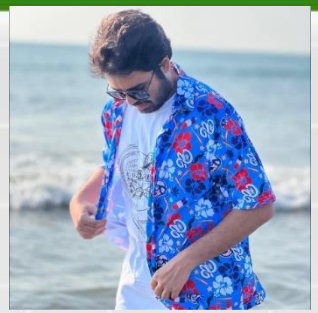
EEE 426: Biomedical Signals, Instrumentation and Measurement Laboratory

An IoT Based Remote Health Monitoring System Using Integrated ECG Module and Pulse Oximeter

Group01: Lab Group G2



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Aim Of This Project

- Creating a smart non-invasive heart monitoring system with integrated sensors
- Uploading the real time data to IoT cloud for remote access
- Finding heart rate from the acquired ECG signal and cross validating with a pulse oximeter

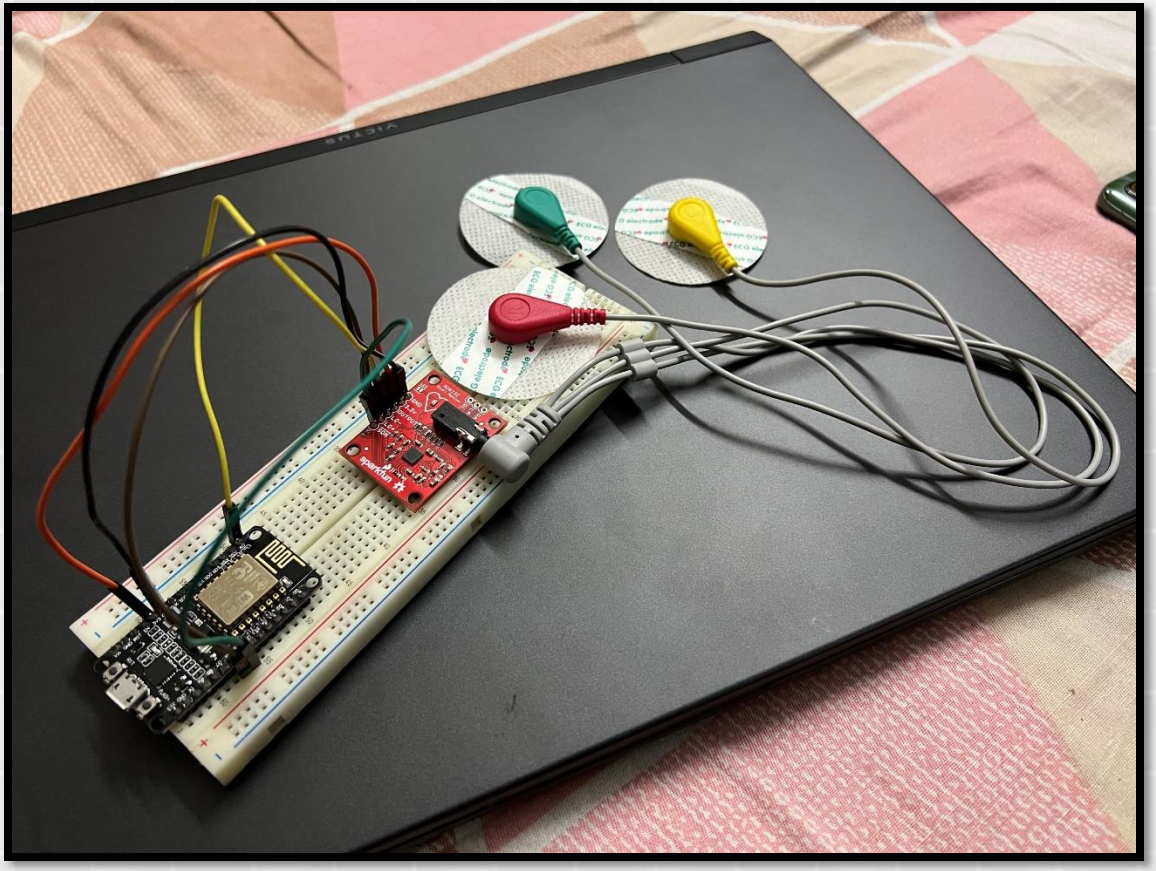
Societal Impact

- Health care for people in living in remote areas without direct access to medical professionals
- A cheap home monitoring system for patients
- Easily portable alternative that will be convenient for use during different rescue operations in disaster zones

