ASSIGNMENT-7
Integrate the GPS and IMU Gazebo Plugins to the created Two Wheeled Robot
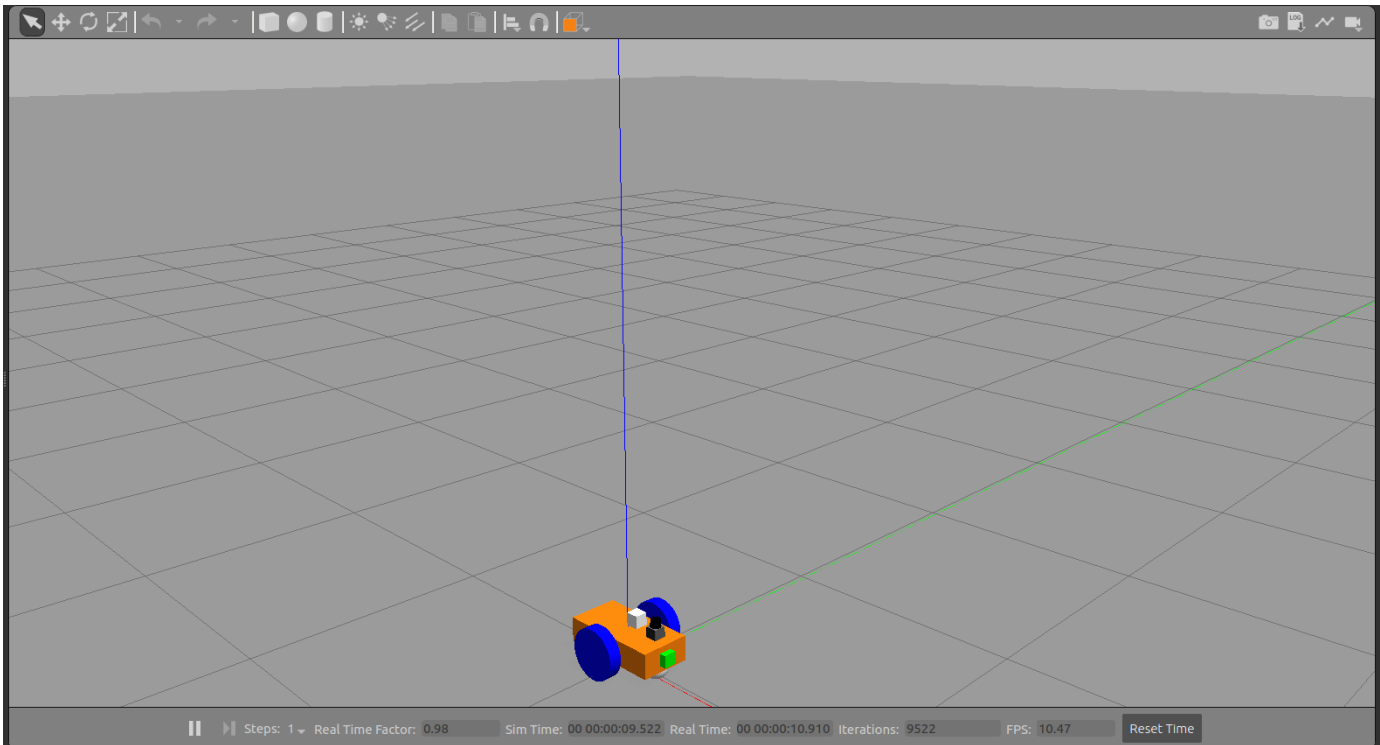
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For the purpose of this assignment I made changes to the already existing 2 wheel robot we made during lecture time.

