

Robotrix 2024-25 Final Hackathon Problem Statement

Basket the Ball!!!

Objective

The Coppeliassim simulation scene that is provided contains an arena. In the arena, there is a robot with a basketball hoop and a basketball shooter. The robot can move the hoop in any of the three axes. The objective is to successfully dunk the basketball into the hoop by moving the hoop to the path of the basketball, which is shot automatically by the basketball shooter. As an aid for this task, the basketball hoop is equipped with two cameras.

Instructions

- Download the Coppeliassim world file from [here](#).
- Download the Python script template from [here](#).
- Do not edit the world file.
- Edit the Python script template to perform the task according to the objective.
- The codes should be neat, well-structured, and well-documented.

Specifications

The basketball arena has the following measurements:

- Dimensions of Total Arena: 10000 mm x 10000 mm
- Hoop Diameter: 320 mm
- Dimensions of the backboard (behind the hoop): 960 mm x 720 mm
- Height of Ball Shooter: 400mm

Two vision sensors have been placed on the backboard to see the basketball. The Vision sensor specifications are given as:

- Resolution: 512 x 512 px
- Field of View: 80°
- Distance Between the Cameras: 700 mm
- Vertical Distance Between the Cameras and Hoop: 390mm

The hoop's position data can be determined using the dummy element `hoop_odom`.

(Note: You are not allowed to use the `getObjectPosition()` function for any other purposes other than finding the position of the hoop from the dummy element `hoop_odom`)

All sliding joints about each axis can only be controlled using velocity data.

Score Distribution

Each run will have ten shots, after which the simulation will stop automatically. The team will gain 10 points every time the ball goes through the hoop. All teams will be evaluated out of 100 points.

The team that scores the most points will be declared the winner.

Submission Guidelines

- The submission will be via Google Drive. The link to the drive folder should be submitted on Unstop. Ensure that you provide view access to the folder.
- The following contents should be included in the drive folder:
 - The final Python script used for the solution. The script should be neat and readable, with comments provided wherever required.
 - A screen recording of the running simulation.
 - A text file explaining the approach used for the solution.
- Guidelines for the screen recording:
 - Software like OBS Studio (cross-platform) or Kazam (Linux only) can be used for screen recording.
 - The video should be recorded from the start of the simulation to the end (the simulation should stop automatically after ten shots of the basketball).
 - The initial part of the video should briefly show the code being used for the simulation.
 - The message window of Coppeliassim should be **clearly** visible in the recorded video since the final score will be displayed there.



- The link to the Google Drive folder should be submitted before the deadline - **22nd December 2024, 9:00 AM**. Any changes done to the folder after the deadline will lead to disqualification.

GOOD LUCK!