

ABSTRACT

Simultaneous Localization and Mapping (SLAM) is an algorithm used by robots to explore an area that has not been recognized. The recognition is done for mapping and localization in areas with no reference. This algorithm has problem for mobile robots (e.g. submarines, drones, explorer robots, etc.), which are simultaneously doing map estimation for mapping and relative robot pose to the map. Data becomes inaccurate because there is no global information and also the estimation of the robot position who recognized the area in real time.

In this Final Project simulate and analyze FastSLAM 1.0 algorithm to estimate the environmental map and position of the robot on the environment, on virtual robot Pioneer 3-DX. Simulation and analysis utilize ROS (Robot Operating System) as the base of operating system. Simulation performed on Gazebo simulator. Node on ROS served as robotic navigation system that maps the environment in real time and automatically from start position and estimate position of the robot on the environment.

The result of this Final Project showed the influence of the number of particles used with the accuracy of the FastSLAM 1.0 algorithm. Based on the analysis and testing using ROS showed that more the number of particles used, the higher the accuracy of the maps are obtained and it can take longer processing time.

Keywords: SLAM, Pioneer 3-DX, FastSLAM, Gazebo, and ROS.