CFM AI&VR Weekly Report: Week #3 of 2019

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UESTC — January 17, 2019

1 Summary

This week, I spent most of my time on reading the book **<14 lectures on visual SLAM>**, it's almost the best book for beginners to learn SLAM. In addition, I read a classical paper on the topic of LSD-SLAM, but honestly, I can not fully understand the core methods of those papers, due to lack of basic knowledge of SLAM, and **Matrix Analysis** methods are also very important.
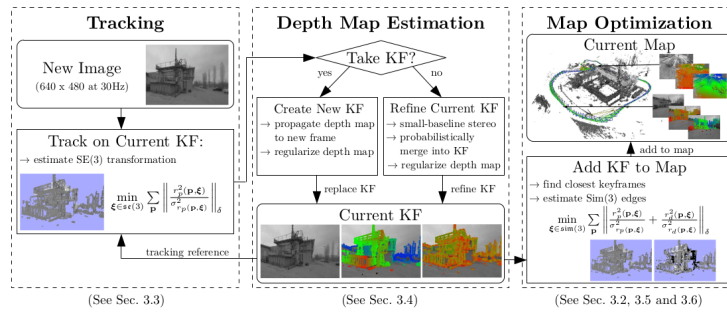
2 Paper Reading: LSD-SLAM

Figure 1: Overview over the complete LSD-SLAM algorithm.

LSD-SLAM is a direct monolular SLAM algorithm which alows to build large-scale, consistent maps of the environment.

2.1 Main Methods

- LSD-SLAM uses direct image alignment with filtering-based estimation of semi-dense depth maps;

- The algorithm it proposes probabilistically consistent incorporation of uncertainty of the estimated depth into tracking.

- LSD-SLAM could run in real-time on a CPU, and even on a mordern smartphone.

3 Book Reading: Chapter 1-3 of SLAM-BOOK

Chapter 1 and 2: Introduction to SLAM, and basic usage of cmake. **Chapter 3**: Rotation Matrix/Vector, Euler Angles, Quaternion, and how to tranform between them. Practice code is avaliable at: `https://github.com/Yidadaa/Coding-Every-Day/tree/master/2019/slam-book-code`.

4 Plan

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

- Survey Paper: Past, Present, and Future of Simultaneous Localization and Mapping: Toward the Robust-Perception Age

- Textbook: <14 lectures on visual SLAM>, Chapter 4-6