Shusen Lin

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Projects: https://pumpkincode2077.github.io

Education

- **University of California, San Diego** — La Jolla, CA
  M.S., Electrical Engineering - Intelligence Systems, Robotics & Control — *Sep 2021 - Jun 2023*
- **Arizona State University** — Tempe, AZ
  B.S.E., Electrical Engineering — *Dec 2018 - May 2021*
  Undergraduate Teaching Assistance and Grader in Signal & System I

Technical Skills

- **Robotics**: ROS, Gazebo, Rviz, QGIS, OMPL, PCL, Pytorch, Apollo
- **Languages**: C++, Python, MATLAB, Verilog, OpenMP, OpenACC, CUDA
- **Others**: Git, XML, Markdown, LaTeX, Linux, Fusion, Cura, LTspice, LabVIEW, Cadence

Publication

Dai, Z., Asgharivaskasi, A., Duong, T., **Lin, S**., Tzes, M., Pappas, G., & Atanasov, N. (2023). Optimal Scene Graph Planning with Large Language Model Guidance. ArXiv. /abs/2309.09182 (ICRA2024)

Work Experiences

- **Department of Intelligent Driving Tools, Ruqi Mobility** — Guangzhou, China
  Autonomous Driving Algorithm Engineer, Full Time — *July 2023 - Present*
  - **Keywords**: HD Map, Self-Driving, Data Cleaning, Planning, Vectorized Map, Calibration, Apollo
  - **Main works**: Data pre-processing for HD Map annotation; Hybrid A* star algorithm for a U-turn trajectory generation in narrow urban scenarios; Online vectorized lane-level map construction and update based on BEV+Transformer MapTR results; Apollo planning&control algorithm IPC deployment; Writing patents.
- **Existential Robotics Laboratory, UCSD** — La Jolla, CA
  Student Researcher - Racecar Team, supervised by Prof. Nikolay Atanasov — *Jun 2022 - Jun 2023*
  - **Keywords**: SLAM, Planning, Mapping, Navigation, C++, Python, Gazebo, ROS
  - **Research**: Dai, Z., **Lin, S**., Asgharivaskasi, A., & Atanasov, N. Active-iSDDF: Active Incremental Estimation of Signed Directional Distance Functions. Considering direction factor in SDF for unknown environments mobile robot exploration.
  - **Main works**: Applying, configuring Voxblox, Octomap, A*, RRT* (ompl) algorithms to RC racecar robot. Implementing and verifying the results with real-time sensors and Gazebo simulations; Setting up and maintaining Jackal robot for research purposes; Configuring iSDDF planner, frontier-based explorer, TARE planner, and Limo-SLAM to Jackal robots.
  - **Hardware**: Jackal robots, OS1-32 Lidar, 4x4 RC racecar, Intel D455 depth camera, Hokuyo LiDAR UST-10LX

Project Experiences

- **Robotic Experience in CSE276A Robotics, UCSD** — La Jolla, CA
  Group Course Project, C++, Python, ROS — *Sep 2022 - Dec 2022*
  - *Main works*: Driving a four wheels robot,building PID controller for localization, Kalman Filter SLAM, A* path planning, coverage path planning, integrating above features to the robot for act like a Roomba.
  - *Hardware*: MegaBot mBot with Mecanum wheels, Qualcomm RB5 platform with dual camera.
- **Robotic Experience in ECE276A&B Robotics Sensing, Estimation & Planning, UCSD** — La Jolla, CA
  Individual Course Projects, Python — *Dec 2021 - Jun 2022*
  - *Object Detection*: Locating a phone on images, training the SVM model with HOG pre-processing and sliding window method
  - *Particle Filter and Visual-Inertial SLAM*: Implementing SLAM using IMU, 2-D LiDAR scans, and stereo camera measurements from an autonomous vehicle to do the SLAM via an Extended Kalman filter and Particle filter separately
  - *Motion Planning*: Implementing A* and JPS search-based planning algorithms in a 2D target chasing problem.
  - *Infinite-Horizon Stochastic Optimal Control*: Solving a trajectory tracking problem for a ground differential-drive robot via receding-horizon certainty equivalent control and generalized policy iteration.

Course Works

- **Artificial Intelligence & CSE**: Robotic sensing, mapping & planning, SLAM, Deep learning, Parallel computation
- **Electrical Engineering**: Analog, Signal & Systems, DSP, Comm network, Computer architecture, Digital design, Control theory
- **Fundamental**: Linear algebra & system, Statistical learning, Random process, Data structure, Optimization

Honors and Awards

- Summa Cum Laude Honor Cord, Arizona State University, May 2021
- Second Prize, Campus Electronic Design Competition, Beijing University of Technology, July 2018
- Third Prize, Electronic Design Competition, Beijing, July 2018