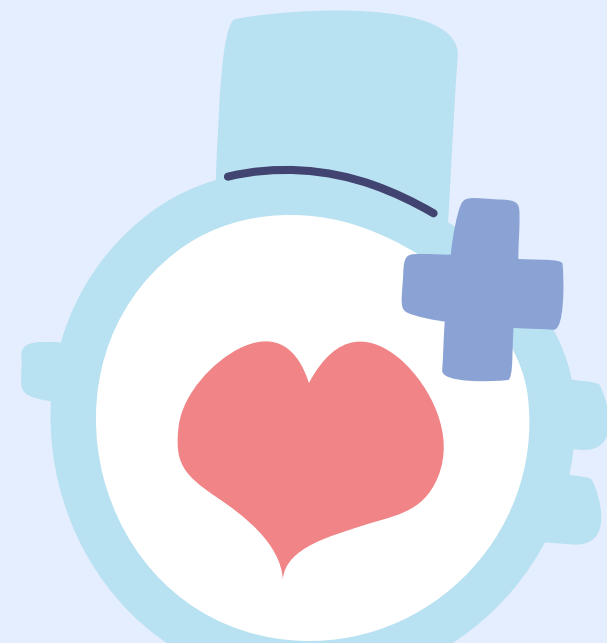


# SmartBeat



# Plan

1

Problem

2

Solution

3

Implimentation

4

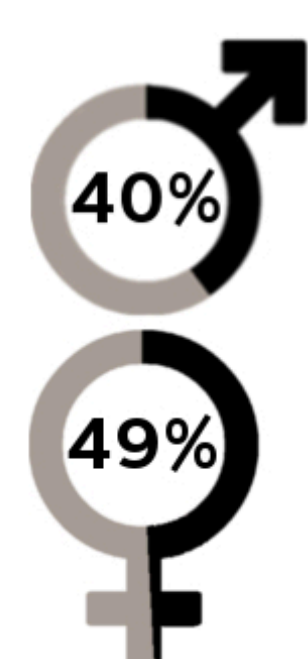
Conclusion

# Problem

- Cardiovascular diseases are a leading global killer
- Early detection is critical
- Current monitoring tools are: Bulky, Invasive, Not suitable for long-term use



