



HEART ATTACK PREDICTION

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OUR TEAM

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PROBLEM STATEMENT

- Heart attacks are a leading cause of death, often due to late detection.
- Traditional methods are inadequate for early risk identification, leading to preventable fatalities and higher healthcare costs.
- A more accurate, data-driven solution is needed to predict risks earlier.

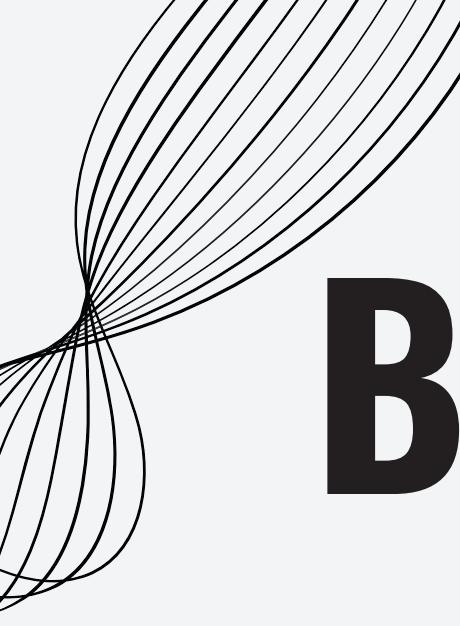


MARKET NEED

- Hospitals
- Insurers
- Patients

All of them are seeking tools for better heart attack prevention.

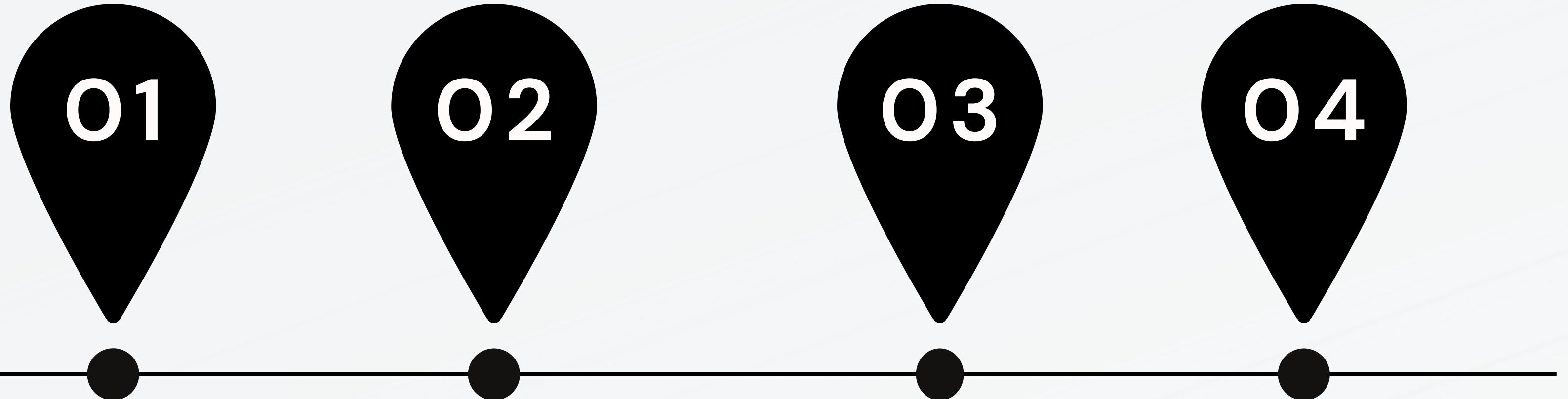
Early detection reduces costs, improves outcomes,
and empowers patients to manage their health proactively, creating a demand for predictive solutions.



BUSINESS USE CASES

- Healthcare Providers: Early risk detection improves patient outcomes and reduces emergency care.
- Insurance Companies: Better risk assessments lead to optimized healthcare plans and reduced claims.
- Patients: Personalized insights help individuals take preventive actions and manage their heart health.

