



MOUSE USING EYE **TRACKING**

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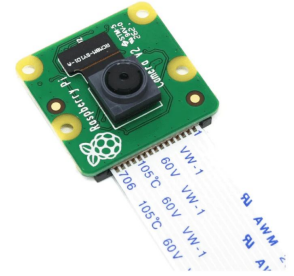
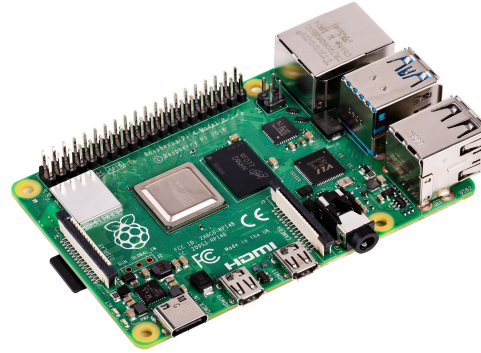
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OBJECTIVE

- Developing a mouse emulation system for individuals with disabilities, leveraging both hardware and software components.
- Implementing an eye-tracking technology with a Raspberry Pi, allowing users to control the mouse pointer by tracking their eye movements.
- Leveraged Mediapipe and PyAutoGUI libraries
- Orchestrating the setup of a Raspberry Pi access point for seamless Wi-Fi connectivity with a laptop, enabling real-time visual capture and eye movement tracking using the Raspberry Pi camera.

COMPONENTS USED





LIBRARIES USED

- **Mediapipe library** : Machine learning models for tasks such as object detection, pose estimation, facial recognition, and more.
- **PyAutoGUI library** : A Python library facilitating cross-platform automation of mouse and keyboard interactions.

