University Institute of Engineering

Department of Computer Science & Engineering

Experiment:8

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Branch: Computer Science & Engineering **Section/Group:115-B**

Semester:2 **Date of Performance:04-05-2023**

Subject Name: Disruptive Technologies-2

Subject Code: 22ECH-103

1..Aim of the practical: Understanding robotics development platform environment to model. program and simulate robots.

2. Tool Used: CoppeliaSim

3. Basic Concept/ Command Description:

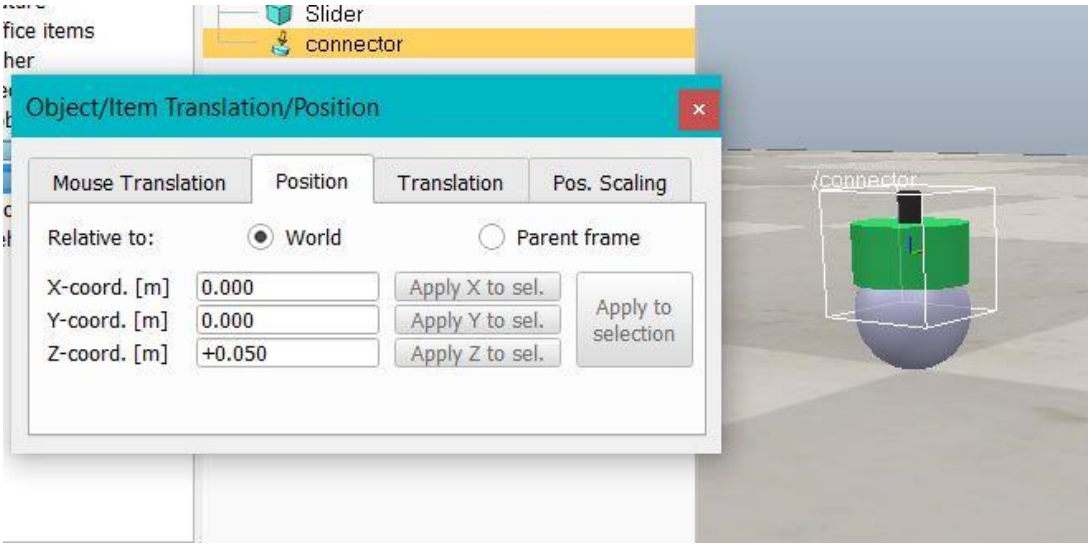
Robotics is the intersection of science, engineering and technology that produces machines, called robots, that substitute for (or replicate) human actions. The types of Robotics are as follows:

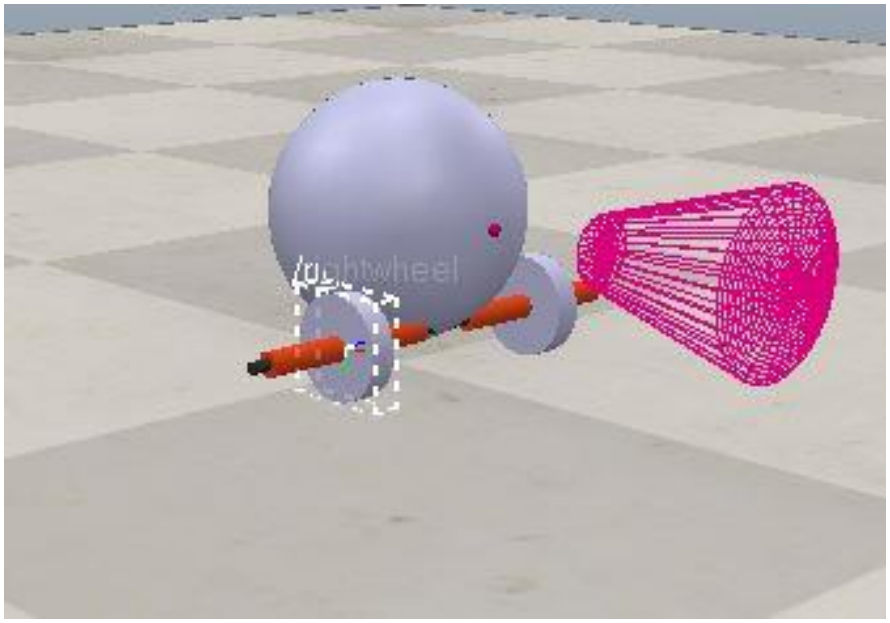
- Autonomous Mobile Robots (AMRs)
- Automated Guided Vehicles (AGVs)
- Articulated Robots
- Humanoid Robots
- Cobots Robots
- Hybrids Robots
- Fixed Vs. Nonfixed Location Robots

CoppeliaSim: The robot simulator CoppeliaSim, with integrated development environment, is based on a distributed control architecture: Robot Operating System (ROS) is a set of software libraries and tools for building robot applications Controllers can be written in C/C++, Python, Java, Lua, Matlab or Octave. This

makes CoppeliaSim very versatile and ideal for multi-robot applications. each object/model can be individually controlled via an embedded script, a plugin, ROS / ROS2 nodes, remote API clients, or a custom solution.