PROJECT TIMELINE



SPRINT 1

**BUSINESS
UNDERSTANDING**

SPRINT 2

- PREPROCESSING
- ANALYSIS AND VISUALIZATION
- FEATURE ENGINEERING

SPRINT 3

Modeling

SPRINT 4

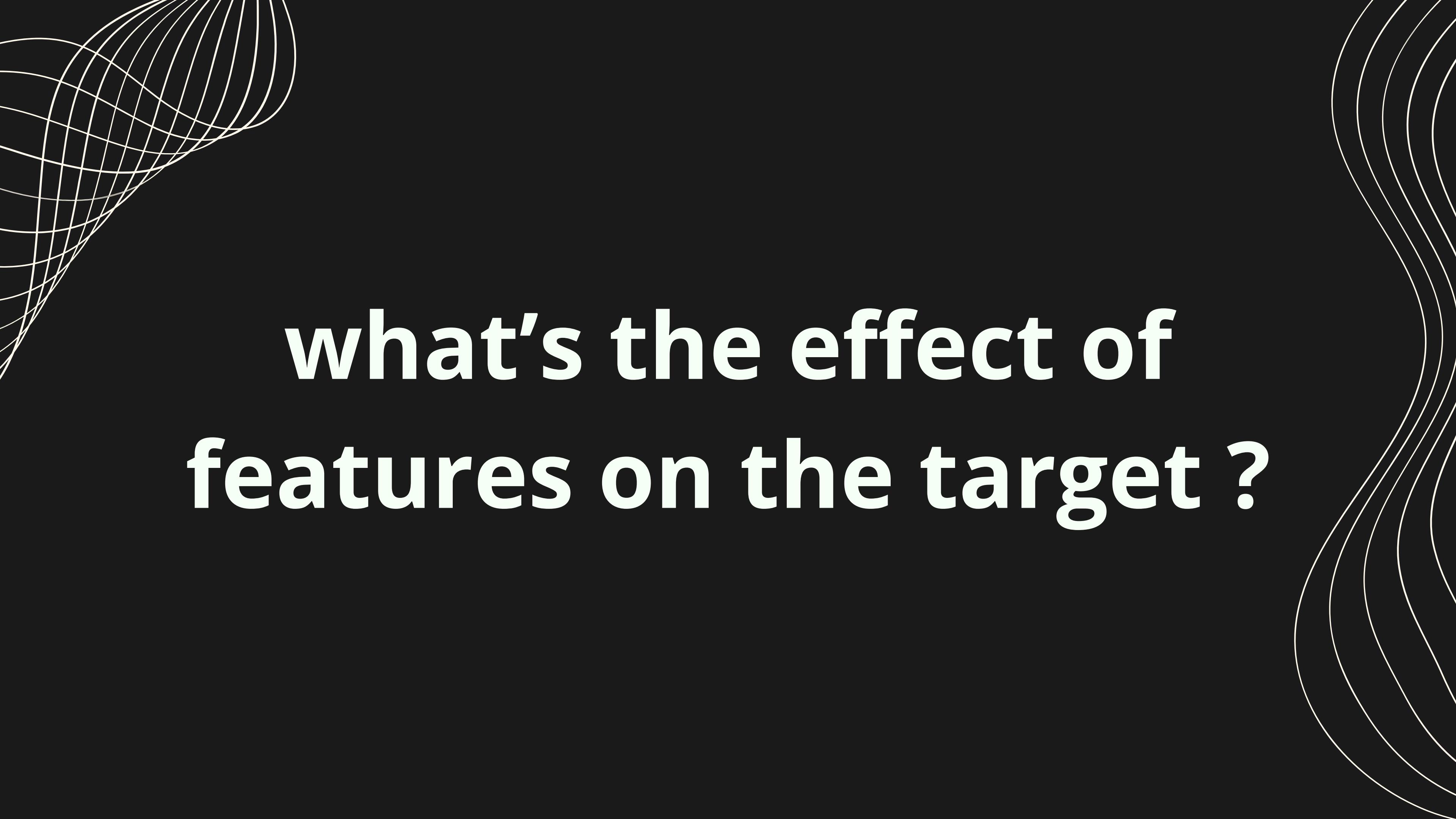
Deployment



INSIGHTS

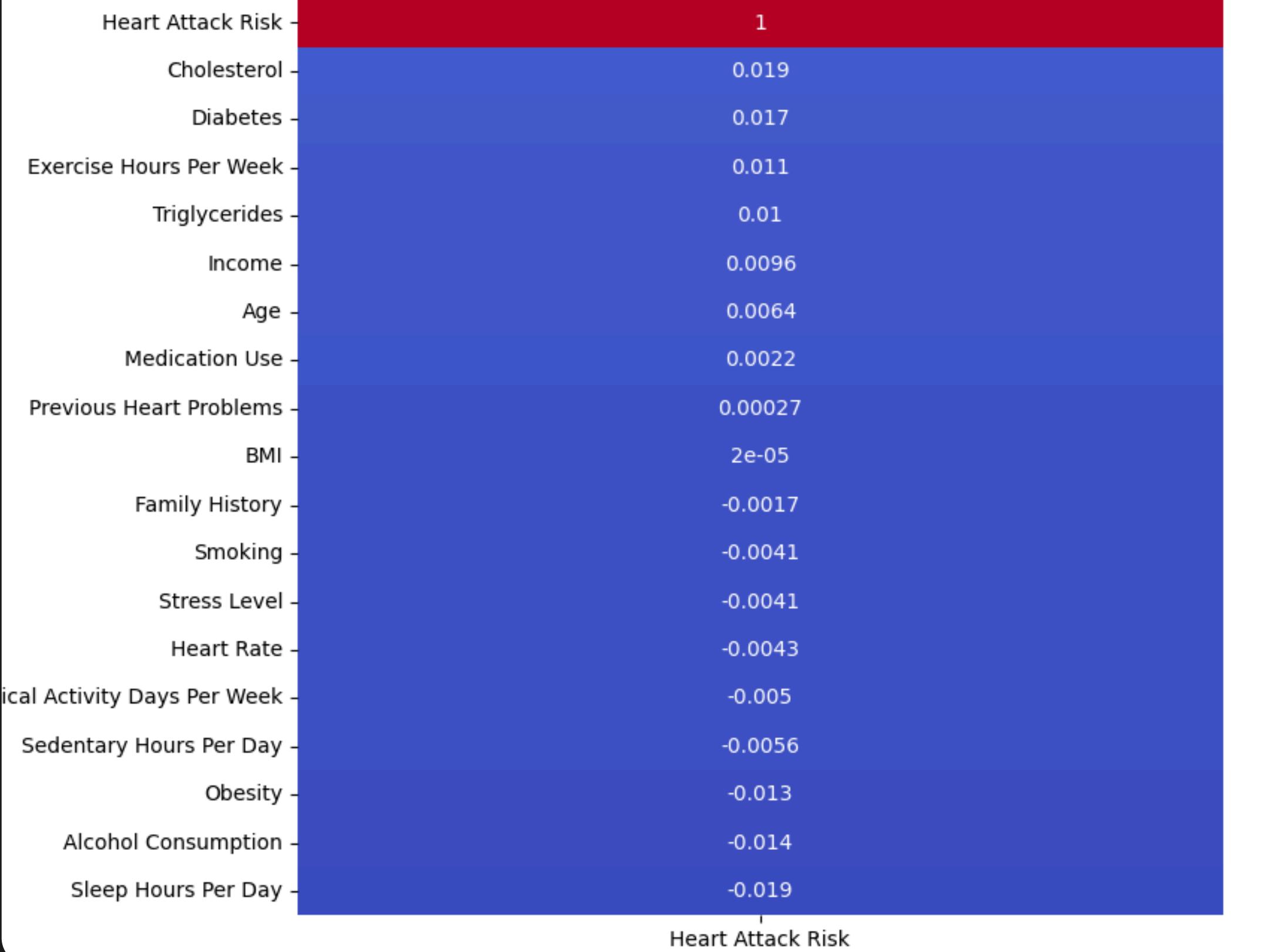
Questions

- what's the effect of features on the target
- what's the percentage of who in heart attack risk by the :
 - Diet
 - Country
 - Age
 - Sex



