Implementation of a Robot Behaviour Learning Simulator

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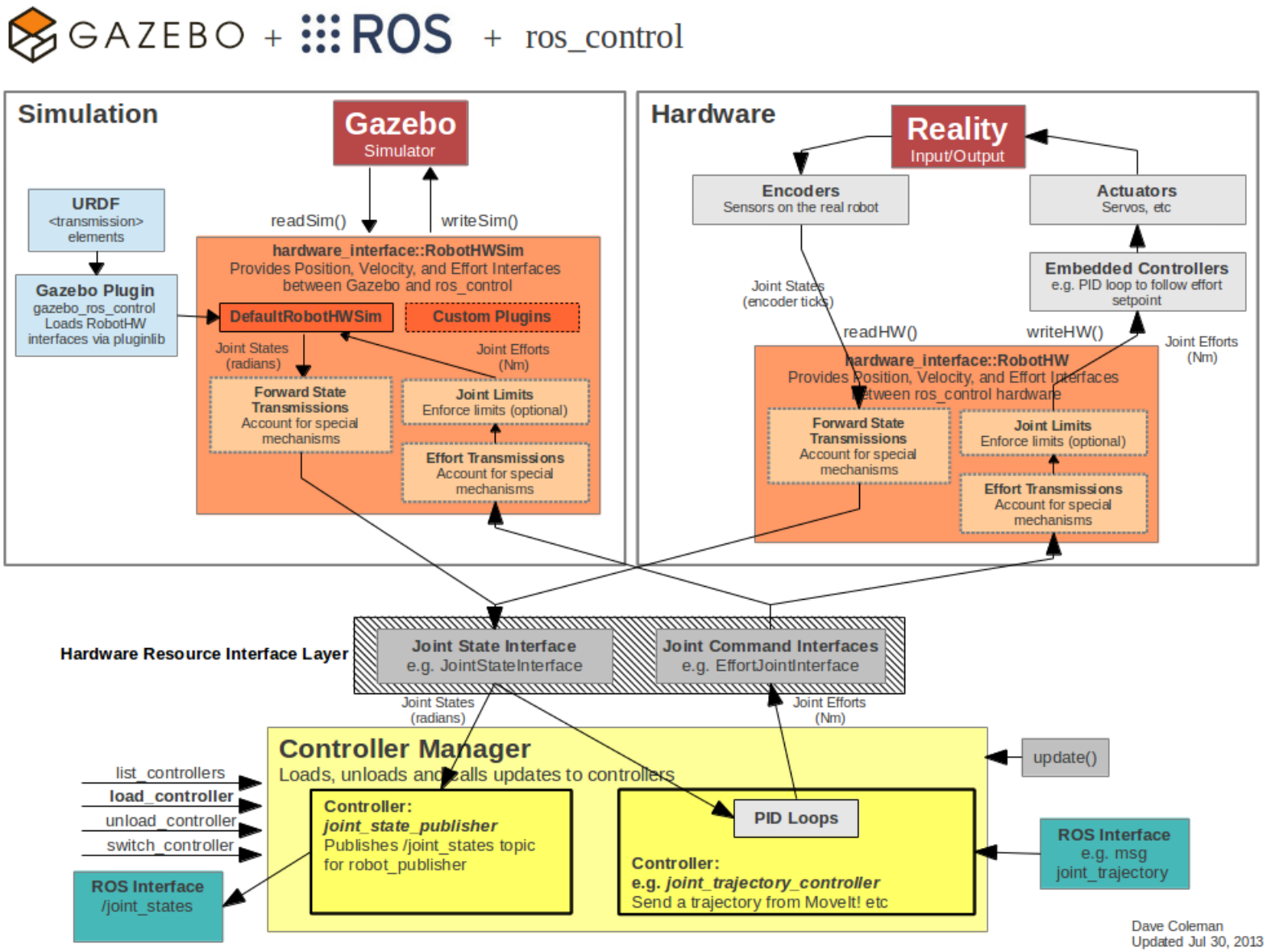
Overview

