**DEPARTMENT OF COMPUTER & SOFTWARE ENGINEERING**

**COLLEGE OF E&ME, NUST, RAWALPINDI**

A logo of a university

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**Microprocessor and Microcontroller Based Design**

**Project Report**

**SUBMITTED TO:**

**Instructor Taimoor Zahid**

**SUBMITTED BY:**

**CE 43 A**

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| --- | --- |
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**Submission Date: 05-01-24**

**Project: Autonomous Robotic Car with Live Video Streaming**

**Introduction:**

* **Overview:**

The aim of the project was to develop a road-based navigation robot, which broadcasts its own location to the user and travels to the nearby road-accessible location specified by the user. Alongside this, the robot also incorporates live video streaming using cloud.

* **Hardware:**

1. Raspberry Pi 3
2. GPS Module NEO6M V2 Ublox
3. 4x L298N Motor Drivers
4. 4x 3-6V TT Gear Motors
5. MPU 6050
6. IR Sensor
7. USB Web Camera

* **Misc:**

1. 5V Power Bank
2. 4x 3.7V Lithium Cells
3. 2x Battery Holder
4. 4x Rubber Wheels
5. 1x Chassis

* **Software:**

1. Arduino IDE
2. VSCode

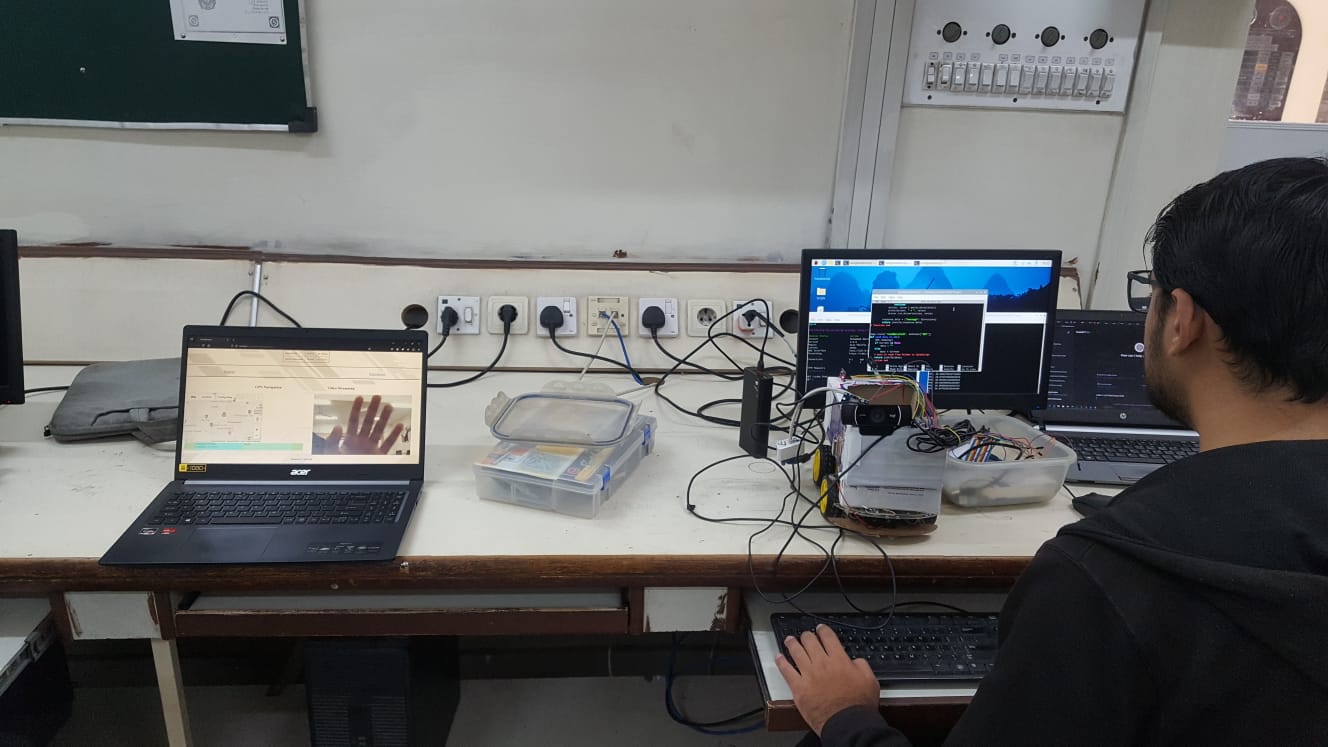
**Pictures:**

**Car:**

A robot with wheels and wires

Description automatically generated[](https://www.youtube.com/embed/8ybqrKF6dUw?feature=oembed)