# Heart disease in Europe



Number one killer of women in European countries **51**

Number one killer of men in European countries **41**

**4,002,632**

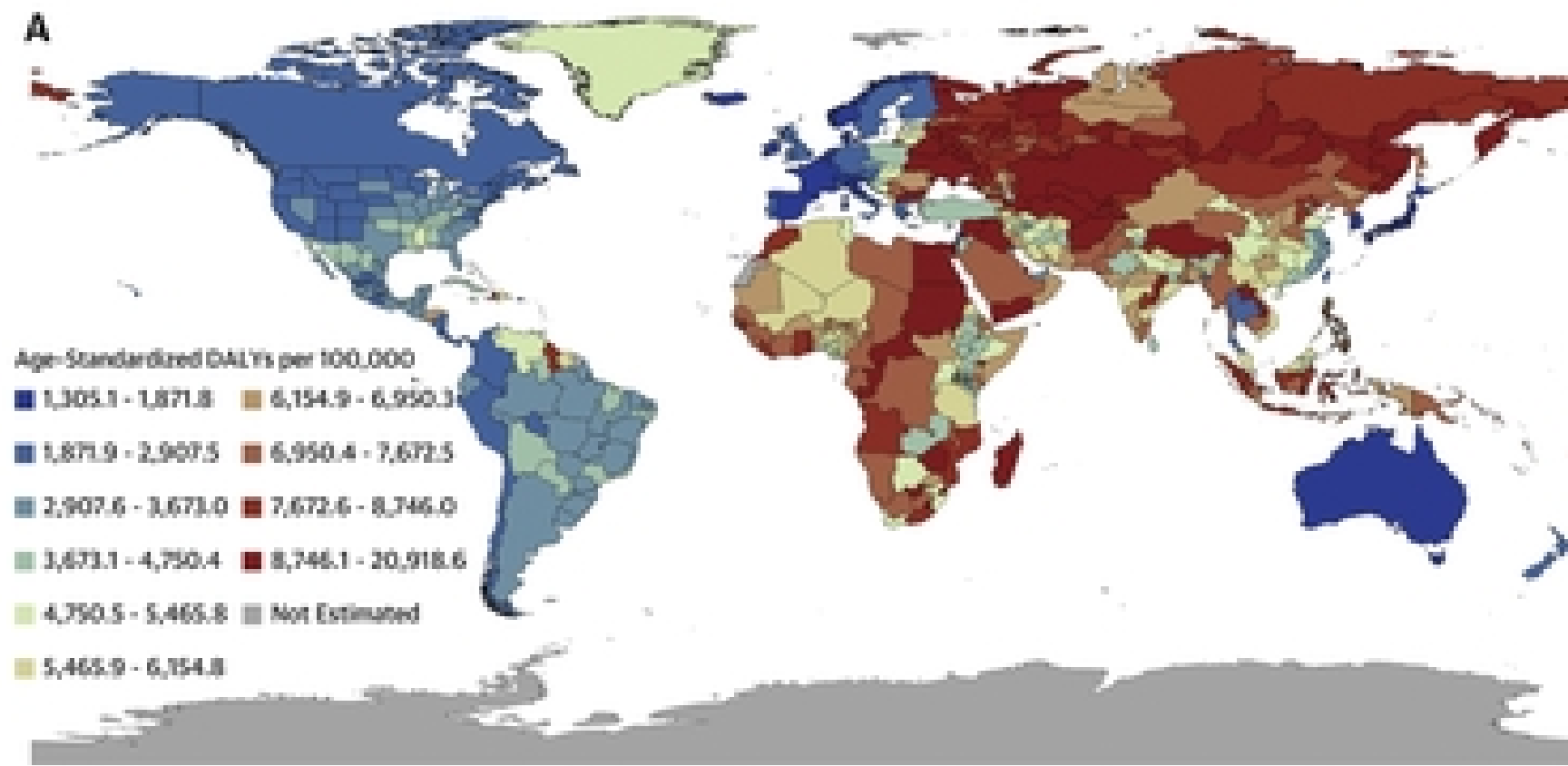
**total deaths**

Heart disease causes 45% of deaths in the WHO's European region  
It kills **40 in 100** men and **49 in 100** women

