

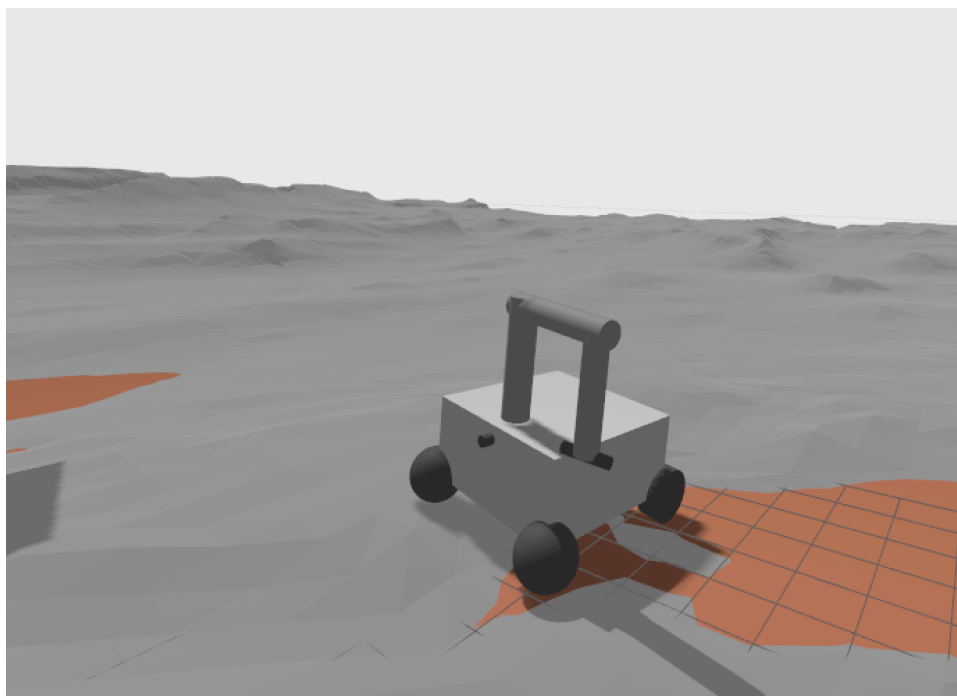
Assignment 3 Report

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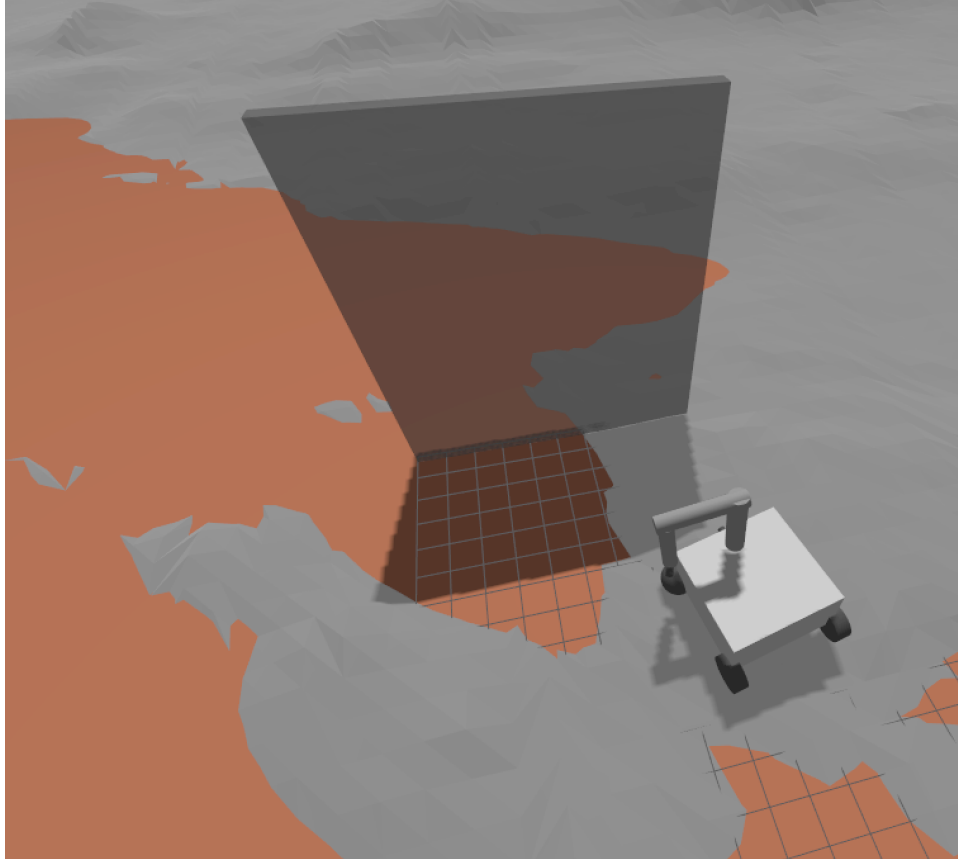
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In this assignment, I created a dummy Mars rover model using Gazebo Classic Model Editor, having basic movement functionality and a LiDAR sensor for obstacle detection. The rover movement can be controlled using keyboard inputs as well as a publisher node.

1 Rover Model



The model has a revolute arm and a prismatic secondary joint. I replaced the two front wheels of the rover with spheres to allow easy turning. I have also added a pre-existing model of the surface of Mars from the Gazebo library.



I also added a wall to check the working of the LiDAR sensor. The rover is pushed back with a velocity of 0.5m/s whenever it comes within 5m of the wall. The movement is controlled by a differential drive plugin.

2 Challenges Faced

Erratic movement of rover:

After configuring the ROS-Ignition bridge to use the `/cmd_vel` topic, the rover started moving in random directions even though no keypress commands were given. This was due to continuous publishing of `linear: x:0.5` velocity messages to the `/cmd_vel` topic, causing unintended movement. I tried to debug this using `ign topic -e -t /keyboard/keypress` to listen for the messages published to keypress topic and it showed random arrow keys being pressed at a fast rate, and then error messages saying "A message was lost". This was causing the rover to move without command, often in random directions, and even override the keypress input sometimes. This was also interfering with the

working of the LiDAR sensor as it also published messages to the same `/cmd_vel` topic.

Solution:

The random messages were actually being published to `/cmd_vel` topic due to incorrect closing of the `ROS-Ignition` bridge in earlier runs. `Ctrl-C` is not effective in killing the parameter bridge connection and it must be done manually using `htop` command after ending every run to ensure no stray messages get published to the target topic. I also needed to change all instances of `/cmd_vel` to `/debug.cmd_vel` as some earlier incomplete bridge connection was still publishing messages to `/cmd_vel`.