

1 Simulation Platform Building

1.1 The Infantry Description Files Creating

We use The SolidWorks to URDF exporter to get the export of NJUST Alliance RM2017 Infantry SolidWorks assemblies into a URDF file.

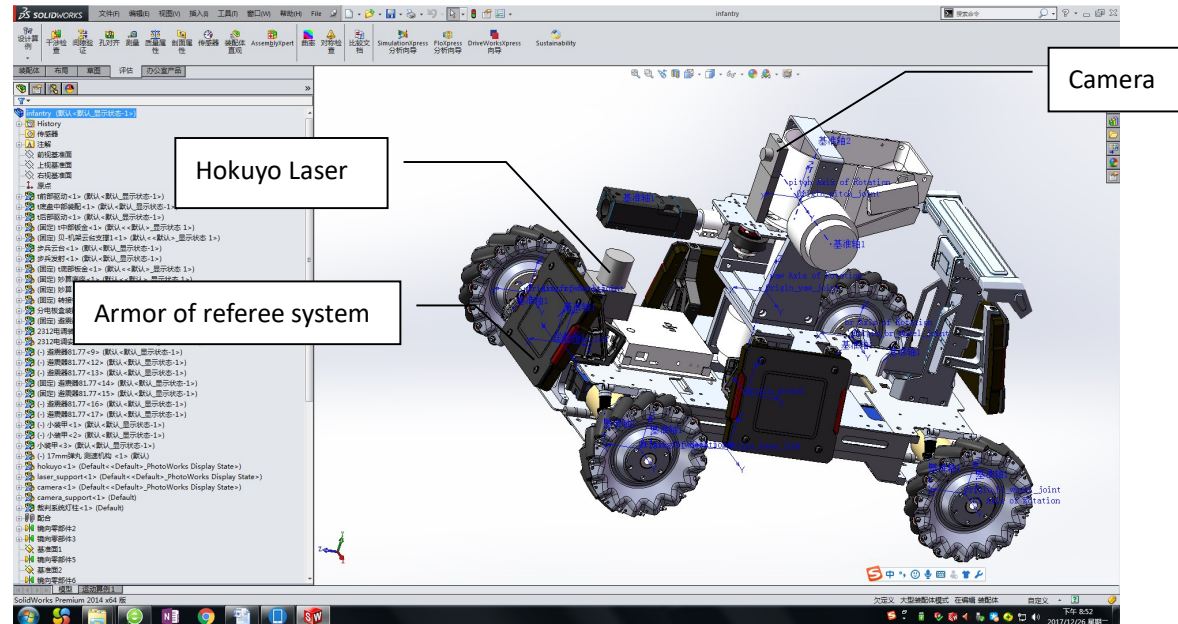


Figure 1 NJUST Alliance RM2017 Infantry SolidWorks assemblies

1.2 Sensor Simulating

After creating the URDF of our infantry, we add simulated sensors to our robot (Laser and Camera)

1.3 Challenge Map Building

We build the challenge map in the gazebo and created simulation world.

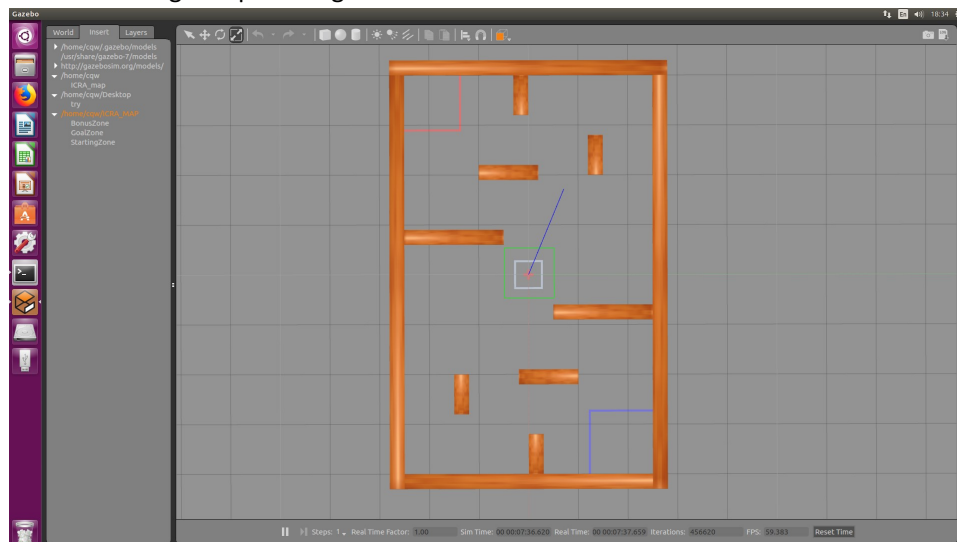


Figure 2 Challenge Simulation World in the Gazebo (top view)

