Yunsheng Ma

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EDUCATION

Purdue University   West Lafayette, IN
Doctor of Philosophy, Advisor: Prof. Ziran Wang   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, Software Engineering   Sep. 2016 – May 2020

University of California, Berkeley   Berkeley, CA
Undergraduate Exchange Student   Aug. 2018 – May 2019

EMPLOYMENT

Waymo Research   Mountain View, CA
Research Intern, Mentor: Dr. Wei-Chih (Wayne) Hung   May 2025 – Present
Research Topic: Spatial Reasoning with Foundation Models

Bosch Research North America & Bosch Center for Artificial Intelligence   Sunnyvale, CA
Research Intern, Mentor: Dr. Burhaneddin Yaman   Sep. 2024 – May 2025
Research Topic: Foundation Models for Autonomous Planning

Toyota North America   Mountain View, CA
Research Intern, Mentor: Dr. Amr Abdelraouf   May 2024 – Aug. 2024
Research Topic: Vision-Language Models for Autonomous Driving

Purdue University   West Lafayette, IN
Graduate Research Assistant, Mentor: Dr. Ziran Wang   Aug. 2022 – Present
Research Topics: Autonomous Driving, Foundation Models, BEV Perception

New York University   New York, NY
Graduate Teaching Assistant   Jan. 2021 – May 2021
Course: CSCI-GA.3033: Design and Analysis of Algorithms

DiDi   Beijing, China
Computer Vision Research Intern, Mentor: Dr. Pengfei Xu   June 2019 – Sep. 2019
Research Topic: Video Understanding

University of California, Berkeley   Berkeley, CA
Undergraduate Researcher, Mentor: Dr. Sicheng Zhao   Nov. 2018 – May 2019
Research Topic: Domain Adaptation

REFEREED PUBLICATIONS

Conference Proceedings

†denotes co-first authors

[C17] Yunsheng Ma, Amr Abdelraouf, Rohit Gupta, Ziran Wang, and Kyungtae Han. "Video Token Sparsification for Efficient Multimodal LLMs in Autonomous Driving." *IEEE Intelligent Vehicles Symposium*, 2025.

[C16] Yunsheng Ma, Wenqian Ye, Can Cui, Haiming Zhang, Shuo Xing, Fucai Ke, Jinhong Wang, Chenglin Miao, Jintai Chen, Hamid Rezatofighi, Zhen Li, Guangtao Zheng, Chao Zheng, Tianjiao He, Manmohan

Chandraker, Burhaneddin Yaman, Xin Ye, Hang Zhao, and Xu Cao. "Position: Prospective of Autonomous Driving - Multimodal LLMs, World Models, Embodied Intelligence, AI Alignment, and Mamba." In *Proceedings of the Winter Conference on Applications of Computer Vision* (**WACV**) *Workshops*, 2025.

[C15] Yunsheng Ma, Xu Cao, Wenqian Ye, Can Cui, Kai Mei, and Ziran Wang. "Learning Autonomous Driving Tasks via Human Feedbacks with Large Language Models." In *Findings of the Association for Computational Linguistics:* **EMNLP** 2024.

[C14] Yunsheng Ma†, Can Cui†, Xu Cao†, Wenqian Ye, Peiran Liu, Juanwu Lu, Amr Abdelraouf, Rohit Gupta Kyungtae Han, Aniket Bera, James M. Rehg, and Ziran Wang. "LaMPilot: An Open Benchmark Dataset for Autonomous Driving with Language Model Programs." In *Proceedings of the IEEE/CVF Conference on Computer Vision and Pattern Recognition* (**CVPR**), 2024.

[C13] Xu Cao†, Tong Zhou†, Yunsheng Ma†, Wenqian Ye, Can Cui, Kun Tang, Zhipeng Cao, Kaizhao Liang, Ziran Wang, James M. Rehg, and Chao Zheng. "MAPLM: A Real-World Large-Scale Vision-Language Benchmark for Map and Traffic Scene Understanding." In *Proceedings of the IEEE/CVF Conference on Computer Vision and Pattern Recognition* (**CVPR**), 2024.

[C12] Juanwu Lu, Can Cui, Yunsheng Ma, Aniket Bera, and Ziran Wang. "Quantifying Uncertainty in Motion Prediction with Variational Bayesian Mixture." In *Proceedings of the IEEE/CVF Conference on Computer Vision and Pattern Recognition* (**CVPR**), 2024.

[C11] Can Cui, Zichong Yang, Yupeng Zhou, Yunsheng Ma, Juanwu Lu, Lingxi Li, Yaobin Chen, Jitesh Panchal, and Ziran Wang. "Personalized Autonomous Driving with Large Language Models: Field Experiments." In *IEEE International Conference on Intelligent Transportation Systems* (**ITSC**), 2024.

