1st Prototype Testing

ADAS Twin HIL Simulator

Thesis Project

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Required Hardware and Software

Hardware

- Logitech G29 Steering Wheel, Brake, & Throttle
- Intel NUC Skull Canyon (Simulation machine)
- Monitor to show results (NUC has no display)
- Necessary connection cords (USB, HDMI, etc)

Software

- Carla simulator
- Carla Client Script for G29 (Python3)
- Custom Test Class and functions (Python3)
- jstest-gtk linux app

Contents

1   Introduction

It is important to make sure that our software is working correctly with our hardware before we start adding the more complicated Hardware in the Loop (HIL) system. We need to test things such as the general functionality and the timing to make sure that the general connections between the Logitech G29 and the simulator work as intended.

For the tests below, we have the G29 controller connected via USB to the simulation PC, and Carla is running on the simulation PC. We also have our communication client script for the wheel, which also has our test function to display useful test results.

2   Test #1: Wheel general connectivity

2.1   Procedure

1. Open up the jstest-gtk app
2. Make sure that the wheel is connected
3. Make sure that the axis value in jstest-gtk is 0
4. Turn the wheel all the way to the left
5. Make sure that the axis value in jstest-gtk is the minimum value
6. Turn the wheel all the way to the right
7. Make sure that the axis value in jstest-gtk is the maximum value

2.2   Measurable Criteria

1. The axis values in the pyjoystick app should reflect the changes in the hardware

3   Test #2: Wheel connectivity with Carla

3.1   Procedure

1. Start the client script on the simulation PC with the wheel connected
2. Make sure that moving the wheel also moves the car in the simulation
3. Make sure that the modified test function prints out the steering wheel axis values
4. Press some of the buttons for break, throttle, and parking break. See if these are reflected in the simulation

3.2   Measurable Criteria

1. See how much the car moves in the simulation
2. See how pressing the different low/high inputs for the brake and throttle affect things
3. Look at the actual number output on the screen for the axis values using our test function that we added to the client communication script.

4   Test #3: Delay times for wheel and Carla

4.1   Procedure

1. Start the client script on the simulation PC with the wheel connected
2. Make sure that moving the wheel also moves the car in the simulation
3. Run for some time and close the client script
4. See the average time that it takes to get the wheel axis value from the G29 hardware

4.2   Measurable Criteria

1. Delay of USB connection with the wheel

5   Other

Code for the tests is on GitHub at https://github.com/jkulskis/thesis