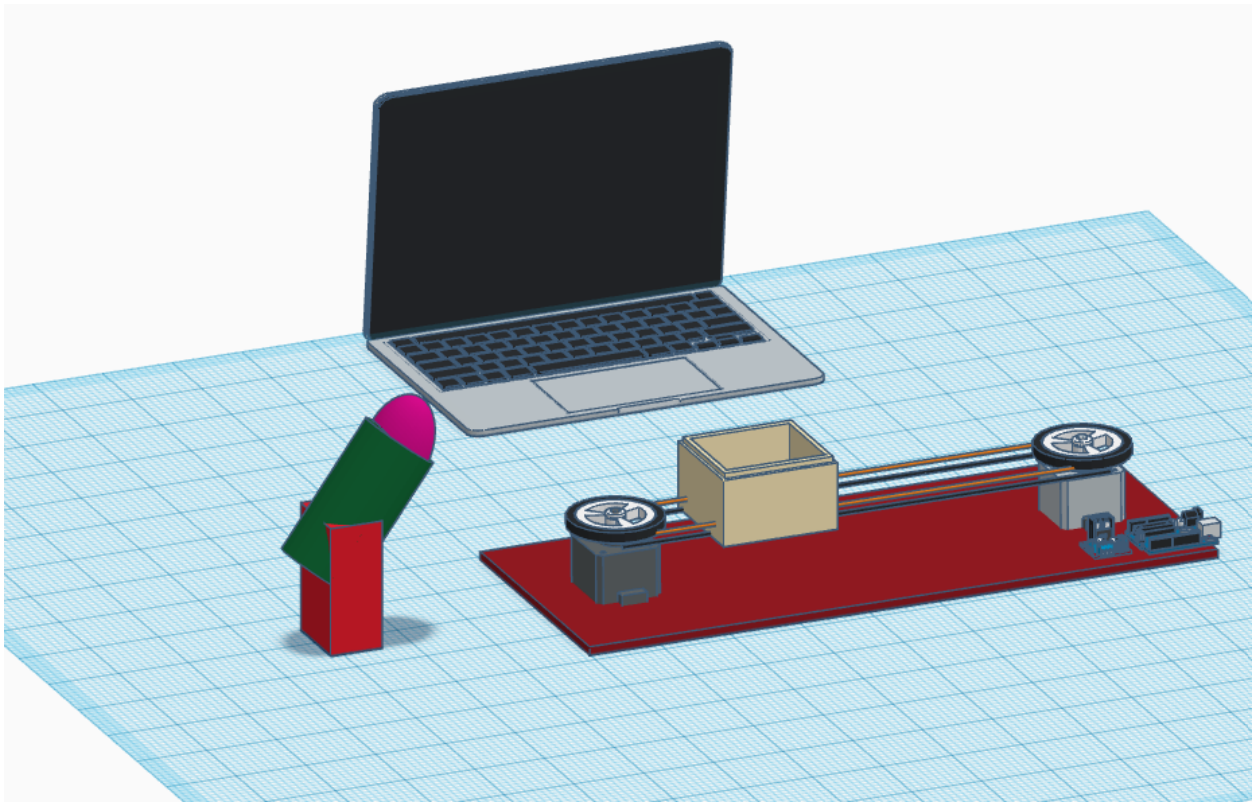

Ball catcher using OpenCV

Team :

