JACK YI YANG

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EDUCATION

Carnegie Mellon University, Robotics Institute — Pittsburgh, PA
Master of Science in Robotics, QPA: 3.89/4.33 — August 2019
Thesis: Surfel-based RGB-D Reconstruction and SLAM with Global and Local Consistency

Harvey Mudd College — Claremont, CA
Bachelor of Science in Engineering, GPA: 3.79/4.00, Class Top 10% — May 2017

WORK EXPERIENCE

Nuro Inc., *Senior Software Engineer, Mapping and Localization* — Mountain View, CA, Summer 2021-Present

- Tech Lead for satellite/aerial imagery-based **ML localization system** achieving sub-meter level localization accuracy for autonomous vehicle application.
  - Designed the overall ML architecture and built a **convolution neural network** in Tensorflow to extract robust multi-modal sensor features through differentiable cross-correlation. Successfully expands the AV deployment region by more than 200 square miles while reducing the mapping cost by 50%.
  - Developed a **distributed MapReduce data pipeline** to efficiently process terabyte-scale of geospatial data for ML consumption, increasing the model iteration speed by 40%.
  - Spearheaded the ML verification module by leveraging geometry-based **3D vision / SLAM** to validate for autonomouos vehicle deployment.
- Developed a **Transformer-based** ML model to extract road semantics by fusing LiDAR and camera data in Bird's Eye View (BEV) representation.
  - Built **customized KNN attention** kernel, reducing the GPU memory load during both training and inference by 30%.
  - Created a novel **geometry-based ground truth alignment** method to improve training data quality, increasing model precision/recall by over 10%.
- Led the development and maintenance of Nuro's multi-city HD map system.
  - Developed CUDA-based Iterative Closest Point (ICP) algorithm using **GPU KD tree** acceleration, achieving a 20x latency improvement.
  - Built a **geospatial map storage system** utilizing an optimized data structure for rapid spatial indexing on a non-Euclidean manifold.

Phiar Technologies, Inc., *Software Engineer, Perception* — Redwood City, CA, Fall 2019-Summer 2021
Startup acquired by Google in 2022

- Led the development of a **tightly-coupled visual inertial odometry** with sensor data from monocular camera, IMU, GPS, and vehicle odometer on a mobile iOS device.
- Developed an **offline calibration pipeline** using a combination of visual odometry and batch pose graph optimization to calibrate the intrinsics and extrinsics of cameras, IMUs, and vehicle odometers.

PUBLICATIONS

Evaluating Global Geo-alignment for Precision Learned Autonomous Vehicle Localization using Aerial Data
International Conference on Robotics and Automation (ICRA) 2025, **Y. Yang**, X. Zhao, C. Zhao, S. Yuan, S. Bateman, T. Huang, C. Beall, and W. Maddern

Surfel-Based Dense RGB-D Reconstruction with Global and Local Consistency
International Conference on Robotics and Automation (ICRA) 2019, **Y. Yang**, W. Dong, and M. Kaess

GPU Accelerated Robust Scene Reconstruction
International Conference on Robots and Systems (IROS) 2019, W. Dong, J. Park, **Y. Yang**, and M. Kaess

SKILLS

- **Programming Languages:** C++, Python, Swift
- **Tools and frameworks:** Tensorflow, Pytorch, CUDA, Protobuf, Bazel, ROS, Eigen, OpenCV, NumPy, GTSAM, Ceres