Yidan Gao

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Education

New York University — New York, USA
PhD Student in Computer Science, advisors: David Fouhey, Daniele Panozzo — *Sep. 2024 – Present*

ETH Zurich — Zurich, Switzerland
Master's in Mechanical Engineering, GPA 5.4/6.0 — *Sep. 2020 – May 2024*

Tongji University — Shanghai, China
Bachelor's in Engineering Mechanics, GPA 91/100 — *Sep. 2016 – Jul. 2020*

Publications

LookUp3D: Data-Driven 3D Scanning — *SIGGRAPH Asia 2025*
Giancarlo Pereira, **Yidan Gao***, Yurii Piadyk*, David Fouhey, Claudio T Silva, Daniele Panozzo*

- Introduced a 3D scanning approach that bypasses triangulation using a per-pixel color-to-depth lookup table collected at calibration, enabling reconstruction of dynamic scenes at 450 fps and 1 MP resolution.
- Studied residuals as effective confidence cue for depth filtering and requery. Explored multiple options for denoising and simplifying the lookup search, including approximation with an MLP, highlighting the system's potential in further acceleration and optimization.

Robust Incremental Structure-from-Motion with Hybrid Features — *ECCV 2024*
Shaohui Liu, **Yidan Gao***, Tianyi Zhang*, Rémi Pautrat, Johannes L. Schönberger, Viktor Larsson, Marc Pollefeys*

- Integrated structural features (points, lines, vanishing points, point-line associations, etc) within the context of incremental SfM, leveraging classic SfM software COLMAP and line mapping library LIMAP.
- Enhanced pose accuracy across all stages of the SfM pipeline, including registration, triangulation, and bundle adjustment, and achieved better robustness system-wide.

Research Projects

Improving 3D Line Reconstruction Using SfM Point Cloud — May 2022 – Sep. 2022
Computer Vision and Geometry Group (CVG), ETH Zurich — *Advisor: Marc Pollefeys*

- Proposed new 3D line fitting and merging using sparse depth inferred from SfM. Exploited track information and uncertainty from SfM to improve completeness and accuracy of the 3D reconstructions.

COLMAPSLAM – An Offline Python SLAM Using COLMAP — Feb. 2022 – Jul. 2022
Computer Vision and Geometry Group (CVG), ETH Zurich — *Advisor: Marc Pollefeys*

- Developed a Python SLAM system leveraging COLMAP and ORB-SLAM. Achieved faster speed than COLMAP and richer mapping than ORB-SLAM, with comparable or improved trajectory accuracy.

Environment Mapping for Large-Scale Teleoperation — Oct. 2021 – Dec. 2021
Robotic Systems Lab (RSL), ETH Zurich — *Advisor: Marco Hutter*

- Proposed a volumetric mapping pipeline that constructs a 3rd-person-view colored map and mesh using real-time fusion of onboard camera and lidar data, enabling the teleoperation of the robot excavator.

Skills & Proficiency

Languages: Chinese (Native), English (C1), German (A2)
Programming: C/C++, Python, Git, ROS, MATLAB, Docker
Operating Systems: Windows, Linux