HEART DISEASE DIAGNOSTIC ANALYSIS

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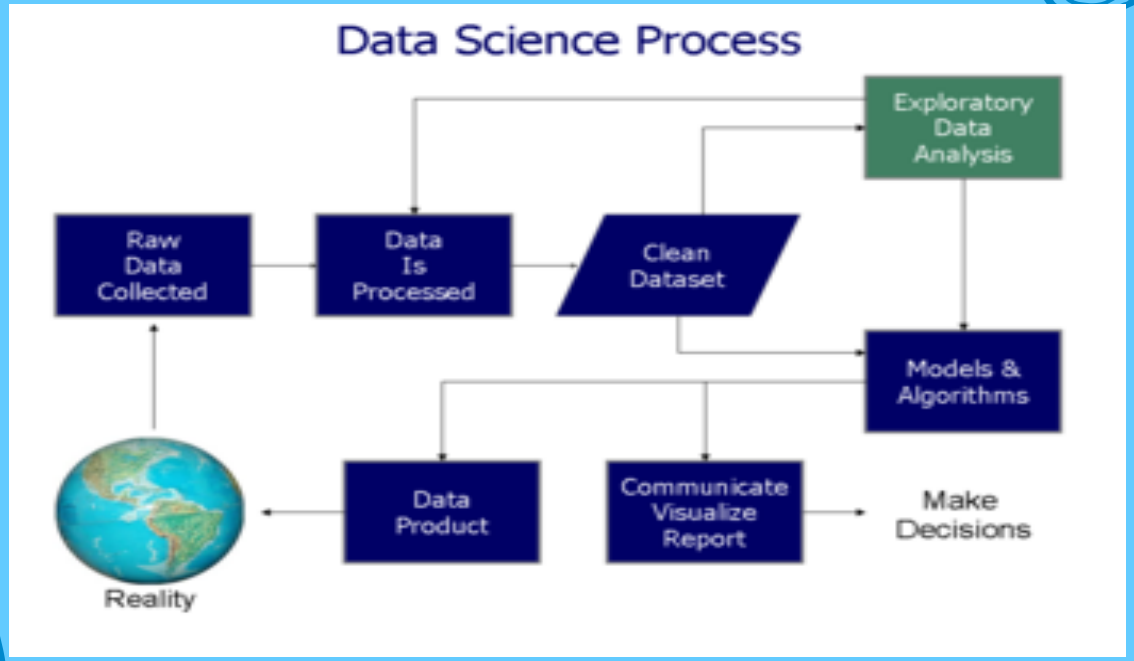
OBJECTIVE

