Heart Disease Predictor

Created by Leah Nagy

FUNCTIONAL MEDICINE

- In 2015 - diagnosed with an incurable, disabling disease
- **Functional Medicine*** found the root cause
- Created individualized treatment plan
- Today - healthy, disease-free!!!

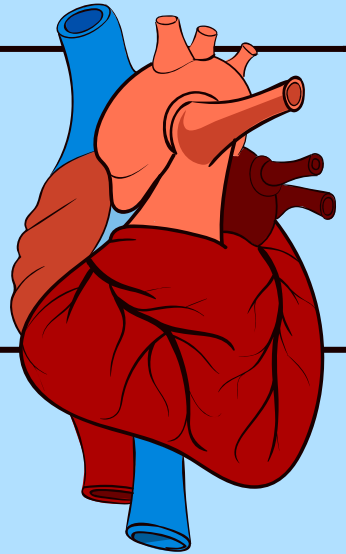
* **Functional Medicine** is a systems biology-based approach that focuses on identifying and addressing the root cause of disease.

CAUSES OF HEART DISEASE

1 Leading Cause of Death in the United States

SMOKING

OBESITY



GENETICS

DIABETES

80% of heart disease is preventable

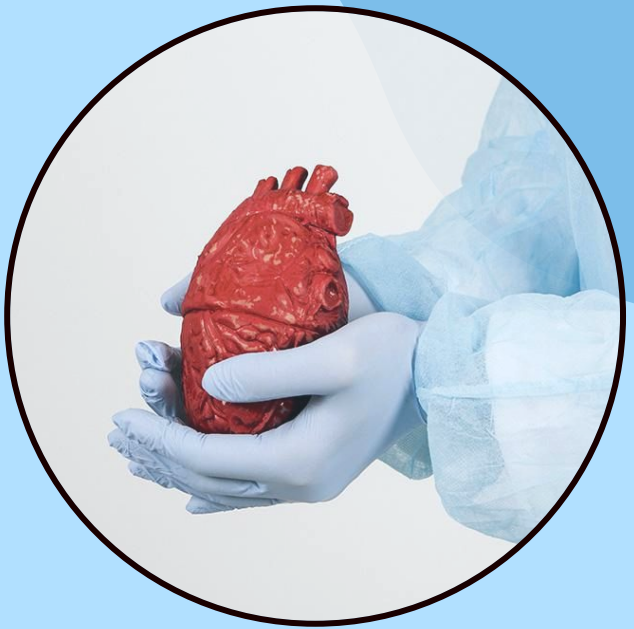
PROJECT GOALS

Predictive Model
using SKLearn, Pandas, and other libraries to determine probability of current heart disease

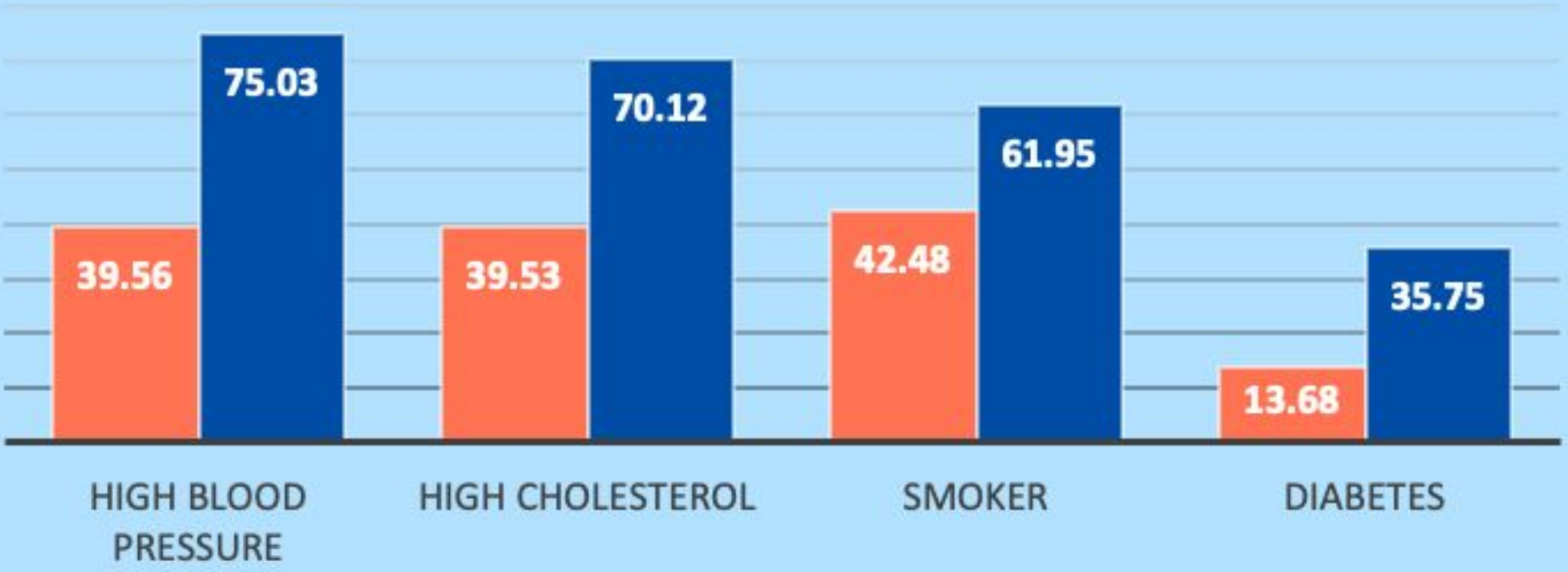
App Prototype
using StreamLit for patients to answer lifestyle questions to be shared with their doctor

