Dongyue Lu

Curriculum Vitae

School of Computing
National University of Singapore
℘ *(+65)98654411*
✉ *dongyue.lu@tum.de*
✆ *My Webpage*
 Github

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 framework using a dense optical flow estimator and a differentiable dynamic bundle adjustment layer. Solved occlusion and object discontinuity using a camera-object graph. Experiments on Virtual KITTI dataset proved this system achieved better object pose estimation accuracy and greater robustness than other SOTA works in outdoor scenes.(*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)