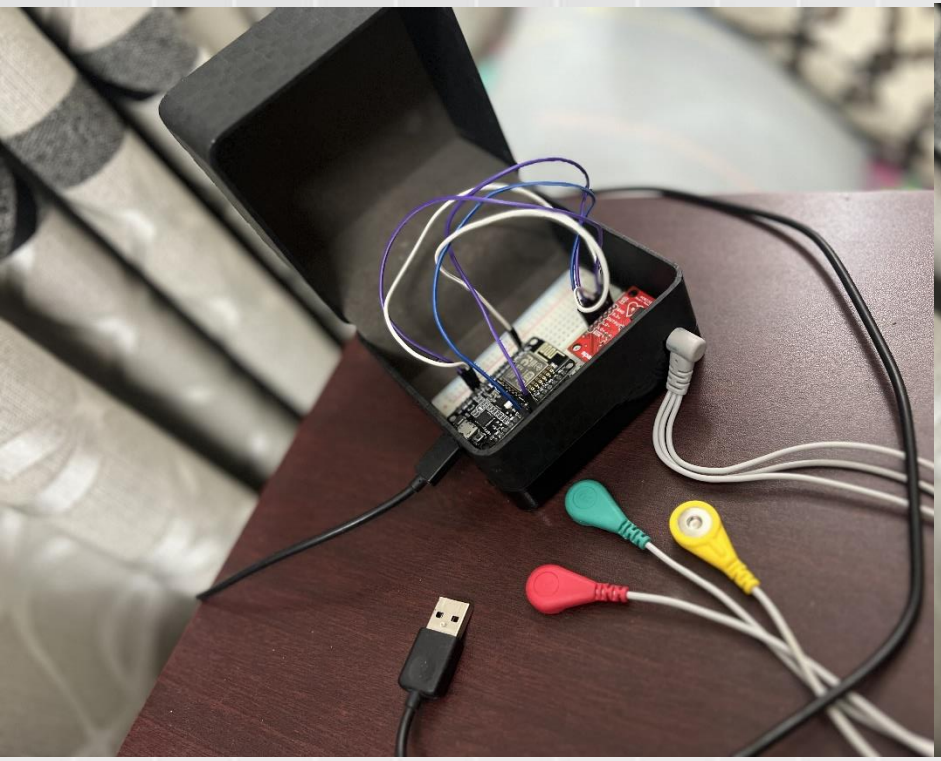
Hardware Setup

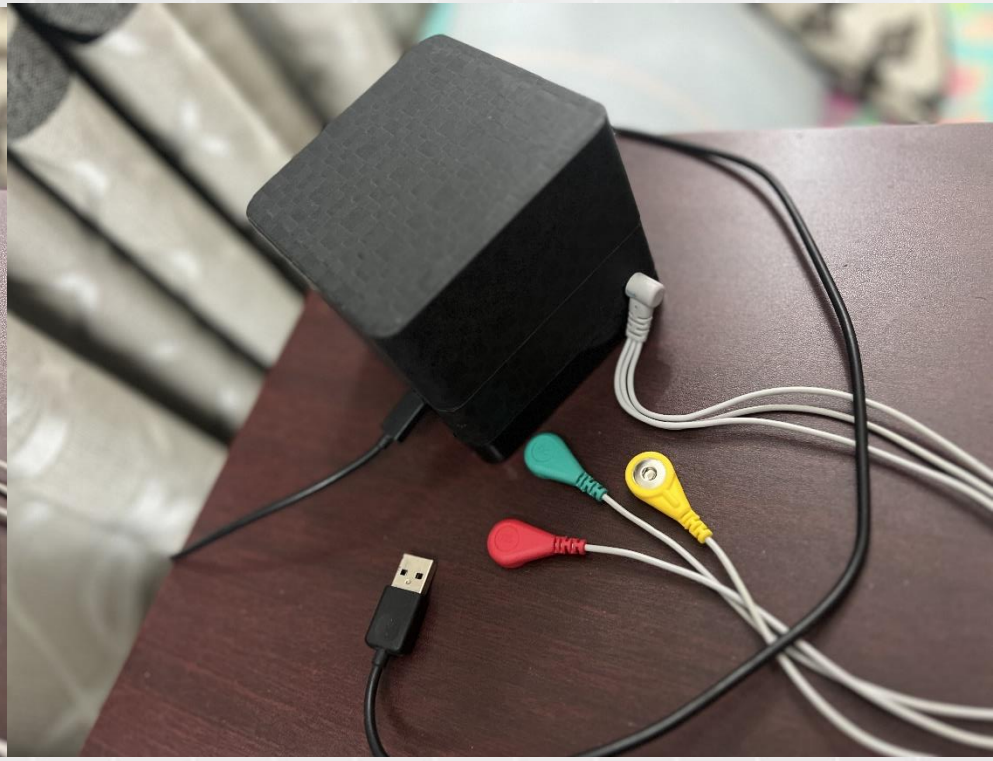
Setup consisted:

