

VibraSight

A Hackduino 3.0 Project

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Report

Testing of the components :	Done (GPS module - Probably defective)
Integration to the project :	Done (LiDar,MPU,GPS module couldn't be used)
Assembly and Testing :	Done

We had some setbacks, but the device is now functional; it uses the Yolo V8 model in nano size, exported in onnx format for faster speeds when running on CPU.

Hardware	Price
Raspberry pi 4 Model B	5050
SanDisk Ultra microSD	430
Raspberry Pi Camera V2	1800
Arduino NANO	300
Button sized Vibrator Motors	300
Power Bank	500
Walking Stick	600
Gloves	135
Earphone	200
Total	9315

Power Consumption

With the current setup the device can run for about 1 hour with a 10000 mAh power bank

Device	Power Consumption (per hour in mAh)
Raspberry pi 4B	3000
Arduino NANO	19
Button sized Vibrator Motors	1200
Total	4219

Vibrasight

Our project has all three primary hardware different in it.

1. Microcontroller
2. Sensors
3. Actuators

Microcontroller

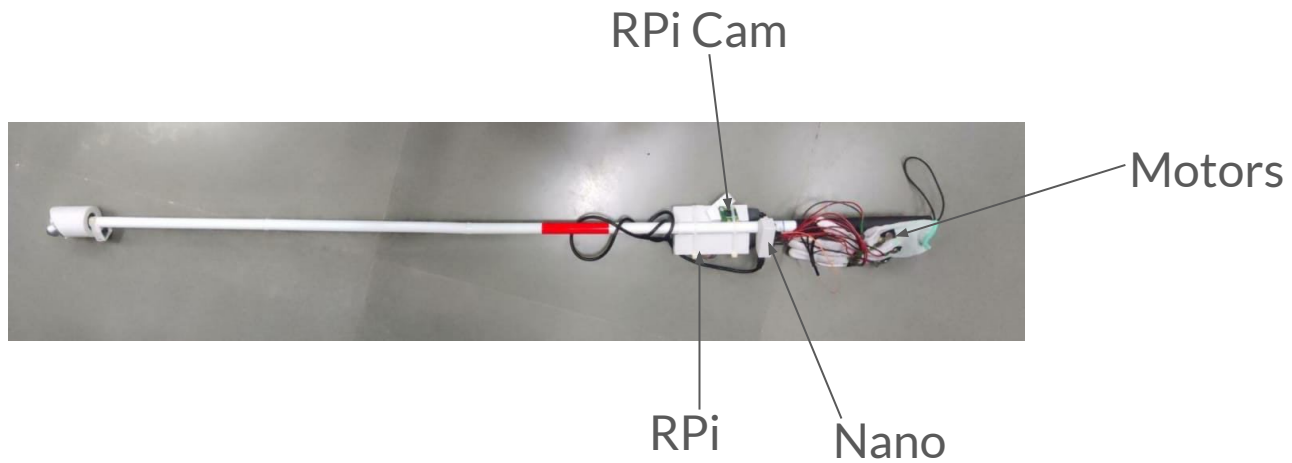
Our stick uses Raspberry Pi 4 as its primary processing unit, which provides greater processing power than any Arduino board.