**Configuration:**

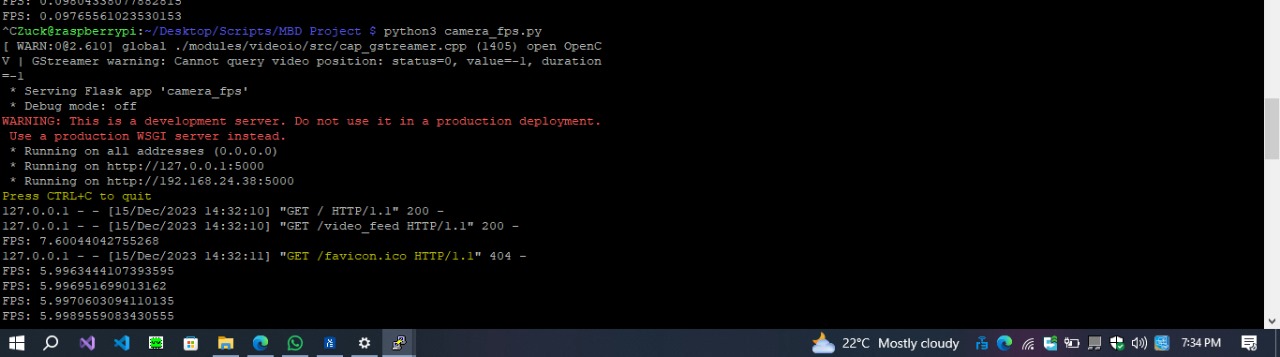


* 1. *Video Streaming on NGROK*

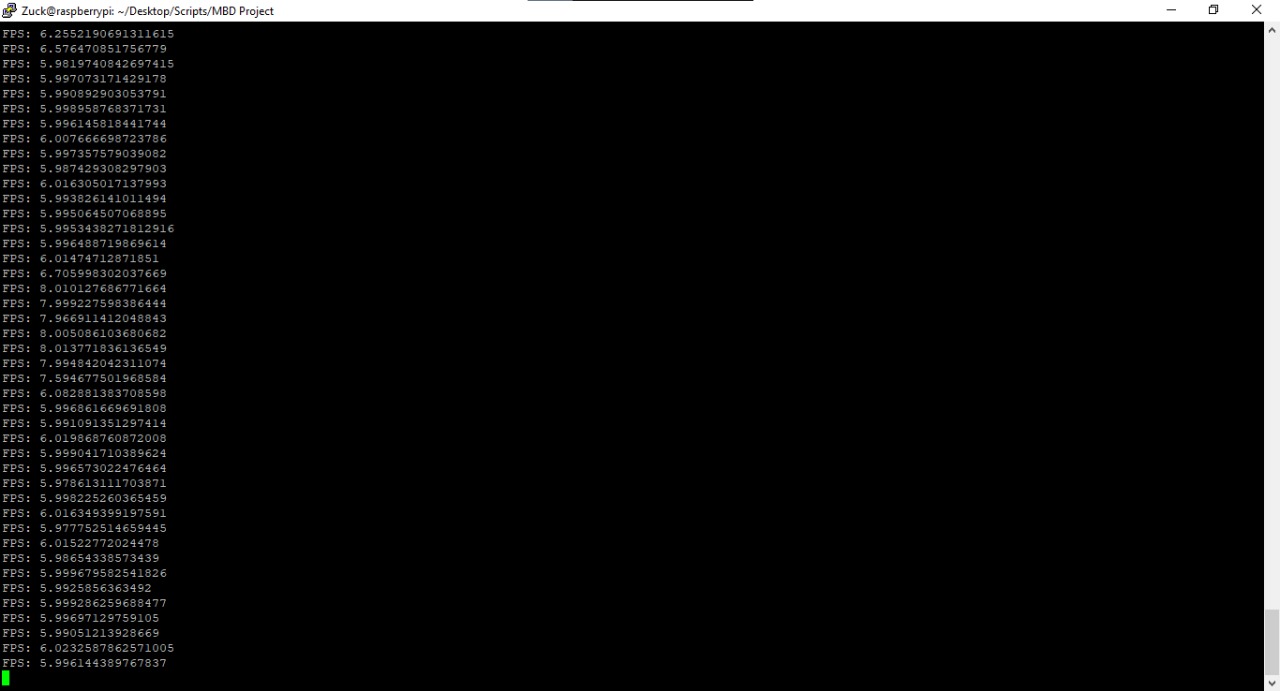
**Live Streaming via USB webcam**:

[](https://www.youtube.com/embed/OpzDrNYBJgI?feature=oembed)

