Modification and Testing of a SLAM Framework for Dynamic Environments

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Kurzbeschreibung

This thesis presents a modified RGB-D Simultaneous Localization and Mapping

(SLAM) algorithm, to improve the estimation of the camera pose in dynamic environments.

The openly available Real-Time Appearance-Based Mapping (RTAB-Map)

SLAM algorithm is analyzed and adapted by the static point weighting algorithm,

which deals with dynamic objects. The Frame-To-Map (F2M) approach of RTABMap

is further used while the odometry is calculated based on the modified version

of the static point weighting algorithm. Foreground depth edges are extracted and

matched with the intensity assisted Iterative Closest Point (IAICP) method. To distinguish

between features of dynamic and static objects, a static weight from the

integrated SLAM algorithm is used. It is based on the spatial distances of matches.

The estimation of the camera poses includes this weighting system. The influence of

several parameters used in SLAM algorithms is analyzed, on the example of the proposed

algorithm. Values for these parameters are chosen for the proposed SLAM

algorithm to deliver a robust performance in different environments. The proposed

SLAM algorithm is evaluated with two datasets regarding its performance in different

environments. To analyze how the accuracy changes through the combination of the

two algorithms, the proposed algorithm is compared to the two basis algorithms.

Betreuer

Stefan Röhrl

Dokumentation

Die Masterarbeit wurde bei und mit ITK Engineering erstellt.