



# AI and IoT Based Heart Health Screening System (AIHSS)

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To develop a quick, convenient, environment friendly, low cost & secure heart health screening system using AI and IoT.

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Team Members: Ayush Kumar, Sonam Chhikara  
Problem Statement: Health Care



# ||INTRODUCTION||

- The proposed system is a perfect blend of IoT and Machine learning to provide a low-cost, quick, convenient, secure, and eco-friendly solution for monitoring the health parameters in real-time and predicting heart health.
- It comprises of IoT device for real-time data collection, a cloud server for data storage , front-end for user input, back-end to analyze the data and make predictions by using the machine learning model.

# **Selection of Problem Statement**

Since 2012

*While going through the research papers and articles related to heart diseases, we observed that the doctors to patient ratio are very low, specifically in developing countries like India. At remote locations and tribal regions, the availability of doctors is low. So, to help the doctors and people we thought of developing a system for primary screening. This will help the people to decide how soon they should consult the doctors to prevent severe heart problems.*

# METHODOLOGY

- The system will monitor the body parameters such as blood pressure, blood glucose level, temperature and heart rate using IoT sensors and send the collected data to the cloud.
- Machine learning algorithms make predictions of heart health which reported highest accuracy of about 92%.
- It will notify the person in case of deviation from the standard values of body parameters.
- The degree of emergency will be decided by setting a threshold for different body parameters on consulting the specialist doctors for respective diseases.
- Flask was used to connect it with a user-friendly web application. Users have the option to enter their health parameters if they have reports from the laboratory or it can be checked by your hardware. The person can log in our web app and can enter the details. Machine learning model analyses this data and makes the predictions into five classes viz. low risk, moderate risk, high risk, healthy or diseased heart