- NodeMCU (ESP8266)
- AD8232
- 3-lead electrodes

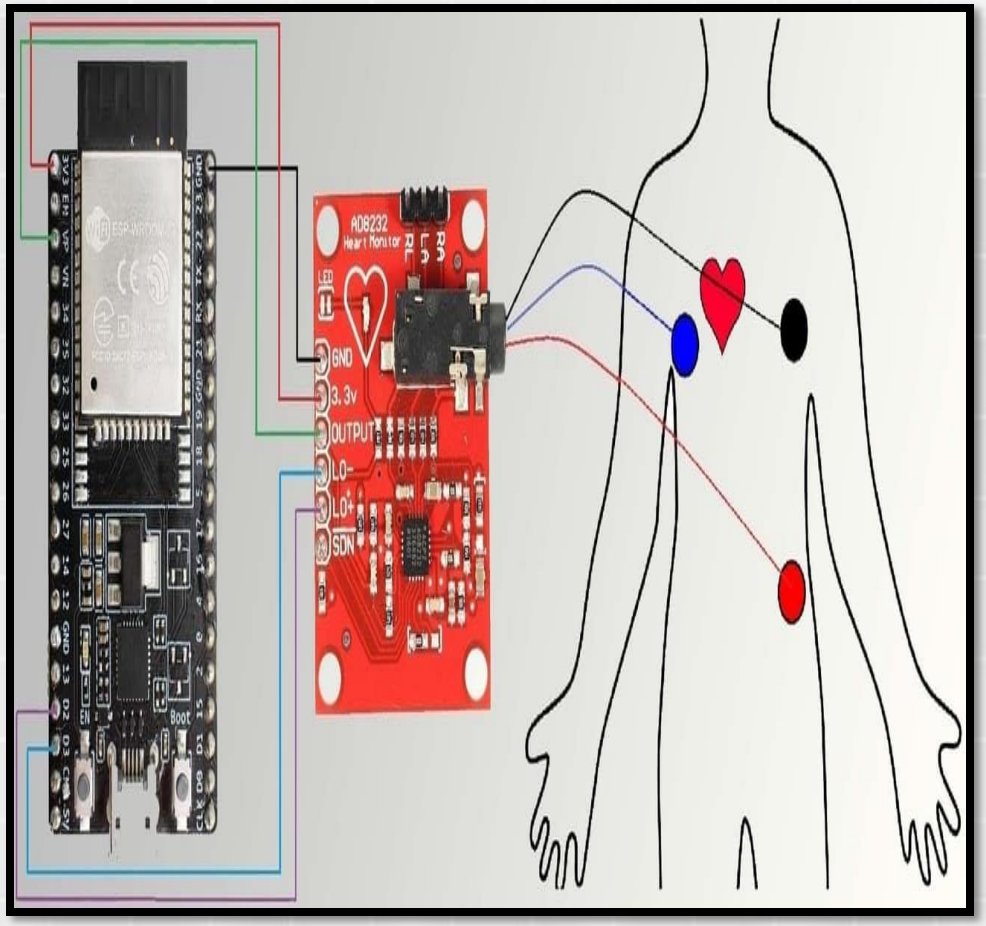


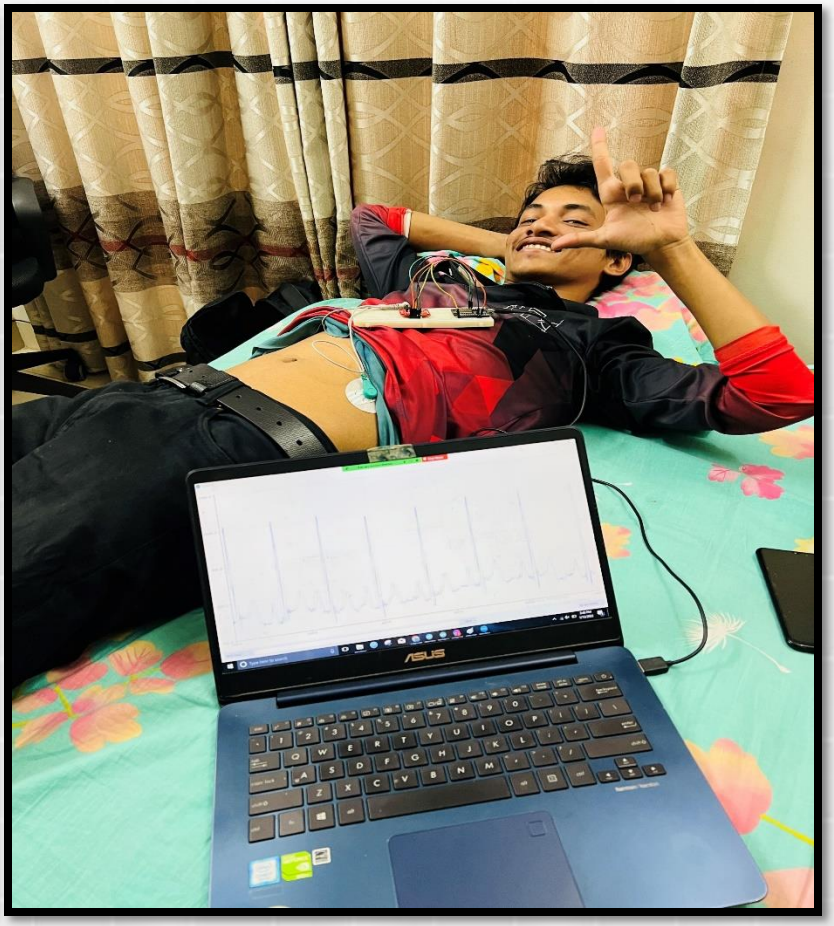
