Heart Disease Diagnostic Analysis

Project Report by

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CONTENT

- *Objective*

- *Project Details*

- *Problem Statement*

- *Architecture*

- *Dataset Information*

- *Important Parameters*

- *Insights*

- *Key Performance Indicators (KPIs)*

- *Q & A*

- *Conclusion*

OBJECTIVE

The aim of this project is to analyze the occurrence of Heart Disease among people by studying different parameters, factors and their effects related to heart disease by using the provided dataset.

Business Objectives:

❑ Performing EDA through Python and find insights.

❑ Extract various information such as heart disease rates, Heart disease by - gender, by age.

❑ Compare attributes of the dataset to extract necessary information.

❑ Make Dashboard with extracted information from data.

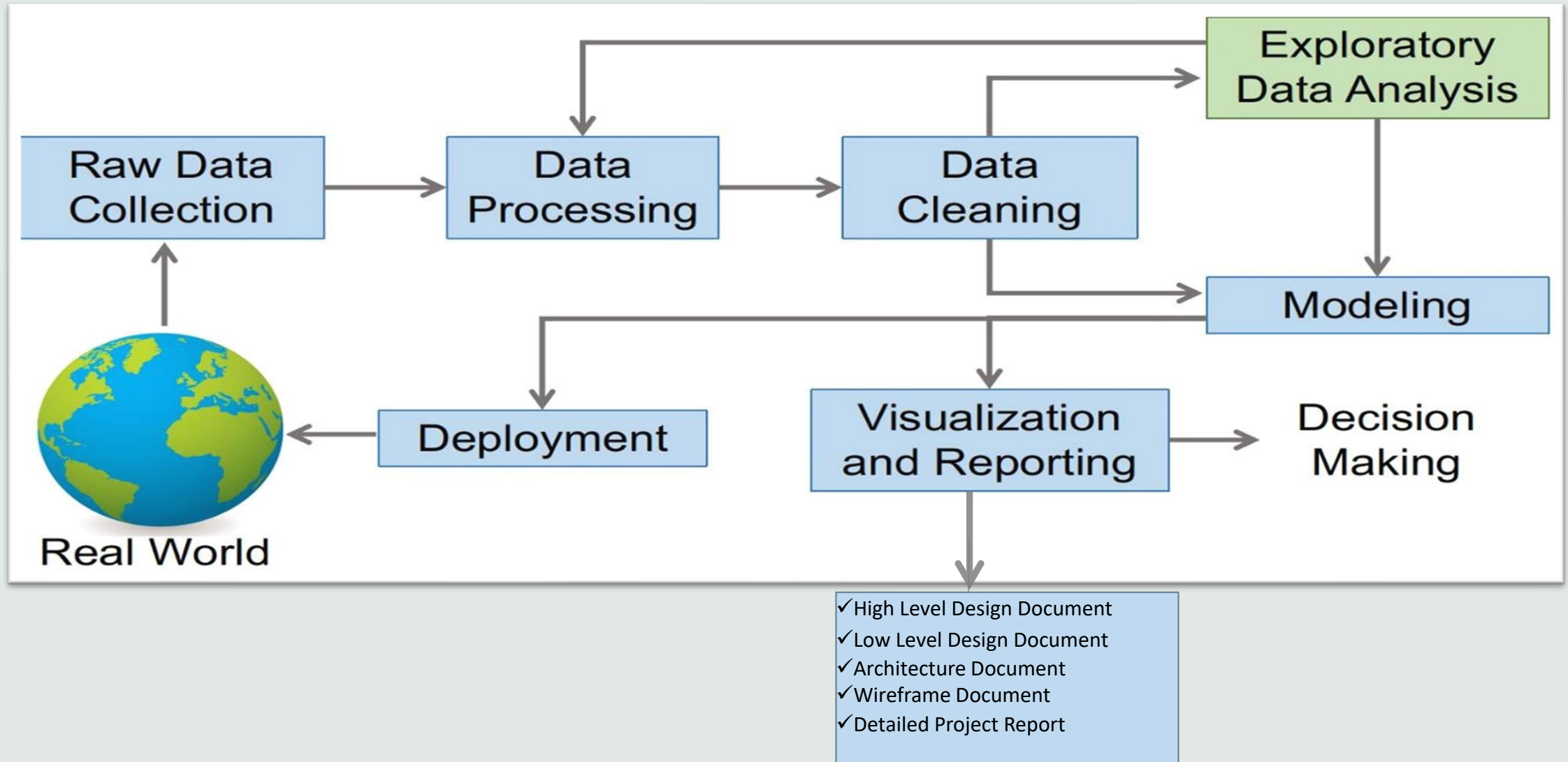❑ Find key metrics and factors and show relationship between attributes.

