Heart Disease Diagnostic Analysis

By Tarush Tanwar

Project Detail

Project Title	Heart Disease Diagnostic Analysis
Technologies	Data Science
Domain	Healthcare
Project Difficulties level	Intermediate
Programming Languages Used	Python
Tools used	Jupyter Notebook

Objective
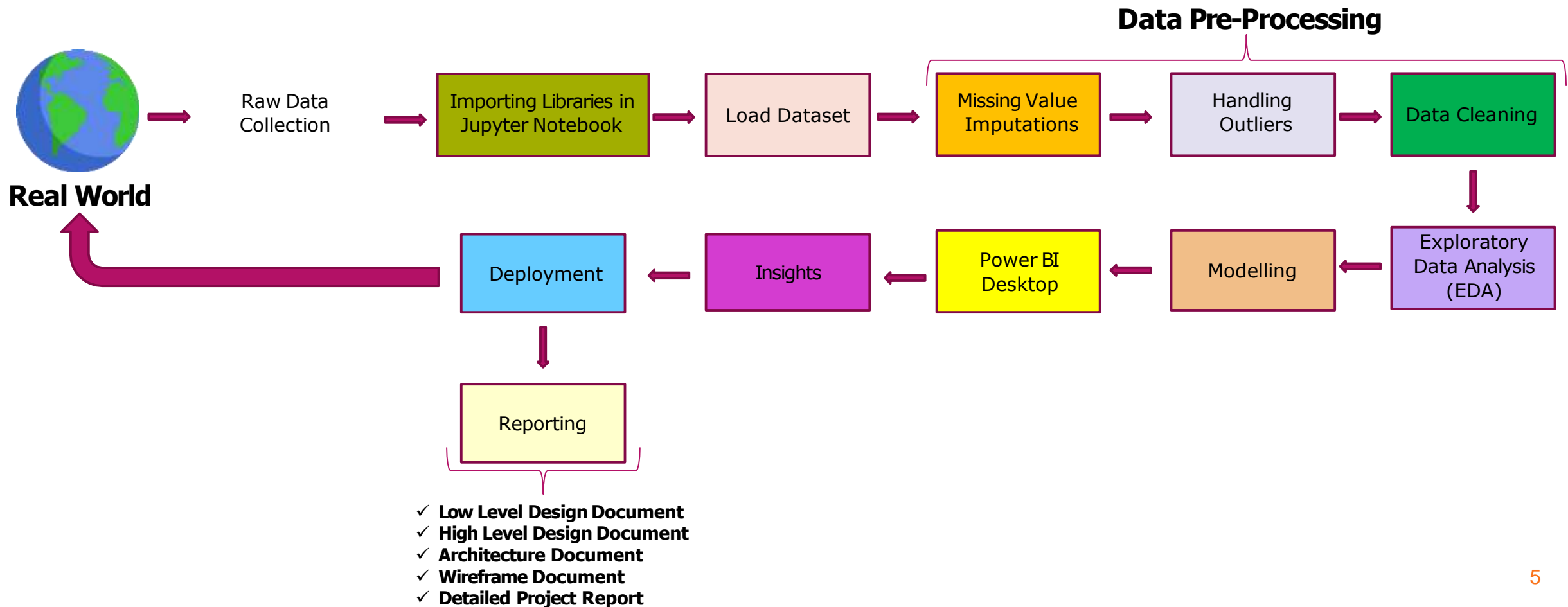
The goal of this project is to analyse the heart disease occurrence, based on a combination of features that describes the heart disease.

Problem Statement

Health is real wealth in the pandemic time we all realized the brute effects of covid-19 on all irrespective of any status. You are required to analyse this health and medical data for better future preparation.

A dataset is formed by taking into consideration some of the information of 1025 individuals.

Architecture

Data Pre-Processing

Real World → Raw Data Collection → Importing Libraries in Jupyter Notebook → Load Dataset → Missing Value Imputations → Handling Outliers → Data Cleaning

Data Cleaning → Exploratory Data Analysis (EDA) → Modelling → Power BI Desktop → Insights → Deployment → Real World

Deployment → Reporting

Reporting:
- ✓ Low Level Design Document
- ✓ High Level Design Document
- ✓ Architecture Document
- ✓ Wireframe Document
- ✓ Detailed Project Report

Dataset Information

age: The person's age in years

sex: The person's sex (1 = male, 0 = female)

cp: The chest pain experienced (Value 1: typical angina, Value 2: atypical angina, Value 3: non-anginal pain, Value 4: asymptomatic)

trestbps: The person's resting blood pressure (mm Hg on admission to the hospital)

chol: The person's cholesterol measurement in mg/dl

fbs: The person's fasting blood sugar (> 120 mg/dl, 1 = true; 0 = false)

restecg: Resting electrocardiographic measurement (0 = normal, 1 = having ST-T wave abnormality, 2 = showing probable or definite left ventricular hypertrophy by Estes' criteria)

thalach: The person's maximum heart rate achieved

Dataset Information

exang: Exercise induced angina (1 = yes; 0 = no)

oldpeak: ST depression induced by exercise relative to rest

slope: the slope of the peak exercise ST segment (Value 1: upsloping, Value 2: flat,
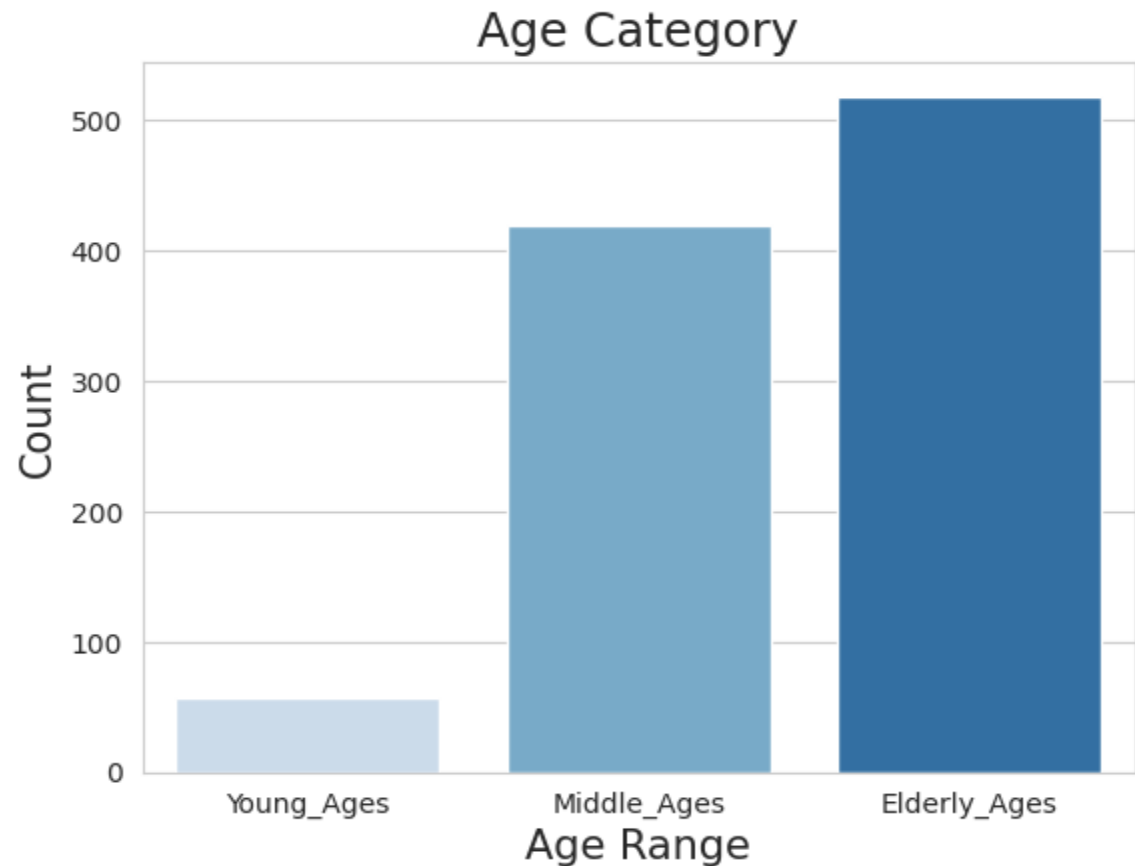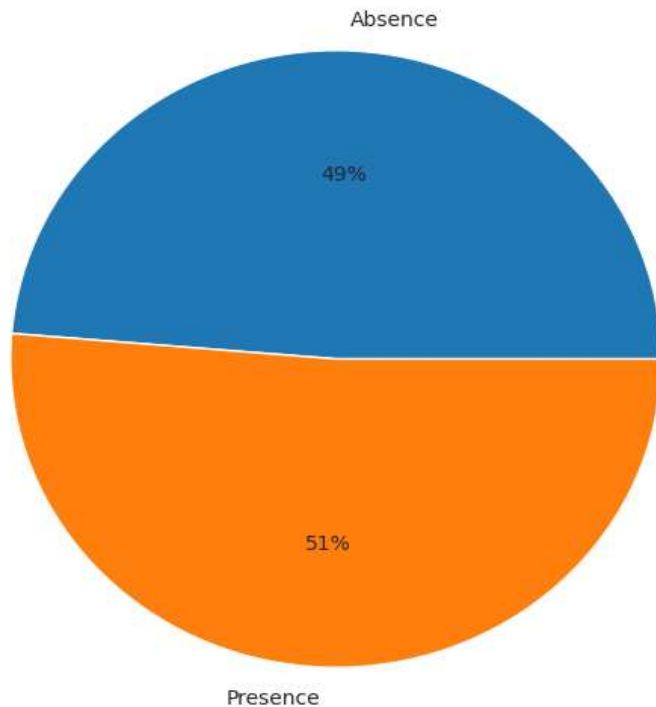   Value 3: down sloping)