Final Hardware Setup



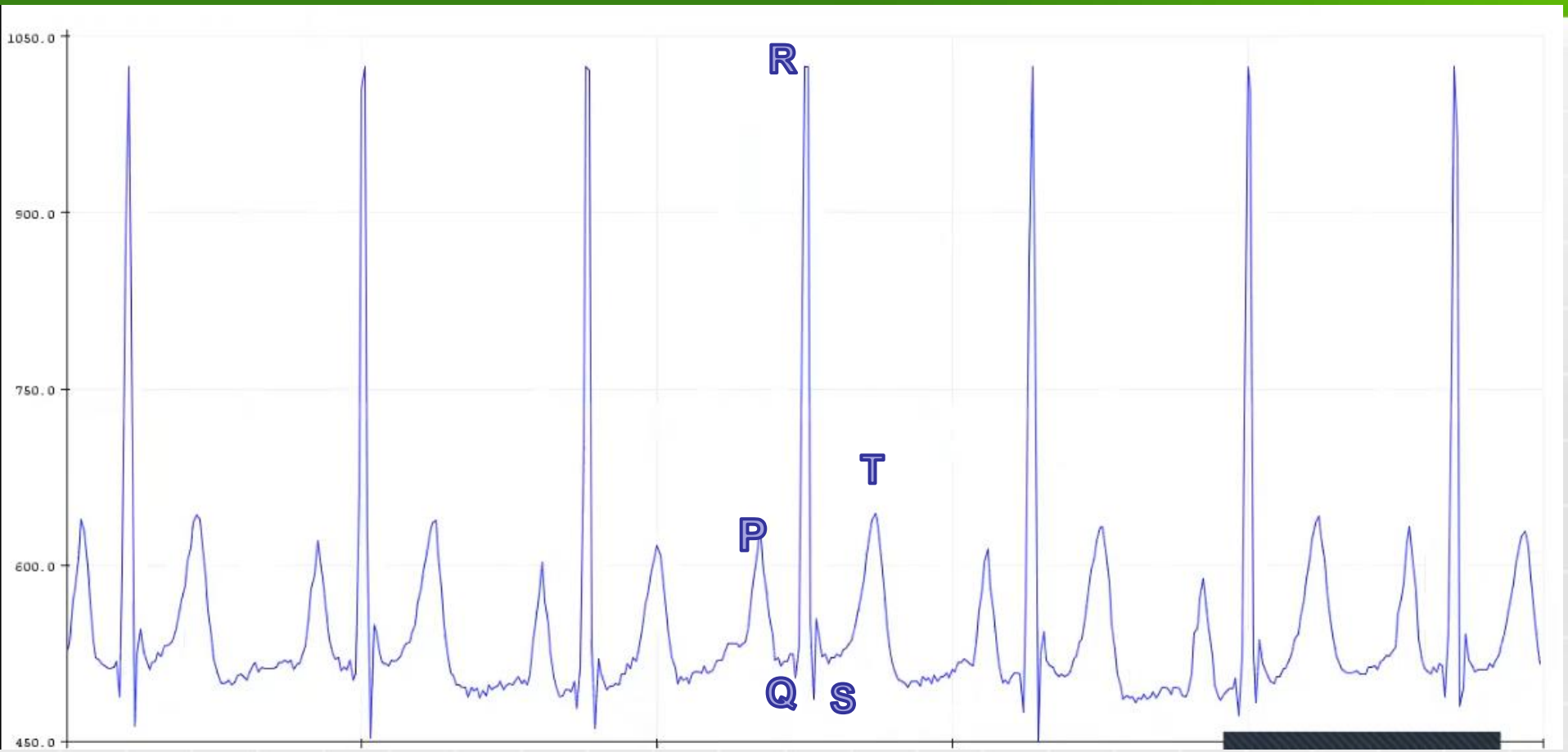


Real Time Data Acquisition

