

Yukun Xia

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Education

Carnegie Mellon University - School of Computer Science

Master of Robotics System Development, GPA: 4.00/4.00

Pittsburgh, PA

May 2022

Harvard University

M.S., Engineering Science, GPA: 3.945/4.00

Cambridge, MA

May 2020

Xi'an Jiaotong University

B.S., Applied Mechanics, GPA: 3.66/4.00

Xi'an, China

May 2015

Work Experience

Deepmap - Software Engineer Intern - Localization Team

Pittsburgh, PA (remote) | May 2021 – July 2021

- Implemented stereo visual odometry in C++ with visualization and evaluation tools, estimated interframe motion and its uncertainty, reduced the overall localization system error.

Projects

An Empirical Study on Multi-View Reconstruction Methods(*report*)

CMU | Mar 2022 – Apr 2022

- Quantitatively and qualitatively compared dense multi-view reconstruction quality of COLMAP, MVSNet and NeRF in customized challenging scenes

Deployment of SuperPoint on Jetson Nano (*github*)

CMU | Oct 2021 – Dec 2021

- Retrained SuperPoint models with different configurations, deployed them on a Jetson Nano, and tested the trade-off between performance and energy efficiency on the KITTI dataset

Mobile Robot Object Classification & Avoidance (*link*)

CMU | Oct 2020 – Dec 2021

- Conducted Agile teamwork and developed ROS programs in C++
- Built a factory simulation environment in Gazebo with mobile robots, forklifts and pedestrians
- Trained YOLOv5 and deployed the model onto Jetson AGX Xavier via TensorRT, reaching 50FPS
- Calibrated camera-lidar-robot extrinsics with nonlinear least square solvers
- Estimated object locations by fusing image object detection and lidar point cloud
- Set up a ground truth system to evaluate the performance of object detection models and the sensor fusion algorithm

Reimplementation of V-LOAM (*github*)

CMU | Mar 2021 – May 2021

- Extracted and matched features from images; estimated continuous depth map from point cloud; optimized frame-to-frame motion with Ceres
- Refactored A-LOAM to integrate with visual odometry and enabled more controllable intermodular communication
- Reduced translation and rotation error of A-LOAM respectively by 26.9% and 22.5% in 9 KITTI sequences in average

Real-time MPC with iLQR for Self-Driving in Carla (*github*)

Harvard | Apr 2020 – June 2020

- Learned the vehicle dynamical model by combining the bicycle model and a fully connected neural network
- Implemented the iLQR algorithm from scratch with Google Jax
- Validated the real-time performance of MPC algorithm in Carla, with iLQR potentially running in 1kHz

Skills

- Languages:** C++, Python; *Basic:* Matlab
- Tools:** CMake, Bazel, Git, Gerrit; *Basic:* Makefile, Bash, Docker
- Packages:** ROS, Eigen, Numpy, OpenCV, Ceres, Pytorch; *Basic:* PCL, Jax, Protobuf, Halide, TensorRT, OctoMap
- Software:** Blender, Gazebo, Carla

Publication

- Hongbiao Zhu, Chao Cao, **Yukun Xia**, Sebastian Scherer, Ji Zhang, Weidong Wang. DSVP: Dual-Stage Viewpoint Planner for Rapid Exploration by Dynamic Expansion. IROS 2021.
- Chao Cao, Hongbiao Zhu, Fan Yang, **Yukun Xia**, Howie Choset, Jean Oh, Ji Zhang. Autonomous Exploration Development Environment and the Planning Algorithms. ICRA 2022.