DATASET

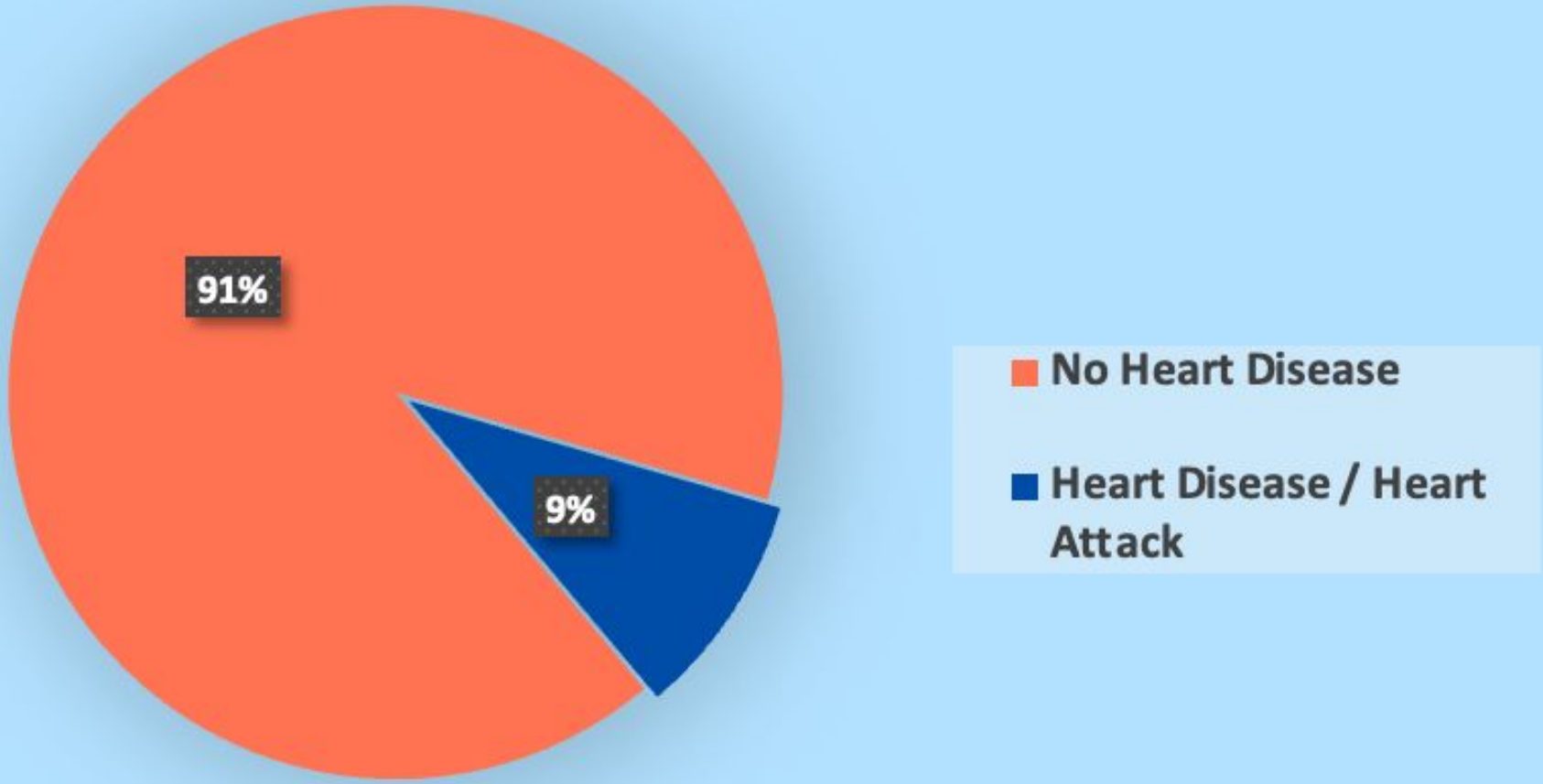
- Data Source: The Behavioral Risk Factor Surveillance survey conducted by the CDC
- Sample Size: 253,680
- Target: Presence/History of Heart Disease or Attack
- Features: 21 Health & Lifestyle Features
  (such as: age, sex, general health, diabetes, blood pressure, smoker, activity level, etc.)