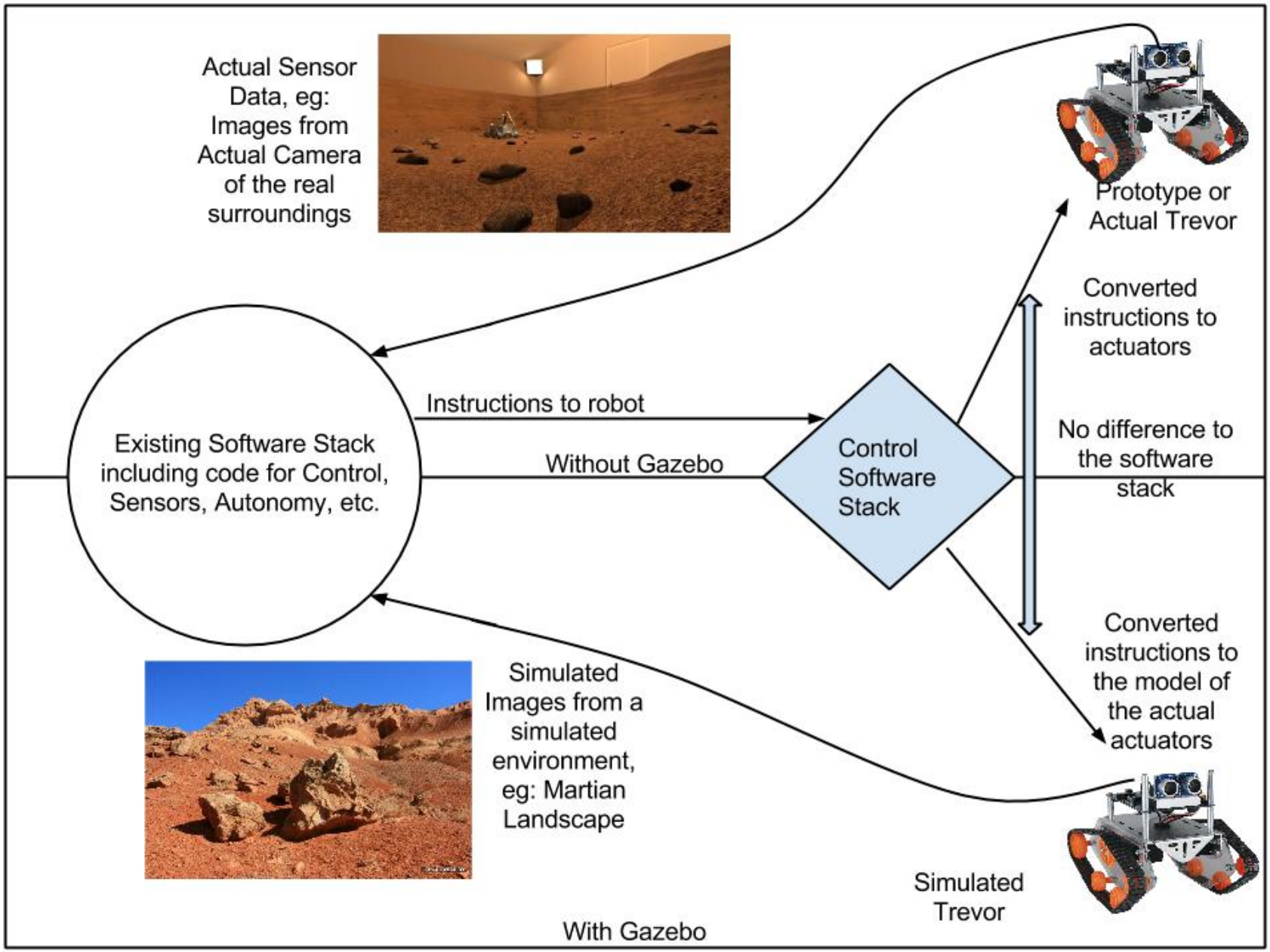
Work Done

- I started reading on few local planner techniques, namely DWA planner and TEB planner. I have started learning the TEB Planner.
- I tried doing the log file, which has some bugs due to the libraries involved in the computation.
- I read on another path planning technique useful to us in local planning too.