# Front End

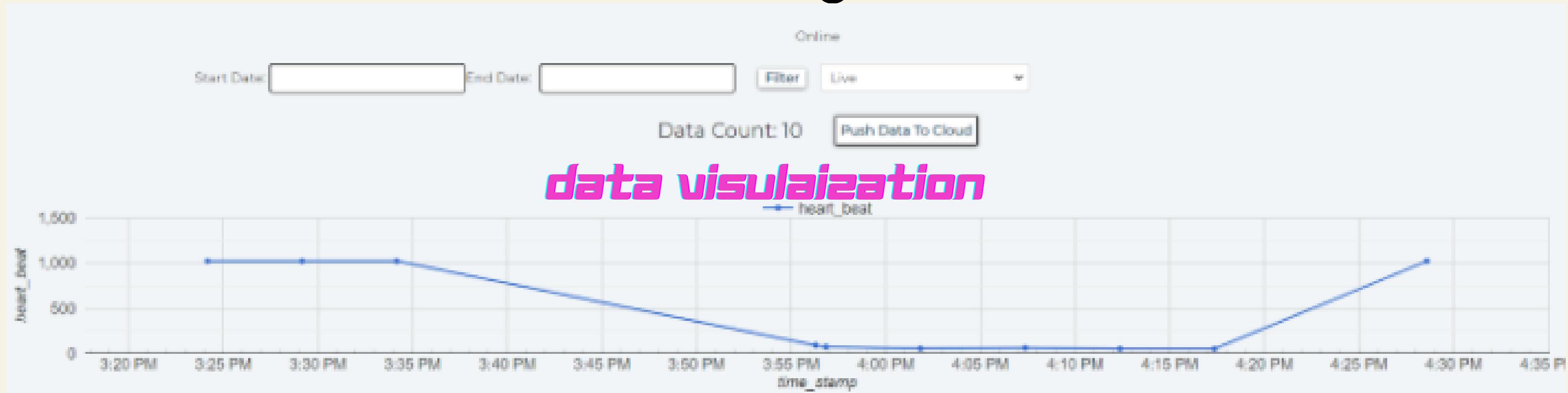
Data input by user

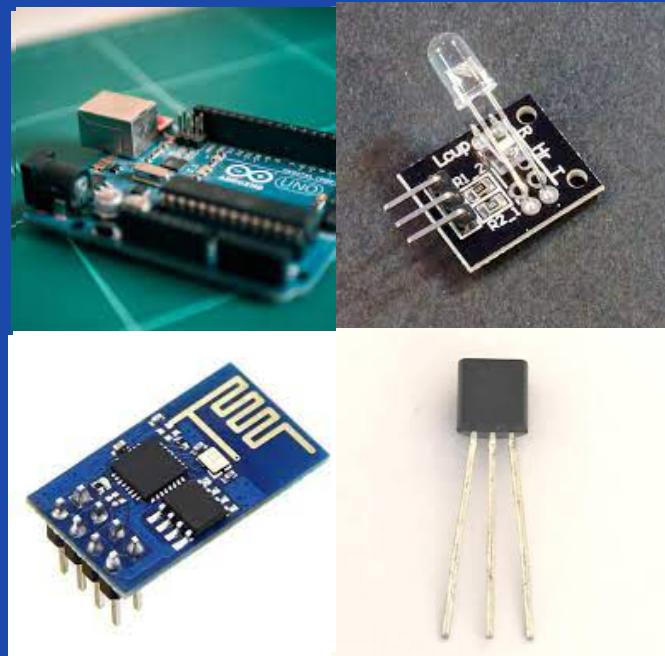


# Back End

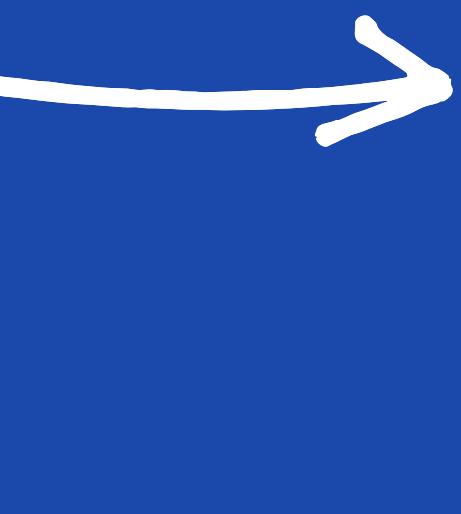
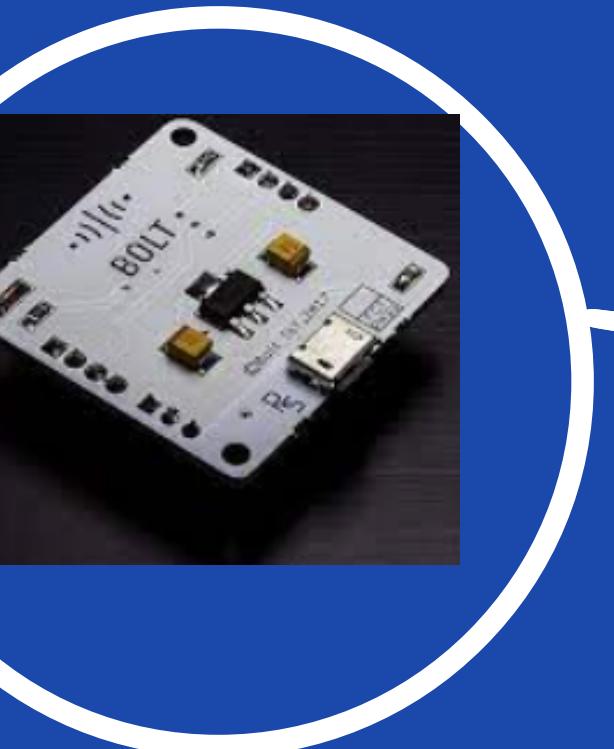
Cloud  
storage

ML model





IoT



Collection  
of real-  
time data

Suffering from  
heart disease

High Risk

Moderate Risk

Low Risk

Healthy Heart

Feedback



— 09 —

# **WORKING**

## **STEP 1**

Collection of real time data by IoT sensors.

## **STEP 2**

Storage of data at Bolt Cloud.

## **STEP3**

Data is used to detect heart health by using AI and Machine learning Algorithms.

## **STEP 4**

User friendly web application is built where user can enter the parameters to check heart health.

# Traditional Testing

Time-Consuming and inconvinient

No real-time monitoring and data collection

Lack of data security



Medical waste generation

# Testing by AIHSS

Quick and convenient

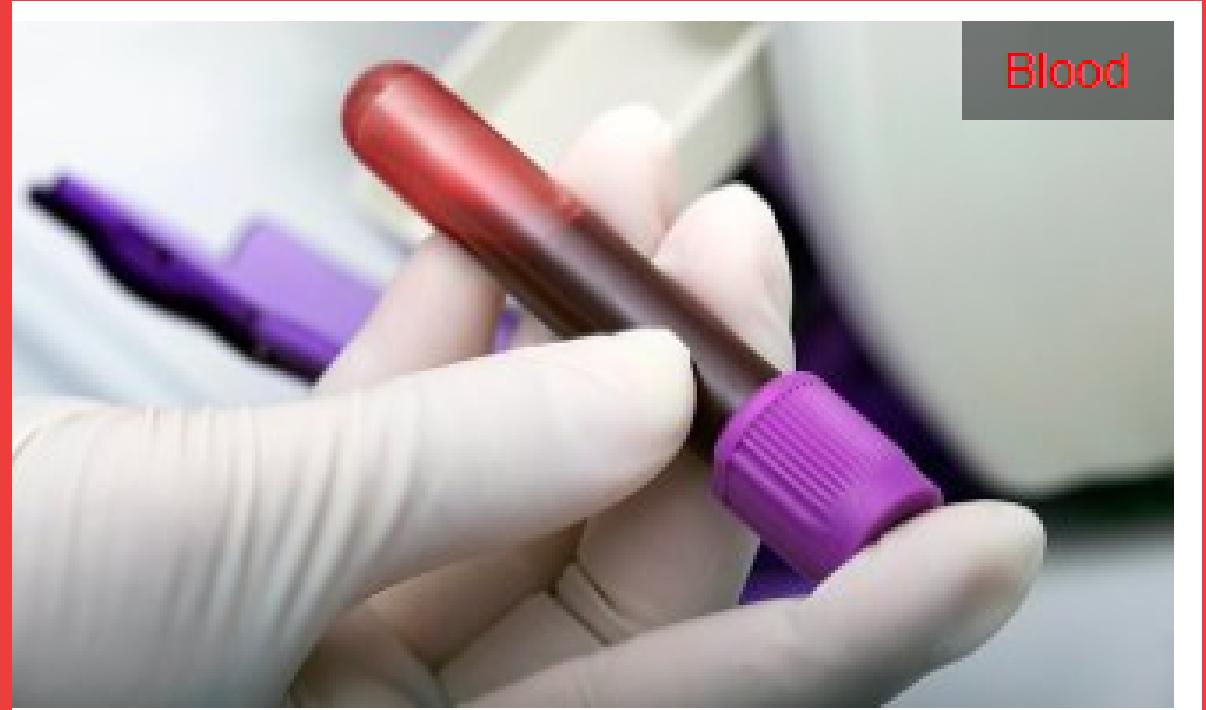
Real-time monitoring and data collection

