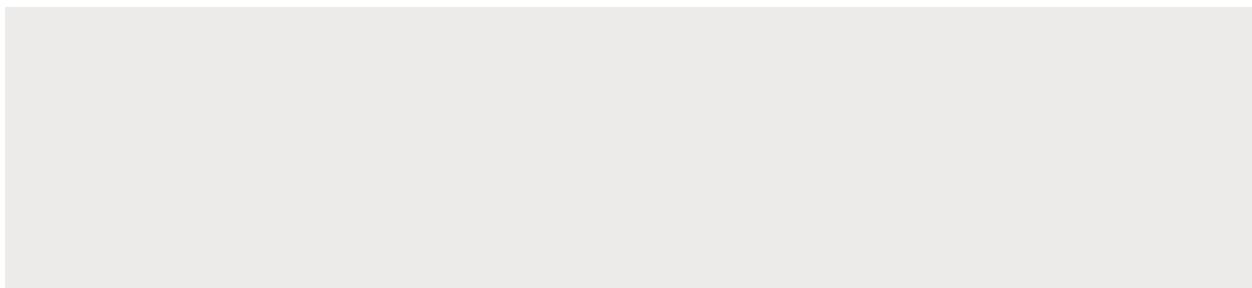




Healthcare Support System



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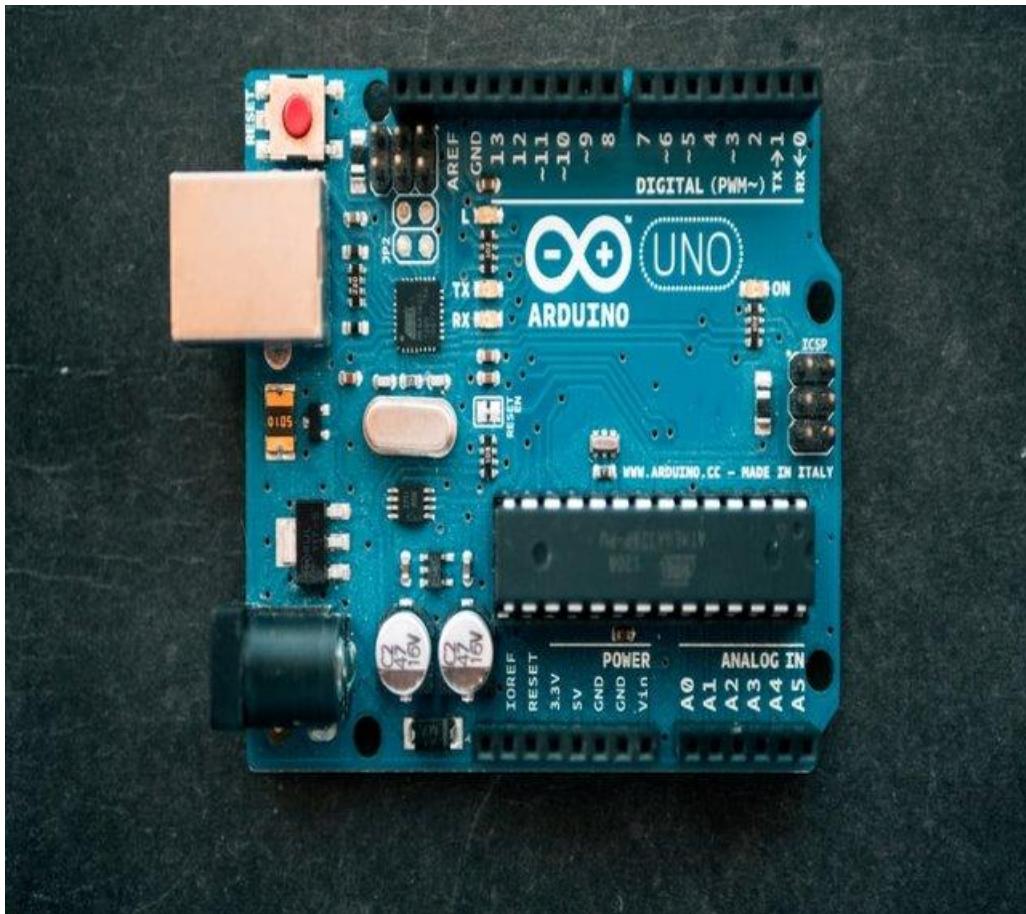
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Introduction

The idea of the project is to help the patient's needs inside a hospital, using **Mediapipe**, **OpenCV** and **Arduino UNO**.

