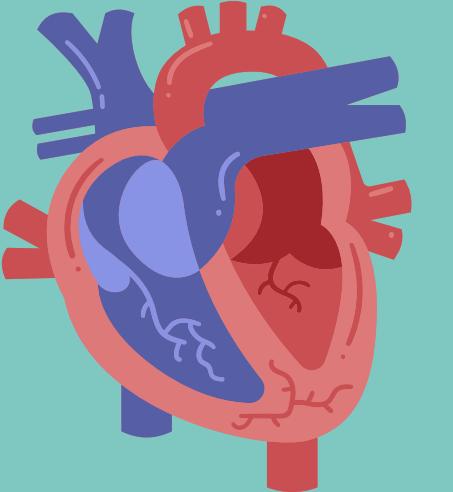




Leveraging Machine Learning for Cardiovascular Disease(CVD) Prediction



Problem Statement



**Cardiovascular diseases
remain a leading cause of
mortality worldwide,
necessitating early detection
and prevention strategies.**



Research Questions

Key risk factors for
cardiovascular diseases

Machine Learning's role in
predicting cardiovascular
likelihood

Patient data insights for
preventive measures



Objectives

- Our MAIN OBJECTIVE is to use Machine Learning to create a user friendly cardiovascular risk profile tool.

- To analyze data to prioritize key Cardiovascular disease risk factors.

- To use machine learning to predict Cardiovascular disease occurrence.

- To offer actionable insights to end users for early intervention based on patient segmentation.



Data Description

The data was categorized as follows

1. Objective: factual information;

- Age in days
- Height in centimeters
- Weight in kilograms
- Gender categorized as Female and Male

2. Examination: results of medical examination;

- Systolic and Diastolic blood pressure
- Glucose and Cholesterol values

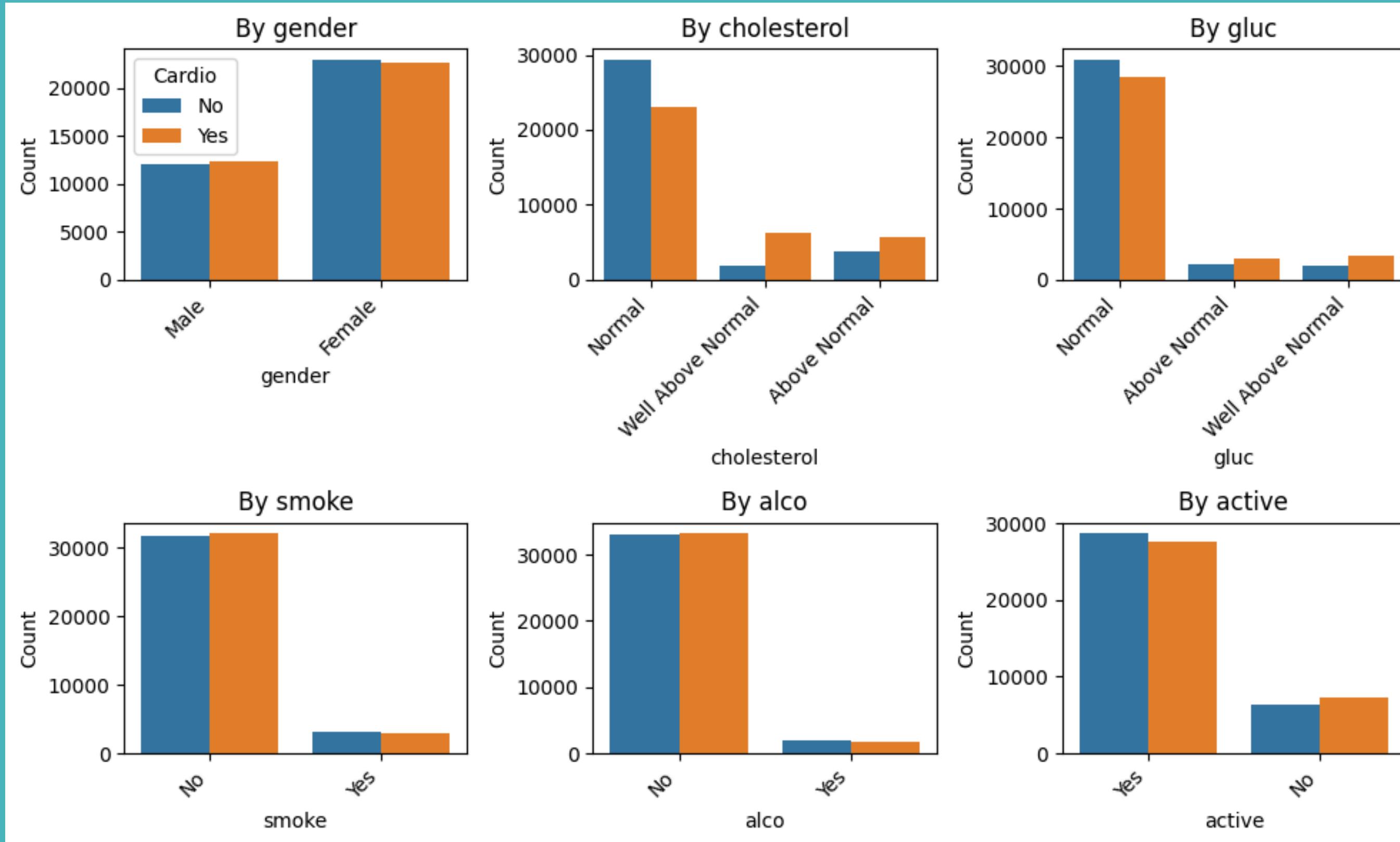
3. Subjective: information given by the patient.