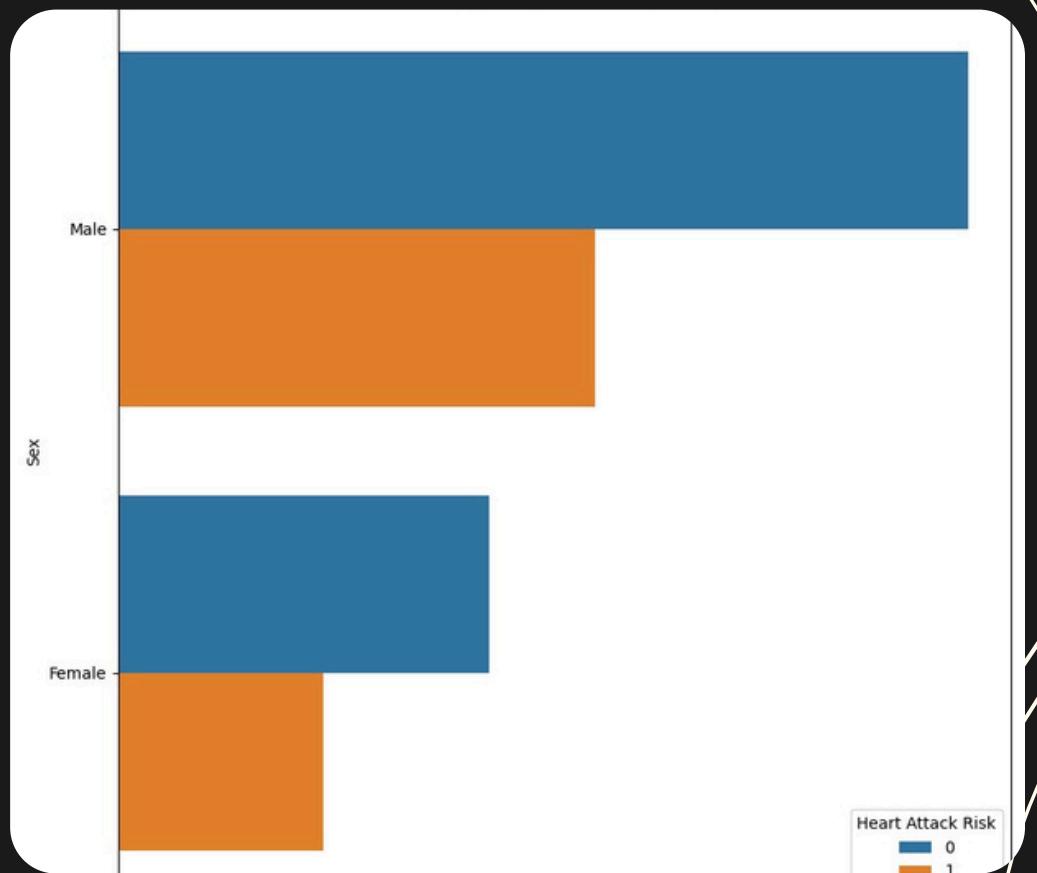
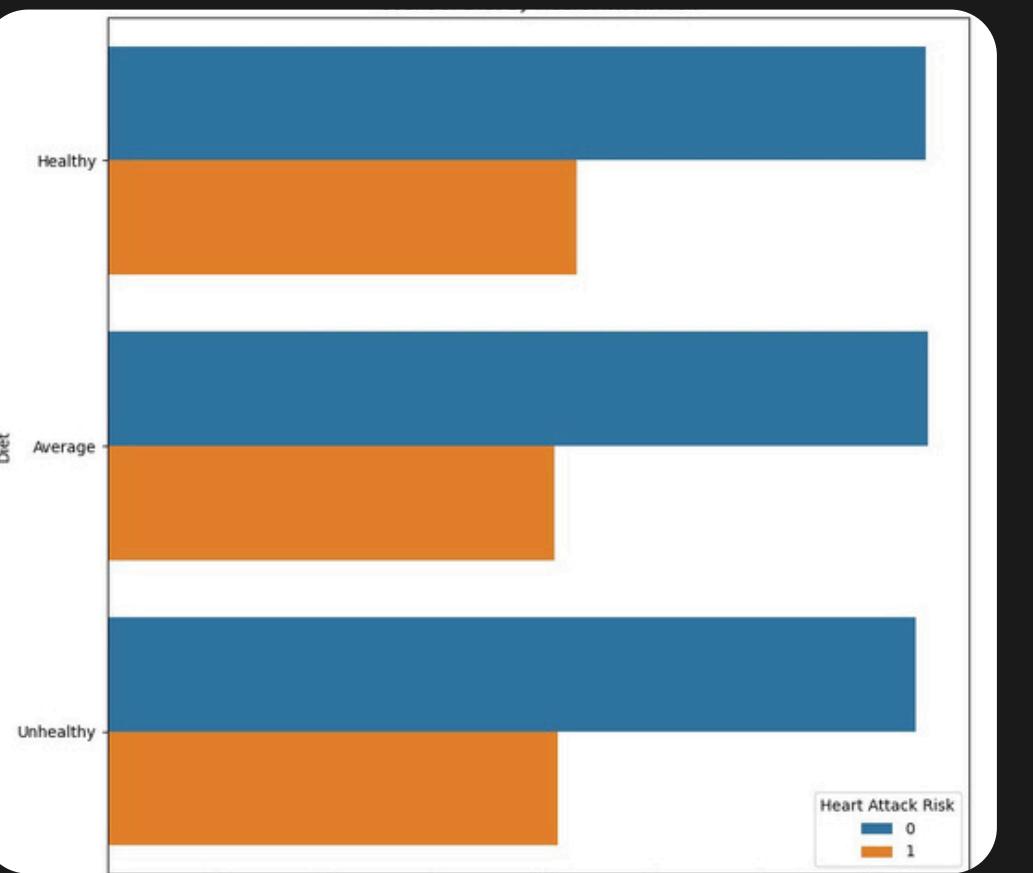
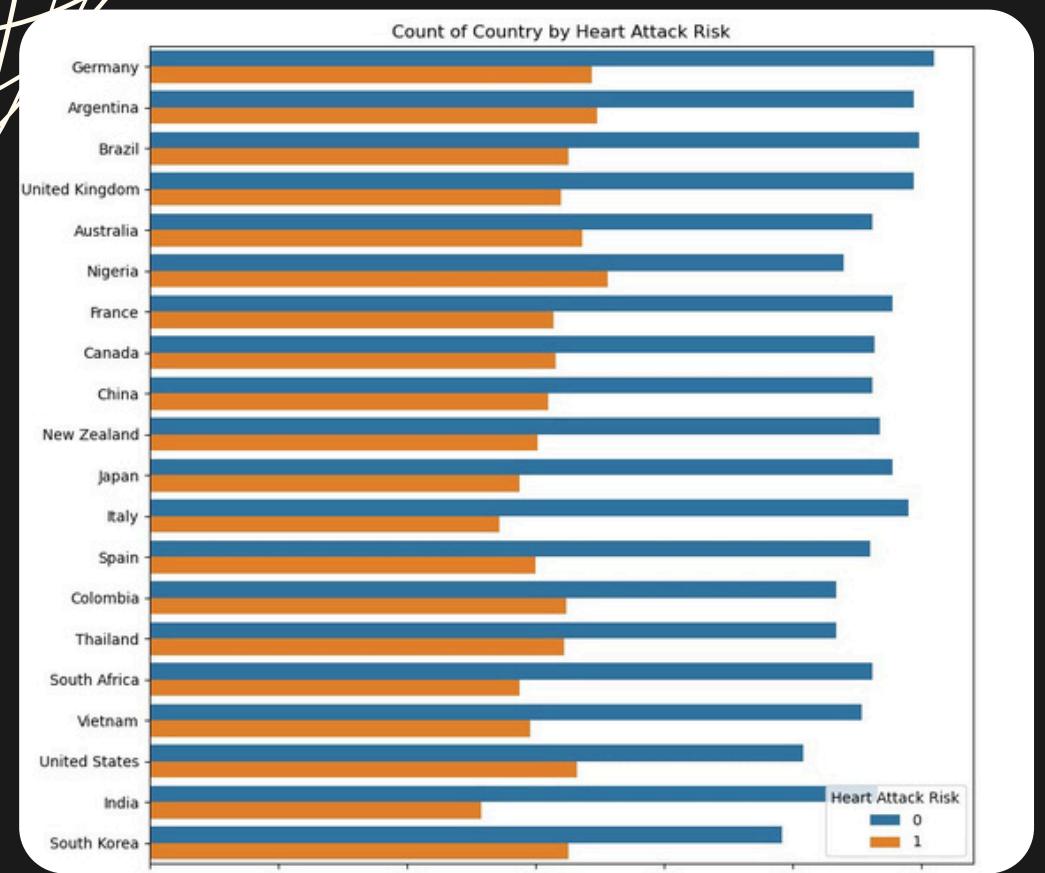
**what's the effect of
features on the target ?**