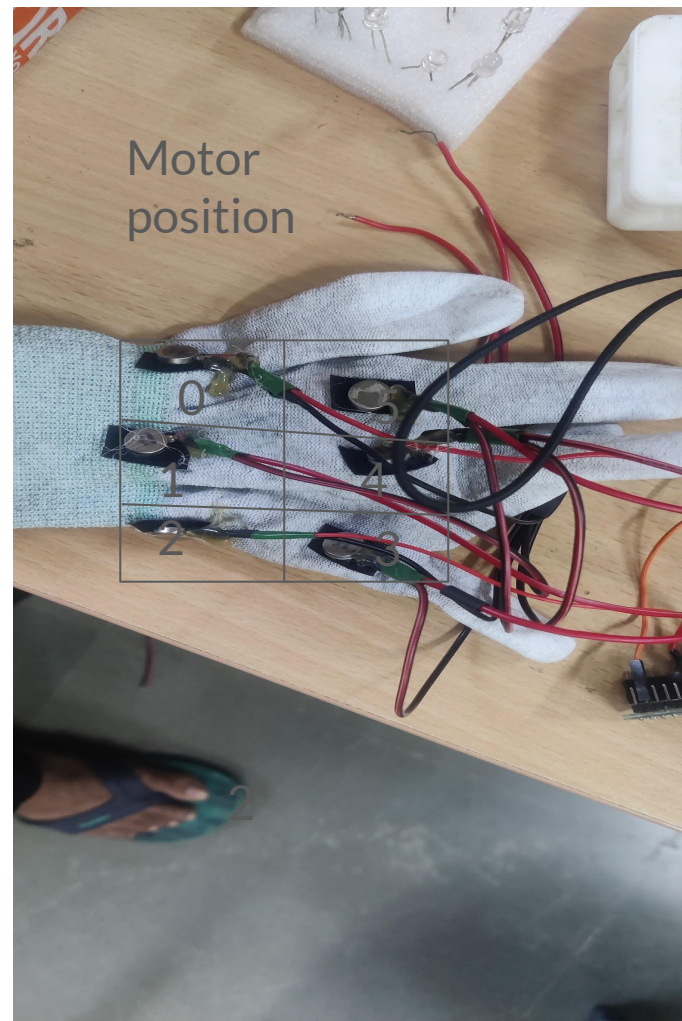
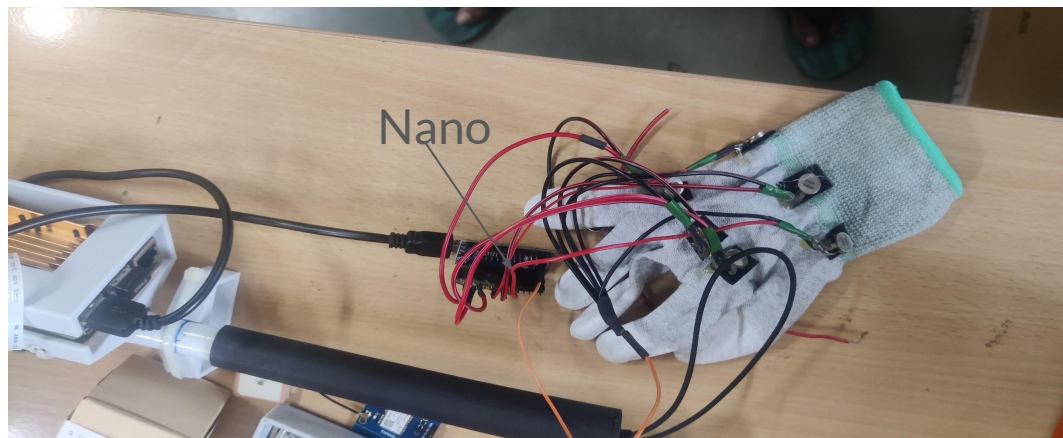
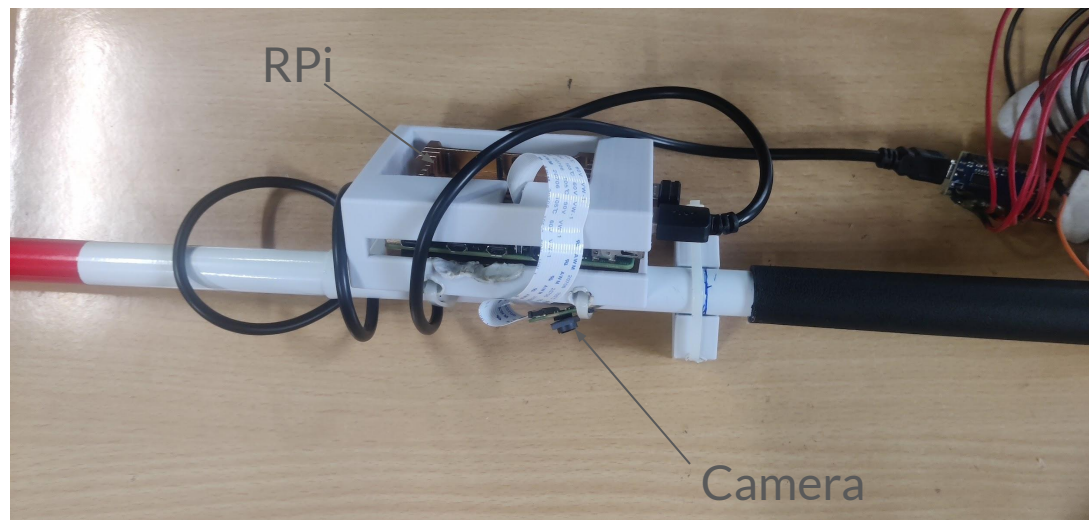
Sensors

