

**Technical University of Crete**  
**Electrical and Computer Engineering**



**Autonomous Agents**  
**INF 412**  
**3rd Laboratory Exercise**  
**Report**

## 1. The purpose of the exercise

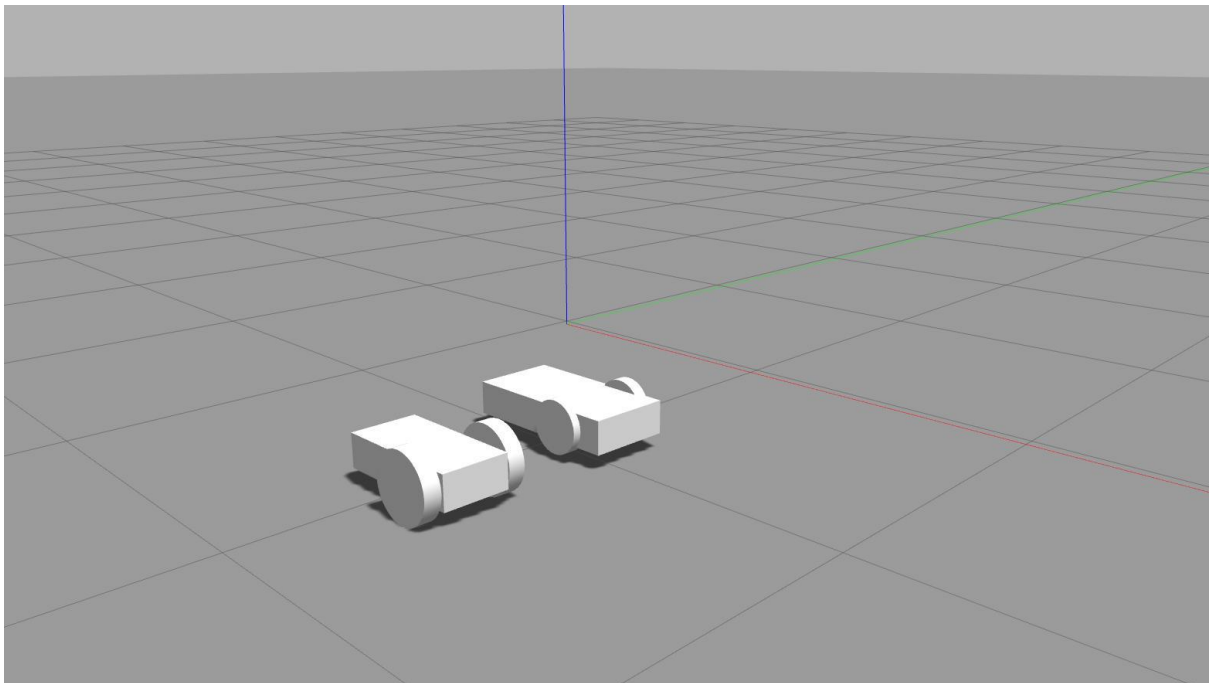
This laboratory exercise was designed to familiarize us with the Gazebo simulator and the creation of a simple robot equipped with a body, two wheels, and sensors. Additionally, we engaged in the creation of a new world where the newly designed robot was placed.

