HEART DISEASE PREDICTION

Kate Yu | BrainStation | Capstone Project

Project Overview

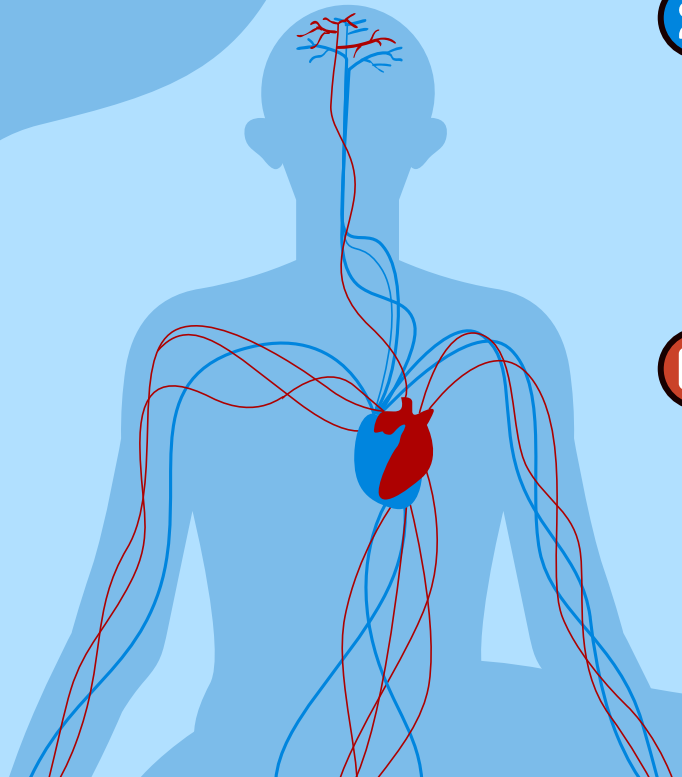
Background & Problem Statement

Data Processing & EDA

Machine Learning Modeling

Key Features

Background



Fact of Heart Disease:

In every **36 sec** one person dies in the United States from cardiovascular disease, that's 1 in every 4 deaths! [1]

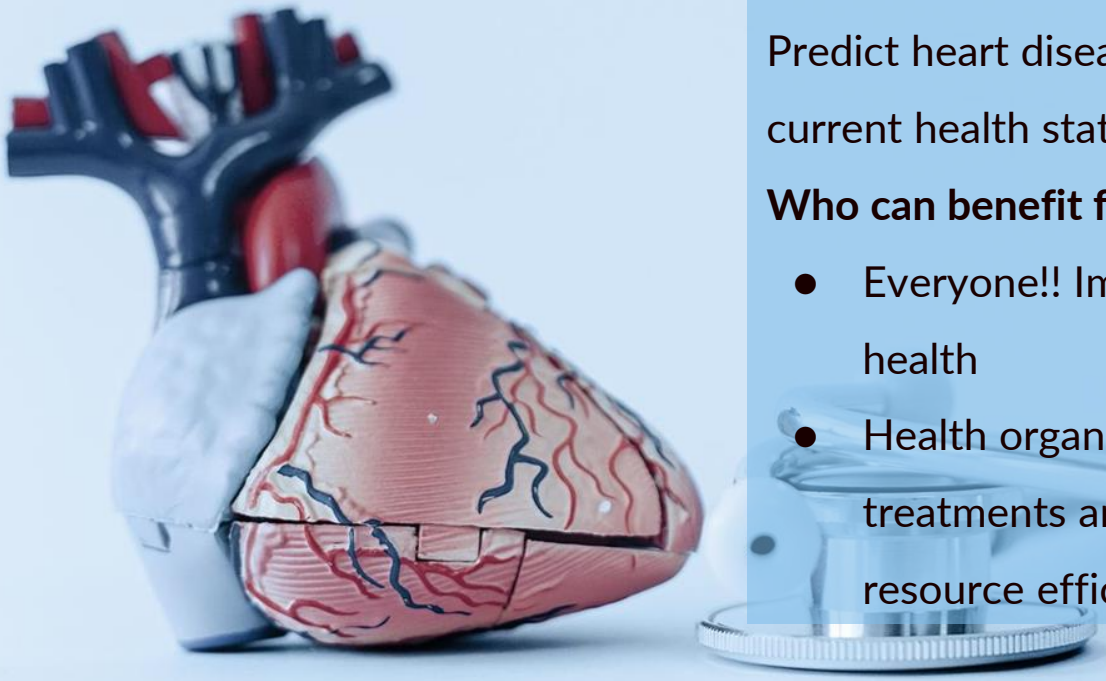
Traditional Ways to Diagnose Heart Disease:

- Blood tests, electrocardiogram, cardiac computerized tomography scan etc. [2]

Time Consuming & Invasive

[1]: "Heart Disease Fact" , *CDC government*
[2]: "Diagnosis Coronary Heart Disease", *NHS*

Problem Statement



Goal of this project:

Predict heart disease possibility based on current health status

Who can benefit from this?

- Everyone!! Improve awareness of heart health
- Health organizations: make proactive treatments and distribute medical resource efficiently

Data Source

Original source: CDC Organization

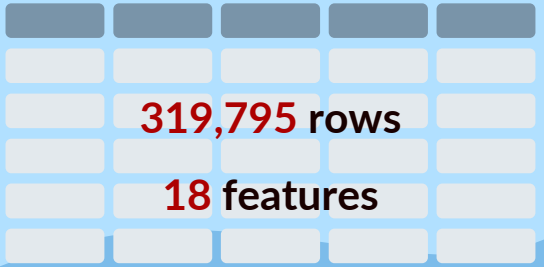
2020 annual CDC survey data of 400k adults related to their health status (300 columns)

CDC Centers for Disease Control and Prevention

Direct source: Kaggel

Condensed version with less features in a single csv file

kaggle



Data Preprocessing

Numeric Features

- Examples:

  BMI, Sleep Time

- Processing:

  Check distribution

Binary Features

- Examples:

  Diabetic, Smoking

- Processing:

  Change to 1/0

Multi-classes Features

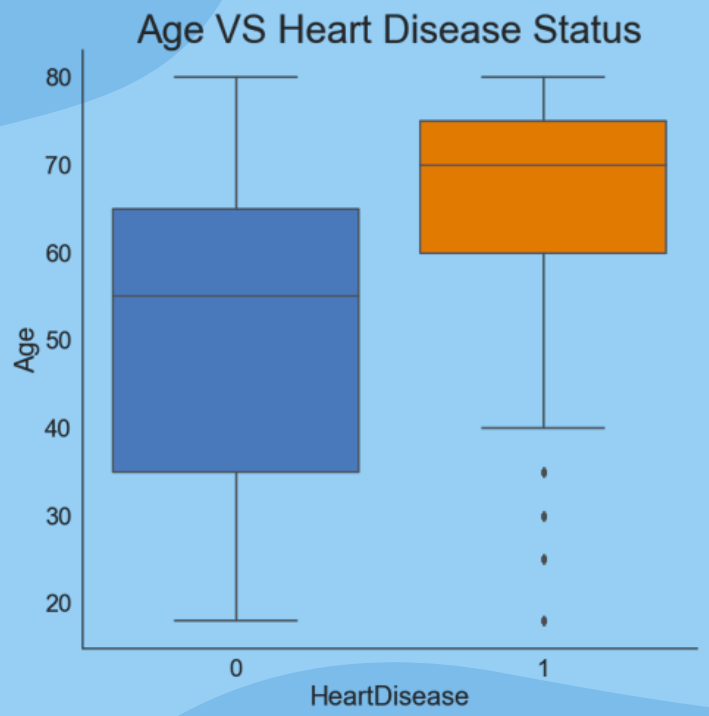
- Examples:

  Age Category, Race

- Processing:

  Change to a series of number, dummy variable

Exploratory Data Analysis



Age is the most important factor lead to heart disease.

