Shengjie Xu

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Education

University of Maryland — College Park, MD
Ph.D. in Computer Science — 2023–Current

University of California, Santa Cruz — Santa Cruz, CA
M.S. in Electrical and Computer Engineering, GPA: 3.86/4.00, Advisor: Leilani H. Gilpin — 2021–2023

- Thesis: "A Framework for Generating Dangerous Scenes: Towards Explaining Realistic Driving Trajectories"

Hebei University of Technology — Tianjin, China
B.S. in Mechanical Engineering (Concentration: Automotive Engineering) — 2007–2011

Publications

[1] A. Gao, N. L. Williams, G. Lee, **Shengjie Xu**, X. Wang, W. B. S. Chambers, Y.-L. Qiao, and M. Lin, "Event-driven lighting for immersive attention guidance", in *CVPR 2024*, in submission.

[2] **Shengjie Xu**, L. Mi, and L. H. Gilpin, "A framework for generating dangerous scenes for testing robustness", in ***NeurIPS 2022 Workshop*** - *Progress and Challenges in Building Trustworthy Embodied AI*, Oct. 2022.

[3] X. Wang, D. Cong, Z. Yang, **Shengjie Xu**, and J. Han, "Modified quasi-newton optimization algorithm-based iterative learning control for multi-axial road durability test rig", *IEEE Access*, vol. 7, pp. 31 286–31 296, 2019, ISSN: 2169-3536.

[4] **Shengjie Xu**, "The synthetic 3dof wheel force for passenger vehicle based on predicted frequency response function model", in *WCX World Congress Experience*, 2018, p. 9.

Research Experience

GAMMA Lab, University of Maryland — College Park, MD
Research Assistant — Fall 2023 –Present

- Supervisor: Dr. Ming C. Lin
- NeRF-based rendering, with application in even-driven relighting.
- Material Point Method based 3D Gaussian Splatting soft-body simulation.
- Event camera based 3D Gaussian Splatting.
- Diffusion-based video relighting.

AIEA Lab, University of California, Santa Cruz — Santa Cruz, CA
Graduate Student Researcher — Winter 2022–Spring 2023

- Supervisor: Dr. Leilani H. Gilpin
- Designed generative model to manipulate object's pose, color, and shape in 2D image to extend corner-cases of self-driving datasets (paper link).
- Investigated the explainability of LiDAR object detection model via SHAP.
- Presented our paper at the NeurIPS 2022 and BayLearn 2022.

AVIS Lab, University of California, Santa Cruz — Santa Cruz, CA
Graduate Student Researcher — Winter 2022–Fall 2022

- Supervisor: Dr. James E. Davis
- Trained LiDAR-based 3D object detection model PV-RCNN by PyTorch.
- KITTI/Waymo/nuScene datasets visualization and labeling.

China Automotive Technology and Research Center Tianjin, China
Sr. Researcher Jan. 2017 –Sept. 2021

- Computer Vision R&D team
- Developed an high-speed autonomous driving test platform based on a virtual Thunderhill track by importing convex optimized waypoints (project link).
- Developed a disparity estimation algorithm for reconstructing the 3D model of a road surface to estimate real-time wheel force. Programmed a real-time convolution pipeline to visualize the predicted wheel force via PyQtGraph. Implemented YOLO-v3 for real-time road type detection and classification.
- Investigated the black-box modeling properties of the wheel force by Multi-Layer Perceptron and LSTM. Presented our work at the SAE World Congress Experience 2018.

Work Experience

China Automotive Technology and Research Center Tianjin, China
Sr. Engineering Manager Sept. 2011 –June 2019

- Led vehicle testing team in CATARC.
- Founded a Road Simulation team to serve Road Load Data Acquisition and system-identification-based dynamical road simulation.

Skills

- **Programming Languages:** Python, JavaScript, MATLAB, C++, Java, LaTeX, Julia
- **Machine Learning:** PyTorch, Tensorflow, Haiku/JAX, Scikit-learn, NumPy, Pandas, Qiskit
- **Computer Graphics:** OpenCV, OpenGL/WebGL, Unreal Engine, Unity, PyBullet, CARLA
- **Tools:** AWS EC2, gcloud CLI, Linux (Ubuntu), Git, Docker, ROS, Kubernetes, Slurm, Plotly

Academic Service

- Reviewer, AAAI-24's Special Track on Safe, Robust and Responsible AI (**AAAI SRAI**) 2023
- Reviewer, Conference on Neural Information Processing Systems (**NeurIPS**) 2022
- Reviewer, SAE International World Congress Experience (**SAE WCX**) 2018

Courses

- CMSC 657 Introduction to Quantum Information Processing, University of Maryland Fall 2023
- CMSC 838B Differentiable Programming, University of Maryland Fall 2023
- CMSC 848B Computational Imaging, University of Maryland Spring 2024
- CMSC 838C Advances in XR, University of Maryland Spring 2024
- CMSC 764 Advanced Numerical Optimization, University of Maryland Spring 2024