- Smoking, Alcohol intake and Physical activity

4. Target variable; The presence or absence of cardiovascular disease



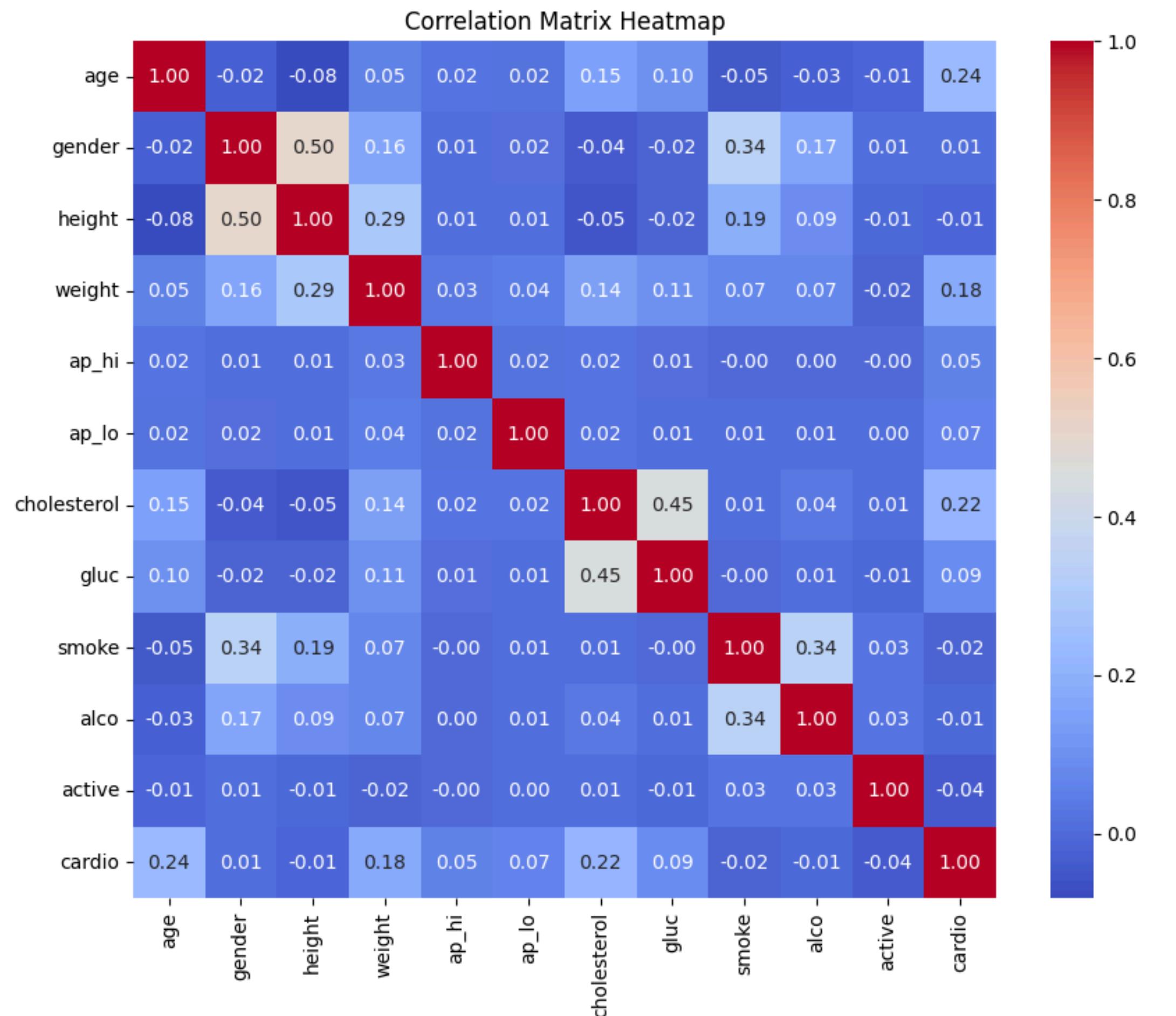
Data Distribution



**Distribution of
Cardiovascular
disease amongst
features**

These factors cannot be used in isolation to determine the risk of cardiovascular disease.

