

# **Academic Report**

## **Cover Page**

Subtitle

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### **INSTITUTE OF TECHNOLOGY, NIRMA UNIVERSITY-**

Team Nirma was one of the team from India which participated in the Abu robocon 2022. They are well known in the field of robotics.

There robots are good and accurate. The principle they have used , is to collect the ball and feed it into the other robot was quiet unique, we'll discuss the later.

## THE DESIGN-

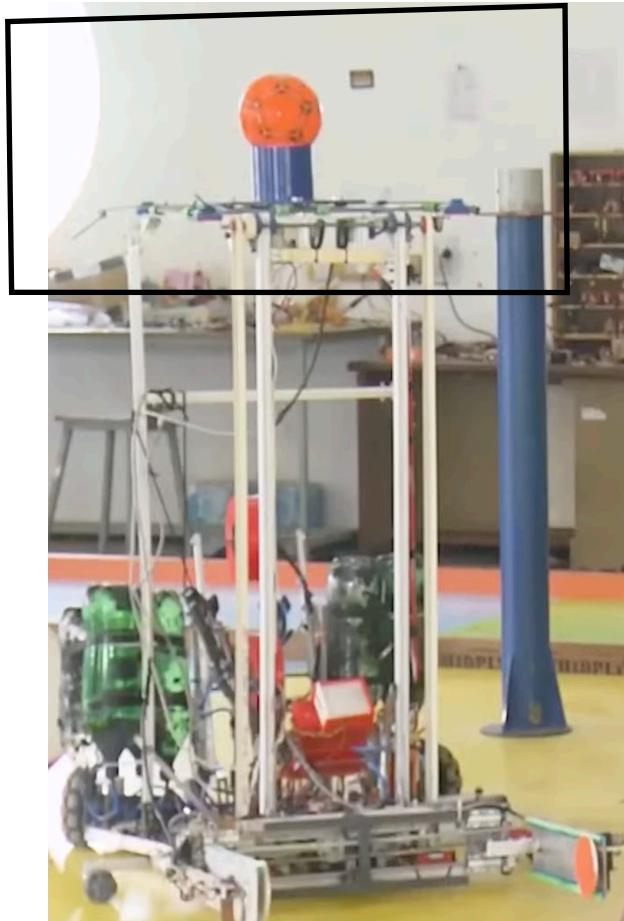


This robot is responsible for stacking up the lagori and collecting the balls and feeding them to the other robot.

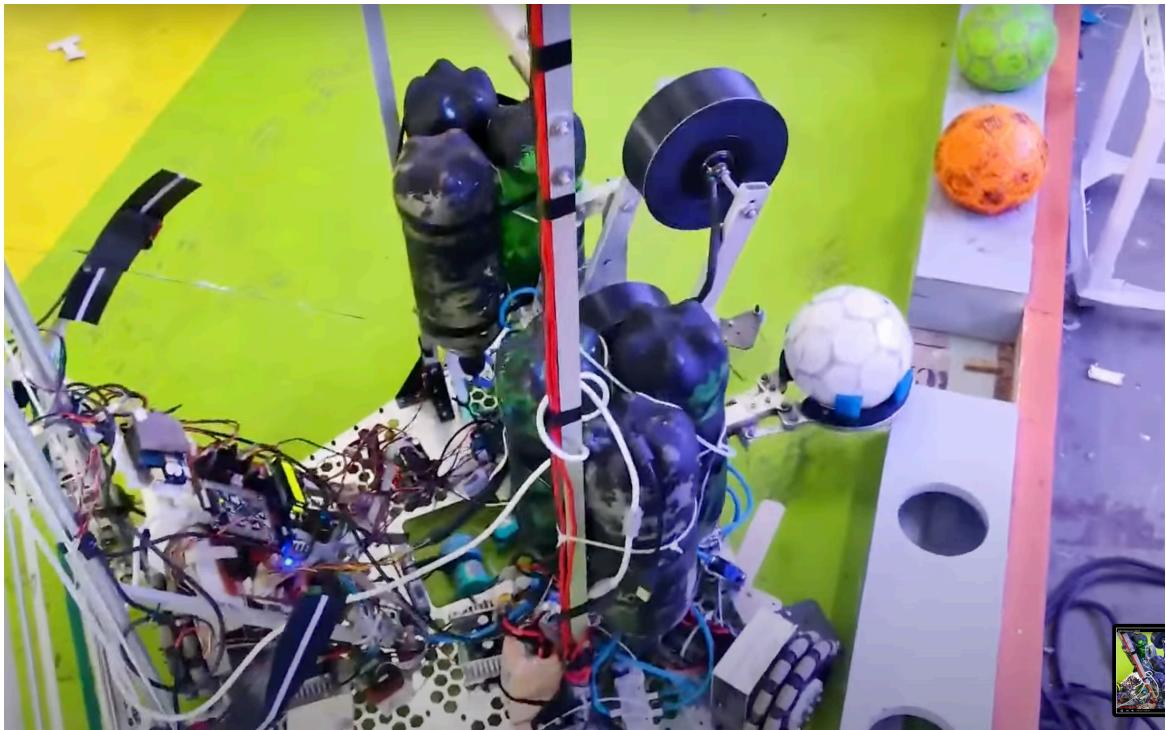
There were three main parts other than the processing unit and the wheels.