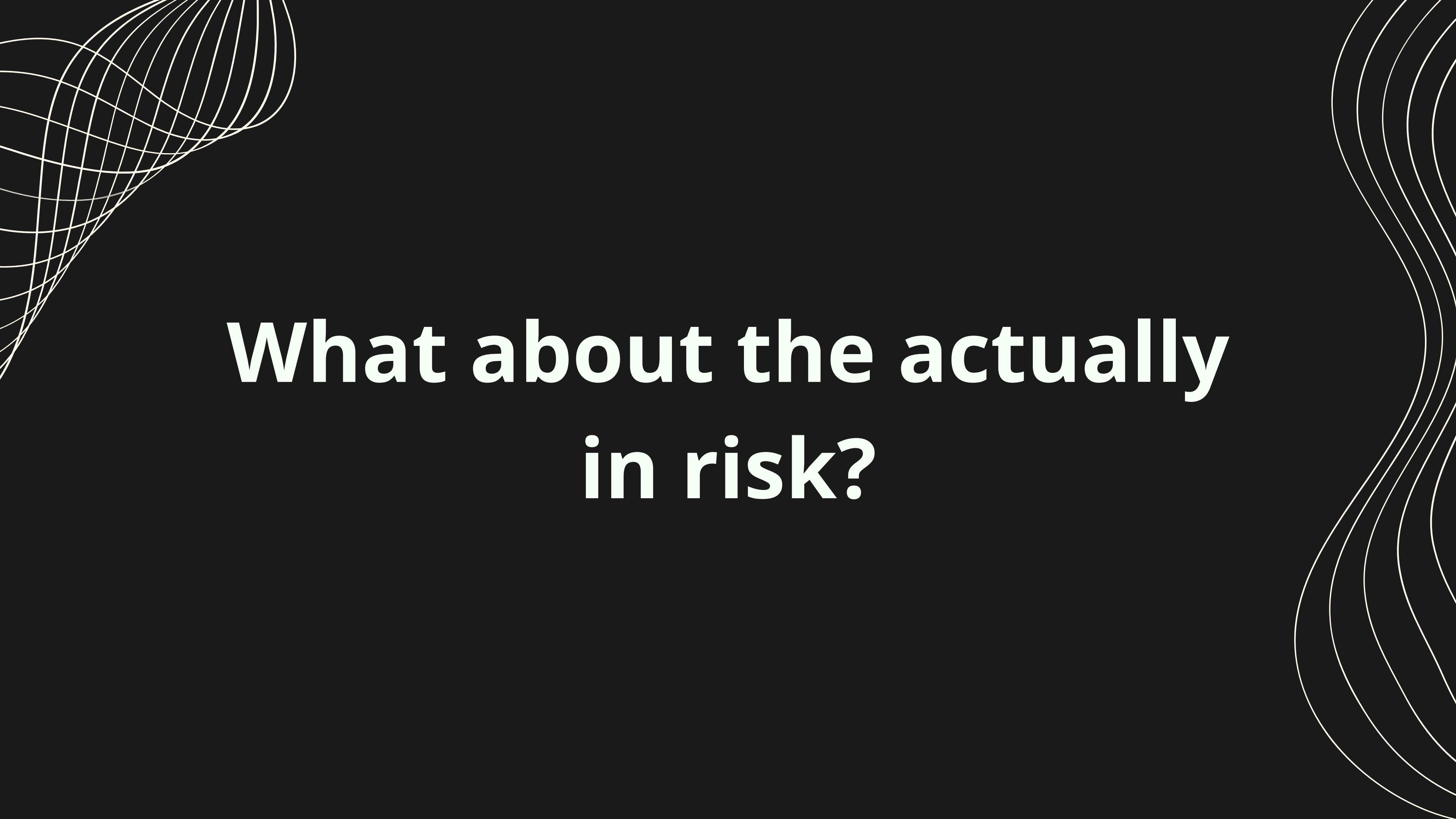
Correlation of Numerical Features with Heart Attack Risk



