Project 1 Report

Ninad Harishchandrakar 118150819 ninadh@umd.edu

Project Partner: Ameya Konkar 118191058 akonkar@umd.edu

Project 1 Implementation:

- Created a model with rear wheel drive and a separate transmission system for the two front wheels.
- Next, with the help of Solidworks to URDF exporter, assigned 6 links and 5 joints for the system and defined its parameters. A URDF folder was exported which was put inside the Catkin workspace.
- As per instructions, 5 transmission elements for each joint, and an extra dummy link and joint was added to the URDF file.
- For the LIDAR sensor, the properties of the sensor were added to the Xacro file, and with the help of an extra joint, it was attached to the body of the robot.
- Next, 3 controllers were defined to control the movement of the robot in the config_controllers file.
- Robot was launched into the empty world and checked for errors. Necessary changes were made to the template launch file to launch the robot into the given world file through Gazebo.
- Ran the robot simulation in Rviz to check LIDAR data. Had to reduce the size of the Laserscan.
- Next, required changes based on the configuration were made to the template teleop file. The robot was successfully controlled with the help of teleop commands in the Gazebo world. Had to change various PID values to make the model run properly.
- Lastly, another Python script was made to make the robot run in a circle. Along with this, a publisher and a subscriber was made to subscribe to the topic that the publisher was publishing to.

Personal contributions:

- Conceptualized and created the entire robot model in Solidworks and exported the URDF file along with model parameters.
- Added the transmission elements as well as dummy joints and links.
- Updated the controller file and integrated teleop into the model.
- Corrected several issues with the teleop and controller of the robot. Had an issue with the namespace of the controller spawner and the controller types which were corrected.

Links:

1. Teleop control: (Link)

2. Robot controlled by publisher: (Link)