

Date	15 November 2022
Team ID	PNT2022TMID50017
Project Name	Visualizing and Predicting Heart Disease with an Interactive Dashboard

Uploading Heart disease Prediction Dataset Using Cognos

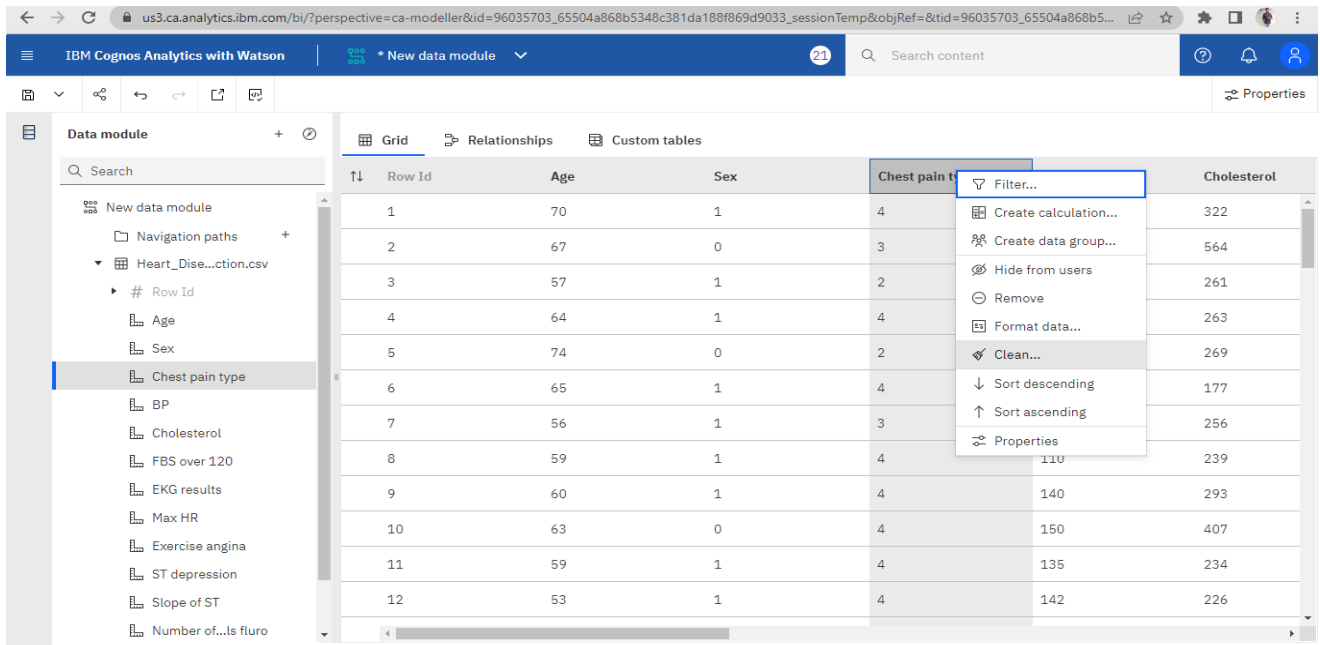
Analysis:USN-1:

- As a user, I can gather the details of the patients and storing the data set.
- Uploading the dataset of heart_disease_prediction.csv file to IBM Cognos Analytics

The screenshot displays the IBM Cognos Analytics web interface. The browser address bar shows the URL: `us3.ca.analytics.ibm.com/bi/?perspective=content&tab=myContent&folder=iB48AFB55B20144A98DE98001F734989F`. The page header includes the text "IBM Cognos Analytics with Watson" and a "Content" dropdown menu. A search bar with the placeholder "Search content" is also present. The main content area is titled "Content" and features a "New +" button. Below the title, there are tabs for "My content", "Team content", and "Samples". A blue banner at the top of the content area indicates "1 item selected". To the right of this banner are links for "More +", "Create", "Details", "Delete", and "Cancel". The content area displays two items: "Heart_Disease_Prediction_D..." and "Heart_Disease_Prediction.csv". The first item is partially visible and has a last accessed date of "04/11/2022, 20:50". The second item, "Heart_Disease_Prediction.csv", is fully visible and has a last accessed date of "02/11/2022, 01:07". It is marked as a CSV file with a green "CSV" label and an upload icon.

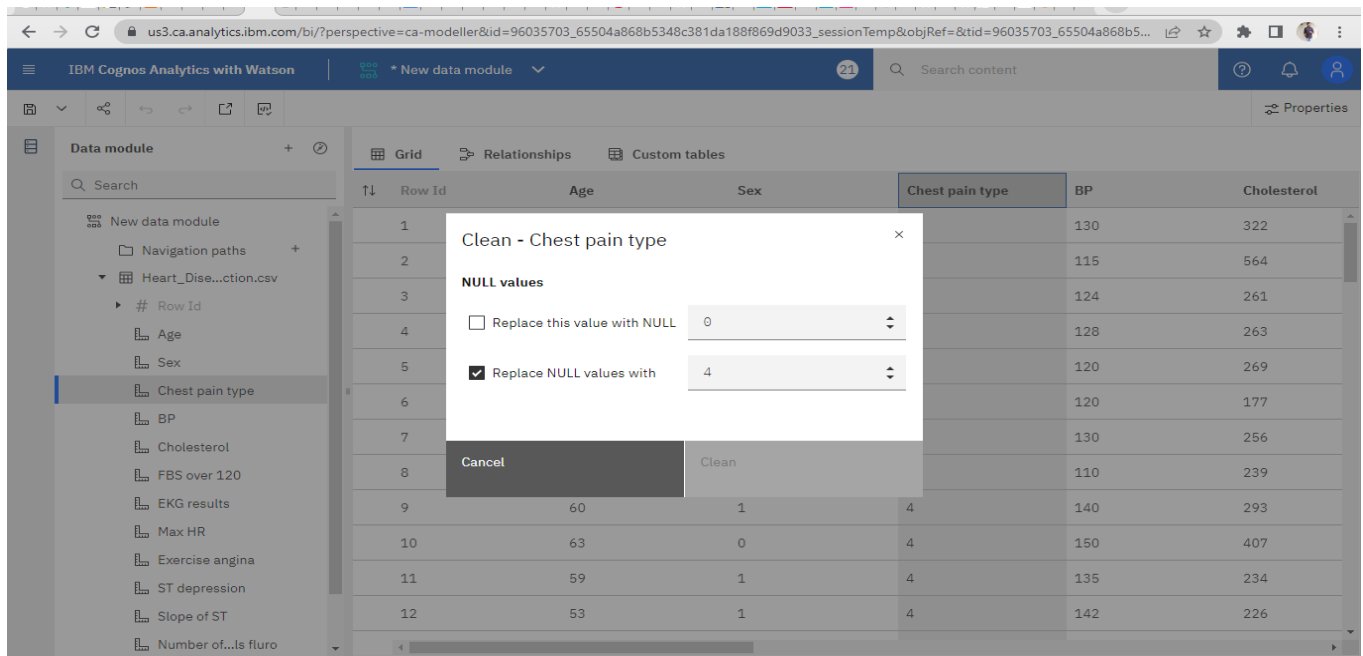
Data Cleaning and Data Processing using Cognos