## 2. The Robot

### 2.1 A simple Mobile Robot

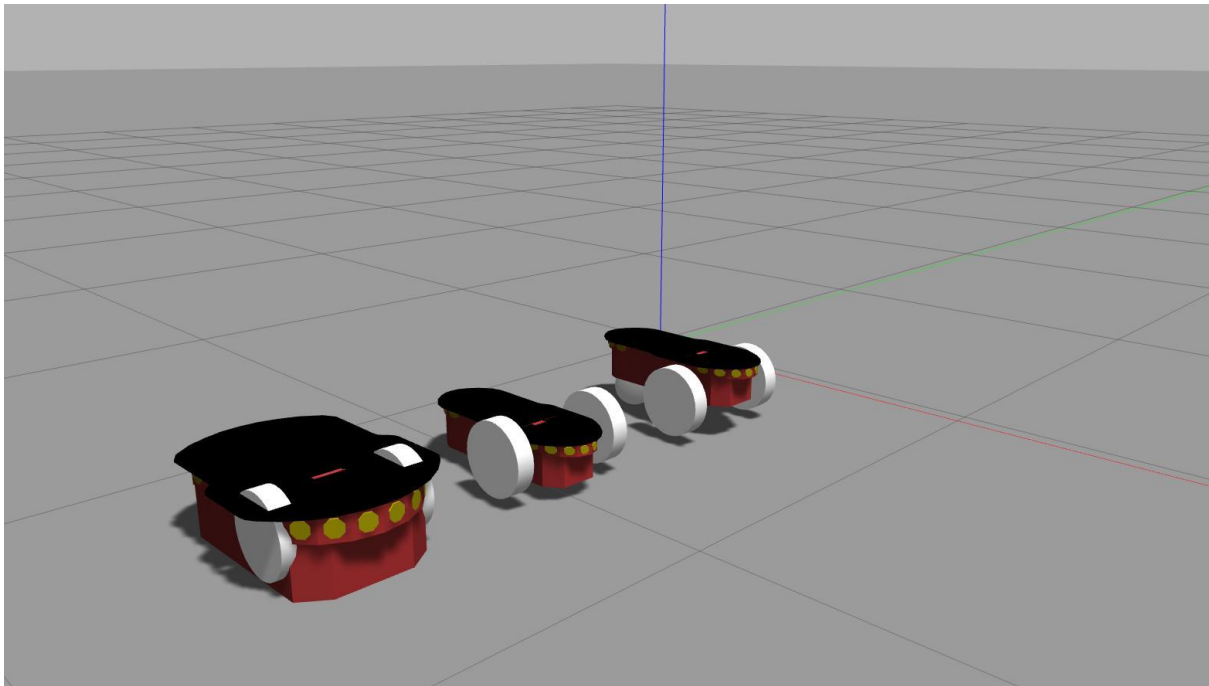
Initially, by following the tutorials in the category “Built a Robot” and especially the one called “Make a Mobile Robot”, the first version was created. To accomplish this, we generated a model config file and an SDF file. The model.config file provides a description of the robot along with additional metadata. Meanwhile, the model.sdf file contains the essential tags required to instantiate a model.

After completing the tutorial, to enhance my understanding of the code, I made adjustments to a few parameters. Specifically, I increased the size of the robot's body and slightly reduced the size of the wheels. The outcomes of these modifications are visible below:



