

FAN LU

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EDUCATION

Tongji University, Shanghai, China

September 2020 – Present

Ph.D. student of Automotive Engineering

Supervisor: Prof. Guang Chen

Research Interests: 3D computer vision, including point cloud registration and neural rendering.

Tongji University, Shanghai, China

September 2015 – July 2020

Bachelor of Automotive Engineering

GPA: 4.60/5.0 (Top 15%)

PUBLICATIONS

RSKDD-Net: Random Sample-based Keypoint Detector and Descriptor

Fan Lu, Guang Chen, Yinlong Liu, Zhongnan Qu, Alois Knoll

Advances in Neural Information Processing Systems (NeurIPS), 2020

We propose a random sample-based keypoint detector and descriptor for large scale LiDAR point clouds registration, which achieves state-of-the-art accuracy with $15\times$ faster speed than existing learning-based methods.

PointINet: Point Cloud Frame Interpolation Network

Fan Lu, Guang Chen, Sanqing Qu, Zhijun Li, Yinlong Liu, Alois Knoll

AAAI Conference on Artificial Intelligence (AAAI), 2021

We study a novel task named *Point Cloud Frame Interpolation*, which aims to predict intermediate point clouds between two frames and can be used to upsample low frame rate point cloud streams to higher frame rates.

MoNet: Motion-based Point Cloud Prediction Network

Fan Lu, Guang Chen, Yinlong Liu, Zhijun Li, Sanqing Qu, Tianpei Zou

IEEE Transactions on Intelligent Transportation Systems (T-ITS), 2022

We propose a novel learning-based framework for future LiDAR point clouds prediction, which combines content features and motion features to improve the accuracy and also quality of the predicted point clouds.

HRegNet: A Hierarchical Network for Large-scale Outdoor LiDAR Point Cloud Registration

Fan Lu, Guang Chen, Yinlong Liu, Lijun Zhang, Sanqing Qu, Shu Liu, Rongqi Gu

IEEE/CVF International Conference on Computer Vision (ICCV), 2021

We propose a hierarchical network to leverage rich features in deeper layer and precise position information in shallower layers for robust and precise LiDAR point cloud registration. Bilateral consensus and neighborhood consensus are introduced to improve robustness.

HRegNet: A Hierarchical Network for Efficient and Accurate Outdoor LiDAR Point Cloud Registration

Fan Lu, Guang Chen, Yinlong Liu, Lijun Zhang, Sanqing Qu, Shu Liu, Rongqi Gu, Changjun Jiang

IEEE Transactions on Pattern Analysis and Machine Intelligence (T-PAMI), 2023

Extended journal version of HRegNet[ICCV'21]. Further introduce spatial consistency for better performance.

Sparse-to-Dense Matching Network for Large-scale LiDAR Point Cloud Registration

Fan Lu, Guang Chen, Yinlong Liu, Yibing Zhan, Zhijun Li, Dacheng Tao, Changjun Jiang

IEEE Transactions on Pattern Analysis and Machine Intelligence (T-PAMI), 2023

We propose a Sparse-to-Dense Matching Network (SDMNet) for large-scale outdoor LiDAR point cloud registration. A novel two-stage feature matching paradigm and an optimal transport-based neighborhood matching module are proposed to improve the efficiency and robustness of point cloud registration.

HONORS AND AWARDS

- Shanghai Outstanding Graduate, 2020
- Second Prize of National Post-Graduate Mathematical Contest in Modeling, 2020
- First Class Scholarship of Tongji University, 2018-2019
- First Prize of “Challenge Cup” in Shanghai, 2019