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

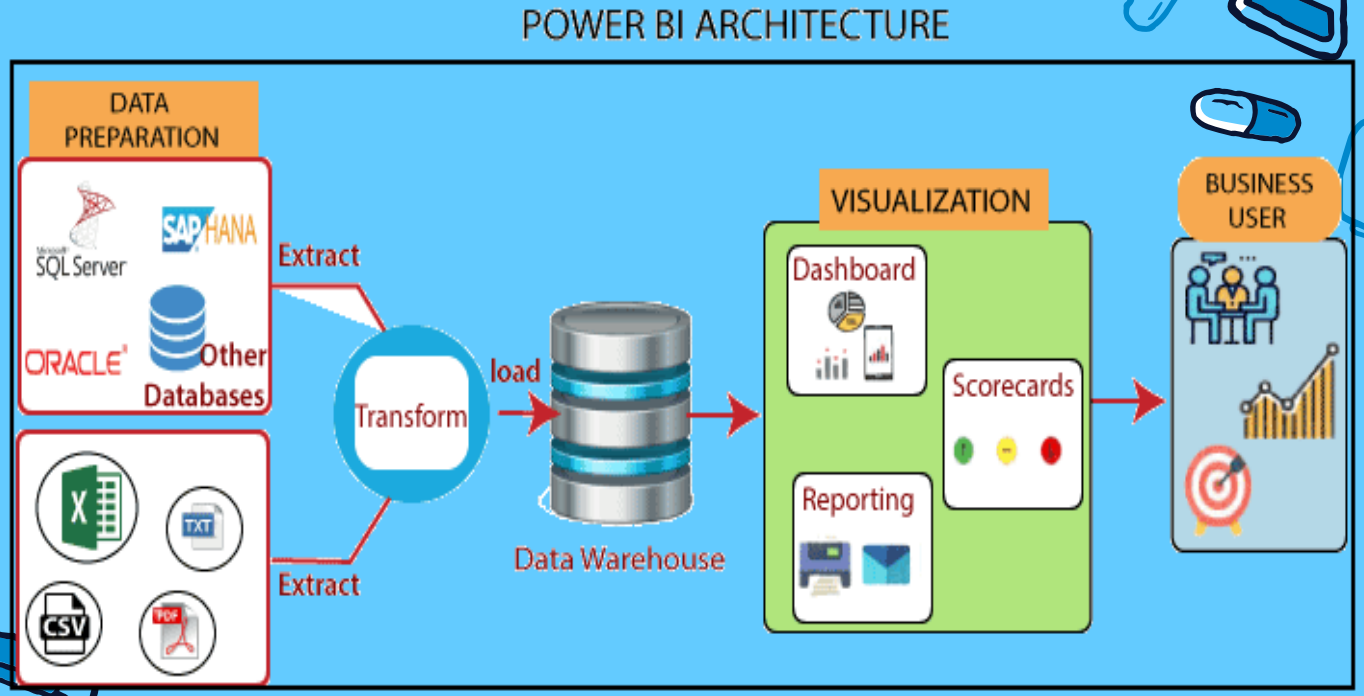
PROBLEM STATEMENT

- 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 analyze this health and medical data for better future preparation.
- Dataset is formed by taking sample medical information from 303 peoples.

ARCHITECTURE



POWER-BI ARCHITECTURE



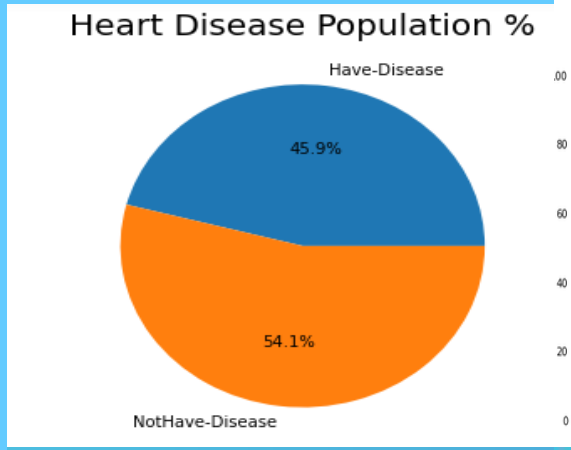
DATASET INFORMATION

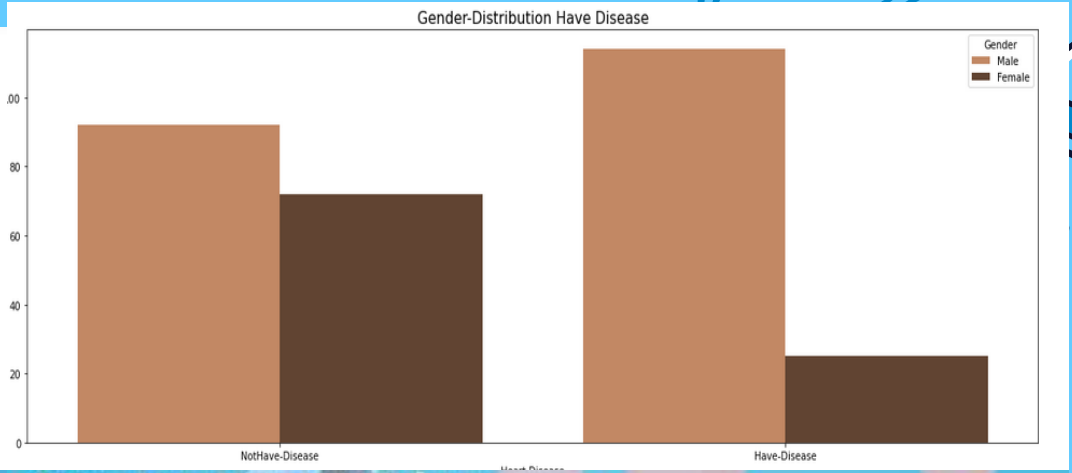
The file name heart_disease_dataset.csv contains different columns such as age, chest pain (cp), cholesterol (chol), thalassemia (thal), and fasting blood sugar (fbs),num(represent who have disease and who havenot), etc ..Sample Dataset below.