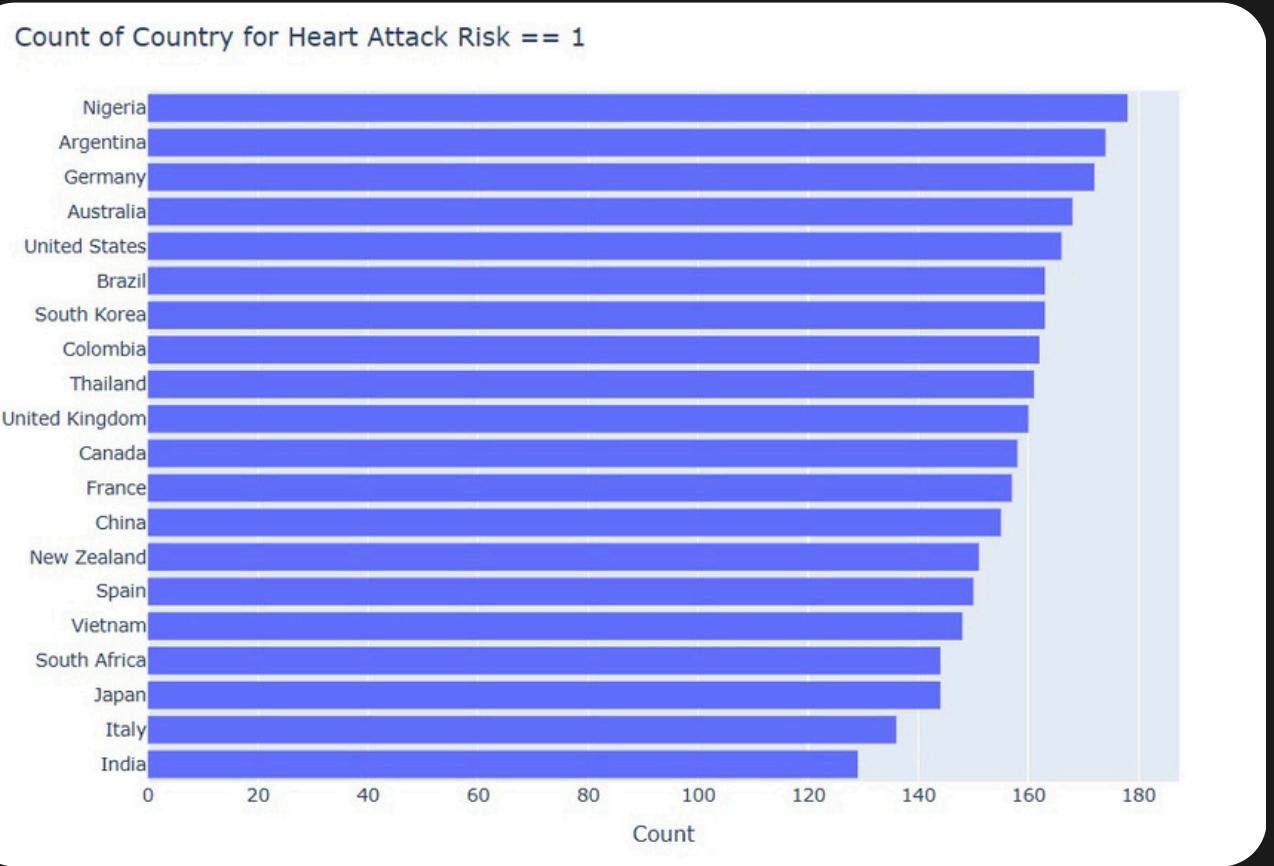


**what's the percentage of
who in heart attack risk by
these Features ?**

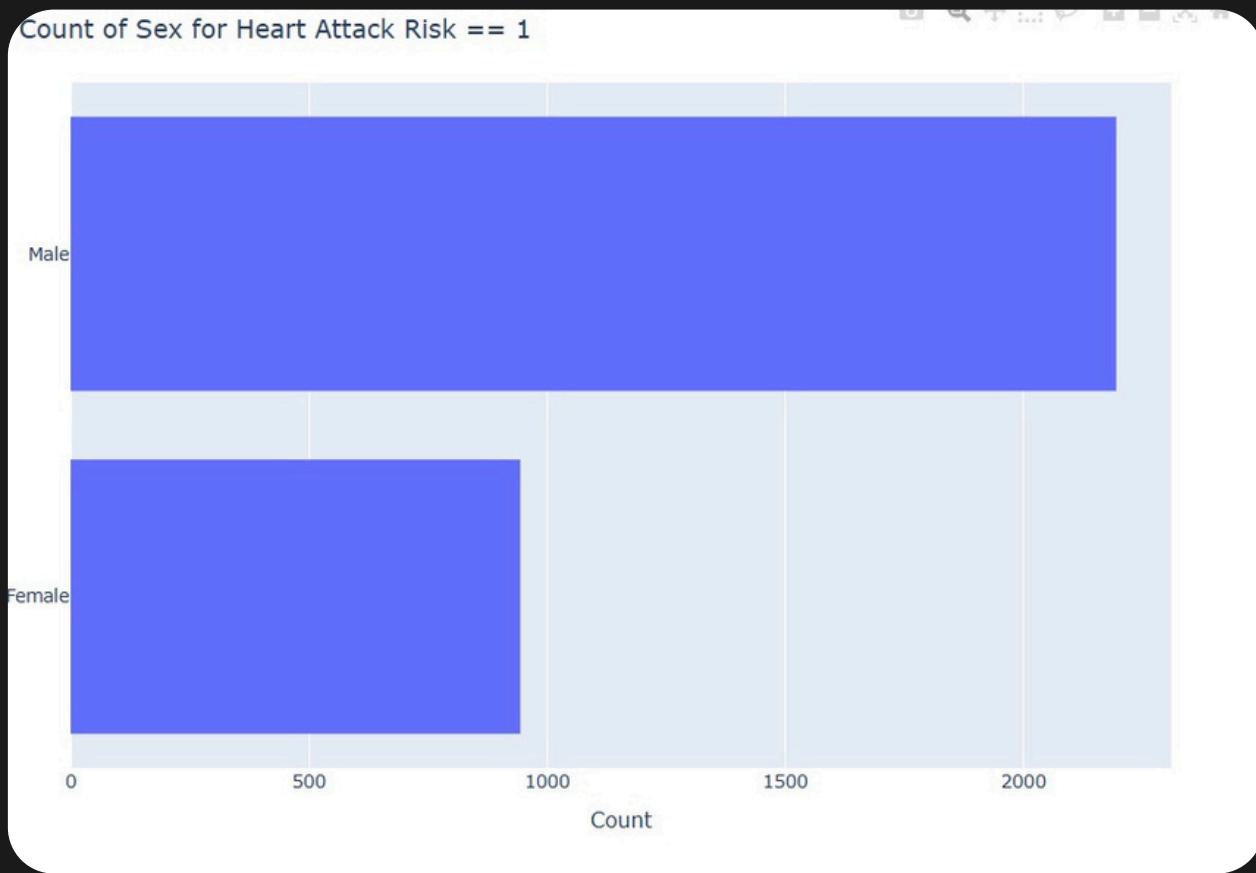




**What about the actually
in risk?**

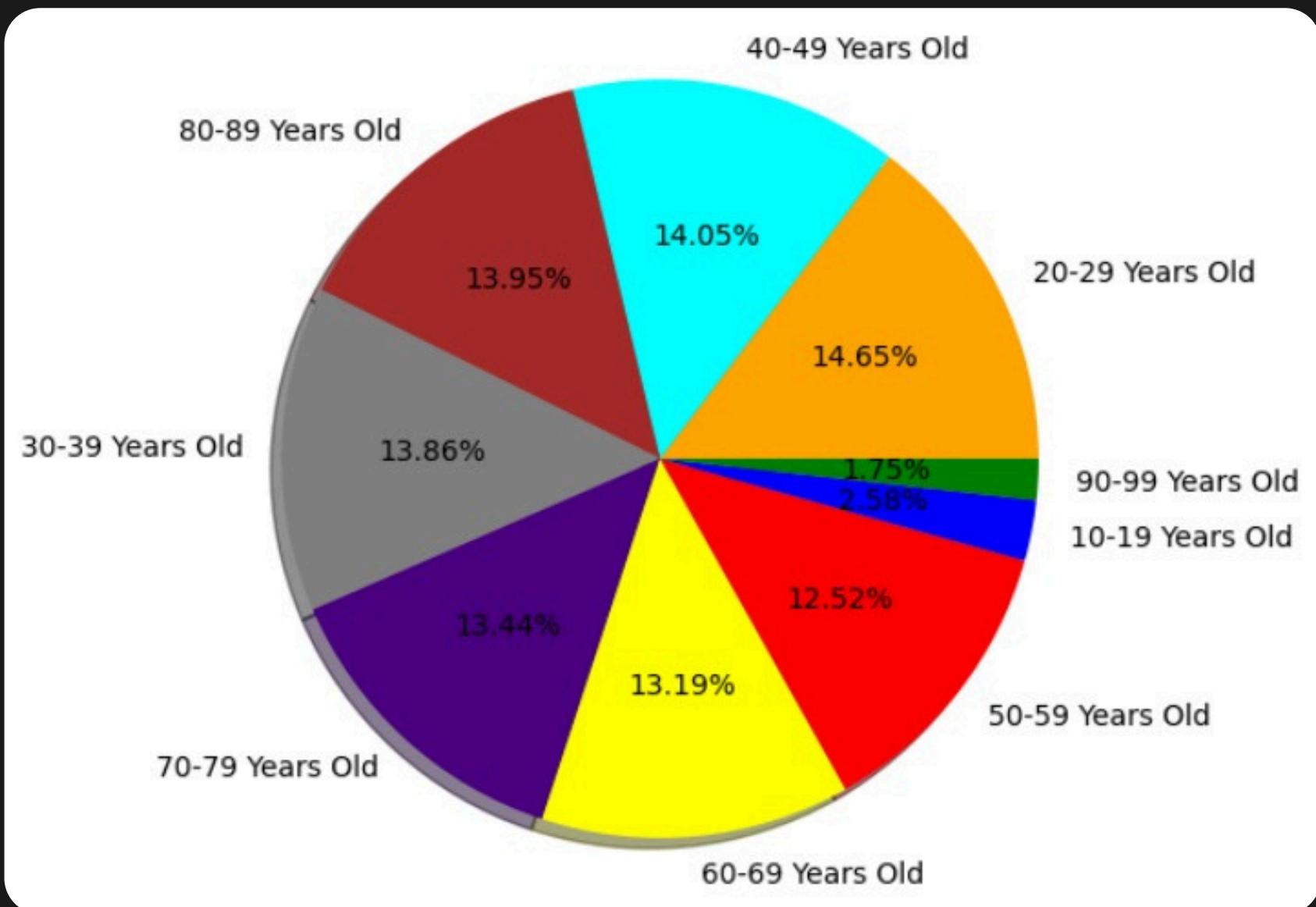


Country



Sex

What about age ?



FEATURE ENGINEERING

Feature Engineering

- handling Blood Pressure column.
- Encode Categorical Features.
- Standardization Numerical Features.

Handling Blood Pressure

Problem :

- The feature “Blood pressure” is an object consisting of two part (systolic/diastolic).

Solution :

- Splitting this feature into two new features “systolic_pressure” and “diastolic_pressure”.

Encode Categorical Features

Problem :

- There are 3 Features other than “Blood Pressure” which are “Sex”, “Diet” and “Country”.

Solution :

- one hot encoding to “Sex” feature .
- Label encoding to “Diet” and “Country” features .

Standarization Numerical Features

Problem :

- Select which features to make standarization and which to make min-max scaling.

Solution :

- Select 10 features to do standarization and 3 features to do min-max scaling .



