FOLLOW ME TROLLEY

MENTORED BY-

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INTRODUCTION

- The purpose of a human following robot is to improve the relationship between people and the robot. For instance, the robot can carry heavy loads for people in hospitals, airports and shopping centers.
- In this project, we have used the **Raspberry Pi to build a Robot that could track human and follow it**.
- Image recognition is one of the popular way in which the robots are thought to understand objects by looking at the real world through a camera just like we do.
- Processing IDE has been used for Image processing.

WORKING MODEL OF TROLLEY

- Will follow a specific person in a particular range.
- Will turn automatically when it's owner turns.
- Will adjust it's speed accordingly to it's owner's speed.
- Capacity -5kg (can be increased later on).
- Trolley will follow the person and will maintain a distance of 0.5 to 1m.
- It will work only on plane surfaces.
- Should be able to interact with some means.
- Owner can be changed.
- If trolley stops following its owner due to any obstruction or due to any reason (shortage of power supply, someone forcefully tries to stop trolley) then alarm will be triggered.
- Trolley's battery will be rechargeable.
- Trolley will be of container type in which we can put anything according to requirement.

ADVANTAGES

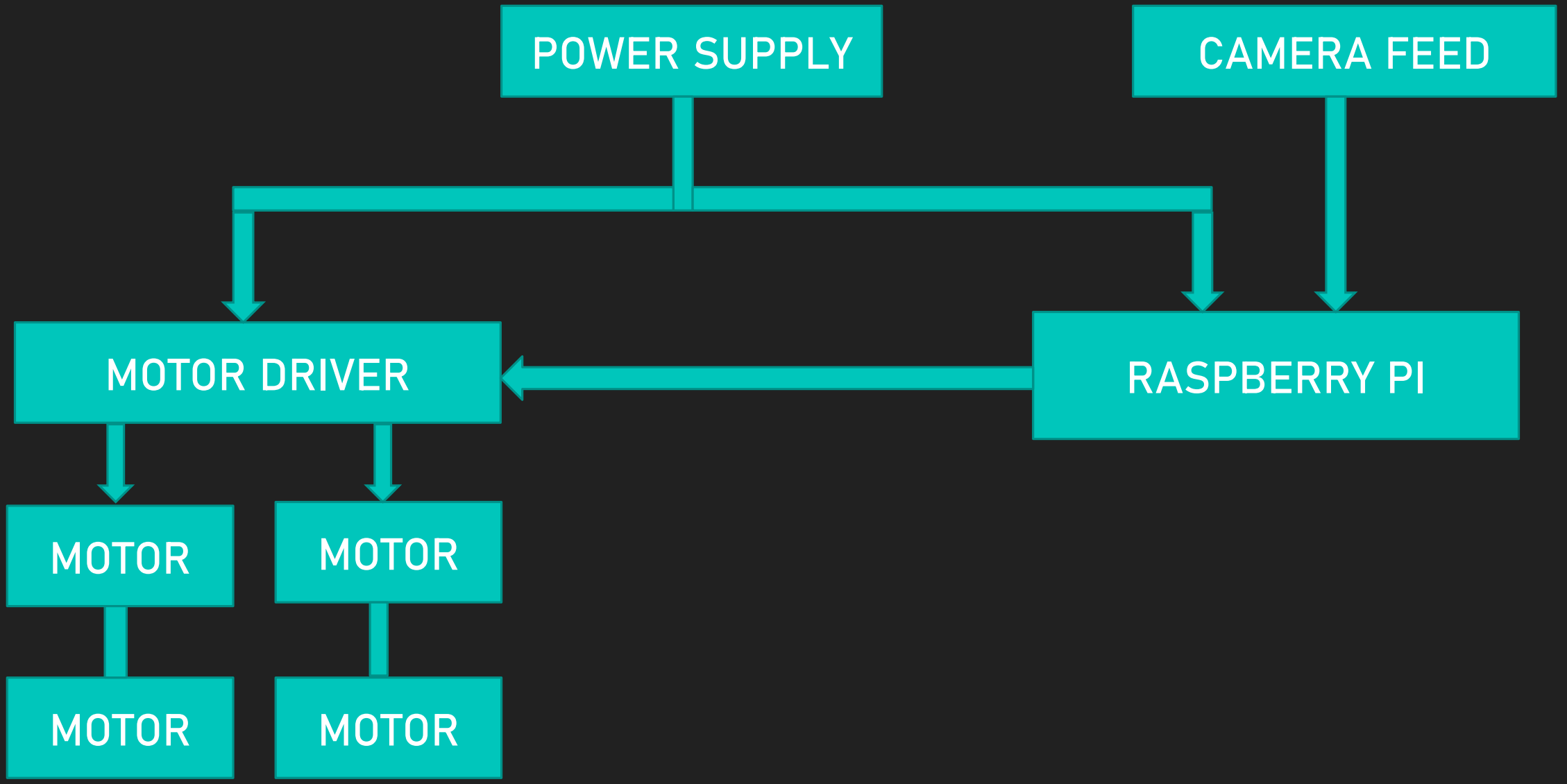
- CAN BE USED AT SHOPPING MALL.
- CAN BE USED AT AIRPORT.
- MULTIPURPOSE TROLLEY.
- CAN BE USED IN INDUSTRIES.