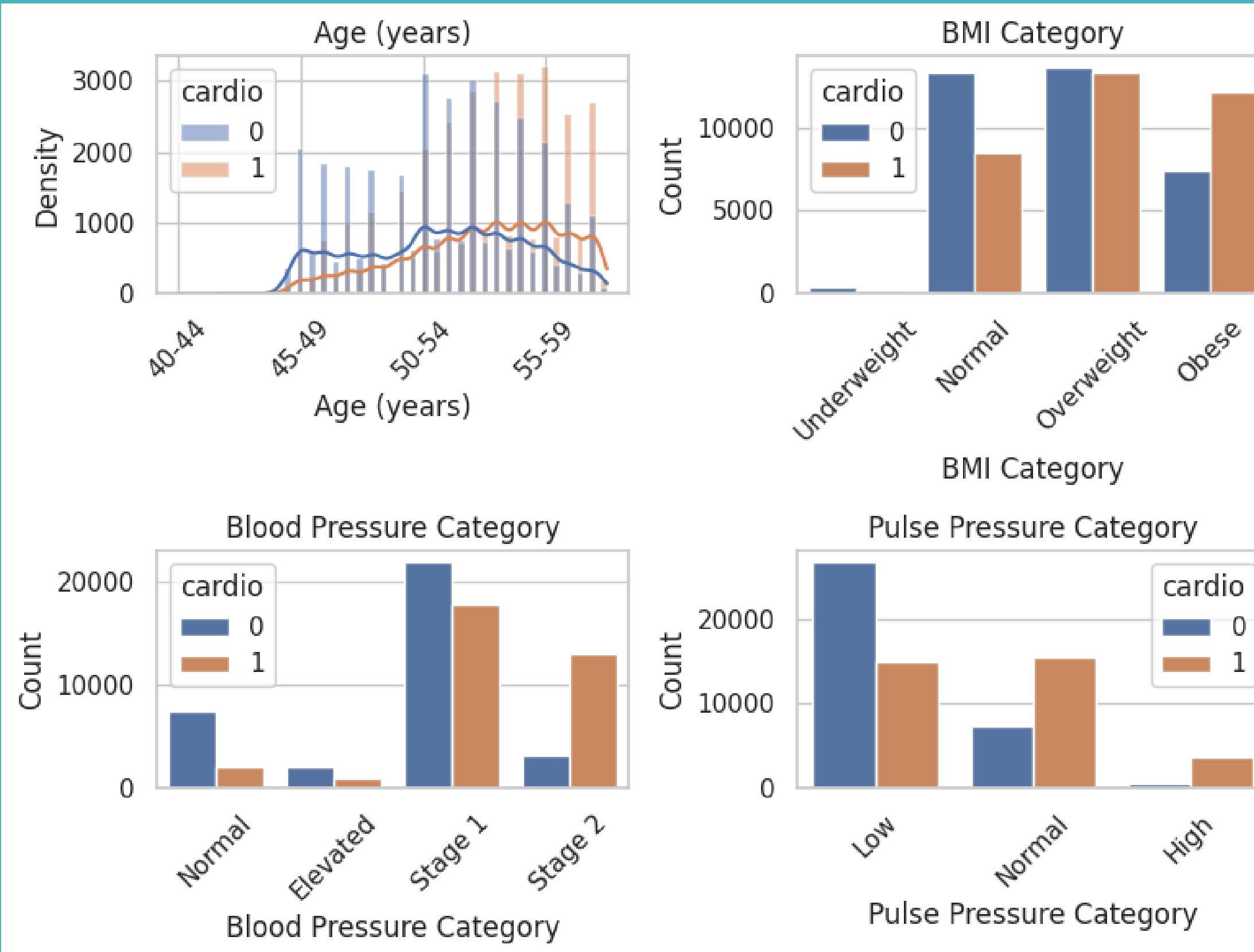
Key Risk Factors Identification



**Relationship
between Cardio
and other variables**

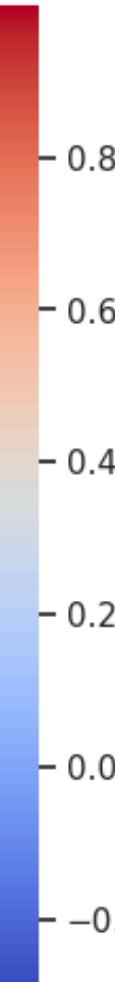
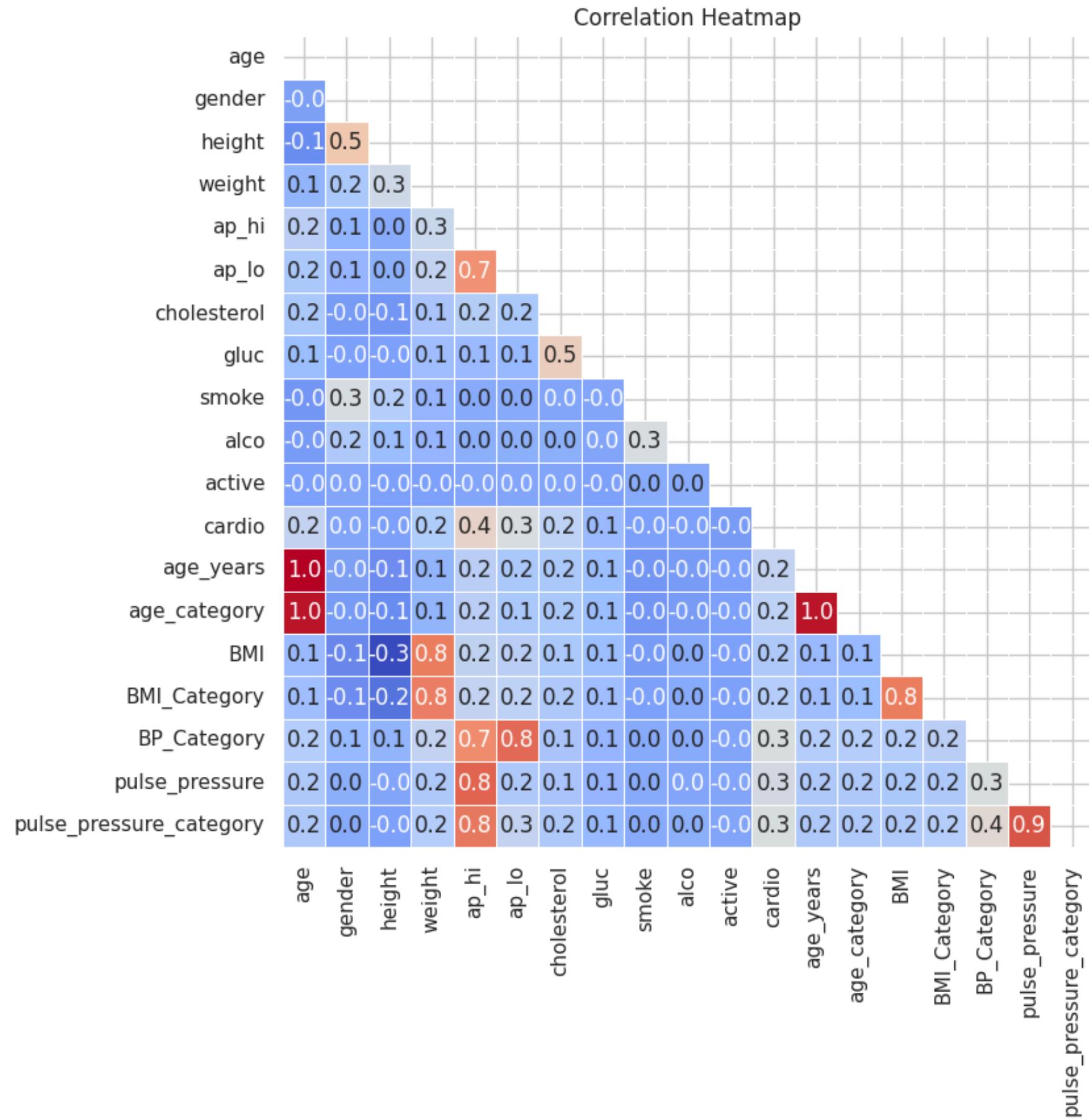