ca: The number of major vessels (0-3)

thal: A blood disorder called thalassemia (3 = normal; 6 = fixed defect; 7 =
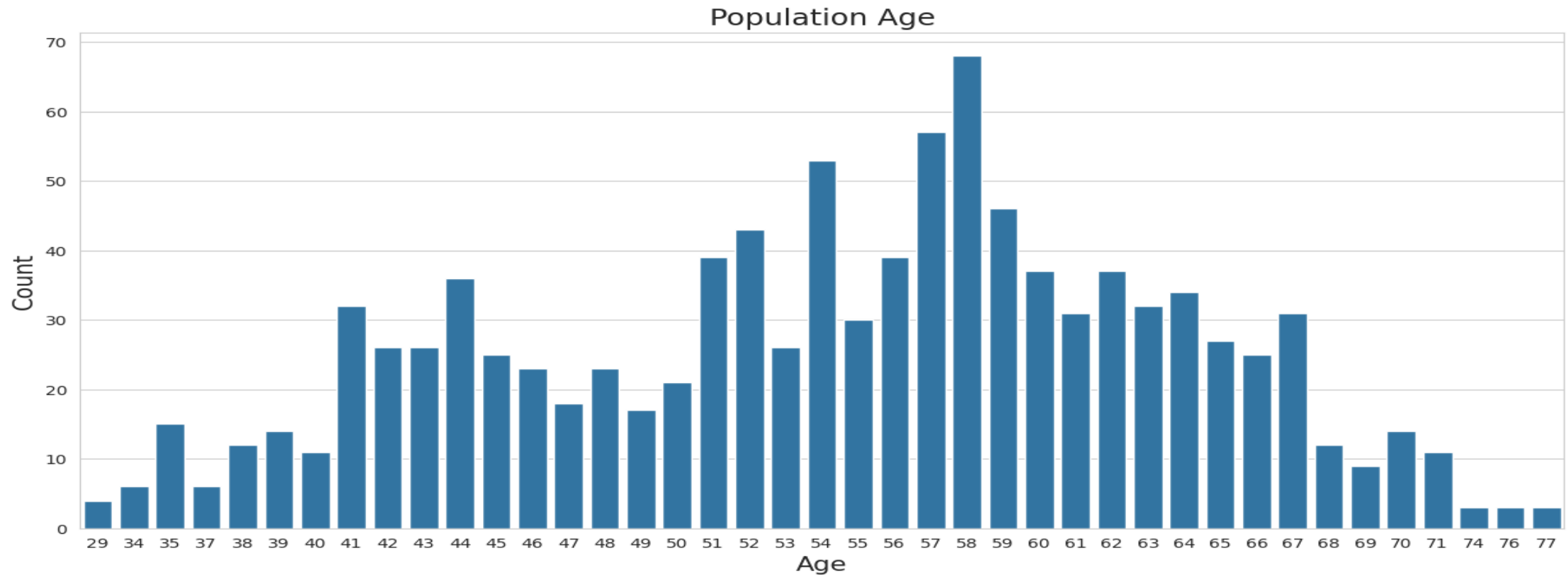   reversable defect)