Figures for the 53 countries in the WHO European region

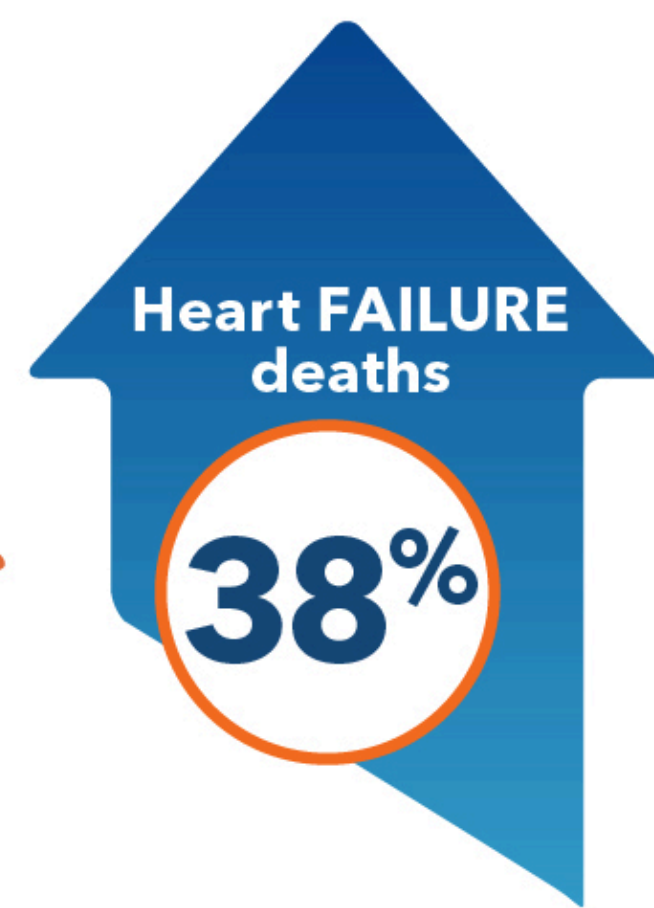


## CENTRAL ILLUSTRATION: Global Burden of Cardiovascular Diseases and Risks



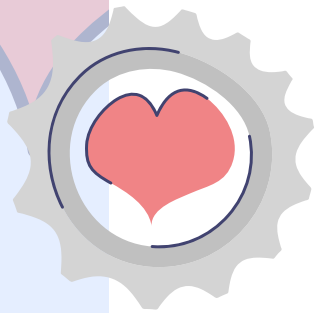
## From 2011 to 2017

After decades of decline, U.S. deaths from **HEART DISEASE** on the rise



\*Kaiser Permanente analysis of Centers for Disease Control and Prevention (CDC) WONDER database; Sidney et al., JAMA Cardiology 2019.

