Implementation of a robot behaviour learning simulator

Kushagra Singh BISEN

Ecole des Mines Saint-Etienne

kushagrasingh.bisen@etu.emse.fr

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Overview

A Recap

The meeting was held at 01/04 and following tasks were discussed.

- A discussion to decide the tools and language for the task.
- Framework which will provide the movement with other robots.
- Developing some sort of simulation with the turtlebots.

Tools

Operating System

The simulation is done using ROS(Robot Operating System) an open source robotics product, which isn't a full-fledged but provides a great abstraction level over the hardware level. Thus, preventing the end user to reinventing the wheel. ROS is trusted by major companies and labs as well as Professor Boissier in EMSE. ROS is majorly a network with servant and master being able to change positions and roles to publish or subscribe to information from other nodes. ROS has a seperate distribution for each version of Ubuntu.

Tools

Docker
Containerization is important to isolate the environment variables to affect the project. As, the end result will run in a robot which I think will be running with some sort of Arduino/Raspberry Pi chipset attached to it, contanerization will be great for deployment. Currently, I was able to do small simulations with containers but I was not able to do the project in a docker container, as I am not experienced in deployment much. I will learn by doing the projects.

Tools

Programming language

There is an *option* to work with Python, C++, Java, Ruby in
ROS. In our simulation, Python will work with the best being the
one with the most support (official support from ROS) and being
able to intetwine with C++ (also officially supported) if needed.
Python is the chosen language for these simulations.

Online ROS Platforms

There are online ROS platforms in which you can build and
simulate ROS simulations.

Simulation

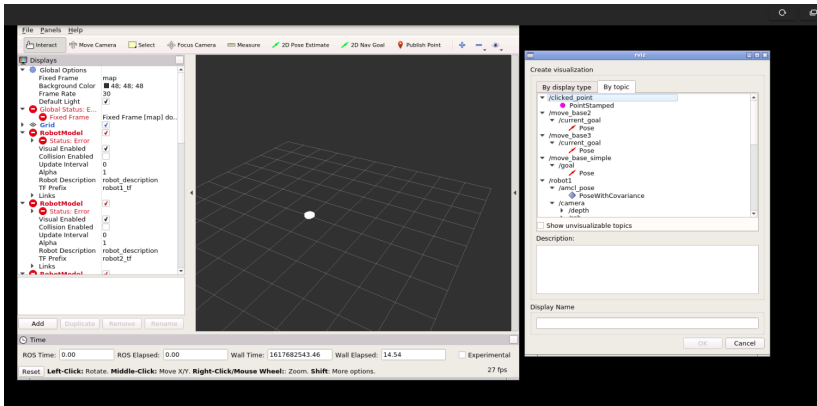I simulated an environment with 3 turtlebots.

- I am using ROS's Navigation package.
- I wrote code to simulate the movement of these three turtlebots in relation to one another, but the bots were given different destinations.
- The code is written, but there is some bug in the launch file for navigation.
- Gazebo is great for 3D but, if you want to give a 2D goal, then RViz is the Simulator to go for. Note that, we can use both simulators hand in hand.
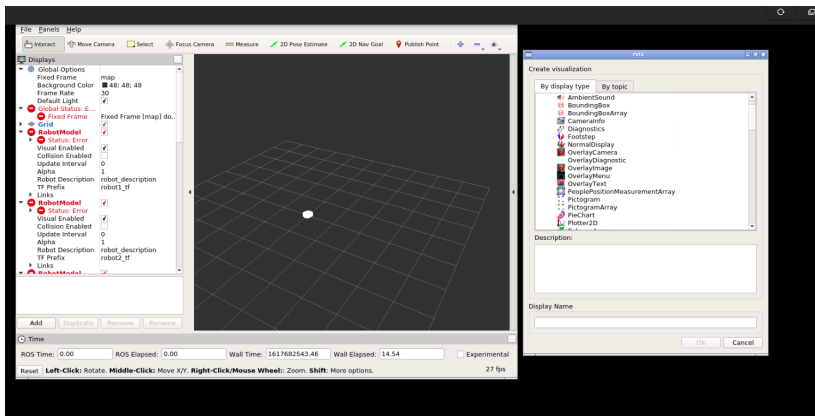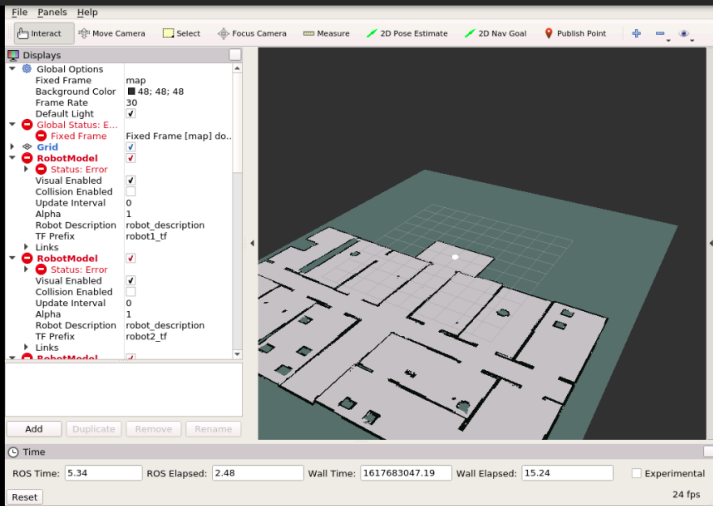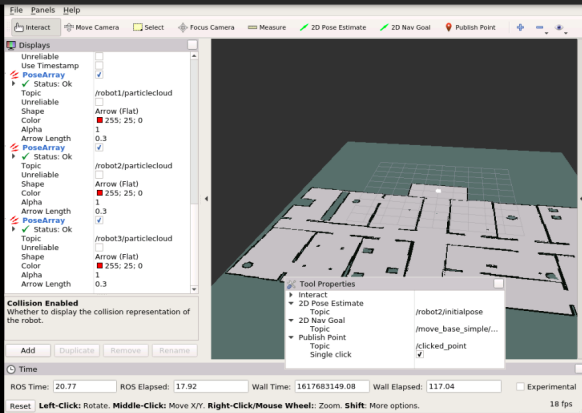- I will now present my simulation results.

Simulation

Simulation

Simulation

Simulation

Simulation

Thank you!