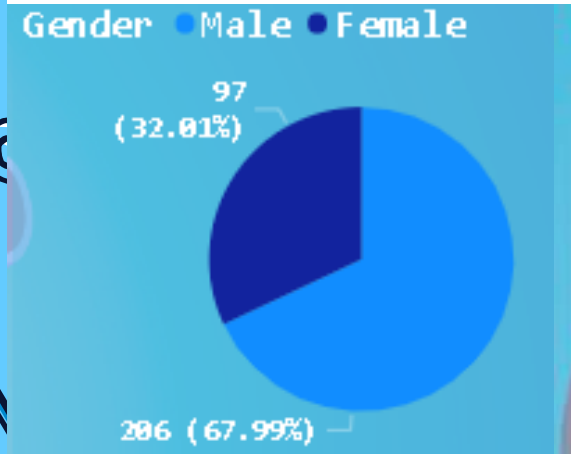
age	sex	cp	trestbps	chol	fbs	restecg	thalach	exang	oldpeak	slope	ca	thal	num
63	1	1	145	233	1	2	150	0	2.3	3	0	6	0
67	1	4	160	286	0	2	108	1	1.5	2	3	3	1
67	1	4	120	229	0	2	129	1	2.6	2	2	7	1
37	1	3	130	250	0	0	187	0	3.5	3	0	3	0
41	0	2	130	204	0	2	172	0	1.4	1	0	3	0
56	1	2	120	236	0	0	178	0	0.8	1	0	3	0
62	0	4	140	268	0	2	160	0	3.6	3	2	3	1
57	0	4	120	354	0	0	163	1	0.6	1	0	3	0
63	1	4	130	254	0	2	147	0	1.4	2	1	7	1
53	1	4	140	203	1	2	155	1	3.1	3	0	7	1
57	1	4	140	192	0	0	148	0	0.4	2	0	6	0
56	0	2	140	294	0	2	153	0	1.3	2	0	3	0
56	1	3	130	256	1	2	142	1	0.6	2	1	6	1
44	1	2	120	263	0	0	173	0	0	1	0	7	0
52	1	3	172	199	1	0	162	0	0.5	1	0	7	0
57	1	3	150	168	0	0	174	0	1.6	1	0	3	0
48	1	2	110	229	0	0	168	0	1	3	0	7	1
54	1	4	140	239	0	0	160	0	1.2	1	0	3	0
48	0	3	130	275	0	0	139	0	0.2	1	0	3	0
49	1	2	130	266	0	0	171	0	0.6	1	0	3	0
64	1	1	110	211	0	2	144	1	1.8	2	0	3	0
58	0	1	150	283	1	2	162	0	1	1	0	3	0
58	1	2	120	284	0	2	160	0	1.8	2	0	3	1

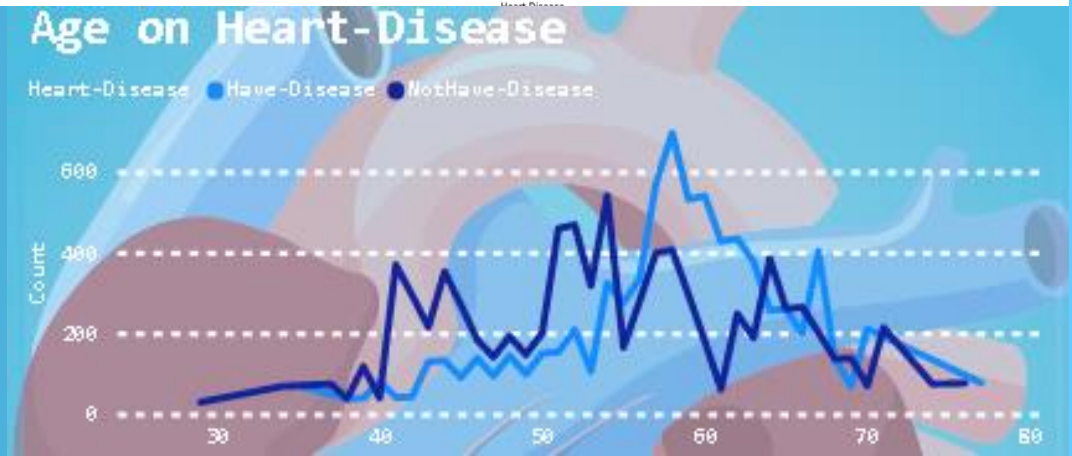
- Age: Person’s age in years.
- Sex: Gender of a person (1->Male 0->Female).
- Cp: Donates Chest pain Experienced which are categorized as(1-> Typical angina , 2->Atypical angina , 3-> Non-angina pain , 4-> Asymptomatic).
- Trestbps : Resting blood pressure (mm hg on admission to hospital).
- Chol: Cholesterol level of a person measure in mg/dl.
- Fbs: Fasting Blood sugar level of a person (>120 mg/dl then denotes as 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 : Maximum heart rate achieved by a person.
- Exang: Exercised induced angina (1->Yes ,0-> No).
- Oldpeak: ST depression induced by exercise relative to rest
- Slope: the slope of the peak exercise ST segment(1-> unsloping , 2-> flat , 3-> downsloping).
- Ca : The number of major vessels(0-3).
- Thal : A blood disorder known as thalassemia categorized as(3->normal ,6-> fixed defect ,7-> reversible defect).
- Num : Heart disease(0->NotHave-Disease 1->Have-Disease).