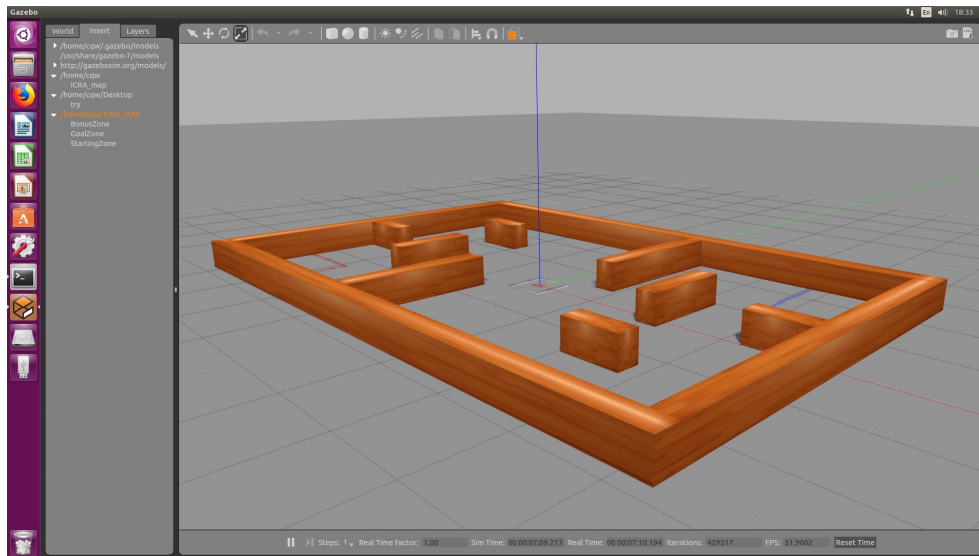


Figure 3 Challenge Simulation World in the Gazebo

1.4 Simulation Environments building

Create some launch files and scripts to control our infantry in the gazebo and leave the APIs for model training.

