ABSTRACT

Simultaneous Localization and Mapping (SLAM) is one of the areas of research in the field of robotics and artificial intelligence. SLAM is used on a moving vehicle (e.g. mobile robots, submarines, or drone) to simultaneously estimate the environmental map and estimate its own position relative to its environment. In the absence of global positioning information, estimating the position on the environment is becoming increasingly difficult and estimating the environmental map will be just as difficult. Because the map contains many calculation estimates, obtaining an accurate map is a challenging job that requires the approach of using probabilities and statistics, especially when done in real time.

In this Final Project simulate and analyze FastSLAM 2.0 algorithm, which is used to estimate the environmental map and estimate the position of the robot relative to its environment, on virtual robot Pioneer 3-DX. Simulations performed on Gazebo simulator. The operating system on the robot using ROS (Robot Operating System). By utilizing ROS (Robot Operating System) as a basis, the operating system drive the robot and conduct environmental mapping and estimate the position of the robot on the environment.

The result of the analysis showed the relationship between the accuracy of the FastSLAM 2.0 algorithm with the number of particles used. Based on the analysis we found that more the number of particles used, the more accurate the maps are obtained but with a longer processing time.

Keyword: SLAM, FastSLAM 2.0, Pioneer 3-DX, Gazebo