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Overview

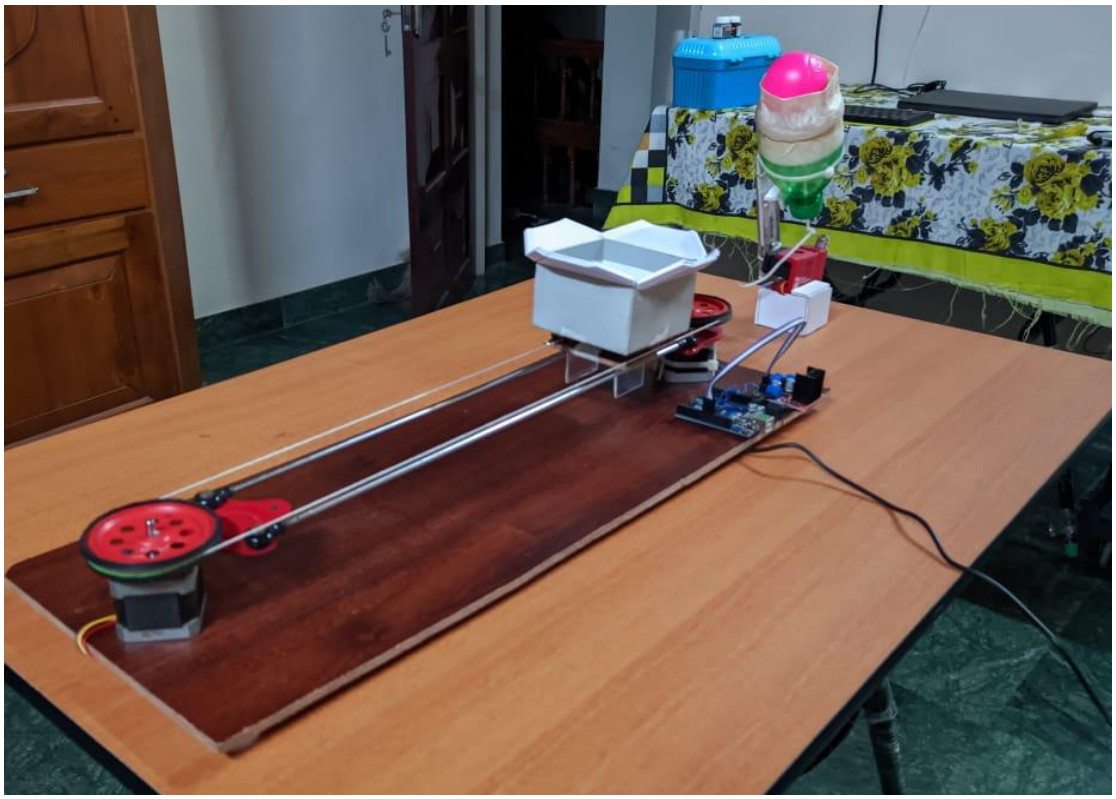
Our project is based on the software-hardware interconnectivity. The goal is to catch a projectile (ball) with a basket attached to a railing. This is achieved with the help of object detection using OpenCV, data processing with python and hardware integration through Arduino.

Working

The projectile is first detected using OpenCV and Python with an external source (webcam) by certain parameters like color in our case. Later, the center coordinates of the ball are then extracted.

Since our object is a projectile, the path followed is a parabolic path. The final coordinate of the object can be found out from a few initial points. For this we make use of the method 'Polynomial Regression' which is done by the python library 'Polyfit'. Once we get the curve through which our object travels, in the coordinate system, the end point is found by simply substituting height as baseline.

The distance thus received is used to turn the stepper in order to move the basket to the correct position. The stepper is powered by driver LN298 and connected to Arduino Uno. The Arduino board is capable of sending and receiving data through its in-built serial monitor. Serial communication in python is achieved through the library 'Pyserial'. The end point received is converted to a suitable value through calibration and sent to the stepper motor. The stepper is moved accordingly to catch the ball.

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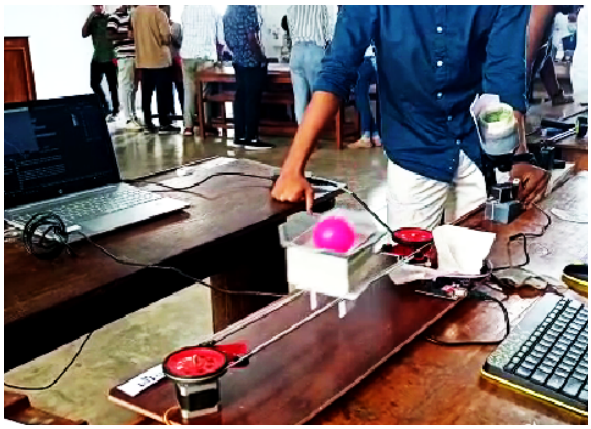

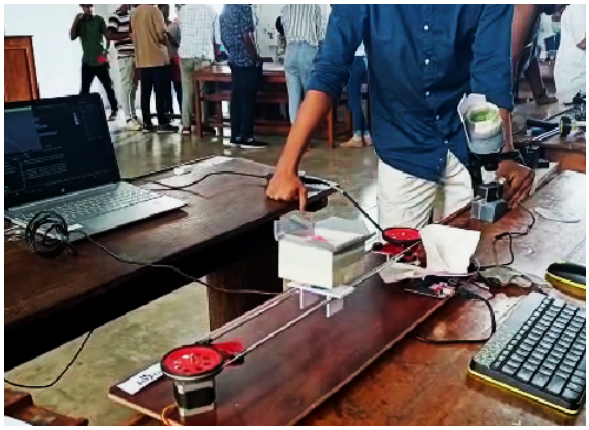

Materials used

L298N Motor driver

12v 2A Adaptor

Jumper wires

A4988 stepper driver

Mini Bread board

Hard board

Arduino UNO

Nema 17 stepper motor (1)

Wheels for the railing

Stepper belt

Civil drafting tool parts (for making railing)