



HeartWellness

Meet the Team



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Summary

Predictive heart disease management application

01

Overview

Designed to predict the likelihood of heart disease in individuals using advanced machine learning algorithms.

02

Features

User login
patient history management
Directory of doctors
Easy appointment booking

03

Goal

Timely and accurate health predictions
early detection and prevention
seamless healthcare services integration

Problem Statement

01

Heart Disease Prevalence

02

Limitations of Traditional Methods

03

Challenges for Patients

Literature Review

01

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Predictive Analytics in Healthcare

Advancements
Studies

02

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Doctor-Patient Connectivity

Accessibility
Convenience

03

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Patient Data Management

Consistency
Integration

04

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Impact of Early Detection

Prevention
Outcomes



Data Collection & Preparation

Source - *Data collected from Kaggle datasets and user inputs.*

Kaggle Dataset:

Comprehensive datasets on
heart disease

User Inputs:

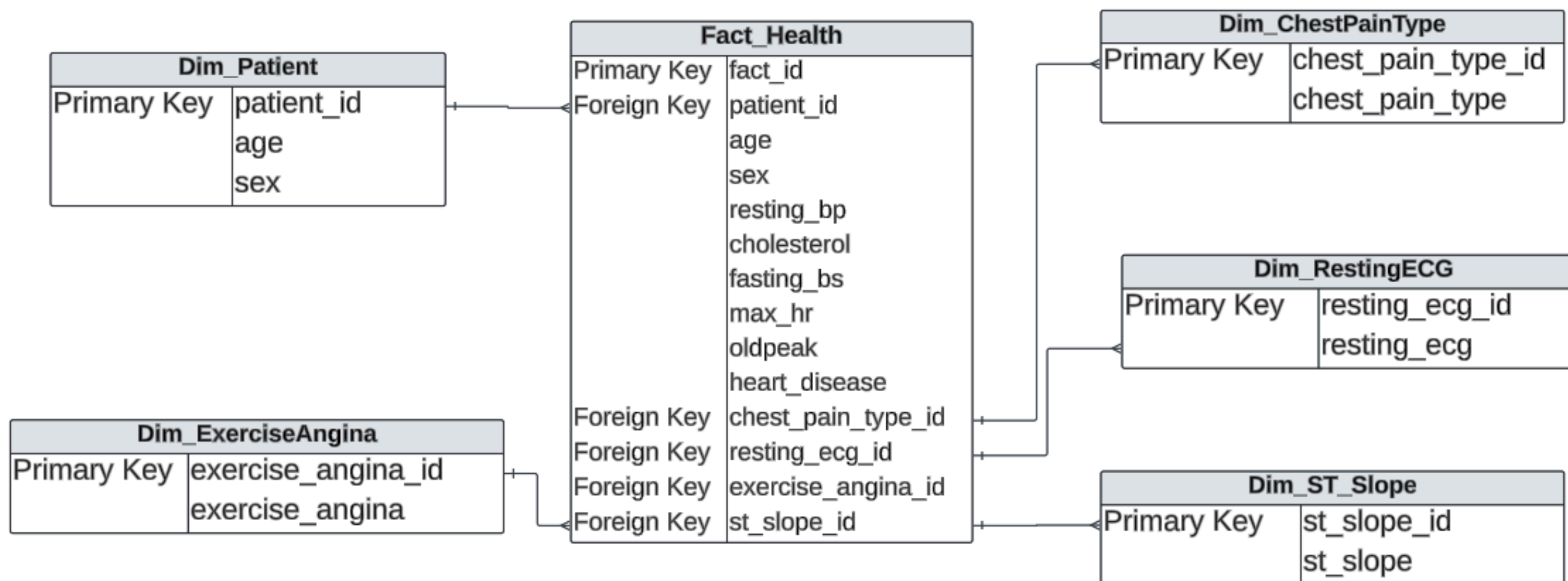
Real-time data entered by
users during registration

Data Integration:

Ensuring data consistency
and integrity through
validation checks

ERD

ER Diagram For Heart Stroke Data




```
-- Create Dim_Patient
CREATE TABLE Dim_Patient (
  patient_id NUMBER GENERATED BY DEFAULT AS IDENTITY PRIMARY KEY,
  age NUMBER,
  sex VARCHAR2(1),
  UNIQUE (age, sex)
);

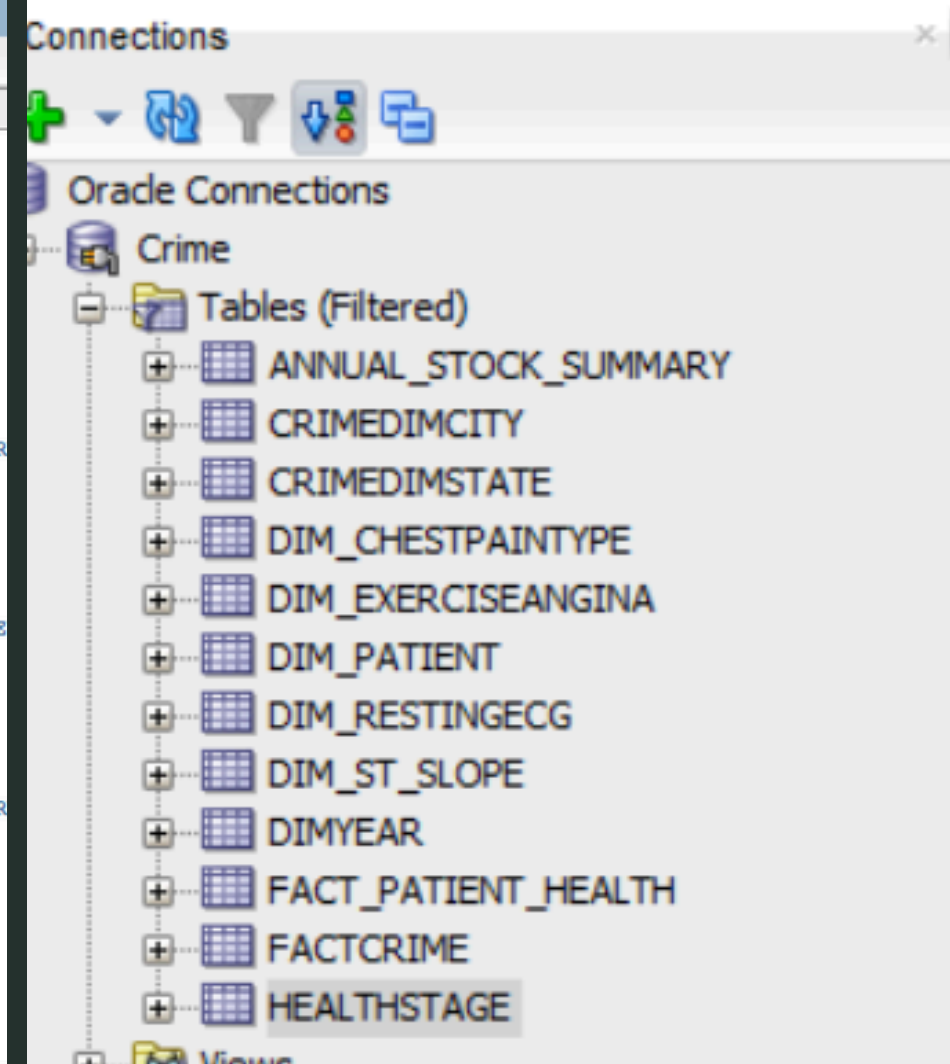
-- Create Dim_ChestPainType
CREATE TABLE Dim_ChestPainType (
  chest_pain_type_id NUMBER GENERATED BY DEFAULT AS IDENTITY PRIMARY KEY,
  chest_pain_type VARCHAR2(10) UNIQUE
);

-- Create Dim_RestingECG
CREATE TABLE Dim_RestingECG (
  resting_ecg_id NUMBER GENERATED BY DEFAULT AS IDENTITY PRIMARY KEY,
  resting_ecg VARCHAR2(10) UNIQUE
);

-- Create Dim_ExerciseAngina
CREATE TABLE Dim_ExerciseAngina (
  exercise_angina_id NUMBER GENERATED BY DEFAULT AS IDENTITY PRIMARY KEY,
  exercise_angina VARCHAR2(1) UNIQUE
);

-- Create Dim_ST_Slope
CREATE TABLE Dim_ST_Slope (
  st_slope_id NUMBER GENERATED BY DEFAULT AS IDENTITY PRIMARY KEY,
  st_slope VARCHAR2(10) UNIQUE
);
```

```
-- Create Fact_Patient_Health
CREATE TABLE Fact_Patient_Health (
  fact_id NUMBER GENERATED BY DEFAULT AS IDENTITY PRIMARY KEY,
  patient_id NUMBER,
  age NUMBER,
  sex VARCHAR2(1),
  resting_bp NUMBER,
  cholesterol NUMBER,
  fasting_bs NUMBER,
  max_hr NUMBER,
  oldpeak NUMBER,
  heart_disease NUMBER,
  chest_pain_type_id NUMBER,
  resting_ecg_id NUMBER,
  exercise_angina_id NUMBER,
  st_slope_id NUMBER,
  FOREIGN KEY (patient_id) REFERENCES Dim_Patient (patient_id),
  FOREIGN KEY (chest_pain_type_id) REFERENCES Dim_ChestPainType (chest_pain_type_id),
  FOREIGN KEY (resting_ecg_id) REFERENCES Dim_RestingECG (resting_ecg_id),
  FOREIGN KEY (exercise_angina_id) REFERENCES Dim_ExerciseAngina (exercise_angina_id),
  FOREIGN KEY (st_slope_id) REFERENCES Dim_ST_Slope (st_slope_id)
);
```



```
-- Populate Dim_Patient
INSERT INTO Dim_Patient (age, sex)
SELECT DISTINCT Age, Sex FROM HEALTHSTAGE;

-- Populate Dim_ChestPainType
INSERT INTO Dim_ChestPainType (chest_pain_type)
SELECT DISTINCT ChestPainType FROM HEALTHSTAGE;

-- Populate Dim_RestingECG
INSERT INTO Dim_RestingECG (resting_ecg)
SELECT DISTINCT RestingECG FROM HEALTHSTAGE;

-- Populate Dim_ExerciseAngina
INSERT INTO Dim_ExerciseAngina (exercise_angina)
SELECT DISTINCT ExerciseAngina FROM HEALTHSTAGE;

-- Populate Dim_ST_Slope
INSERT INTO Dim_ST_Slope (st_slope)
SELECT DISTINCT ST_Slope FROM HEALTHSTAGE;

-- Populate Fact_Patient_Health
INSERT INTO Fact_Patient_Health (patient_id, age, sex, resting_bp,
SELECT
  p.patient_id,
  h.Age,
  h.Sex,
  h.RestingBP,
  h.Cholesterol,
  h.FastingBS,
```