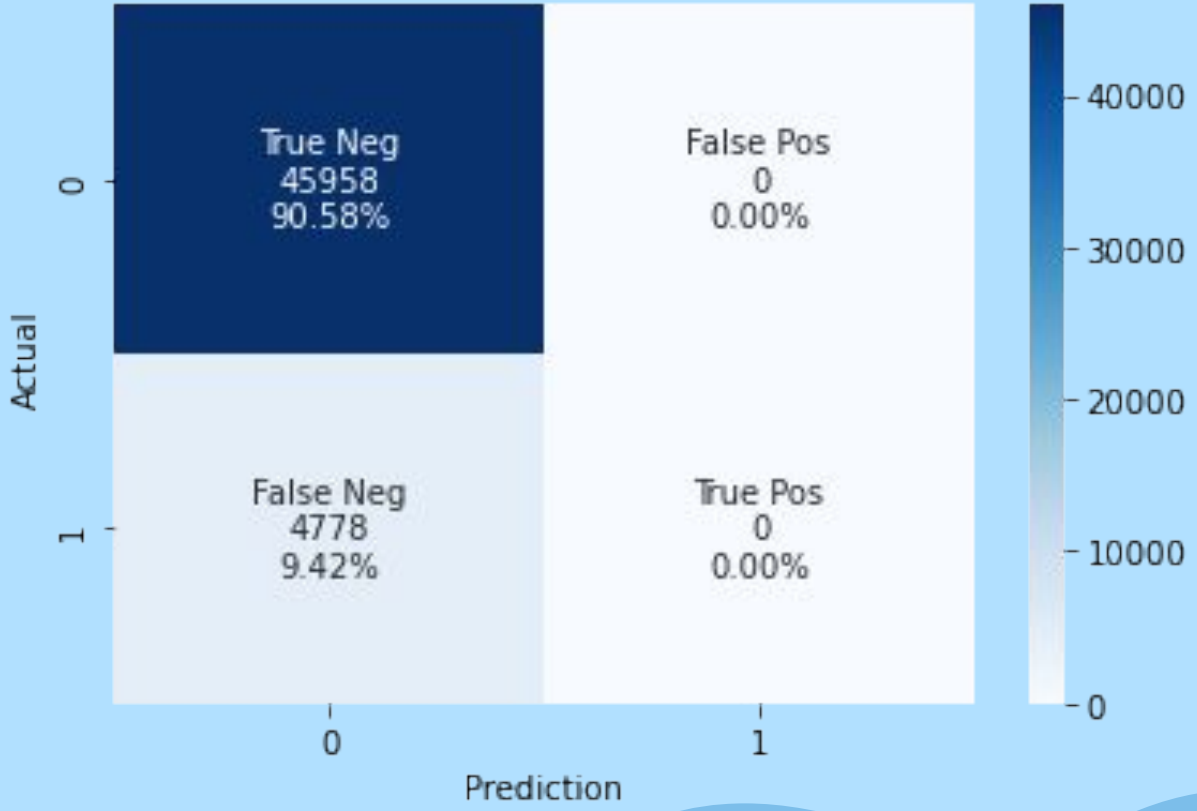
Risk Factors & Presence of Heart Disease