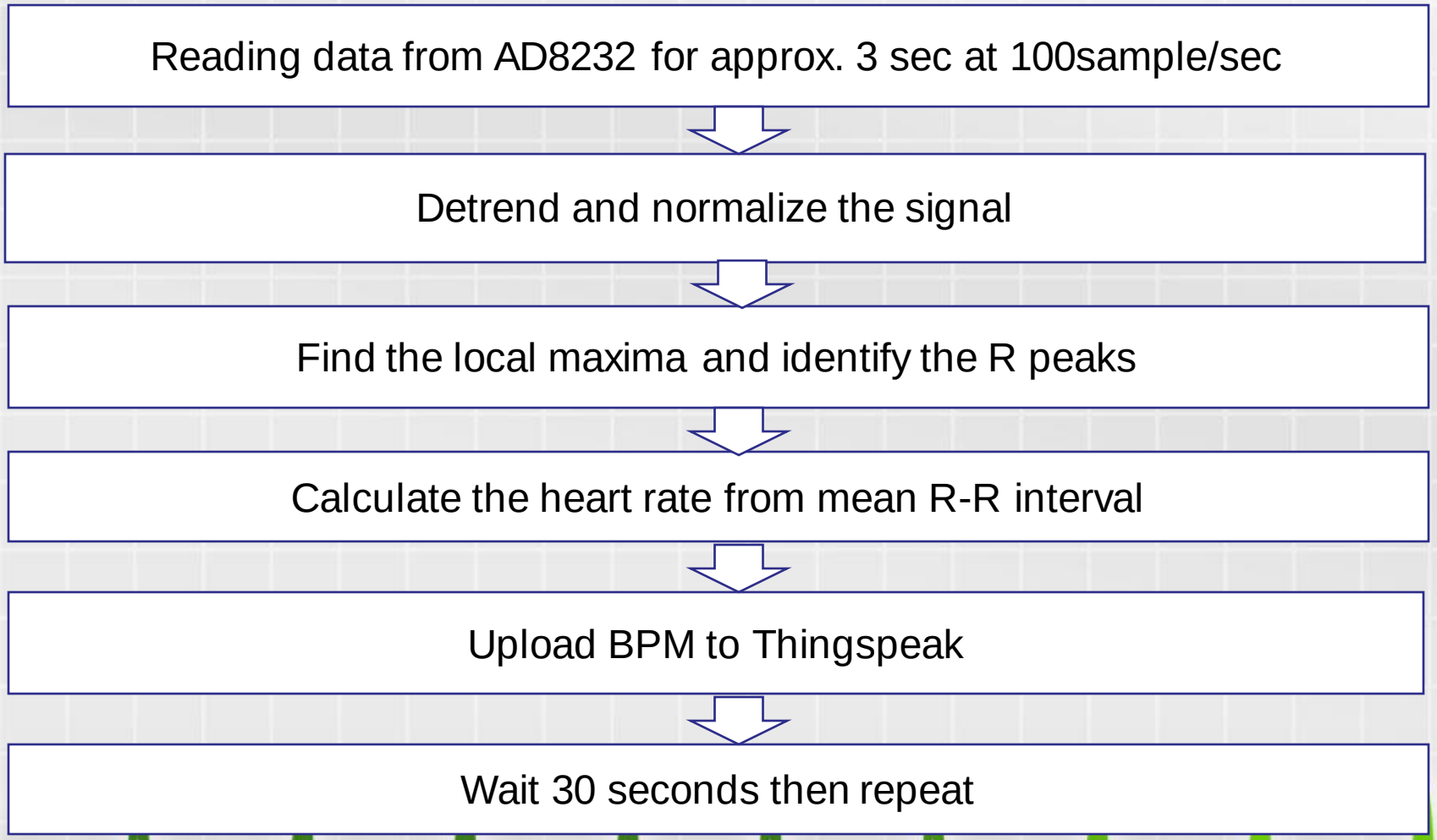




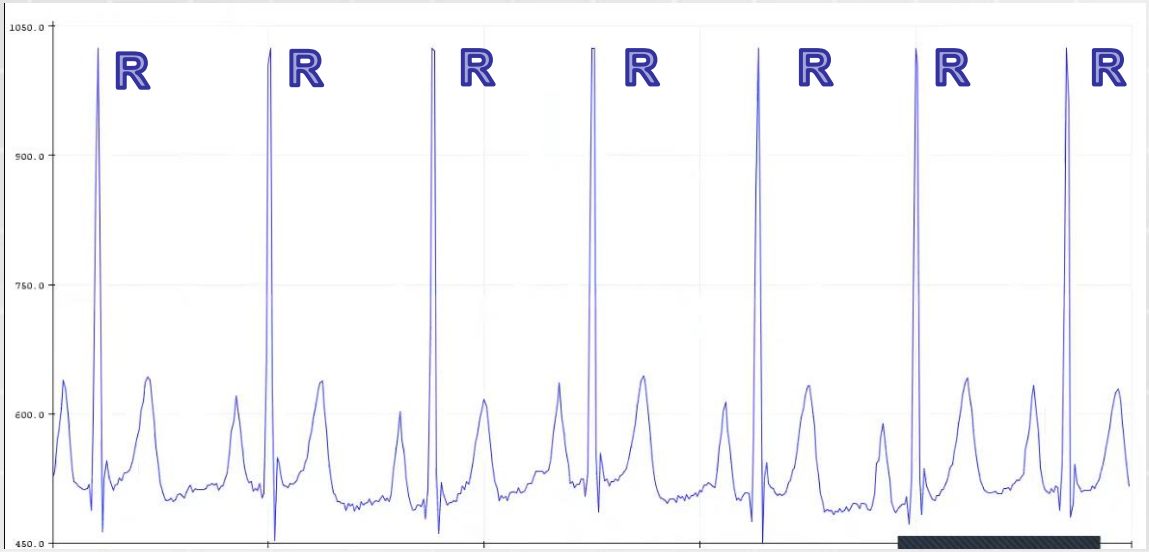
Identifying The Relevant Peaks from Acquired ECG signal