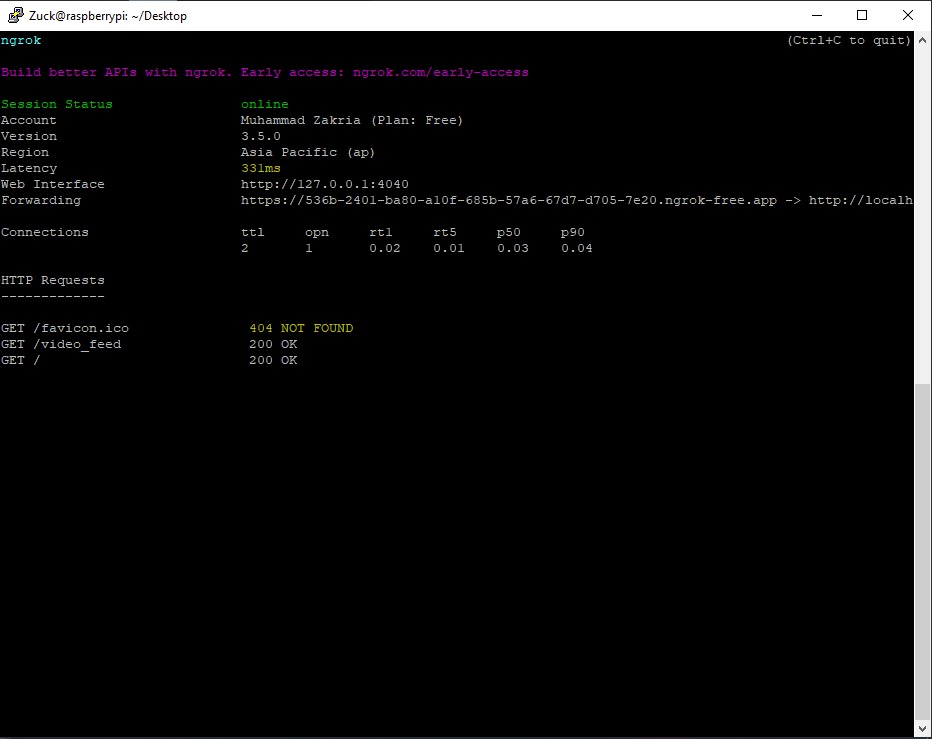
* 1. *Video Streaming on NGROK*



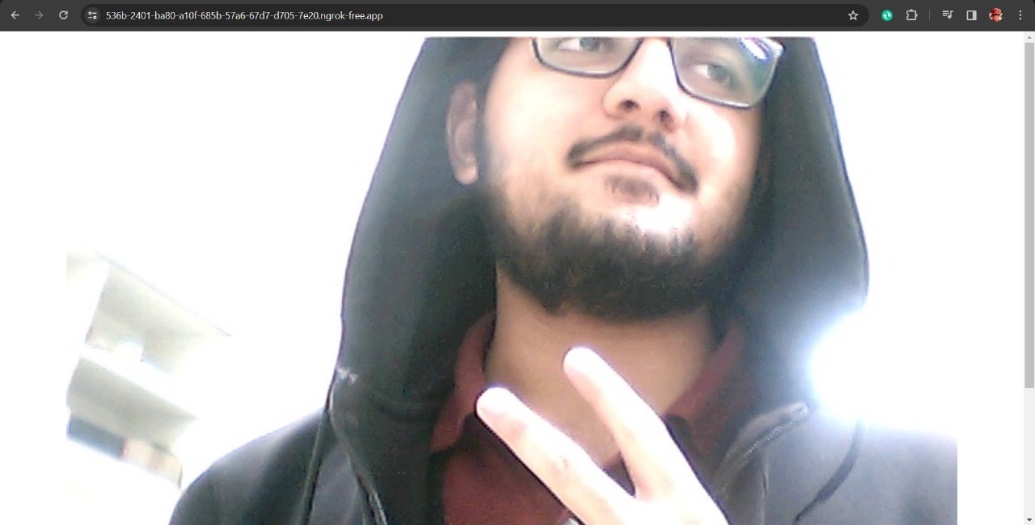
*1.3. Camera server online on Raspberry Pi*