ETL

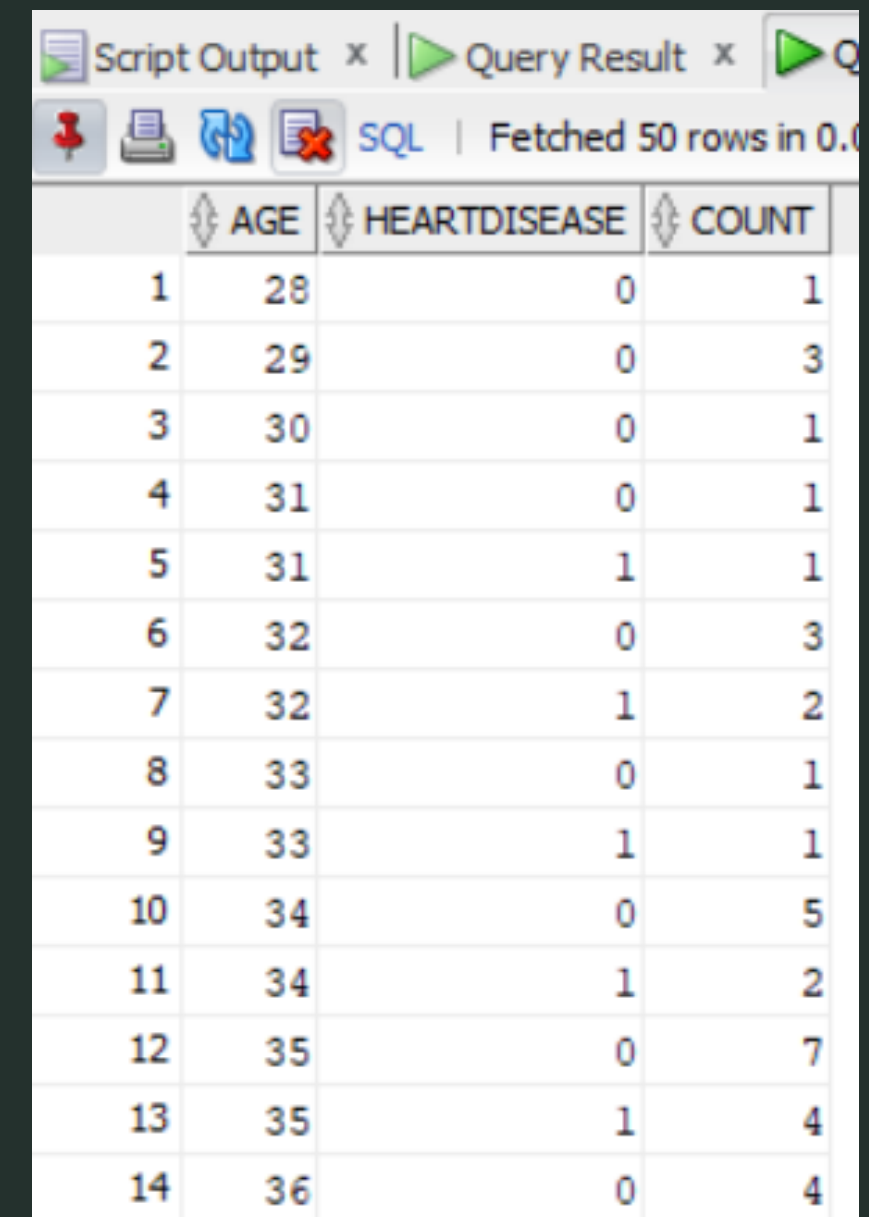
- Create DIM Tables
- Database Table Listing
- Create FACT Table
- Insert data into FACT and DIM tables

Query 1

Distribution of Heart Disease by Age

This query groups the data by age and heart disease status, then counts the number of occurrences in each group.

```
-- Distribution of Heart
SELECT
    Age,
    HeartDisease,
    COUNT(*) AS count
FROM
    HEALTHSTAGE
GROUP BY
    Age, HeartDisease
ORDER BY
    Age;
```



The screenshot shows a database interface with a 'Query Result' tab. It displays 14 rows of data from a table named 'HEALTHSTAGE'. The columns are 'AGE', 'HEARTDISEASE', and 'COUNT'. The data is grouped by age and heart disease status. The 'COUNT' column shows the number of occurrences for each group.