Uploading BPM to ThingSpeak



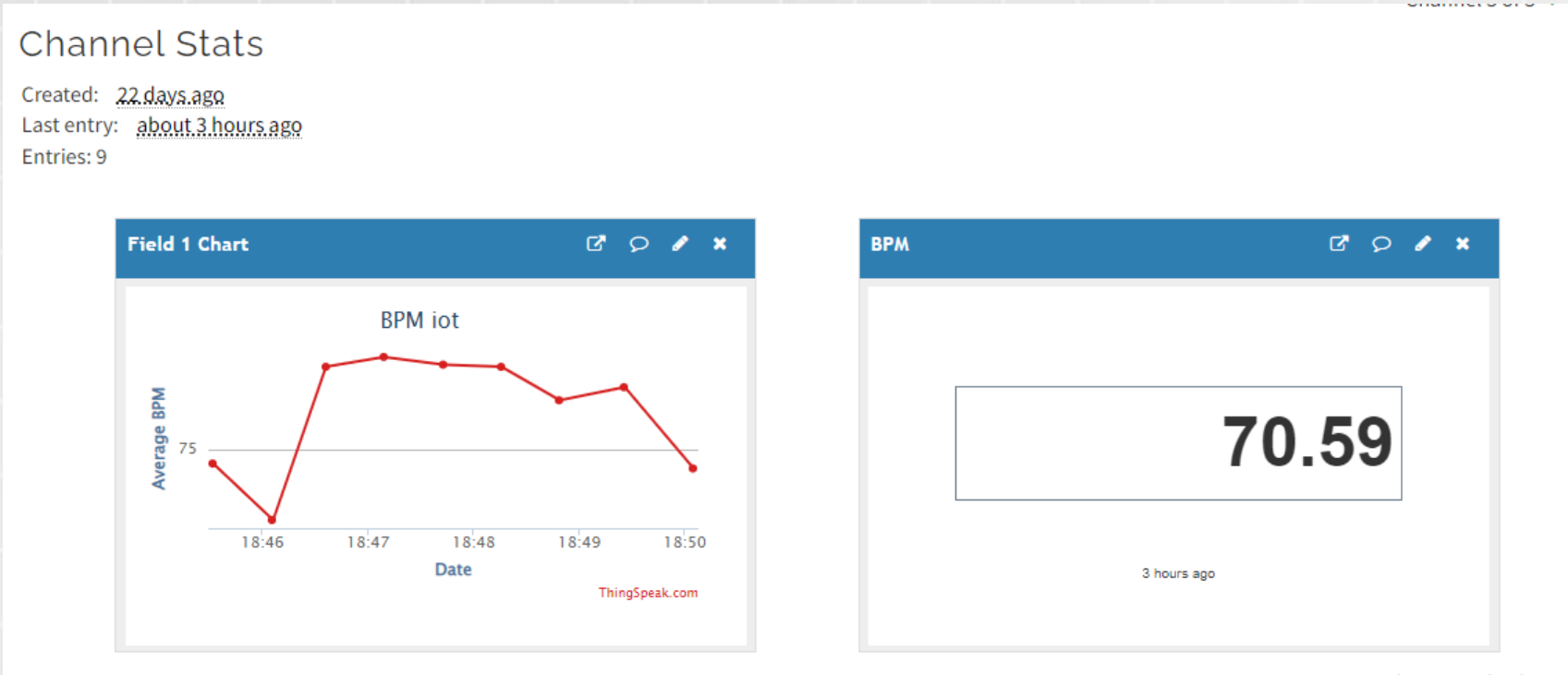
Calculating BPM



$$\text{Heart Rate} = \frac{Fs}{R-R\ interval} * 60$$

IoT Infrastructure

ThingSpeak dashboard showing BPM graph and current value

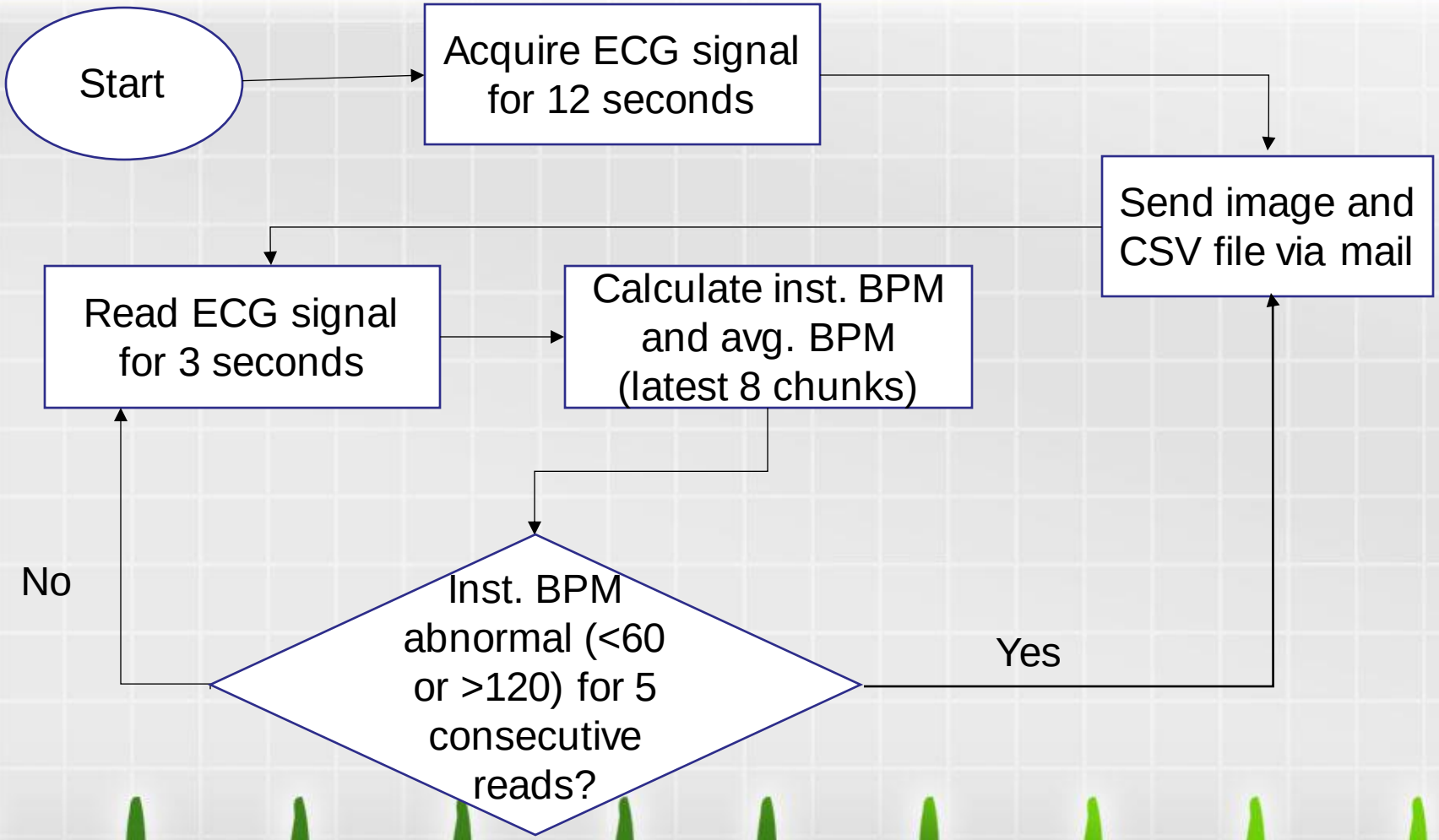


Sending ECG signal by mail

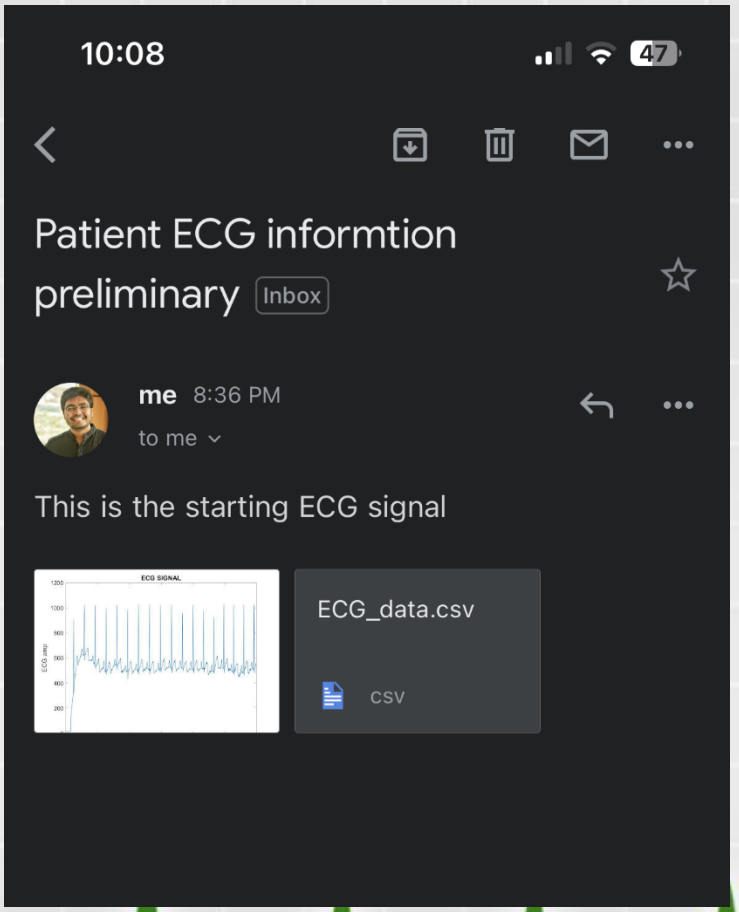