PROJECT DETAILS

Project Title	Heart Disease Diagnostic - Analysis
Technology	Business Intelligence
Domain	Healthcare
Project Difficulty Level	Advanced
Programming Language Used	Python
Tools Used	Jupyter Notebook, MS-Excel, Power BI

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 do the research, analyze this health and medical data for better future preparation.

- Dataset is formed by taking into consideration of some information from 303 individuals.

ARCHITECTURE

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

DATASET INFORMATION

1. age: in years	8. thalach: maximum heart rate achieved
2. sex: 2 Values (1 = male, 0 = female)	9. exang: exercise include angina (1 = yes, 0 = no)
3. chest pain type: 4 values (Value 1: typical angina, Value 2: atypical angina, Value 3: non - anginal pain, Value 4: asymptomatic)	10. oldpeak: ST depression induced by exercise relative to rest
4. trestbps: resting bloop pressure (in mm Hg on admission to the hospital)	11. slope: the slope of the peak exercise ST segment (Value 1: upsloping, Value 2: flat, Value 3: downsloping)
5. chol: serum cholestrol in mg/dl	12. ca: number of major vessels (0-3) colored by flourosopy
6. fbs: (fasting blood sugar > 120 mg/dl), (1 = true, 0 = false)	13. thal: 3 = normal; 6 = fixed defect; 7 = reversable defect
7. restecg: resting electrocardigraphic results: (Value 0: normal, Value 1: having ST-T wave abnormality (T wave inversions and/or ST elevation or depression of > 0.05 mV, Value 2: showing probable or definite left ventricular hypertrophy by Estes' criteria)	14. num: the predicted attribute diagnosis of heart disease (angiographic disease status) (Value 0: < 50% diameter narrowing, Value 1: > 50% diameter narrowing i.e. 0 = no (no presence of heart disease), 1 = yes (presence of heart disease))

IMPORTANT PARAMETERS

1) Age: Age is an independent risk factor for cardiovascular disease (CVD) in adults. Aging can cause changes in the heart and blood vessels that may increase a person's risk of developing cardiovascular disease.

2) Sex: Men generally develop CVD at a younger age and have a higher risk of coronary heart disease (CHD) than women. Women develops Heart Disease 7 to 10 years later than in men i.e. chances of heart risk develop in women after postmenopausal.

3) Resting Blood Pressure: High blood pressure adds to your heart's workload. High blood pressure increases the force of blood through your arteries and can damage artery walls , and narrowed arteries that are less elastic make it more difficult for blood to travel and increases risk of heart failure, heart diseases, heart attack, stroke, atrial fibrillation, chronic kidney disease.

4) Fasting Blood Sugar: High blood sugar can damage blood vessels and the nerves that control your heart. People with diabetes are also more likely to have other conditions that raise the risk for heart disease.

5) Cholesterol: High levels of cholesterol can increase your risk of heart disease, conditions like peripheral artery disease, high blood pressure and stroke. With high cholesterol, you can develop fatty deposits in your blood vessels. Eventually, these deposits grow, making it difficult for enough blood to flow through your arteries.

6) Resting ECG: Major and minor ECG abnormalities among older adults were associated with an increased risk of CHD events.

7) Maximum Heart Rate: A high heart rate was associated with a higher risk of all-cause mortality and cardiovascular events, an increase in heart rate by 10 beats per minute was associated with an increase in the risk of cardiac death by at least 20%, and this increase in the risk is similar to the one observed with an increase in systolic blood pressure by 10 mm Hg.

