PDPM INDIAN INSTITUTE OF INFORMATION TECHNOLOGY, DESIGN AND MANUFACTURING JABALPUR

Madhya Pradesh-482005, India

Early Detection of Heart Attack

Interim Report II, submitted in partial fulfilment of the requirement for the degree of
Bachelor of Technology (B. Tech) and Bachelor of Design (B. Des)

Kushal Gaddamwar

(Roll no.-20BCS121)

Raghav Patidar

(Roll no.-20BCS168)

Neeraj Kumar

(Roll no.-20BCS144)

Priyansh Sahu

(Roll no.-20BCS163)

Katta Nitish

(Roll no.-20BEC052)

Mehul Dehury

(Roll no.-20BDS052)
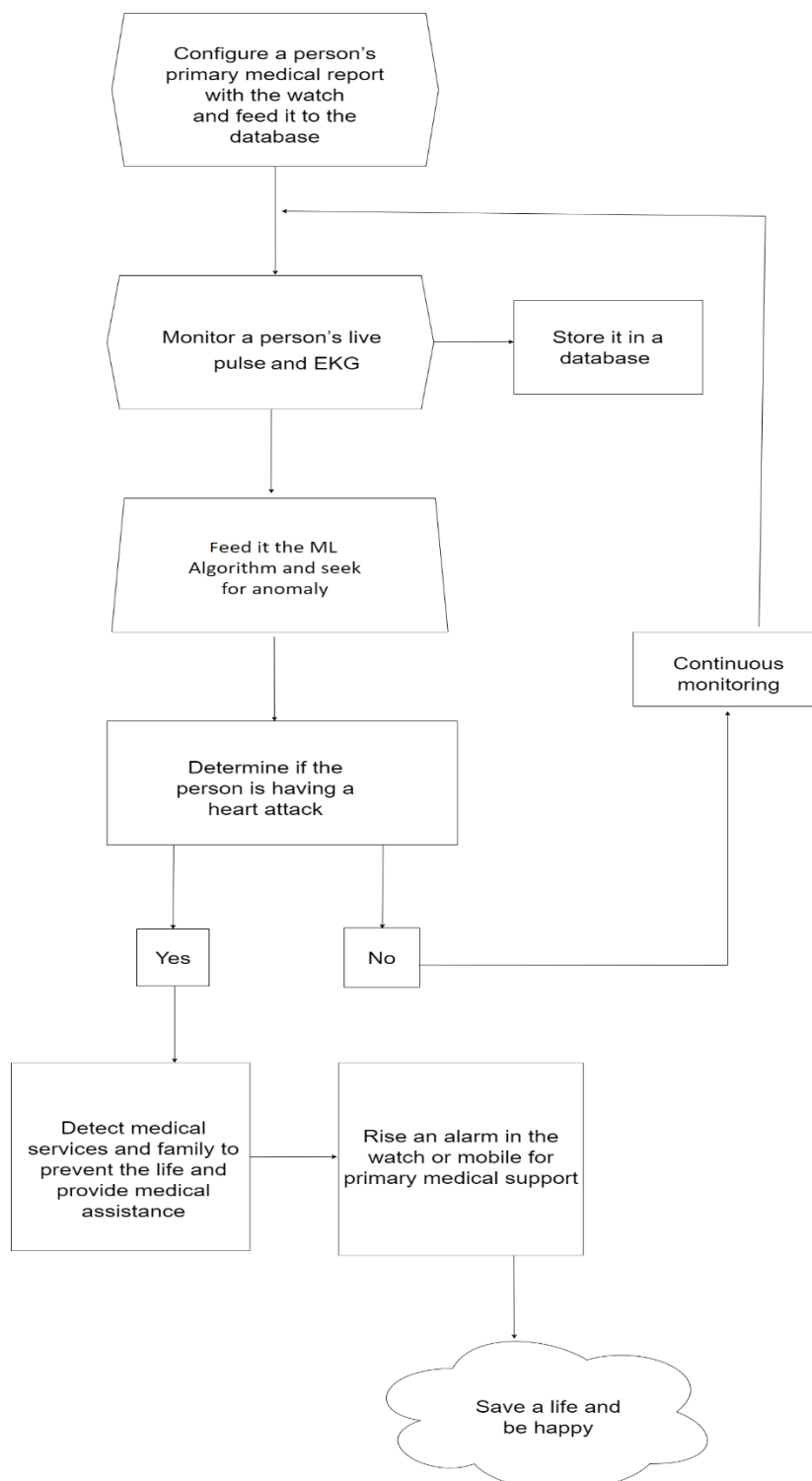
Swastik Bharti

(Roll no.-20BSM058)

Under Supervision of

Dr. Koushik Dutta

AIM

Heart diseases and problem still remains one of the largest cause of deaths among adults and senior citizen. The uncertainty of a heart attack, stroke, or collapse is the biggest fear of a heart patient. Not getting primary medical support and assistance on time causes a lot of these death or permanent irreparable damages.