INSIGHTS

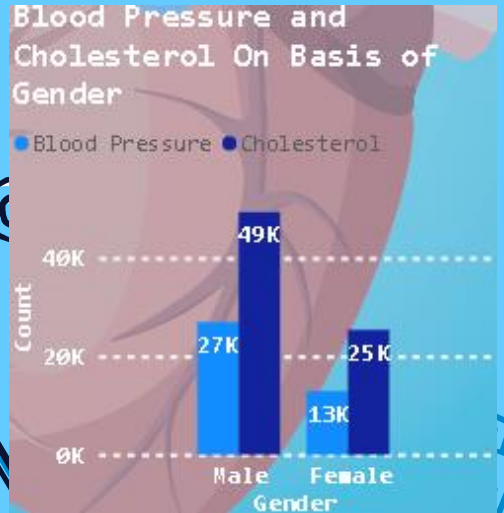

Heart Disease Population %
Have-Disease
45.9%
54.1%
NotHave-Disease

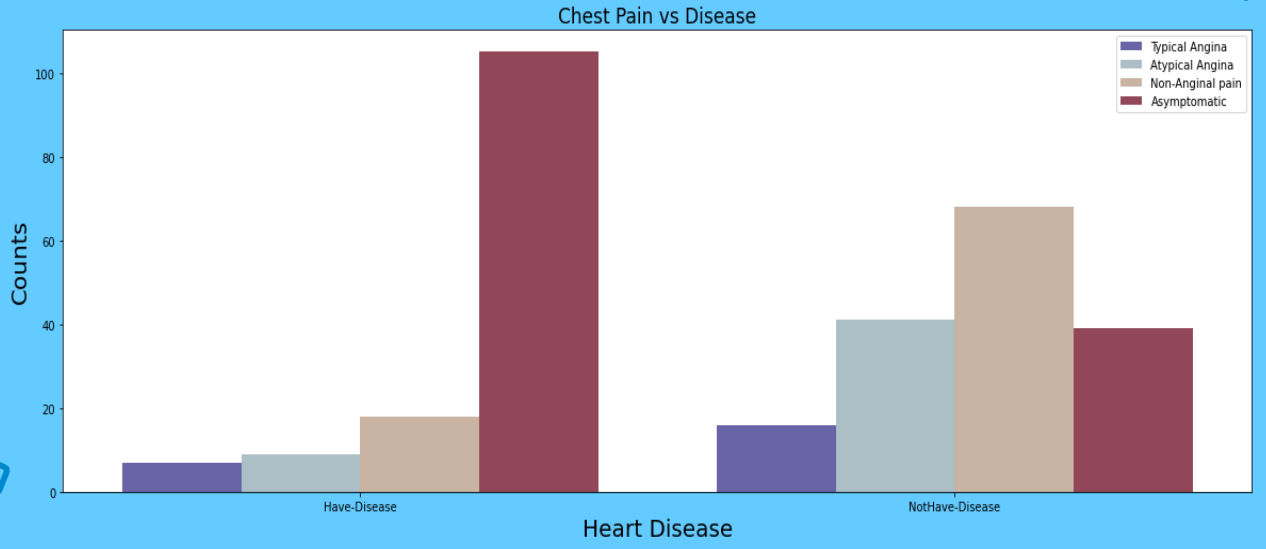

Gender-Distribution Have Disease
Gender
Male
Female
0
20
40
60
80
NotHave-Disease
Have-Disease