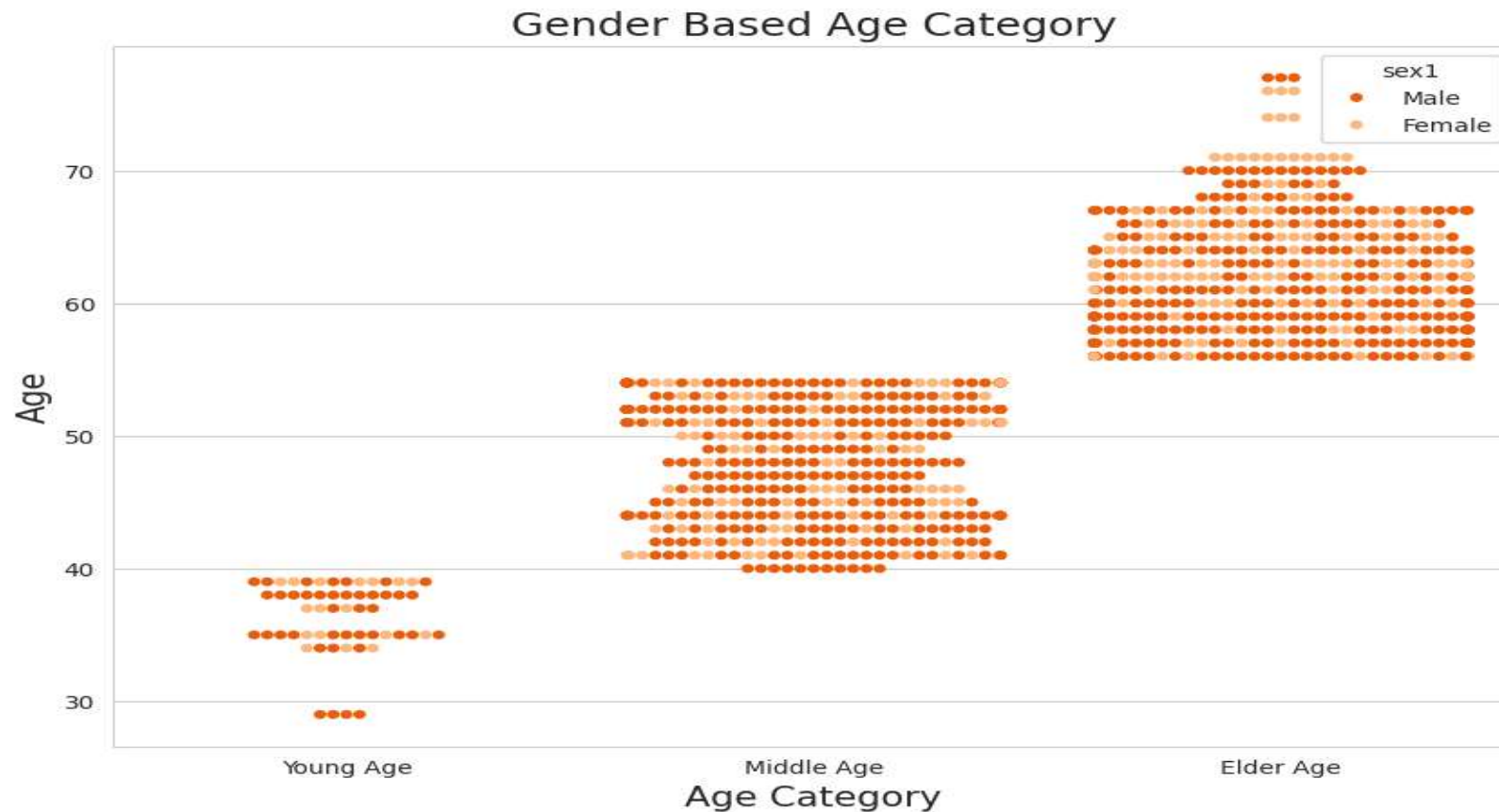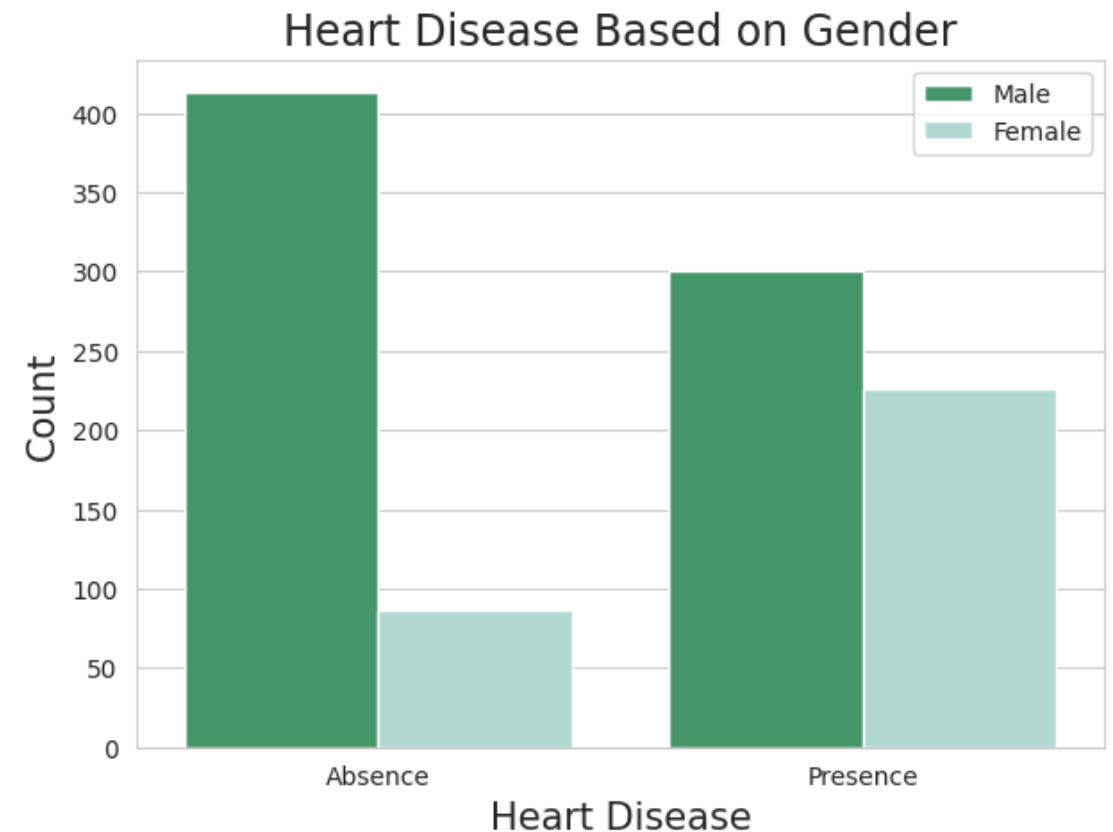**num:** Heart disease (0 = no, 1 = yes)

Data Analysis using Python

Data Analysis using Python

Population Age

9

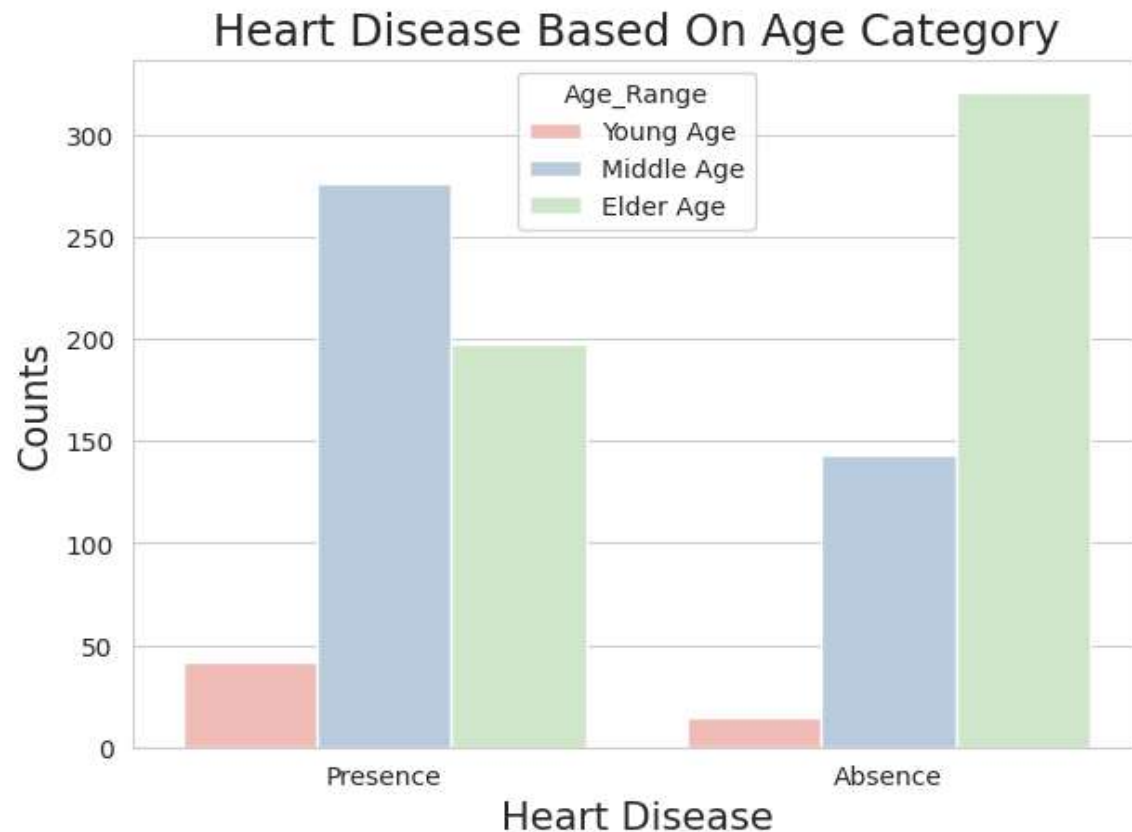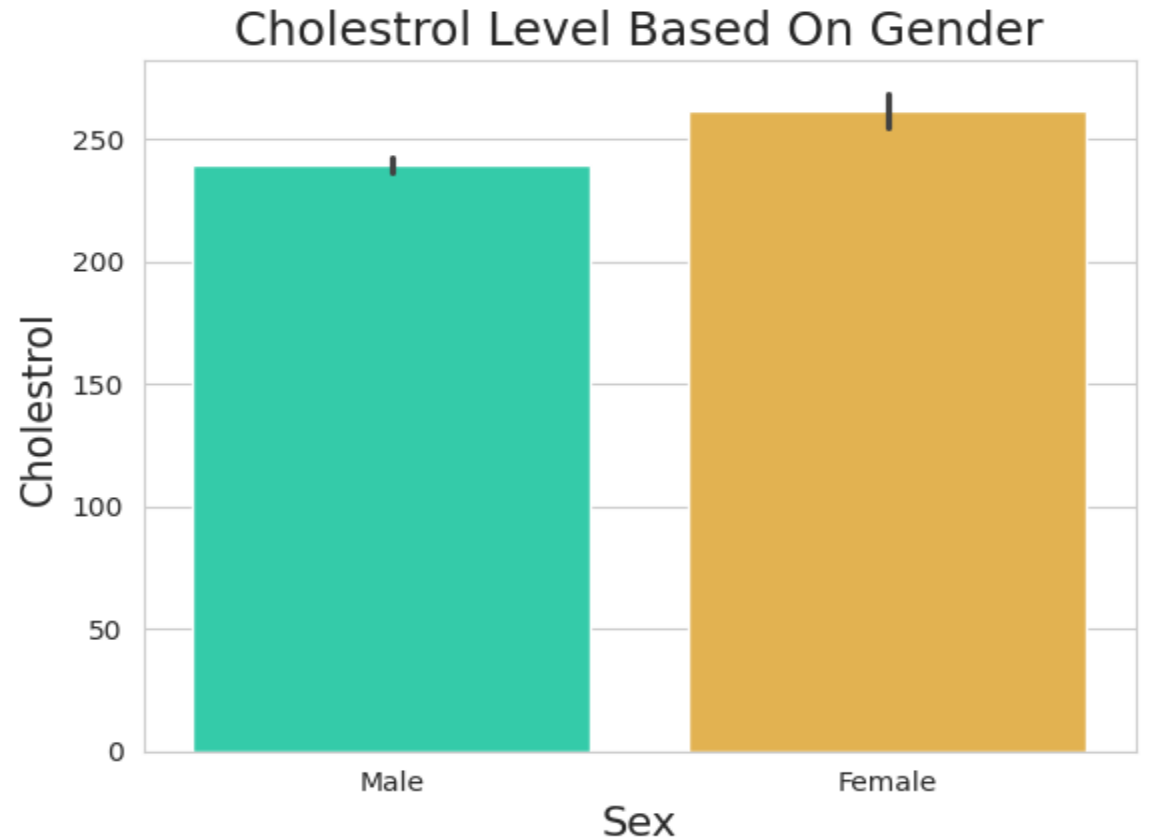# Data Analysis using Python