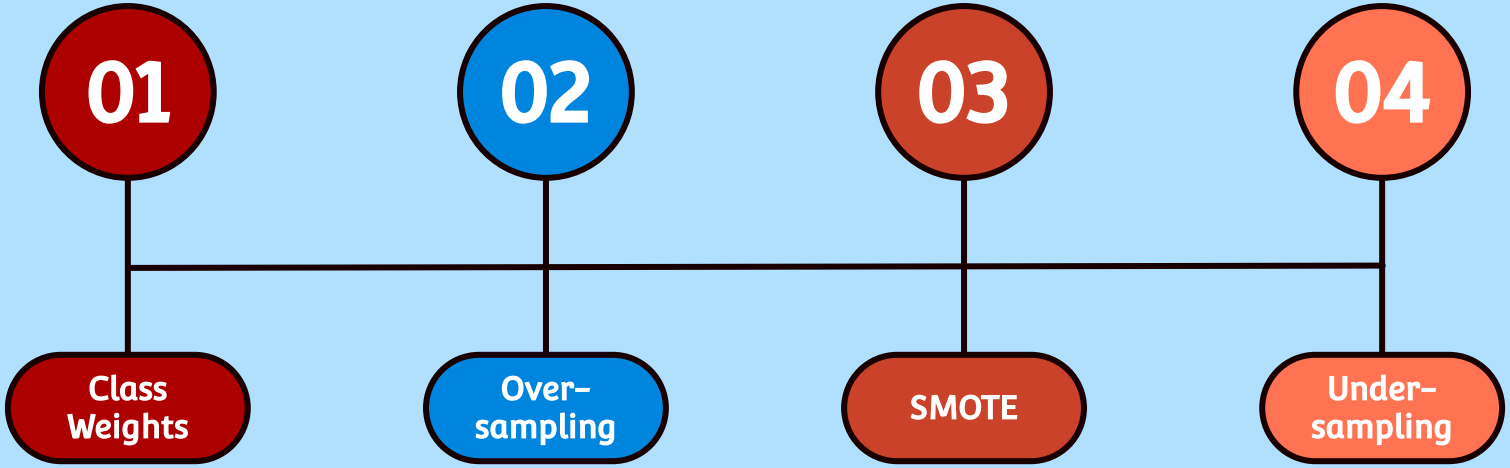
Distribution of Target Variable



Confusion Matrix – Simple Logistic Regression



Class Imbalance Solutions



Class Imbalance Solutions

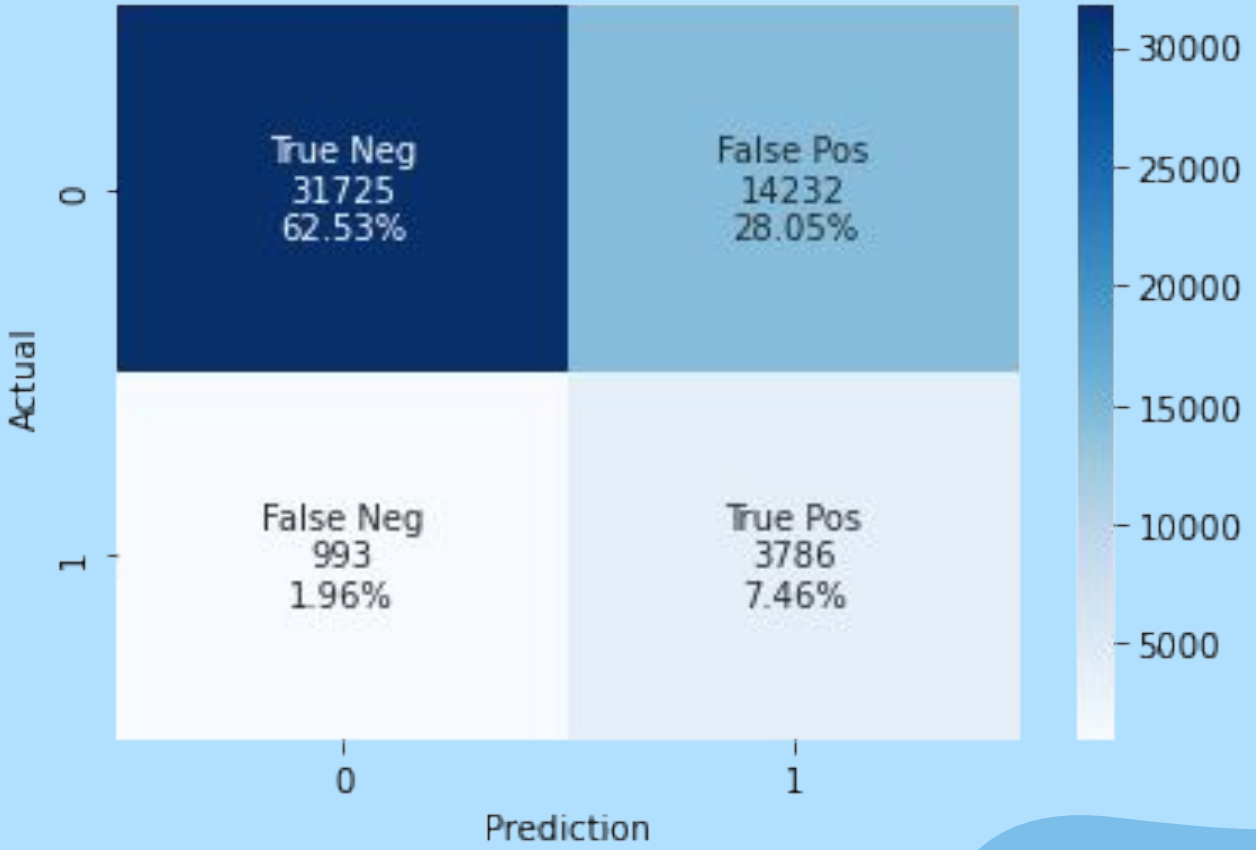
Logistic Regression Model	Accuracy	Recall	Precision	F2	Brier Loss
Baseline	0.905	0.045	0.474	**0.055**	0.905
Class Weights	0.7	0.792	0.21	**0.51**	0.7
Oversampling	0.724	0.756	0.22	**0.508**	0.724
SMOTE	0.726	0.75	0.22	**0.506**	0.726
Undersampling	0.725	0.755	0.22	**0.508**	0.725