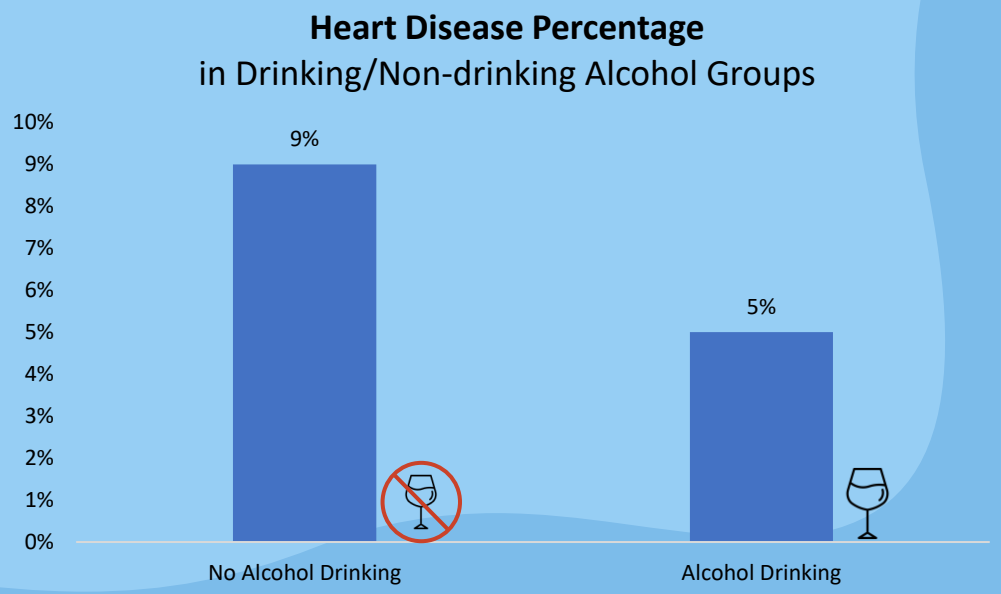
The average age of people who have heart disease is 66 years old, which is **15 years older** than the average of people who do not have the disease.