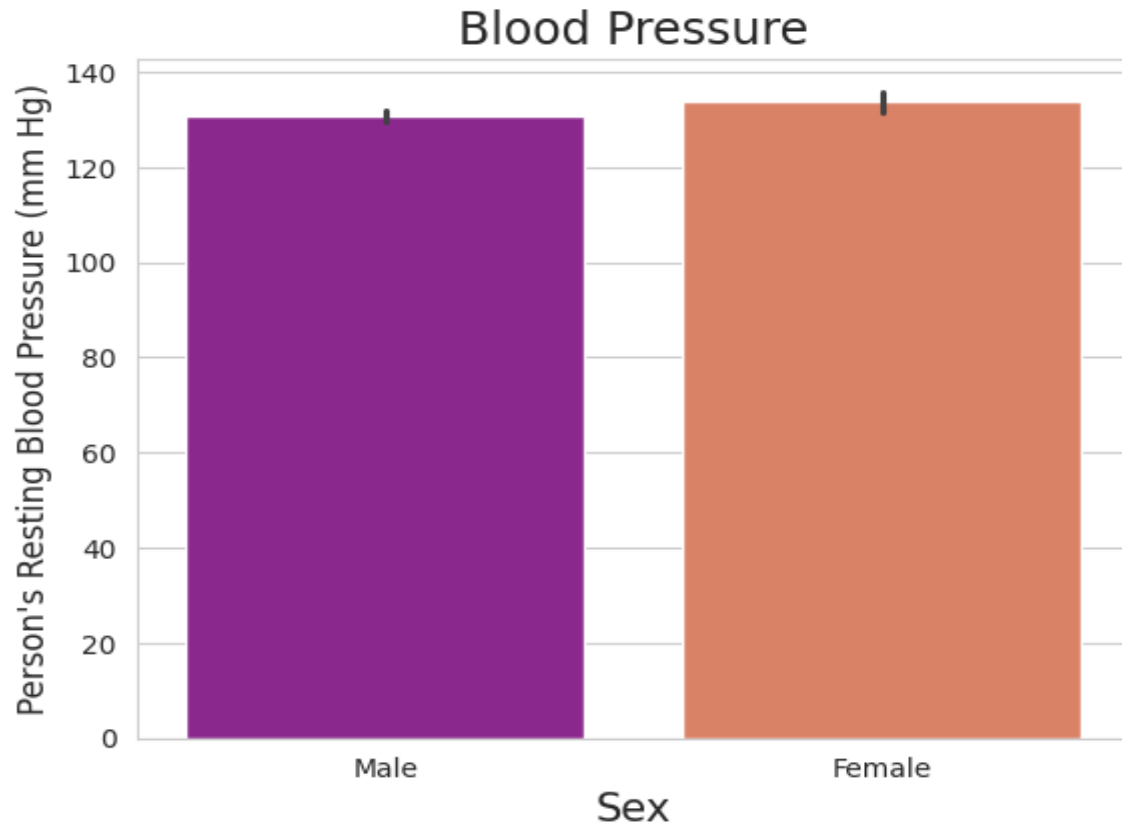
Gender Based Age Category

Data Analysis using Python

Data Analysis using Python

Data Analysis using Python
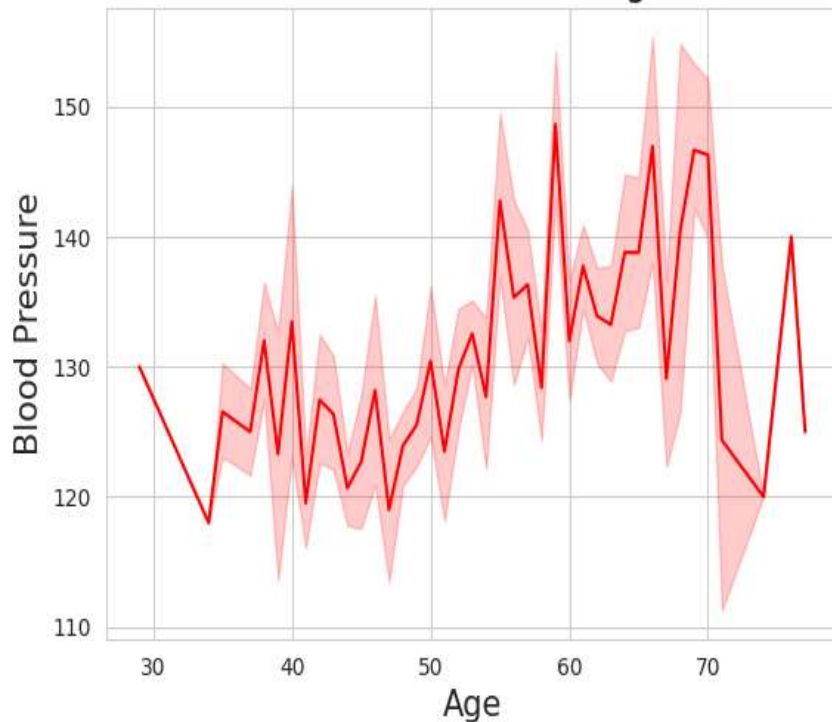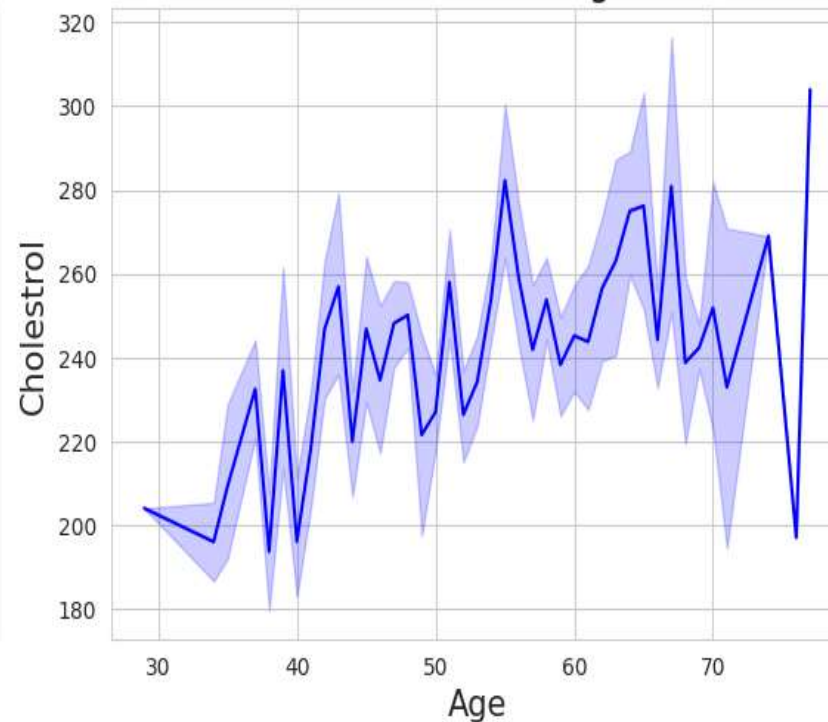
