Report

Inspiration

Aegis is a two-wheeled robot that follows you wherever you go. It is basically a rolling robot that balances itself on two wheels and follows a person using the camera on top.
The motivation for doing this project is to explore the field of robotics. We want to learn the controls of a robot, how to build a robot from scratch (like its design and electrical components); what all mathematics is required to make a robot.
The advantage of rolling robots is the simplicity of their driving mechanisms, which makes them good candidates for miniaturization. Two-wheeled robots are the most prevalent rolling robots in the literature. The prevalence of these robots stems from a crucial advantage they present over other varieties of rolling robots in that they do not have a minimum turning radius

Description

We are creating a 2-wheeled self-balancing robot that can autonomously follow any person. The advantage of two-wheeled robots is that they required less space to move and hence can be used inside buildings and places with less space available. The design can be extended to create personal assistants like robots that can follow you everywhere inside your work or home environment.

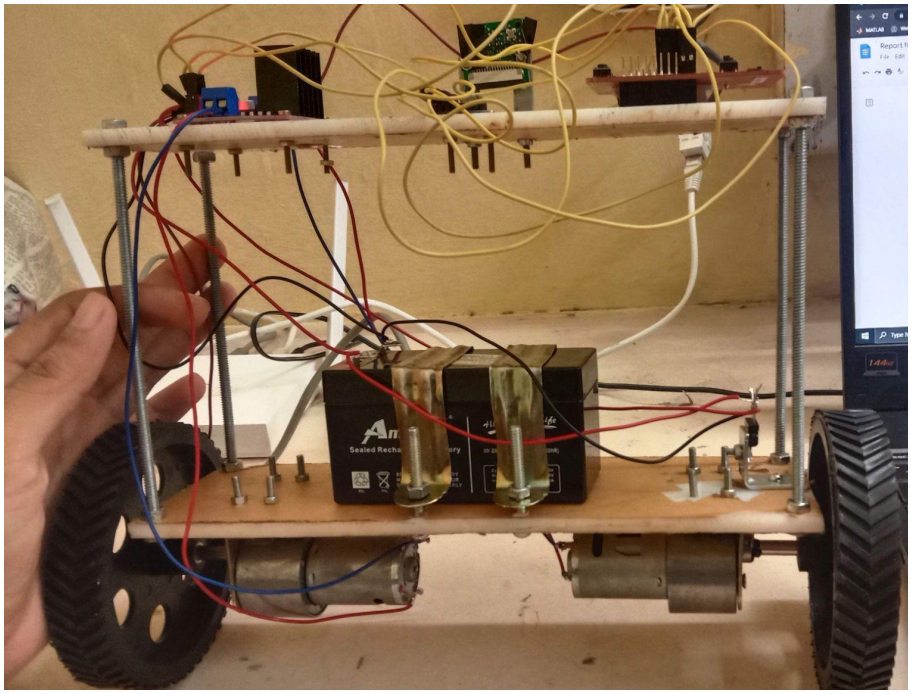
Work Done Till Date

Created a CAD model for the bot with all the necessary components. Planned the electric hardware circuit. Worked with YOLO for implementing the person following part of the project.

Started assembly of hardware. Modified YOLO to work on Rpi.

YOLO related work: https://github.com/krishanu23022002/ITSP_object_detection
CAD Model:
https://drive.google.com/drive/folders/1j9zeOJ7YQD6y0ET4RD4L89u38Fgmlmvs?usp=sharin

g
Hardware:



List of hardware required

MPU6050	
Raspberry Pi 3 Model B	127
Motor Driver L298N	3399
Rpi Camera Module	239
2 Motors	300
2 Wheels (12cm diameter)	Approx (800)
2 Batteries(12V and 5V)	Approx (150)
5V voltage regulator	Approx (1000)
Chassis Plates (Acrylic)	
Nuts and Bolts	
Angle Brackets	

References

https://www.youtube.com/watch?v=RFqvTmEFtOE
for basic object detection model

https://www.youtube.com/watch?v=b59xfUZZqJE
how to detect objects using Yolo

https://www.youtube.com/watch?v=kdLM6AOd2vc&list=PLS1QulWo1RIa7D1O6skqDQ-JZ1GGHKK-K
Watched the playlist to understand OpenCV

https://github.com/ultralytics/yolov5
official GitHub page for Yolov5 model

https://github.com/tensorflow
learned about the basics of TensorFlow

https://grabcad.com/library/two-wheel-self-balancing-robot-1/details?folder_id=3157323
took inspiration to build our model