

Yu-Ang Zhang

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Education Background

Department of Civil Engineering, University of Washington, U.S. Sep. 2024 - Jun. 2029 (expected)

- Ph. D. in Civil Engineering (Computer Vision)
- GPA: 3.7/4.0

Department of Automation, Tsinghua University, China Aug. 2021 - Jun. 2024

- Master of Engineering in Automation
- GPA: 3.8/4.0

Department of Automation, Tsinghua University, China Aug. 2017 - Jul. 2021

- Bachelor of Engineering in Automation

Core Courses

- Pattern Recognition, Machine Learning, Artificial Neural Network, Big Data Modeling and Analysis, Numerical Analysis and Algorithms, Systems Engineering and Optimization

Research Experience

Adaptive Momentary Trajectory Prediction with Dual Diffusion Model Feb. 2025 - Oct. 2025

Advisor: Yin Hai Wang, Professor, Department of Civil Engineering, University of Washington

- Aimed to advance momentary pedestrian trajectory prediction under **extremely limited observations** (only two frames), which is critical for traffic safety in real-world blind-spot scenarios.
- Proposed *Diffusion²*, a **dual diffusion framework** that sequentially reconstructs unobserved histories and forecasts future trajectories, with dual-head parameterization for **uncertainty estimation** and an **adaptive noise scheduler**.
- *Diffusion²* achieved **state-of-the-art** results on ETH/UCY and Stanford Drone datasets, reducing FDE by up to **35.0%** (HOTEL) and meeting real-time requirements with DDIM sampling (75 ms latency).
- Submitted paper titled *Diffusion²: Dual Diffusion Model with Uncertainty-Aware Adaptive Noise for Momentary Trajectory Prediction*, currently under review at IEEE Transactions on Intelligent Transportation Systems (T-ITS).

Collaborative Perception for Autonomous Driving & Smart City May 2023 - Aug. 2024

Advisor: Yuguang (Michael) Fang, Professor, Department of Computer Science, City University of Hong Kong. Xianhao Chen, Assistant Professor, Department of Electrical and Electronic Engineering, The University of Hong Kong

- Aimed to design schemes that ensure **collaborative perception** in band-limited and time-varying channel scenarios.
- Proposed *SmartCooper*, which optimized the compression rate by channel status and ranked the transmission priority of sensor data from the **Connected Autonomous Vehicle (CAV)** using vehicle distance and location.
- *SmartCooper* reduced the communication costs by **23.1%** and improved the performance metric AP@IoU by **7.2%** compared with the state-of-the-art schemes (C-AOL, TWD, TWF etc.) on OPV2V dataset.
- Submitted paper titled *SmartCooper: Vehicular Collaborative Perception with Adaptive Fusion and Judger Mechanism*, which was accepted by ICRA 2024; another journal paper accepted by IEEE TMC.

3D Fusion Perception Based on Intelligent Vehicle Infrastructure Cooperation (IVIC) Jul. 2021 - Feb. 2023

Advisor: Jianming Hu, Associate Professor, Department of Automation, Tsinghua University

- Aimed to design fusion models that could effectively detect object categories such as car, cyclist, and pedestrian; subsequently applied the model to **Intelligent Vehicle Infrastructure Cooperation (IVIC)** and smart city scenes.
- Proposed *PillarFusion*, a LiDAR and Camera **fusion approach** for 3D perception; *PillarFusion* increased FPS by 2.9 folds compared with baselines (PointRCNN, MV3D etc.) on KITTI-2018 dataset.
- Introduced an anchor-free 3D object detection network based on H23D R-CNN and point cloud, which improved AP@IoU by 3.80% compared with baselines on KITTI-2018 dataset.

- Submitted paper titled *PillarFusion: Efficient 3D fusion object detection based on pillars*, which was accepted by CICTP 2024; another conference paper accepted by CAICE 2023.

Selected Publications

- [1] **Zhang, Y.**, An, H., Fang, Z., Xu, G., Zhou, Y., Chen, X., & Fang, Y. (2024). SmartCooper: Vehicular Collaborative Perception with Adaptive Fusion and Judger Mechanism. In IEEE International Conference on Robotics and Automation (ICRA 2024) (pp. 4450-4456).
- [2] **Zhang, Y.**, Li, X., Liu, H., Zhang, X., & Hu, J. (2024). PillarFusion: Efficient 3D fusion object detection based on pillars. In The 24th COTA International Conference of Transportation Professionals (CICTP 2024) (pp. 308-318).
- [3] Luo, Y.[†], **Zhang, Y.**[†], Chen, K., Zheng, X., Zhang, S., Chen, S., & Wang, Y. (2025). Diffusion²: Dual Diffusion Model with Uncertainty-Aware Adaptive Noise for Momentary Trajectory Prediction. *Under review*.
- [4] Li, X.[†], **Zhang, Y.**[†], Shi, Y., Zhu, H., Hu, J., & Peng, L. (2023). Quality Assessment of Image Dataset for Autonomous Driving. In IEEE International Conference on Imaging Systems and Techniques (IST 2023) (pp. 1-6).
- [5] Li, X., **Zhang, Y.**, Liu, H., Hu, J., & Peng, L. (2023). An anchor-free 3D object detection method with Camera and LiDAR based on H23D R-CNN. In International Conference on Computer, Artificial Intelligence, and Control Engineering (CAICE 2023) (vol. 12645, pp. 1301-1310).
- [6] Fang, Z., Hu, S., An, H., **Zhang, Y.**, Wang, J., Cao, H., Chen, X., & Fang, Y. (2024). PACP: Priority-Aware Collaborative Perception for Connected and Autonomous Vehicles. IEEE Transactions on Mobile Computing (vol. 23, no. 12, pp. 15003-15018).

Skills

Languages: C++, C, SQL, Python, PyTorch, TensorFlow, MATLAB, OpenCV, OpenPCDet.

ML & CV model: VLM, LLM, DDPM, DDIM, ViT, V2X-ViT, Transformer, Pointpillars, PointFusion, etc.