MACHINE LEARNING MODELS

Machine Learning Models

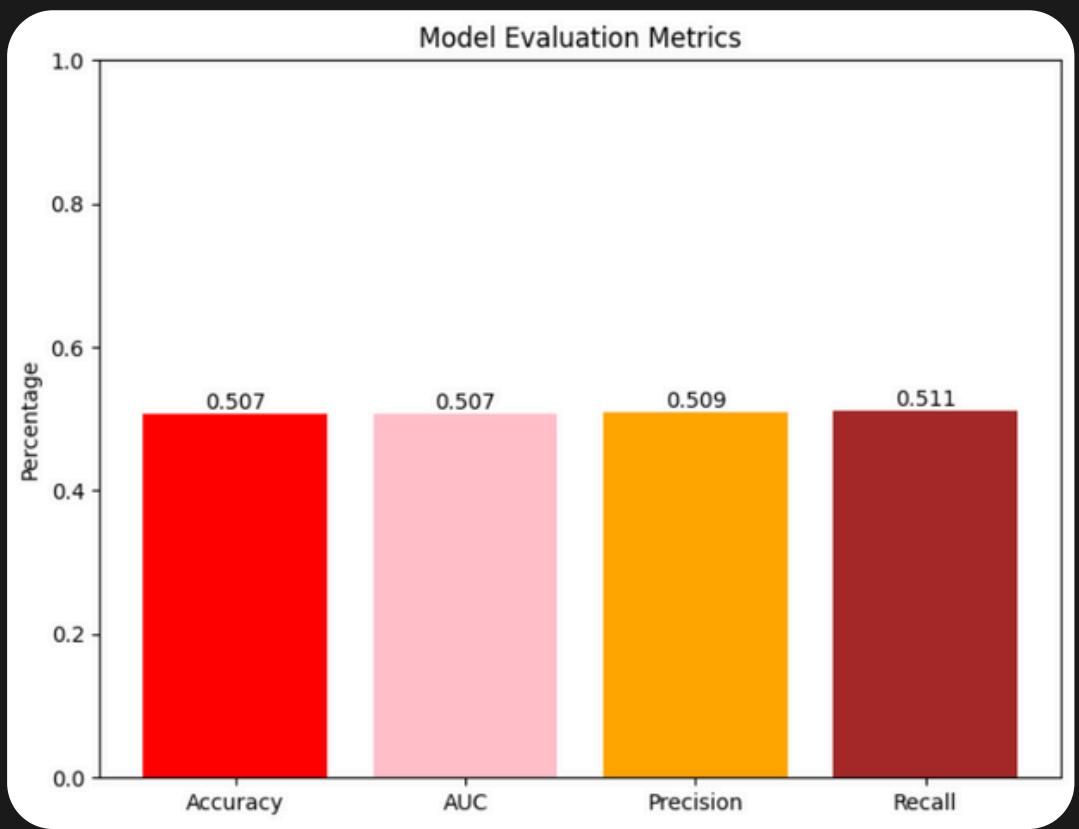
Heart Attack Risk Prediction :

- A binary class supervised machine learning problem .

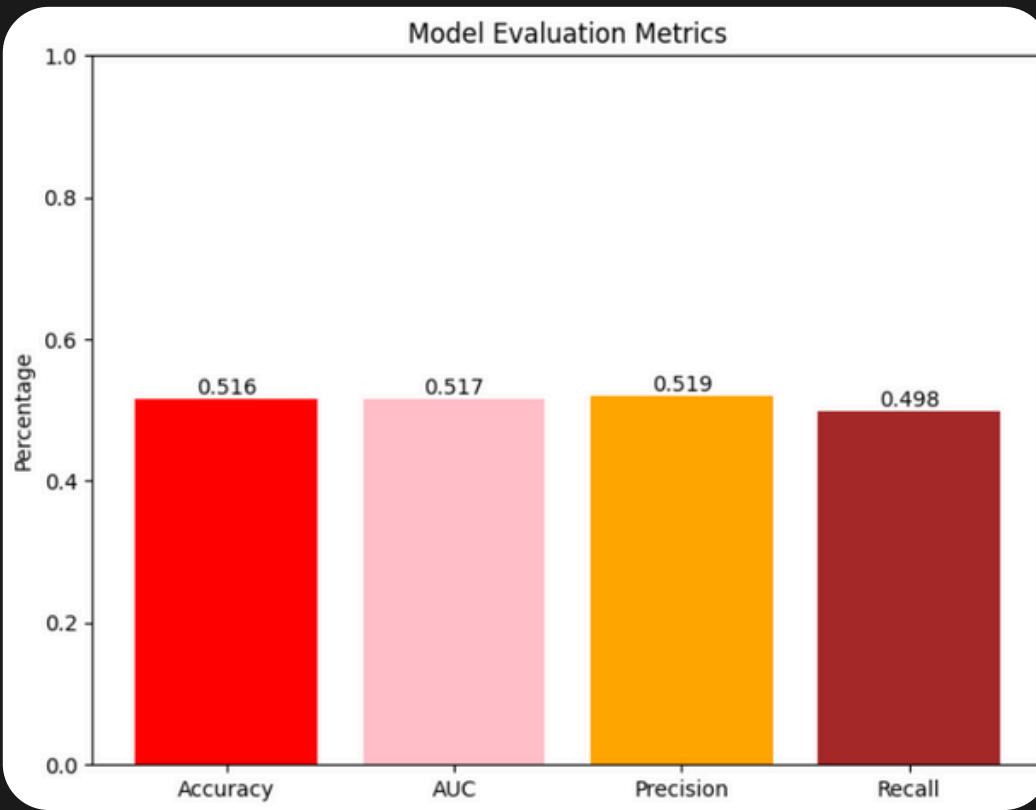
Models used in this project :

- LogisticRegression
- SVC
- KNeighborsClassifier
- DecisionTreeClassifier
- XGBoost
- RandomForestClassifier

