

ABSTRACT

A mobile robot is a software-controlled machine that uses sensors and other technologies to recognize the environment it's in and complete a predefined task. A lot of research has been done on field robots, and mobile robots themselves have many applications in various fields, and one of them is search and rescue. In a search and rescue scenario, mobile robots can be used to map and search for victims in an unknown environment in disaster struck environment, in particular earthquake disaster.

In this thesis we propose a semantic SLAM system to be used in a mobile robot in a search and rescue scenario. We use ORB-SLAM as the base SLAM algorithm for the system using Yolov8 as an object detection to detect victims in the area. The system will then build a semantic map with location of victims within the area to help in creating an effective rescue operation, while removing the map point that belongs to a person to improve accuracy against moving person. The system will be built with ROS as the framework and Raspberry Pi as the mobile robot controller.

The system in this thesis shows that the mobile robot could create a Semantic Map with the location of human victim marked. And improved the accuracy of ORB-SLAM3 when tested on TUM RGB-D Dataset.

Keywords: Semantic SLAM, Mobile Robots, Search and Rescue, Semantic Map, ROS.