Authenticated access, data security by cryptography and staganography



No waste generation,

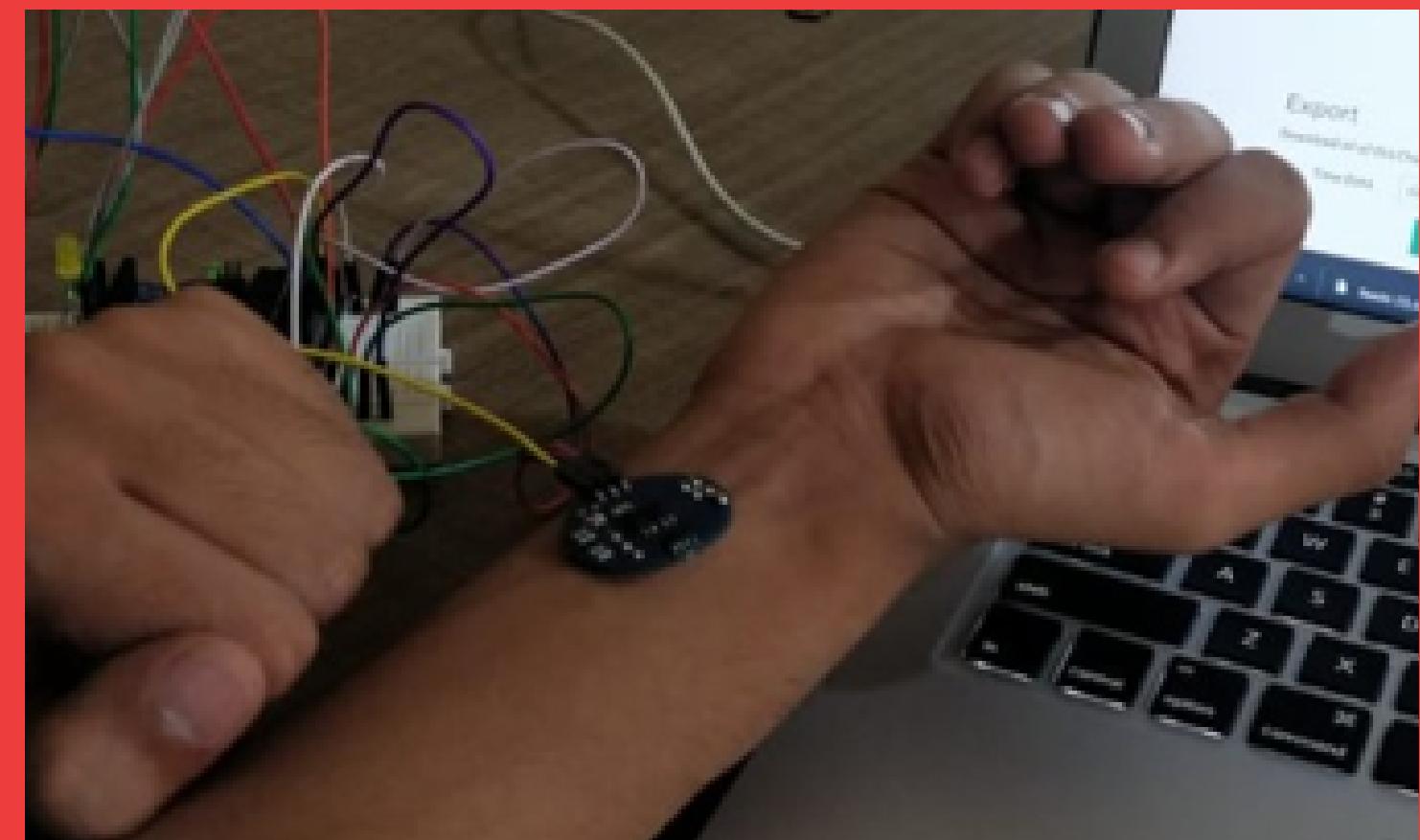
# Traditional Testing



**CARDIAC PROFILE ADVANCED (68 Tests)**  
~~Rs. 4000~~ **Rs. 3300**



# Testing by AIHSS



# THE SIGNIFICANCE AND REPERCUSSIONS OF THE CHOSEN PROBLEM STATEMENT

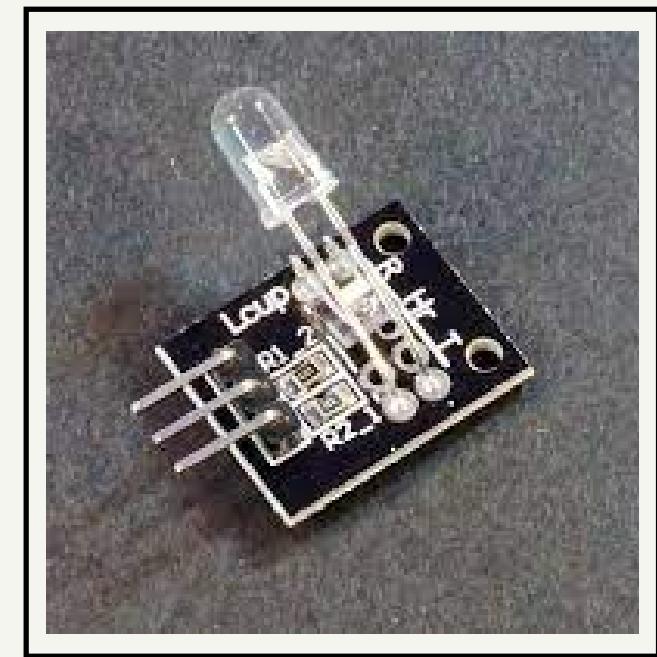
- Reduced Errors
  - Collection of real-time data by IoT device.
  - Analysis of collected data by Machine Learning (ML) model.
  - ML reduces biasness and improve precision in decision making.
- Low Cost
  - Remote consultation saves the cost of commuting.
  - No cost of waste disposal, collection and transportation