## 2.2 Attach a Mesh as Visual

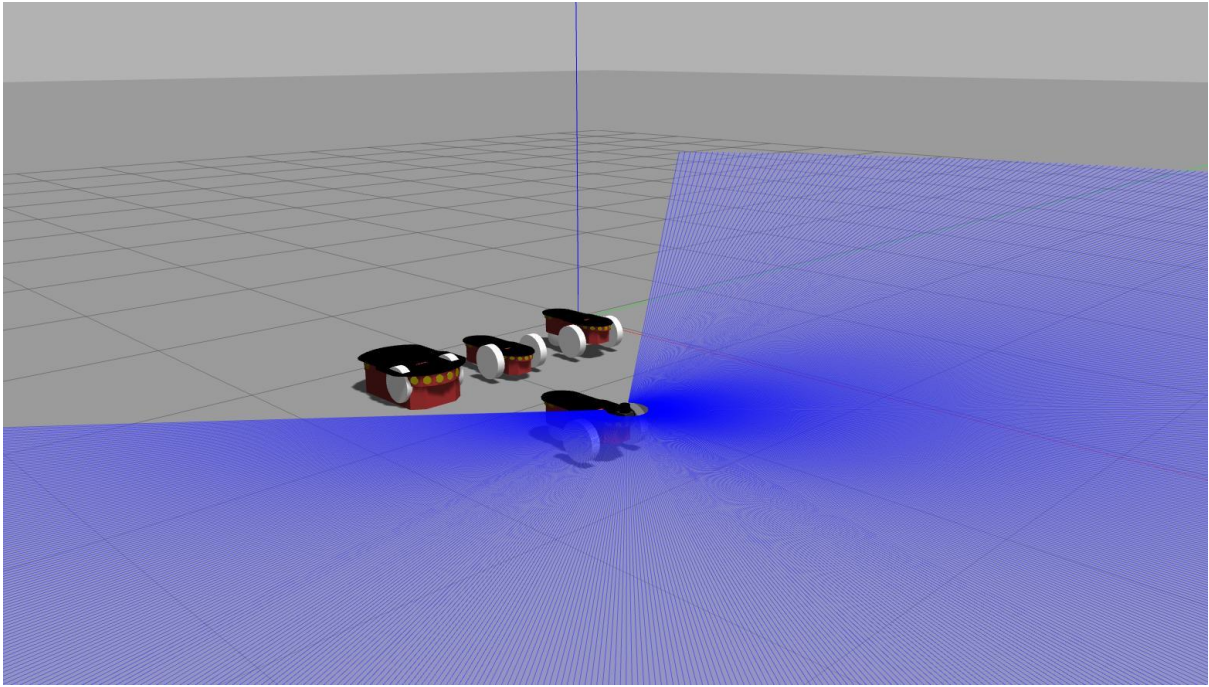
Furthermore, I followed the tutorial on "Attach a Mesh as Visual." Meshes play a crucial role in enhancing the visual aesthetics and sensor capabilities of a model. For this reason, a mesh named Pioneer 2DX was incorporated into the robot. After a few scaling adjustments, the last (3rd) robot is the final result.