Feature Engineering

Distribution of cardiovascular disease amongst the features created



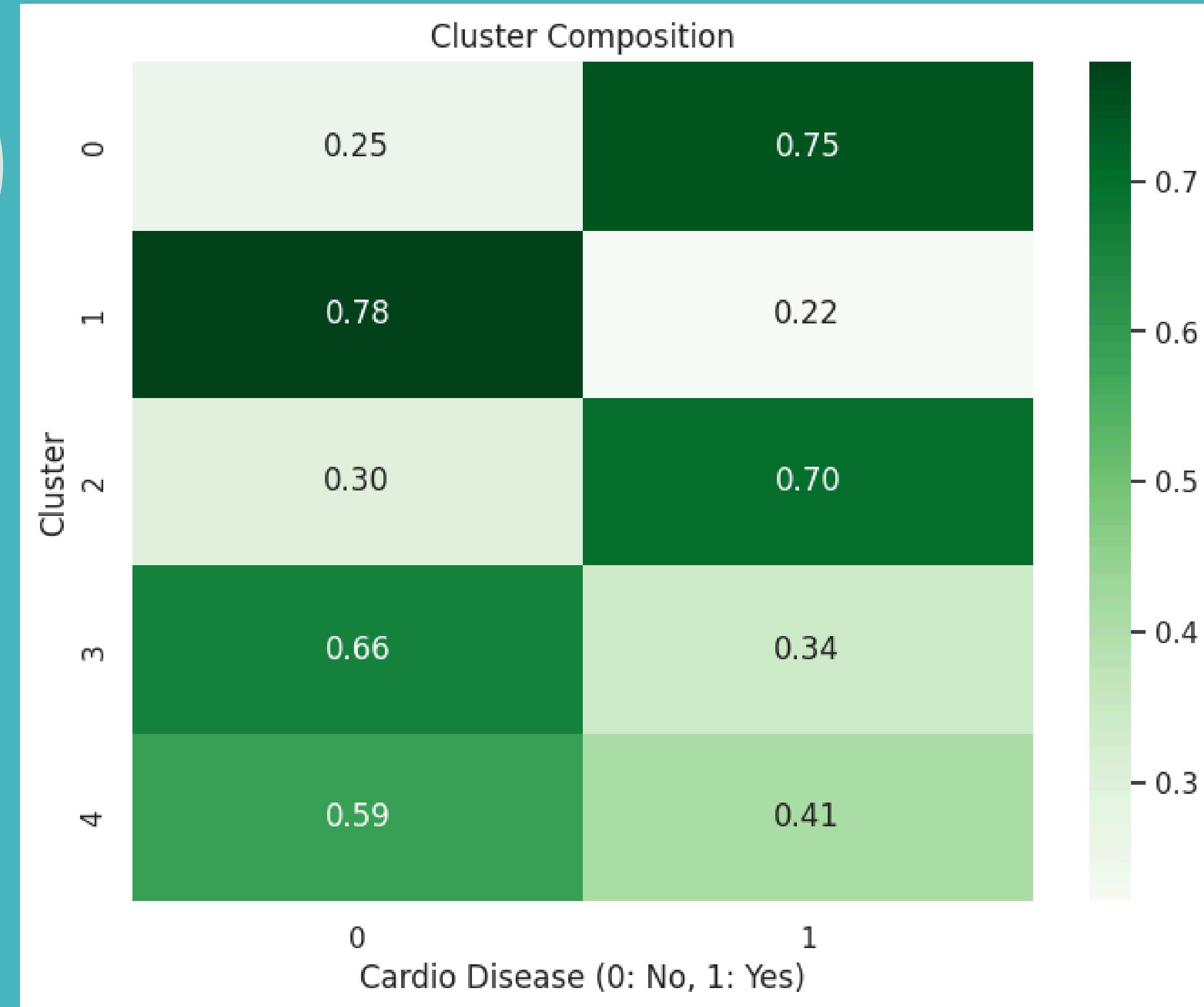
These factors created can be used to provide insights on the risk of cardiovascular disease.

