Shengjie Xu

sxu88@ucsc.edu | shengjie-xu.com

Education

University of California, Santa Cruz | ***MS in Electrical & Computer Engineering*** Sept. 2021 - 2023 (expected)
Advisor: Leilani H. Gilpin. Santa Cruz, CA

- cumulative GPA: 3.84

Hebei University of Technology | ***BSc in Mechanical Engineering, Vehicle Engineering minor*** Sept. 2007 – June 2011
Advisor: Zhanqun Shi. Tianjin, China

Research Interests

Trustworthy/Explainable AI, Physical Scene Understanding, 3D Vision, Robotics and Self-driving Cars

Professional Experience

University of California, Santa Cruz | ***Graduate Student Researcher*** Dec. 2021 – present
An Explainable Artificial Intelligence Framework for Neural Networks Training Santa Cruz, CA

- An explainability analysis of LiDAR inference model by using SHAP (Co-advised by James Davis).
- Generate Danger-KITTI corner cases by manipulating car's pose, color, and shape (GitHub).
- A proposal of developing explainable AI feedback with GAN/adversarial generated datasets.

China Automotive Technology and Research Center | ***Sr. Researcher*** Jan. 2017 – Sept. 2021
Led an R&D team of computer vision in automotive applications. Tianjin, China

- Developed an autonomous driving test platform based on a virtual Thunderhill track using OpenStreetMap, Unreal Engine, and CARLA by importing optimized waypoints and autonomously drove the vehicle model on the path at a maximum speed of 150kph.
- 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.
- Created a data analysis system to investigate the black-box modeling properties of the wheel force by Multi-Layer Perceptron and LSTM.
- Founded an internal learning group dedicated to bringing self-driving machine learning knowledge to help staff across the company on the topics of CNN, Computer Vision, linear SVM, UKF/EKF, Particle Filter, A* planning.

China Automotive Technology and Research Center | ***Sr. Engineering Manager*** Sept. 2011 – June 2019
Led vehicle testing team in CATARC. Tianjin, China

- Founded a Road Simulation team to serve Road Load Data Acquisition and system-identification-based dynamical road simulation.

Publications

A Framework for Generating Dangerous Scenes for Testing Robustness NeurIPS Workshop on TEA 2022
Shengjie Xu, Lan Mi, Leilani H. Gilpin

DANGER: A Framework of Danger-Aware Novel Dataset Generator Extension for Robustness Test of Machine Learning BayLearn 2022
Shengjie Xu, Leilani H. Gilpin

Integrated Model Predictive Control and Adaptive Unscented Kalman Filter for Semi-active Suspension System Based on Road Classification SAE Technical Paper 2020
Zhenfeng Wang, **Shengjie Xu**, Fei Li, Xinyu Wang, Jiansen Yang, Jing Miao

Modified Quasi-Newton Optimization Algorithm Based Iterative Learning Control for Multi-axial Road Durability Test Rig IEEE Access 2019
Xiao Wang, Dacheng Cong, Zhidong Yang, **Shengjie Xu**, Junwei Han

The Synthetic 3DOF Wheel Force for Passenger Vehicle Based on Predicted Frequency Response Function Model SAE Technical Paper 2018
Shengjie Xu

Courses

CSE 201 Analysis of Algorithms | *Instructor: Seshadhri Comandur* — Winter 2022

CSE 160 Introduction to Computer Graphics | *Instructor: James E. Davis* — Fall 2021

- Johnny 5. A WebGL-based blocky 3D animal won 2nd Overall Best prize in the Hall of Fame of CSE 160.
- Escape from Wolfenstein. A WebGL-based first-person shooter game won Best Story/Game prize in the Hall of Fame of CSE 160.

ECE 240 Introduction to Linear Dynamical Systems | *Instructor: Gabriel Hugh Elkaim* — Fall 2021

AM 214 Applied Dynamical Systems | *Instructor: Daniele Venturi* — Fall 2021

Honors/Awards & Certificates

Stanford Certificate of Completion on *ICME Summer Workshops 2022 — Fundamentals of Data Science* — Aug. 2022

San Diego Supercomputer Center Training Certificate on *High Performance Computing (HPC) / Cyberinfrastructure (CI) Training Series* — Jan. 2022 – May. 2022

Coursera Course Certificates on *Visual Perception for Self-Driving Cars*, *Introduction to Self-Driving Cars* — Feb. 2020 – Mar. 2020

Udacity Course Certificates on *Computer Vision and Deep Learning*, *Sensor Fusion*, *Localization*, *and Control* — Mar. 2018 – Aug. 2018

Automotive Engineering Research Institute *Excellent Core Researcher* — 2015

Automotive Engineering Research Institute *Excellent Core Researcher* — 2013

Distinguished Undergraduate Thesis Award — 2011

Invited Talks

International Forum on Reliability Session of SAE China — Sept. 2019

"The Application of Hybrid Simulation Road Simulation in Automotive Durability Development" — Shanghai, China

SAE World Congress Experience — Apr. 2018

"The Synthetic 3DOF Wheel Force for Passenger Vehicle Based on Predicted Frequency Response Function Model" — Detroit, MI

Professional Service

Paper Reviewer

- Conference on Neural Information Processing Systems (**NeurIPS 2022**)
- SAE International World Congress Experience (**SAE WCX 2018**)

Teaching Experience

CSE30: Programming Abstractions: Python | *Teaching Assistance, UC Santa Cruz* — Spring 2022, Fall 2021

ECE121: Microcontroller System Design | *Teaching Assistance, UC Santa Cruz* — Winter 2022

Research Mentoring

Wangyuan Xing | *Undergraduate student at Hebei University of Technology* — Jan. 2021 – June 2021

- *Trajectory Optimization and Control Simulation for Driverless Racecar Based on CARLA.* **Best Paper**

Pengchao Wang | *Undergraduate student at Hebei University of Technology* — Jan. 2021 – June 2021

- *Unreal Engine based Autonomous Vehicle Traffic Scene Construction and Pedestrian Detection*

Zhaoran Wang | *Undergraduate student at Hebei University of Technology* — Jan. 2021 – June 2021

- *Research and Application of Pavement Information Reconstruction Based on Stereo Vision.* **Best Paper**

Skills

Programming Languages: Python, HTML, JavaScript, MATLAB, C++, Java, LaTeX, Julia
Tools: OpenCV, PyTorch, Tensorflow, Haiku/JAX, OpenGL/WebGL, Scikit-learn, CARLA, Unreal Engine, PyBullet, AWS EC2, Linux (Ubuntu), Git, Docker

Specialty

Fine Arts: My Renaissance-style practicing drawings are available at here.
Liberal Arts: Reading books about economic liberalism, history, democracy, constitutionalism, and entrepreneurship.