Analytics: USN-2:



The screenshot shows the IBM Cognos Analytics interface. On the left, the 'Data module' pane lists fields from a 'Heart_Dise...ction.csv' file, including 'Row Id', 'Age', 'Sex', 'Chest pain type', 'BP', 'Cholesterol', 'FBS over 120', 'EKG results', 'Max HR', 'Exercise angina', 'ST depression', 'Slope of ST', and 'Number of...ls fluoro'. The main area displays a data grid with columns: 'Row Id', 'Age', 'Sex', 'Chest pain type', and 'Cholesterol'. A context menu is open over the 'Chest pain type' column, showing options: 'Filter...', 'Create calculation...', 'Create data group...', 'Hide from users', 'Remove', 'Format data...', 'Clean...', 'Sort descending', 'Sort ascending', and 'Properties'. The 'Clean...' option is highlighted.

Row Id	Age	Sex	Chest pain type	Cholesterol
1	70	1	4	322
2	67	0	3	564
3	57	1	2	261
4	64	1	4	263
5	74	0	2	269
6	65	1	4	177
7	56	1	3	256
8	59	1	4	239
9	60	1	4	293
10	63	0	4	407
11	59	1	4	234
12	53	1	4	226



The screenshot shows the same IBM Cognos Analytics interface, but with a 'Clean - Chest pain type' dialog box open. The dialog box has a title bar 'Clean - Chest pain type' and a close button. It contains a section 'NULL values' with two options: 'Replace this value with NULL' (unchecked) and 'Replace NULL values with' (checked). The 'Replace NULL values with' option has a dropdown menu showing the value '4'. There are 'Cancel' and 'Clean' buttons at the bottom of the dialog box. The background data grid is dimmed.

Row Id	Age	Sex	Chest pain type	BP	Cholesterol
1				130	322
2				115	564
3				124	261
4				128	263
5				120	269
6				120	177
7				130	256
8				110	239
9	60	1	4	140	293
10	63	0	4	150	407
11	59	1	4	135	234
12	53	1	4	142	226

us3.ca.analytics.ibm.com/bi/?perspective=ca-modeller&id=96035703_65504a868b5348c381da188f869d9033_sessionTemp&objRef=&tid=96035703_65504a868b5...

IBM Cognos Analytics with Watson | * New data module | 21 | Search content | ? | ? | ?

Properties

Data module

Search

- Heart_Dise...ction.csv
 - # Row Id
 - Age
 - Sex
 - Chest pain type
 - BP
 - Cholesterol
 - FBS over 120
 - EKG results
 - Max HR
 - Exercise angina
 - ST depression
 - Slope of ST
 - Number of...ls fluro
 - Thallium
 - Heart Disease

Grid Relationships Custom tables

↑↓ : angina	ST depression	Slope of ST	Number of vessels fluro	Thallium	Heart Disease
	2.4	2	3	3	Presence
	1.6	2	0	7	Absence
	0.3	1	0	7	Presence
	0.2	2	1	7	Absence
	0.2	1	1	3	Absence
	0.4	1	0	7	Absence
	0.6	2	1	6	Presence
	1.2	2	1	7	Presence
	1.2	2	2	7	Presence
	4	2	3	7	Presence
	0.5	2	0	7	Absence
	0	1	0	7	Absence

us3.ca.analytics.ibm.com/bi/?perspective=ca-modeller&id=96035703_65504a868b5348c381da188f869d9033_sessionTemp&objRef=&tid=96035703_65504a868b5...

IBM Cognos Analytics with Watson | * New data module | 21 | Search content | ? | ? | ?

Properties

Data module

Search

- Heart_Dise...ction.csv
 - # Row Id
 - Age
 - Sex
 - Chest pain type
 - BP
 - Cholesterol
 - FBS over 120
 - EKG results
 - Max HR
 - Exercise angina
 - ST depression
 - Slope of ST
 - Number of...ls fluro
 - Thallium
 - Heart Disease

Grid Relationships Custom tables

↑↓ ults	Max HR	Exercise angina	ST depression	Slope of ST	Number of vessels fluro	T
				2	3	
				2	0	
				1	0	
				2	1	
				1	1	
				1	0	
				2	1	
				2	1	
	170	0	1.2	2	2	
	154	0	4	2	3	
	161	0	0.5	2	0	
	111	1	0	1	0	

Clean - Number of vessels fluro

NULL values

☐ Replace this value with NULL 0

☒ Replace NULL values with 0

Cancel Clean

us3.ca.analytics.ibm.com/bi/?perspective=ca-modeller&id=96035703_65504a868b5348c381da188f869d9033_sessionTemp&objRef=&tid=96035703_65504a868b5...

IBM Cognos Analytics with Watson

21 Search content

Properties

Data module

Heart_Dise...ction.csv

- # Row Id
- Age
- Sex
- Chest pain type
- BP
- Cholesterol
- FBS over 120
- EKG results
- Max HR
- Exercise angina
- ST depression
- Slope of ST
- Number of...ls fluro
- Thallium

Grid Relationships Custom tables

angina	ST depression	Slope of ST	Number of vessels fluro	Thallium	Heart Disease
2.4	2	3	3		
1.6	2	0	7		
0.3	1	0	7		
0.2	2	1	7		
0.2	1	1	3		
0.4	1	0	7		
0.6	2	1	6		
1.2	2	1	7		
1.2	2	2	7		
4	2	3	7		
0.5	2	0	7		
0	1	0	7		

Filter...
Create data group...
Create navigation path...
Split...
Hide from users
Remove
Format data...
Clean...
Sort descending
Sort ascending
Properties

Heart Disease

Presence
Absence
Absence

us3.ca.analytics.ibm.com/bi/?perspective=ca-modeller&id=96035703_65504a868b5348c381da188f869d9033_sessionTemp&objRef=&tid=96035703_65504a868b5...