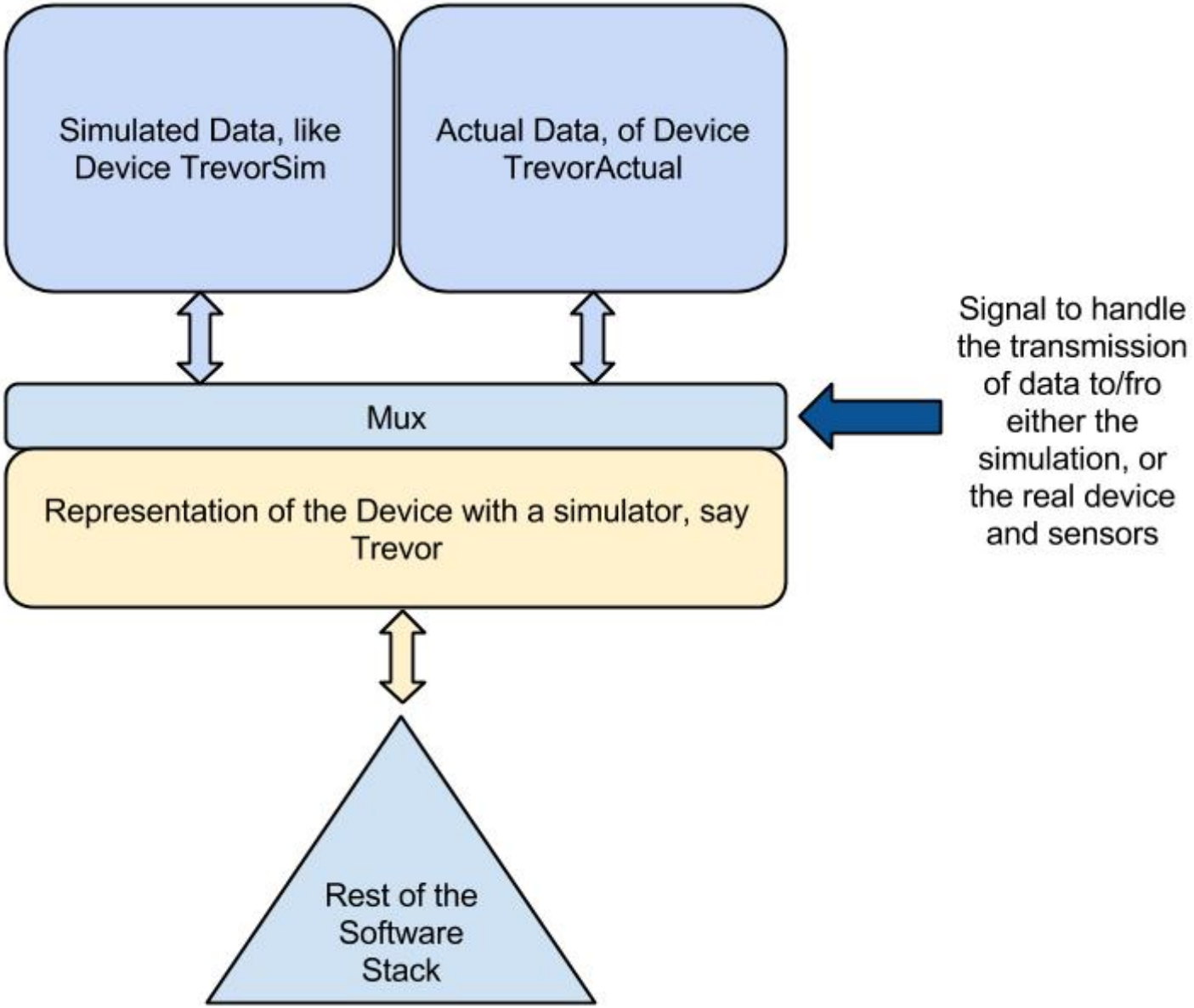
ROS + Gazebo control architecture



ROS + Gazebo control architecture



ROS + Gazebo control architecture



Current Status

- I am able to detect obstacle in nearby 3*3 space.
- I have made function to detect and print the other required values in the csv file.
- The problem is with the toning and arranging the log now.