Data Analysis using Python
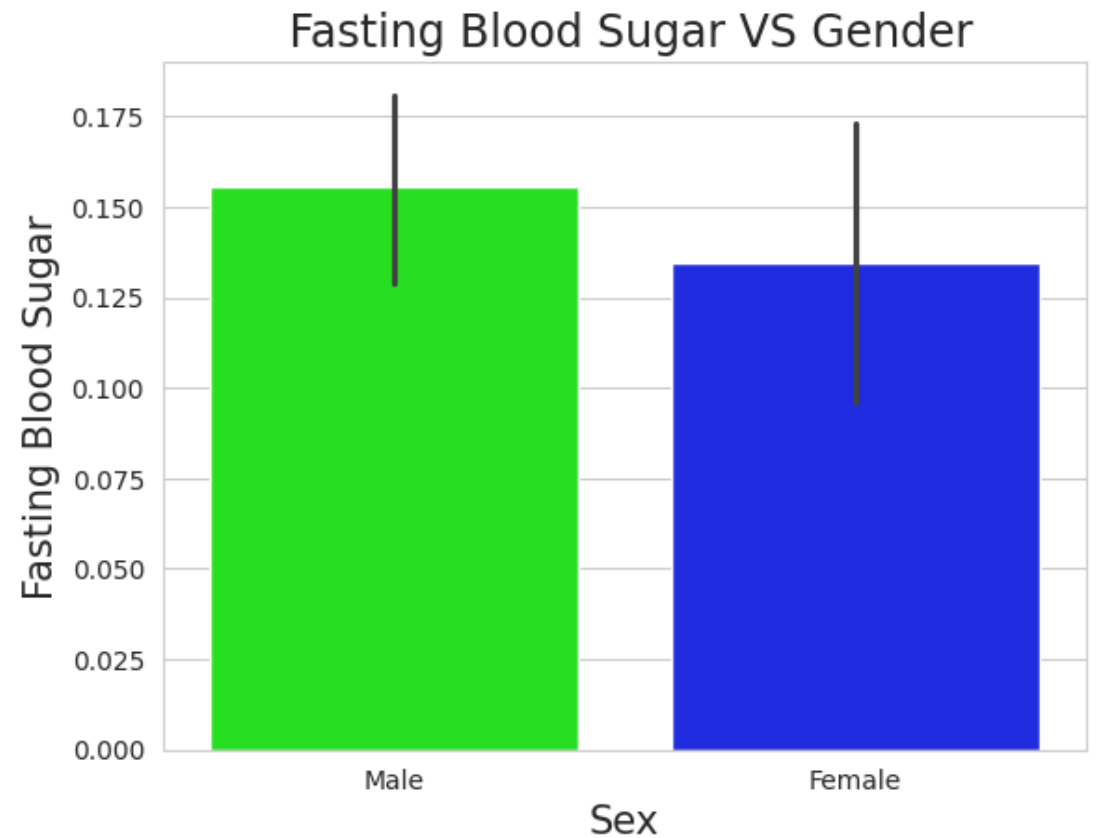
Data Analysis using Python
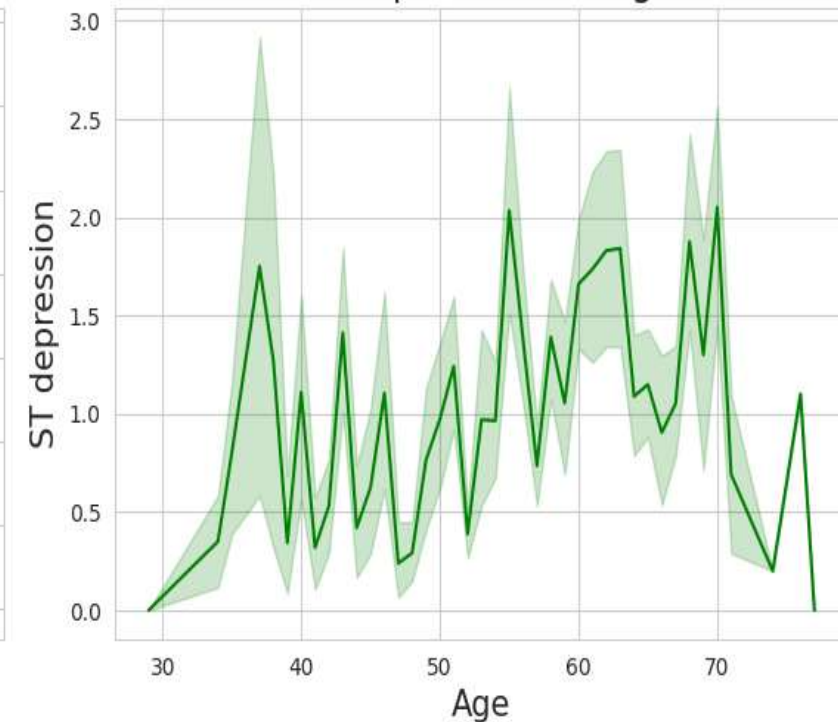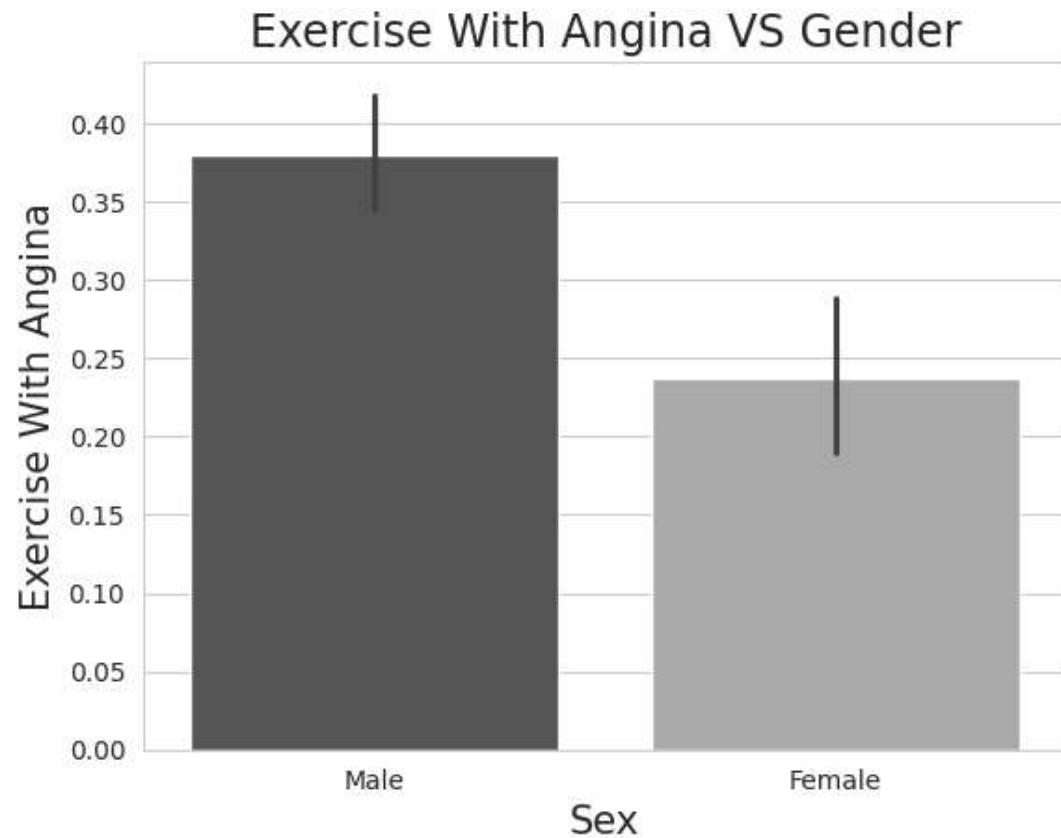
Tableau Dashboard