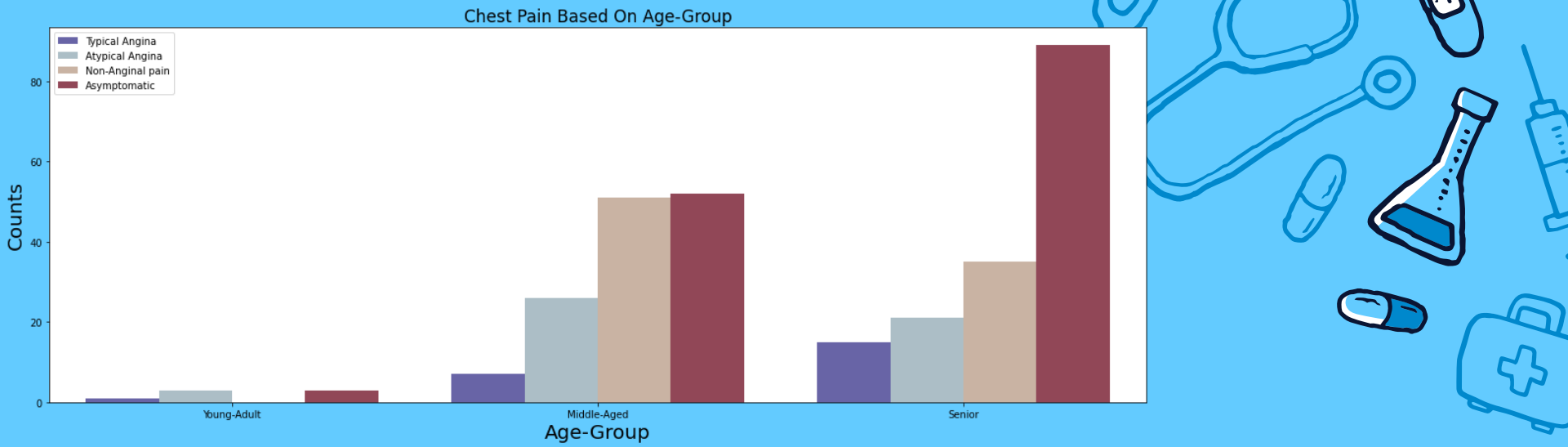

Gender Male Female
97
(32.01%)
206 (67.99%)

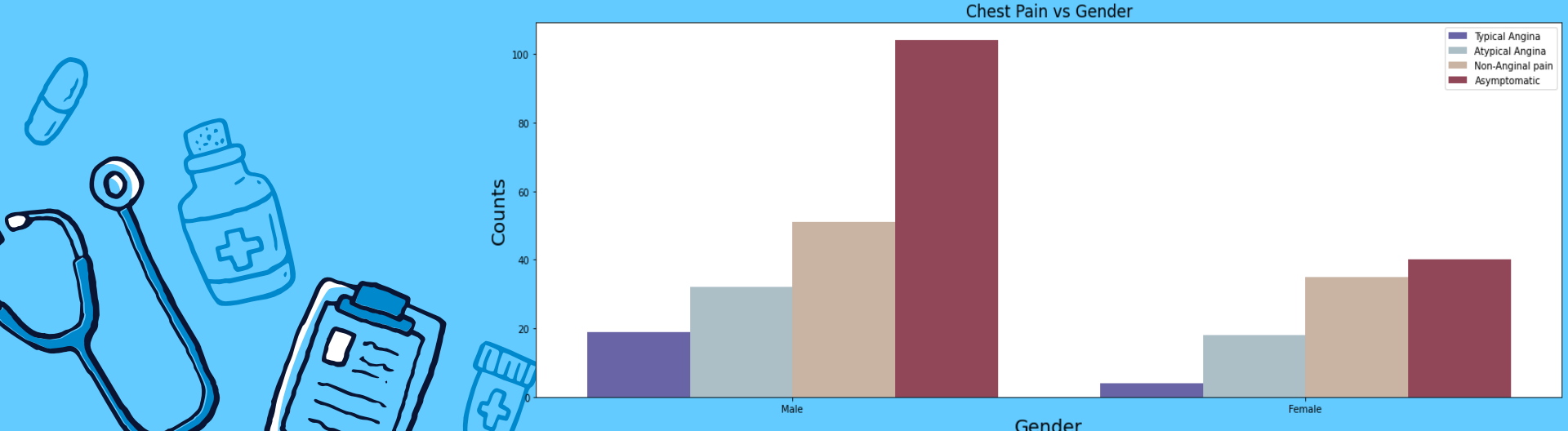

Age on Heart-Disease
Heart-Disease Have-Disease NotHave-Disease
Count
600
400
200
0
30
40
50
60
70
80

- From Heart Disease Population % pie chart we can see that more half i.e. around 54.13 %(53.1% approx.) From given People data from csv don't have heart disease while around 45.87 %(45.9% aprrox.) People have heart disease.
- In above gender distribution disease bar graph showing max number of male people are having heart disease in compare to female people. Also number male is max in not having disease in compare to female.
- From another pie chart displays gender number from sample dataset that 206 people are male and 97 people are female.
- From above graph age distribution we can see mostly from age 50 to 70 have heart related problem

