Milestone 4 Progress Evaluation

1. Project Name: IGVC - Intelligent Ground Vehicle Competition
2. Team members:
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   - Jinwen Zhang (jzhang2015@my.fit.edu)
   - John Light (jlight2016@my.fit.edu)
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3. Faculty Sponsor: Dr. Marius Silaghi (msilaghi@fit.edu)
4. Client: Dr. Ken Gibbs
5. Meetings with the Client:
   - 01/31/2020
   - 02/07/2020
   - 02/14/2020
6. Date of meeting faculty sponsor:
   - 02/17/2020

1 Task matrix:

Task	Completion %	Viet Dung	To do
Rewrite codes into ROS nodes	100	100	
Build the Gazebo simulation	90	90	Set obstacle, improve the map
Test the simulation	100	100	

2 Task Discussion:

2.1 Rewrite codes into ROS nodes:

ROS (Robot Operating System) is a set of tools and libraries for making robot applications.

Different components in the robot system will communicate with each other using ROS message and service systems. Using the `rospy` library, we rewrite the existing Python codes into ROS nodes by using ROS Subscriber and Publisher as input and output.

2.2 Build the Gazebo simulation:

Gazebo is an application used for robot simulation. Using Gazebo, we can test the robot specification. Gazebo also comes with a plugin simulating the output of a depth camera and publish the image to ROS nodes.

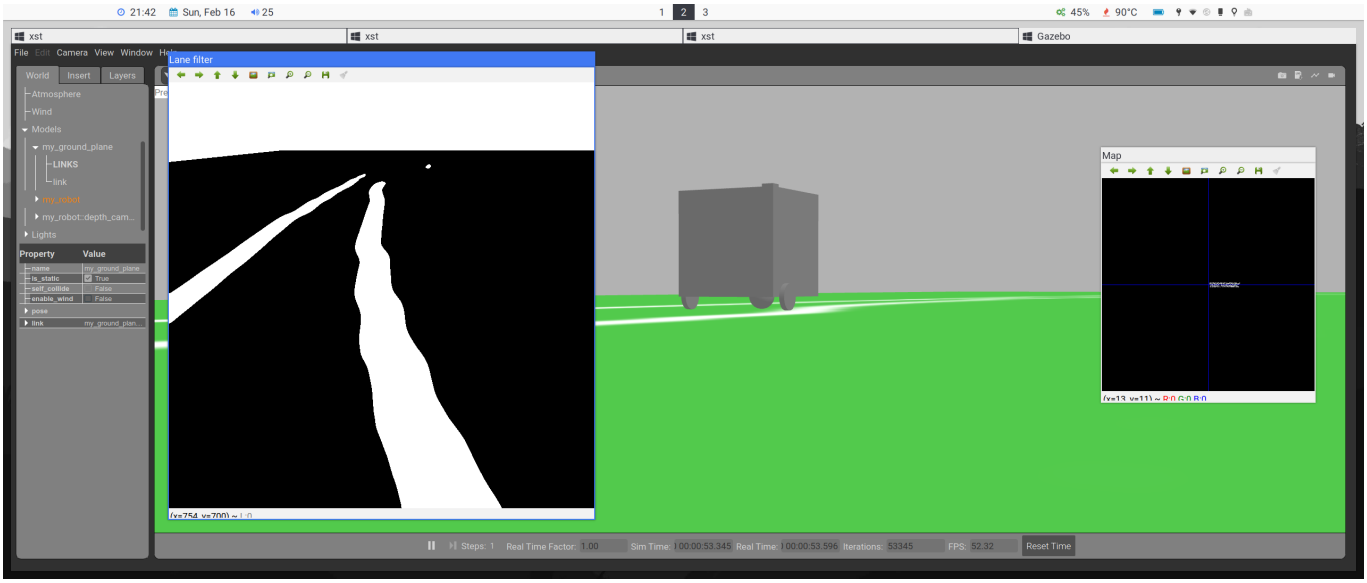
The simulation includes the models for the robot and a map using 2d image as texture on plain surface. In order to move the robot, we wrote a plugin to control the robot joints.

2.3 Test the simulation:

The Ros nodes will subscribe to the topic published by Gazebo. In testing, each Ros nodes will display its output in order to test the software.

The lane detection node will find the white lines drawn on the map and published the filtered image to the mapping node.

The mapping node will receive the image from the lane detection. It will get the robot's position using Gazebo existing ROS services `get_model_state` and calculate the robot's orientation on the 2D plane from the Gazebo quarternions orientation (x, y, z, w)



3 Contribution discussion:

- Viet Dung Nguyen
  - Improve the Gazebo models, correct the coordinates of the robot model's components.
  - Draw the map for the simulation.
  - Write the Gazebo plugin to move the robot.
  - Rewrite the lane detection and mapping modules into ROS nodes.
  - Testing the simulation. Verify that the nodes are working as intended.
  - Write the documentation. Describe the process for building and testing the project.

4 Plan for the next milestone:

- Implement motion planning.
  - Using the map, find the way from the robot current position to the next waypoint.
  - Plan the robot motion, calculate the speed of the robot joints in order to control the robot movement.
- Create poster for Senior design showcase.

5 Faculty Sponsor feedback on each task for the current milestone:

- Task 1

- Task 2

- Task 3

Signature

Date

6 Faculty Sponsor evaluation:

Viet Dung Nguyen 0 1 2 3 4 5 6 7 8 9 10

Signature

Date