Heart Disease Diagnostic Analysis

Gender	
Female	Male
312	713

Heart Disease	
Absent	Present
499	526

NEXT
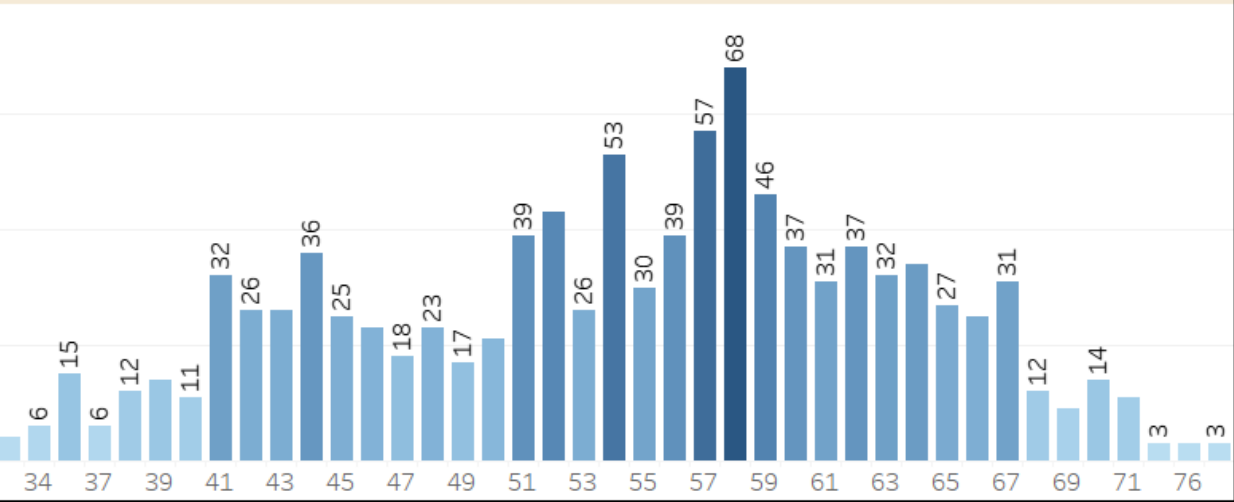
Age vs count

Age vs Resting BP
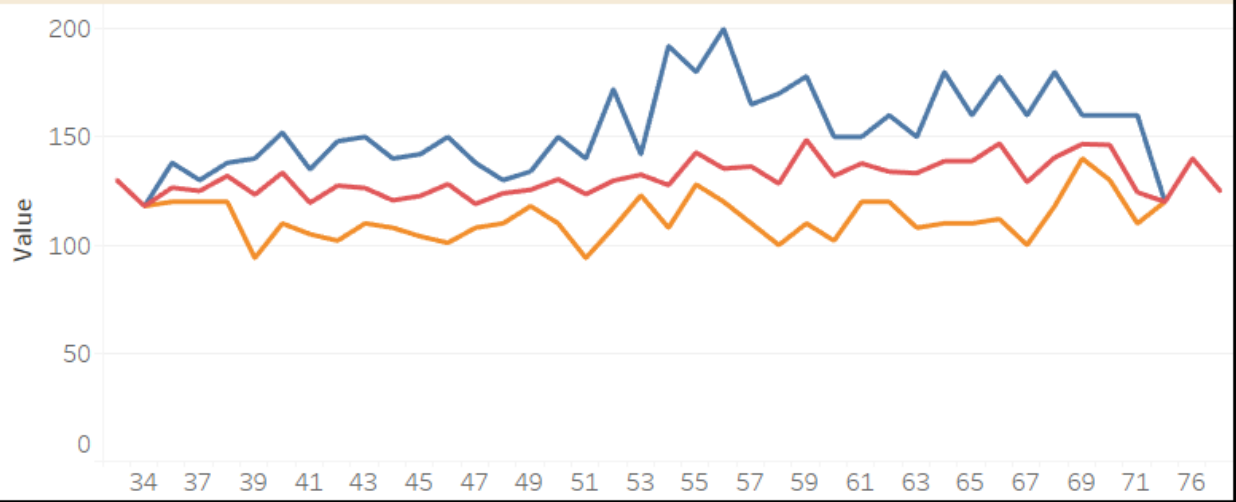
Patient Distribution by Slope

74
469
482
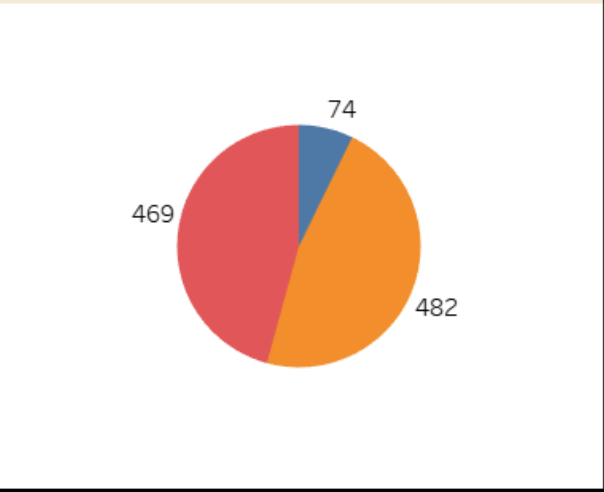
Patient Distribution by Exercise Induced Angina