Our project tries to solve the uncertainty problem threw the help of AI and ML. A wearable portable device connected to your phone that can track your heart condition in real time and provide the data to your mobile and a database. This data will be continuously fed to an ML algorithm to detect any anomaly in your heart's condition and detect if the person is having a heart attack. If a person is having a heart attack proper medical assistance will be provided to them and family and the doctor will be alerted.

```
┌─────────────────────────┐
│  Configure a person's   │
│  primary medical report │
│  with the watch         │
│  and feed it to the     │
│  database               │
└─────────────────────────┘
            │
            ▼
┌─────────────────────┐      ┌──────────────┐
│ Monitor a person's  │─────▶│ Store it in a│
│ live pulse and EKG  │      │ database     │
└─────────────────────┘      └──────────────┘
            │
            ▼
┌─────────────────────┐
│ Feed it the ML      │
│ Algorithm and seek  │
│ for anomaly         │
└─────────────────────┘
            │
            ▼
┌─────────────────────┐           ┌──────────────┐
│ Determine if the    │           │ Continuous   │
│ person is having a  │           │ monitoring   │
│ heart attack        │           └──────────────┘
└─────────────────────┘
       │           │
       ▼           ▼
   ┌─────┐     ┌─────┐
   │ Yes │     │ No  │
   └─────┘     └─────┘
       │
       ▼
┌─────────────────────┐      ┌─────────────────────┐
│ Detect medical      │      │ Rise an alarm in the│
│ services and family │─────▶│ watch or mobile for │
│ to prevent the life │      │ primary medical     │
│ and provide medical │      │ support             │
│ assistance          │      └─────────────────────┘
└─────────────────────┘
                                     │
                                     ▼
                              ☁ Save a life and
                                be happy ☁
```

Technical/Product Specification

Following sensors would be used in the device:

1. **Pulse Sensor**:
   A pulse wave is the change in the volume of a blood vessel that occurs when the heart pumps blood, and a detector that monitors this volume change is called a pulse sensor.

2. **Oximeter**:
   An instrument to measure the proportion of oxygenated hemoglobin in the blood.

3. **Sweat Sensor**:
   Device to monitor the levels of sweating and substances in sweat.

4. **Electrocardiogram:**
   A compact and wearable EKG, to detect the beating of heart.

5. **Gyroscope, Accelerometer, GPS tracking System:**
   For tracking patient's geolocation speed and positioning.

6. **LED Display, Speaker, Vibrator, Ambient Light sensors:**
   Basic watch features.

7. **Arduino and Other components:**
   For connecting and building a prototype.

8. **Motherboard:**
   For developing a production level product.

Concept Generation

The main objective of this fabrication project is to make a wearable and portable device, for people with heart disease and complications who has a higher risk of heart failure and/or stroke, to assist them in recovery and detect and prevent heart attack.

The concept is to gather the medical history of a patient along with their current time cardiovascular health with the help of oximeter and ECG in the device.

We are to analyze this data along with surveys of various other patients with similar health issue and predict if a person is at a risk of a heart attack with the help of machine learning algorithms and AI, as early as possible and alert the patient, his doctor andkin via a mobile alerting mechanism. The device will also help in assisting doctor to keep a real time medical history of a patient

Summary and Future Development Prospect

The next phase of our Engineering Design Project will be to create a prototype of how product functions and give a basic understanding to the stakeholder of the functionality of the product. This is the phase where we finalize the design, components and conduct testing in order to convert into tangible output.

BILL OF MATERIALS

S No.	Sensor	Price (₹)	Quantity	Total Price	Item Description and Justification
1.	Oximeter	3200/-	1	3200/-	To measure pulse and heartbeat
2.	ECG	9500/-	1	9500/-	Electric voltage monitoring
3.	Gyroscope/Accelerometer	3500/-	1	3500/-	To measure running speed
4.	Ambient Light Sensors	800/-	1	800/-	Appropriately dim the device's screen to match it.
5.	LED screen	2500/-	2	5000/-	For Display
6.	GPS tracking system	1100/-	1	1100/-	To locate the Patient.
7.	Vibrator	800/-	1	800/-	For notification Purpose
8.	Speaker	2000/-	1	2000/-	For Alert
9.	Resistor 1K	600/-	1	600/-	Use in circuit
10.	Connecting cables	3000/-	2	6000/-	Use in circuit
11.	Arduino	5000/-	1	5000/-	Use in circuit
12.	Breadboard	80/-	1	100/-	Use in circuit
13.	BT module HC-105	350/-	1	350/-	Use in circuit to connect with android application
14.	Motherboard	8000/-	1	8000/-	For enhanced prototype
15.	Battery for watch	2000/-	1	2000/-	Power to start and working in project
16.	Deploy landing page	5000/-	1	5000/-	To give platform to download and install android application
17.	Development charges	6000/-	1	6000/-	Authentication, Database, Deploy application, Testing, AWS, Cloud storage, etc.
18.	Miscellaneous/other Expenses	10% of Total	1	5895/-	Other expenses while developing project.
			Total	**64845**/-	