IBM Cognos Analytics with Watson

21 Search content

Properties

Data module

Heart_Dise...ction.csv

- # Row Id
- Age
- Sex
- Chest pain type
- BP
- Cholesterol
- FBS over 120
- EKG results
- Max HR
- Exercise angina
- ST depression
- Slope of ST
- Number of...ls fluro
- Thallium

Grid Relationships Custom tables

uro	Thallium	Heart Disease
3		Presence
7		Absence
7		Presence
7		Absence
3		Absence
7		Absence
6		Presence
7		Presence
7		Presence
7		Presence
7		Absence
7		Absence

Clean - Heart Disease

Whitespace

☐ Trim leading and trailing whitespace

Convert case to

☐ UPPERCASE ☐ lowercase ☒ Do not change

Return a substring of characters

Start Length

Preview

This is a preview

NULL values

☐ Replace this value with NULL Empty string

☒ Replace NULL values with

Cancel Clean

IBM Cognos Analytics with Watson | New data module | 21 | Search content | Properties

Data module: Heart_Disease_prediction.csv

angina	ST depression	Slope of ST	Number of vessels fluro	Thallium	Heart Disease
	2.4	2	3	3	Presence
	1.6	2	0	7	Absence
	0.3	1	0	7	Presence
	0.2	2	1	7	Absence
	0.2	1	1	3	Absence
	0.4	1	0	7	Absence
	0.6	2	1	6	Presence
	1.2	2	1	7	Presence
	1.2	2	2	7	Presence
	4	2	3	7	Presence
	0.5	2	0	7	Absence
	0	1	0	7	Absence

Creating the Data module Using Cognos

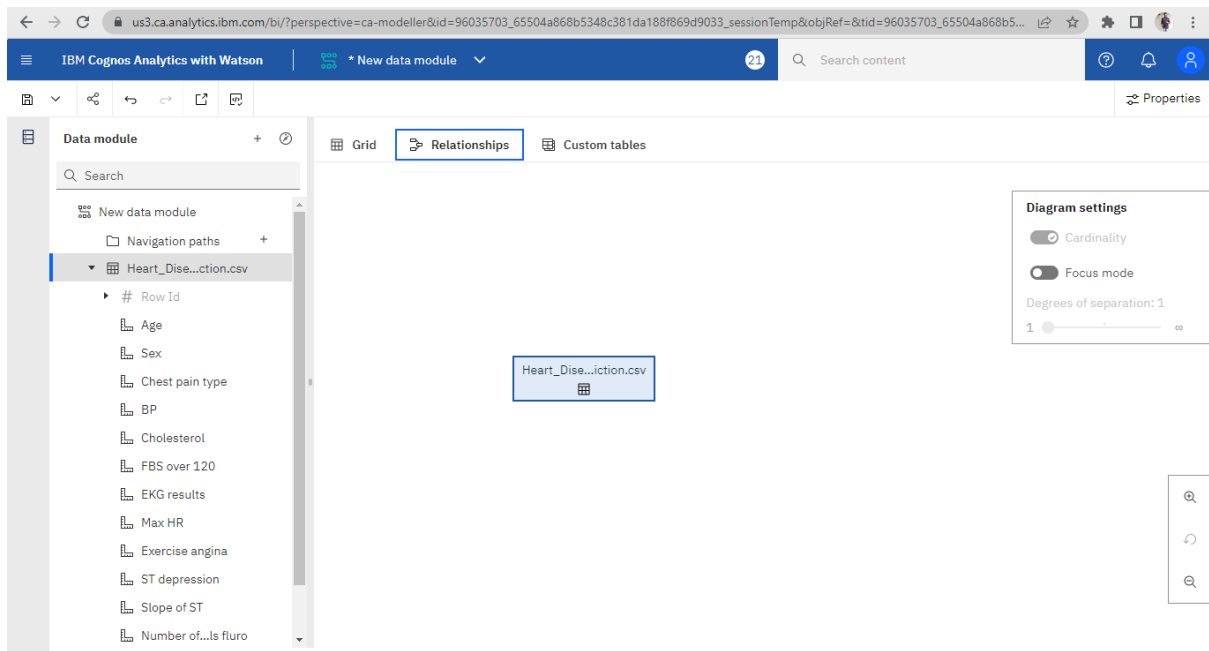
Analytics USN 3

- As an Analyst, I collect Raw data and create the data module
- The data module create using Heart_Disease_prediction.csv dataset

IBM Cognos Analytics with Watson | New data module | 21 | Search content | Properties

Data module: Heart_Disease_prediction.csv

angina	ST depression	Slope of ST	Number of vessels fluro	Thallium	Heart Disease
	2.4	2	3	3	Presence
	1.6	2	0	7	Absence
	0.3	1	0	7	Presence
	0.2	2	1	7	Absence
	0.2	1	1	3	Absence
	0.4	1	0	7	Absence
	0.6	2	1	6	Presence
	1.2	2	1	7	Presence
	1.2	2	2	7	Presence
	4	2	3	7	Presence
	0.5	2	0	7	Absence
	0	1	0	7	Absence