[C10] Yunsheng Ma, Juanwu Lu, Can Cui, Sicheng Zhao, Xu Cao, Wenqian Ye, and Ziran Wang. "MACP: Efficient Model Adaptation for Cooperative Perception." In *Proceedings of the IEEE/CVF Winter Conference on Applications of Computer Vision* (**WACV**), 2024.

[C9] Can Cui†, Yunsheng Ma†, Xu Cao†, Wenqian Ye†, Yupeng Zhou, Kaizhao Liang, Jintai Chen, Juanwu Lu, Zichong Yang, Kuei-Da Liao, Tianren Gao, Erlong Li, Kun Tang, Zhipeng Cao, Tong Zhou, Ao Liu, Xinrui Yan, Shuqi Mei, Jianguo Cao, Ziran Wang, and Chao Zheng. "A Survey on Multimodal Large Language Models for Autonomous Driving." In *Proceedings of the IEEE/CVF Winter Conference on Applications of Computer Vision* (**WACV**) *Workshops*, 2024.

[C8] Can Cui, Yunsheng Ma, Xu Cao, Wenqian Ye, and Ziran Wang. "Drive As You Speak: Enabling Human-Like Interaction With Large Language Models in Autonomous Vehicles." In *Proceedings of the IEEE/CVF Winter Conference on Applications of Computer Vision* (**WACV**) *Workshops*, 2024.

[C7] Yunsheng Ma and Ziran Wang. "ViT-DD: Multi-Task Vision Transformer for Semi-Supervised Driver Distraction Detection." *IEEE Intelligent Vehicles Symposium*, 2024.

[C6] Wenqian Ye, Yunsheng Ma, Xu Cao, and Kun Tang. "Mitigating Transformer Overconfidence via Lipschitz Regularization." In *Proceedings of the Thirty-Ninth Conference on Uncertainty in Artificial Intelligence* (**UAI**), 2023.

[C5] Yunsheng Ma, Wenqian Ye, Xu Cao, Amr Abdelraouf, Kyungtae Han, Rohit Gupta, and Ziran Wang. "CEMFormer: Learning to Predict Driver Intentions from In-Cabin and External Cameras via Spatial-Temporal Transformers." *IEEE International Conference on Intelligent Transportation Systems* (**ITSC**), 2023.

[C4] Can Cui, Yunsheng Ma, Juanwu Lu, and Ziran 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.

[C3] Yunsheng Ma, Liangqi Yuan, Amr Abdelraouf, Kyungtae Han, Rohit Gupta, Zihao Li, and Ziran 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.

[C2] Liangqi Yuan, Yunsheng Ma, Lu Su, and Ziran 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.

[C1] Sicheng Zhao[†], Yunsheng Ma[†], Yang Gu, Jufeng Yang, Tengfei Xing, Pengfei Xu, Runbo Hu, Hua Chai, and Kurt 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.

Journal Articles

[†]denotes co-first authors

[J3] Can Cui[†], Yunsheng Ma[†], Xu Cao, Wenqian Ye, and Ziran Wang, "Receive, Reason, and React: Drive as You Say, With Large Language Models in Autonomous Vehicles." *IEEE Intelligent Transportation Systems Magazine*, 2024

[J2] Yunsheng Ma, Runjia Du, Amr Abdelraouf, Kyungtae Han, Rohit Gupta, and Ziran Wang. "Driver Digital Twin for Online Recognition of Distracted Driving Behaviors." *IEEE Transactions on Intelligent Vehicles*, 2024.

[J1] Can Cui, Yunsheng Ma, Juanwu Lu, and Ziran Wang. "REDFormer: Radar Enlightens the Darkness of Camera Perception with Transformers." *IEEE Transactions on Intelligent Vehicles*, 2023.

PATENTS

[P2] Rohit Gupta, Yunsheng Ma, Amr Abdelraouf and Kyungtae Han. "Adaptive Road Sign Interpretation and Vehicle Response System." *U.S. patent application 19/004,333.* Filed Dec. 2024

[P1] Rohit Gupta, Yunsheng Ma, Amr Abdelraouf and Kyungtae Han. "Context-Aware External Object Detection and Vehicle Guidance." *U.S. patent application 19/004,331.* Filed Dec. 2024