HARDWARE REQUIRED

- Raspberry Pi
- Camera
- Robot Chassis
- Gear motors with wheel
- L293D motor driver
- Power bank or any other portable power source

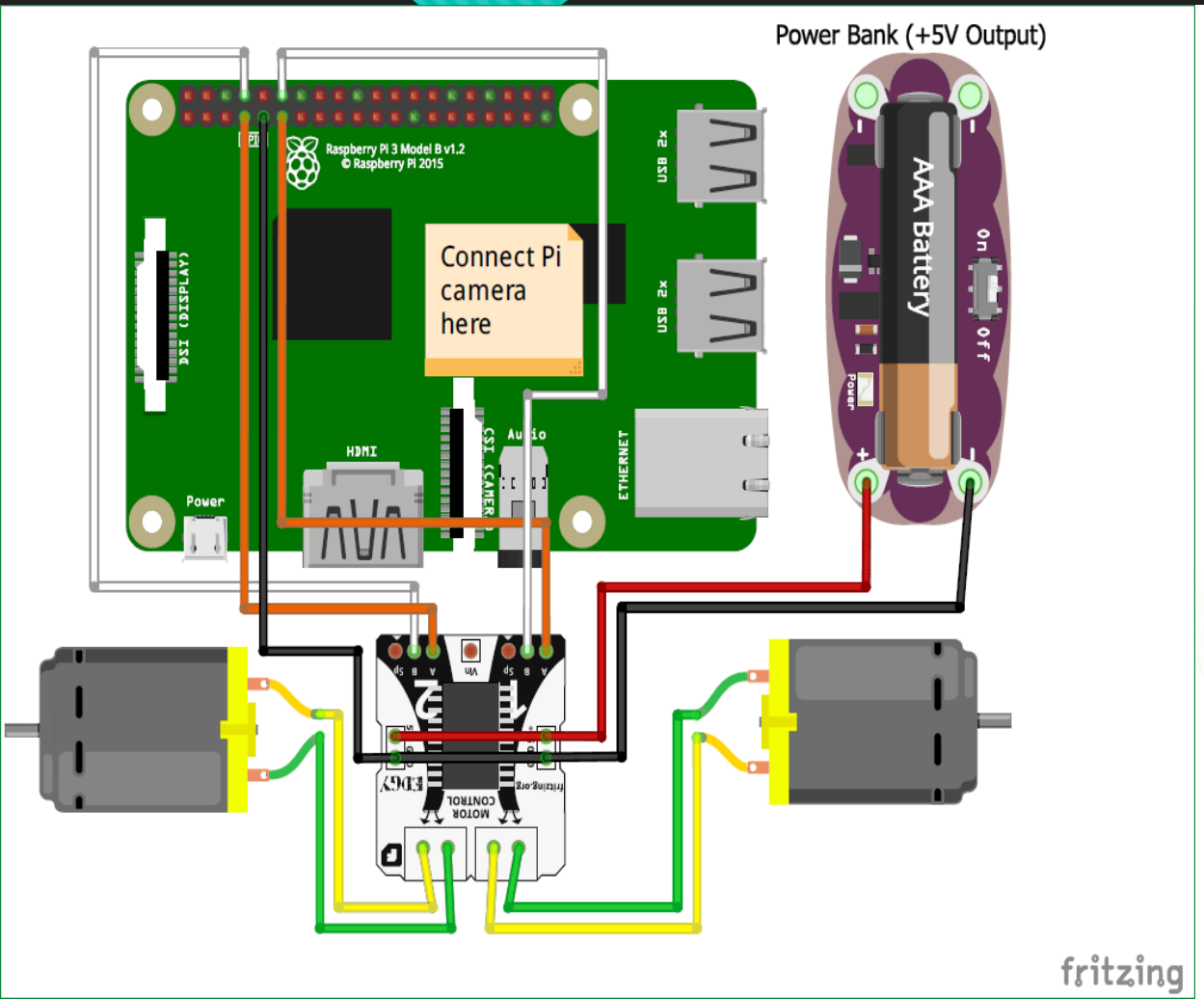
PROGRAMMING REQUIREMENT

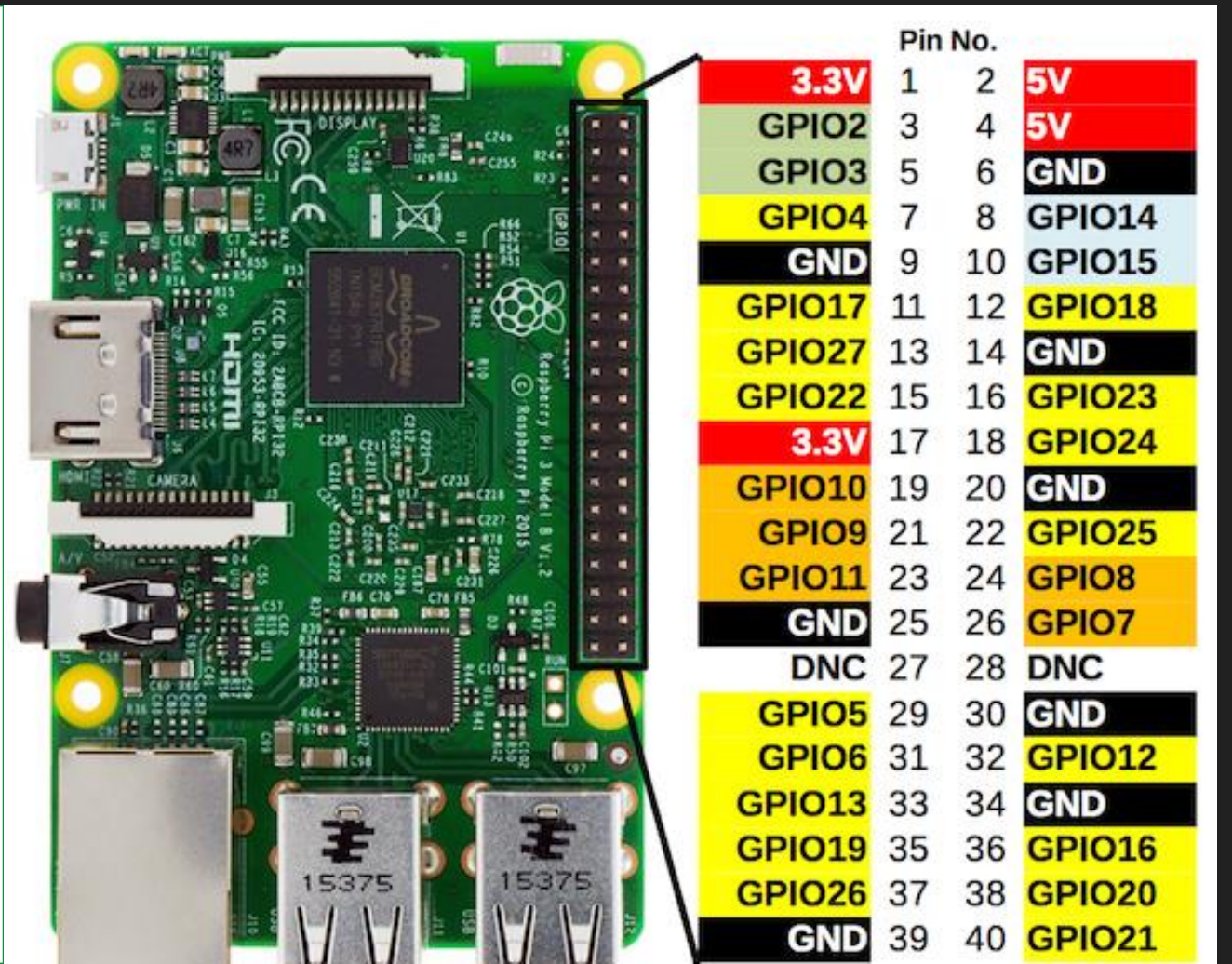
- PROCESSING ARM SOFTWARE
- RASPBIAN OS
- BASIC JAVA PROGRAMMING LANGUAGE



BLOCK DIAGRAM

CIRCUIT DIAGRAM AND GPIO PINS





PROGRAM CONCEPT

The **program concept** is very simple. Although the intention of the project is to track a person, we are actually not going to do it. We are just going to identify the person using a color say its clothes color. As we all know videos are nothing but continuous frames of pictures. So we take each picture and split it into pixels. Then we compare each pixel color with the color of the