of socially-compliant driving behaviour for automated vehicles to enhance safety and efficiency in mixed traffic

Workshop Organizer (Vice) | IEEE International Conference on Intelligent Transportation Systems (ITSC), Bilbao, Bizkaia, Spain, Sep. 24, 2023

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

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 Reviewer Services

Journals

- 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
- Applied Ergonomics
- Journal of Internet Technology
- European Transport Research Review
- ASCE-ASME Journal of Risk and Uncertainty in Engineering Systems, Part A: Civil Engineering

Conferences and Proceedings

- 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)

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

System architect for control of shuttle machine | Beijing IBOSST for Logistics Co., Ltd. May.2016-Aug.2017

Data Analyst | Beijing Municipal Commission of Transport: TOCC Jun.2016- Jul.2016

Data Analysis Engineer | DiDi Chuxing Company May.2016-Jun.2016

- Determined the approximate trajectory of ride-sharing by transfer learning from private car trajectories
- Calculated the daily total vehicle emissions reductions by using the PHEM model

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

Test Engineer Assistant | China Unicom southern district IPv6 renovation project, MIIT CTTL Nov.2013-Dec.2013

- Tested all kinds of typical applications on the Internet under the IPv6 environment

Research Intern | Broadband Network & Digital Media: Qionghai Dai's Lab, Tsinghua University Jul.2013-Aug.2013

- Review of technical investigation for controlling waves in space and time for imaging and focusing in complex media

LEADERSHIP & VOLUNTEER EXPERIENCE

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

- 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
- Deep Learning
- Deep Reinforcement Learning
- 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, Meditation, Kung Fu**, Chess, Yoga, Reading, Mountain climbing