

# Yunsheng Ma

[Personal Website](#) | [Google Scholar](#) | [GitHub](#) | [LinkedIn](#) | [X](#) | [DBLP](#) | [OpenReview](#)

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## EDUCATION

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<b>Purdue University</b> Ph.D., Research Fields: Autonomous Driving, Transportation Engineering	West Lafayette, IN Jan. 2023 – Present
<b>New York University</b> Master of Science, Computer Science	New York City, NY Sep. 2020 – May 2022
<b>Harbin Institute of Technology</b> Bachelor of Engineering, Computer Software Engineering	Weihai, China Sep. 2016 – May 2020
<b>University of California, Berkeley</b> Visiting Student, Electrical Engineering and Computer Sciences	Berkeley, CA Aug. 2018 – May 2019

## SELECTED PUBLICATIONS

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### In Conference Proceedings ( <sup>†</sup>denotes co-first authors )

- [CVPR'24] Y. Ma<sup>†</sup>, C. Cui<sup>†</sup>, X. Cao<sup>†</sup>, W. Ye, P. Liu, J. Lu, A. Abdelraouf, R. Gupta, K. Han, A. Bera, J. M. Rehg, Z. 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*, 2024.
- [CVPR'24] X. Cao<sup>†</sup>, T. Zhou<sup>†</sup>, Y. Ma<sup>†</sup>, W. Ye, C. Cui, K. Tang, Z. Cao, K. Liang, Z. Wang, J. M. Rehg, and C. Zheng. “MAPLM: A Real-World Large-Scale Vision-Language Dataset for Map and Traffic Scene Understanding.” In *Proceedings of the IEEE/CVF Conference on Computer Vision and Pattern Recognition*, 2024.
- [CVPR'24] J. Lu<sup>†</sup>, C. Cui<sup>†</sup>, Y. Ma, A. Bera, and Z. Wang. “Quantifying Uncertainty in Motion Prediction with Variational Bayesian Mixture.” In *Proceedings of the IEEE/CVF Conference on Computer Vision and Pattern Recognition*, 2024.
- [WACV'24] Y. Ma<sup>†</sup>, J. Lu<sup>†</sup>, C. Cui, S. Zhao, X. Cao, W. Ye, Z. Wang. “MACP: Efficient Model Adaptation for Cooperative Perception.” In *Proceedings of the IEEE/CVF Winter Conference on Applications of Computer Vision*, 2024.
- [ITSC'23] 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 International Conference on Intelligent Transportation Systems*, 2023.
- [AAAI'20] S. Zhao<sup>†</sup>, Y. Ma<sup>†</sup>, 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*, 2020, **Oral Presentation**.

### Journal Articles

- C. Cui<sup>†</sup>, Y. Ma<sup>†</sup>, X. Cao, W. Ye, Z. Wang, “Receive, Reason, and React: Drive as You Say, With Large Language Models in Autonomous Vehicles.” *IEEE Intelligent Transportation Systems Magazine*, 2024
- Y. Ma, R. Du, A. Abdelraouf, K. Han, R. Gupta, Z. Wang. “Driver Digital Twin for Online Recognition of Distracted Driving Behaviors.” *IEEE Transactions on Intelligent Vehicles*, 2024.
- C. Cui, Y. Ma, J. Lu, Z. Wang. “REDFormer: Radar Enlightens the Darkness of Camera Perception with Transformers.” *IEEE Transactions on Intelligent Vehicles*, 2023.

## WORK EXPERIENCE

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**Digital Twin Lab, Purdue University** Aug. 2022 – Present  
Graduate Research Assistant Advised by [Dr. Ziran Wang](#)

**Embodied AI for Autonomous Driving [CVPR'24]:** Proposed LaMPilot, a novel framework that integrates LLMs into Autonomous Driving (AD) systems. Created LaMPilot-Bench, the first benchmark dataset to evaluate language model programs in AD. Conducted experiments to assess LLMs' performance in handling diverse driving scenarios and following user instructions.

**BEV-Based 3D Detection [WACV'24]:** Proposed MACP, a framework that equips pre-trained single-agent models with cooperation capabilities for V2V communications. Adapted the model by freezing most parameters and adding lightweight modules to address challenges in shifting to cooperative settings. Demonstrated superior performance in simulated and real-world benchmarks with fewer tunable parameters and reduced communication costs.

**Vision-Based Driver Monitoring [IEEE T-IV]:** Proposed a Driver Digital Twin framework with transformer-based action recognition and temporal localization modules, achieving SOTA performance in driver distraction detection on three publicly available benchmarks.

**Didi Chuxing**  
Research Intern

June 2019 – Sep. 2019  
Advised by [Dr. Pengfei Xu](#)

**Video Emotion Recognition [AAAI'20]:** Proposed a Visual-Audio Attention Network (VAANet) that integrates spatial, channel-wise, and temporal attention into a 3D convolutional neural network. VAANet achieved SOTA performance on both the VideoEmotion-8 and Ekman-6 benchmarks.

## PROFESSIONAL ACTIVITIES AND SERVICE

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### Organizing Committee

Co-Organizer, WACV 2024 Workshop on [Large Language and Vision Models for Autonomous Driving](#)  
Co-Organizer, [MAPLM Challenge: A Vision-Language Benchmark for Map and Traffic Scene Understanding](#)

### Review (43 papers in total)

ECCV (European Conference on Computer Vision)  
IJCAI (International Joint Conference on Artificial Intelligence)  
CVPR (IEEE/CVF Conference on Computer Vision and Pattern Recognition)  
ICML (International Conference on Machine Learning)  
IEEE IV (IEEE Intelligent Vehicles Symposium)  
FISTS (IEEE Forum on Integrated and Sustainable Transportation System)  
ITSC (IEEE International Conference on Intelligent Transportation Systems)  
ISBI (IEEE International Symposium on Biomedical Imaging)  
ICCPs (ACM/IEEE International Conference on Cyber-Physical Systems)  
MOST (IEEE International Conference on Mobility: Operations, Services, and Technologies)  
IEEE Internet of Things Journal  
IEEE Transactions on Intelligent Vehicles  
WACV Workshop on Large Language and Vision Models for Autonomous Driving (LLVM-AD)

### Volunteer

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

## SELECTED AWARDS

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Outstanding Speaker Award, Annual Conference on Next-Generation Transportation Systems	2023
AAAI Student Scholarship Grant	2023
NeurIPS ML4AD Grant	2022

## TECHNICAL SKILLS

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**Programming:** Python, C++

**Libraries:** PyTorch, Lightning, Hugging-Face, LangChain, MMDetection3D, Open3D, OpenCV

**Tools:** CARLA, Chroma, Git,  $\LaTeX$ , SQL