YUNSHENG MA

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EDUCATION

Purdue University — West Lafayette, IN
Ph.D., Research Field: Autonomous Driving, Transportation Engineering — Jan. 2023 – Present

New York University — New York, NY
Master of Science, Computer Science — Sep. 2020 – May 2022

Harbin Institute of Technology — Weihai, China
Bachelor of Engineering, Computer Software Engineering — Sep. 2016 – May 2020

University of California, Berkeley — Berkeley, CA
Visiting Students, Electrical Engineering and Computer Sciences — Aug. 2018 – May 2019

PUBLICATIONS

Papers Under Review (*denotes co-first authors)

Y. Ma, J. Lu, C. Cui, S. Zhao, X. Cao, W. Ye, Z. Wang. "MACP: Efficient Model Adaptation for Cooperative Perception." 2023

Y. Ma, R. Du, A. Abdelraouf, K. Han, R. Gupta, and Z. Wang. "Driver Digital Twin for Online Recognition of Distracted Driving Behaviors." 2023

C. Cui*, **Y., Ma***, X. Cao, W. Ye, Z. Wang. "Receive, Reason, and React: Drive as You Say with Large Language Models in Autonomous Vehicles." 2023

In Conference Proceedings (*denotes co-first authors)

Y. Ma, W. Ye, X. Cao, A. Abdelraouf, K. Han, R. Gupta, Z. Wang. "CEMFormer: Learning to Predict Driver Intentions from In-Cabin and External Cameras via Spatial-Temporal Transformers." *IEEE 26th International Conference on Intelligent Transportation Systems* (**ITSC**), 2023.

C. Cui, **Y. Ma**, J. Lu, Z. Wang. "Radar Enlighten the Dark: Enhancing Low-Visibility Perception for Automated Vehicles with Camera-Radar Fusion." *IEEE 26th International Conference on Intelligent Transportation Systems* (**ITSC**), 2023.

Y. Ma, L. Yuan, A. Abdelraouf, K. Han, R. Gupta, Z. Li, Z. Wang. "M^{2}DAR: Multi-View Multi-Scale Driver Action Recognition With Vision Transformer." In *Proceedings of the IEEE/CVF Conference on Computer Vision and Pattern Recognition (**CVPR**) Workshops*, 2023.

L. Yuan, **Y. Ma**, L. Su, Z. Wang. "Peer-to-Peer Federated Continual Learning for Naturalistic Driving Action Recognition." In *Proceedings of the IEEE/CVF Conference on Computer Vision and Pattern Recognition (**CVPR**) Workshops*, 2023.

W. Ye, **Y. Ma**, X. Cao, K. Tang. "Mitigating Transformer Overconfidence via Lipschitz Regularization." In *Proceedings of the Thirty-Ninth Conference on Uncertainty in Artificial Intelligence* (**UAI**), 2023.

S. Zhao*, **Y. Ma***, Y. Gu, J. Yang, T. Xing, P. Xu, R. Hu, H. Chai, and K. Keutzer. "An End-to-End Visual-Audio Attention Network for Emotion Recognition in User-Generated Videos." In *Proceedings of the AAAI Conference on Artificial Intelligence* (**AAAI**), 2020, **Oral Presentation**.

Workshop Presentations (*denotes co-first authors)

W. Ye*, **Y. Ma***, Xu Cao."Uncertainty Estimation in Deterministic Vision Transformer." AAAI Workshop on Uncertainty Reasoning and Quantification in Decision Making (**UDM-AAAI**), 2023.

Y. Ma, Z. Wang. "ViT-DD: Multi-Task Vision Transformer for Semi-Supervised Driver Distraction Detection." NeurIPS Workshop on Machine Learning for Autonomous Driving (**NeurIPS ML4AD**), 2022.

Work Experience

Digital Twin Lab, Purdue University — Aug. 2022 – Present
Research Assistant — Advised by Dr. Ziran Wang

Foundation Models for Autonomous Driving: Proposed a new perspective for improving decision-making and enabling human-like interaction in autonomous vehicles by leveraging Large Language Models.

BEV Perception: Proposed a novel MACP framework to enable a single-agent pre-trained model with cooperation capabilities. It achieves SOTA performance in both simulation and real-world cooperative perception benchmarks, with fewer tunable parameters and reduced communication cost. This series of works has been published in ITSC.

Driver Digital Twin: Proposed novel multi-view spatial-temporal Transformers for driver intention prediction, driver action recognition, and temporal action localization. This series of works has been published in CVPRW and ITSC.

Didi Chuxing — June 2019 – Sep. 2019
Research Engineer Intern — Advised by Dr. Pengfei Xu

Video Emotion Recognition: Proposed a Visual-Audio Attention Network (VAANet) that integrates spatial, channel-wise, and temporal attentions into a 3D convolutional neural network. It achieved SOTA performance on both the VideoEmotion-8 and Ekman-6 datasets. Work published at AAAI.

Teaching Experience

NYU CSCI-GA.3033 Design and Analysis of Algorithms — Spring 2021
Teaching Assistant — Instructor: Prof. Manuel Charlemagne

Professional Activities

As a Workshop/Challenge Organizer

Co-Chair of WACV 2024 Workshop on Large Language and Vision Models for Autonomous Driving (**LLVM-AD**), Waikoloa, Hawaii.

Co-Organizer of the **MAPLM** Challenge: A Large-Scale Vision-Language Benchmark for Map and Traffic Scene Understanding.

As a Reviewer

Reviewer of *IEEE Internet of Things Journal* (**IoT-J**)
Reviewer of *IEEE Transactions on Intelligent Vehicles* (**T-IV**)
Reviewer of *Workshop on Large Language and Vision Models for Autonomous Driving* (**LLVM-AD**) 2024
Reviewer of *International Conference on Intelligent Transportation Systems* (**ITSC**) 2023
Reviewer of *ACM/IEEE International Conference on Cyber-Physical Systems (**ICCPS**)* 2023
Reviewer of *IEEE International Conference on Mobility: Operations, Services, and Technologies (**MOST**)* 2023
Reviewer of *International Conference on Machine Learning* (**ICML**) 2022

As a Volunteer

Volunteer of *Conference on Uncertainty in Artificial Intelligence* (**UAI**) 2023
Volunteer of *AAAI Conference on Artificial Intelligence* (**AAAI**) 2023
Assistant Moderator of *TRB Conference on Innovations in Travel Analysis and Planning* 2023
Webmaster of *IEEE Technical Committee on Internet of Things in Intelligent Transportation System* 2022 – Present

Fellowships & Awards

Conference on Next-Generation Transportation Systems, *Outstanding Speaker Award* 2023
AAAI Student Scholarship Grant 2023
NeurIPS ML4AD Travel Grant, sponsored by *Waymo* 2022

Technical Skills

Programming: Python, C/C++

Packages: PyTorch/Tensorflow, Lightening, Hugging-Face, LangChain, OpenAI-Gym, OpenCV

Tools: Git, LaTeX, SQL