We have taken the idea of hand-tracking using the Mediapipe Library to **count the number of fingers to light up the LED's.**



IOT in Healthcare

Before the Internet of Things, patients' interactions with doctors were limited to visits, and tele and text communications. There was no way doctors or hospitals could monitor patients' health continuously and make recommendations accordingly.

Internet of Things enabled devices have made remote monitoring in the healthcare sector possible, unleashing the potential to keep patients safe and healthy, and empowering physicians to deliver superlative care. It has also increased patient engagement and satisfaction as interactions with doctors have become easier and more efficient. Furthermore, remote monitoring of patient's health helps in reducing the length of hospital stay and prevents readmissions. IoT also has a major impact on reducing healthcare costs significantly and improving treatment outcomes.

IoT is undoubtedly transforming the healthcare industry by redefining the space of devices and people interaction in delivering healthcare solutions. IoT has applications in healthcare that benefit patients, families, physicians, hospitals and insurance companies.

Apart from monitoring patients' health, there are many other areas where IoT devices are very useful in hospitals. IoT devices tagged with sensors are used for tracking real time location of medical equipment like wheelchairs, defibrillators, nebulizers, oxygen pumps and other monitoring equipment. Deployment of medical staff at different locations can also be analyzed real time.

So due to all these revolutions in the healthcare industry with the help of IOT, we can say that our proposed prototype can also be of great importance for patients in need as well as help hospital staff and doctors monitor critical patients on time.

What is Mediapipe?

MediaPipe is a cross-platform, graph-based framework for building multimodal (video, audio, and sensor) applied machine learning pipelines.

MediaPipe is a framework for building multimodal (eg. video, audio, any time series data), cross platform (i.e Android, iOS, web, edge devices) applied ML pipelines.

MediaPipe offers open source cross-platform, customizable ML solutions for live and streaming media.

MediaPipe also facilitates the deployment of machine learning technology into demos and applications on a wide variety of different hardware platforms (e.g., Android, iOS, workstations).

What is OpenCV?

OpenCV (Open Source Computer Vision Library) is an open source computer vision and machine learning software library. OpenCV was built to provide a common infrastructure for computer vision applications and to accelerate the use of machine perception in the commercial products. **OpenCV is written in C++** and its primary interface is in C++, but it still retains a less comprehensive though extensive older C interface. All of the new developments and algorithms appear in the C++ interface. There are **bindings in Python, Java and MATLAB/OCTAVE**.

Working of the Prototype

Suppose a patient is not in a condition to communicate with the doctor about his/her needs at that moment or needs some supplies but cannot call the doctor. Then the camera monitoring the patient will track the number of fingers put up by him/her.

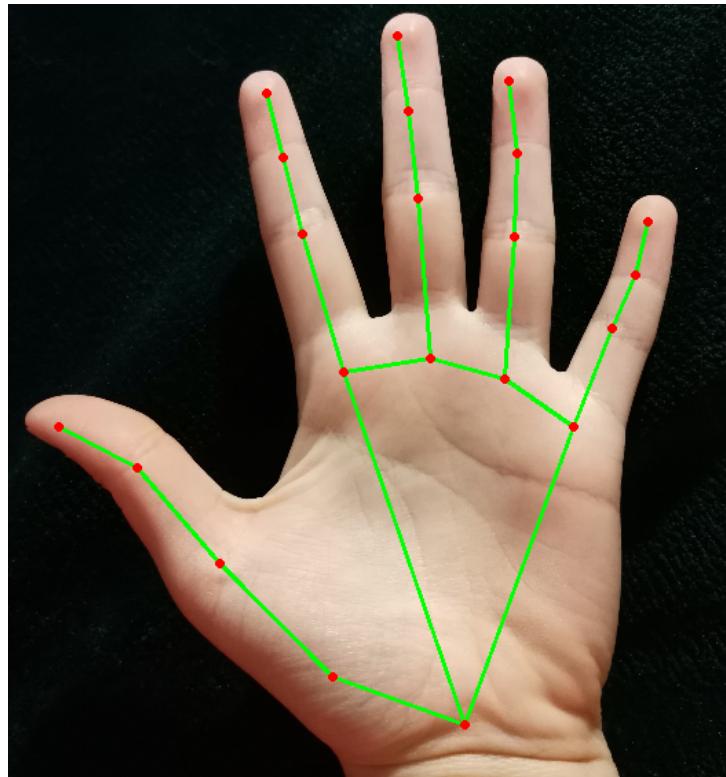
Accordingly, the light will glow at the place where all the patients are monitored.

