Xiang Guo

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Education

University of Virginia (UVa), Charlottesville, VA, USA 2017 – Present

Ph.D student in Systems and Information Engineering (SIE), Advisor: Arsalan Heydarian GPA:3.88

Beihang University (BUAA), Beijing, China 2014 – 2017

M.S. in Transportation Engineering, Advisor: Ying Wang and Guangquan Lu GPA:3.50

Beihang University (BUAA), Beijing, China 2010 – 2014

B.S. in Transportation Engineering GPA:3.31

Research Interests

- Human Factors, Human-Machine Interaction, Virtual Reality
- Driver Behavior Analysis, Driving Simulation, Pedestrians and Cyclists' Safety, Music Emotion Study
- Data Analysis, Machine Learning Applications in Human modeling

Publications

1. Tavakoli, A., Kumar, S., **Guo, X.**, Balali, V., Boukhechba, M., Heydarian, A. (2021). HARMONY: A Human-Centered Multimodal Driving Study in the Wild. IEEE Access, 9, 23956-23978.
2. **Guo, X.**, Jiang, Y., & Kim, I. (2020, April). Interacting with Autonomous Platoons: Human Driver's Adaptive Behaviors in Planned Lane Changes. In *2020 Systems and Information Engineering Design Symposium (SIEDS)* (pp. 1-5). IEEE.
3. **Guo, X.**, Cui, L., Park, B., Ding, W., Lockhart, M., & Kim, I. (2019). How Will Humans Cut Through Automated Vehicle Platoons in Mixed Traffic Environments? A Simulation Study of Drivers' Gaze Behaviors Based on the Dynamic Areas of Interest. In *Systems Engineering in Context* (pp. 691-701). Springer, Cham.
4. **Guo, X.**, Wang, Y., Zhang, J., & Zhou, F. (2017). Application and development of Detection Response Task (DRT) in driver cognitive workload research, *Chinese Journal of Ergonomics*,23(1), (pp. 73-77).
5. Wang, Y., **Guo, X**., Zhu, Y., & Zhang, J. (2016, September). Color Block Task: A New Surrogate Secondary Task to Measure the Impact of Drivers' Incrementally Increased Workload. In Proceedings of the Human Factors and Ergonomics Society Annual Meeting (Vol. 60, No. 1, pp. 1889-1893). Sage CA: Los Angeles, CA: SAGE Publications.
6. Zhu, Y., Wang, Y., Li, G., & **Guo, X**. (2016, October). Recognizing and Releasing Drivers' Negative Emotions by Using Music: Evidence from Driver Anger. In Adjunct Proceedings of the 8th International Conference on Automotive User Interfaces and Interactive Vehicular Applications (pp. 173-178).
7. Wang, Y., Zhu, J., Zheng, T., Gao, F., & **Guo, X.** (2015). Comparing Three Smart Device Setups for the Use of Speech Interface in Destination Search while Driving. *Transportation Research Board 94th Annual Meeting* (No. 15-0469).
8. Wang, Y., Liu, R., Jiang, Z., Zhu, J., & **Guo, X.** (2014). Using Behavior and Human Machine Interaction Safety of In-vehicle Smart Terminals, *Industrial Engineering and management* 19(3), pp.141-146.

Research Experiences

Garduate Research Assistant May. 2019 – Present

University of Virginia,VA,USA Advisor: Arsalan Heydarian

- **Vulnerable road users' safety** Virtual Reality and Real Road study on pedestrians and cyclists to assess their patterns of perception and reaction in certain contextual settings to enhance the safety of the whole traffic system, data collection includes cycling/walking performance, eye tracking, physiological state, body movement tracking and questionnaires.

- **Driver in the Loop** Collaborate on a longitudinal naturalistic driving studies to building models to predict driver behavior, and emotional changes in response to different environmental conditions. Data includes videos from both outside and inside the car, physiological data of the driver, audio data from both music players and environment.
- **Living Link Lab** Long-term studies of occupant behavior, cognition, and interactions in a large collaborative environment while monitoring the changes in environmental factors at the University of Virginia (UVA) Cyber-Physical Systems laboratory (Link Lab), work on users' music and emotion data.

Garduate Research Assistant Aug. 2017 – May. 2019

University of Virginia,VA,USA Advisor: Inki Kim

- **Driver behavior study in mixed traffic environments** Driving simulation research on human driving behavior(vehicle dynamics, eye tracking and physiological analysis) when cutting through automated vehicle platoons in mixed traffic environments.
- **Gestures and Tasks Recognition for Robert Surgery Videos** To classify the gestures and tasks in robert surgery videos, combine image features with kinematic text data into recurrent neural network (RNN) with Long short-term memory (LSTM) units to predict the gestures and tasks in the videos.