ball; if a match is found then we can say that we have found the person. With this information we can also identify the position of the person (pixel color) on the screen. If the position is far left we move the robot to right, if the position is far right we move the robot to left so that the pixel position always stays at the center of the screen.

USED LIBRARIES

import processing.io.*

- THE HARDWARE I/O LIBRARY IS USED TO ACCESS THE GPIO PINS OF THE PI DIRECTLY FROM THE PROCESSING ENVIRONMENT.

import gohai.glvideo.*

- THE glvideo LIBRARY IS USED TO ACCESS THE RASPBERRY PI CAMERA MODULE.

SETUP FUNCTION

Inside the *setup* function we **initialize the output pins to control the motor and also get the video from the pi camera** and size it in a window of size 320 * 240.

```
void setup()
 {
    size(320, 240, P2D);
    video = new GLCapture(this);
    video.start();
    trackColor = color(255, 0, 0);
   GPIO.pinMode(22, GPIO.OUTPUT);
   GPIO.pinMode(14, GPIO.OUTPUT);
   GPIO.pinMode(17, GPIO.OUTPUT);
   GPIO.pinMode(18, GPIO.OUTPUT);
}
```

DRAW FUNCTION

The *void draw* is like the infinite loop the code inside this loop will be execute as long as the program is terminated. If a camera source is available we read the video coming out of it

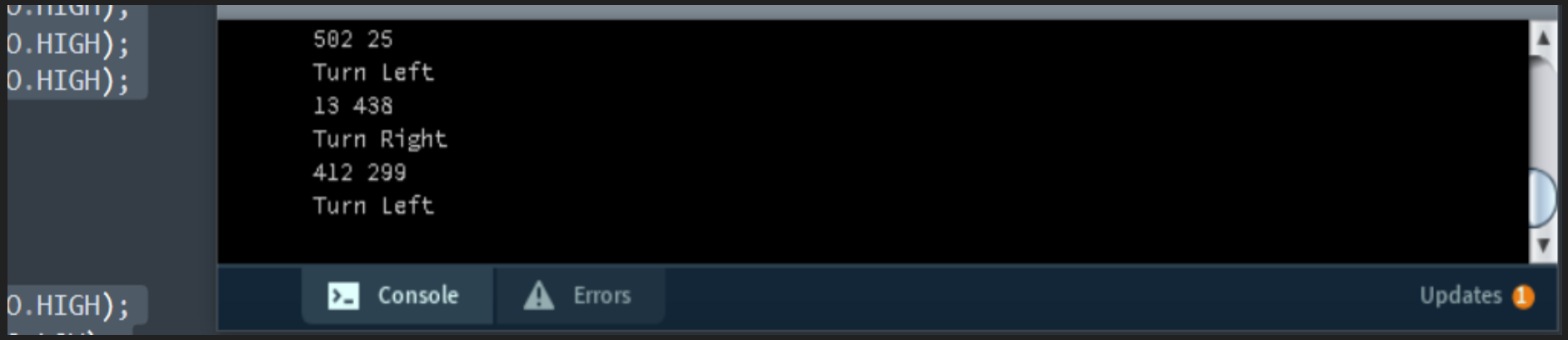
```
void draw()
 {
     background(0);
     if (video.available())
    {
          video.read();
     }
}
```

MOUSE PRESSED FUNCTION

To **detect the color initially**, we have to click on the color. Once clicked the color will be stored in variable called *trackColour*.