	AGE	HEARTDISEASE	COUNT
1	28	0	1
2	29	0	3
3	30	0	1
4	31	0	1
5	31	1	1
6	32	0	3
7	32	1	2
8	33	0	1
9	33	1	1
10	34	0	5
11	34	1	2
12	35	0	7
13	35	1	4
14	36	0	4

Query 2

Average Cholesterol Levels by Chest Pain Type

```
-- Average Cholesterol Levels by Chest Pain Type
SELECT
    ChestPainType,
    AVG(Cholesterol) AS avg_cholesterol
FROM
    HEALTHSTAGE
GROUP BY
    ChestPainType
ORDER BY
    ChestPainType;
```

This query calculates the average cholesterol levels for each type of chest pain.

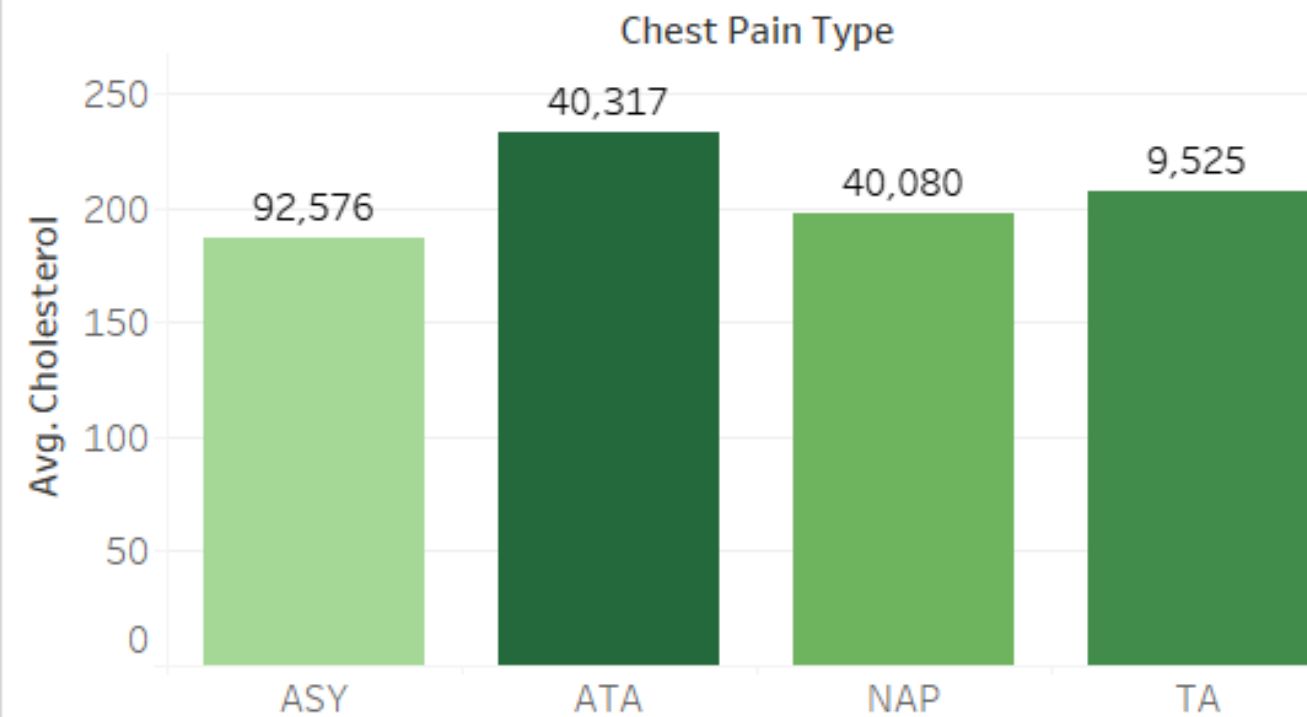
Script Output x | Query Result x | Query Result 1 x | Query Result 2 x

SQL | All Rows Fetched: 4 in 0.103 seconds

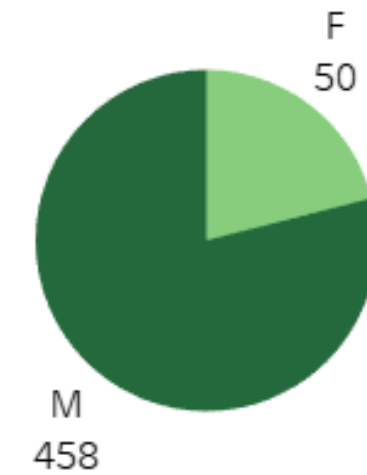
	CHESTPAINTYPE	AVG_CHOLESTEROL
1	ASY	186.645161290322580645161290322580645161
2	ATA	233.04624277456647398843930635838150289
3	NAP	197.438423645320197044334975369458128079
4	TA	207.065217391304347826086956521739130435

Tableau Visualization

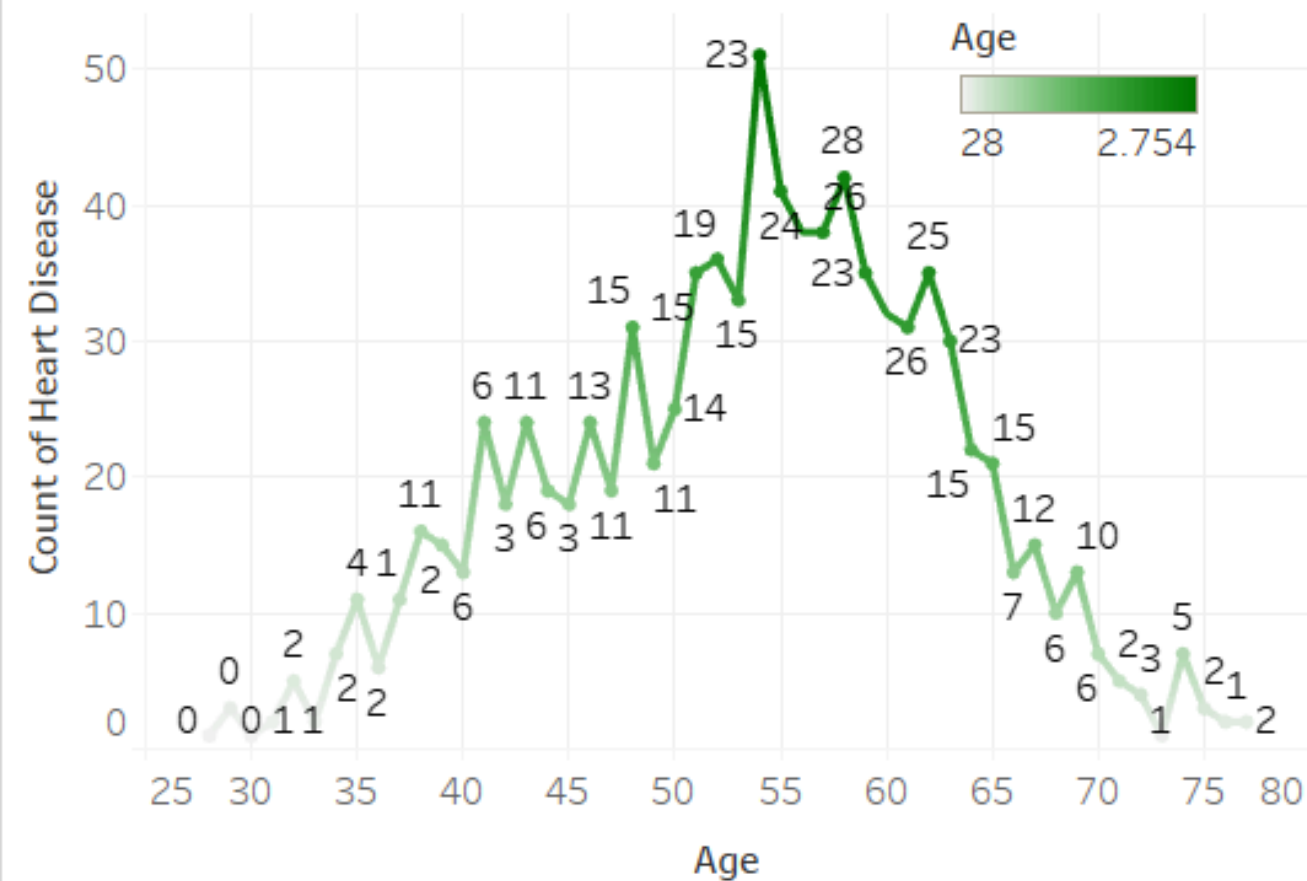
Average Cholesterol Levels by Chest Pain Type



