Meng Wang

CONTACT INFORMATION

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RESEARCH INTERESTS

Human-Computer Interaction, Artificial Intelligence, Human Factors

EDUCATION

University of Massachusetts Amherst, Amherst, MA **Aug. 2021 - Present**

Ph.D. in Industrial Engineering

- Supervisor: Dr. Shannon Roberts

Worcester Polytechnic Institute, Worcester, MA **Aug. 2016 - May 2018**

M.S. in Data Science - GPA: 3.82/4.0

Central University of Finance and Economics, Beijing, China **Sep. 2012 - June 2016**

B.S. in Statistics - Major GPA: 90.6/100

University of Nottingham, Nottingham, UK **Jan. 2015 - June 2015**

Statistics (Exchange student) - Grade: A

EXPERIENCE

Honda Research Institute, San Jose, CA **Jan. 2024 - May 2024**

Research Intern

- Analyzed and synchronized multi-modal data to assess drivers' wellbeing levels and prosocial behaviors;
- Implemented a contrastive learning model to quantify drivers' prosocial behaviors and assess their intentions regarding wellbeing;
- Developed an annotation web study tool to facilitate the annotation of driver behavior.

AAA Foundation for Traffic Safety, Washington DC **May 2022 - Aug. 2022**

Research Intern

- Built seasonal time series models to analyze and quantify the effect of the COVID-19 pandemic on the fatal crashes and related features;
- Explored and applied the computer vision (panoptic segmentation) models on the street view images and defined the road complexity index using the output from the algorithm.

MIT AgeLab, Cambridge, MA **Mar. 2020 - Jul. 2021**

Machine Learning Engineer

- Used computer vision and machine learning algorithms to analyze driver's cognitive load;
- Incorporated AWS services to driver's facial analysis pipeline to improve the annotation speed and prediction efficiency.

AdaViv (MIT DeltaV startup), Cambridge, MA **Aug. 2018 - Mar. 2020**

Research Scientist

- Trained computer vision object detection model to detect the buds region in the plants, and developed unsupervised anomaly detection model to detect anomalies on the plants;
- Built an AWS-based model deployment system that can automatically fetch data from S3 pre-process and train data in SageMaker and send predictions to the website;

- Responsible for data quality control, built operational dashboards that can monitor the image quality of data collection sessions and annotation quality of data annotation progress.

Pfizer Inc., Groton, CT **Jan. 2018 - May 2018**

Data Analysis Intern

- Conducted correlation analysis to find important factors that had an impact on the medicine waste ratio, and these substantial factors had a Pearson's Correlation Coefficient from 0.5 to 0.7 and a mutual information score from 0.7 to 0.9;
- Used Neural Networks to predict waste ratio to see which neurons were activated, compared these neurons with the factors found from correlation analysis;
- Built dashboards to help Pfizer monitor those influential features and adjust the dispensing plan accordingly.

Tencent, Beijing, China **Feb. 2016 - Jun. 2016**

Data Engineer Intern

- Assisted Financial Branch in managing data from various sources;
- Conducted exploratory data analysis and data visualization to help team members better understand the data.

Journal Publications

Wang, M., Ojuri, B., Roberts, S. C., McDermott, J., & Fisher, D. L. (2023). "Impact of level 2 automation and ADHD symptomatology on young drivers' attention maintenance." *Transportation research part F: traffic psychology and behavior*, 94, 504-516.

Ding, L., Terwilliger, J., Parab, A., **Wang, M.**, Fridman, L., Mehler, B., & Reimer, B. (2023). "CLERA: A Unified Model for Joint Cognitive Load and Eye Region Analysis in the Wild." *ACM Transactions on Computer-Human Interaction*.

Zhang, F., **Wang, M.**, Parker, J. I., & Roberts, S. C. (2023). "The effect of driving style on responses to unexpected vehicle cyberattacks." *Safety*, 9(1), 5.

Ding, L., Glazer, M., **Wang, M.**, Mehler, B., Reimer, B., & Fridman, L. (2020, October). Mit-avt clustered driving scene dataset: Evaluating perception systems in real-world naturalistic driving scenarios. In *2020 IEEE Intelligent Vehicles Symposium (IV)* (pp. 232-237). IEEE. (selected for oral presentation)

Journal Papers Under Review

[Under Review] **Wang, M.***, Paari M.*, Hungund, A., Pamarthi, J., Roberts, S., & Pradhan, A. K., "Investigating training program interactions that predict hazard anticipation skills for novice teen drivers." *Journal of Traffic and Transportation Engineering (English Edition)*, submitted in December 2023.

[Under Review] **Wang, M.**, Parker, J., Wong, N., Mehrotra, S., Roberts, S.C., Kim, W., Romo, A. & Horrey, W.J., "The Effect of Human-Machine Interface Design on Driver Performance and Behavior While Using Vehicle Automation" *Accident Analysis & Prevention*, revision submitted in October 2023.