We have encoded the count of fingers as :-

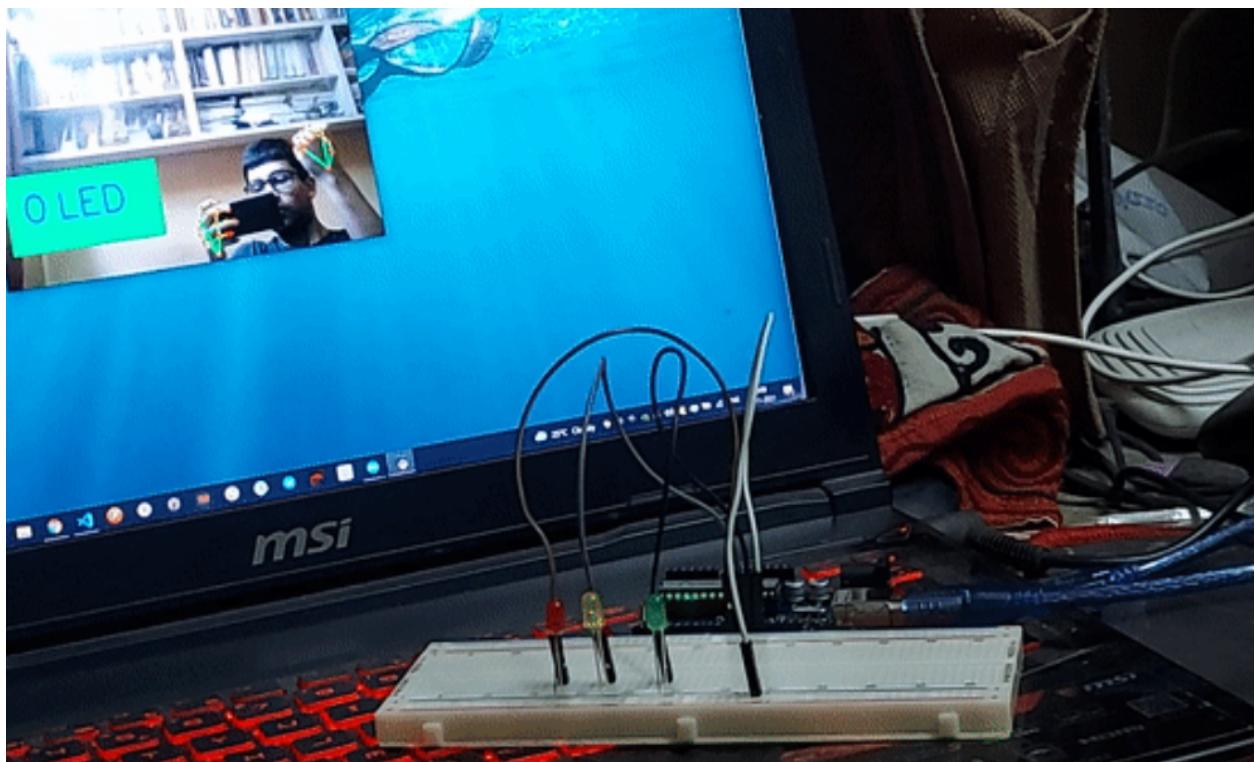
- 1 fingers → Green Light → **The patient is okay but needs supplies like food and water or some daily medicines**
- 2 fingers → Yellow Light → **The patient needs to go to the bathroom for urination or excretion**
- 3 fingers → Red Light → **The patient is facing severe problems and needs instant medical attention**

