Yupeng Han

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Education & Research

Carnegie Mellon University, Robotics Institute — Oct 2019 - June 2021
Topic : GPU-based Real-Time Object Pose Estimation — Advisor: **Prof. Maxim Likhachev**
Purdue University, West Lafayette — Aug 2017 - Dec 2018
M.S. in Engineering — GPA: 3.96/4.00
Shanghai Jiao Tong University, China — Aug 2013 - Jun 2017
Bachelor in Mechanical Engineering, Tsien-Hsue-Shen Honor Program — GPA: 3.75/4.30

Professional Experience

EBots Inc. — **Computer Vision Engineer**
6Dof Pose Estimation & 3D Reconstruct & CUDA Optimization — May 2022 - Present

- 3D Reconstruction
- Speed up point cloud generation module by **20X**, using local plane fitting and hash checking, significantly speeding up denoising and triangulation steps, reducing point cloud generation time from 170ms to ∼8ms. Meanwhile, enable the point cloud generation module hole-filling capability. The final 3D point cloud has a three-dimensional resolution of 40 microns and can reconstruct the gold metal surface.
- Point Cloud Registration
- Accomplish **10X** speed-up for the ICP module. Applied KD-Tree to optimize the point nearest point pairing process, learn the statistic within the point cloud, eliminate outliers within the point pairing process, and other engineering perspective optimization.

Trifo Inc. — Research & Development Engineer
Optimize SLAM & Local Feature Generation — Jun 2021 - May 2022

- Developed a submap feature voting mechanism to adjust submap poses to compensate for errors accumulated in odometer travel and depth sensor noise.

CMU Robotics Institute — **Research Engineer - Robotic Perception**
GPU-based Real-Time Object Pose Estimation System — Oct 2019 - Jun 2021

- Vehicle Detection Based-on Sensor Fusion**[**Video**]**
- Created an efficient 3D vehicle detection system for autonomous driving by leveraging deep learning, computer graphics, and optimization techniques to achieve high speed, scalability, and accuracy.
- Indoor Object-6DOF Pose Estimation**[**Video**]**
- Developed the pose proposal generation module in an RGB-D 6-DOF pose estimation framework. Tested on the open dataset (YCB-Video), results show that our algorithm surpasses state-of-the-art 6-DOF pose estimation methods with great margins without the need for any ground truth pose annotations.

Deptrum Co.Ltd — Computer Vision Engineer
Face Detection on Depth Images **[**Video**]** — Apr 2019 - Aug 2019

- Developed depth image face detection pipeline. Obtained 99.93% precision and over 97% recall.

Publications

- A Agrawal, **Y Han** and M Likhachev, "PERCH 2.0:Fast and Accurate GPU-based Perception via Search for Object Pose Estimation" *IEEE International Conference on Intelligent Robots and Systems (IROS), 2021*
- J Thekinen, **Y Han** and J Panchal, "Designing Market Thickness and Optimal Frequency of Multi-Period Stable Matching in CBDM" *ASME International Design Engineering Technical Conferences (IDETC), 2018*

Skills

Programming: C++, CUDA, Python
Technical Expertise: RGB-D 6DOF Pose Estimation, 3D Reconstruction, Parallel Programming