[Under Review] **Wang, M.**, Mehrotra, S., Wong, N., Parker, J., Roberts, S.C., Kim, W., Romo, A. & Horrey, W.J., "Human-Machine Interfaces and Vehicle Automation: A Review of the Literature and Recommendations for System Design, Feedback, and Alerts." *Transportation Research Part F: Traffic Psychology and Behaviour*, submitted in November 2022.

[Under Review] **Wang, M.**, Parker, J. I., Zhang, F., & Roberts, S. C., "A simulator study assessing the effectiveness of training and warning systems on drivers' response performance to vehicle

cyberattacks." *Accident Analysis & Prevention*, revision submitted in October 2023.

Conference Publications

Pamarthi, J., Hungund, A., **Wang, M.**, Sayer, T., Hallman, J., Roberts, S., & Pradhan, A. K. (2023, October). "Risk-ATTEND (Risk Anticipation Training to Enhance Novice Driving): Pilot Evaluation of a Risk Anticipation Training Program for Teen Drivers." In *Proceedings of the Human Factors and Ergonomics Society Annual Meeting* (p. 21695067231192622). Sage CA: Los Angeles, CA: SAGE Publications.

Parker, J. I., Zhang, F., **Wang, M.**, & Roberts, S. C. (2022, September). "How do drivers respond to vehicle cyberattacks? A driving simulator study." In *Proceedings of the Human Factors and Ergonomics Society Annual Meeting* (Vol. 66, No. 1, pp. 737-741). Sage CA: Los Angeles, CA: SAGE Publications.

Research Reports

Wang, M., Jah'inaya Parker, N. W., Mehrotra, S., Roberts, S. C., Kim, W., Romo, A., & Horrey, W. J. (2023). "Human-Machine Interfaces and Vehicle Automation: The Effect of HMI Design on Driver Performance and Behavior." (Technical Report). Washington, D.C.: AAA Foundation for Traffic Safety.

Mehrotra, S., **Wang, M.**, Wong, N., Parker, J., Roberts, S.C., Kim, W., Romo, A. & Horrey, W.J. (2022). "Human-Machine Interfaces and Vehicle Automation: A Review of the Literature and Recommendations for System Design, Feedback, and Alerts" (Technical Report). Washington, D.C.: AAA Foundation for Traffic Safety.

Tefft, B.C. & **Wang, M.** (2022). "Traffic Safety Impact of the COVID-19 Pandemic: Fatal Crashes Relative to Pre-Pandemic Trends, United States, May–December 2020" (Research Brief). Washington, D.C.: AAA Foundation for Traffic Safety.

Projects

Complexity Level Identification of Roadway Scenes **Jan 2023 - Current**

PhD dissertation project at UMass

- Initial work stemmed from internship at AAA Foundation of Traffic Safety.
- Incorporate the computer vision models to identify the objects on the roadway scene images and define a road complexity index to quantify;
- Use machine learning models to investigate if there is a relationship between driving behavior and road complexity index.

Driver's Cognitive Load Analysis **May 2020 - Jun. 2021**

Machine Learning project at MIT

- Introduced individualized normalization to the driver's cognitive load analysis and improve the classification accuracy to 95%, paper has been submitted to CHI 2020;
- Used Markov chain Monte Carlo to get the parameter set of which the buffer scores have the most significant associations with driver's cognitive load, and such parameter set achieved a precision and recall score of 0.8 and 0.8.

Services

Conference Reviewer for TRB 2024.

Conference Reviewer for HFES 2023 Surface Transportation Technical Group.

Co-chair for the Surface Transportation Technical Group sessions in HFES 2022.

Conference Reviewer for AutoUI 2020.

Teaching Assistant, University of Massachusetts, Amherst **Fall 2022**
MIE657 - Human Factors Design Engineering

Teaching Assistant, Worcester Polytechnic Institute **Spring 2018**
DS595 - Special topics: Information Retrieval & Social Media

Honors and Awards

New England University Transportation Center (NEUTC) Scholarship for PhD Dissertation Project, Amherst, MA **2024**

UMass College of Engineering Doctoral Fellowship for Outstanding Students, Amherst, MA **2022**

1st Place, Research Innovation Exchange competition (GRIE) 2018 in Data Science GQP category (Among 10 teams), Worcester, MA **2016**

Excellent Community President Prize, Beijing, China **2014**

The Soong Ching Ling Scholarship for Outstanding High School Students, Guangzhou, China **2012**

Misc.

Programming: Python (Pandas, Sklearn, Tensorflow, Keras, Plotly), R, SQL, LaTeX, Matlab, SAS

Software: Tableau, Weka, SPSS

Platforms/Tools: AWS SageMaker, Docker, Linux, GIT

Languages: Native in Chinese, fluent in English