How Hand Tracking Works Using MediaPipe

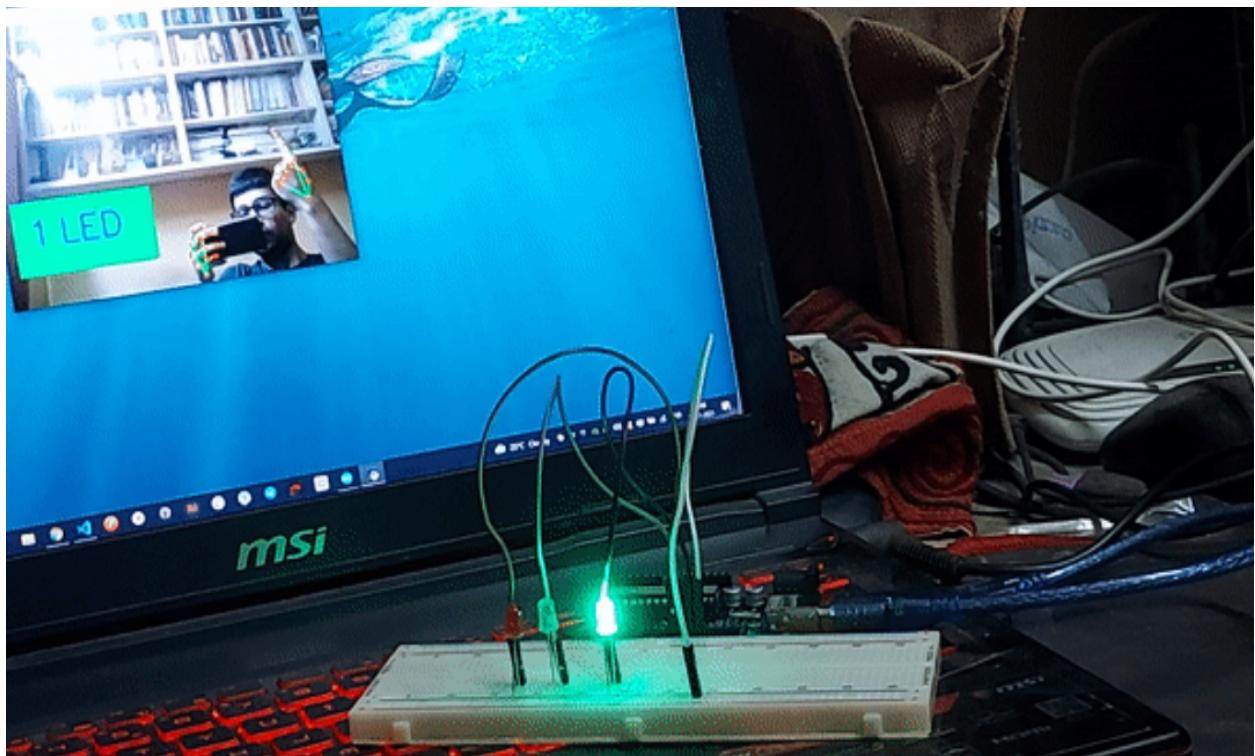
MediaPipe Hands is a high-fidelity hand and finger tracking solution. It employs machine learning (ML) to infer 21 3D landmarks of a hand from just a single frame. Whereas current state-of-the-art approaches rely primarily on powerful desktop environments for inference, our method achieves real-time performance on a mobile phone, and even scales to multiple hands.



