

Dongyue Lu

Curriculum Vitae

School of Computing
National University of Singapore
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Research Interest

3D Computer Vision, Robotic Perception.

Education

- 2020–2023: **Master of Science, Robotics, Cognition, Intelligence**, *Technical University of Munich*, Munich, Germany.
GPA:1.3/1.0
- 2015–2020: **Bachelor of Engineering, Vehicle Engineering**, *Tongji University*, Shanghai, China.
GPA:4.44/5.0

Publications

- 2023 Yingye Xin, Xingxing Zuo, Dongyue Lu, and Stefan Leutenegger. Simplemapping: Real-time visual-inertial dense mapping with deep multi-view stereo. In *22nd IEEE International Symposium on Mixed and Augmented Reality (ISMAR)*. IEEE, 2023.

Research Experience

- Research Intern **Computer Vision and Robotic Perception (CVRP) Laboratory, National University of Singapore**, August, 2023 - Present.
Topic: Dexterous Hand-Object Reconstruction.
Advisor: Prof.Gim Hee Lee
- MSc Student **Smart Robotics Lab, Technical University of Munich**, May, 2022 - July, 2023.
Thesis: Dynamic Object SLAM with Dense Optical Flow.
Developed a joint camera and dynamic object pose estimation and shape reconstruction framework using a dense optical flow estimator and a differentiable dynamic bundle adjustment layer. ([Introduction](#))
Project: SimpleMapping: Real-Time Visual-Inertial Dense Mapping with Deep Multi-View Stereo.
Proposed a real-time visual-inertial method for 3D mesh reconstruction using monocular images and IMU readings. Developed SPA-MVSNet, a neural network for leveraging sparse map points to estimate dense depth. Fused dense depth maps using TSDF-Fusion to create a global map. Achieved impressive 3D mesh reconstruction results, with a 39.7% F-score improvement over existing methods on the EuRoC dataset. ([Project Page](#))
Advisor:Dr.Xingxing Zuo, Prof.Dr.Stefan Leutenegger
- MSc Student **Visual Computing Lab, Technical University of Munich**, April, 2021 - March,2022.
Project: End-to-end Learned Multi-View Stereo Reconstruction with Transformers.
Proposed an end-to-end multi-view stereo method that fused sparse TSDF volumes incrementally regressed by 3D sparse convolution with a novel transformer fusion module to achieve coherent reconstruction. Trained and conducted experiments on ScanNet, which showed that this method had real-time efficiency and better performance in extreme cases compared to state-of-the-art methods. ([Project Page](#))

Project: Shape Completion with Meso-Skeleton Learning.

Proposed a novel point cloud completion method that leveraged the intermediate meso-skeleton of a point cloud to maintain global topology. Conducted experiments on ShapeNet, which showed that using the meso-skeleton, this method could effectively capture the global structure and had a better completion effect than traditional frameworks. ([Project Page](#))

Advisor: Dr. Yinyu Nie, Prof. Dr. Matthias Nießner

Selected Projects

January, 2022 – March, 2022 **Path Planning for UAV Avalanche Rescue**, Autonomous Aerial Systems group, Technical University of Munich.

Designed and deployed a UAV equipped with an avalanche beacon in a simulated environment to perform avalanche rescue missions. Explored various path planning algorithms based on geometry and potential field for efficient victim search and compared their performance through extensive experiments. ([Project Page](#))

Advisor : Christoph Killing, Prof. Dr.-Ing. Markus Ryll

June, 2021 – August, 2021 **Stereo Reconstruction**, 3D AI Lab, Technical University of Munich.

Applied various keypoint detectors (SIFT, ORB) and dense stereo matching methods (Block matching, Semi-global matching) to reconstruct 3D scenes and conducted performance comparisons. ([Project Page](#))

Advisor : Yuchen Rao, Prof. Dr. Angela Dai

Fellowships & Awards

- 2021 **Runner-up** Tencent AIMIS Medical Artificial Intelligence Algorithm Competition
- 2020 **2nd Prize** "Huawei Cup" The 17th China Post-graduate Mathematical Contest in Modeling
- 2019 **Champion** Formula Student Combustion China (TJU Racing Team)
- 2019 **4th Place** Student Formula Japan (TJU Racing Team)
- 2018 **4th Place** Student Formula Japan (TJU Racing Team)
- 2018 **1st Prize** Formula Student Combustion China (TJU Racing Team)
- 2017 **2nd Prize** China Undergraduate Mathematical Contest in Modeling
- 2017 **3rd Prize** Tongji University Mathematical Contest in Modeling
- 2019 **3rd Prize** Tongji Scholarship of Excellence
- 2018 **1st Prize** Tongji Scholarship of Excellence
- 2017 **3rd Prize** Tongji Scholarship of Excellence

Working experience

- June 2019 – October 2019 **Schaeffler, Commercial Category Intern**, Shanghai, China.
- Processed part data from suppliers with machine learning classification algorithms (k-means, random forest).

Position of Responsibility

- 2019-2024 **Assistant Engineer**, China Society of Automotive Engineers.
- 2017-2019 **Head of Chassis**, TJU Racing Team.

Skills

- Computer Skills Python, C++, Git flow, ROS, etc.
- Languages English (fluent), Chinese (native), German (basic), Japanese (basic)