345
680

Chest Pain vs Count

Type - 1	Type - 2	Type - 3	Type - 4
497	167	284	77

Serum Cholestoral > 200mg/dl

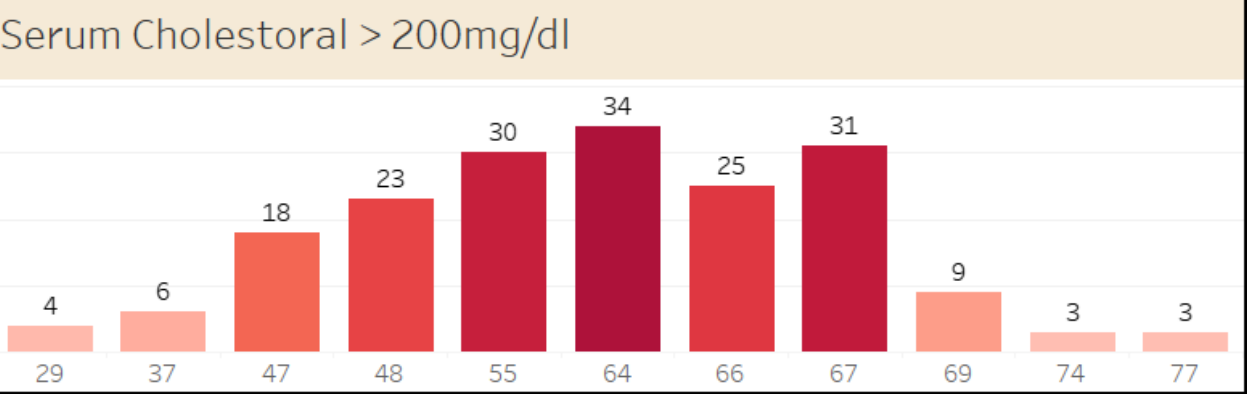| 29	37	47	48	55	64	66	67	69	74	77
4	6	18	23	30	34	25	31	9	3	3

Patient Distribution by Flourosopy Level
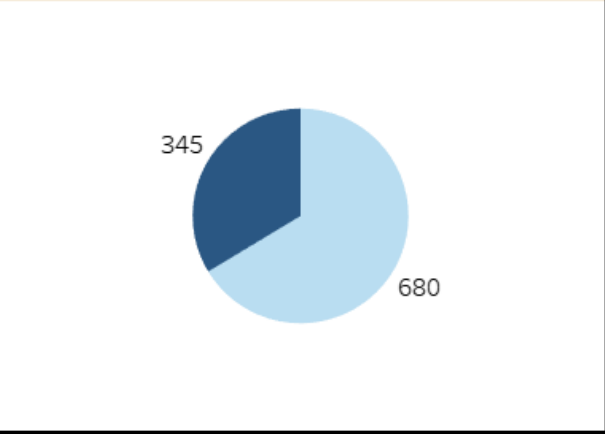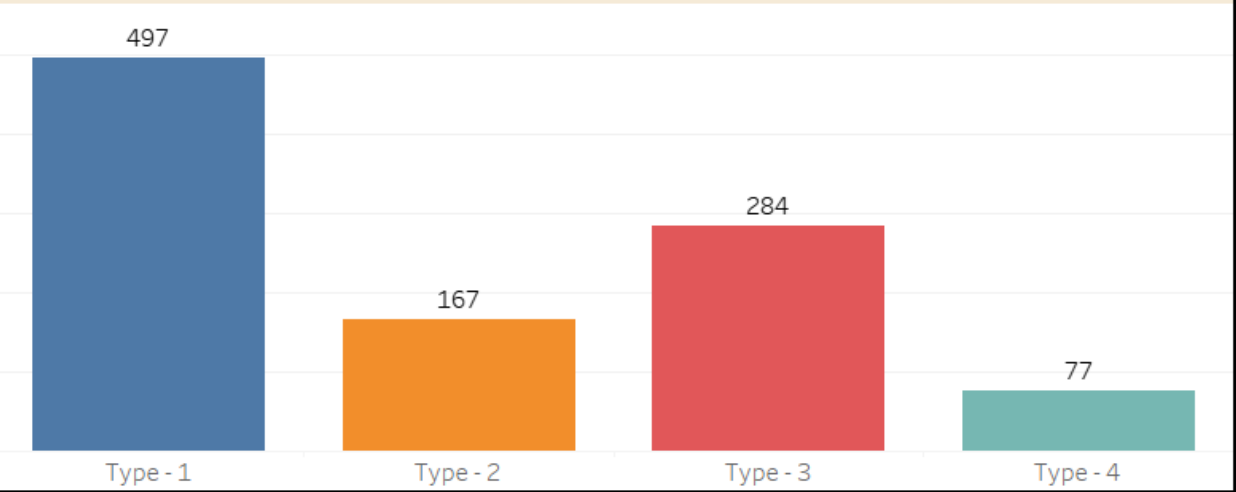
No. of Patients

Gender

Female	Male
312	713

Heart Disease

Absent	Present
499	526

PREVIOUS

Oldpeak vs Count

329

| 0.1 | | 0.3 | | 0.5 | | 0.7 | | 0.9 | | 1.1 | | 1.3 | | 1.5 | | 1.8 | | 2 | | 2.2 | | 2.4 | | 2.6 | | 2.9 | | 3.1 | | 3.4 | | 3.6 | | 4 | | 4.4 | | 6.2 |
| 23 | | 10 | | 15 | 47 | 3 | 44 | 10 | 51 | 6 | 58 | 3 | 44 | 16 | 36 | 32 | 14 | 11 | 21 | 17 | 10 | 15 | 12 | 4 | 3 |

