

Yang Miao

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Educational Background

- 2021-2024 Master in Robotics, System and Control, ETH Zurich, GPA **5.83/6**
2016-2020 B.Eng. in E.E. and Automation, Harbin Institute of Technology, GPA 96.9/100 (**Top 1/289**)
2019 Visiting student, University of California, Berkeley, GPA **4.0/4.0**

Research Experiences

11/2023-04/2024 Visual Localization to 3D Scene Graph ([webpage](#)) Research Assistant

Keywords: Cross-modal localization; 3D scene graph; Multi-modal embedding; Contrastive Learning;

Supervisor: Dr. Dániel Béla Baráth, Dr. Francis Engelmann, Dr. Olga Vysotska at CVG Lab, ETHZ

- Publication:** Y. Miao, F. Engelmann, O. Vysotska, F. Tombari, M. Pollefeys, D. Baráth, “*SceneGraphLoc: Cross-Modal Coarse Visual Localization on 3D Scene Graphs*”, *ECCV 2024*.
- Proposed a novel challenge of cross-modal localization of a query image within 3D scene graphs.
- Leveraged multiple modalities of scene graph for object embedding in the scene graph.
- Contrastive learning for a shared embedding space for objects in query images and in 3D scene graph.
- Outperforms** existing cross-modal localization methods by a large margin

10/2022-10/2023 Panoptic SLAM with Semantic and Geometric Consistency ([github](#)) Master Thesis

Keywords: 3D panoptic mapping; Semantic-aided localization; C++; python; ROS; PyTorch

Supervisor: Dr. Iro Armeni, Dr. Dániel Béla Baráth, Prof. Dr. Marc Pollefeys at CVG Lab, ETHZ

Phase 1: Incremental Panoptic Mapping

- Publication:** Y. Miao, I. Armeni, M. Pollefeys, D. Barath, “*Volumetric Semantically Consistent 3D Panoptic Mapping*”, *IROS 2024 (Oral Pre)*
- Developed algorithms which incrementally builds 3D panoptic map with RGB-D frames;
- Outperforms** existing 2D-3D semantic-instance mapping method with estimated trajectory.

Phase 2: Semantic-aided Localization (transferred to next project)

- Improved ORB-SLAM3 and Voxgraph with panoptic information.
- Explored semantic-aided with panoptic information, which led to “Visual Localization to 3D Scene Graph”.

04/2022-10/2022 Visual Odometry with New Unprecedented Event Camera ([github](#)) Research Assistant

Keywords: Visual Odometry; Event Camera; Feature Tracking; ROS; C++; Ceres

Supervisor: Nico Messikommer, Daniel Gehrig, Prof. Dr. Davide Scaramuzza at RPG Lab, UZH

- Developed feature tracking algorithms for new event camera with events with absolute intensity value.
- Outperforms** existing methods.
- Grants Oculi sensor (low resolution) feature tracking accuracy **comparable to** Realsense(high resolution).

Industry Research Experiences

06/2020-06/2021 3D Computer Vision for Automation of Port Operations ([pdf](#)) Research Assistant

Keyword: Lidar Pointclouds Processing; Pattern Recognition; Pose Estimation; ROS; C++

Supervisor: Prof. Zhan Li - Intelligent Control Lab, Harbin Institute of Technology

- Publication:** Y. Miao, C. Li, Z. Li, Y. Yang, X. Yu, “*A Novel Algorithm of Ship Structure Modeling and Target Identification Based on Point Cloud for Automation in Bulk Cargo Terminals*,” *Measurement and Control 2021*
- Developed and **deployed** a system for hatch recognition and pose estimation of cargo ships at **Tianjin Port**.