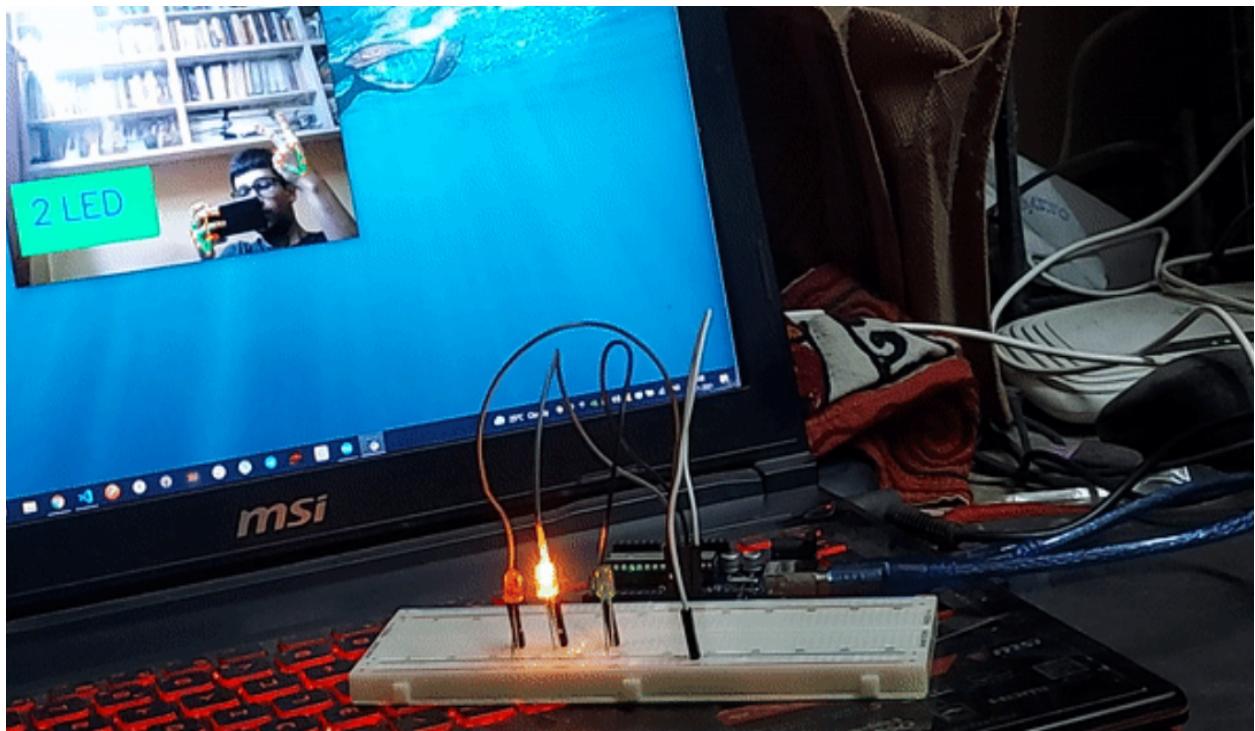
0 fingers → No Light → The patient does
not need anything



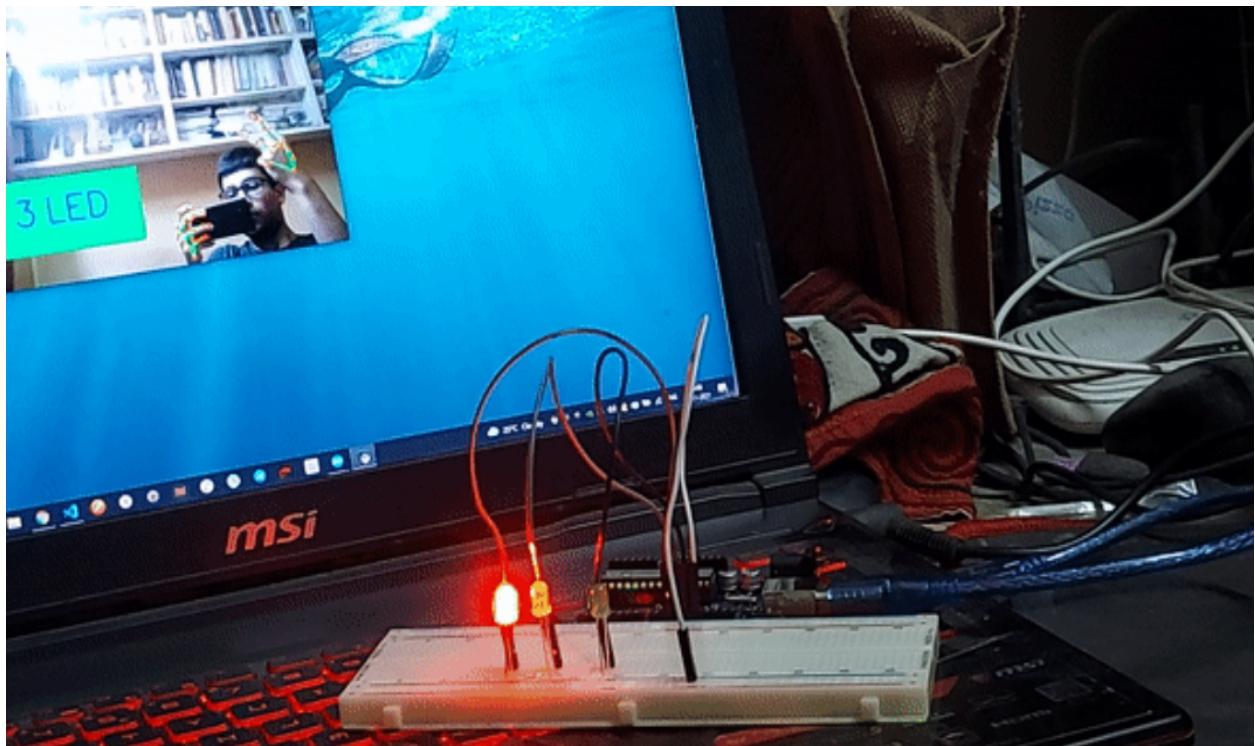
1 fingers → Green Light → The patient is okay but needs supplies like food and water or some daily medicines