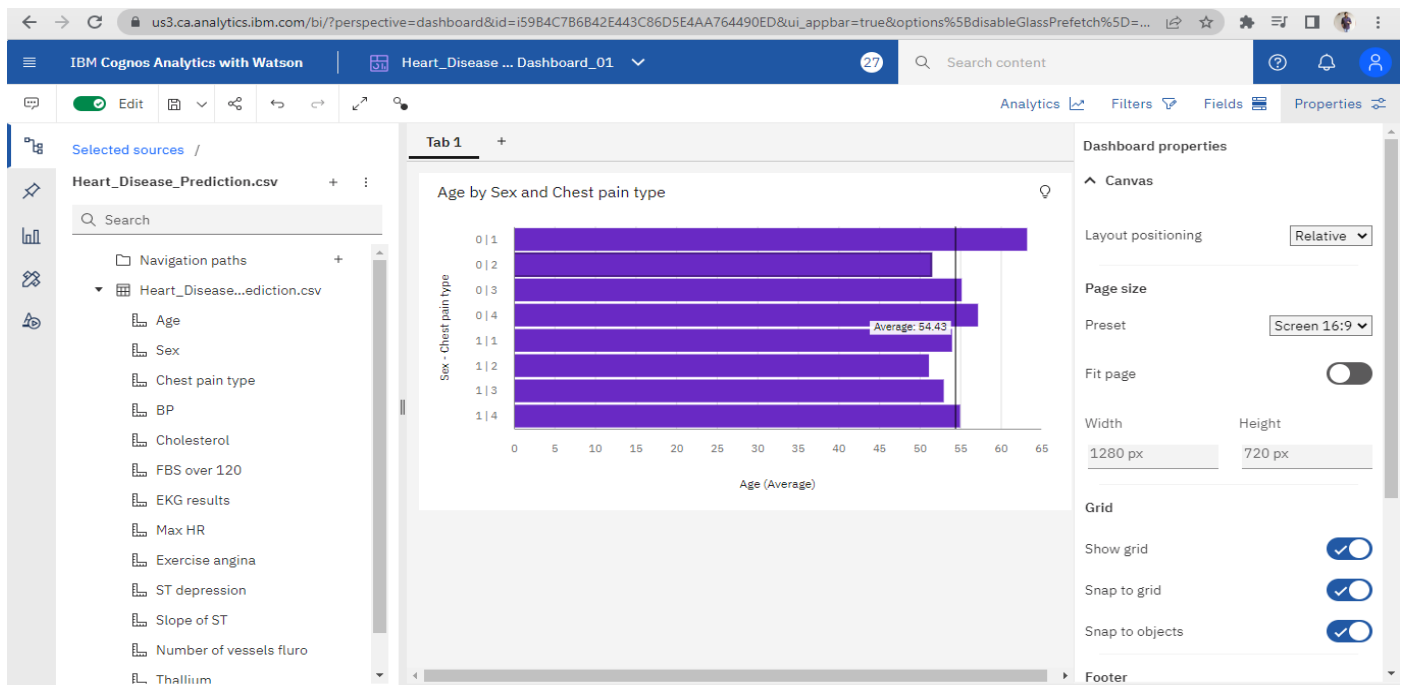
Exploration of Heart disease Prediction Dataset Using Cognos Analysis:

USN-4,5:

- As a Data analyst, I create a predicted model by also preparing story card with using explored data.
- As a Data analyst, I will create different types of models in explored data to identify suitable model with effectively and efficiently.

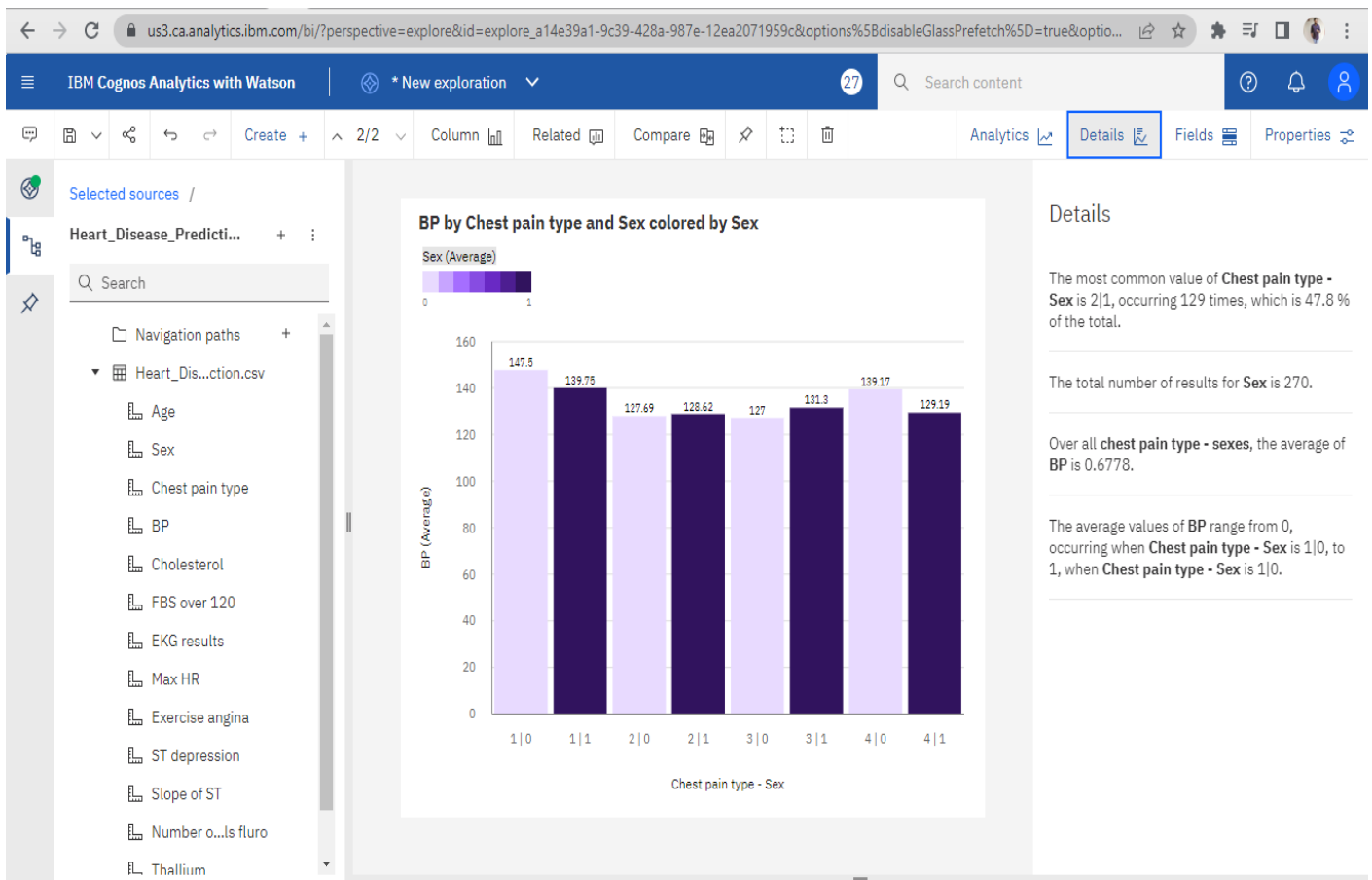
Age By Chest pain type:

- ✓ The most common value of **Chest pain type** is 4, occurring 129 times, which is 47.8% of the total.
- ✓ Over all **chest pain types**, the average of **Age** is 54.43.
- ✓ The average values of **Age** range from 51.26, occurring when **Chest pain type** is 2, to 55.85, when **Chest pain type** is 1.