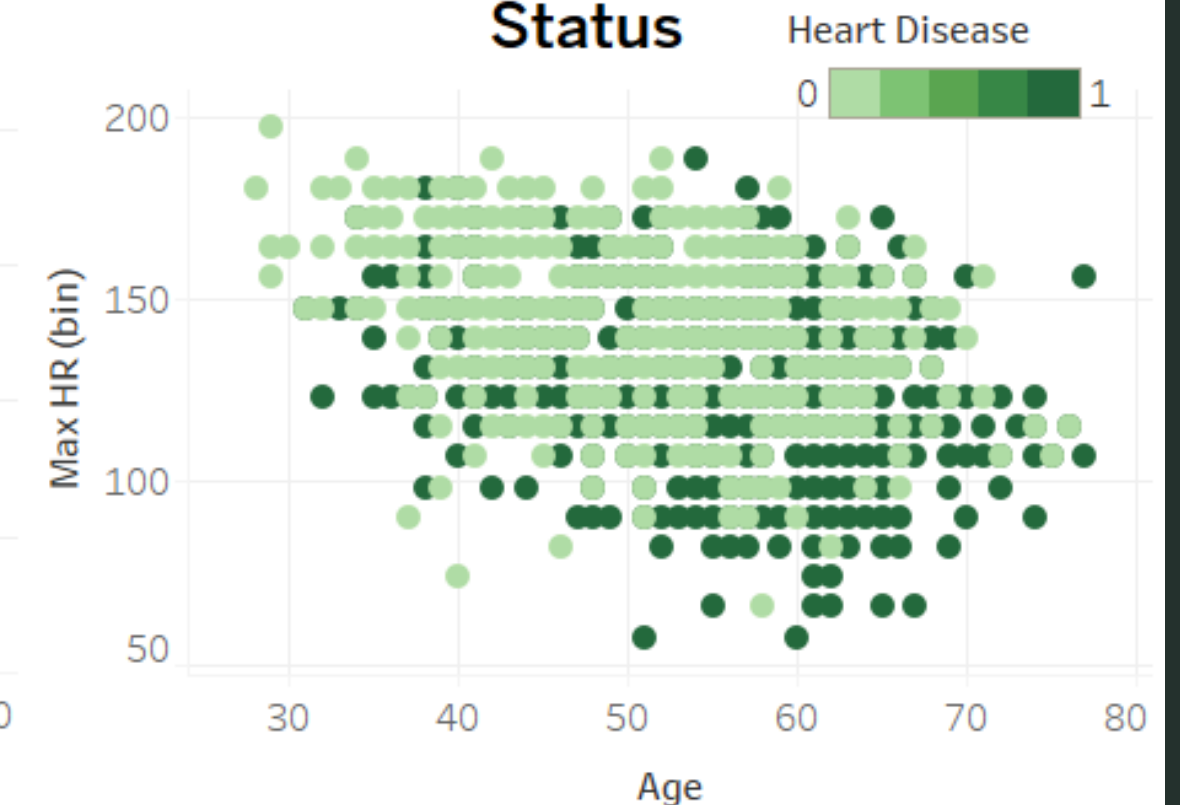
Distribution of Heart Disease by Gender



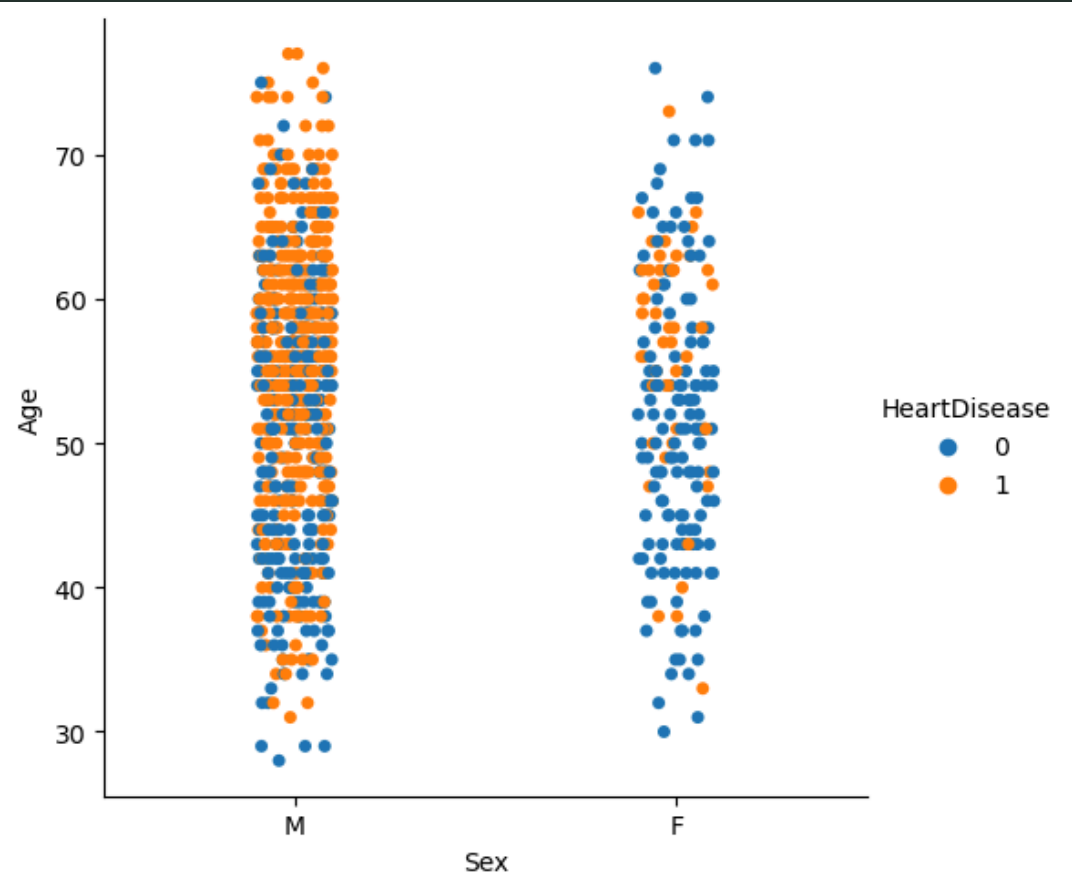
Distribution of Heart Disease by Age



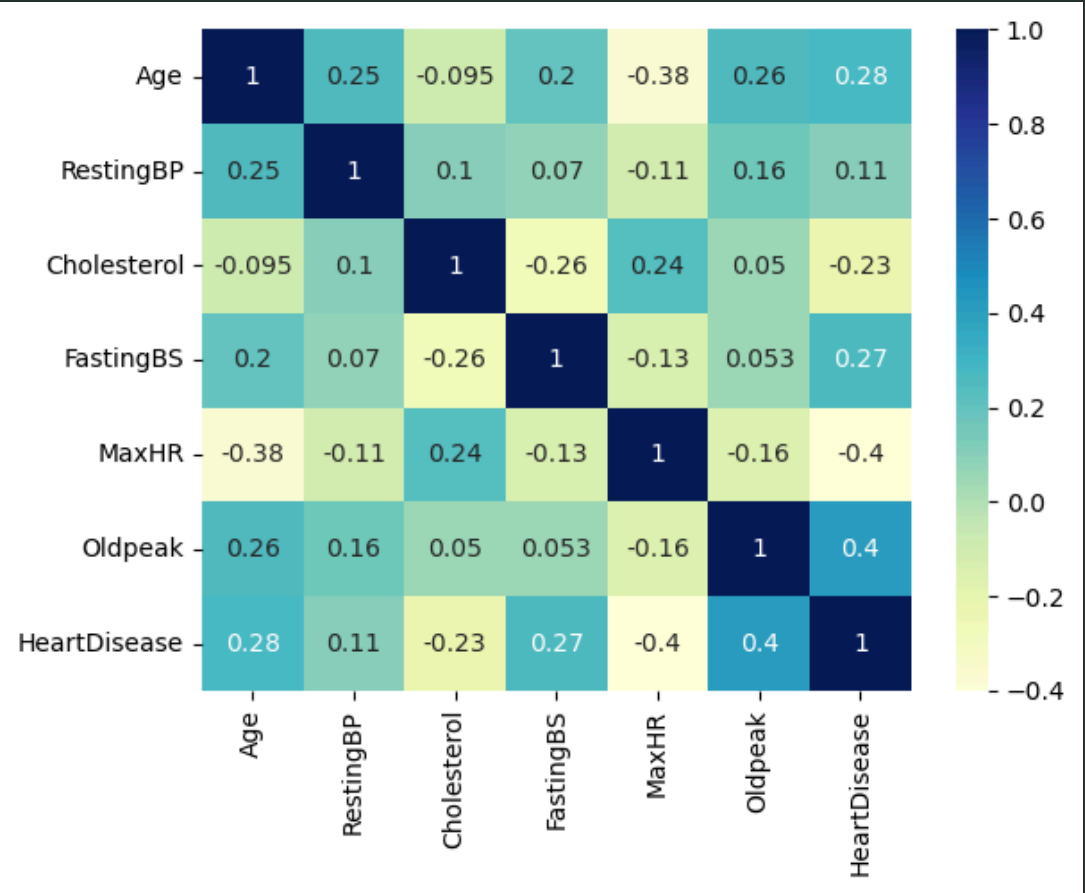
Relationship Between Maximum Heart Rate and Age, by Heart Disease Status