8) ST Depression: ST depression refers to a finding on an electrocardiogram, wherein the trace in the ST segment is abnormally low below the baseline.ST depression can increase the risk of an adverse cardiac event such as a heart attack or blood clots.
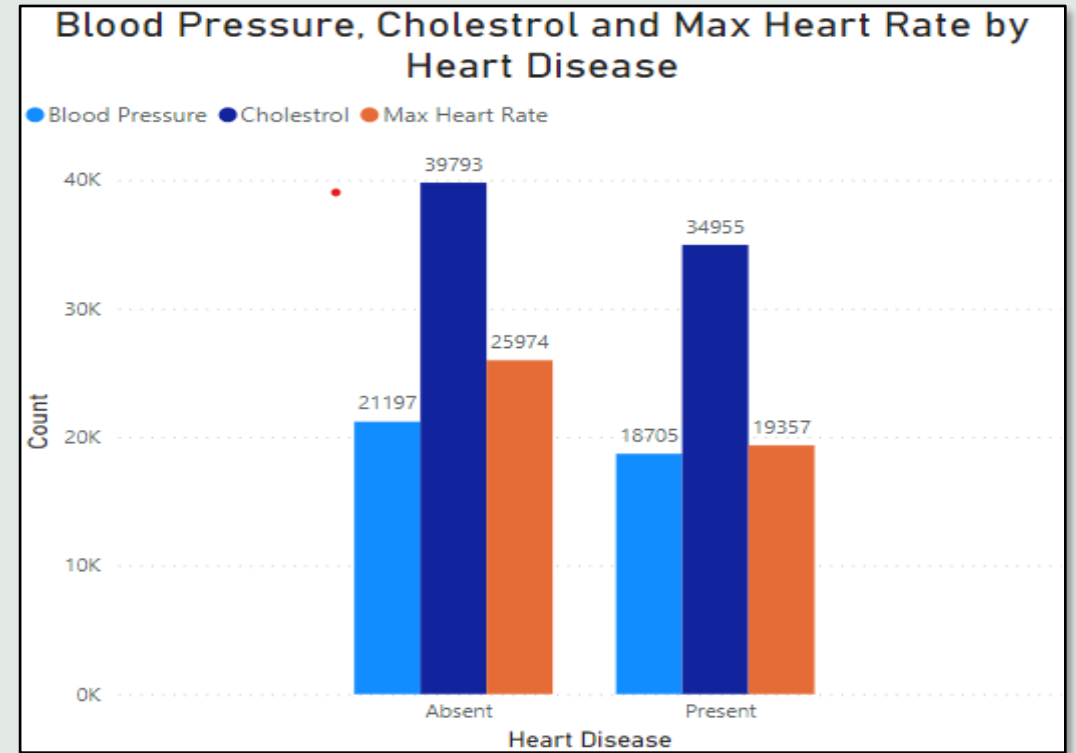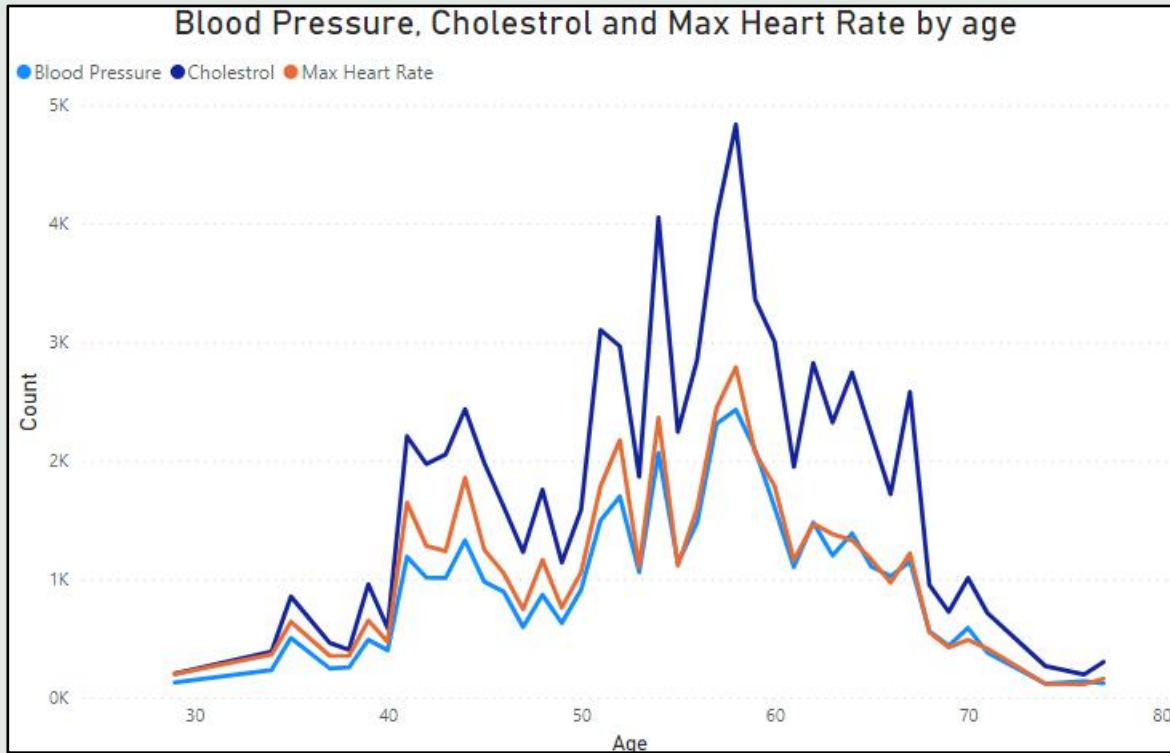
INSIGHTS
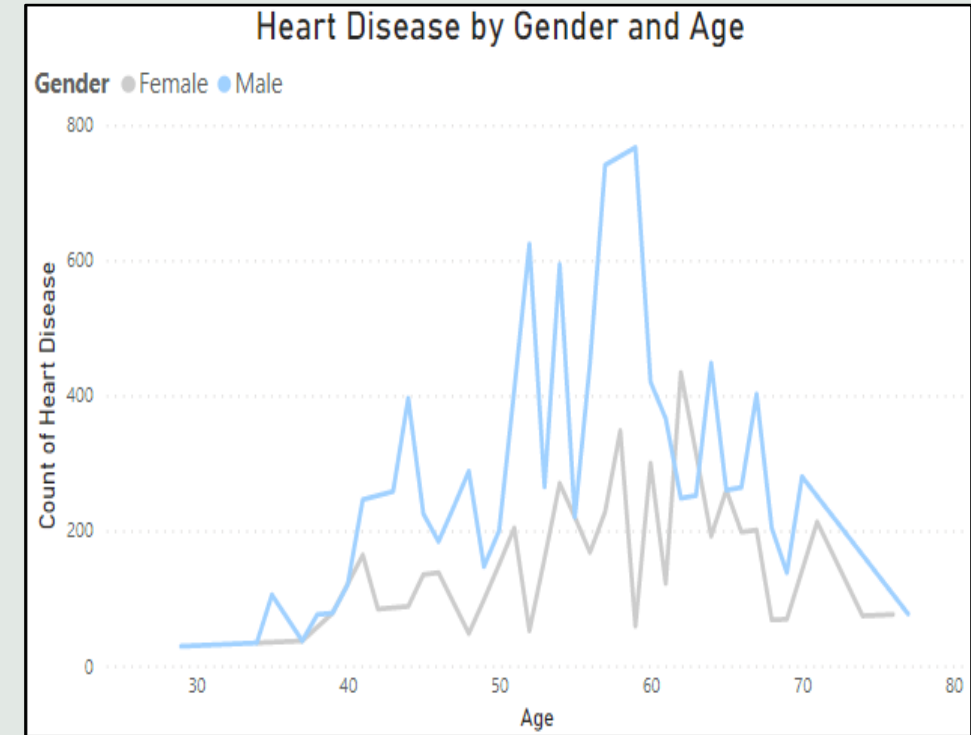