*1.4. FPS from slower camera*



*1.5. NGROK server online*



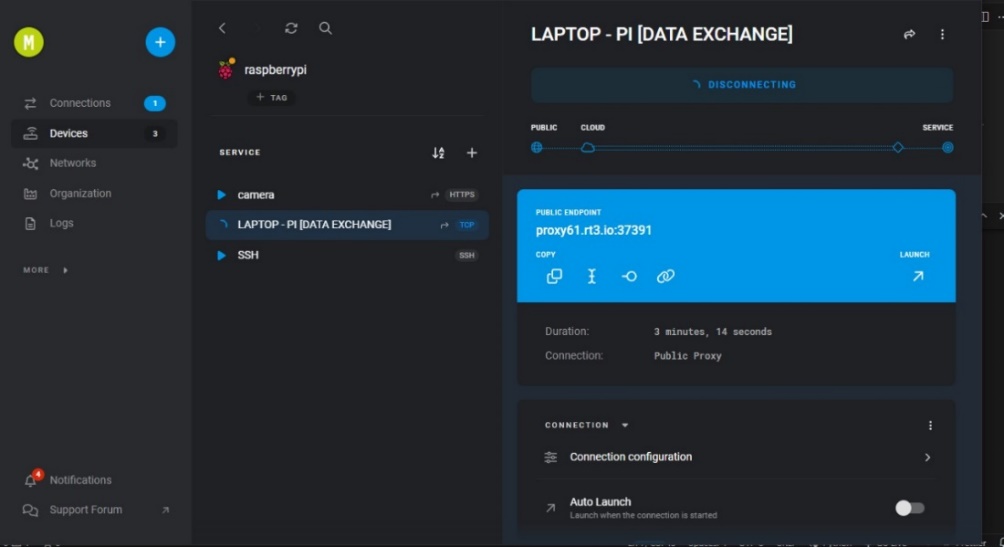
*1.6. Live stream on NGROK Cloud provided URL*

**Real-time location of car via GPS:**

A screenshot of a computer program

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*1.7. Sensor Reading sent from PI ttyAMA0*



*1.8. Device registered on RemoteIT*

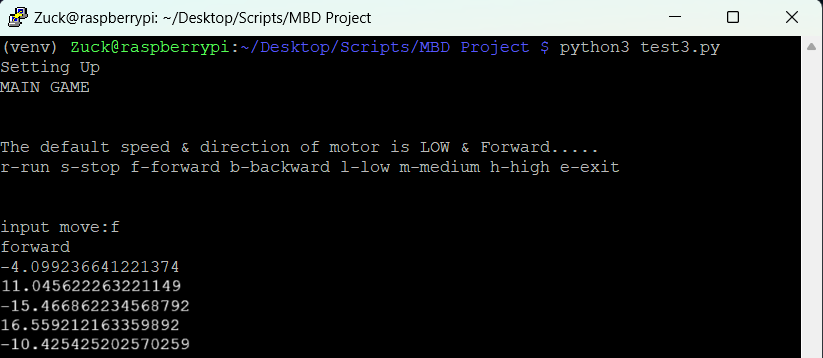
A screenshot of a computer

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A screenshot of a computer

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*1.8. Communication between JavaScript and Flask Server for exchange of GPS data and Route*

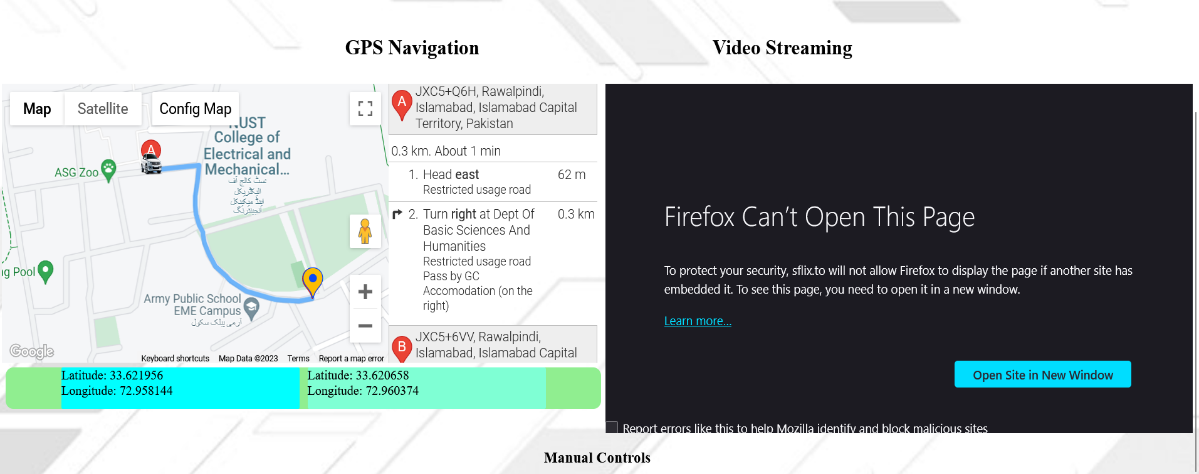


*1.9. MPU 6050 returning Gyro readings whenever Gyro readings have difference of > 10 degrees*

**Website:**

A white paper with black text

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*1.12. Webpage*

**Car Moving Based on MPU and Direction sent from Website:**

**[](https://www.youtube.com/embed/8OIE8YjhjAg?feature=oembed)**