Exploratory Data Analysis

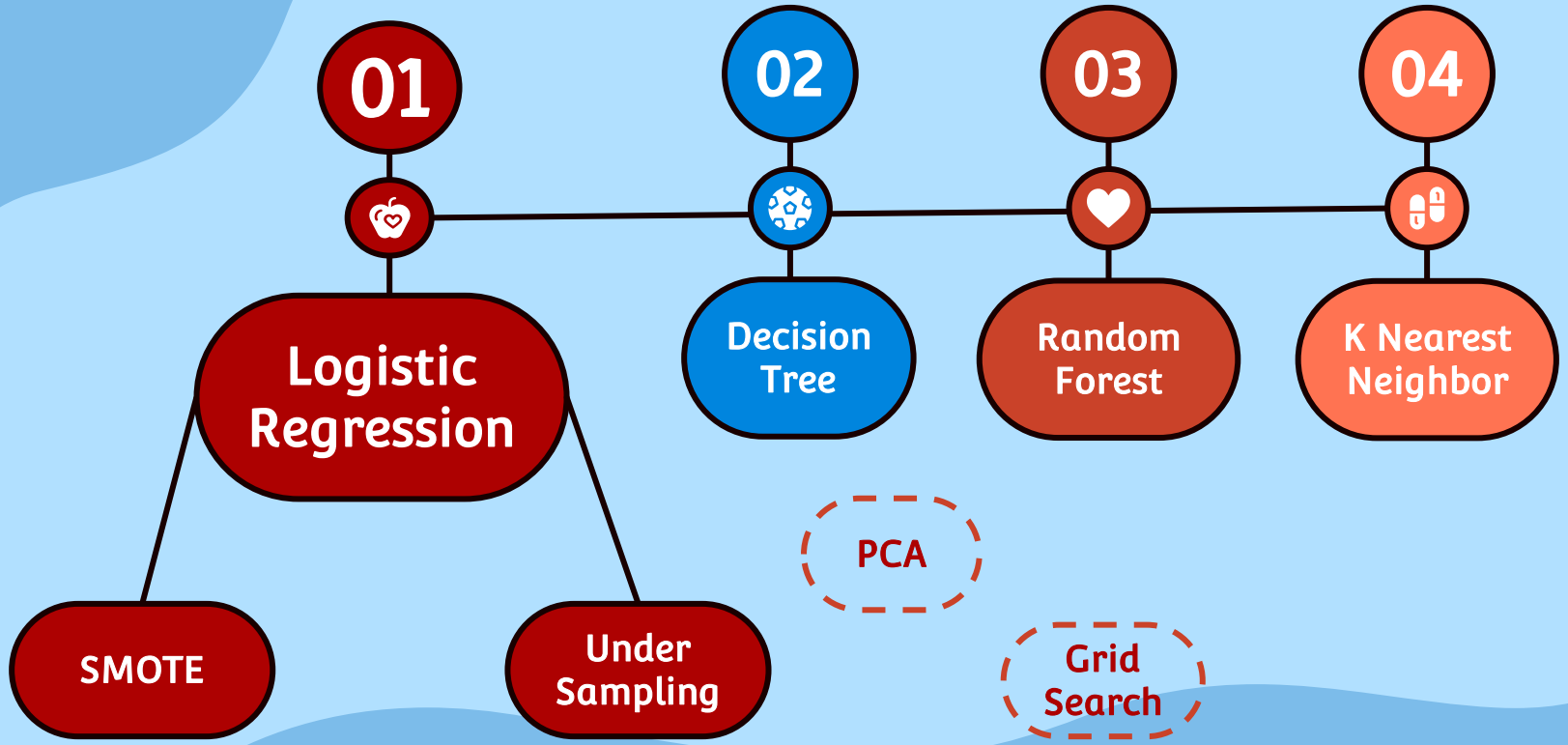
Drink moderately helps to **PREVENT** heart disease!!

In non-alcohol drinking group, there are **1.8 times** more people who get heart diease compared to alcohol drinking group.