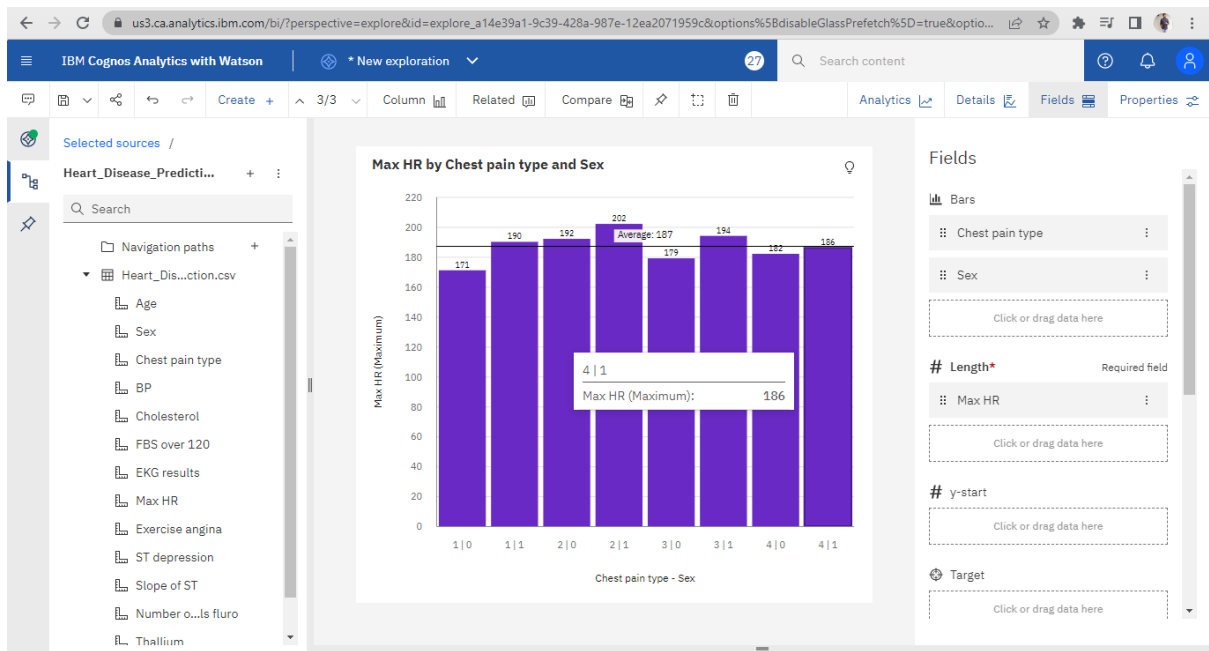
BP by Chest pain type and Sex coloured by Sex:

- The most common value of **Chest pain type - Sex** is 2|1, occurring 129 times, which is 47.8 % of the total.
- The total number of results for **Sex** is 270.
- Over all **chest pain type - sexes**, the average of **BP** is 0.6778.
- The average values of **BP** range from 0, occurring when **Chest pain type - Sex** is 1|0, to 1, when **Chest pain type - Sex** is 1|0.



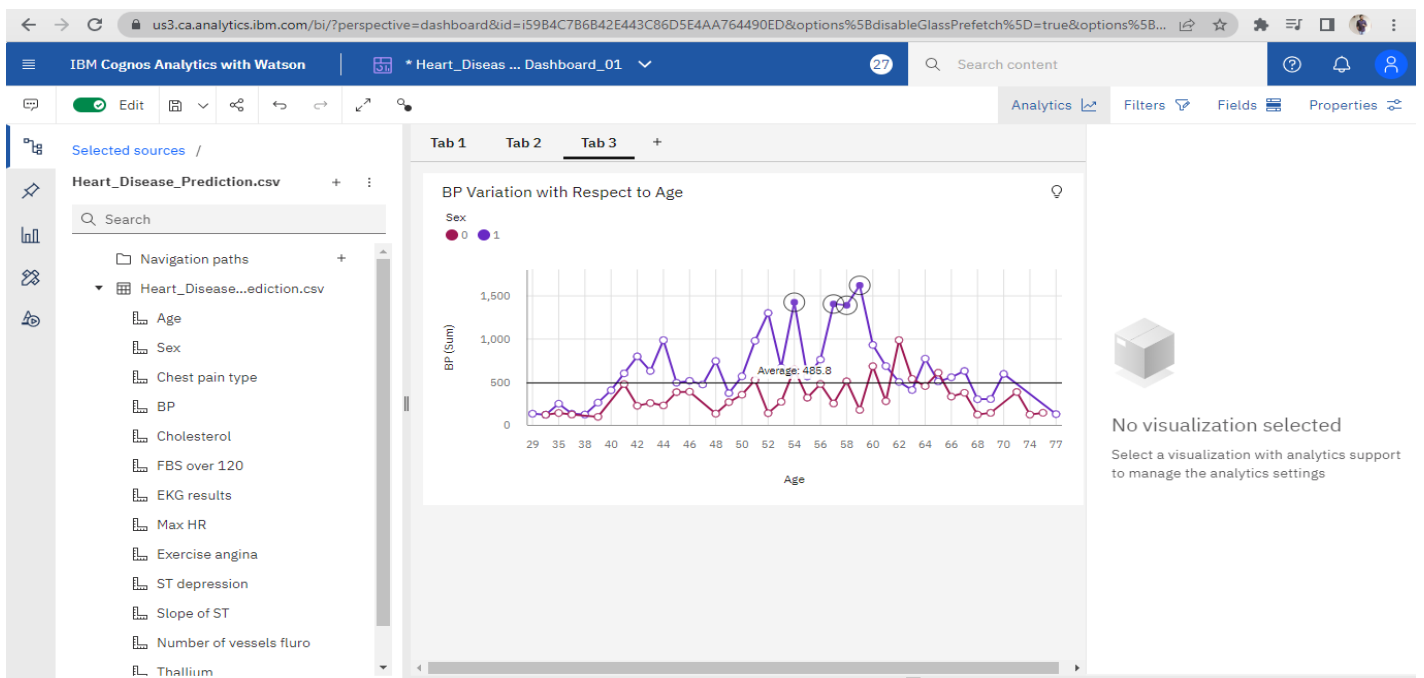
Max HR by Chest pain type and Sex:

- ❖ The total number of results for **Max HR**, across all **chest pain type - sexes**, is 270.
- ❖ The most common value of **Chest pain type - Sex** is 2|1, occurring 129 times, which is 47.8 % of the total.
- ❖ The largest value of **Max HR** is 1, occurring when **Chest pain type - Sex** is 1|0.