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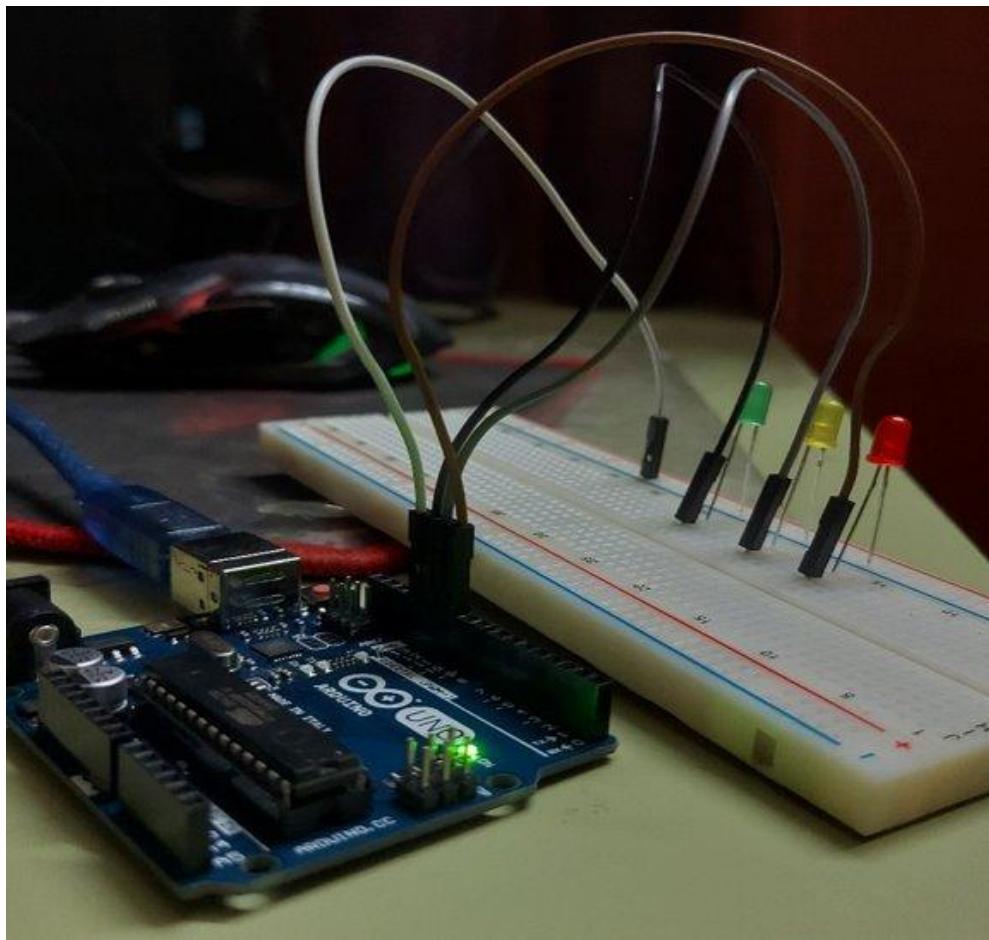


3 fingers → Red Light → The patient is facing severe problems and needs instant medical attention



Hardwares Used:

- Arduino UNO
- Jumper Wires
- Breadboard
- Camera module (we used our laptops)
- LED lights - Red, Green & Yellow



How to set up locally?