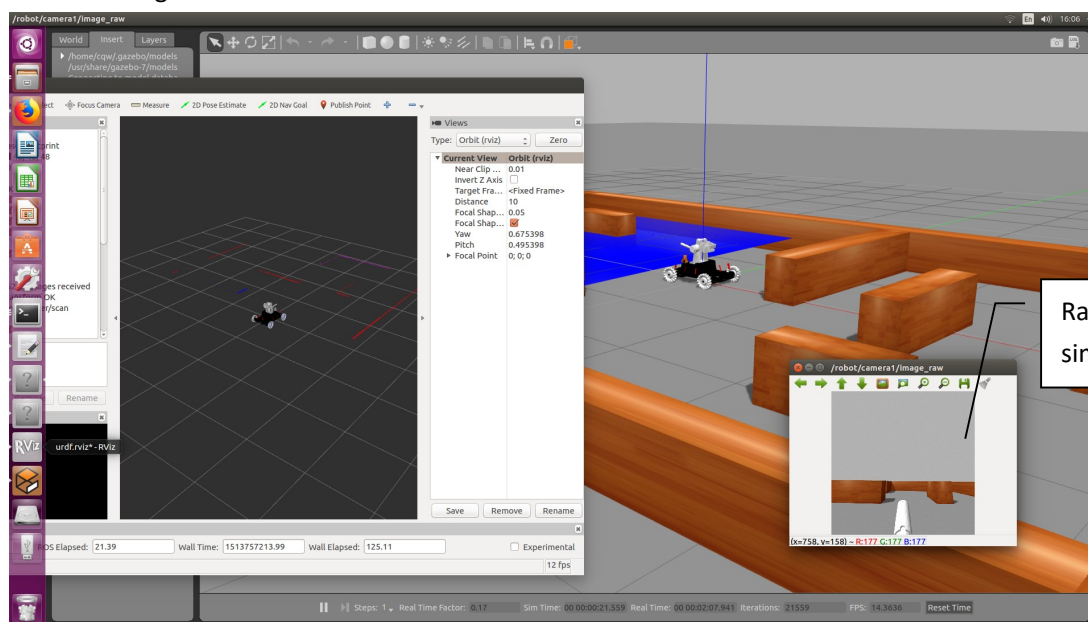


Figure 4 Single infantry (with referee system) simulation environment view

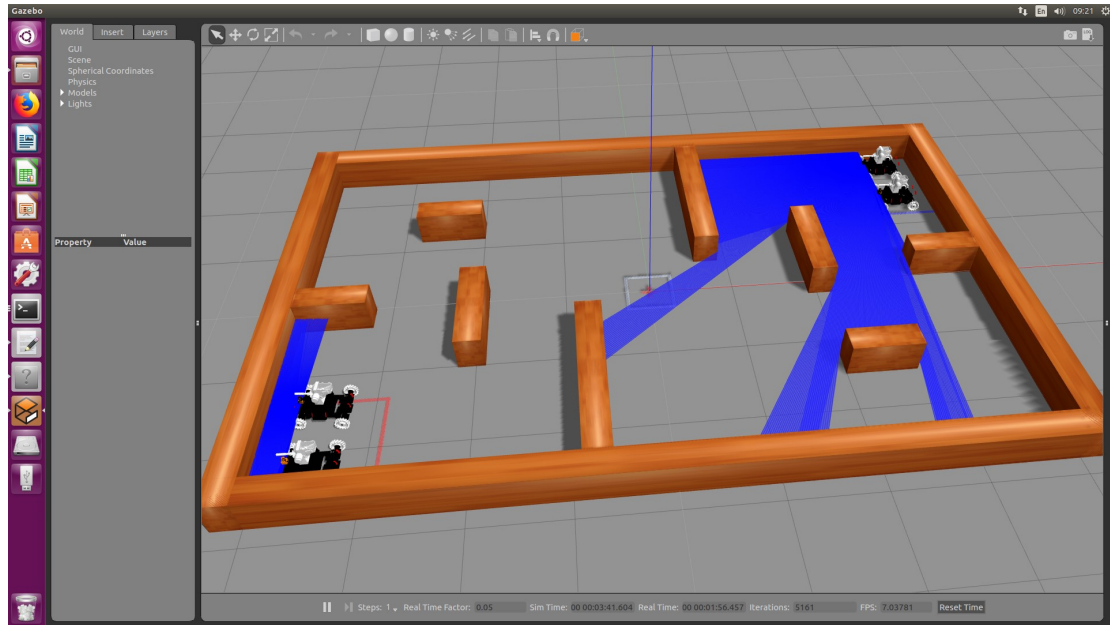


Figure 5 Multi infantry simulation environment view

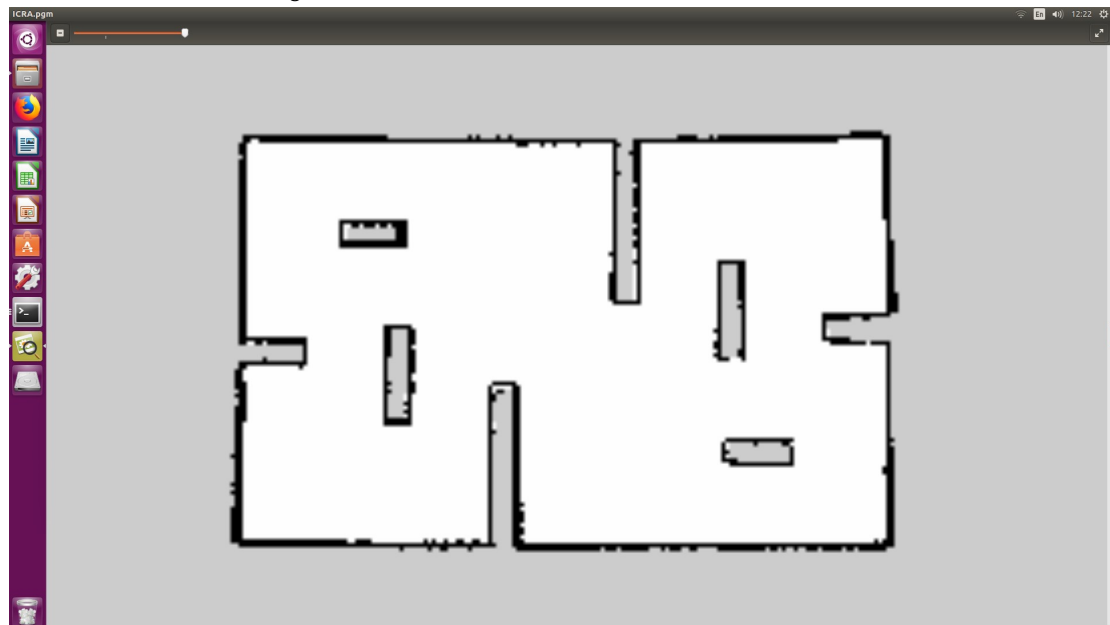


Figure 6 2D map generate with hokuyo laser

1.5 Rules Simulation

To ease the computing load, we are going to simplify the challenge rules in simulation environments. We will create a judgement service script in ROS to perform the referee system in reality. The judgement service will watch on the information about the capture between RoboMaster AI agents (red infantry) and our agents. It will begin counting as soon as the information generating and records HP damage according the last time of the capture. The service script also publish the HP value of each infantry, which will be the score part of our model.