Resting ECG vs Count

0	1	2
497	513	15

Fasting Blood Sugar

153

872

Thallium Test Value

7 64

410

544
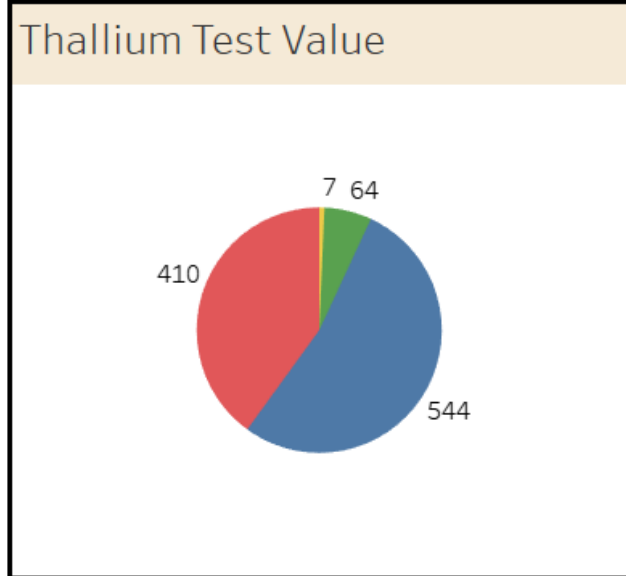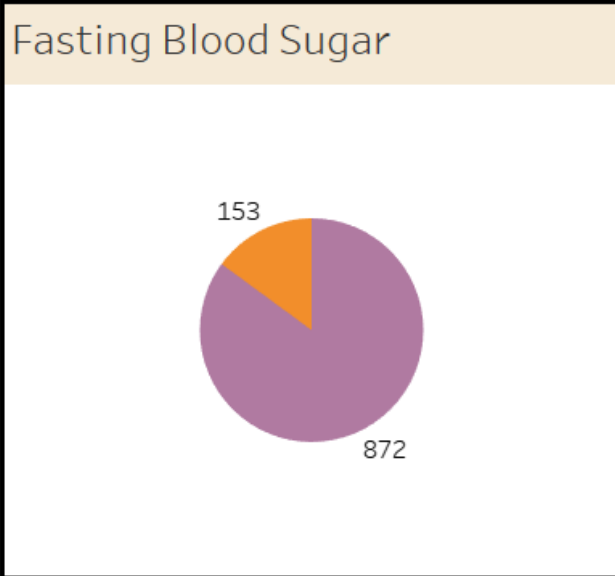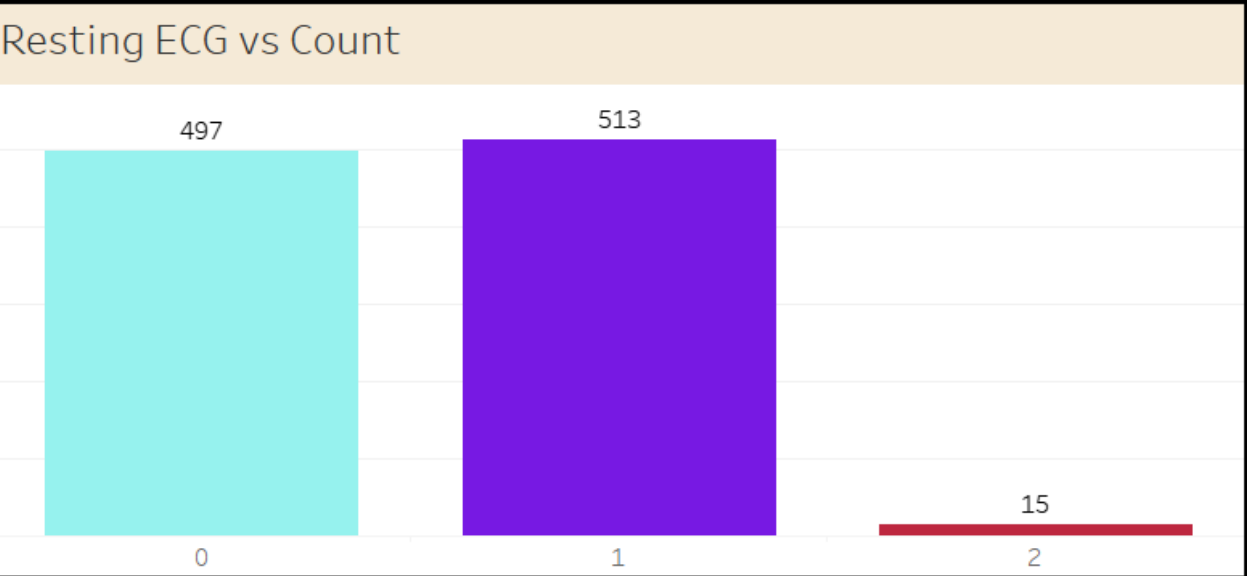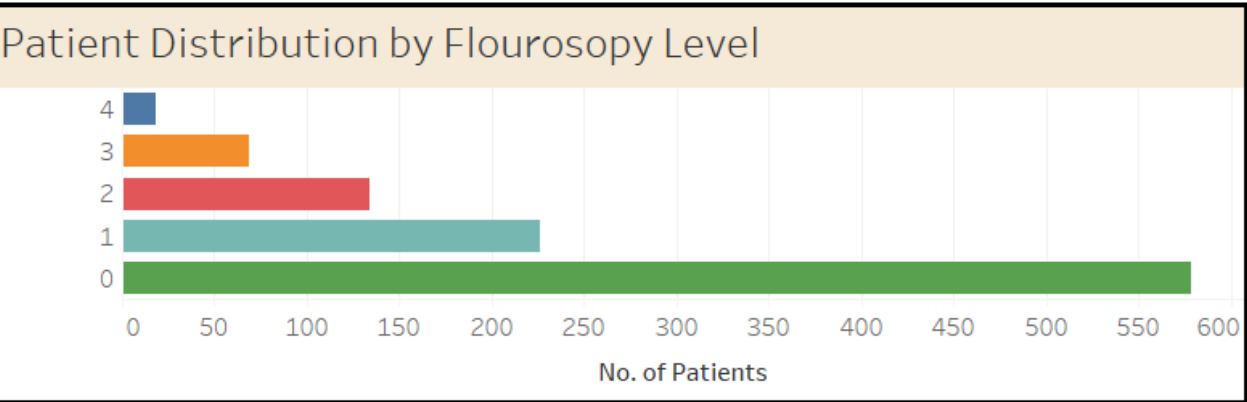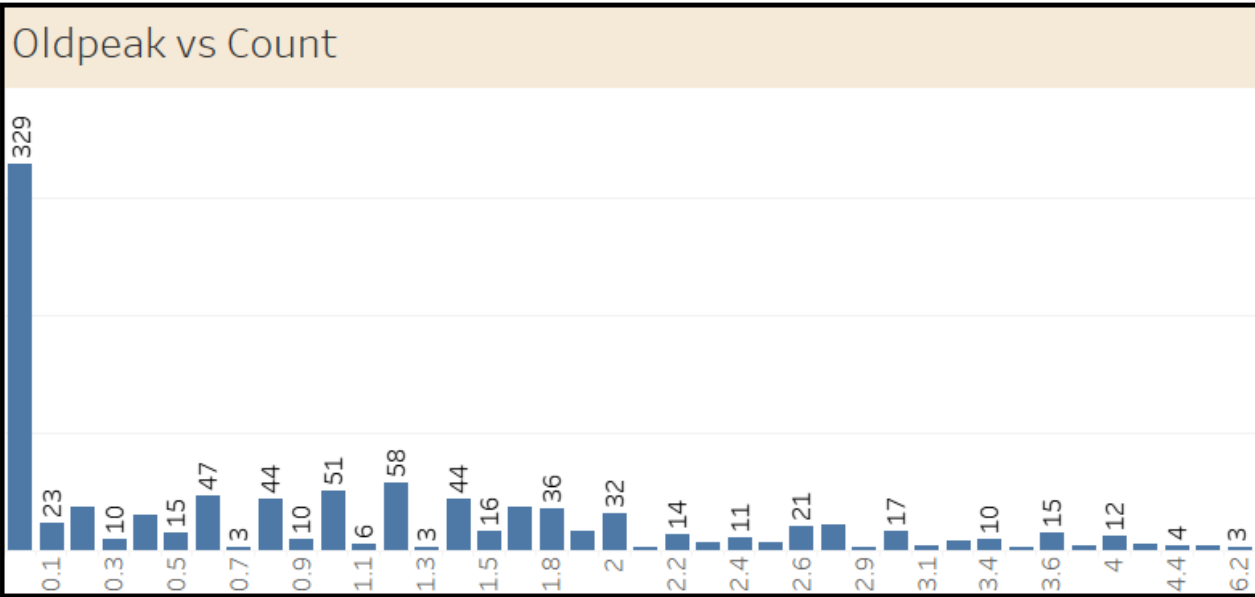
Insights

➢ Out of 1025 patients, there are 312 females and 713 males, with an average age of 54.

➢ 48.5% of patients (13% females and 35.5% males) experience no chest pain.

➢ Very severe chest pain affects 7.5% of patients (77 total, 13 females, and 64 males).

➢ Patients aged 55-65 often have the highest resting blood pressure (diastolic over 150 mg/dl), indicating a higher risk of hypertension.

➢ Approximately 83% of patients (853 total, 267 females, and 586 males) have serum cholesterol levels above 200 mg/dl, increasing cardiovascular disease risk.

Insights

➢ Fasting blood sugar levels above 120 mg/dl are found in 15% of patients (42 females and 111 males), suggesting prediabetes or Type 2 diabetes.

➢ Only 1.5% of patients (11 females and 4 males) show a resting electrocardiographic value of 2, indicating possible heart attack signs.

➢ 48.5% of patients have no cardiac abnormalities.

➢ Male patients generally have better resting electrocardiographic results than female patients.

➢ Exercise-induced angina is present in 34% of patients (74 females and 271 males).

Insights

➤ Moderate ischemia (Oldpeak value of 0.8) is noted in 390 patients.

➤ Normal slope value (1) is observed in 47% of patients, while 46% have a slope value of 2. However, 7% have a slope value of 0, indicating more severe ischemia or coronary artery disease.

➤ Eighteen male patients have a critical fluoroscopy level of 4. Conversely, 56% have a fluoroscopy value of 0, indicating healthy heart function.

➤ Thallium test value of 2, suggestive of decreased blood flow or scar tissue, is seen in around 93% of patients.

Insights

➢ Approximately 21% of patients (105 females and 114 males) with chest pain severity of 2 are diagnosed with heart disease, with males being more prone.

➢ About 51% of patients are diagnosed with heart disease.

➢ Signs of heart disease are notably present in patients aged 40-45 and 50-60.

Thank you