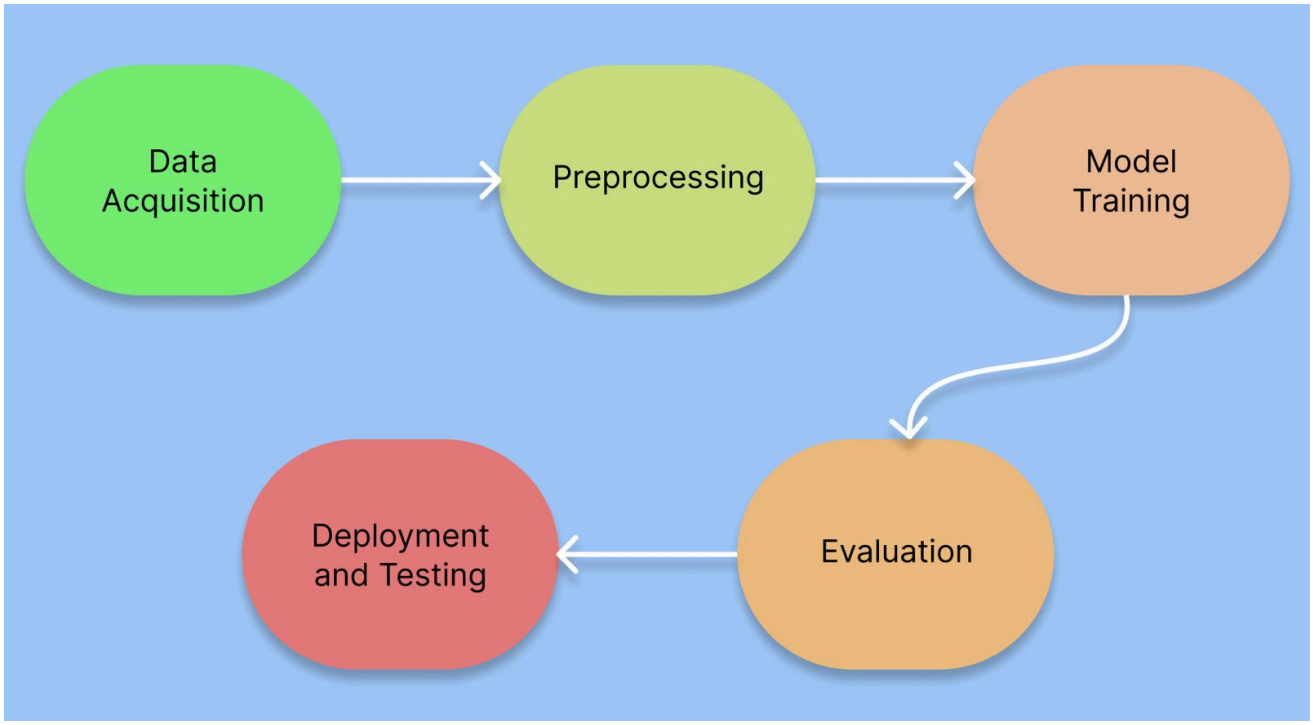
# Emotion Classification using Physiological Signals

## Overview

This project aims to develop a machine learning model for emotion classification using physiological signals. By leveraging datasets that monitor various emotional states, the model will distinguish between different emotions, particularly focusing on fear, arousal and Excitement. The system will utilize sensor data such as EMG (electromyography), ECG (electrocardiography), EDA (electrodermal activity), PZT (piezoresistive sensors), and accelerometer readings (ACCX, ACCY, ACCZ). Currently, a temporary dataset is being used while precise data is yet to be accessed.The model will primarily consider **heart rate and skin temperature** for distinguishing emotions but will be trained with precision using all other available parameters.

## Block Diagram



## Objective and Motivation

The primary objective is to develop a **wearable device** that can help women feel safe **everywhere and anywhere** by detecting emotional states through physiological signals. By accurately classifying emotions such as fear and arousal, the system can trigger appropriate safety measures, enhancing personal security and mental well-being. The motivation behind this project is to integrate emotion recognition technology into wearable safety devices, contributing to advancements in personal security, mental health monitoring, and human-computer interaction.

## Software and Equipment

- **Programming Language**: Python
- **Libraries**: TensorFlow, PyTorch, Scikit-learn, Pandas, NumPy
- **Tools**: Jupyter Notebook, Google Colab
- **Datasets**: DECEiVeR and other publicly available emotion datasets (temporary dataset in use, precise data to be accessed later)

## Expected Outcome

By the end of this project, we expect to achieve a machine learning model capable of accurately classifying emotions based on physiological signals. The system should demonstrate strong performance in differentiating between fear and arousal, providing valuable insights for applications in mental health and human-computer interaction.

This project lays the groundwork for further research in affective computing and physiological-based emotion recognition.