  - No cost for sample collection and testing in laboratory,
- Better patient experience
  - Convenient to use.
  - No blood sampling is involved.
  - continuous monitoring of patients is feasible.
  - 24x7 availability.
  - Remote access is possible.
- Environment Friendly
  - No waste generation
- Societal Impact
  - Low-cost and Intelligent assistant for doctors.
  - Easy and self monitoring of heart risk is possible for people.
  - Helpful specifically for people living in remote areas where health experts are not available.



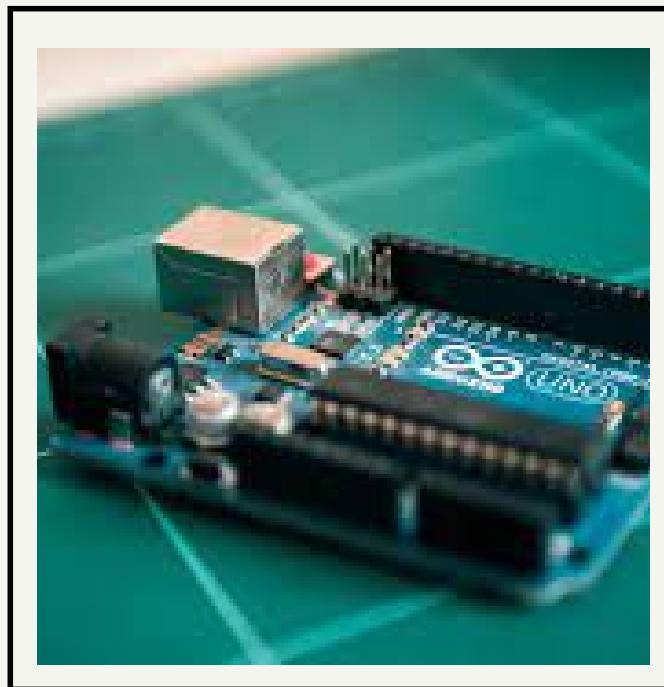


# IoT Devices

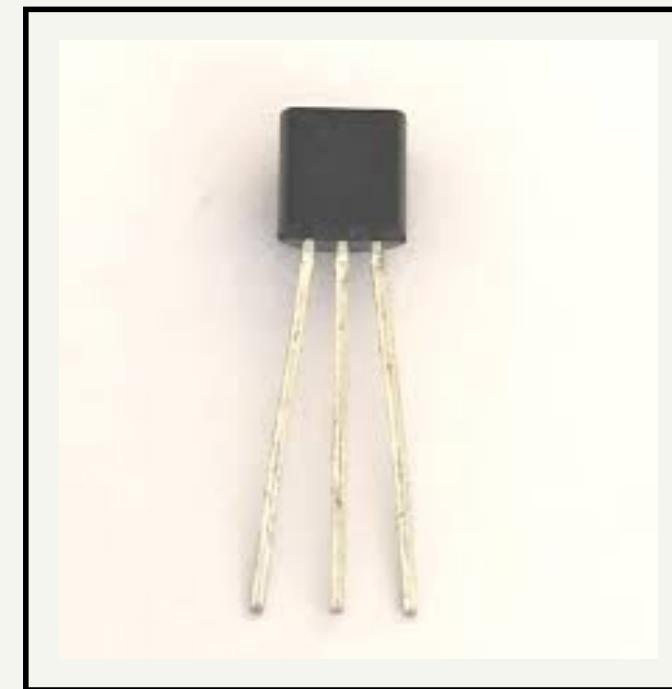
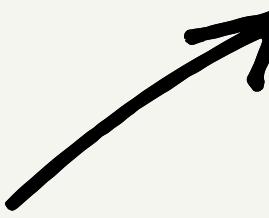
Heartbeat  
sensor