BLOCK DIAGRAM

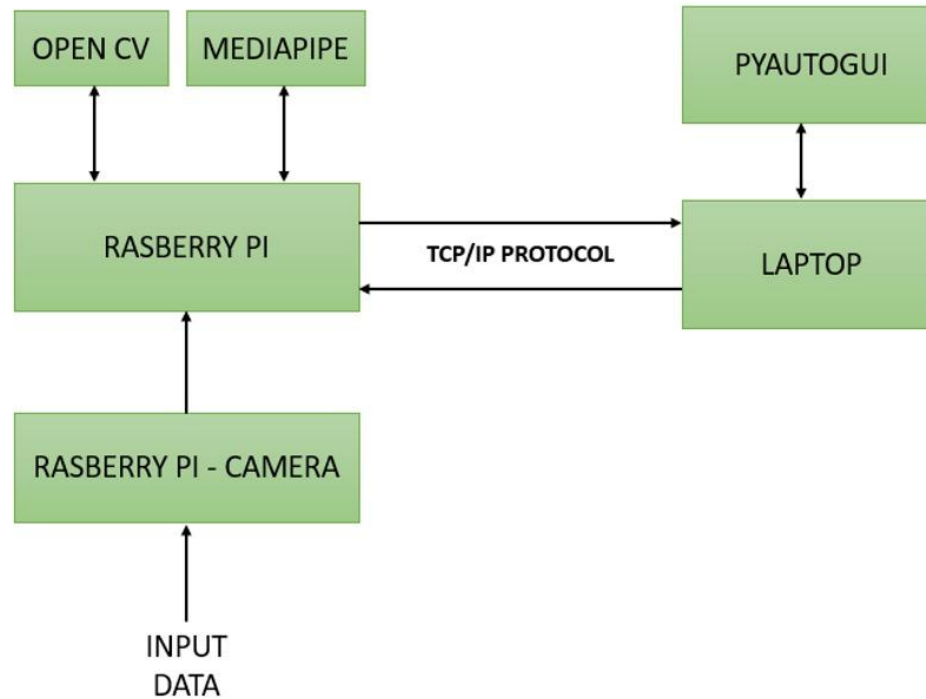


FIGURE 1



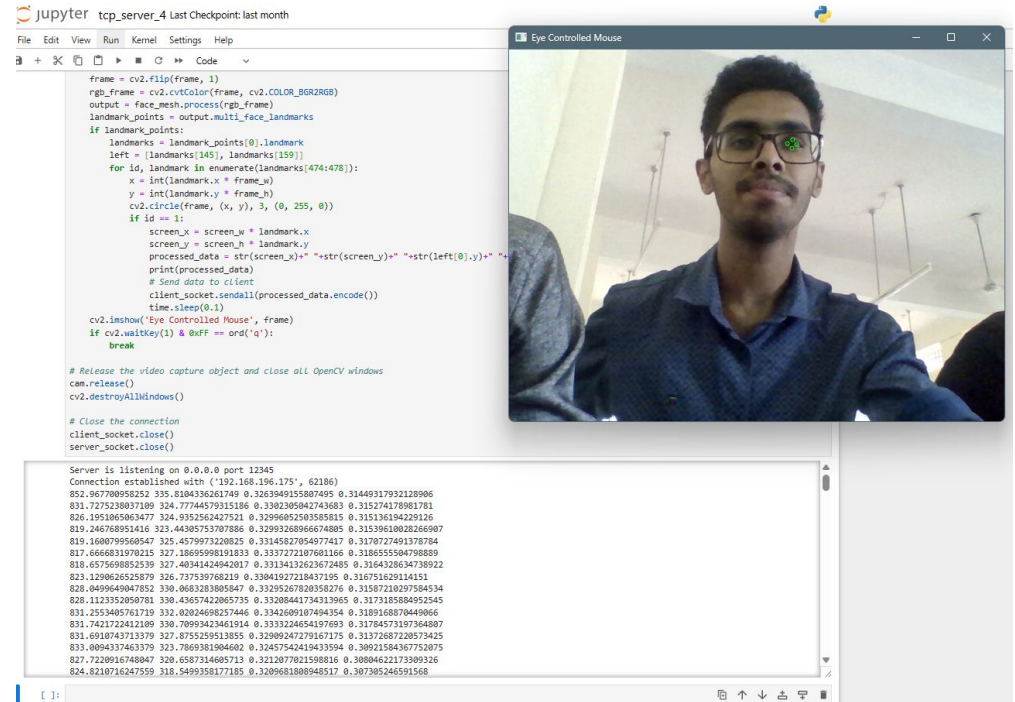
PRODUCT DEVELOPMENT

1. DEMO CODE CHECK:

- Step 1 : Used webcam of a laptop to track eye coordinates and moved it's own mouse cursor.
- Step 2 : Eye coordinates were tracked using the webcam of one laptop. These coordinates were then transmitted over a common WiFi network via the TCP/IP Protocol to another laptop, which utilized the data to move its cursor

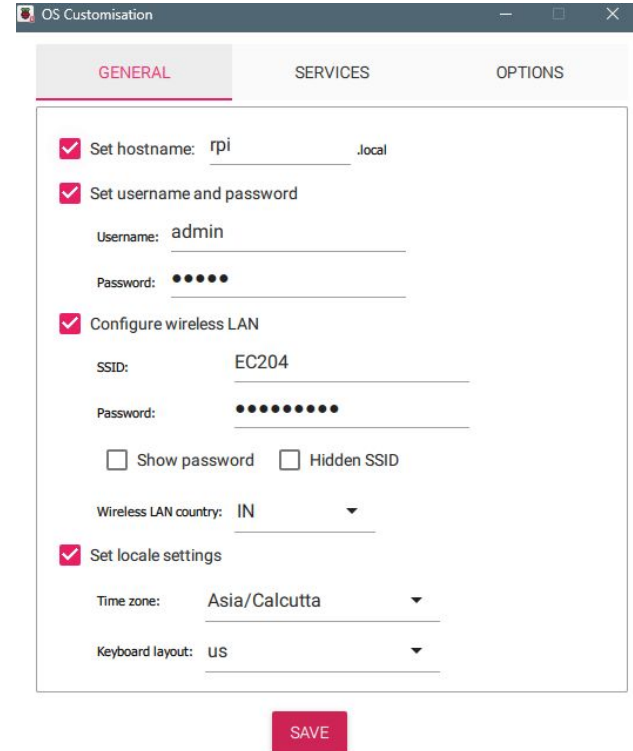
1. DEMO CODE CHECK:

- Step 3: We eliminated the need for an external WiFi network. Instead, we configured one laptop as an access point, with the other laptop connecting directly to it.



2. HARDWARE:

- 32 bit OS for Raspberry Pi 4B was Configured and Installed



The screenshot shows the 'OS Customisation' window with the 'GENERAL' tab selected. The window has three tabs: 'GENERAL', 'SERVICES', and 'OPTIONS'. The 'GENERAL' tab contains several configuration options, each with a checked checkbox:

- ☒ Set hostname: .local
- ☒ Set username and password
 - Username:
 - Password:
- ☒ Configure wireless LAN
 - SSID:
 - Password:
 - ☐ Show password ☐ Hidden SSID
 - Wireless LAN country:
- ☒ Set locale settings
 - Time zone:
 - Keyboard layout:

A red 'SAVE' button is located at the bottom right of the window.

2. HARDWARE:

- In order to use Raspberry Pi Headless ,we SSH (Secure Socket Shell) into Raspberry Pi via terminal

```
Microsoft Windows [Version 10.0.22631.3296]
(c) Microsoft Corporation. All rights reserved.

C:\Users\gagan>ssh admin@rpi
admin@rpi's password:
Linux rpi 6.6.20+rpt-rpi-v8 #1 SMP PREEMPT Debian 1:6.6.20-1+rpt1 (2024-03-07) aarch64

The programs included with the Debian GNU/Linux system are free software;
the exact distribution terms for each program are described in the
individual files in /usr/share/doc/*/copyright.

Debian GNU/Linux comes with ABSOLUTELY NO WARRANTY, to the extent
permitted by applicable law.
Last login: Mon Mar 18 12:02:29 2024
admin@rpi:~$ ls
Bookshelf Desktop Documents Downloads Music Pictures Public Templates Videos
admin@rpi:~$ sudo raspi-config
sudo: raspi-config: command not found
admin@rpi:~$ sudo raspi-sonfig
sudo: raspi-sonfig: command not found
admin@rpi:~$ sudo raspi-config
admin@rpi:~$ sudo apt-get update && sudo apt-get upgrade
Hit:1 http://deb.debian.org/debian bookworm InRelease
```



2. HARDWARE:

- Dependencies like OpenCV , Mediapipe were installed
- Virtual environment is created using venv module
- Used shell commands to access file and transfer them between a laptop
- Picture was captured using Raspberry Pi camera



FURTHER PLANS

- We've successfully developed code that tracks eye movements using one laptop and moves the cursor of another laptop without relying on an external WiFi network.
- Next step is to obtain videocapture by Raspberry Pi camera. If camera is working properly, import code to Raspberry Pi.
- After ensuring proper working , we can upgrade code for tracking eyeball movement and ensure more accuracy to the product.



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