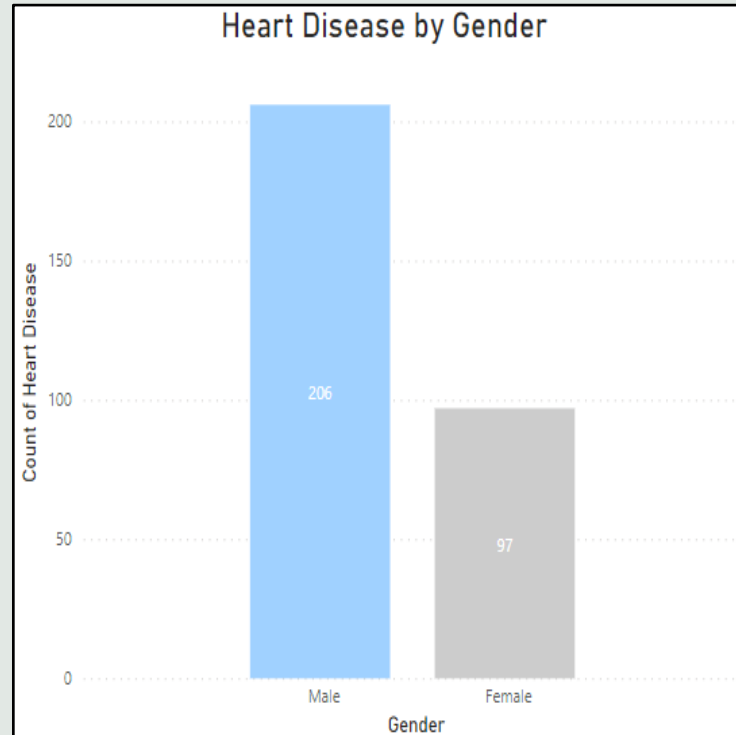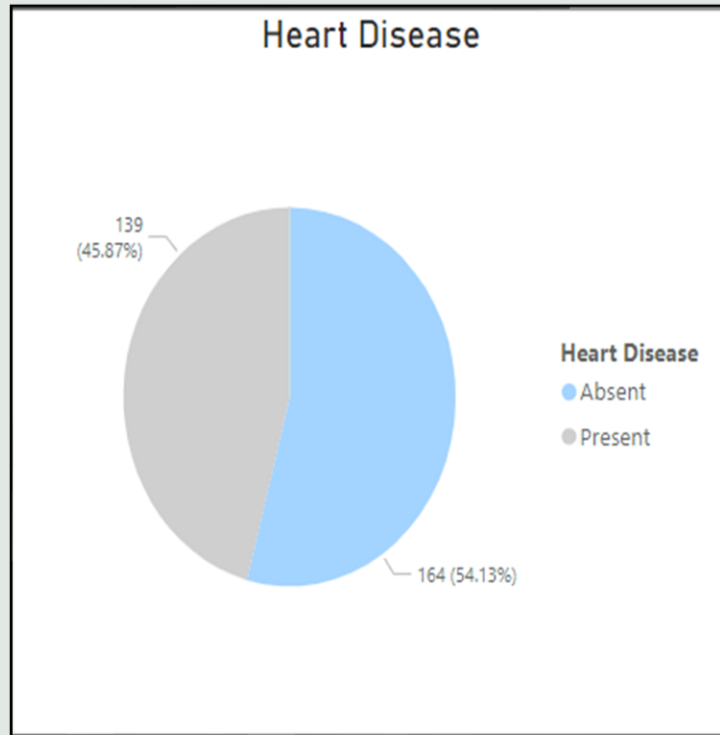
- Almost 45.9% of people are suffering from Heart Disease.
- Males between age 50 – 60 Years and Females between 55 – 65 Years.

