

CFM AI&VR Weekly Report: Week #2 of 2019

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1 Summary

Last sunday, I finished the last examination of this semester. And then I immediately started the survey of SLAM.

2 Paper Reading: CNN-SLAM

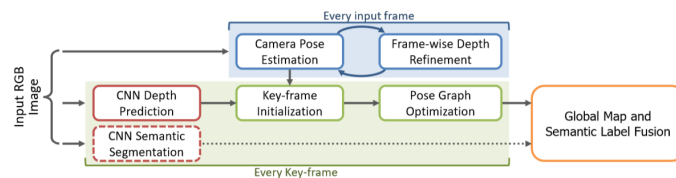


Figure 2. CNN-SLAM Overview.

CNN-SLAM is a direct monocular SLAM algorithm, which is inspired by LSD-SLAM.

2.1 Main Methods

- The camera pose estimation is inspired by the key-frame approach in LSD-SLAM. But in contrast to LSD-SLAM, CNN-SLAM uses a CNN-based depth prediction to generate the depth map, which could validly solve the limitations of traditional monocular SLAM.
- The main contribution of CNN-SLAM is the scheme employed to refine the CNN-predicted depth map associated to each key-frame via small-baseline stereo matching.
- The framework of CNN-SLAM is capable of jointly reconstructing the scene while fusing semantic segmentation labels.

2.2 Conclusion

- CNN-SLAM can run in real-time since the two processes of depth prediction from CNNs run on GPU and other stages run on CPU.
- CNN-SLAM overcomes many limitations of traditional SLAM, especially with respect to estimating the absolute scale, obtaining dense depths along texture-less regions and dealing with pure rotational motions.

3 Plan

I will continue reading more papers and textbooks about SLAM. Here is a list of to-be-read materials:

- Paper: LSD-SLAM: Large-Scale Direct Monocular SLAM
- Paper: ORB-SLAM2: an Open-Source SLAM System for Monocular, Stereo and RGB-D Cameras
- Textbook: <14 lectures on visual SLAM>