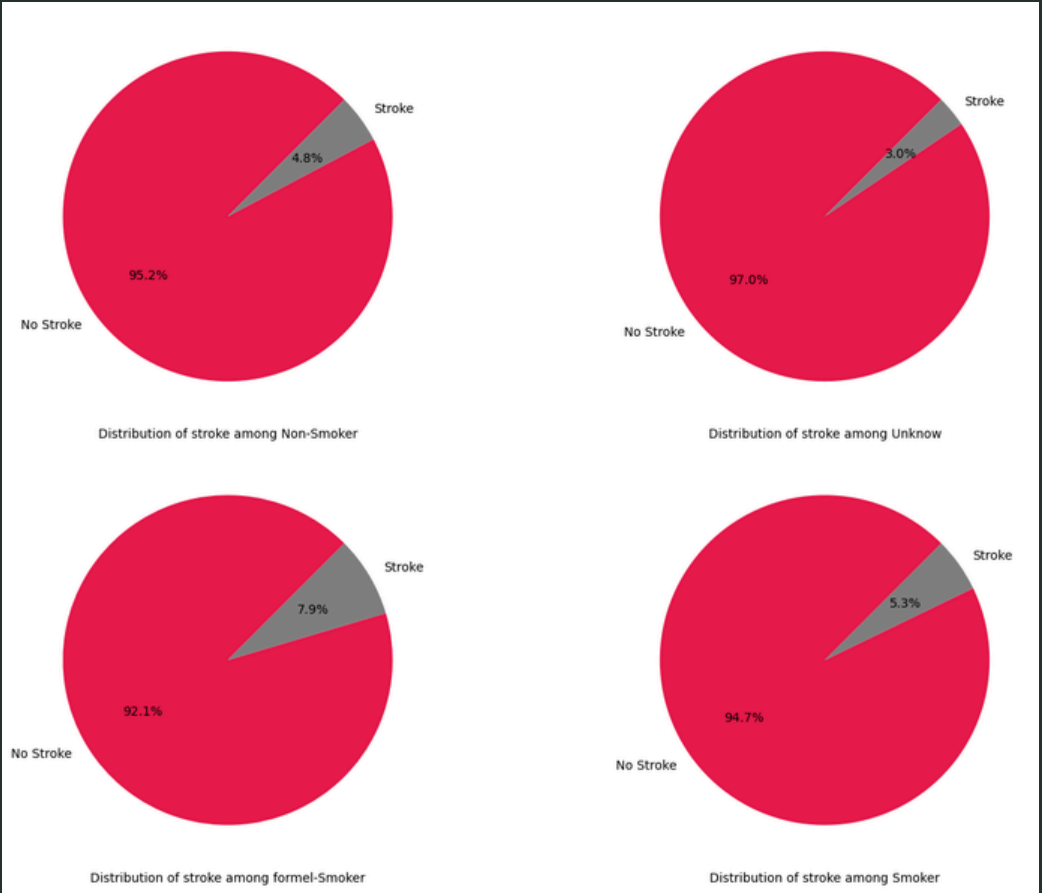
Exploratory Data Analysis



Heart Disease related to Age

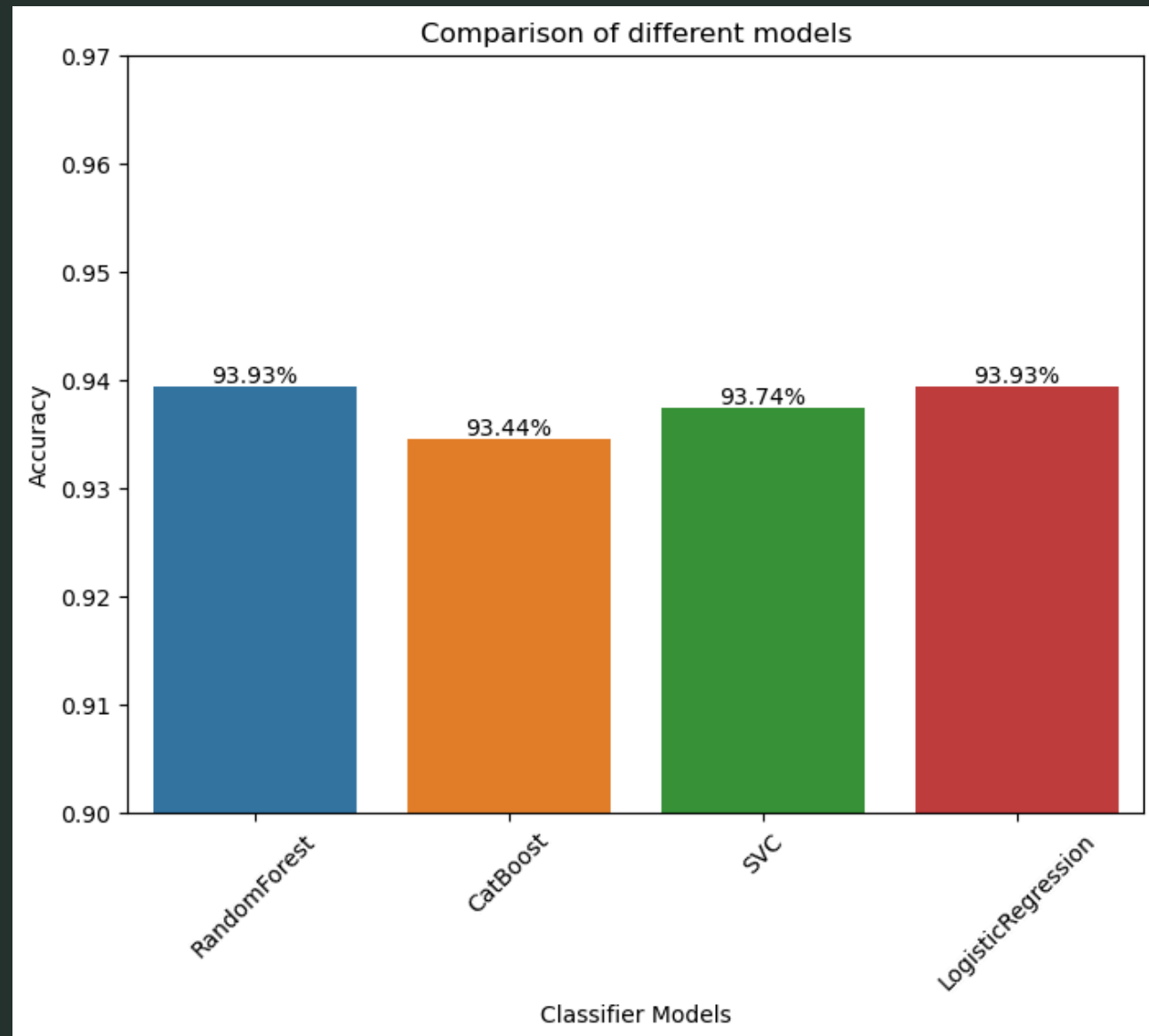


Correlation of all Features

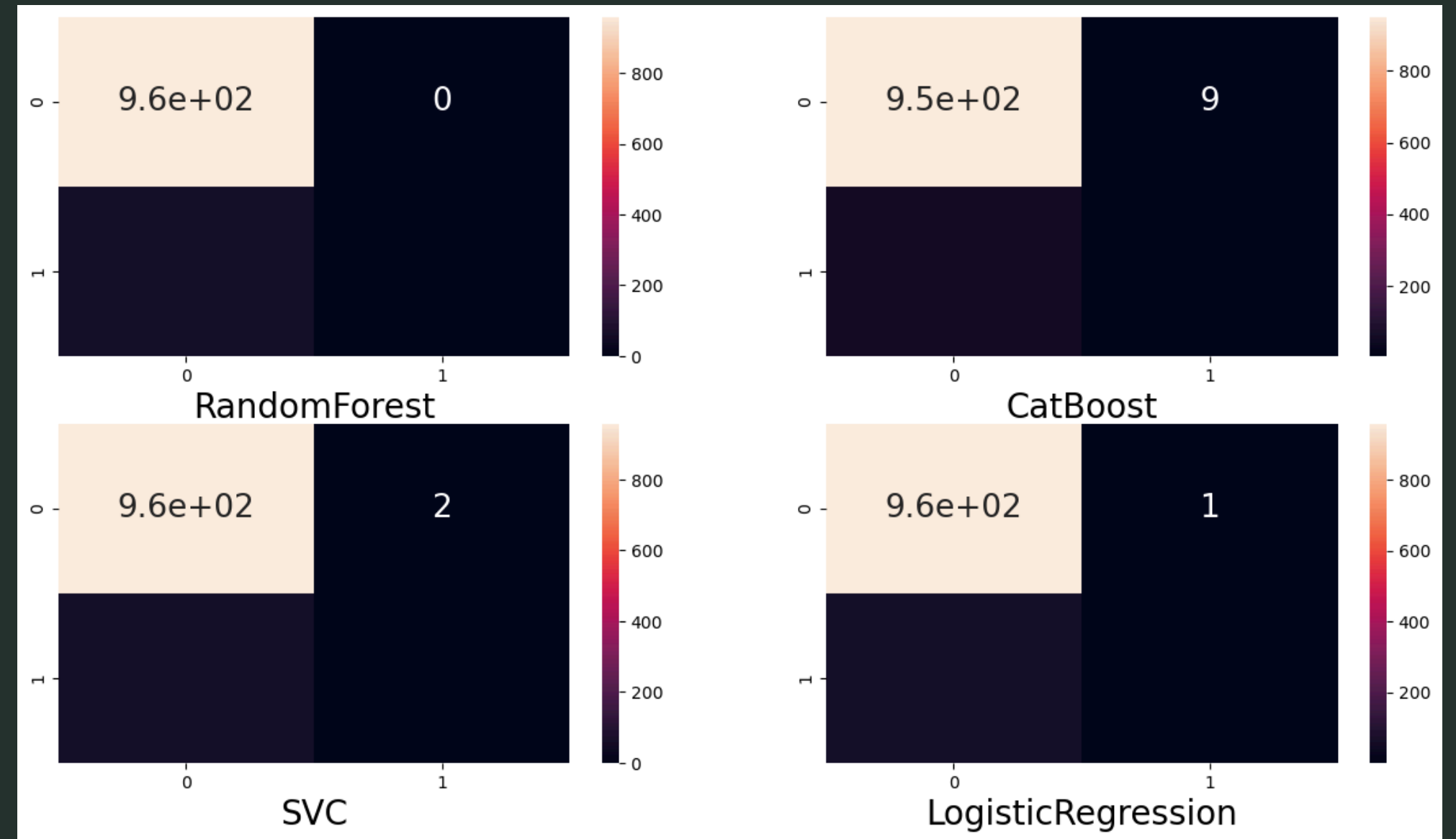


Relation of smoke and Stroke

Result Analysis

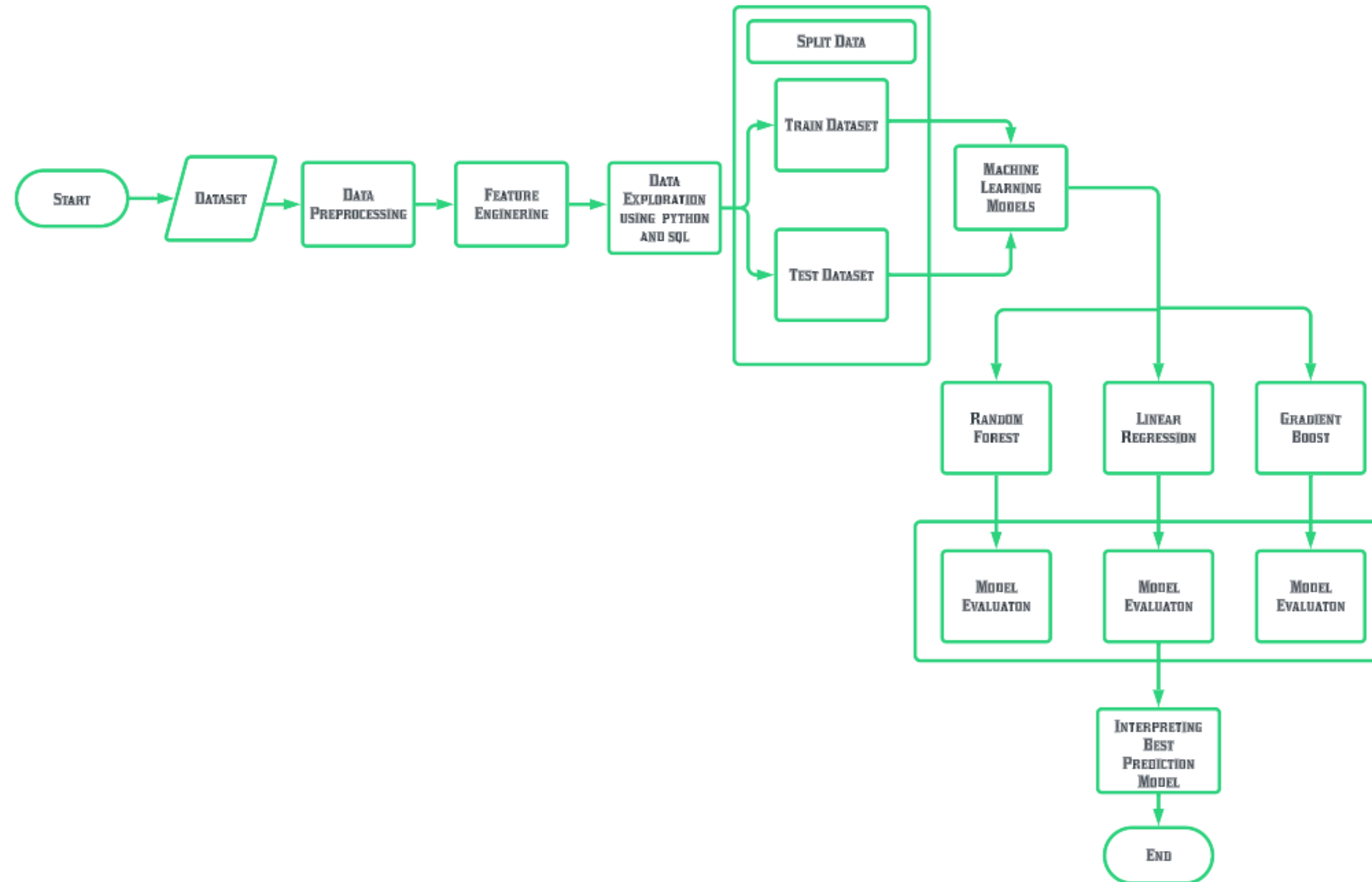


Accuracy of Models

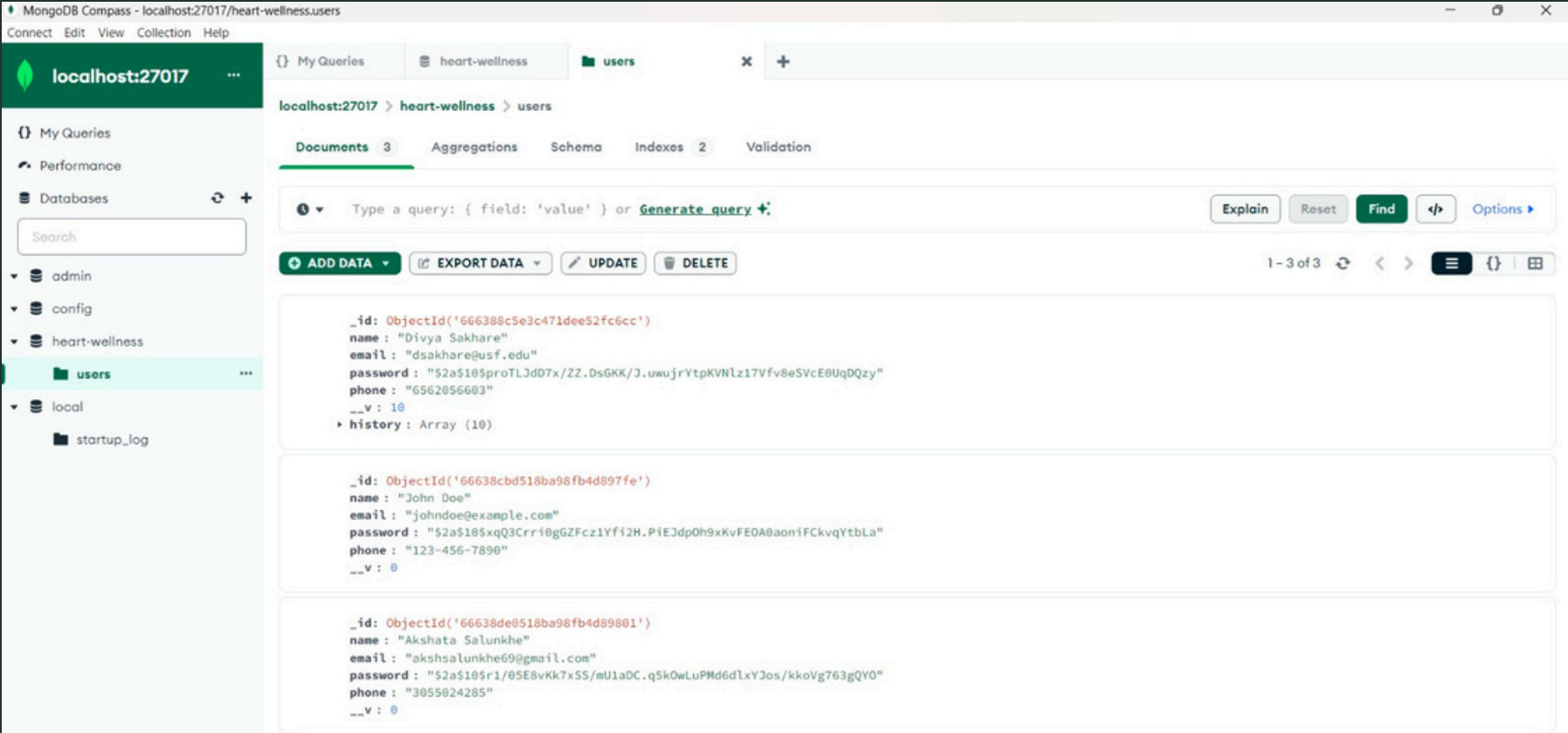


Confusion matrix of Models