Arduino



LM35  
Temperature  
sensor



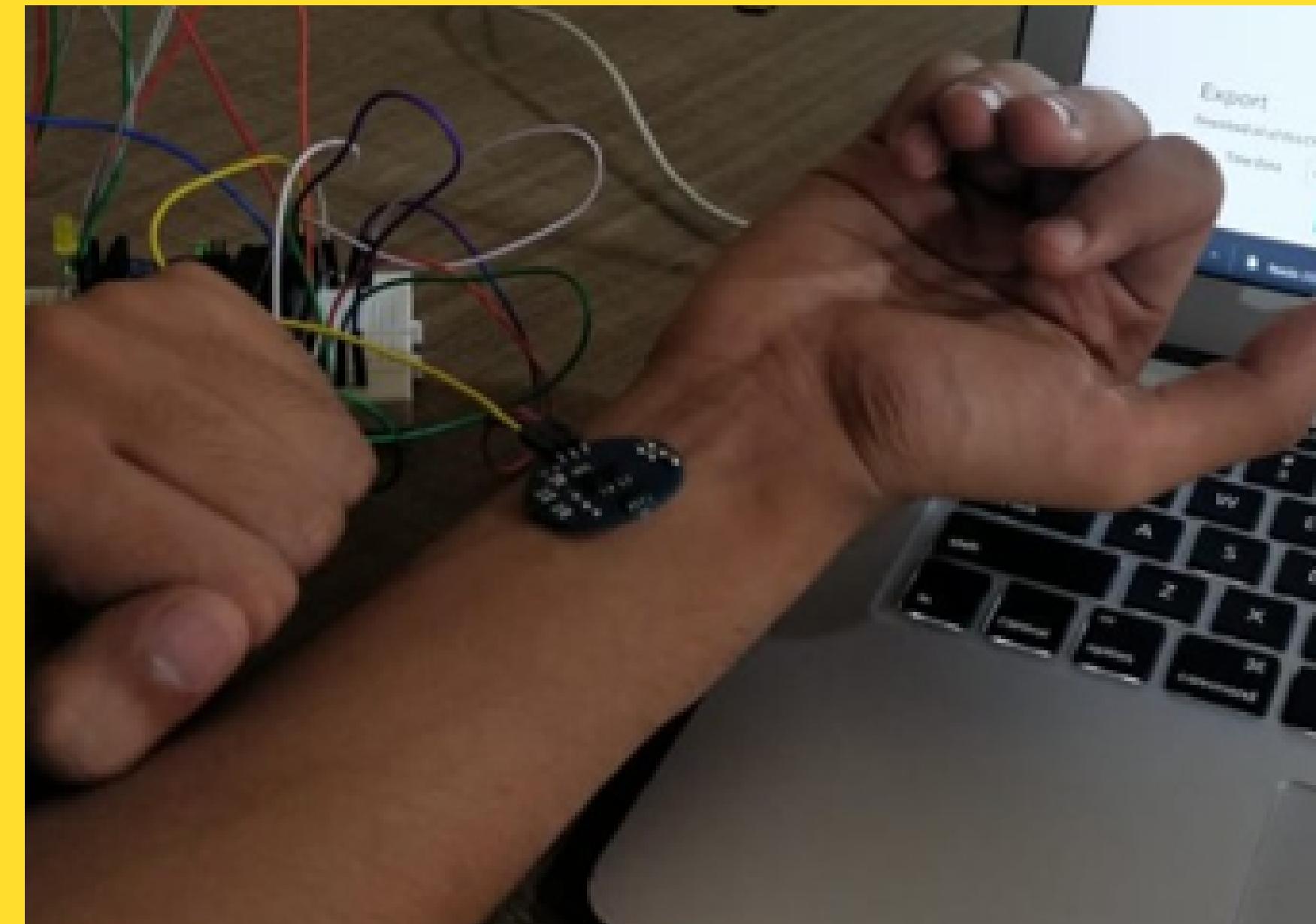
Bolt

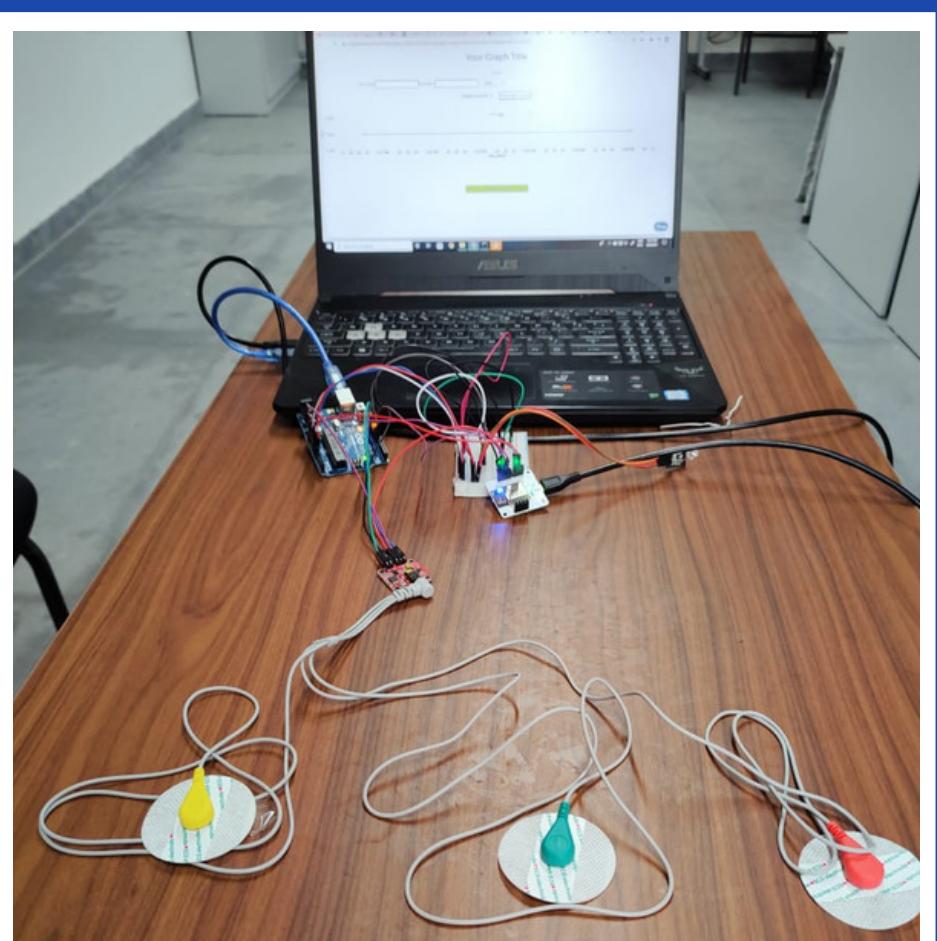


# Real time monitoring of health parameters using IoT device.

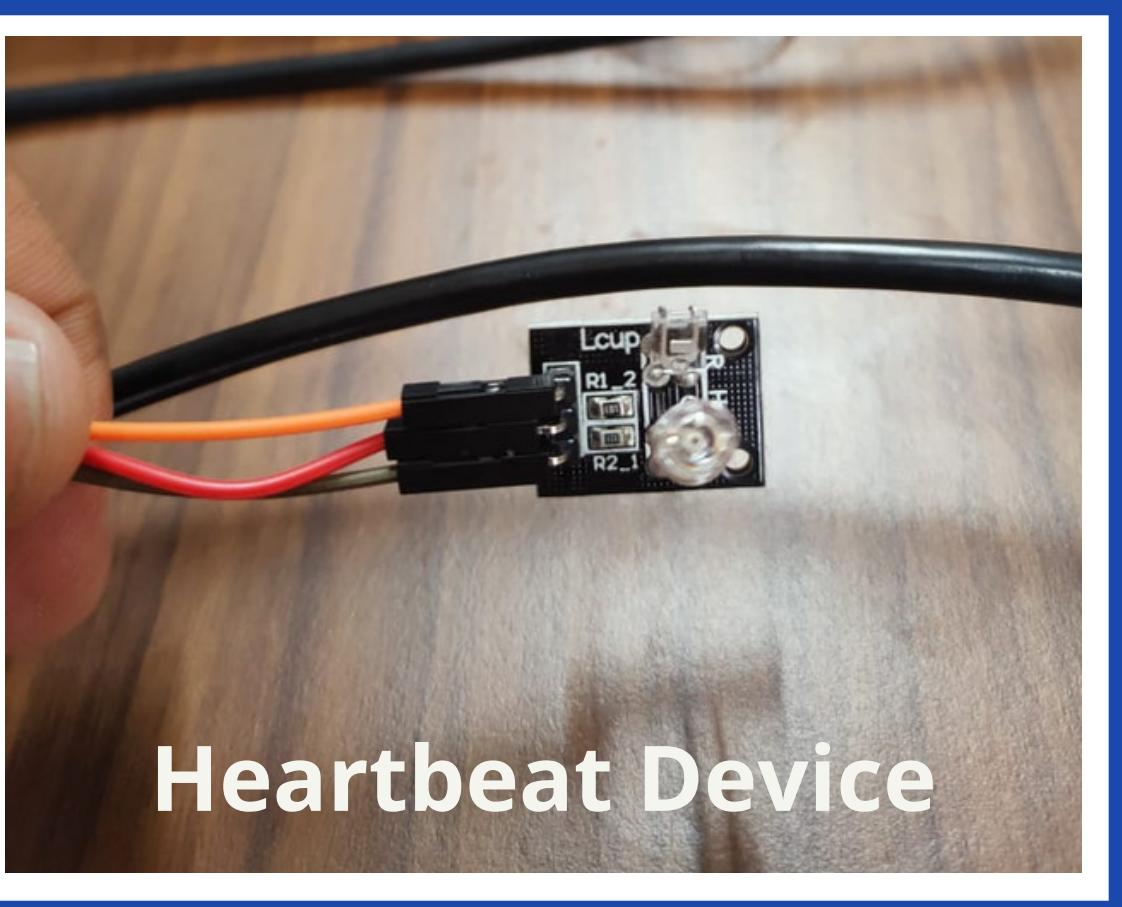
## PARAMETERS

- pulse rate
- body temperature
- ECG
- cholesterol
- blood pressure
- heartrate

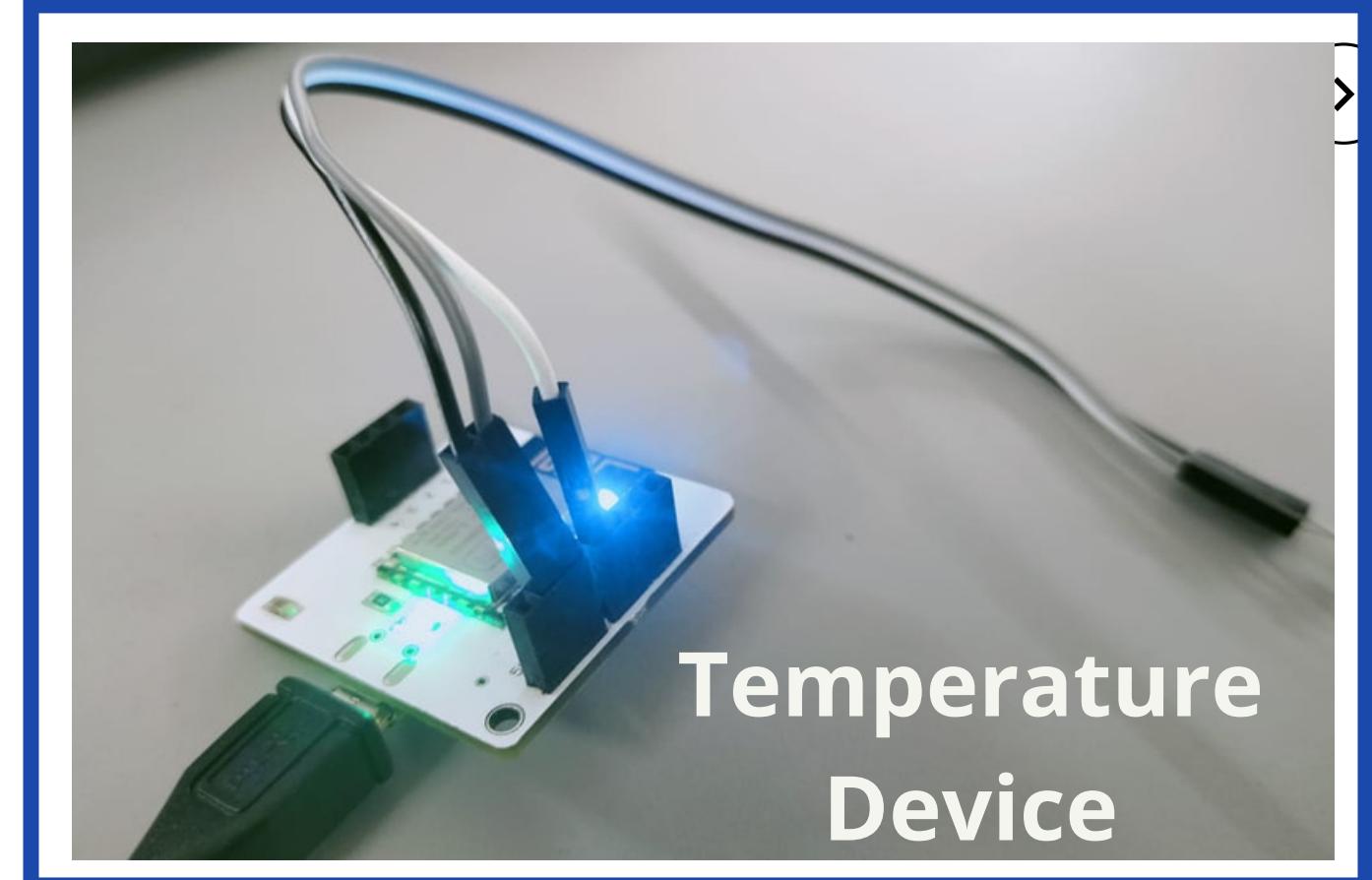




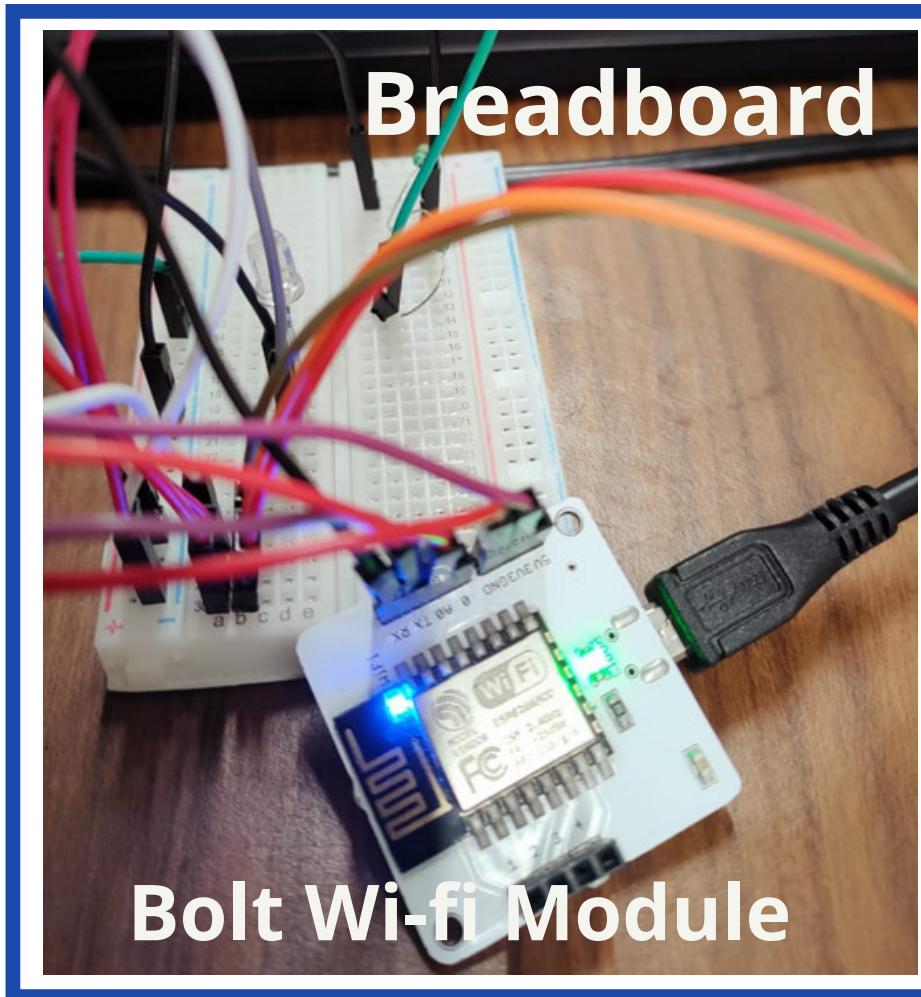
**ECG and heartbeat monitoring system**



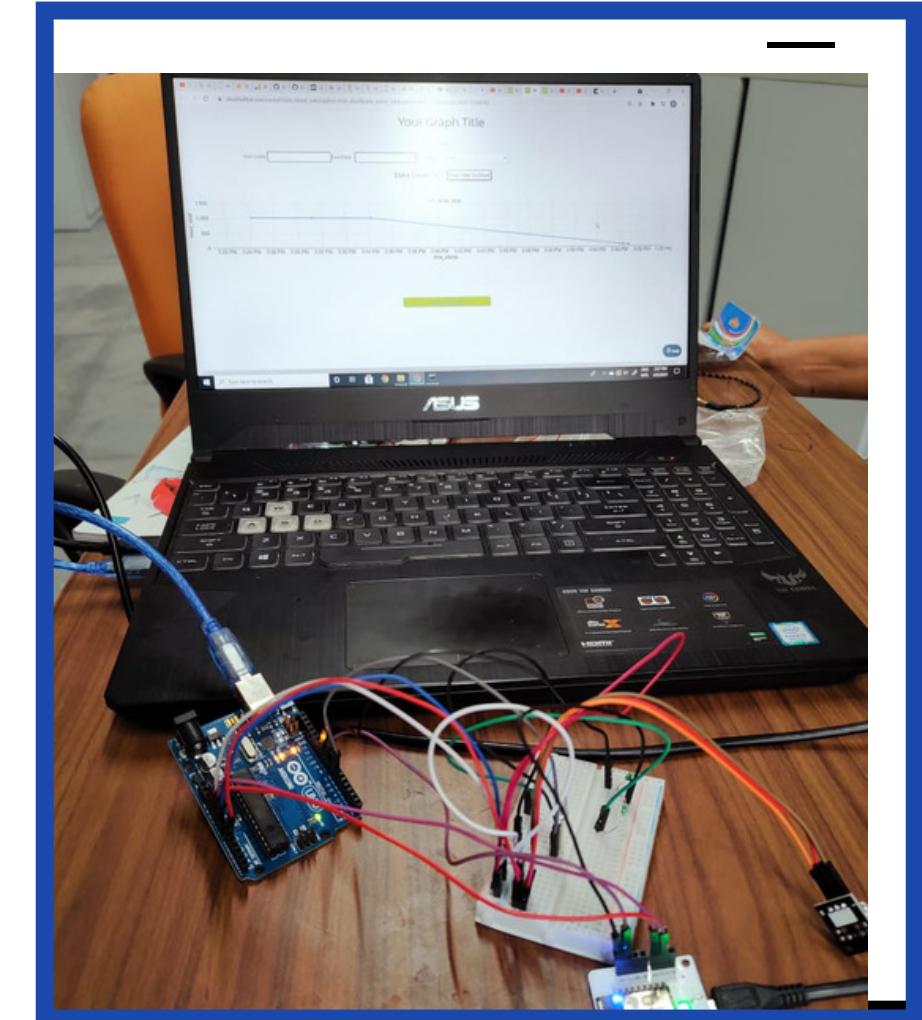
**Heartbeat Device**



**Temperature Device**



**Breadboard  
Bolt Wi-fi Module**