Research Assistant Sep. 2014 – Mar. 2017

Beihang University, Beijing, China Advisor: Ying Wang and Guangquan Lu

- Master thesis research on take-over period in highly automated driving considering the human-vehicle-road loop, driver performance analysis (driving, eye-tracking, physiological). Apply machine learning models for evaluating the quality and safety of the control authority transition process of autonomous vehicles.
- Build the driving simulation and the data collecting systems from scratch, make visual and cognitive Detection Response Task (DRT) prototype system for secondary task test in driving experiment. Design a new surrogate secondary task to measure the impact of drivers' incrementally increased workload, sponsored by the National Natural Science Foundation of China

Undergraduate thesis Sep. 2013 – Jun. 2014

Beihang University, Beijing, China Advisor: Ying Wang

- Traffic Environment Simulation and Safety evaluation for Hong Kong-Zhuhai-Macao Bridge with complex road environment (oversea bridge, undersea tunnel and roundabout), project from the Research Institute of Highway, Ministry of Transport, China

Student Research Training Plan (SRTP) May. 2013 – Apr. 2014

Beihang University, Beijing, China Advisor: Ying Wang

- Design and development of a Driving under the influence (DUI) state self-detection mobile application ('Android BAC Calc.apk') in Android mobile system, $DownloadLink$

Teaching Experiences

Department of Engineering Systems and Environment, UVa. Charlottesville,VA, USA

Teaching Assistant, SYS 6018 - Data Mining 2021 Spring
Teaching Assistant, SYS 4021/6021 - Linear Statistical Models 2019 Fall, 2020 Fall
Teaching Assistant, SYS 3023/6007 - Human-Machine Interface 2020 Spring

Beihang University Beijing, China

Lecturer, Engineering Drawing, School of Continuing Education 2016 Spring
Teaching Assistant, Transportation Planning, School of Transportation Science and Engineering 2015 Spring

Working Experiences

Engineer in *SAIC Motor, Shanghai*, China Apr. 2017 – Jul. 2017

- SAIC Motor Corporation Limited (SAIC Motor) is the largest auto company on China's A-share market.

- Responsible for Data processing for autonomous vehicle test in Advanced Technology Department Competition and analysis for advanced driving assistance system

Product Intern in *Tusimple Technology Co., Ltd*, Beijing, China Feb. 2016 – Jul. 2016

- Tusimple is an Artificial Intelligence company on the cutting edge of the autonomous trucking industry
- Responsible for market research, test standard, data collecting and processing

Safety Evaluation Intern Engineer in *Research Institute of Highway(RIOH) Ministry of Transport*
Beijing, China Dec.2013 – May.2014

- RIOH is the sole national level research institute in the transportation area in China.
- Traffic Scenario Simulation for The Hong Kong–Zhuhai–Macau Bridge (HZMB) project; Traffic sign design improvement for several projects

PRESENTATIONS

- "Assessing and Improving Cyclists' Situational Awareness and Safety through Physiological Sensing and Augmented Reality Technology " Lighting talk in 2021 Transportation Research Board Annual Meeting (Virtual), Jan.29, 2021
- "Interacting with Autonomous Platoons: Human Driver's Adap-tive Behaviors in Planned Lane Changes" in 2020 Systems and Information Engineering Design Symposium (Virtual), Apr.30, 2020
- "Emotion Analysis in Human-centered Systems from Music Perspective- Application in Smart Buildings" in Doctoral Colloquium of the 6th ACM International Conference on Systems for Energy-Efficient Buildings, Cities, and Transportation (BuildSys 2019), New York, Nov.10, 2019
- "Driving through Automated Vehicle Platoons with Different Time Headway: A Preliminary Study on Human Drivers' Gaze Behavior at Dynamic Area of Interest" in the 16th Annual Conference on Systems Engineering Research, Virginia, USA, May.8, 2018
- "The Effect of Three Visual and Cognitive Secondary Tasks on Improving Drivers' Take-over Performance in Automated Driving" in the 2016 National Postgraduate Student Forum on Industrial Engineering, Beijing, China, Dec.10, 2016
- "Drivers' Take-over Performance in Automated Driving under Different Visual and Cognitive Workload" in the International Traffic Medicine Association (ITMA) 25th World Congress, Beijing, China, Sep.24, 2016
- "The application and development of wearable device in driver assistance", in the 2014 National Postgraduate Student Forum on Industrial Engineering, Beijing, China, Nov.22, 2014

SKILLS

- Programming Languages: Proficient in Python and R, intermediate level in Matlab and C#, basic skill in C and Java
- Simulations: Unity, HTC VIVE Virtual Reality, Microsoft HoloLens 2 Augmented Reality, UC/win-road, TransCAD, Paramics, VisSim, CarSim, TransCAD
- Mechanical Engineering Tools: Solidworks, AutoCAD, Ansys, ADAMS
- Physiological measurement: SmartEye/SMI/Tobii/Hololens Eye tracking system, Biopac/Biograph physiological system
- Others: Microsoft Office, Latex, SPSS, Minitab, Photoshop