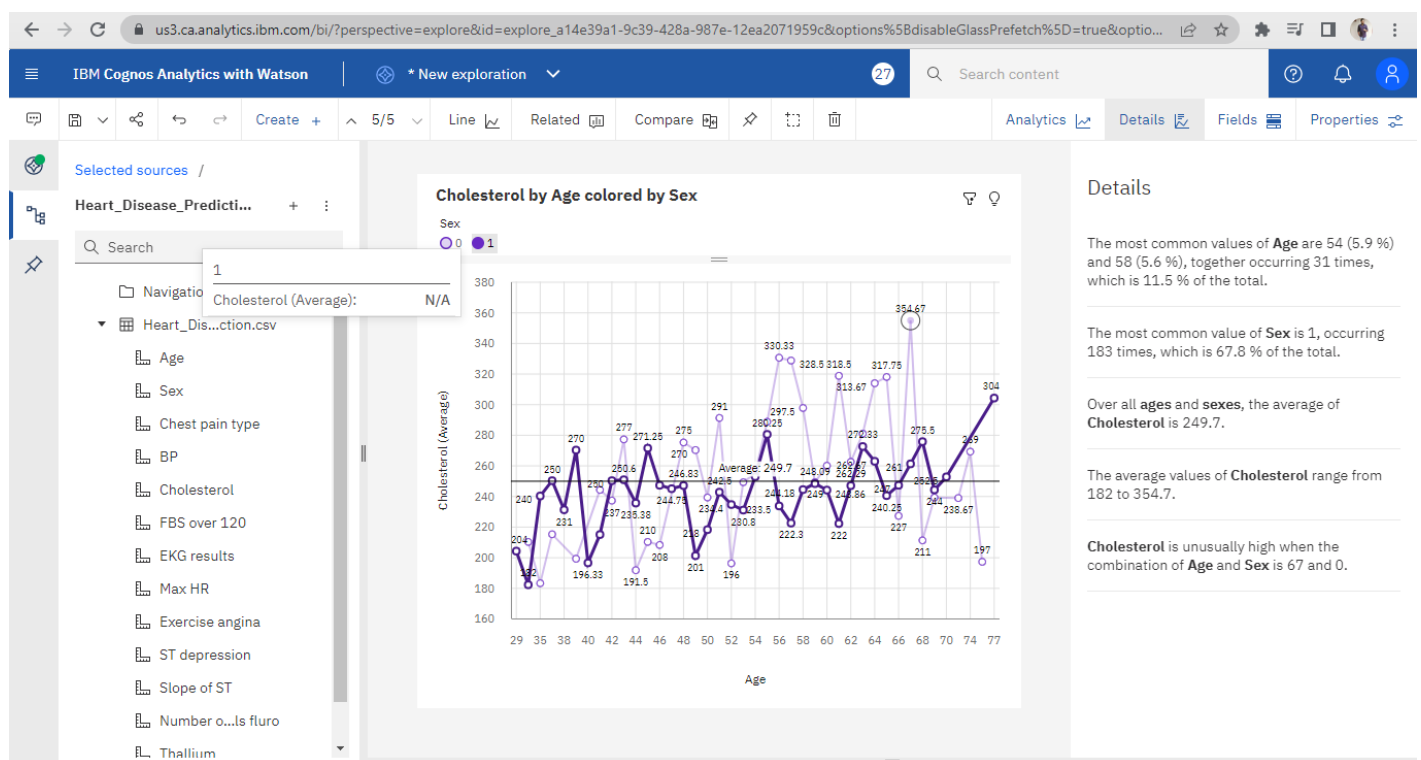
BP by Age:

- The most common values of **Age** are 54 (5.9%) and 58 (5.6%), together occurring 31 times, which is 11.5% of the total.
- Over all **ages**, the average of **BP** is 131.3.
- The average values of **BP** range from 117, occurring when **Age** is 47, to 149.2, when **Age** is 59.
- **BP** is unusually high when **Age** is 59.



Cholesterol by Age colored by Gender:

- ✓ Over all **ages** and **sexes**, the average of **Cholesterol** is 249.7.
- ✓ The average values of **Cholesterol** range from 182 to 354.7.
- ✓ **Cholesterol** is unusually high when the combination of **Age** and **Sex** is 67 and 0.
- ✓ The most common values of **Age** are 54 (5.9 %) and 58 (5.6 %), together occurring 31 times, which is 11.5 % of the total.
- ✓ The most common value of **Sex** is 1, occurring 183 times, which is 67.8 % of the total.

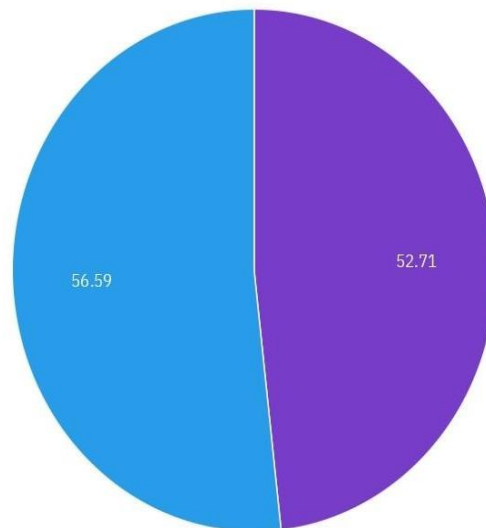


Age By Heart Disease:

- ❖ The most common value of **heart disease** is Absence, occurring 150 times, which is 55.6 % of the total.
- ❖ Over all **heart diseases**, the average of **Age** is 54.43.
- ❖ The average values of **Age** range from 52.71, occurring when **heart disease** is Absence, to 56.59, when **heart disease** is Presence.