Models

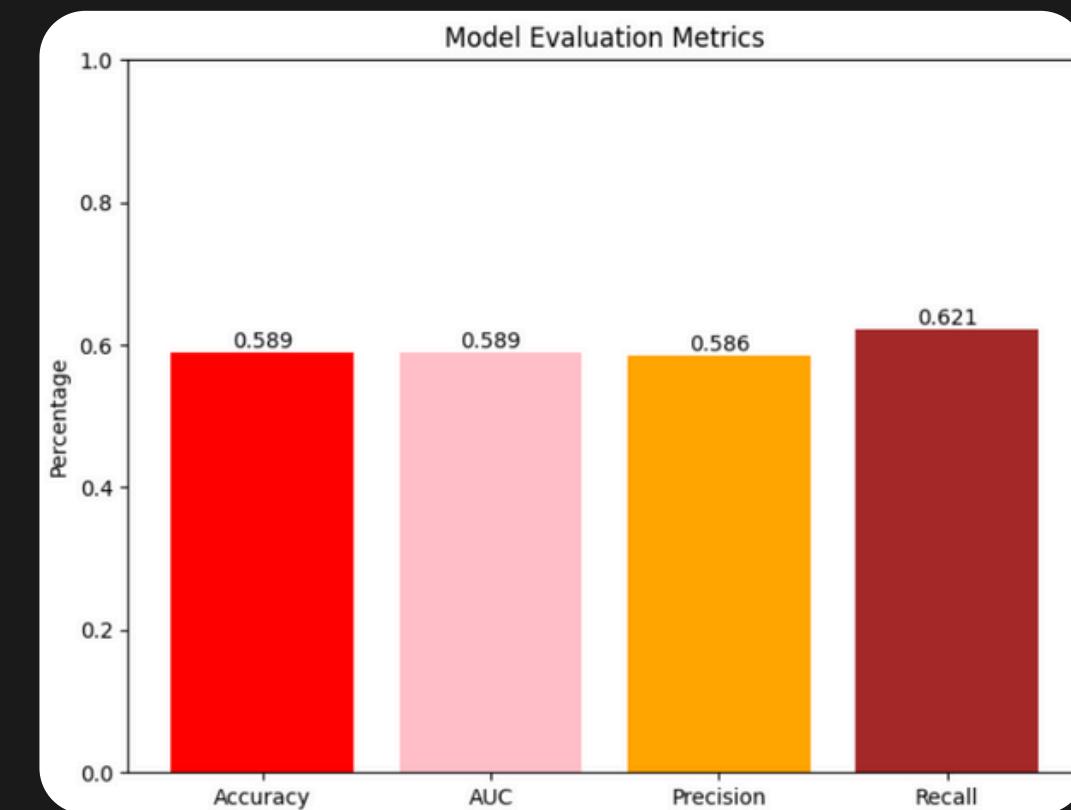


Logistic Regression

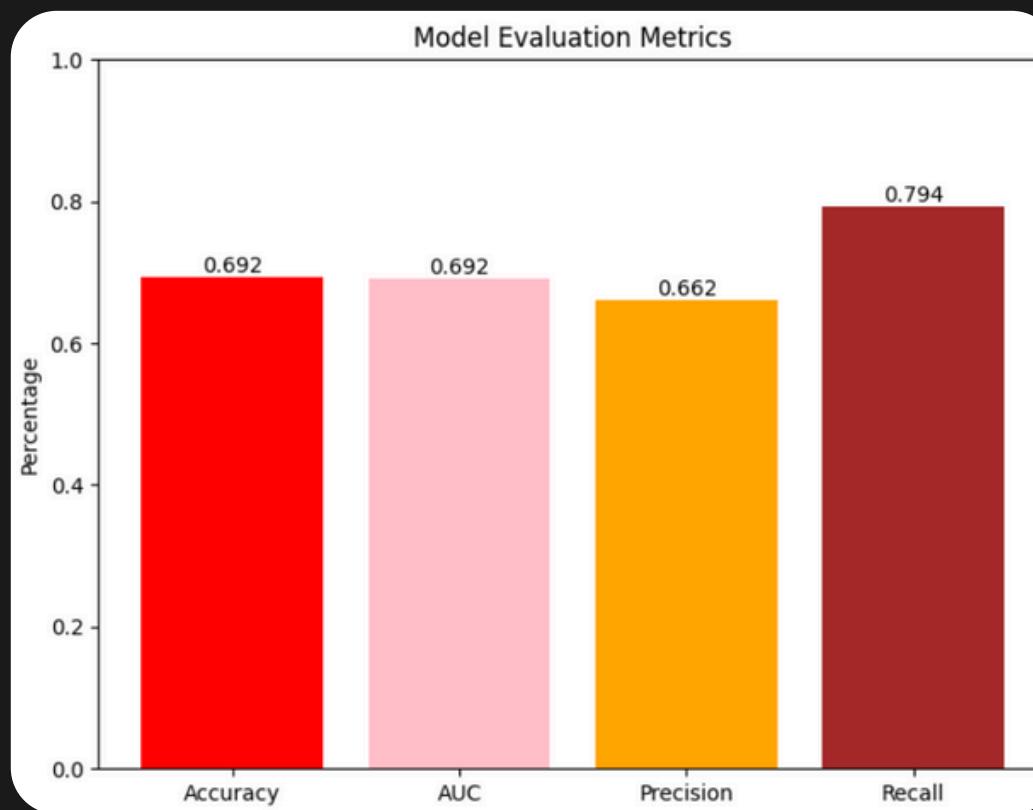


SVC

Models

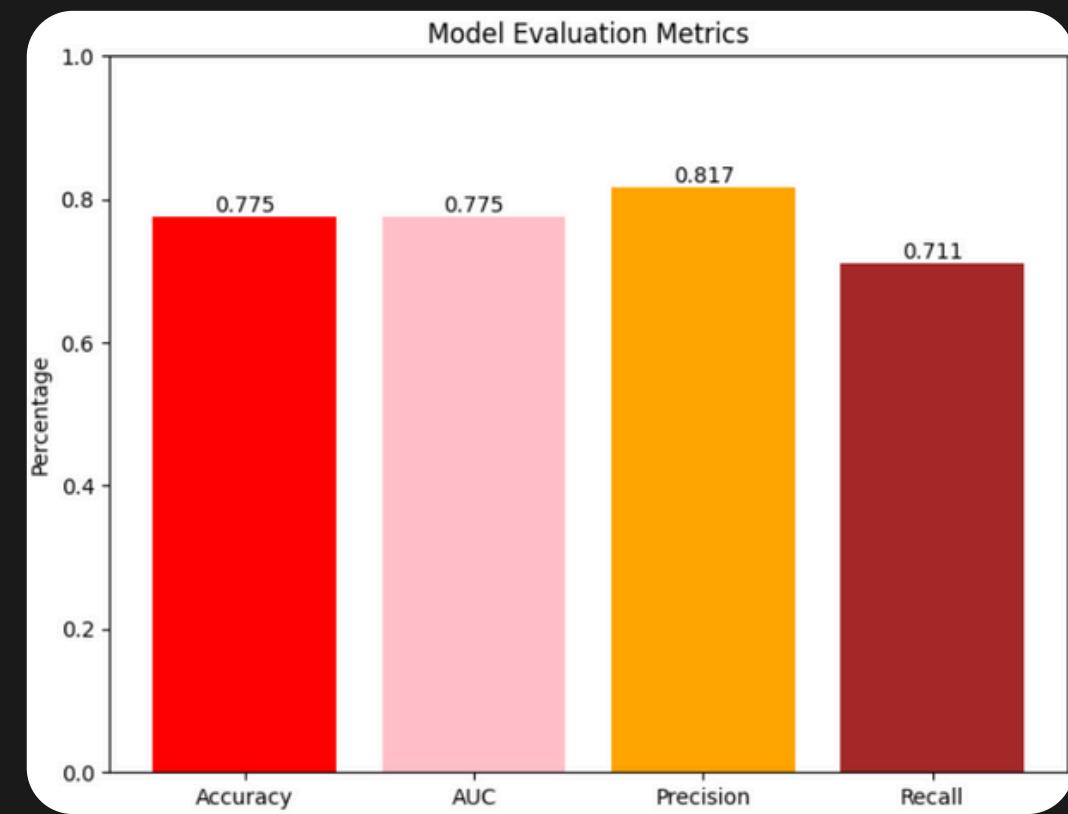


KNN

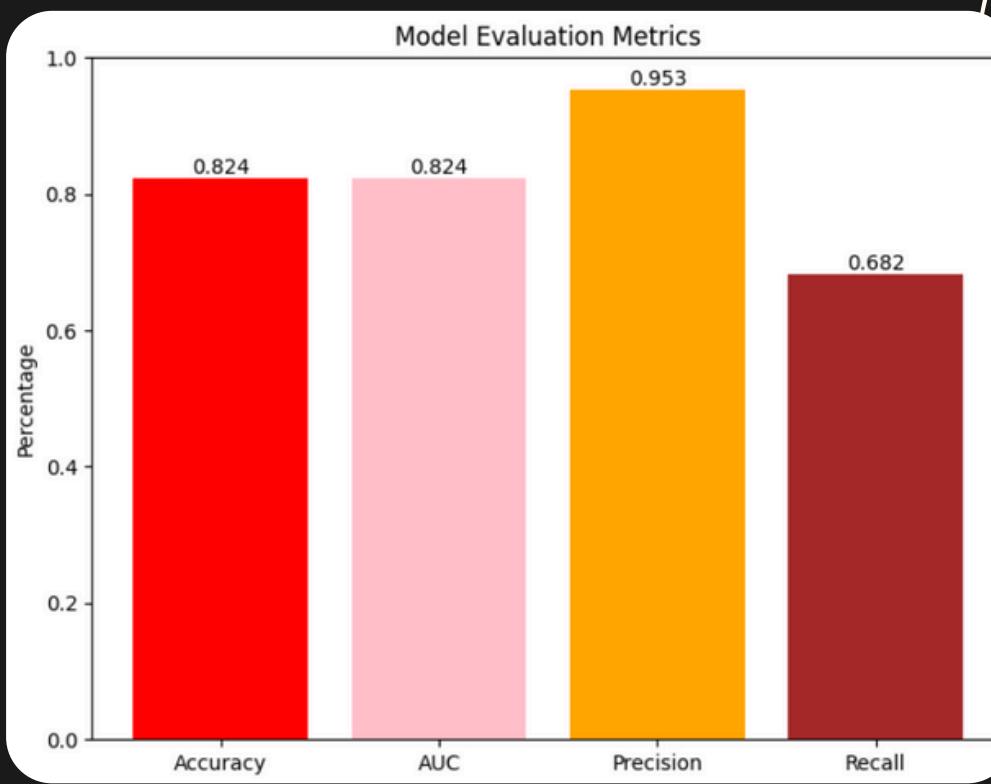


Decision Tree

Models



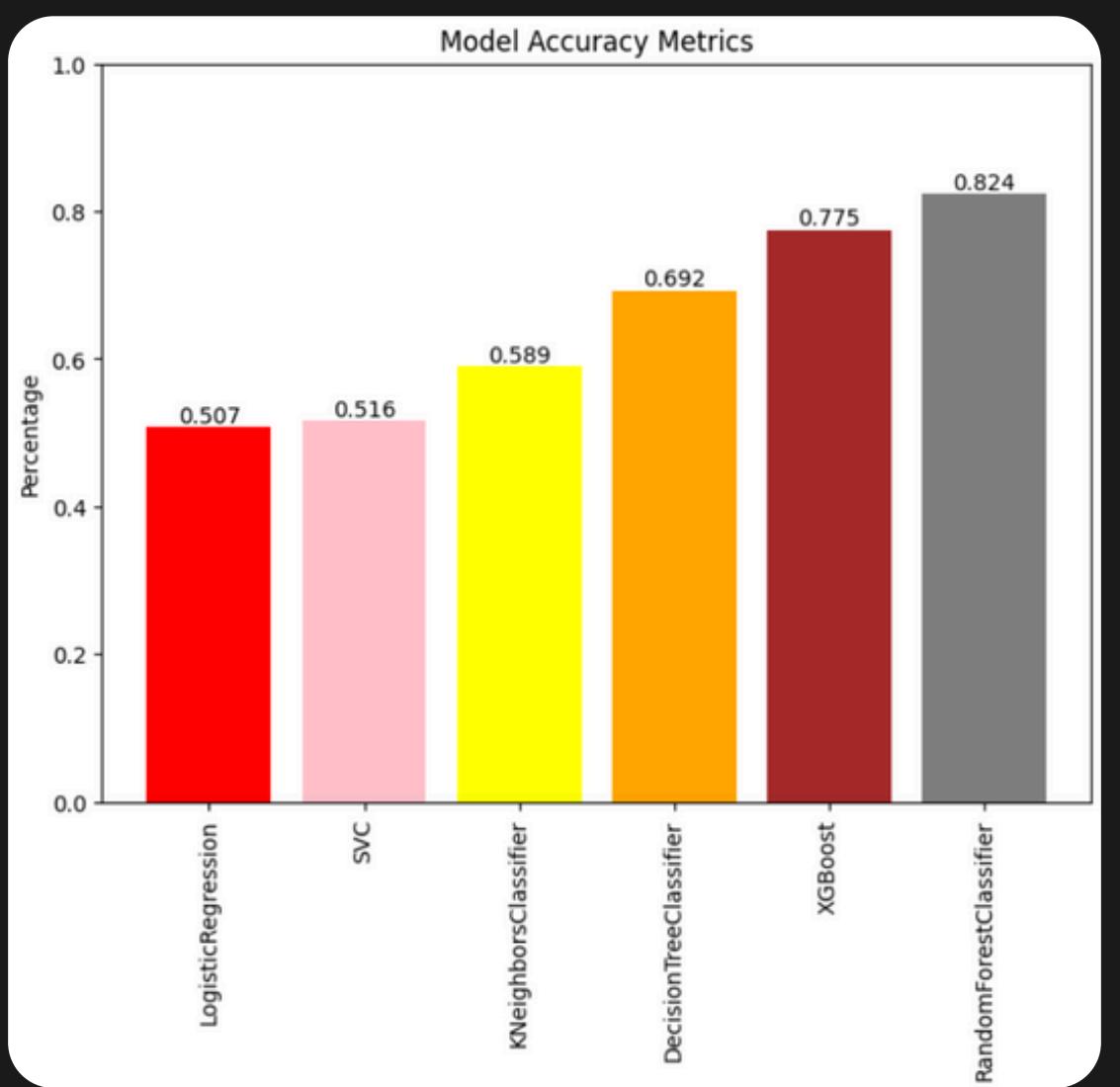
XGBoost



Random Forest

The Best Accuarcy

Random Forest Classifier method





DEPLOYMENT

Why Streamlit?

1. Simple to use and integrates well with machine learning libraries like (scikit-learn).
2. Requires no front-end experience.
3. Fast prototyping of data science and machine learning models.

Key Features of Streamlit

- User-Friendly Interface
 - Build interactive web apps using Python only.
- Live Updates
 - Automatically updates the app when the code changes.
- Interactive Widgets
 - Supports sliders, buttons, and inputs to allow dynamic interactions.

Steps of Deployment Using Streamlit

1- Train Your Model

- Create and train a model using libraries like scikit-learn.
- Save the model (using pickle).

2- Install Streamlit and Create a Python Script

- pip install streamlit
- Import necessary libraries (Streamlit, Pandas, pickle).
- Load the trained model.
- Create a function for model predictions.