# REFERENCES

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2. D. He and S. Zeadally "An analysis of RFID authentication schemes for Internet of Things in healthcare environment using elliptic curve cryptography" IEEE Internet Things J. vol. 2 no. 1 pp. 72-83 Feb. 2015.
3. Rajesh Naidu, Android Based Healthcare Monitoring System, International Journal of Applied Sciences Engineering and Management ISSN 2320 – 3439, Vol. 05, No. 01, January 2016, pp. 98 – 100
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# *Timeline*

**1 - 3 March :** Planned and discussed our unique project collectively in duo.

**5 - 7 March :** Decided the flowchart and execution of IoT and AI based system.

**9 - 13 March :** We made list of IoT devices needed in system and arranged them. Studied theory about its connections through various sites and decided platform (Bolt) to work . Choosing of suitable sensors.

**15-20 March :** Worked in IoT lab to connect IoT devices in order to make sure , they are working perfectly.

**2 April :** Completed backend part of our IoT and AI based system.

**Upto 15 April :** We ran our lot devices along with backend part of system and found it to be perfectly working

**21 April :** Prepared well defined ppt. and started working on frontend part of system.

**25 April to 30 May :** Completed ppt, report, project, In fact whole EL project was completed.

# RESULTS AND DISCUSSIONS

- The system enables to collection real-time data using IoT devices.
- KNN Classifier multi-class classification model predicts the risk of heart disease with an accuracy of about 92%.
- The system can be accessed even at remote locations.
- It is a low-cost and eco-friendly solution for heart patients.
- It can act as an intelligent assistant to doctors.

*AI and IoT based techno-solutions can be game  
changer for the healthcare industry !*

**Thank  
you!**