

SENIOR DESIGN PROJECT: ROBOT 1 ABSTRACT

This design project involved assembling a robot kit, the Robotis Turtlebot Waffle Pi, and then programming it to become an autonomous driving robot. The robot needed to be assembled, and a control computer had to be acquired to communicate with the robot. We immediately divided our team into two groups. The first group worked on a protective shell for our robot, which would be made from acrylic and required group modeling of the robot in a CAD program. The second group worked on programming the robot. This involved downloading and implementation of Robot Operating Systems (ROS) and related packages on both a Raspberry pi and the control desktop. Control of the Raspberry pi would be completed using Secure Shell (SSH) login, a form of remote access. This system would work to control the robot and the sensors needed to achieve self-navigation. As far as the shell design, the team initially struggled with the vast amount of minute measurements that had to be taken and smaller details of the drawing that would play a larger factor down the road. This group also changed the design at different times to produce a better final product. This involved changing the material the shell would be made of, how to secure the shell to the robot, and choosing options of how to fit the shell on the robot for the best aesthetic. The shell overall was a success and met our group's expectations. The programming team found much of the programming with ROS to be a greater challenge than initially anticipated, largely because of the foreign nature of the operating systems used. Despite these challenges, however, progress was made; and the robot achieved some of the desired functionality.