1) Adding the description of imu sensor in the mybot.xacro file

```xml
<!--imu-->
<link name="imu_link"><collision><origin xyz="0 0 0" rpy="0 0 0"/><geometry>
<box size="${cameraSize} ${cameraSize} ${cameraSize}"/></geometry></collision>
<visual><origin xyz="0 0 0" rpy="0 0 0"/>
<geometry><box size="${cameraSize} ${cameraSize} ${cameraSize}"/></geometry><material name="brown"/></visual>
<inertial><mass value="${cameraMass}" /><origin xyz="0 0 0" rpy="0 0 0"/>
<box_inertia m="${cameraMass}" x="${cameraSize}" y="${cameraSize}" z="${cameraSize}" />
<inertia ixx="1e-6" ixy="0" ixz="0" iyy="1e-6" iyz="0" izz="1e-6" /></inertial></link>
<joint name="imu_joint" type="fixed">
<axis xyz="0 1 0" /><origin xyz=".05 0 .1" rpy="0 0 0"/><parent link="chassis"/>
<child link="imu_link"/></joint>
<!--end imu-->
```

The white box on top of the robot is the imu sensor
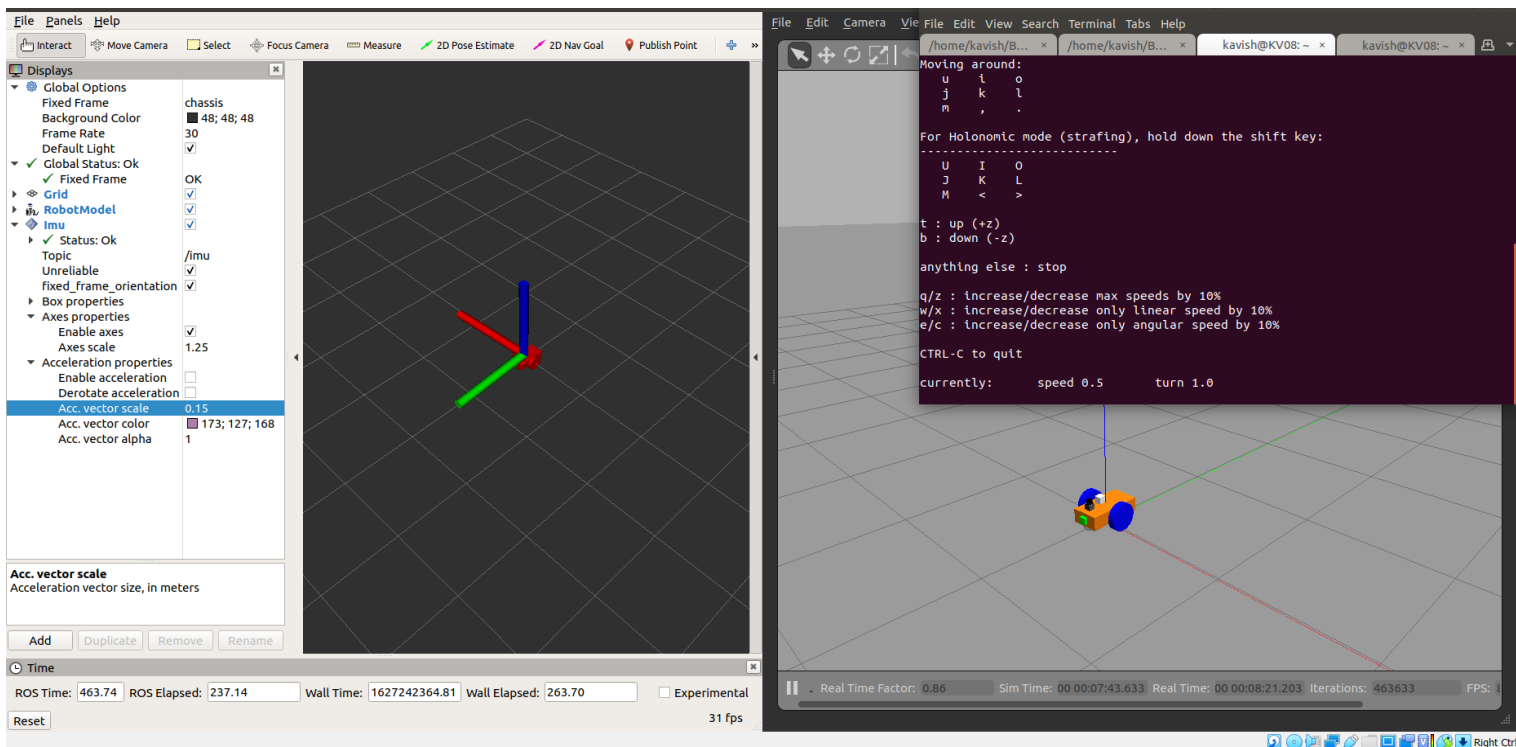

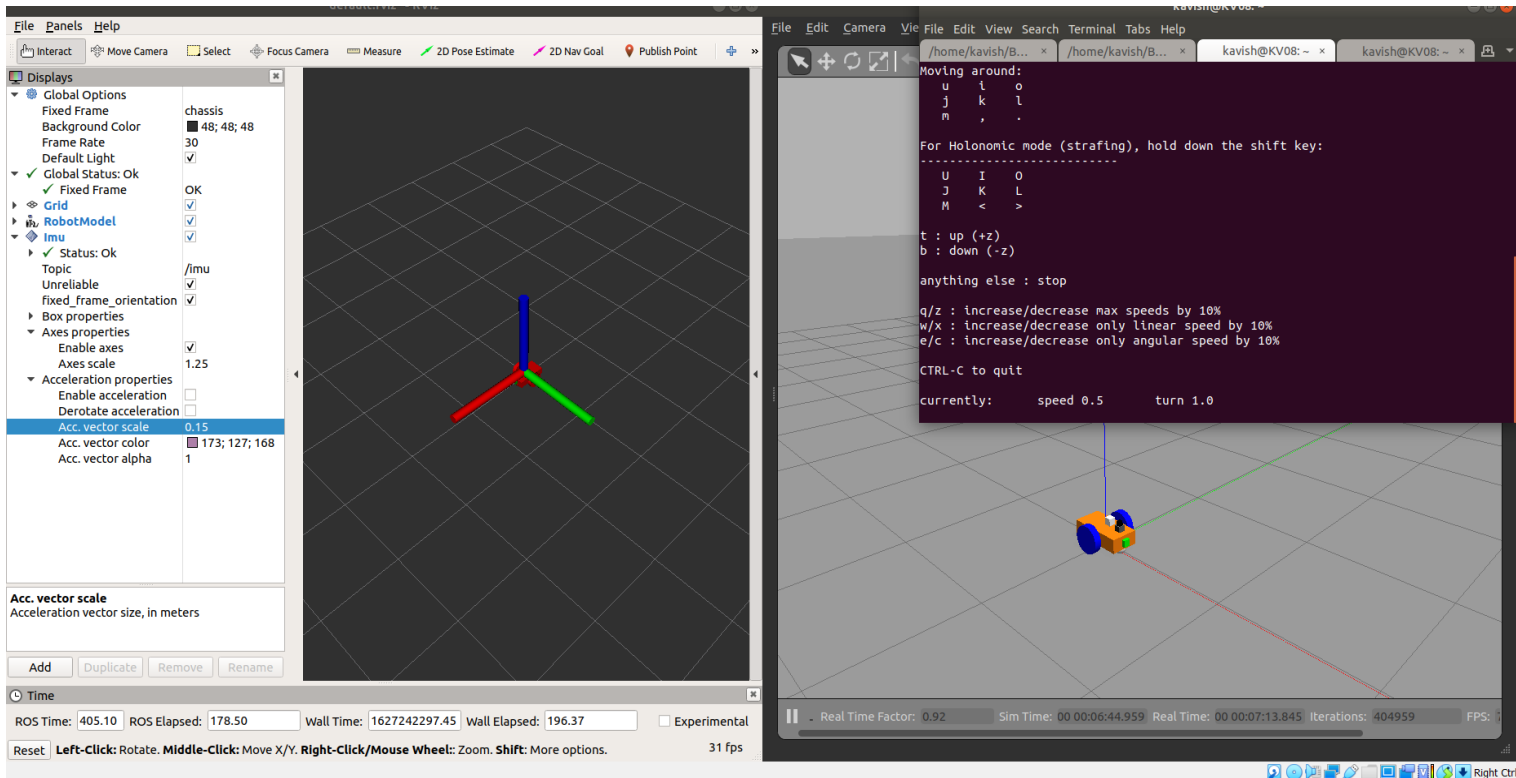2) Adding the Behavior of the imu sensor in mybot.gazebo file

```
18  <!-- IMU SENSOR INTEGRATION-->
19  <gazebo reference="imu_link">
20      <gravity>true</gravity>
21      <sensor name="imu_sensor" type="imu">
22        <always_on>true</always_on>
23        <update_rate>100</update_rate>
24        <visualize>true</visualize>
25        <topic>__default_topic__</topic>
26        <plugin filename="libgazebo_ros_imu_sensor.so" name="imu_plugin">
27          <topicName>imu</topicName>
