Development of Vision Based Indoor Navigation for Autonomous Mobile Robot Utilizing RTAB-Map

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STATEMENT BY THE AUTHOR

I hereby declare that this submission is my own work and to the best of my knowledge, it contains no material previously published or written by another person, nor material which to a substantial extent has been accepted for the award of any other degree or diploma at any educational institution, except where due acknowledgement is made in the thesis.

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ABSTRACT

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The use of autonomous mobile robots (AMR), which can carry out a variety of activities including distribution, inventory management, and monitoring, is common in interior settings. Simultaneous Localization and Mapping (SLAM) and visual odometry allow AMRs to navigate independently and precisely, which is necessary for them to operate in these situations. By examining the changes in visual data collected from one or two cameras affixed to the robot, the technique known as "visual odometry" calculates the motion of the robot. Slam is a method that uses sensor data or an image to create a map of the robot's surroundings while concurrently estimating the robot's attitude. Real-Time Appearance-Based Mapping is a well-liked SLAM framework that is frequently utilized in indoor robot navigation. A graph-based SLAM system called RTAB-Map makes use of visual characteristics to map the surrounding area and infer the robot's posture. It can manage dynamic environments, where the environment's appearance varies over time, and it can also bounce back from tracking errors.

Keywords: Autonomous Mobile Robot, Indoor Robot Navigation, Visual Odometry, SLAM and RTAB-Map

DEDICATION

I dedicate this works for my beloved parents alongside my brothers and sister, my friends, and my university.

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