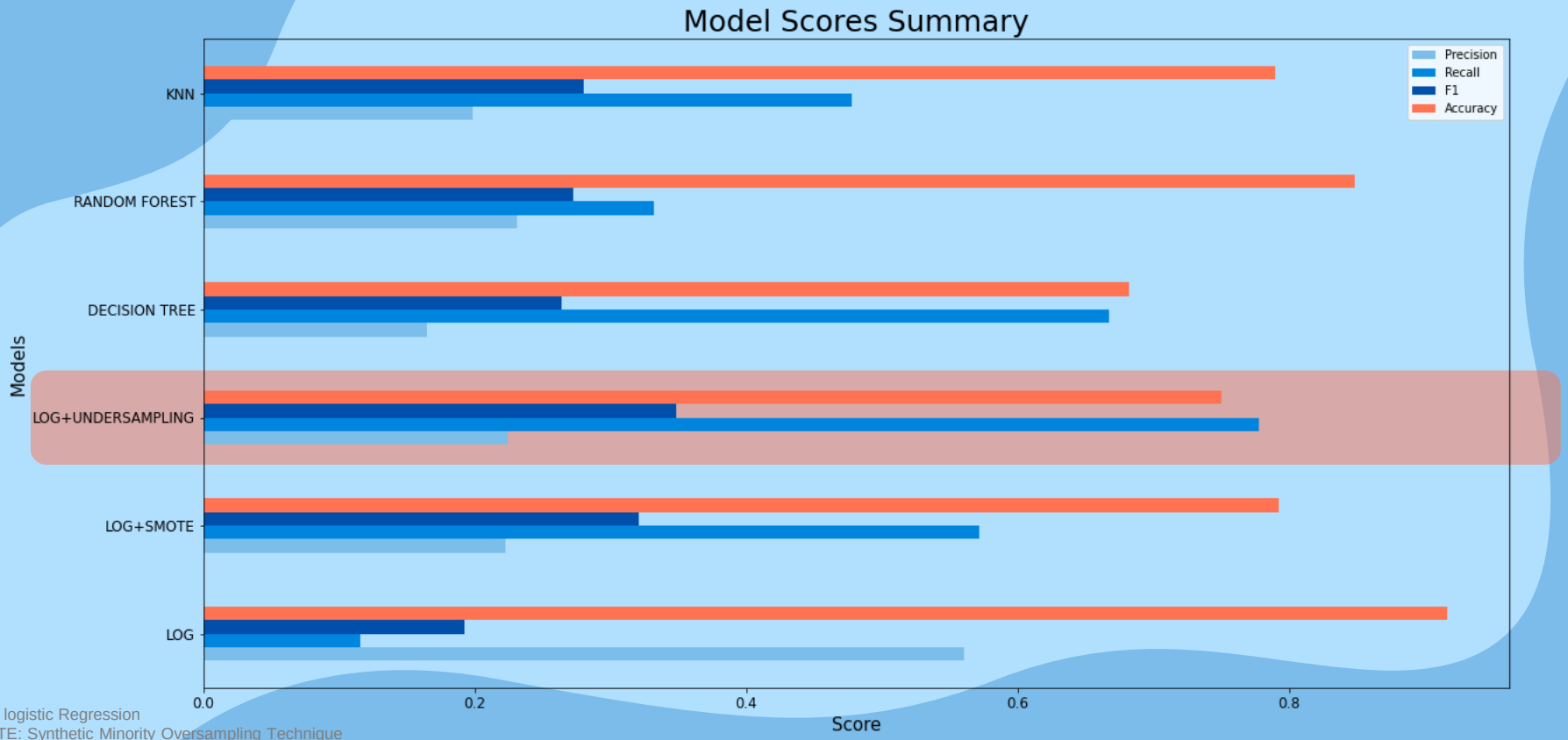
	No Heart Disease	Heart Disease
No Alcohol Drinking	91%	**9%**
Alcohol Drinking	95%	**5%**



Machine Learning Models



Model Evaluation



LOG: logistic Regression
SMOTE: Synthetic Minority Oversampling Technique
KNN: K Nearest Neighbour