28          <bodyName>imu_link</bodyName>
29          <updateRateHZ>10.0</updateRateHZ>
30          <gaussianNoise>0.0</gaussianNoise>
31          <xyzOffset>0 0 0</xyzOffset>
32          <rpyOffset>0 0 0</rpyOffset>
33          <frameName>imu_link</frameName>
34          <initialOrientationAsReference>false</initialOrientationAsReference>
35        </plugin>
36        <pose>0 0 0 0 0 0</pose>
37      </sensor>
38  </gazebo>
39
40  <!---->
```
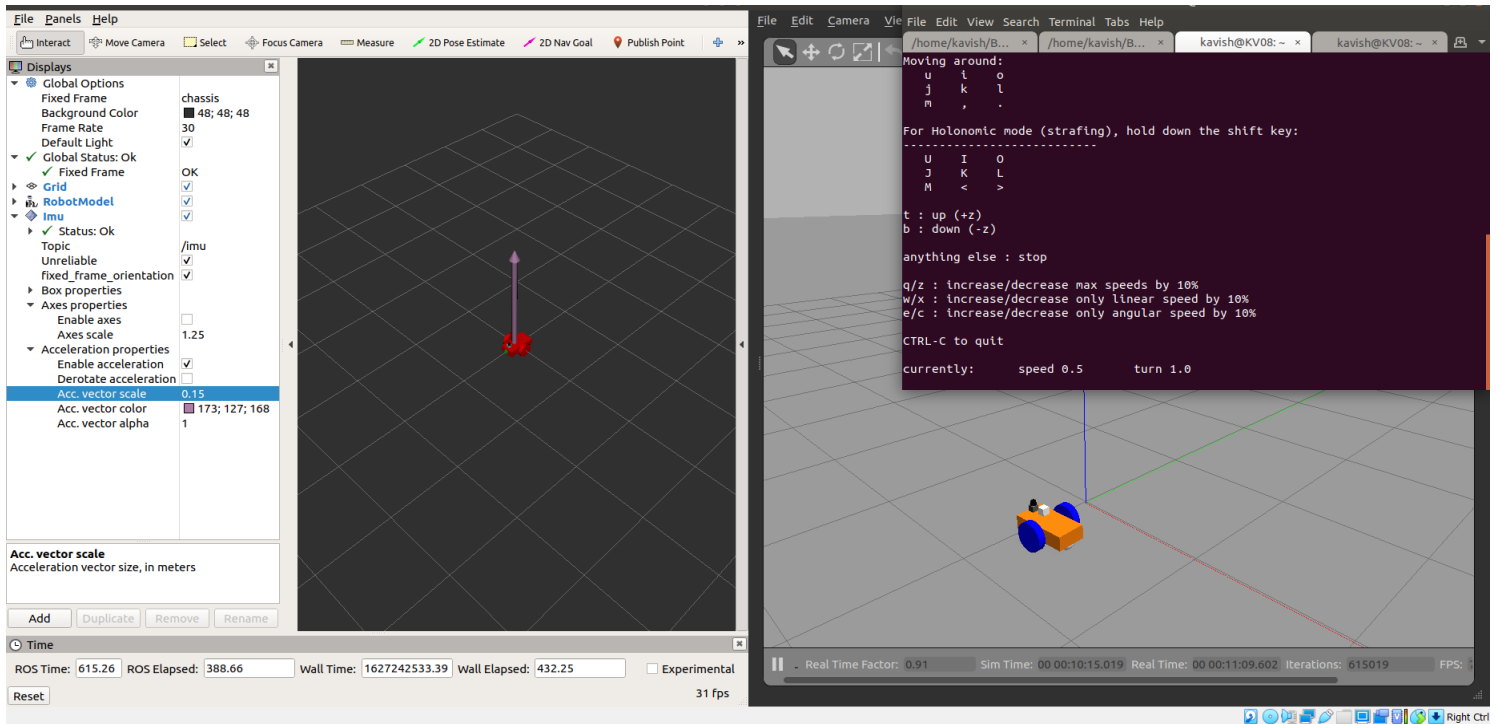
3) Viewing Results In RVIZ:

In this image we can see axes enabled in RVIZ, this axis will change when robot is rotated using teleop node

In the below image, purple arrow represents acceleration

Arrow shows direction in which robot is being accelerated