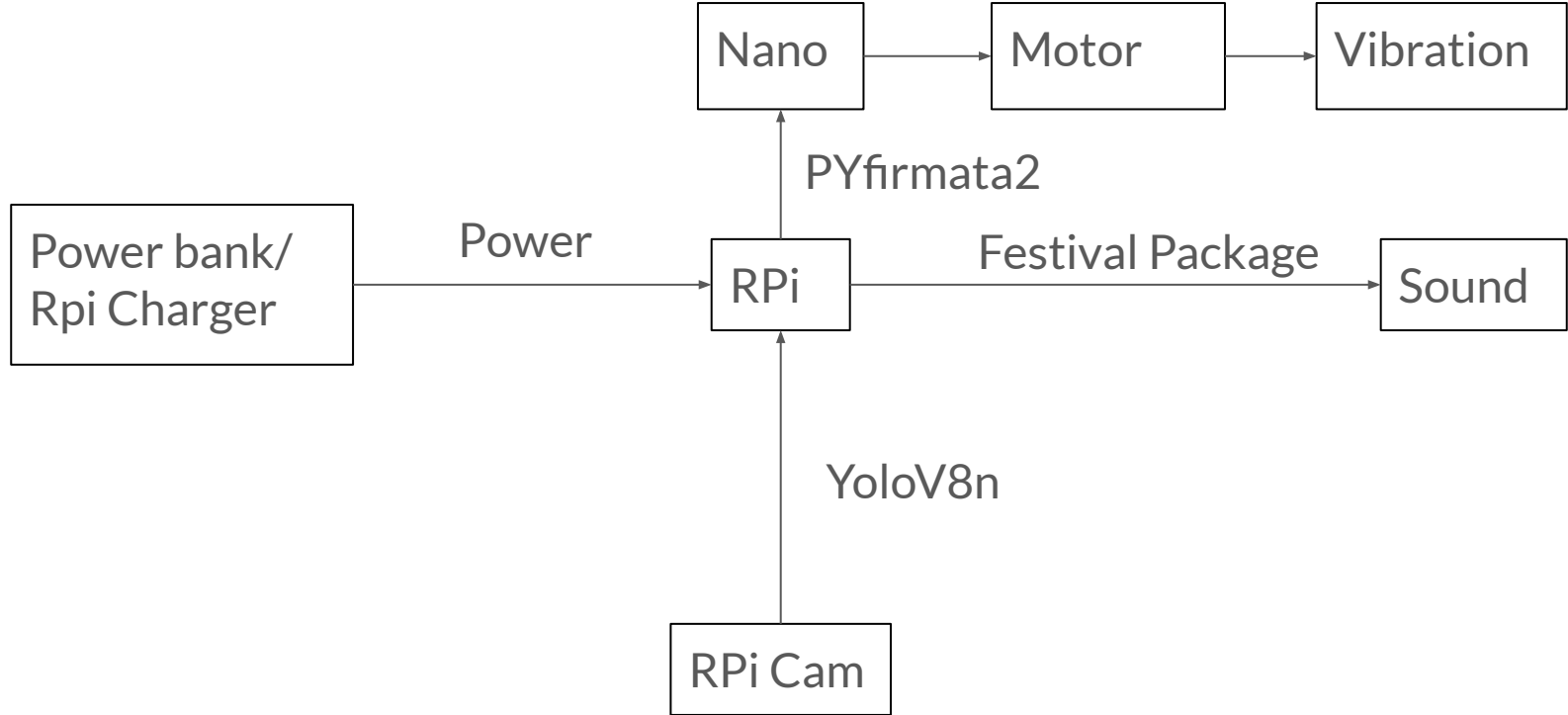
Our stick has sensors integrated into it, a Raspberry Pi v2 camera module
The camera module does the task of object detection.