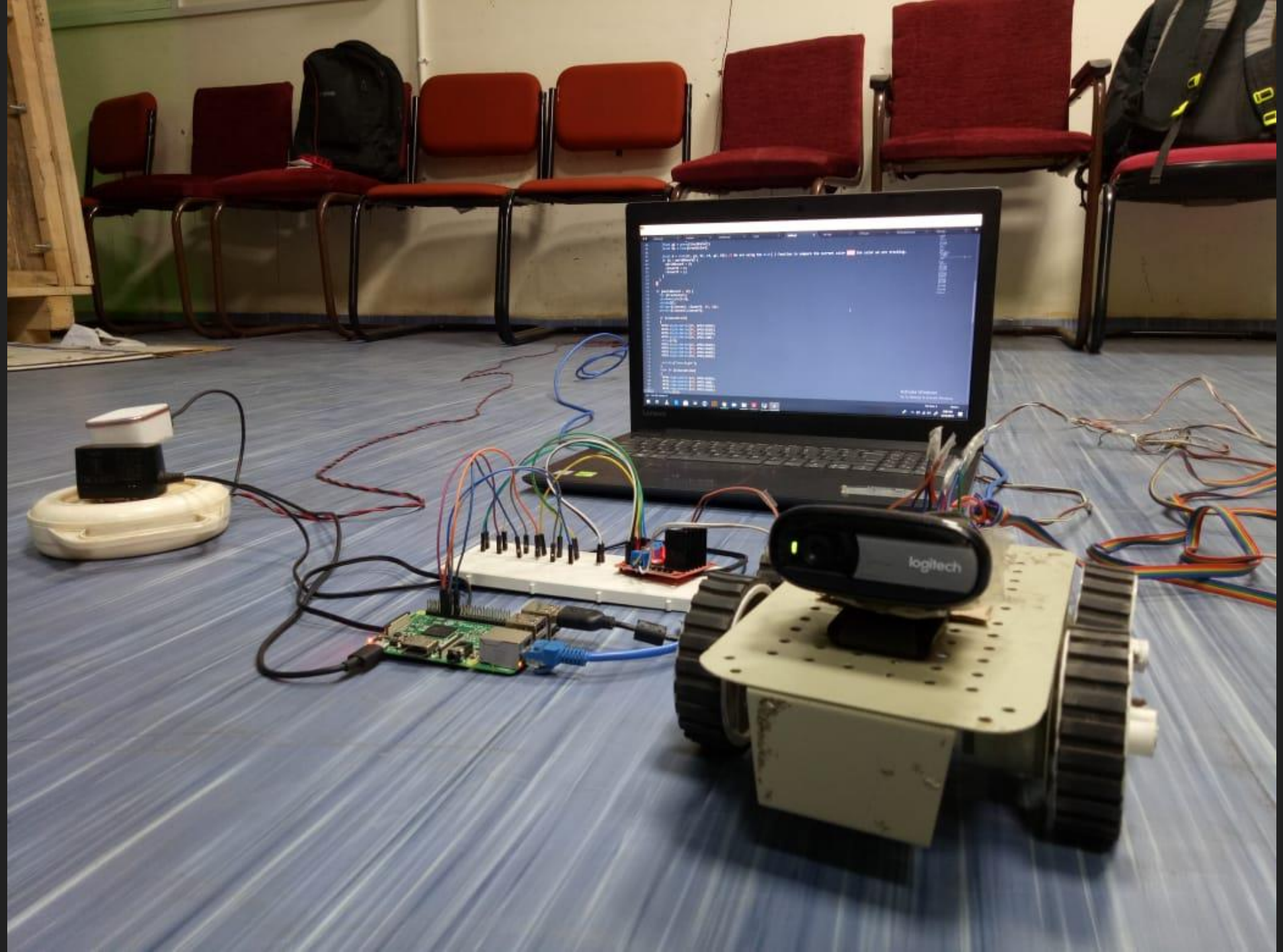
```
void mousePressed()
 {
    //Save color where the mouse is clicked in
    trackColor variable.
    int loc = mouseX + mouseY*video.width;
    trackColor = video.pixels[loc];
}
```

OUTPUT


O.HIGH);
O.HIGH);
O.HIGH);
502 25
Turn Left
13 438
Turn Right
412 299
Turn Left
Console
Errors
Updates 1

What we have done till now.

- Create a prototype that will follow a particular tag.
- Maintains a minimum distance of 0.1m.
- Will turn automatically when it's owner turns.
- Tag can be changed.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FOR COMPLETE CODE REFER-

https://drive.google.com/drive/folders/1QVZ6DWrSauuVJ60WmQIjhdpqPj_nmdeq?usp=sharing

THANKS