Logistic Regression w/ Class Weights

Cross Validation

Regularization:
C = 10

Class Weights:
0: 0.09, 1: 0.91

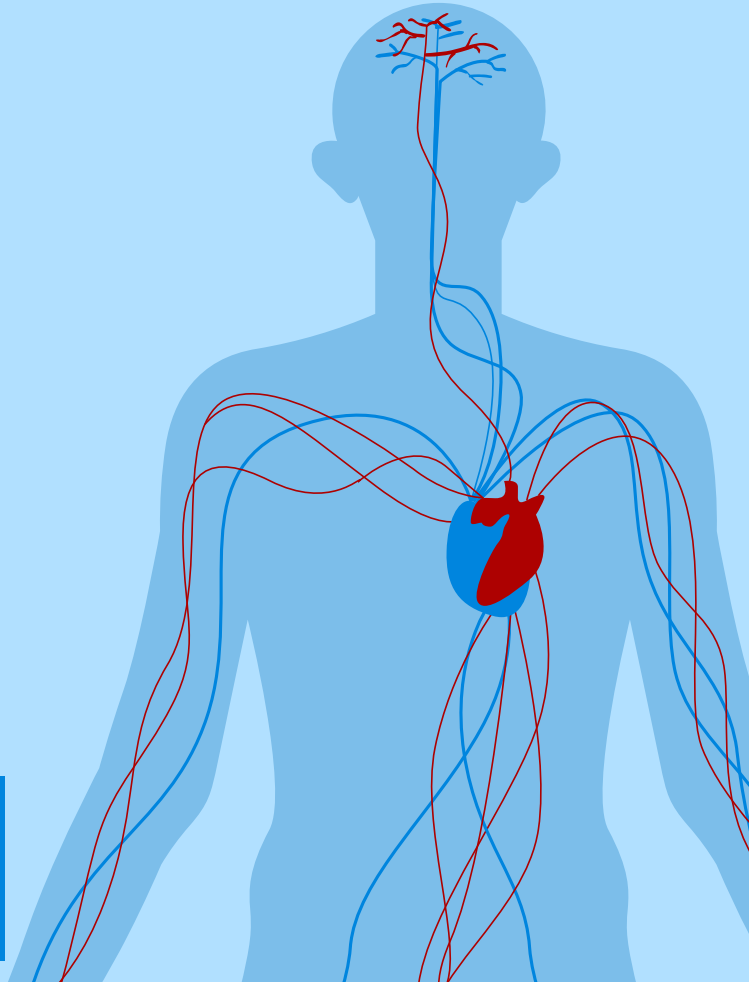


Thresholds

Thresholds	False Negatives	False Positives
P >= 0.25	195 (0.38%)	27,619 (54.44%)
P >= 0.5	993 (1.96%)	14,232 (28.05%)
P >= 0.75	2,733 (5.39%)	4,659 (9.18%)