- Problem: Uploading the entire ECG signal to a IoT platform is not possible due to data loss and delay.

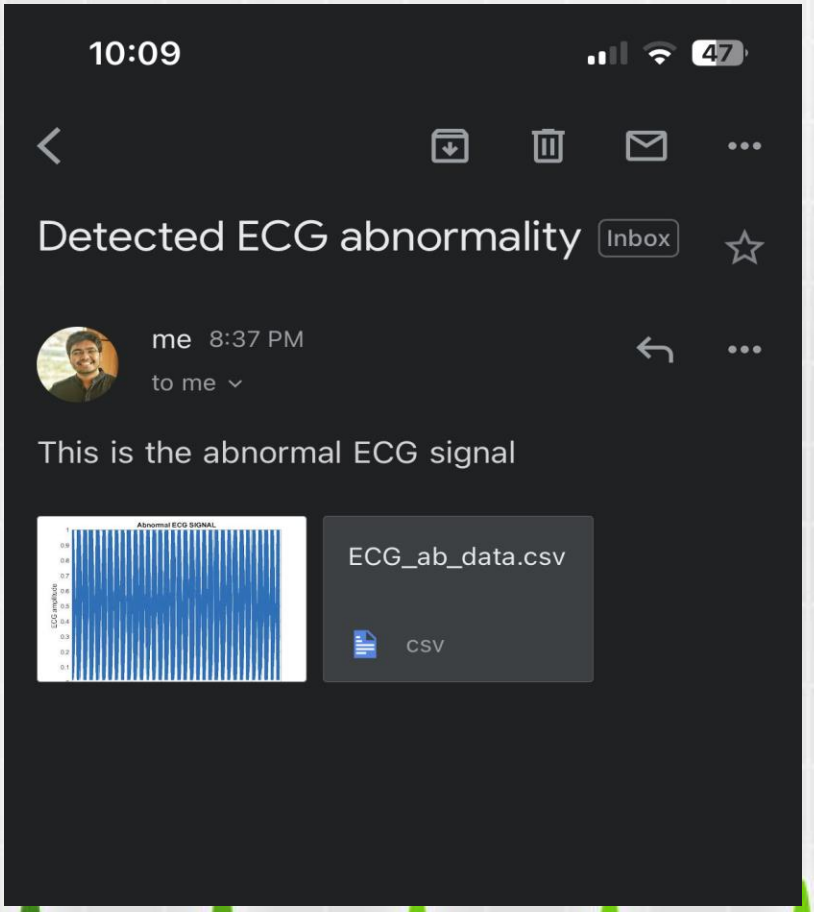
- Solution: Send the signal via mail with attached image of the signal and the related CSV file for further processing if desired.

Sending Mail



Mails sent under the two situations





Uploading to Drive

Attached image file from the mail is automatically uploaded to Google Drive.