Key Features

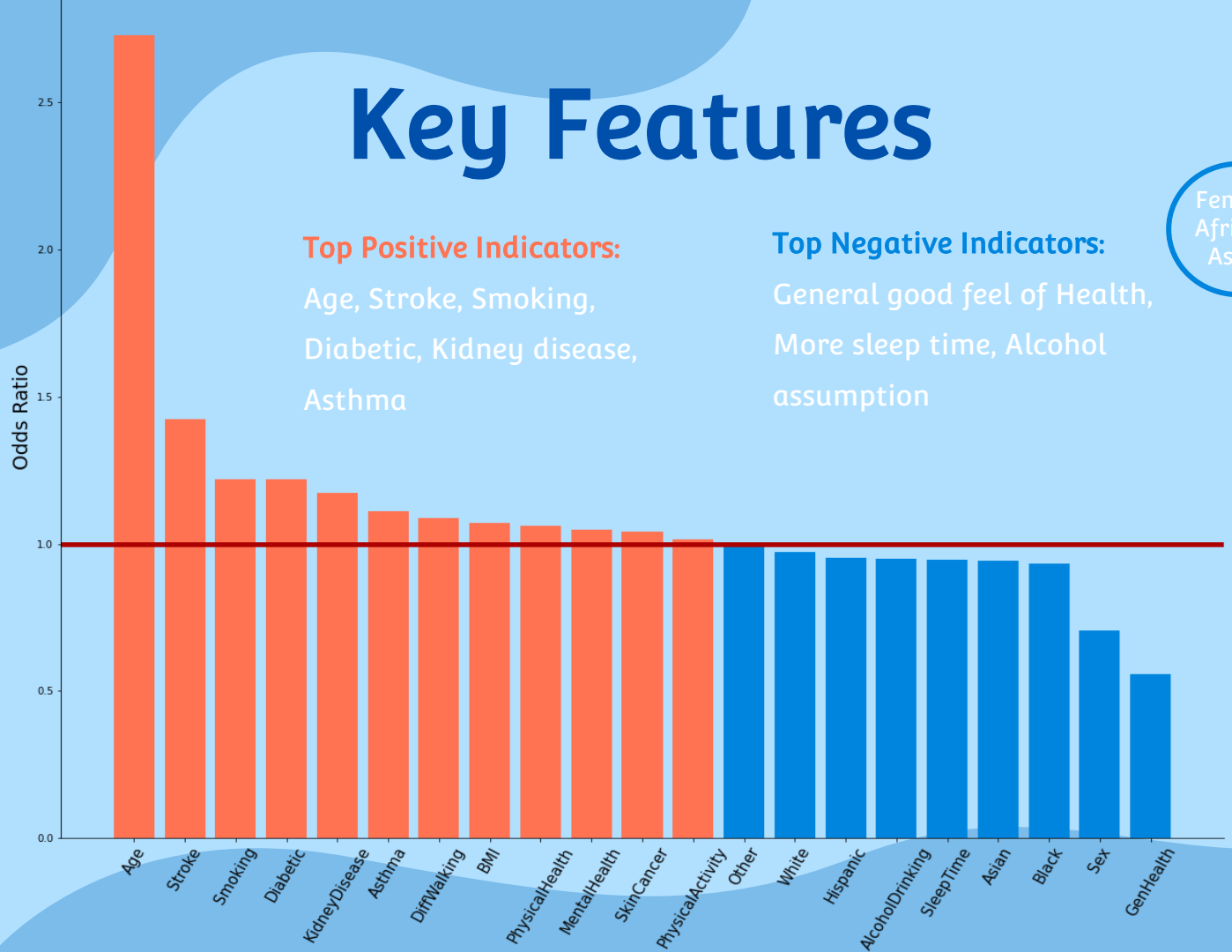
Top Positive Indicators:

Age, Stroke, Smoking, Diabetic, Kidney disease, Asthma

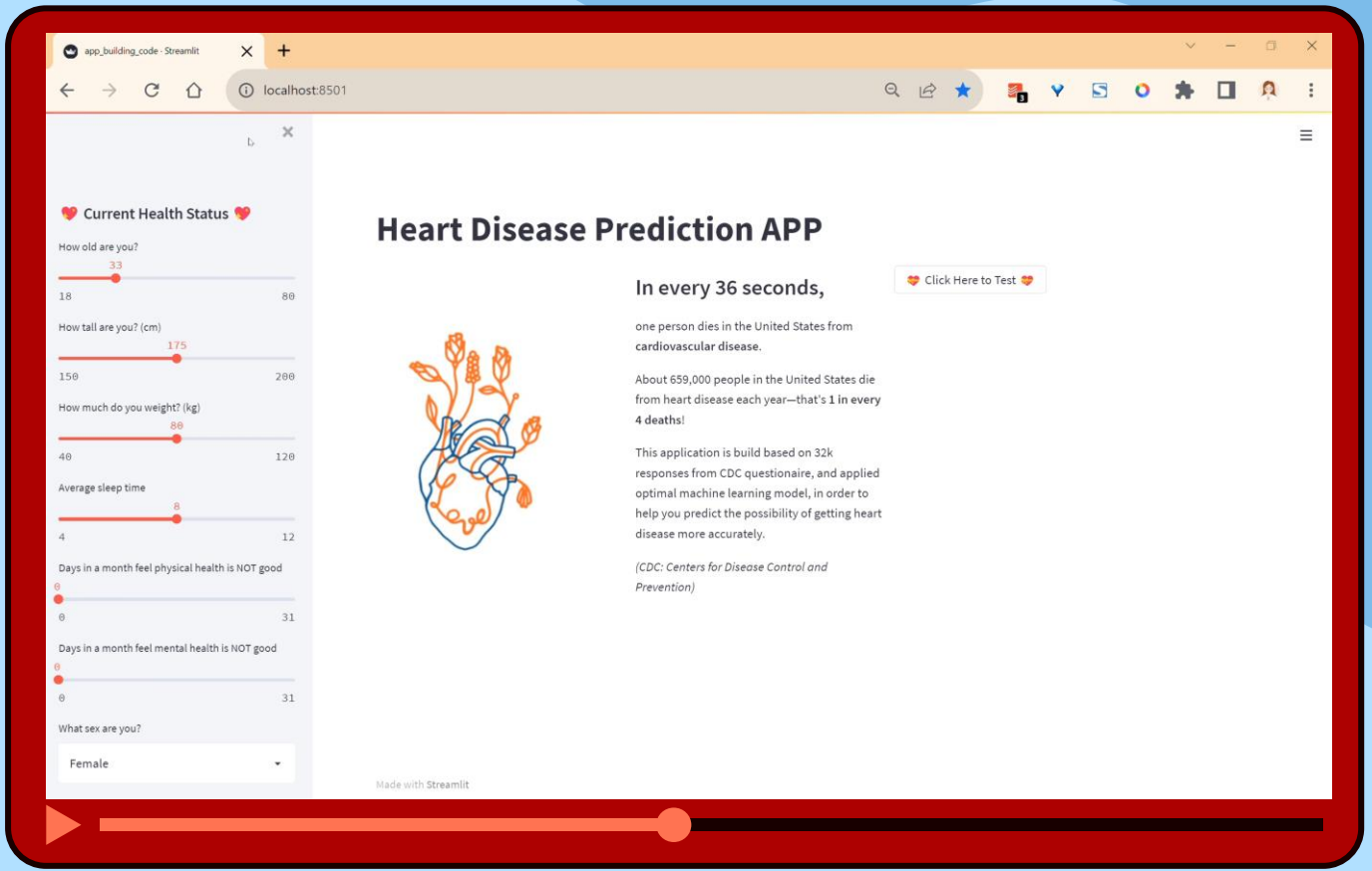
Top Negative Indicators:

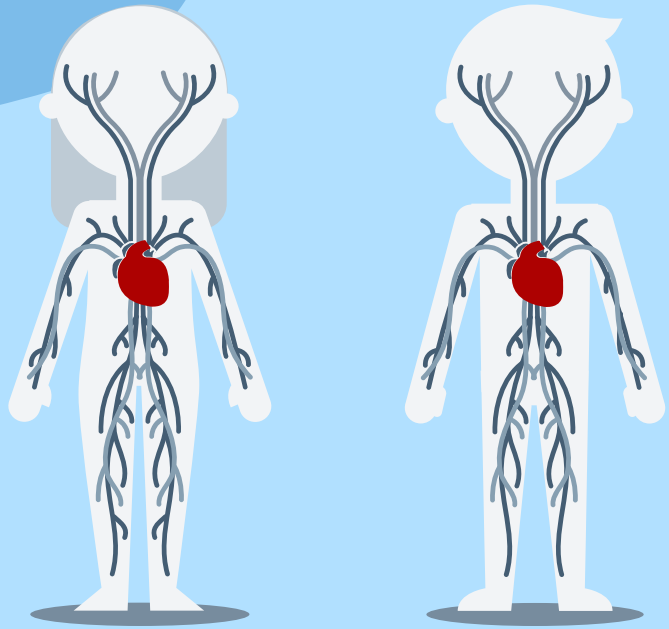
General good feel of Health, More sleep time, Alcohol assumption

Female, African, Asian



Application





THANKS!

Do you have any questions?