Lower Threshold = Decrease FN, Increase FP

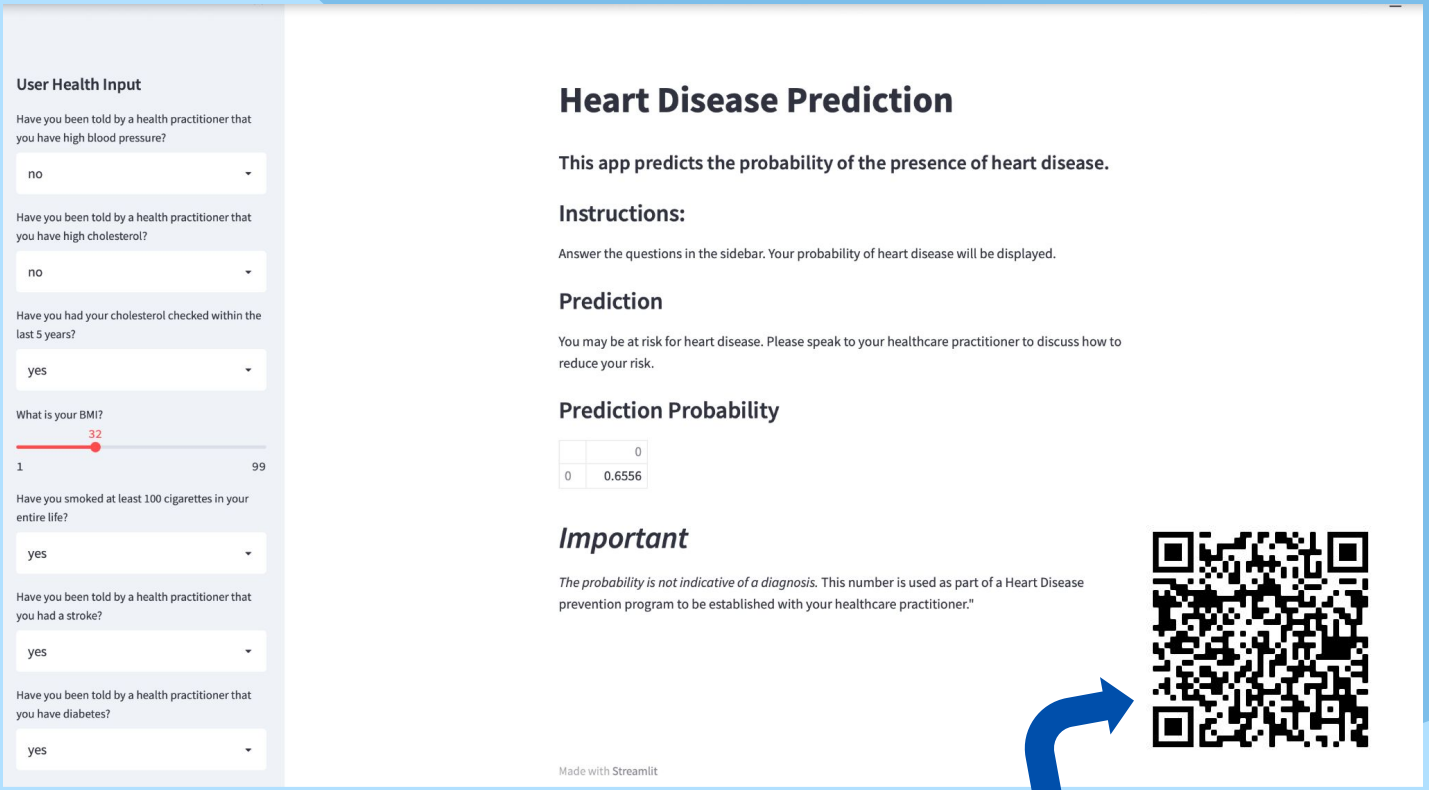
* * This lower threshold could help PREVENT future cases. If used for diagnostics, a higher threshold would be utilized.



StreamLit App

User Input:
Features to be used in the Logistic Regression model

Results:
Probability of heart disease predicted from inputs.



To view and use the app please visit or follow the QR code:

https://share.streamlit.io/leahnagy/streamlit-heart-disease/main/proj_streamlit2.py

THANKS!

The code, slides, and more information can be found on my GitHub site at:
https://github.com/leahnagy

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