4. Observations, Simulation Screen Shots, and Discussions:





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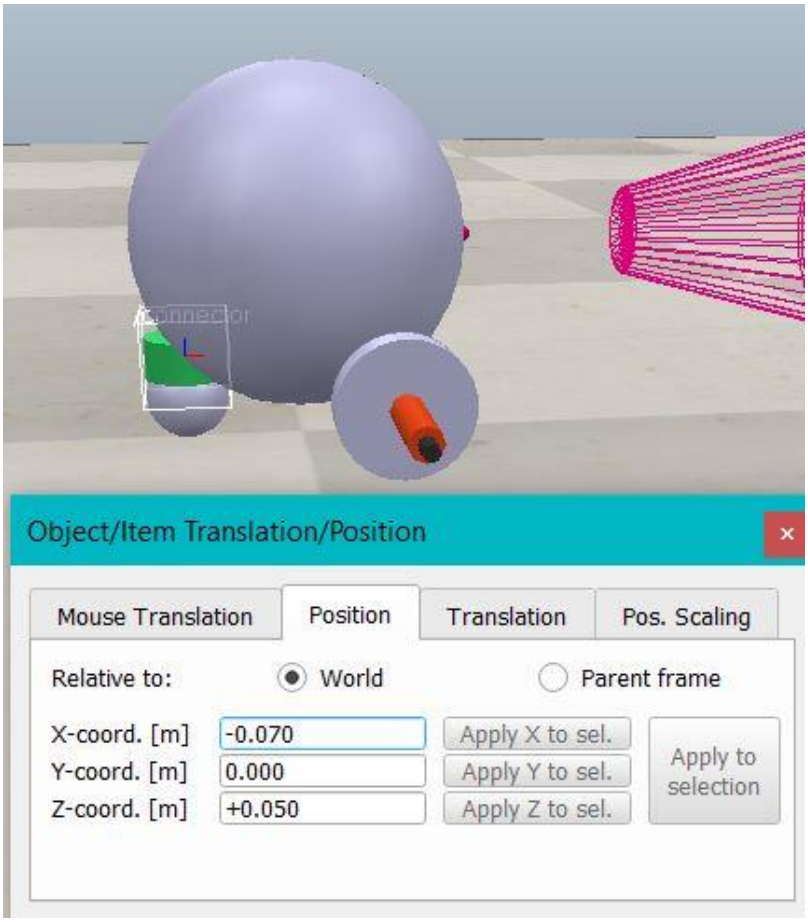

5.Steps to perform the practical: Now, we will see the steps for creating stable: BubbleRob. We now add a small slider or caster.

1. Click on the file option in the menu bar and create a new scene.

2. Add a pure primitive sphere of diameter, x=0.05.

3. Rename it as Slider.

4. Make it collidable, detectable and measureable by double clicking on the slider.

5. Now, double click on teal colour shape, go to dynamic properties and click on Edit material option to set the friction=0.

6. Go to Add option and click on force sensor. Go to position dialogue and put x=4 and z=0.05.

7. Rename it as BubbleRob Connection.

8. Firstly, select slider and then BubbleRob connection. Go to Edit and make the last selected object as

parent.

9. Now, copy them and paste in the main screen.

10. Select connection and go to position, make x= -0.07.

11. Select connection and then select BubbleRob. Go to edit and make the last selected object as parent.

12. Now, select left wheel, go to dynamic properties. Make mass=M*2 and inertia=I*2.

13. Select the local respondable mask and uncheck first four boxes.

14. Similarly, uncheck first four for the right wheel and slider.

15. For BubbleRob, uncheck last four boxes in the local respondable mask.

5. Result and Summary:

Thus, we have successfully created slider to avoid falling back of the Robot.

6. Learning outcomes (What I have learnt):

1. Use of CoppeliaSim
2. Robotics Science

Evaluation Grid (To be filled by Faculty):

Sr. No.	Parameters	Marks Obtained	Maximum Marks
1.	Worksheet completion including writing learning objectives/Outcomes. (To be submitted at the end of the day)		8
2.	Viva voce		10
3.	Conduct		12
	Signature of Faculty (with Date):	**Total Marks Obtained:**	**30**

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