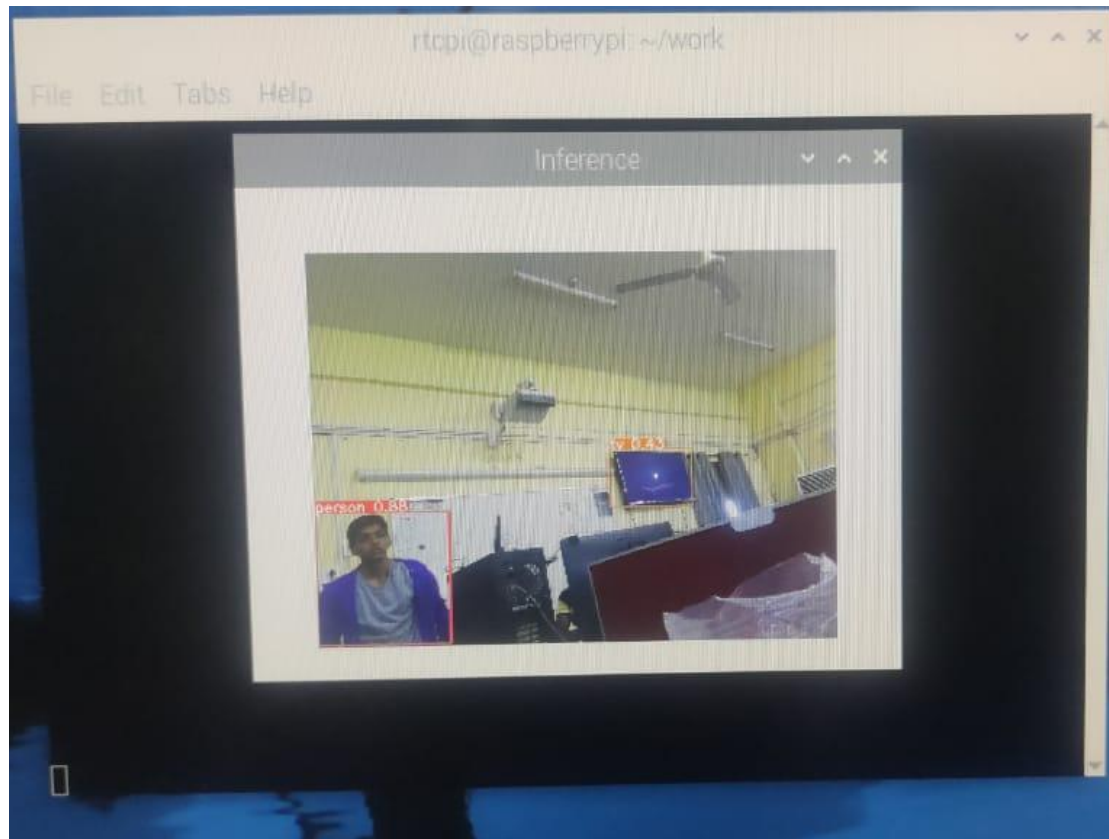
Actuators

Our stick has a set of vibrator motors to provide better haptic feedback for the user. It is helpful to an extent when our user is deaf and blind.









YoloV8 Inference

The input image has been divided into sections corresponding to an actuator. So, the approximate location of the detected object is conveyed to the user.

0	1	2
3	4	5

Code

<https://github.com/CodeScythe0/work>

Possible Improvements

With a better GPS module, Google Maps API can be used. The GPS neo 7m module works on a specific condition. It does not work in indoor conditions.

The LIDAR GS2 has a window-based interface. Thus, it didn't integrate with Raspberry Pi. So, a Linux-operated LIDAR module can be used.

A Smartphone can replace the Raspberry Pi, Camera and Power bank.