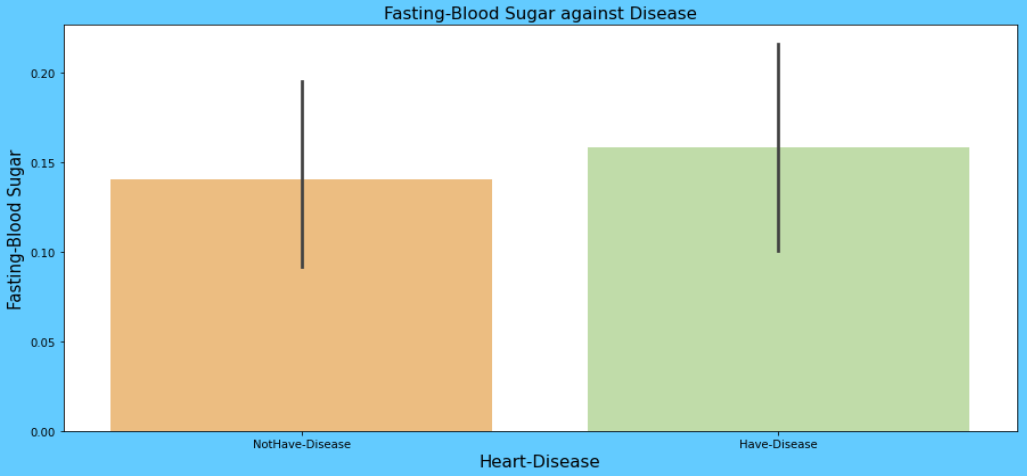


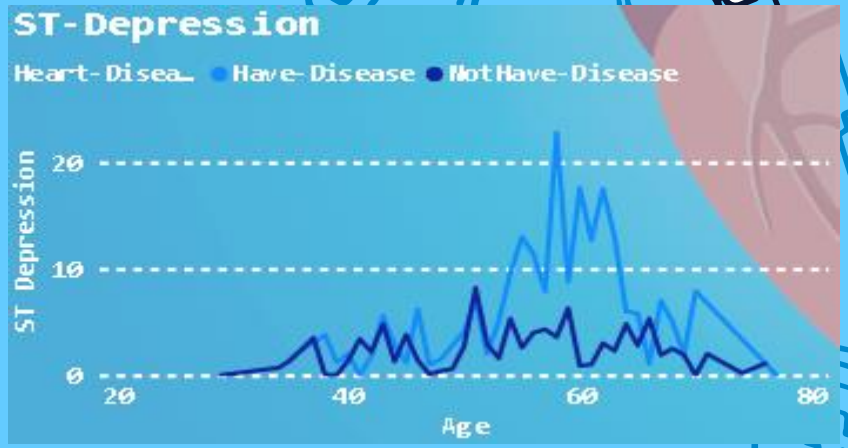


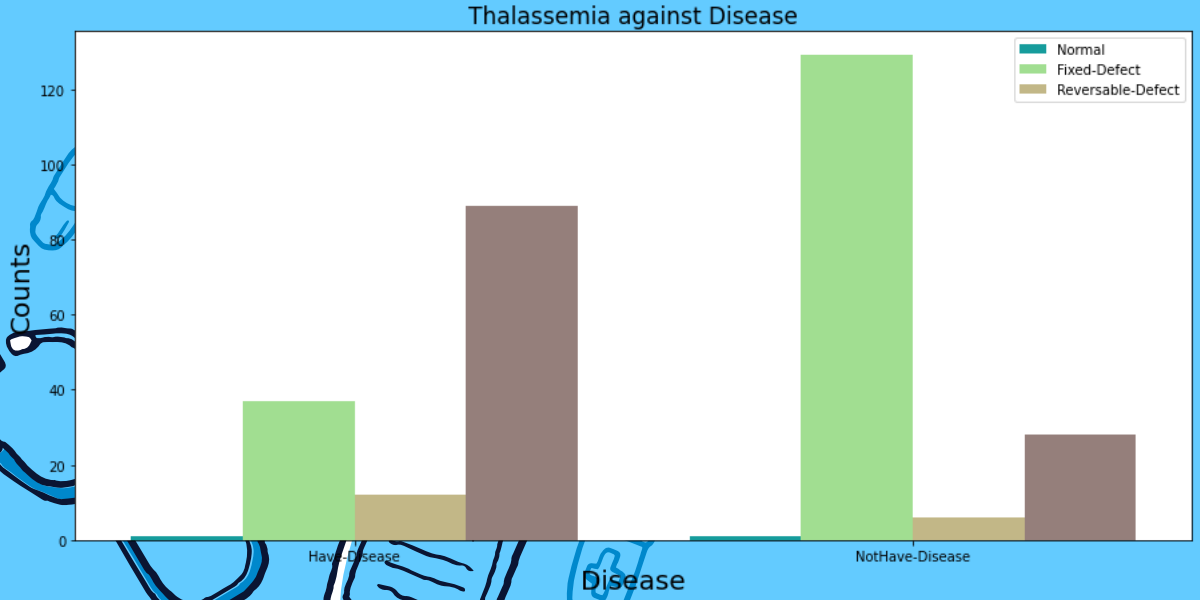

Chest Pain Based On Age-Group
Typical Angina
Atypical Angina
Non-Anginal pain
Asymptomatic
Counts
0
20
40
60
80
Young-Adult
Middle-Aged
Senior
Age-Group