# CHEST PAIN EXPERIENCED BY MOST OF THE PEOPLE
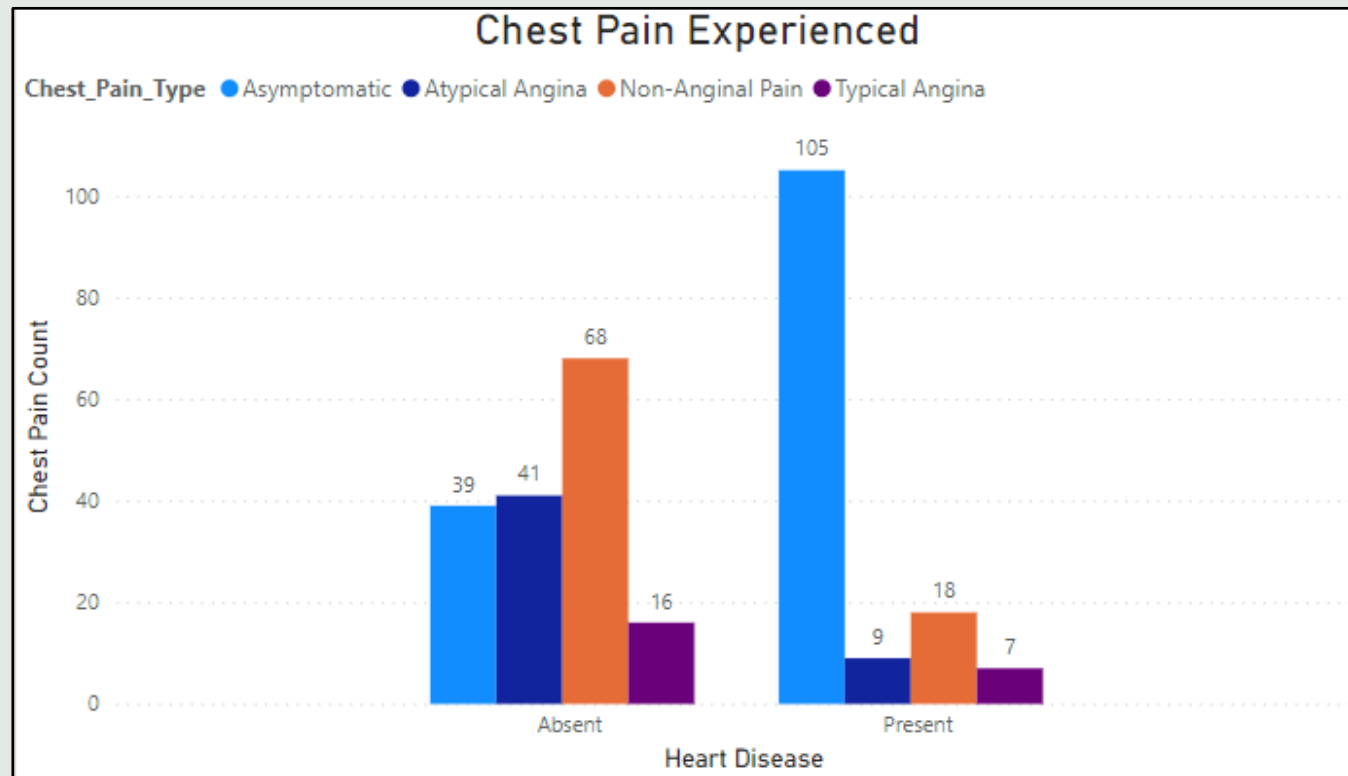
- People having Asymptomatic Chest Pain have a higher chance of having Heart Disease.