- Check if your system has python installed in it before!
- Fork the repository from this Github Link
- Git clone your forked repository
- Create virtual environment

```
- pip install --user virtualenv  
- python -m venv env  
- source env/bin/activate (Linux)  
- env\Scripts\activate (Windows)
```

- Install dependencies

```
- pip install -r requirements.txt
```

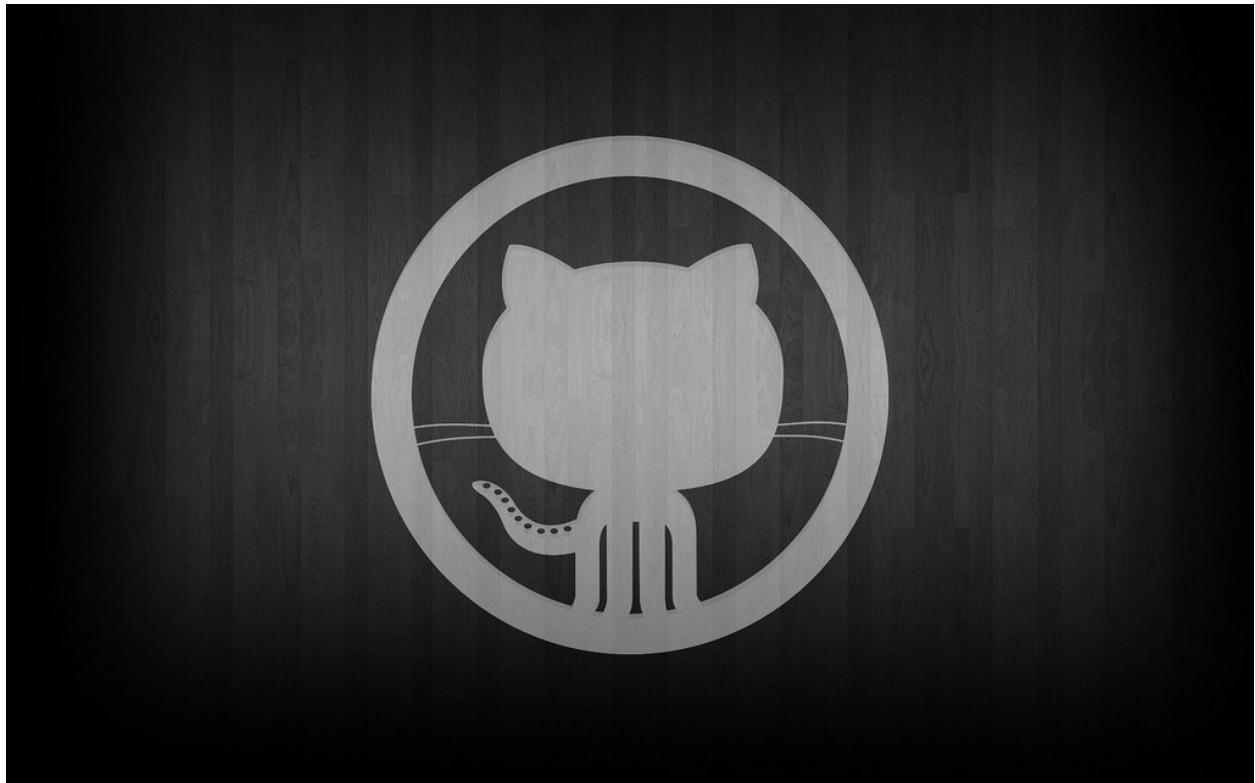
- To check all the dependencies run the command

```
- pip list
```

Scope of Improvement

We can further improve our prototype by generating SMS and Email according to the colors of the led light.

By this we can ensure that the hospital authorities and doctors are aware about the patient's needs and condition at all times.



Project Link :

[Health Care System](#)



A dark, vertical photograph capturing a night scene through a window or glass surface. The image is heavily blurred, showing streaks of light from passing vehicles and streetlights. In the center, there's a bright, multi-colored vertical light source, possibly a traffic signal or a building's illuminated sign. The overall atmosphere is hazy and abstract.

THANK
YOU