# SmartBeat



Smart health monitoring vest



AI-powered analytics

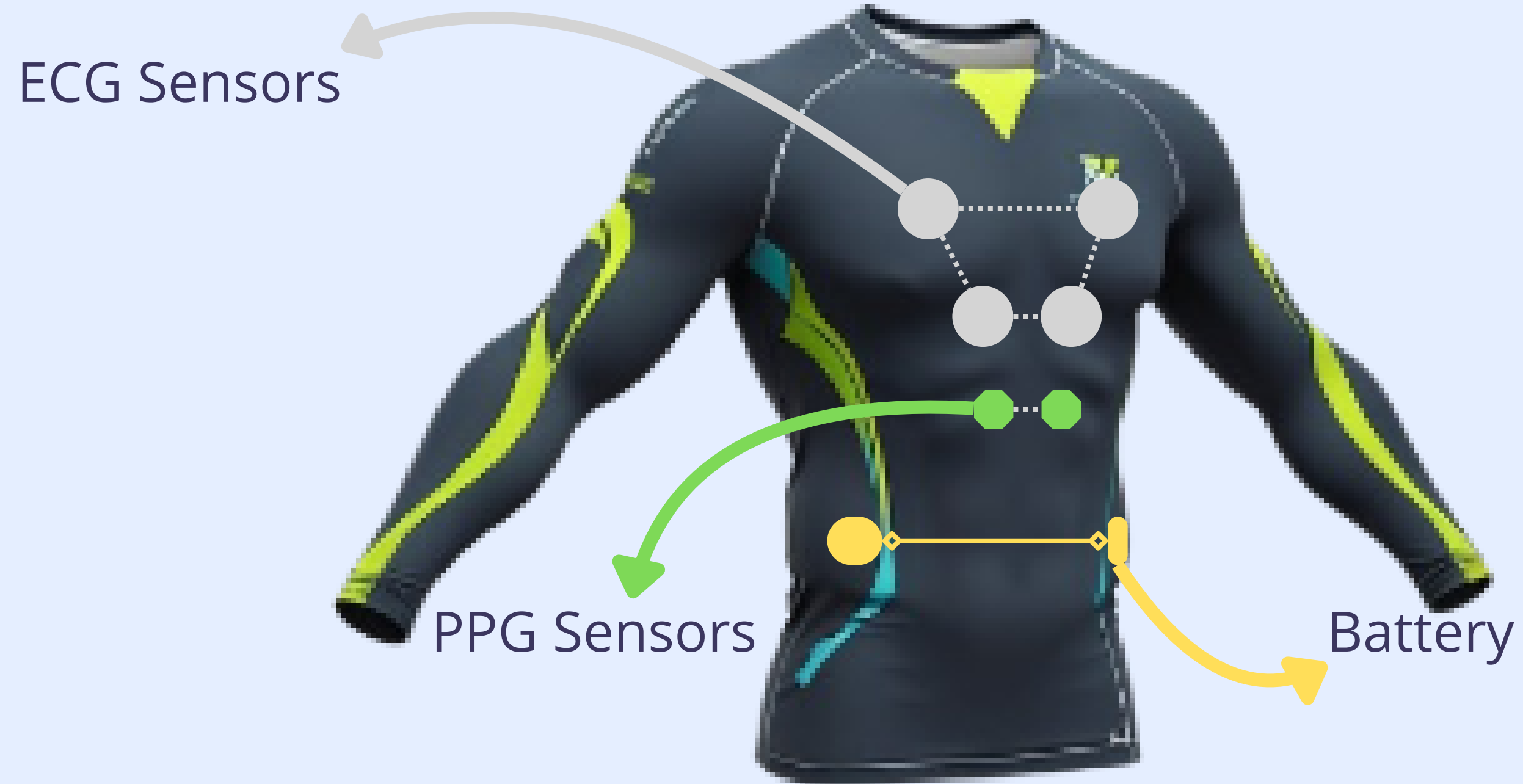


Continuous data collection

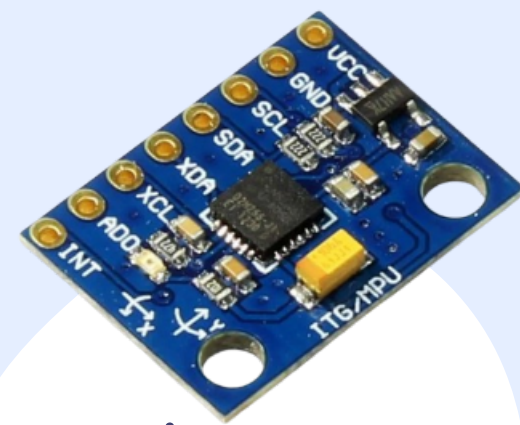


Predictive the heart  
state

# Smart vest



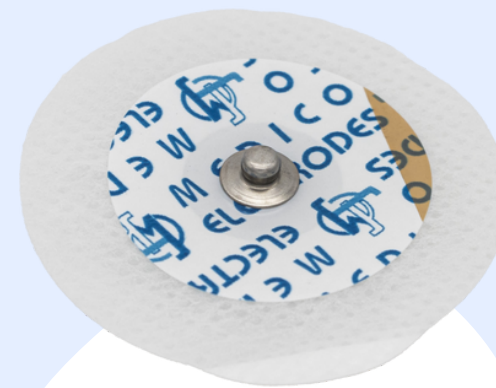
# Sensors



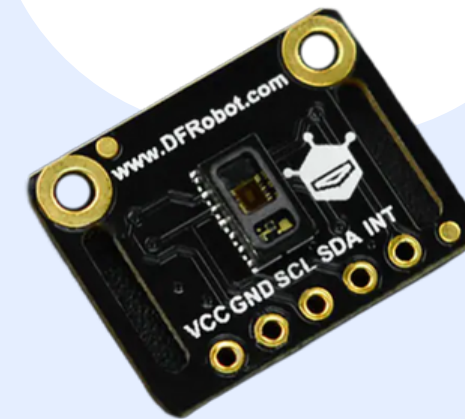
Accelerometer  
/Gyroscope



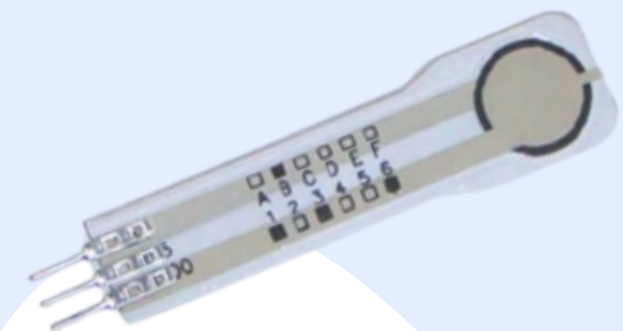
GSR Sensor



Textile ECG  