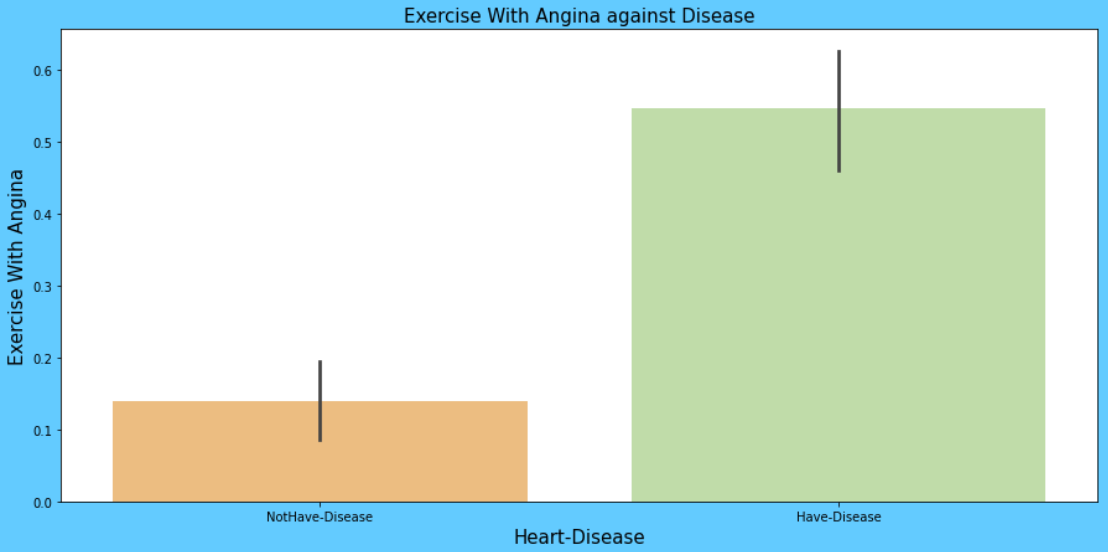

Chest Pain vs Gender
Typical Angina
Atypical Angina
Non-Anginal pain
Asymptomatic
Counts
0
20
40
60
80
100
Male
Female
Gender

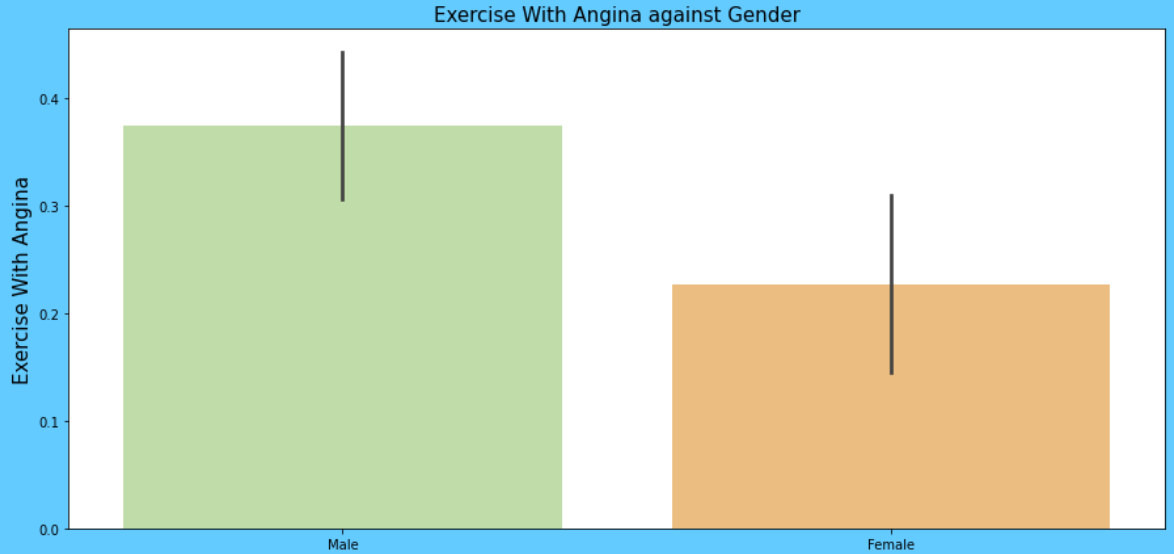
- From figure comprise of blood pressure and cholesterol level on basis of gender where we can see that both cholesterol and blood pressure are on higher side in male in comparison to female .Which are mostly factor responsible for heart disease.
- From figure chest pain types vs disease see that from the sample people wo have higher **Asymptomatic** chest pain have higher chance of heart attack as it is also known as silent attack. In other level there is nominal chance of disease but they also have heart complication.
- From figure chest pain types vs age group see that from the sample people senior age group have more **Asymptomatic** chest pain in comparison to other age group sample people. Hence it as provides the data senior group being most prone to this type of chest pain hence special care should be taken. While in middle age group also **Asymptomatic** is little high then **Non-angina pain** .
- From figure chest pain types vs gender see that from sample people male have higher risk of greeting heart attack in compare to female as the **Asymptomatic** chest pain is high in male.