Steps of Deployment Using Streamlit

3- Add Interactive Features

- Use widgets (`streamlit.slider()`, `streamlit.selectbox()`) to allow user input.
- Process the input to be compatible with the model.

4- Display Predictions

- Output the prediction using `st.write()` or other display methods.
- Run the App Locally (use `streamlit run prodeployment.py` run locally using the terminal -> **(Cloud)**)

Advantages of Streamlit for Deployment

- Fast and Easy Deployment.
- No Front-End Experience Required.
- Allows users to interact with the machine learning model via sliders, dropdowns, and text input.

Feature Selection

Confirm

The Patient Has Heart Attack



Heart Attack Prediction

Your Health, Our Priority – Predict Your Heart Attack Risk in Just a Few Clicks!

Age

54

1

?

99

Sex

Female

▼

Cholesterol

297

100

?

400

Blood Pressure (format: systolic/diastolic)

172/86

Heart Rate

48

20

200

Deploy ⋮

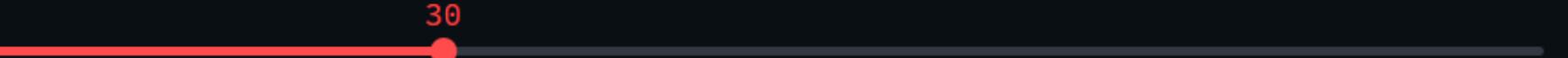
Feature Selection

Confirm

The Patient Has No Heart Attack



Age



Sex

Male

Cholesterol



Blood Pressure (format: systolic/diastolic)

185/58

Heart Rate



BMI



Do you have diabetes?

No

**THANK
YOU !**