Age by Heart Disease

Heart Disease
● Absence ● Presence

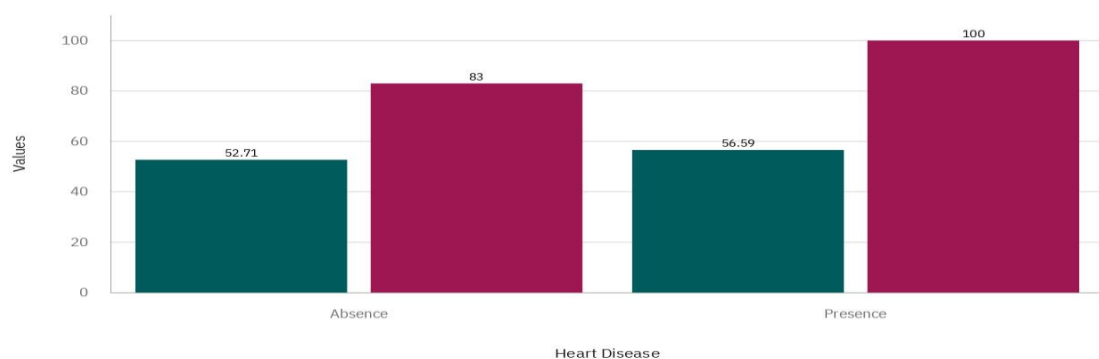


Age and Sex by Heart Disease:

- The total number of results for **Sex**, across all **heart diseases**, is 270.
- Over all **heart diseases**, the average of **Sex** is 0.6778.
- The most common value of **Heart Disease** is Absence, occurring 150 times, which is 55.6% of the total.
- The average values of **Age** range from 52.71, occurring when **heart disease** is Absence, to 56.59, when **heart disease** is Presence.
- **Sex** ranges from 83, when **heart disease** is Absence, to 100, when **heart disease** is Presence.
- The total number of results for **Age**, across all **heart diseases**, is 270.

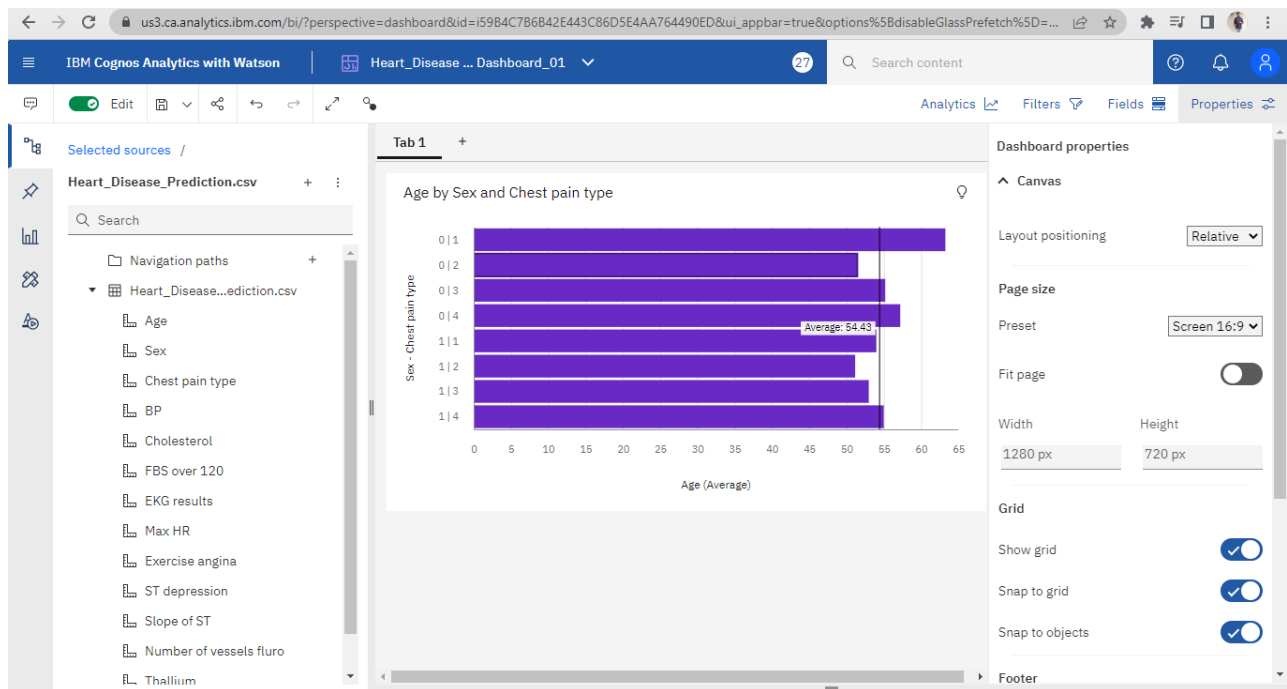
Age and Sex by Heart Disease

Measures
● Age ● Sex



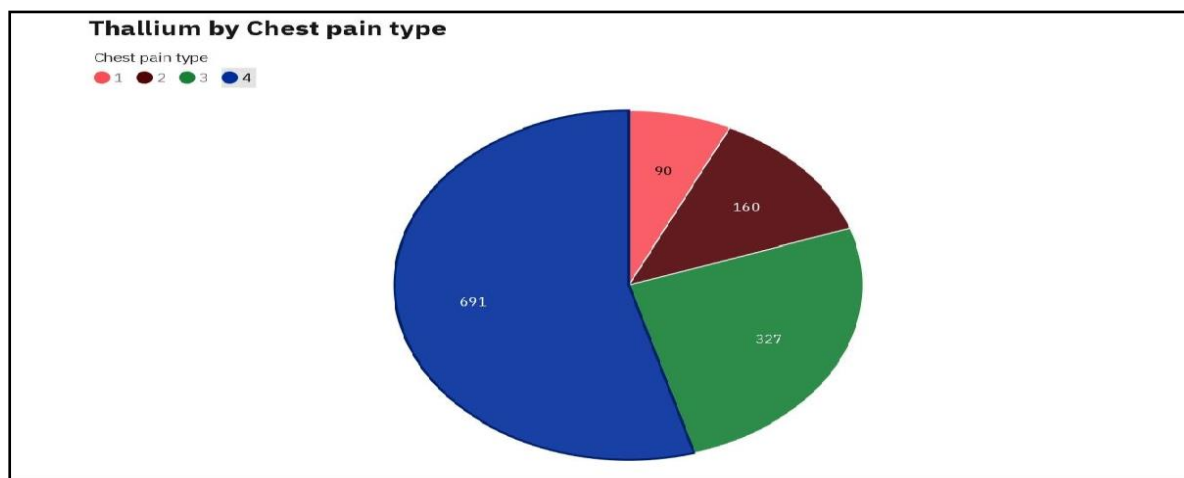
Chest pain type by Chest pain type:

- ✓ The total number of results for **Chest pain type**, across all **chest pain types**, is 270.
- ✓ The most common value of **Chest pain type** is 4, occurring 129 times, which is 47.8% of the total.
- ✓ The count is unusually high when **Chest pain type** is 4.