Fasting-Blood Sugar against Disease
Fasting-Blood Sugar
0.20
0.15
0.10
0.05
0.00
NotHave-Disease
Have-Disease
Heart-Disease


ST-Depression
Heart-Disea…
Have-Disease
NotHave-Disease
ST Depression
20
10
0
20
40
60
80
Age


Thalassemia against Disease
Normal
Fixed-Defect
Reversable-Defect
Counts
120
100
80
60
40
20
0
Have-Disease
NotHave-Disease
Disease


Exercise With Angina against Disease
Exercise With Angina
0.0
0.1
0.2
0.3
0.4
0.5
0.6
NotHave-Disease
Have-Disease
Heart-Disease


Exercise With Angina against Gender
Exercise With Angina
0.0
0.1
0.2
0.3
0.4
Male
Female

- From above figure between fasting blood sugar level vs disease we can see that if you have higher blood sugar level that is greater than **120 mg/dl** then you increases the chance of getting heart complication.
- From above figure between thalassemia vs disease we can see that in category beta thalassemia higher reversible defect severe the chance of getting heart attack in comparison to other category of beta thalassemia.
- From above figure between ST depression vs age vs disease we can observe from here that ST depression mostly increases between the age group of 40-60 have higher chance of having heart disease. While ST depression refers specific outcome that may appear in a person's ECG results, wherein the trace in the ST Segment is abnormally low and sits below the baseline in person's result. One of reason for occurrence when heart muscle's ability to pump blood reduces.
- From above figure Exang vs disease we can conclude by any chance you suffer from Angina, you must do lite exercise not heavy or long minutes exercise other-wise it can worse the situation.
- From above figure Exang vs gender people that have angina are advise exercise in control than male have higher angina then female.

CONCLUSION

- From sample data about 45.87% people are suffering from heart disease.
- From sample data Males are more prone to heart disease in comparison to Female.
- From sample data Senior Aged People are more prone to heart disease then comes middle age people.
- From sample data asymptomatic type chest pain having have a higher chance of heart disease in these category mostly male and senior aged people fall.
- From sample data blood pressure and cholesterol in male have high level in both category then female.
- From sample data ST depression mostly increases between the age group of 40-60 have higher chance of having heart disease
- From sample data Fasting Blood Sugar (Not producing enough of a hormone secreted by your pancreas (insulin) or not responding to insulin properly causes your body's blood sugar levels to rise) > 120 mg/dl increasing your risk of heart attack.
- From sample Data we can conclude by any chance you suffer from Angina, you must do lite exercise not heavy or long minutes exercise other-wise it can worse the situation. In these male are mostly affected in comparison to female.

Q & A

- What's the source of data? The Dataset was taken from project document https://drive.google.com/drive/folders/165Pjmfb9W9PGy0rZjHEA22LW0Lt3Y-Q8
- What was the type of data? It was combination of numerical and categorical values.
- What were the libraries that you used in Python? I used Pandas , NumPy and Matplotlib libraries of python.
- Do we have to download these libraries? To check whether you have it or not try pip list (you need to have pip install in system execute this command)if don't find then download using pip install library name.
- What techniques were you using for data? 1.Finding null values and datatypes. 2.Visualizing relationship between independent variables with each other and output variables. 3.Removing unwanted attributes, removing outliers, impute missing if required otherwise drop from dataset. 4. Transform your data the get desired result.

Thank You