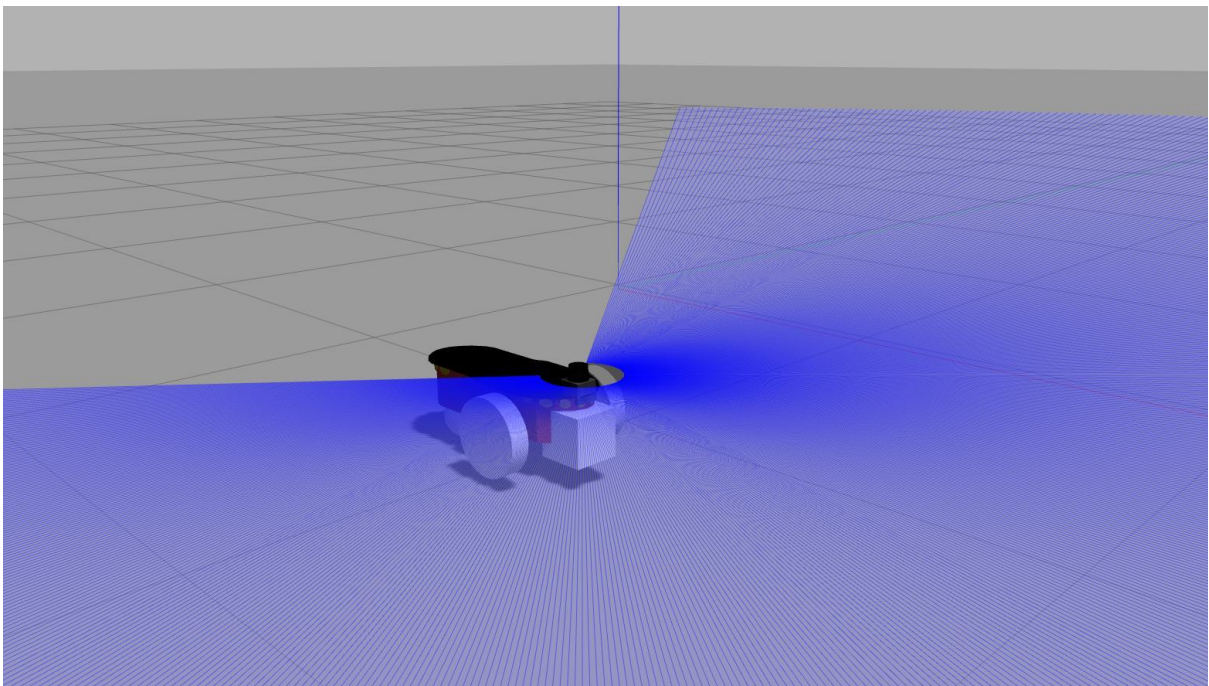
## 2.3 Add a Sensor to the Robot

Furthermore, by following the provided tutorial "Add a Sensor to the Robot", a sensor was incorporated to enhance the robot's perceptual capabilities. It is more clear by seeing the first picture above.

To enhance perception further, a camera was incorporated into the latest version of the model by adjusting the code accordingly. The result can be observed in the second picture.



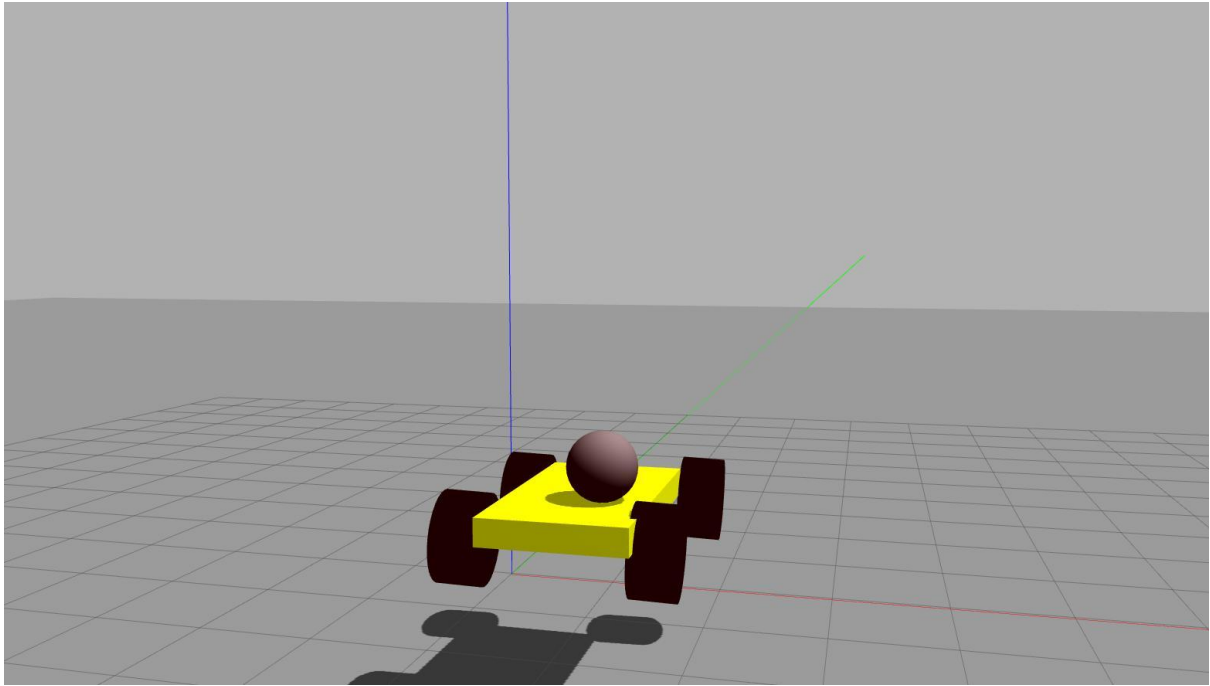
***Picture 1: Sensor***



***Picture 2: Sensor & Camera***

## 2.4 Models Creation

By following the next tutorial called “Model Editor” I created a simple yellow car that carries a ball.



## 2.5 Building a World

The "Building Editor" tutorial for Gazebo provides a step-by-step guide on creating custom buildings within the simulation environment. The tutorial covers various aspects of building creation, from opening the editor to adding features, editing structures, and assigning colors and textures. You can see a two-level house below:

