JINLONG LI

Computer Vision | **Deep Learning** | **Autonomous Driving**

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SUMMARY

- Experienced in pioneering deep learning technologies for computer vision and autonomous driving, with a proven track record of publications in top-tier journals and conferences.

- Computer vision-related models/tools: 2D/3D object detection, Domain adaptation, Transformer-related model, Diffusion-related model, Large language model.

- Autonomous driving-related models/tools: CARLA simulation, Camera-based/LiDAR-based perception.

RESEARCH PROJECTS

Vision-centric perception system via transfer learning technology | *Research Assistant, EECS, CSU* May 2021 - Dec 2022

- Background: Addressing the challenge of limited labeled ground truths in nighttime images for deep learning models, this project aimed to enhance vehicle perception in challenging driving scenarios, such as nighttime, and foggy weather. Leveraging transfer learning technology, the objective was to maximize the use of labeled images to improve model performance.

- **Situation-Sensitive Vehicle Detection Framework (TR-C 2021):** Developed a framework for vehicle detection in both daytime and nighttime using labeled daytime images. Utilized CycleGAN as a style transfer technology to enhance model performance during nighttime conditions.

- **Night-to-Day Translation for Vehicle Detection (TCSVT 2021):** Introduced a detail-preserving Night-to-Day translation method for direct adaptation of daytime models to nighttime vehicle detection.

- **Unsupervised Domain Adaptation for Adverse Conditions (WACV 2023):** Proposed an unsupervised domain adaptation method for robust object detection in foggy and rainy conditions. Integrated AdvGRL and domain-level metric regularization for improved adaptability.

Cooperative 3D LiDAR Perception Deployment | *Research Assistant, EECS, CSU*   Nov 2022 - Sep 2023

- Background: Enhancing Cooperative Autonomous Vehicle (CAV) perception through V2V communication is crucial for improved detection performance. This project focused on real-world deployment, building dataset construction, Lossy Communication challenges, and addressing the domain gap between simulated and real data.

- **Pioneering Dataset Construction (ICRA 2022 & CVPR 2023):** Contributed to OPV2V, the first large-scale cooperative 3D LiDAR dataset, and as key contributor to V2V4Real, the first large-scale real-world V2V perception dataset.

- **Cutting-edge Cooperative Perception Research under Lossy Communication (TIV 2023):** Proposed the first research on V2V cooperative perception (point cloud-based 3D object detection) under lossy communication. Explored the impact of lossy communication on cooperative perception.

- **Simulation-to-Reality Transfer Learning (ICRA2024):** Proposed the first Simulation-to-Reality transfer learning framework for multi-agent cooperative perception using a novel Vision Transformer, named as S2R-ViT. Addressed Deployment Gap and Feature Gap between simulated and real data.

- **Cross-Domain Learning for Multi-Agent Perception (ICRA2024):** Proposed a novel Feature Distribution-aware Aggregation framework, which is the first research on multi-agent perception to address the Distribution Gap of different independent private data for training distinct agents.

- **Adversarial GPS for Multi-Agent Attack (ICRA2024):** Proposed the first research of adversarial GPS signals which are also stealthy for the V2V cooperative perception attacks, denoted as AdvGPS. Three statistically sensitive natural discrepancies in AdvGPS proposed to enhance the multi-agent perception attack in the black-box scenarios.

Low Light Enhancement via Diffusion Model | *Research Assistant, EECS, CSU*   Aug 2023 - Dec 2023

- Background: With the rising prevalence of vision-centric perception systems relying on camera sensors, addressing safety concerns associated with low-light conditions has become imperative for ensuring overall vehicle safety.

- **Multi-Condition Diffusion Framework for Unpaired Low-Light Enhancement (CVPR2024 Rebuttal):** Proposed a Diffusion model to enhance low-light camera images for autonomous driving, mitigating the need for extensive nighttime data collection and preserving daytime performance. Our method incorporates a novel multi-condition adapter that adaptively controls the input weights from different modalitiesto effectively illuminate dark scenes while maintaining context consistency.

Robotic-Assisted Feeding Project of ODHE | *Research Assistant, EECS, CSU*   Sep 2021 - May 2022

- Objective: To develop methods enabling individuals with high tetraplegia to control aspects of helper robot reaching movements, incorporating motion planning, computer vision, and related technologies.

- **Vision-Based Detection System Development:** Led the development of a vision-based detection system for various foods within the Robotic-Assisted Feeding project. Defined food item characteristics to determine required actions, addressing different angles of food presentation. Implemented data augmentation for enhanced model generalization.

EDUCATION

Cleveland State University, Cleveland, USA   **Ph.D. in Computer Science**   Aug 2021 - present

Ph.D., Research Field: Computer Vision, Domain Adaptation, Autonomous Driving. GPA: 3.64/4.0

Chang'an University, Xi'an, China   **Master of Computer Science**   Sep 2018 - Jun 2021

M.S., Research Field: Vehicle Detection, Intelligent Transportation System. GPA: 3.30/4.0

Chang'an University, Xi'an, China   **Bachelor of Transportation Engineering**   Sep 2014 - Jun 2018

B.S., Research Field: Road Crack Detecting. GPA: 3.50/4.0

PEER-REVIEWED PUBLICATION

[1] **J. Li**, R. Xu, X. Liu, B. Li, Q. Zou, J. Ma, H. Yu. "S2R-ViT for multi-agent cooperative perception: Bridging the gap from simulation to reality." International Conference on Robotics and Automation (**ICRA**), 2024.