Key Risk Factors Identification



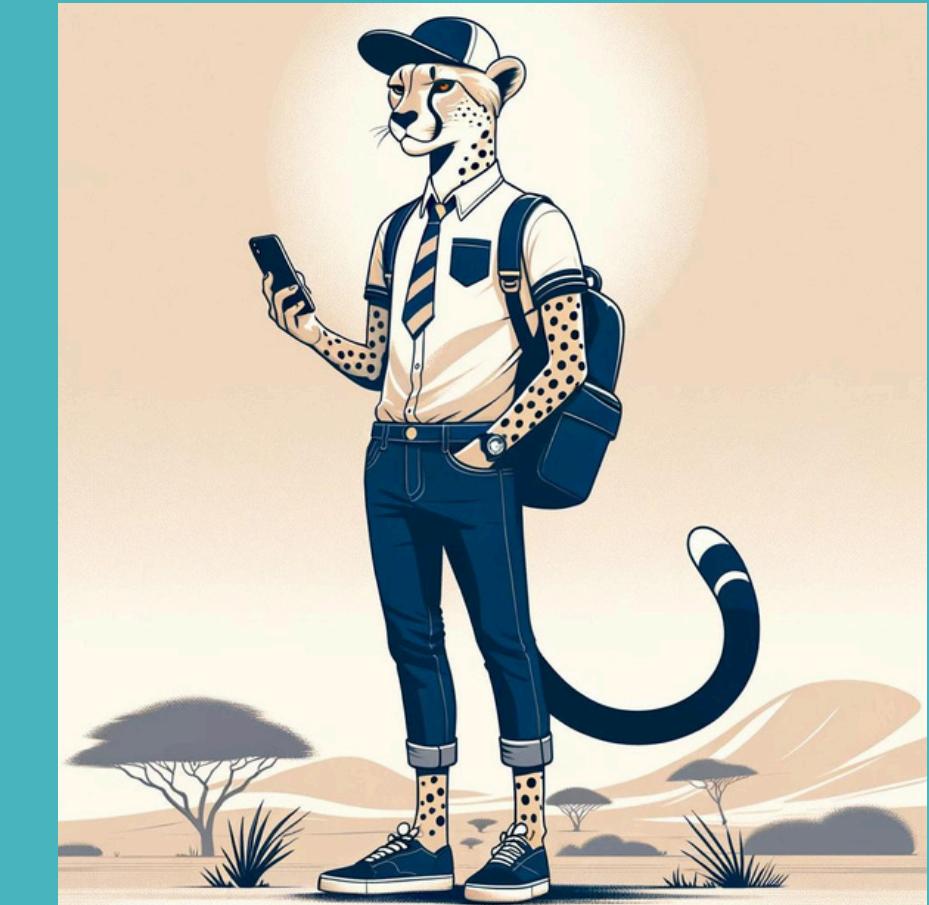
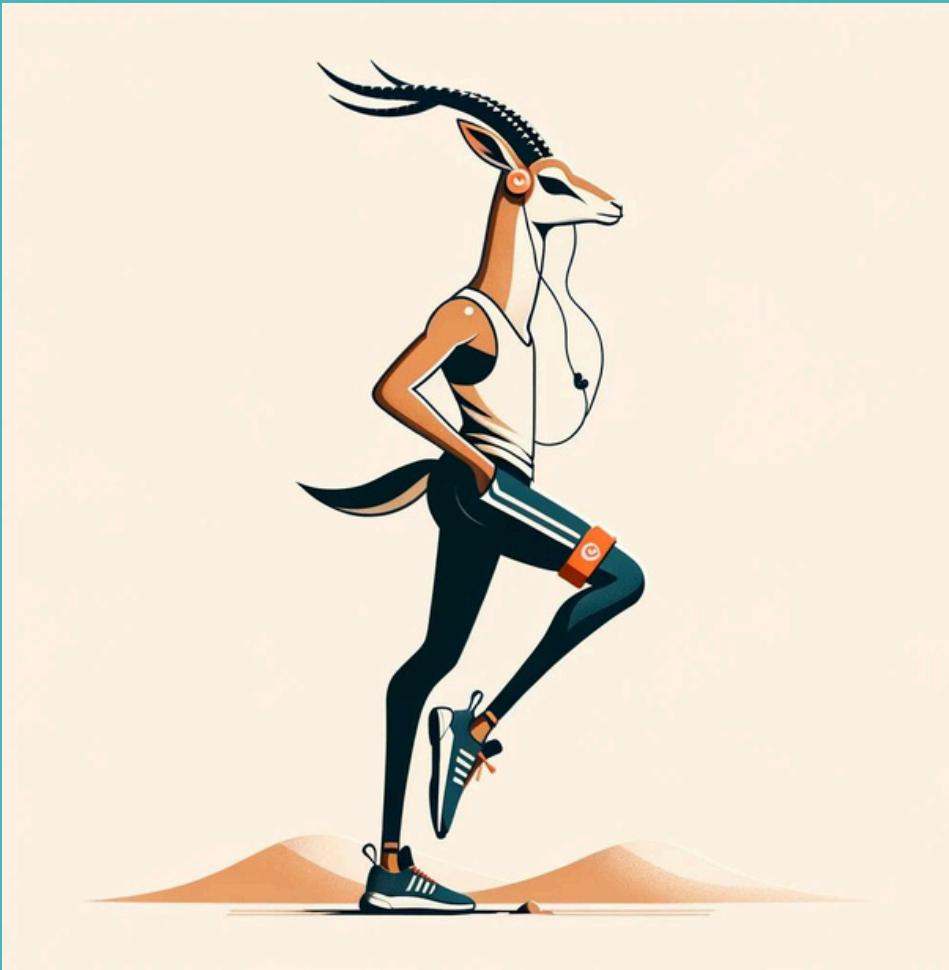
**Relationship between Cardio
and other variables after
Feature engineering**