Electrodes



PPG Sensor

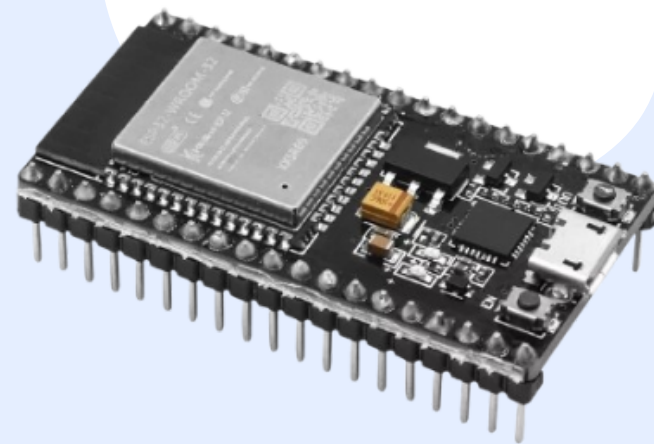


Pressure  
Sensor

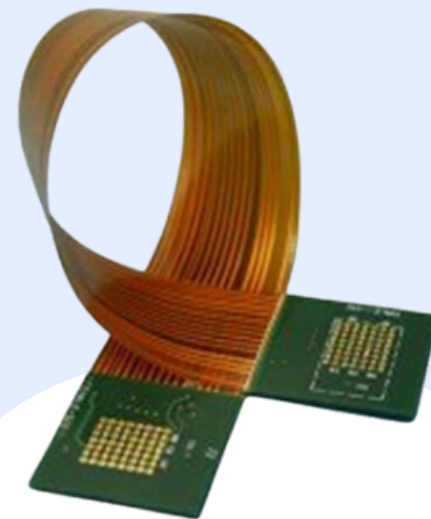


# Electronics and Connectivity

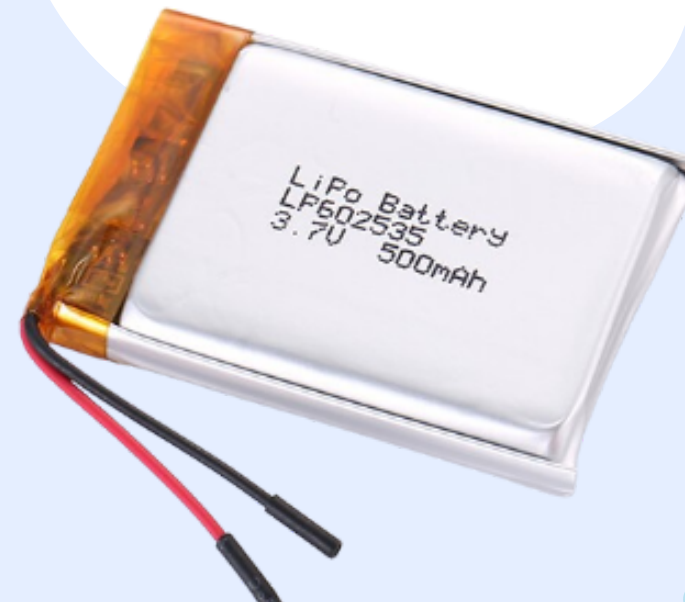
ESP32



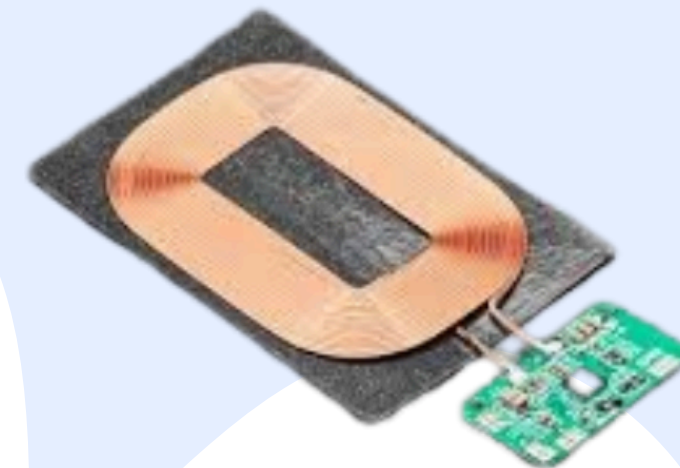
Flexible PCB



small LiPo battery



wireless charging





# Fabric and Materials

Moisture-  
Wicking Fabric

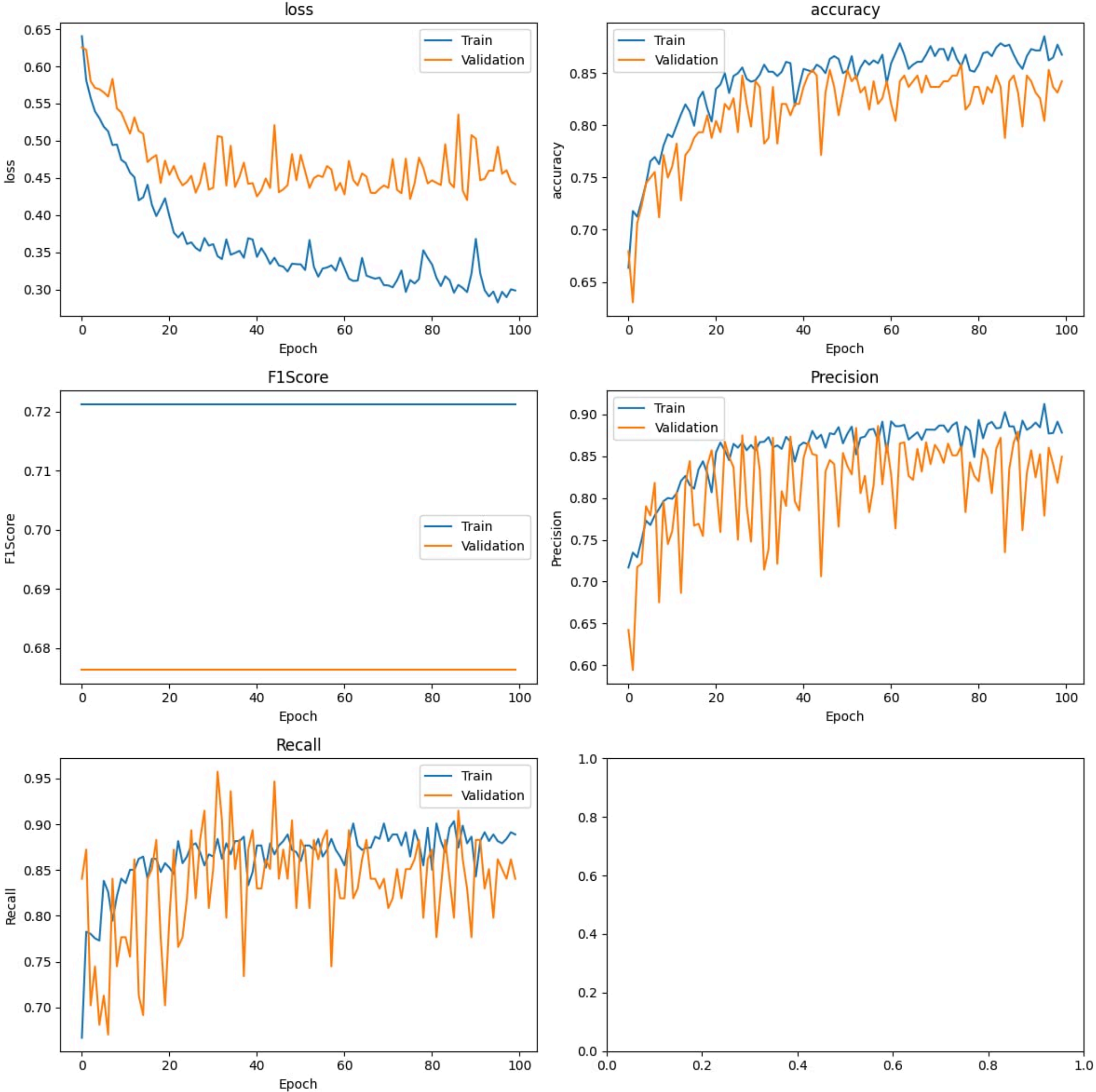


Elastic  
Compression  