Problems Faced

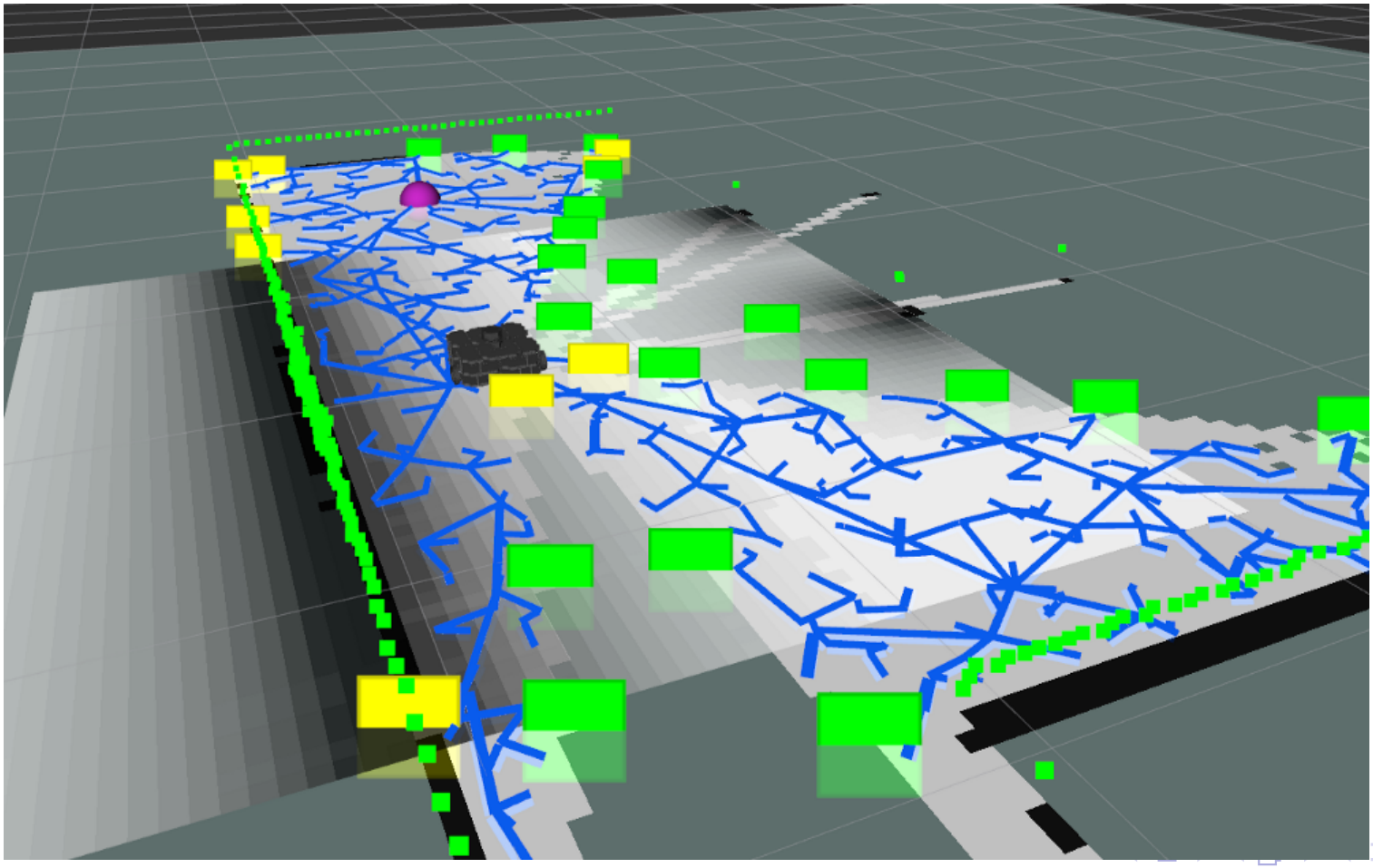
- ROS doesn't have good enough libraries for you to make the log file in csv.
- I can print the values if there is that one specific topic to be considered and subscribed.
- If there are many such topics, with which one has to get the value. The problem of 'synchronousity'comes in the effect.
- For example, it is entirely possible that one topic can publish before the other topic and so on.
- There are methods to avoid this, and I tried one but had no luck.
- Gazebo does in a different way, I will look at how they try to do the log file generation.

Potential Solution

Solving the sync problem by looking into more open source code of people who have approached the same problem. As, the documentation is less on this one. Trial and Error will be the best method.

Rapidly Exploring Random Tree

In this method, there is no definitive strategy for the robot to move towards it's goal. Instead, the robot randomly picks a node and then carries on the motion forward. I am not sure if one can make the agent move in only 4 directions, but I will see.



Artificial Potential Field

In this path planning method, the whole environment is thought of as an energy-thermodynamic field where the goal is the opposite charge to the obstacle as well as the robot. So the robot will repel the obstacle and other robots but will reach the goal. Here too I am not sure if the movement will be in 4 directions.

Thank you for your time