Clustering & Segmentation

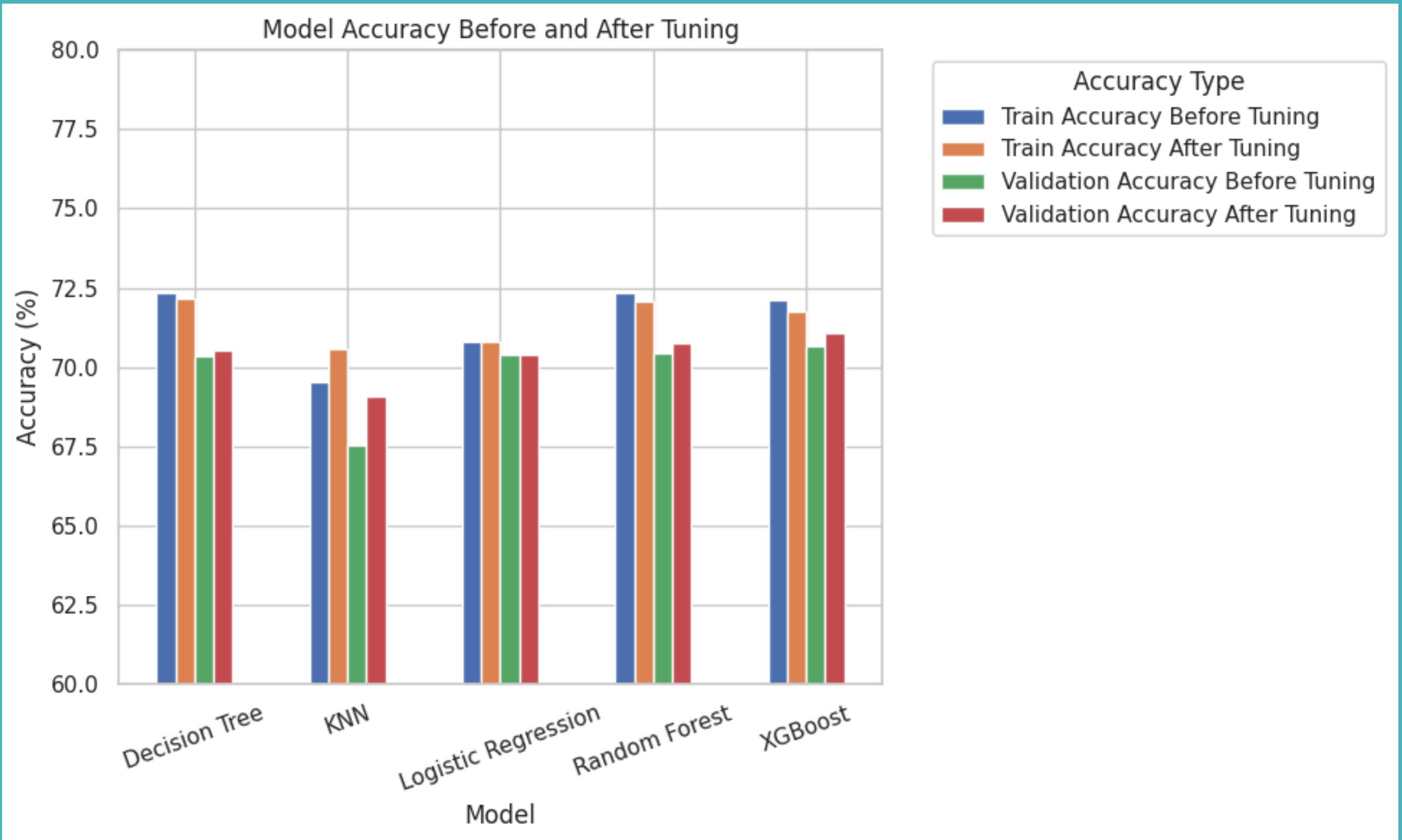


Distribution of Cardio Vascular Disease risk for each cluster

Clustering and segmentation results

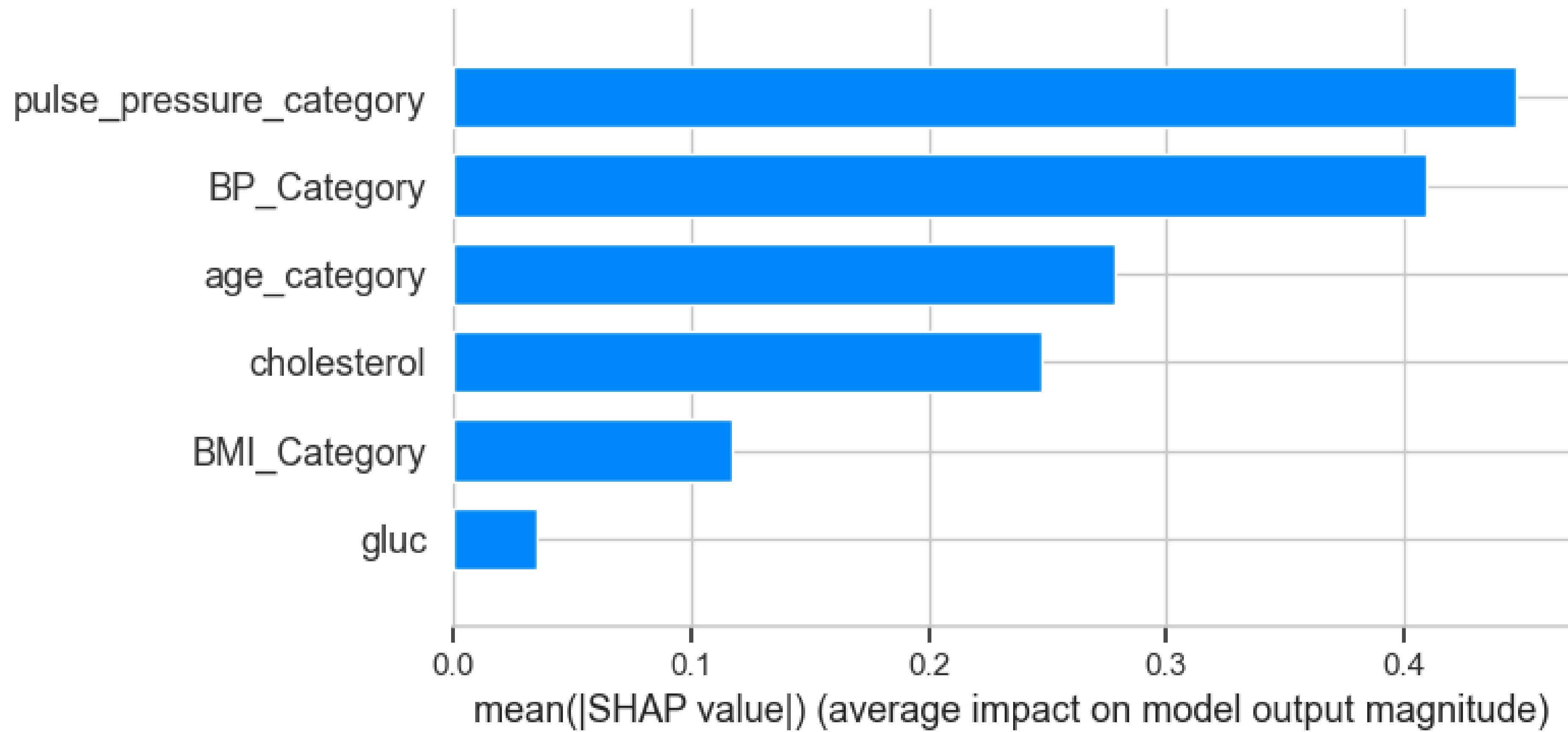


Modelling



Modelling techniques used before and after tuning

Feature Impact Analysis



Model deployment



X

Health Profile



Speedy Cheetah

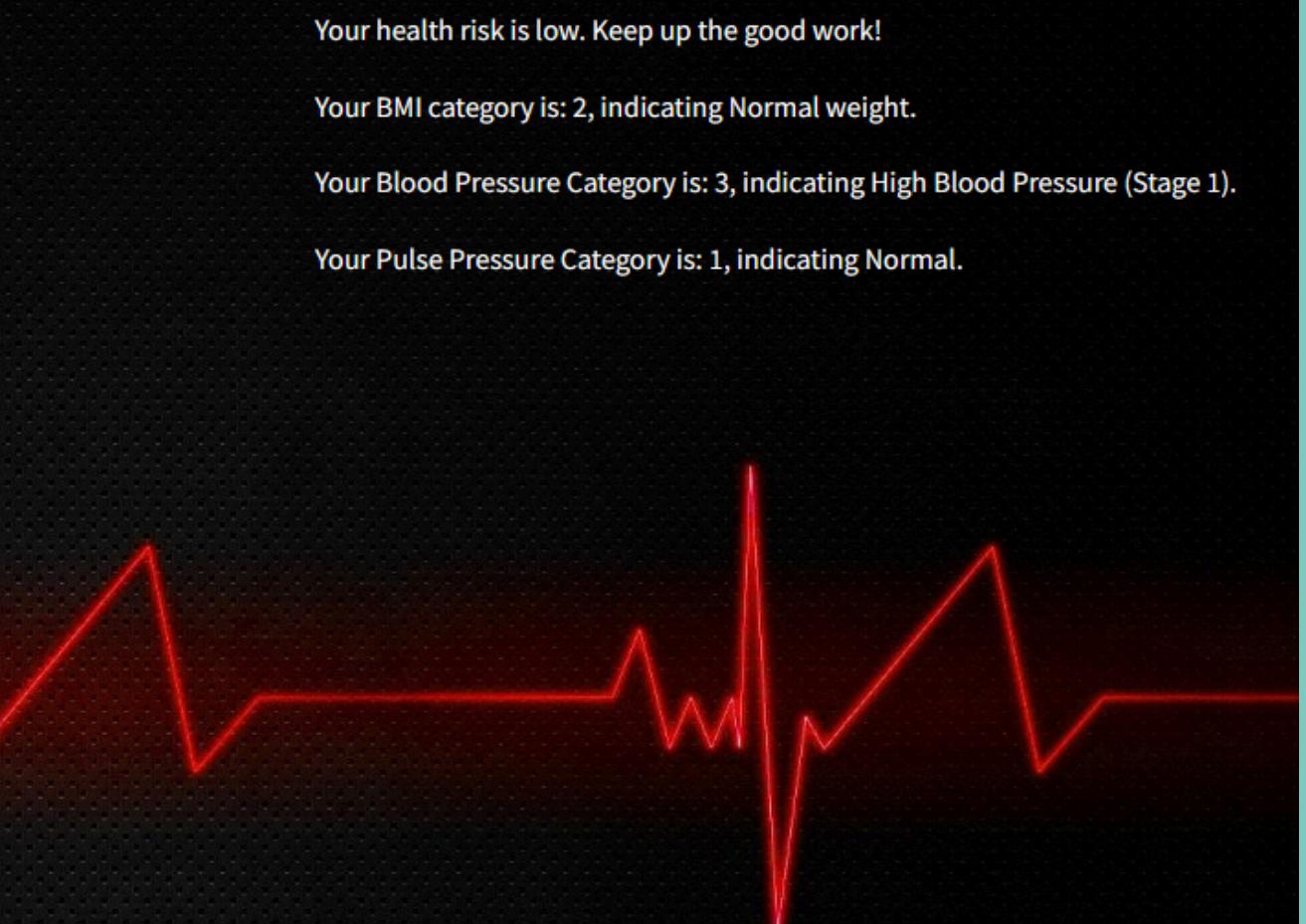
Health Risk Prediction

Your health risk is low. Keep up the good work!

Your BMI category is: 2, indicating Normal weight.

Your Blood Pressure Category is: 3, indicating High Blood Pressure (Stage 1).