Fabric

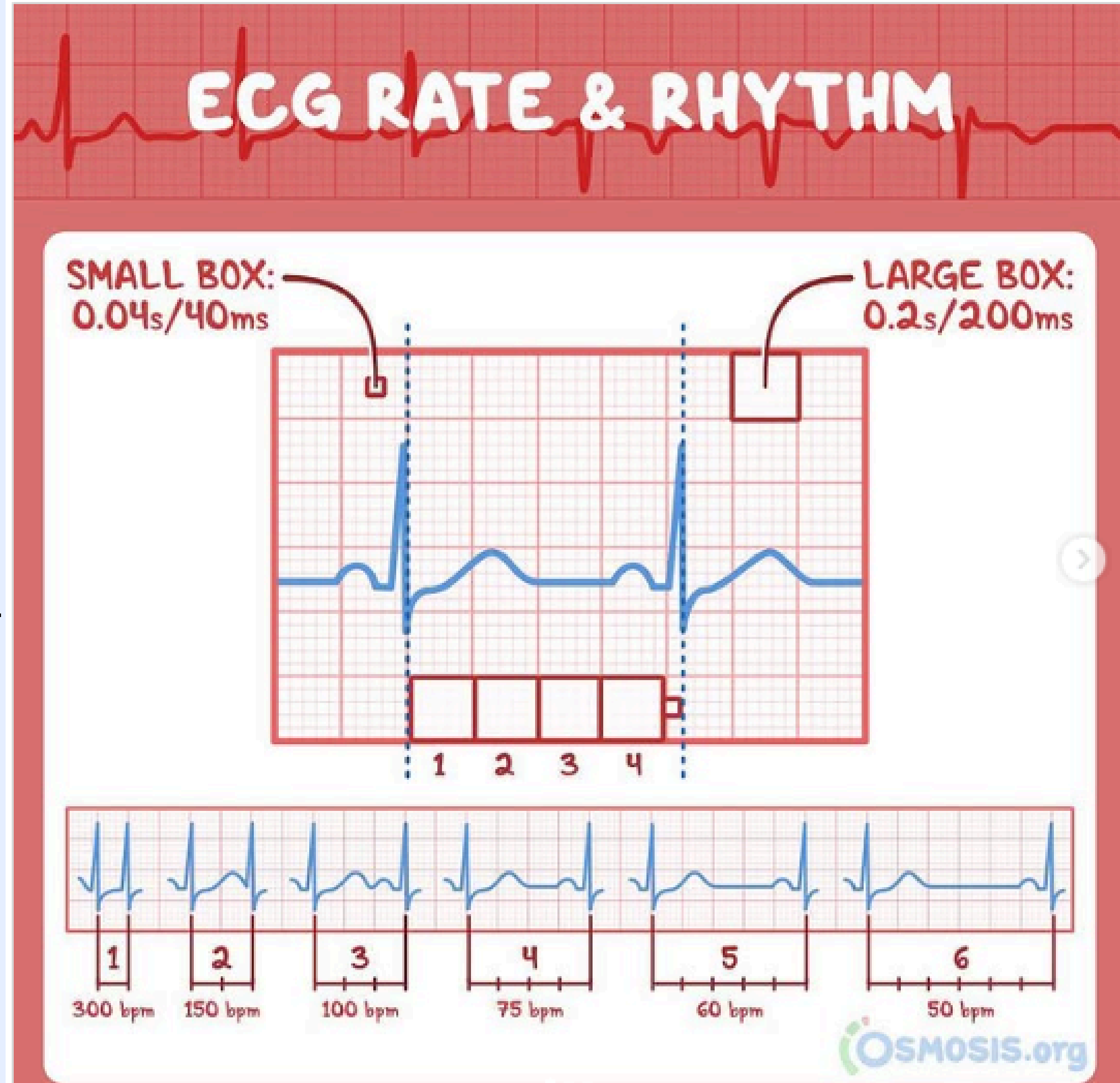


We trained a model using the "heart-failure-prediction" dataset, inspired by the research paper "Application of Deep Learning for Heart Attack Prediction with Explainable AI." We employed an LSTM model to predict heart attacks.

Precision	90%
Recall	95%
Accuracy	85%



We trained a Google Vision Transformer (ViT) model to classify ECG images, inspired by the paper "Heart Disease Detection using Vision-Based Transformer Models from ECG Images".



# Conclusion



1

Developed a smart health monitoring vest with advanced sensors and AI.

3

Designed for comfort, scalability, and cost-effectiveness.

2

classify ECG using google VIT

4

Enables continuous health monitoring and early disease detection.

5

Future work: clinical validation and expanded capabilities.





# Thank You



## Q&A