OTHER PUBLICATIONS

- Yunsheng Ma, Burhaneddin Yaman, Xin Ye, Feng Tao, Abhirup Mallik, Ziran Wang, and Liu Ren. "MTA: Multimodal Task Alignment for BEV Perception and Captioning." *arXiv*, 2024.
- Can Cui, Zichong Yang, Yupeng Zhou, J. Peng, SungYeon Park, Cong Zhang, Yunsheng Ma, Xu Cao, Wenqian Ye, Yiheng Feng, Jitesh H. Panchal, Lingxi Li, Yaobin Chen, and Ziran Wang. "On-Board Vision-Language Models for Personalized Autonomous Vehicle Motion Control: System Design and Real-World Validation." *arXiv*, 2024.
- Wenqian Ye, Guangtao Zheng, Yunsheng Ma, Xu Cao, Bolin Lai, James M. Rehg, and Aidong Zhang. "MM-SpuBench: Towards Better Understanding of Spurious Biases in Multimodal LLMs." *NeurIPS 2024 Workshop on Responsibly Building the Next Generation of Multimodal Foundational Models*, 2024, Oral Presentation.
- Xu Cao, Bolin Lai, Wenqian Ye, Yunsheng Ma, J. Heintz, Jintai Chen, Jianguo Cao, and James M. Rehg. "What is the Visual Cognition Gap between Humans and Multimodal LLMs?" *arXiv*, 2024.
- Wenqian Ye, Guangtao Zheng, Xu Cao, Yunsheng Ma, and Aidong Zhang. "Spurious Correlations in Machine Learning: A Survey." *ICML 2024 Workshop on Data-Centric Machine Learning Research*, 2024.

PROFESSIONAL ACTIVITIES

As a Workshop Organizer

- ICCV 2025 Workshop on Distillation of Foundation Models for Autonomous Driving (2nd WDFM-AD)
- CVPR 2025 Workshop on Distillation of Foundation Models for Autonomous Driving (1st WDFM-AD)
- ICLR 2025 Workshop on AI for Children: Healthcare, Psychology, and Education (AI4CHL)
- WACV 2025 Workshop on Large Language and Vision Models for Autonomous Driving (3rd LLVM-AD)
- ITSC 2024 Workshop on Large Language and Vision Models for Autonomous Driving (2nd LLVM-AD)
- WACV 2024 Workshop on Large Language and Vision Models for Autonomous Driving (1st LLVM-AD)

As a Program Committee Member

- IEEE/CVF Computer Vision and Pattern Recognition Conference (CVPR'24/25)
- IEEE/CVF International Conference on Computer Vision (ICCV'25)
- The European Conference on Computer Vision (ECCV'24)
- IEEE/CVF Winter Conference on Applications of Computer Vision (WACV'25)
- The Conference on Neural Information Processing Systems (NeurIPS'25)
- The International Conference on Learning Representations (ICLR'25)
- AAAI Conference on Artificial Intelligence (AAAI'25)
- The International Joint Conference on Artificial Intelligence (IJCAI'24)
- IEEE Intelligent Vehicles Symposium (IV'23/24/25)
- IEEE Intelligent Transportation Systems Conference (ITSC'23/24)
- IEEE Forum for Innovative Sustainable Transportation Systems (FISTS'24)
- IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS'24/25)
- IEEE International Conference on Robotics and Automation (ICRA'25)
- ACM International Conference on Multimedia (ACMMM'25)
- IEEE International Symposium on Biomedical Imaging (ISBI'24)
- The Conference on Information and Knowledge Management (CIKM'24)
- ACM/IEEE International Conference on Cyber-Physical Systems (ICCPS'23)
- IEEE International Conference on Mobility: Operations, Services, and Technologies (MOST'23)

As a Journal Reviewer

- IEEE Transactions on Intelligent Transportation Systems (T-ITS)
- IEEE Transactions on Intelligent Vehicles (T-IV)
- IEEE Internet of Things Journal (IoT-J)
- IEEE Robotics and Automation Letters (RA-L)

As a Volunteer

- Student Volunteer, The Conference on Uncertainty in Artificial Intelligence, Pittsburgh, PA   2023
- Student Volunteer, TRB Innovations in Travel Analysis and Planning Conference, Indianapolis, IN   2023
- Student Volunteer, AAAI Conference on Artificial Intelligence, Washington, DC   2023
- Webmaster, IEEE Technical Committee on Internet of Things in ITS   2022

STUDENT MENTORING

- Vaishnavi Satish, Master student in Engineering @ Purdue
- Patrick Shen, Undergraduate student in Engineering @ Purdue

TECHNICAL SKILLS

- Programming: Python, C++
- Libraries: PyTorch, Transformers (Hugging Face), MMDetection3D, OpenCV
- Tools: CARLA, Git, Wandb, LaTeX