

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

- Applied Transformers and Machine Learning models on synchronized multi-modal data to assess drivers' well-being levels and prosocial behaviors;
- Investigated Large Language Models (LLMs) prompt engineering to better understand the drivers' prosocial behaviors and incorporated them into the modeling pipeline;
- Developed an annotation web study tool to facilitate the driver behavior annotation pipeline.

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 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., Wong, N., Mehrotra, S., Roberts, S. C., Kim, W., Romo, A., & Horrey, W. J. (2024). "The effect of human-machine interface modality, specificity, and timing on driver performance and behavior while using vehicle automation." *Accident Analysis & Prevention*, 203, 107606.

Wang, M., Zhang, F., & Roberts, S. C. (2024). "A simulator study assessing the effectiveness of training and warning systems on drivers' response performance to vehicle cyberattacks." *Accident Analysis & Prevention*, 203, 107644.

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)

PAPERS UNDER REVIEW

[Under Review] **Wang, M.**, Mehrotra, S., Roberts, S.C., "Personality Matters: A Data-Driven Approach to Driver Characteristics for HMI Optimization." *Auto UI*, submitted in April 2024.

[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.**, 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.

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
MIE657 - Human Factors Design Engineering

Fall 2022

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

Spring 2018

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