

Deep Relative Pose Estimation for Stereo Camera

Goal:

Design a neural network to estimate the relative pose between two frames for a stereo camera.

Description:

Recently there is some work on relative pose estimation between two images/frames based on neural network, which aims for the application in autonomous driving. However, compared to traditional geometric methods (e.g. 5-point algorithm), these methods have much worse accuracy. With a stereo camera we can obtain two frames captured at the same time, and recover the depth for each frame without scale ambiguity. This would help the pose estimation.

This project aims to design a neural network to estimate the relative pose between two frames for a stereo camera. The students will start from learning the existing neural network for disparity/depth estimation and pose estimation for the monocular camera. Then they will focus on the design of neural network for the stereo camera.

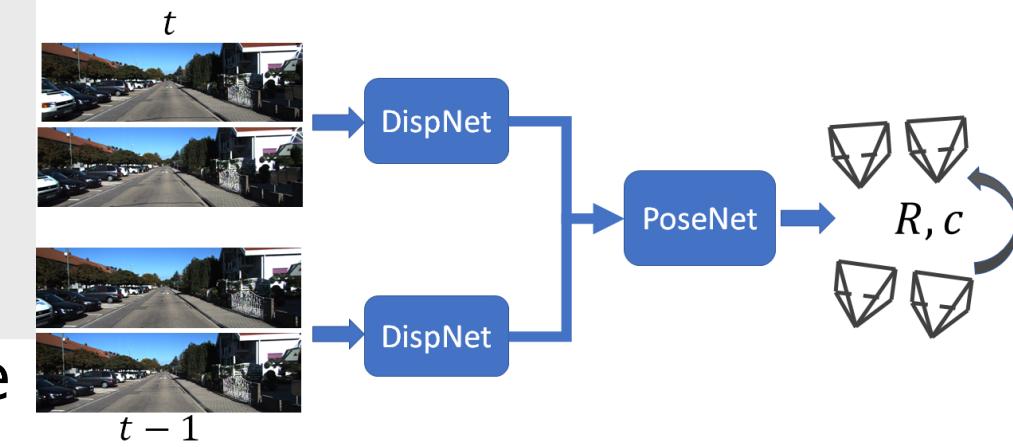
- [1] Zhou T, Brown M, Snavely N, Lowe DG. Unsupervised learning of depth and ego-motion from video. In CVPR 2017.
- [2] Ummenhofer B, Zhou H, Uhrig J, Mayer N, Ilg E, Dosovitskiy A, Brox T. Demon: Depth and motion network for learning monocular stereo. In CVPR 2017.
- [3] Mayer N, Ilg E, Hausser P, Fischer P, Cremers D, Dosovitskiy A, Brox T. A large dataset to train convolutional networks for disparity, optical flow, and scene flow estimation. In CVPR 2016.

Requirements /

Tools:

Required: Python, Linux

Recommended: Experience with TensorFlow, PyTorch or other deep learning frameworks



Supervisor:

Zhaopeng Cui

zhaopeng.cui@inf.ethz.ch

CNB G104