[2] **J. Li**, B. Li, X. Liu, F. juefei-Xu, Q. Guo, H. Yu. "AdvGPS: Adversarial GPS for Multi-Agent Perception Attack." International Conference on Robotics and Automation (**ICRA**), 2024.

[3] **J. Li**, B. Li, X. Liu, R. Xu, J. Ma, H. Yu. "Breaking Data Silos: Cross-Domain Learning for Multi-Agent Perception from Independent Private Sources." International Conference on Robotics and Automation (**ICRA**), 2024.

[4] **J. Li**, R. Xu, J. Ma, Q. Zou, J. Ma, H. Yu. "Domain Adaptive Object Detection for Autonomous Driving under Foggy Weather". Proceedings of the IEEE/CVF Winter Conference on Applications of Computer Vision (**WACV**), 2023. [Code:]

[5] **J. Li**, R. Xu, X. Liu, J. Ma, Z. Chi, J. Ma, H. Yu. "Learning for Vehicle-to-Vehicle Cooperative Perception under Lossy Communication". IEEE Transactions on Intelligent Vehicles (**TIV**), 2023. [Code:]

[6] **J. Li**, Z. Xu, L. Fu, X. Zhou, H. Yu. "Domain adaptation from daytime to nighttime: A situation-sensitive vehicle detection and traffic flow parameter estimation framework". Transportation Research Part C: Emerging Technologies (**TR-C**), 2021. **Impact Factor=8.3**

[7] **J. Li**, J. Ma, Q. Guo, T. Zhang, Y. Lin, H. Yu. "RXFOOD: Plug-in RGB-X Fusion for Object of Interest Detection." IEEE Transactions on Multimedia (**TMM**), 2023. **under review**

[8] **J. Li**, R. Xu, J. Ma, Q. Zou, J. Ma, H. Yu. "Domain Adaptation for Enhanced Object Detection in Foggy and Rainy Weather for Autonomous Driving." IEEE Transactions on Intelligent Vehicles (**TIV**), 2024. **under review**

[9] X. Liu, **J. Li**, J. Ma, H. Sun, Z. Xu, T. Zhang, H. Yu. "Deep Transfer Learning for Intelligent Vehicle Perception: a Survey." Green Energy and Intelligent Transportation (**GEIT**), 2024.

[10] T. Azfar, **J. Li**, H. Yu, RL. Cheu, Y. Lv, R. Ke. "Deep Learning-Based Computer Vision Methods for Complex Traffic Environments Perception: A Review." Data Science for Transportation (**DST**), 2023.

[11] R. Xu, H. Xiang, X. Xia, X. Han, **J. Li**, J. Ma. "OPV2V: An Open Benchmark Dataset and Fusion Pipeline for Perception with Vehicle-to-Vehicle Communication". IEEE International Conference on Robotics and Automation (**ICRA**), 2022. [Code:]

[12] X. Xu, X. Xia, **J. Li**, H. Li, S. Zhang, Z. Tu, Z. Meng, H. Xiang, X. Dong, R. Song, H. Yu, B. Zhou, J. Ma. "V2V4Real: A large-scale real-world dataset for Vehicle-to-Vehicle Cooperative Perception". Proceedings of IEEE/CVF Computer Vision and Pattern Recognition Conference (**CVPR**), 2023. **Highlight (2.5% of 9155 submissions)** [Code:]

[13] R. Xu, **J. Li**, X. Dong, H. Yu, J. Ma. "Bridging the domain gap for multi-agent perception". International Conference on Robotics and Automation (**ICRA**), 2023. [Code:]

[14] L. Fu, H. Yu, F. Xu, **J. Li**, Q. Guo, S. Wang. "Let There be Light: Improved Traffic Surveillance via Detail Preserving Night-to-Day Transfer". IEEE Transactions on Circuits and Systems for Video Technology (**TCSVT**), 2021. [Code:]

[15] Y.Gao*, **J. Li***, , Z. Xu, Z. Liu, X. Zhao, J. Chen. "A novel image-based convolutional neural network approach for traffic congestion estimation". Expert Systems with Applications (**ESWA**), 2021. *Co-first author

[16] H. Sun, L. Fu, **J. Li**, Q. Guo, Z. Meng, T. Zhang, Y. Lin, H. Yu. "Defense against Adversarial Cloud Attack on Remote Sensing Salient Object Detection." Proceedings of the IEEE/CVF Winter Conference on Applications of Computer Vision (**WACV**), 2024.

[17] R. Xu, Z. Tu, Y. Du, X. Dong, **J. Li**, Z. Meng, J. Ma, A. Bovik, H. Yu. "Pik-Fix: Restoring and Colorizing Old Photo". Proceedings of the IEEE/CVF Winter Conference on Applications of Computer Vision (**WACV**), 2023. [Code:]