Your Pulse Pressure Category is: 1, indicating Normal.



Characterized by your rapid response to lifestyle changes, you have potential for quick health improvements.

Here are some health tips based on your health profile:

- Engage in high-intensity interval training.
- Eat more protein to support muscle recovery.
- Get adequate sleep to enhance metabolic rate.

The clustering and predictive models and the scaler used in the project were deployed to the app hosted at <https://cardioapp.streamlit.app/>

Limitations and Recommendations

1

Incorporating More Features

2

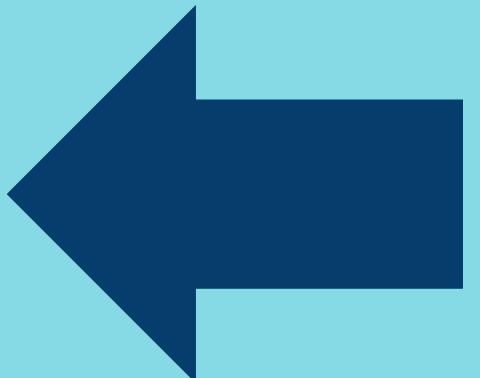
Addressing Bias and Fairness

3

Regular Validation and Updates

4

Creating awareness on cardiovascular health





Conclusion

1. Machine Learning is a great tool that can be used in the Medical field to derive insights from and assist in patient's pre-diagnostic processes.
2. We could not underscore the importance of blood pressure, age, cholesterol, BMI and glucose.
3. Efficient patient segmentation based on risk factors helps in identifying those at highest risk.
4. Creating a user-friendly solution will help in early diagnosis and potentially save lives through timely intervention.



Thank you very much!



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