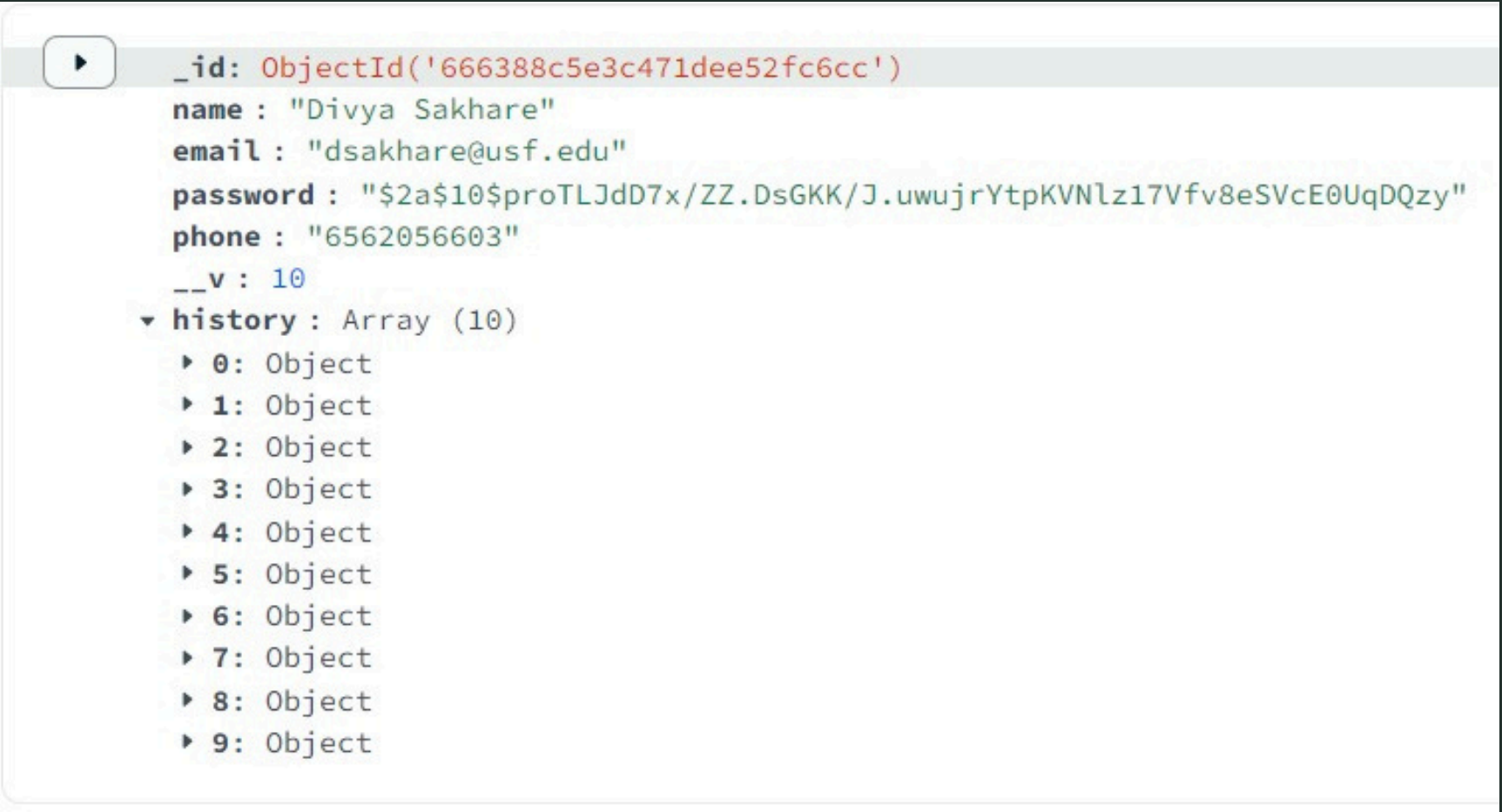
Data Model



Results

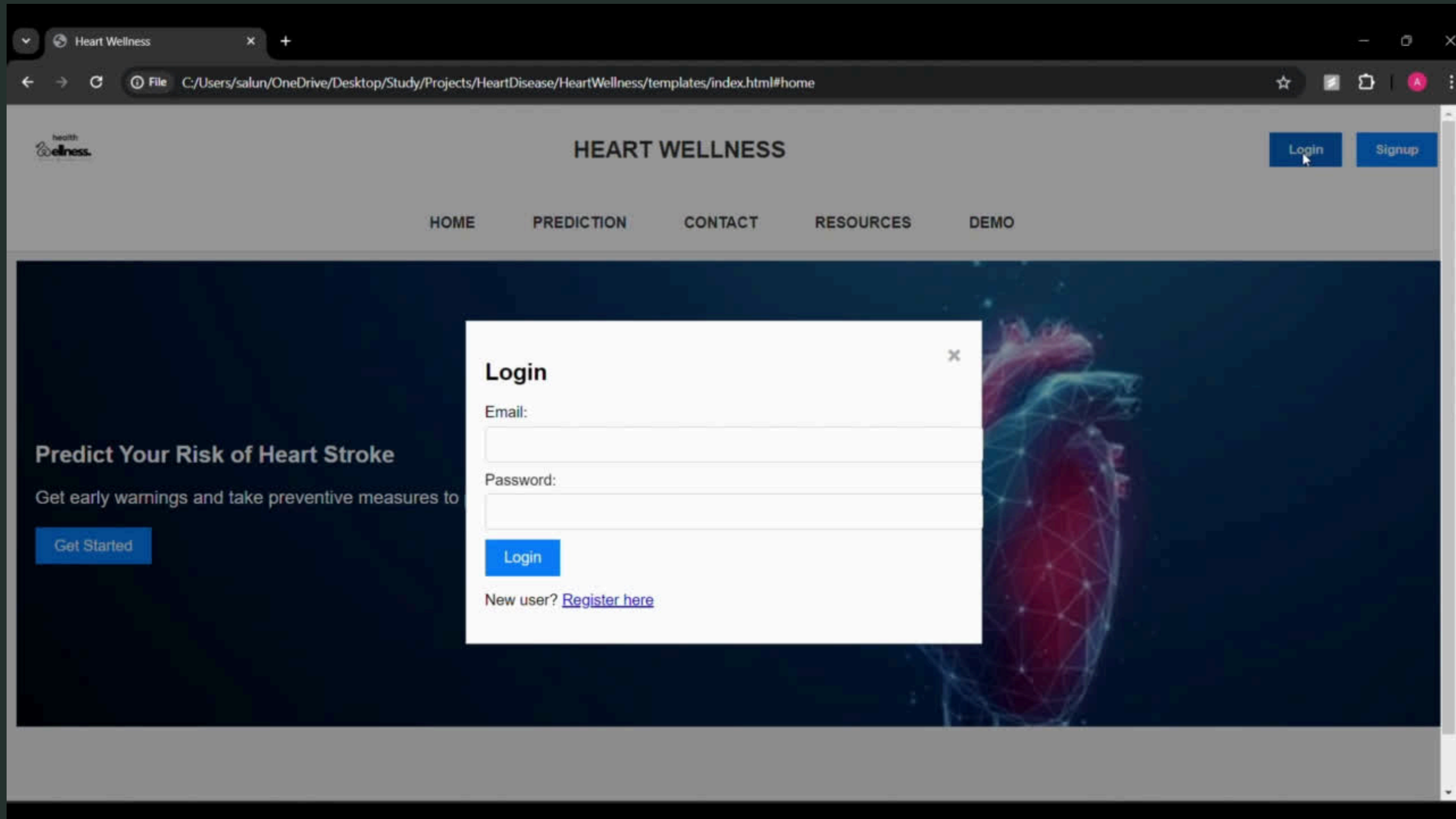


User Login data Saved in MongoDB



Patient history data Saved in MongoDB

Demo



Github Code -<https://github.com/Divyasakhare07/HeartWellness>

Future Scope

01

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Integration with Wearable Devices

- Continuously monitor vital signs
- Real-time health updates and alerts

03

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Expanding Healthcare Services

- Adding features such as telemedicine consultation
- Health education resources

02

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Enhanced Machine Learning Models

- Refinement of the predictive models
- More diverse datasets

04

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Global Expansion

- Cater to different languages
- Accessible to a broader audience

Conclusion

Data Management
Utilized MongoDB

ERD Modeling
Database structure using
Oracle.

Data Visualization
Insightful visualizations
with Tableau & python

Modeling &
Evaluation
Employed Python for
predictive modeling and
model evaluation.

Data Analysis
Comprehensive analysis
using SQL



Thank You