OTHER SYMPTOMS IN HEART DISEASE

Blood Pressure, Cholestrol and Max Heart Rate by age

Blood Pressure, Cholestrol and Max Heart Rate by Heart Disease

- Maximum Heart Rate, Blood Pressure, Cholesterol is observed between the age 50-60 Years.

OTHER SYMPTOMS IN HEART DISEASE
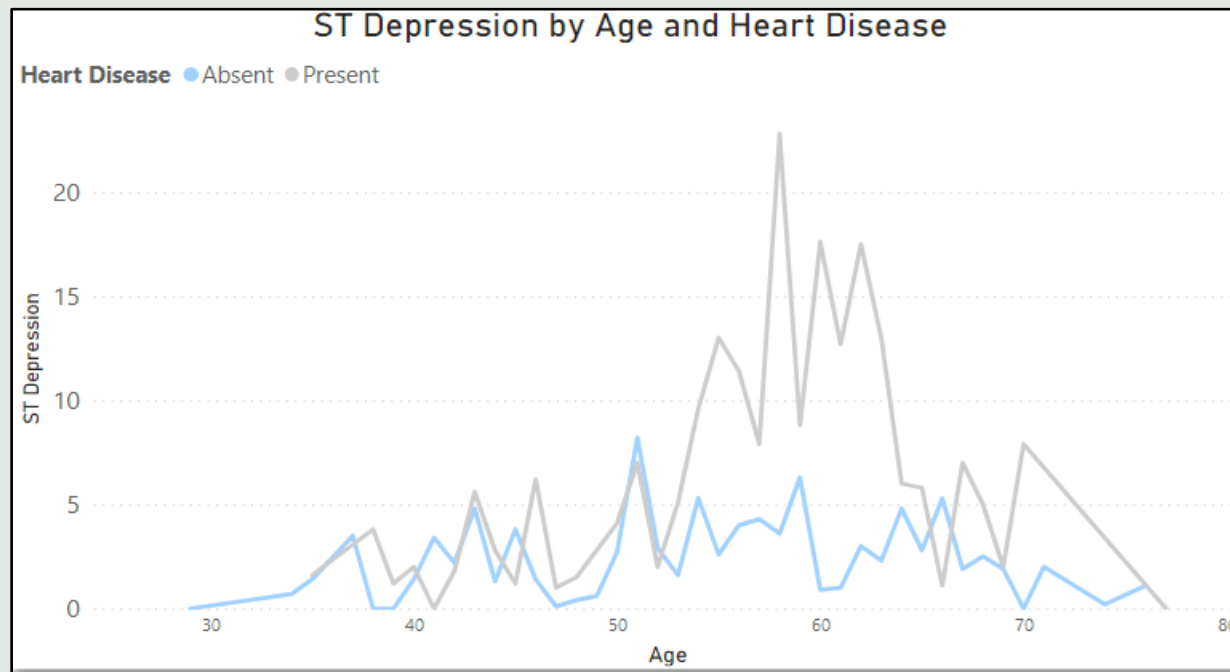
- ST Depression Peak (Flat and Upsloping) is seen more in old Age people (50-65 Years) having Heart Disease.

KEY PERFORMANCE INDICATORS (KPIS)

Key indicators displaying a summary of the Heart Disease Diagnostic-Analysis and its relationship with different metrics:

1. Percentage of People Having Heart Disease.

2. Age Distribution including Gender.

3. Gender Distribution Based on Heart Disease.

4. Chest Pain Experienced by People Suffering from Heart Disease.

5. Blood Pressure, Cholesterol Level and Maximum Heart Rate of Heart Disease Patients according to their Age.

6. ST Depression Experienced by Heart Disease People w.r.t their Age.

CONCLUSION

- Almost 45.87 % of people are suffering from Heart Disease.

- Males and Old Age group people are more prone to Heart Disease.

- Males in Old Age (50 – 60 Years) and Females in Old Age (55 – 65 Years) category suffer from Heart Disease more.

- People experiencing Asymptomatic Chest Pain have a higher chance to have Heart Disease.

- Maximum Heart Rate, Blood Pressure , Cholesterol is observed between the age 50-60.

- Cholesterol level of people having Heart Disease is High.

- ST Depression Peak (Flat and Upsloping) is seen more in old Age people having Heart Disease.

Q & A

Q.1. What's the source of Data?

➢ Link: https://archive.ics.uci.edu/ml/datasets/Heart+Disease

Q.2. What was the type of Data?

➢ The Data has both Numerical and Categorical values.

Q.3. What is the complete flow followed in this project?

➢ Refer slide for better understanding.

Q.4. What techniques were used for Data?

➢ Data Handling and Cleaning, Removing Outliers ➢ Converting Numerical data into Categorical data ➢ Visualization and Report making.

Q.5. What libraries were used in Python?

➢ Pandas, Numpy, Matplotlib, Seaborn.

THANK YOU !