Project 5: Udacity Robotics Nd

Localisation

Localisation of the robot is performed using the amcl_demo.launch file inside of the turtlebot gazebo package, which is in turn inside of the turtlebot_simulator folder. The amcl_demo.launch uses Monte Carlo (MC) localisation to localise the robot. MC localisation involves using a particle filter to localise a robot, where resampling of the particles is based on a recursive Bayesian estimation.

Mapping

The robot's environment is mapped using the gmapping package. The package creates a 2D occupancy grid map from laser and pose data collected by the robot. The occupancy grid map is created using data collected from the robot's onboard laser rangefinder sensor, which is processed using a binary Bayes filter.

Navigation

Navigation is performed using ROS' Navigation stack, which is based on Dijkstra's algorithm, a variant of the Uniform Cost Search algorithm. Dijkstra's algorithm allows you to find out the shortest paths between nodes in a graph.