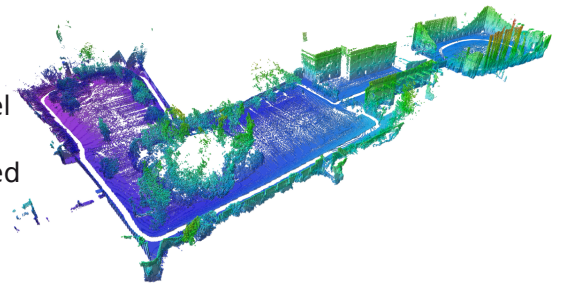


Vision-based Robotic Perception Using a Novel SE(3) Estimator

Description:

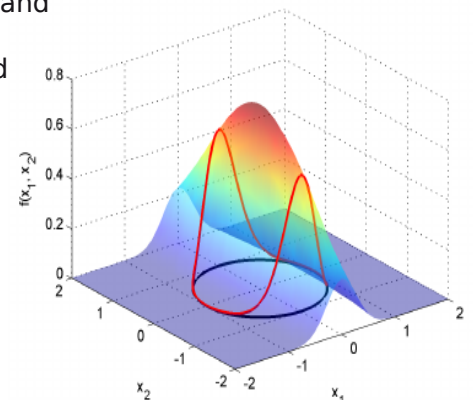
A rigid body motion incorporates both translation and rotation and its 3-dimensional case can be mathematically described as the special Euclidian group SE(3). Yet, due to the high nonlinearity of directional states, its estimation using conventional stochastic filtering algorithm suffers from high inaccuracy. Moreover, conventional representation of SE(3) (e.g., Lie algebra) normally has an assumption of small rotations and little uncertainty, which limits its application in real scenarios. In this thesis, a novel method for recursive estimation of SE(3) will be introduced and further application such as vision-based robotic perception and navigation will be developed. More specifically, the thesis is divided into following working packages:

1. Theoretical investigation of SE(3) representation method and corresponding directional statistics.
2. Development and implementation of a novel SE(3)-estimator.
3. Applying the SE(3)-estimator for vision-based robotic perception tasks.
4. Evaluation with published datasets and comparison with competing algorithms



Requirements:

- Backgrounds of computer science, mathematics and other engineering majors.
- Good knowledge of computer vision/graphics and experience with RGB-D sensors and stochastic estimation is expected.
- Good knowledge of C++ and Matlab.
- Knowledge of ROS is recommended.
- Strong self-motivation, reliability and critical mind is expected



The thesis can be tailored to Hiwi-job as preperation for the beginning stage.

Further information

(also for related topics of Hiwi-job/Bachelor or Master thesis) can be found from:

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