Pabbly connect is an intermediary mail parser that connects the two platforms

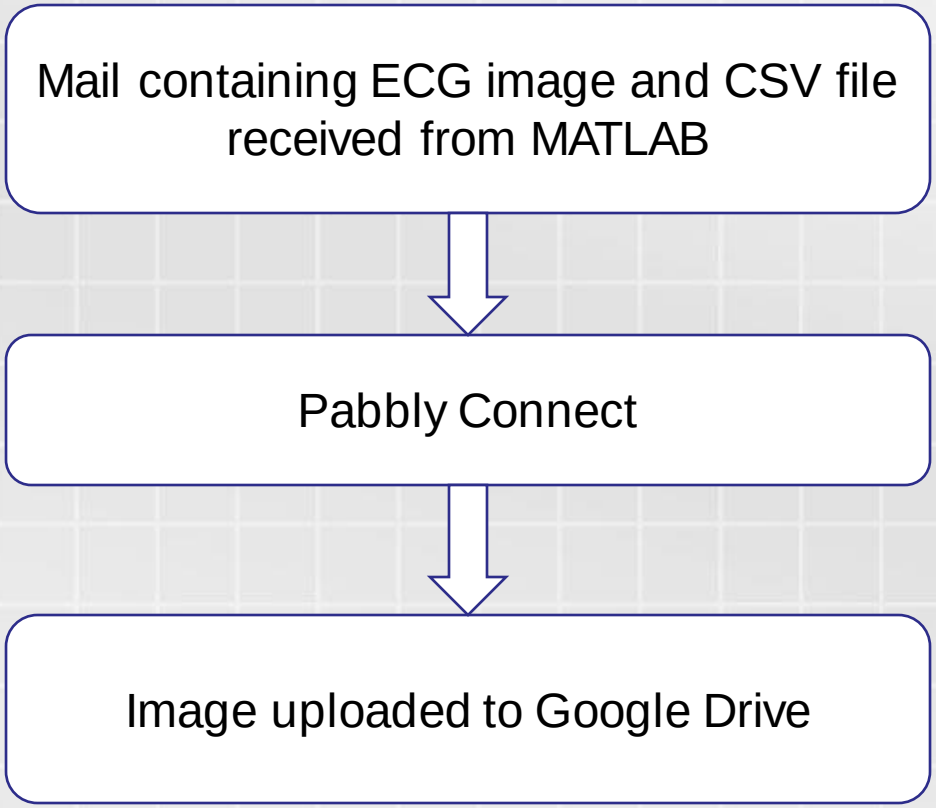
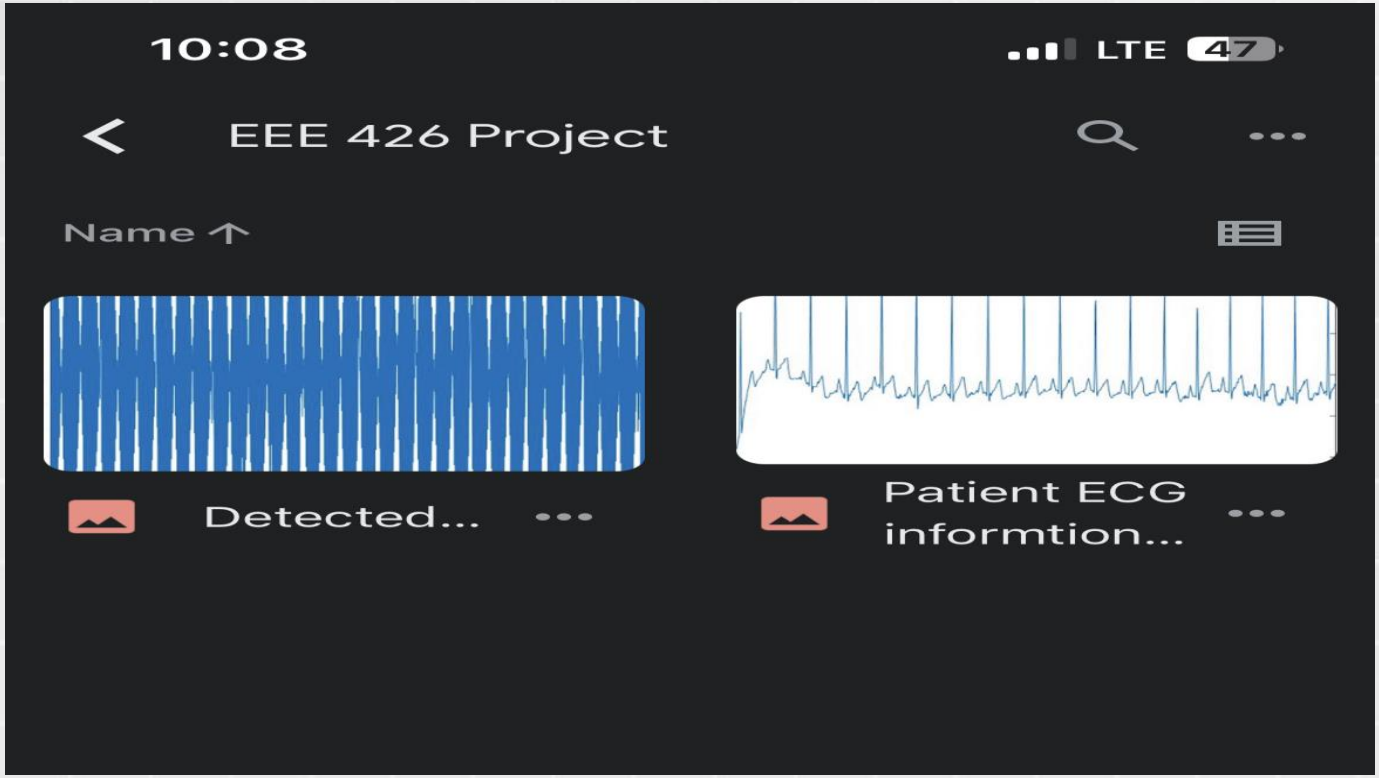


Image uploaded to Google Drive



Innovations and Findings

- Use of IoT cloud platforms in remote health monitoring
- Instant mailing for relevant information in case of abnormalities detected.
- Automatic information upload to Google drive

Cost Sheet

Equipment	Cost(BDT)
AD3232 ECG MODULE	1800
Disposable ECG Electrodes pad	1200
ESP8266	345
Transport	500
Bread Board	70

Future of the Project

- Provide greater reach to rural and underserved communities
- Enables frequent patient monitoring and data collection
- Don’t have to drive to the doctor’s office or clinic
- Help to prevent the spread of COVID-19, flu and other infectious diseases
- promote a healthier environment for everyone
- A family member can help by providing information, asking questions

THANK YOU!!!

Any Questions?