First, the machine which is highlighted in the above picture is used to grab the boxes and stack them up. The claws on both the sides of the machine grab the boxes. And the whole mechanism move vertically upwards to stack them up. It is basically a type of CNC machine which uses stepper

motors to execute the movement, which is known for its accuracy as it compares the number of rotation to steps and execute the task accurately.



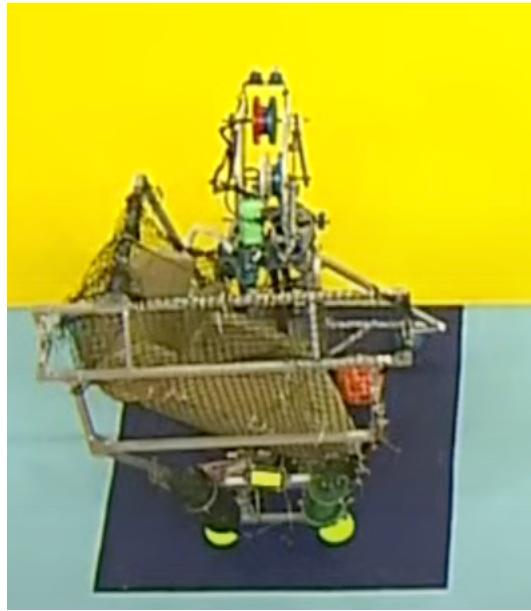
This mechanism highlighted above is used to stabilise the ball on the top of the robot. The purpose of the mechanism is that during the movement of robot the ball should not fall. So it requires a special mechanism which is two axis CNC machine with stepper motors. The movement of the CNC machine depends on the speed and direction of the robot to stabilise the movement.



This mechanism is responsible to collect the ball and shoot it to the other robot so as to collect the balls.

You can see a mechanical arm which grab the balls one by one and feed it to the launcher. The launcher consists of two rotating discs which launches the ball.

Now we will discuss about the other robot which is responsible for breaking the lagori.



This robot consists of two main mechanisms, one to shoot the ball and the other to collect the ball which is thrown by the other robot and feed it to the shooter.

The shooting mechanism is very similar to the one we have discussed about previously. We can see some net sort of thing which provides a large area so that it can collect the ball too when it is launched with some minute mistakes and then it feeds the ball to the launcher.

Basically this were the main tasks of the robot, it is all controlled by arduino, which is a device use to programme the machine. It does all the calculations and run the code which helps the machine to run independently

All the motors are connected to some motor drivers which regulate the speed of motors.

## THE PERFORMANCE-

In the round 1, the lagori break was good but while stacking them up, the task couldn't be completed within time. It can be due to slower processing or due to slower speed.

In the round 2, it was good shooting the poles which were near it but the robot was not very accurate while shooting the poles which was far. It can be due to some calculation mistakes or some other sort of sensor errors.

