Report Date: 07/15/2022
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Summary

We made Gazebo simulator that is navigated by joystick and checked the actual motor runs same with the simulator. Also, we modified SLAM package to run with GUI and connected Realsense and GPS. It both worked well. The path planning code were done and now evaluating its performance.

What FarmVroong completed this week:

- Make joystick to control the car

  Because Jetson nano PWM pin has died, we made Gazebo simulator until the new one comes.
  We used two packages (ackermann_vehicle, teleop_twist_joy)
  The simulator worked well.

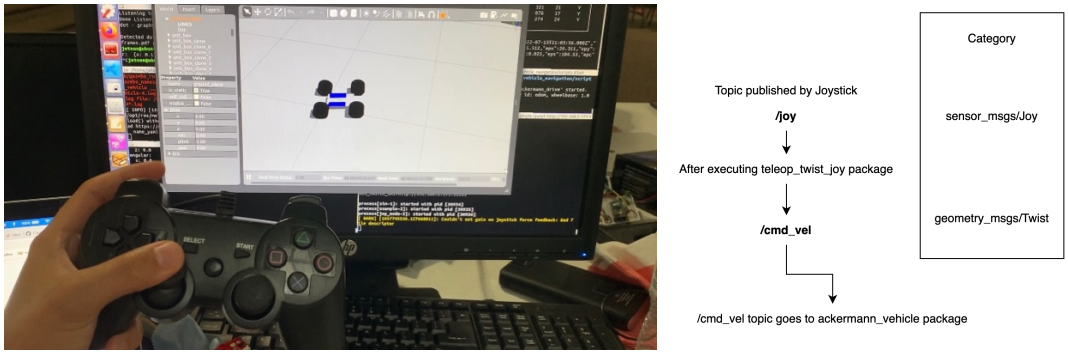

Fig. 1. (a) Gazebo simulator navigated by Joystick control (b) Topic tree

Ackermann_vehicle is about steering the car. If you send the /cmd_vel topic which has linear and angular value to this package, it gives you back the rotation values of each wheel.

- Make GUI for the package

  We have made the SLAM package that works with GPS data, but it didn't have the GUI. So, we implemented GUI from orb_slam_2 package.

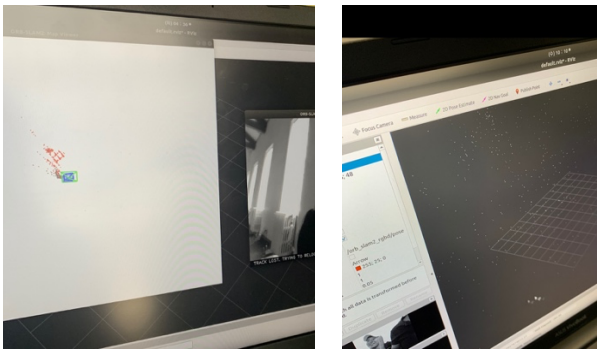

Fig. 2. (a) Successful camera loading (b) Point cloud displayed by RViz

Things to do by next week

- Connect ackermann_vehicle package to i2cpwm_board so the car can move as same as the simulator
- Connect Jetson to the big motor of John Deere toy vehicle
- Build the Gazebo world from the map produced by SLAM (using map2gazebo package)
- Make the path follower simulator

Problems or challenges:

- Pwm pins were broken because of the over voltage
- The SLAM package ran very unstable because of the tf (transform) and ROS coordinates.

References

[1] N. Koenig and A. Howard, "Design and use paradigms for Gazebo, an open-source multi-robot simulator," 2004 IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS) (IEEE Cat. No.04CH37566), 2004, pp. 2149-2154 vol.3, doi: 10.1109/IROS.2004.1389727.

[2] Z. Huang, F. Li and L. Xu, "Modeling and Simulation of 6 DOF Robotic Arm Based on Gazebo," 2020 6th International Conference on Control, Automation and Robotics (ICCAR), 2020, pp. 319-323, doi: 10.1109/ICCAR49639.2020.9107989.