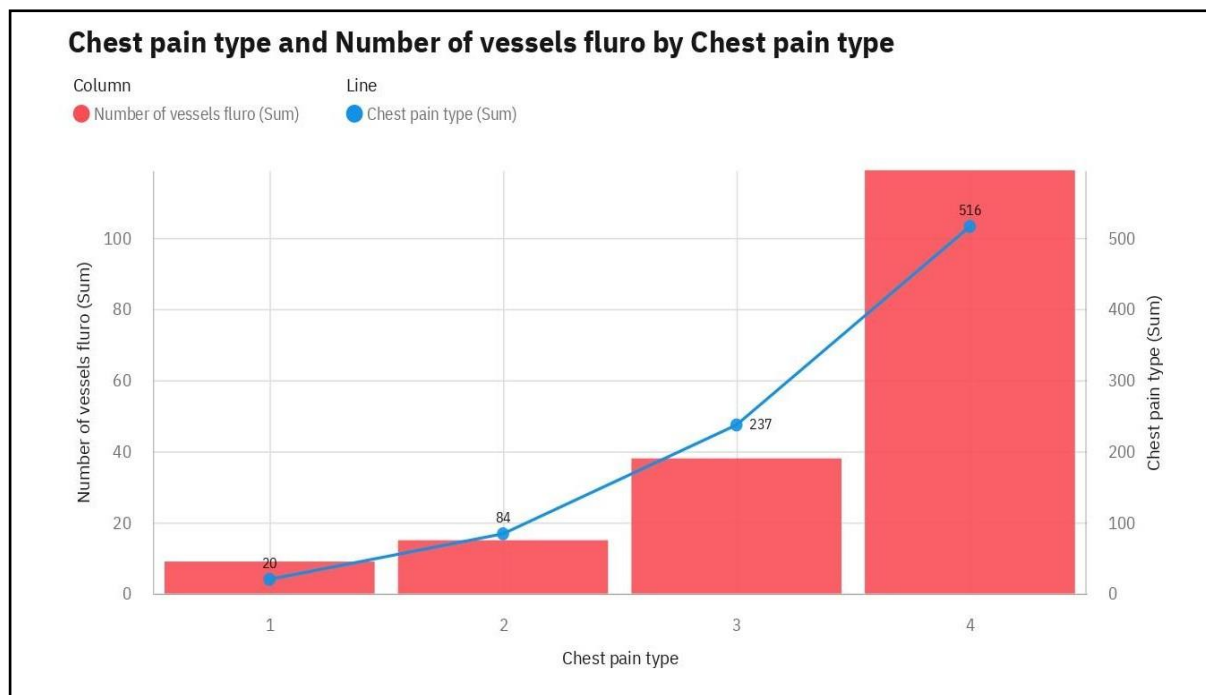
Thallium by Chest pain type:

- Over all **chest pain types**, the sum of **Thallium** is nearly 1500.
- **Thallium** ranges from 90, when **Chest pain type** is 1, to 691, when **Chest pain type** is 4.
- **Thallium** is unusually high when **Chest pain type** is 4.



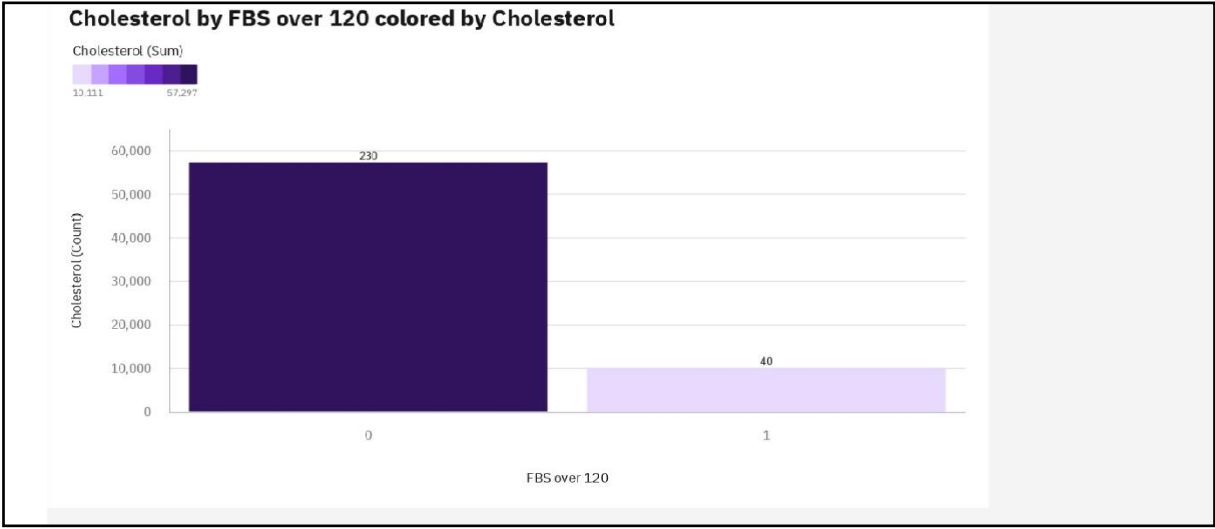
Chest pain type and Number of vessels Fluro by Chest pain type:

- Over all **chest pain types**, the sum of **Number of vessels fluro** is 181.
- **Number of vessels fluro** ranges from 9, when **Chest pain type** is 1, to 119, when **Chest pain type** is 4.
- **Number of vessels fluro** is unusually high when **Chest pain type** is 4.
- Over all **chest pain types**, the sum of **Chest pain type** is 857.
- **Chest pain type** ranges from 20, when **Chest pain type** is 1, to 516, when **Chest pain type** is 4.
- **Chest pain type** is unusually high when **Chest pain type** is 4.



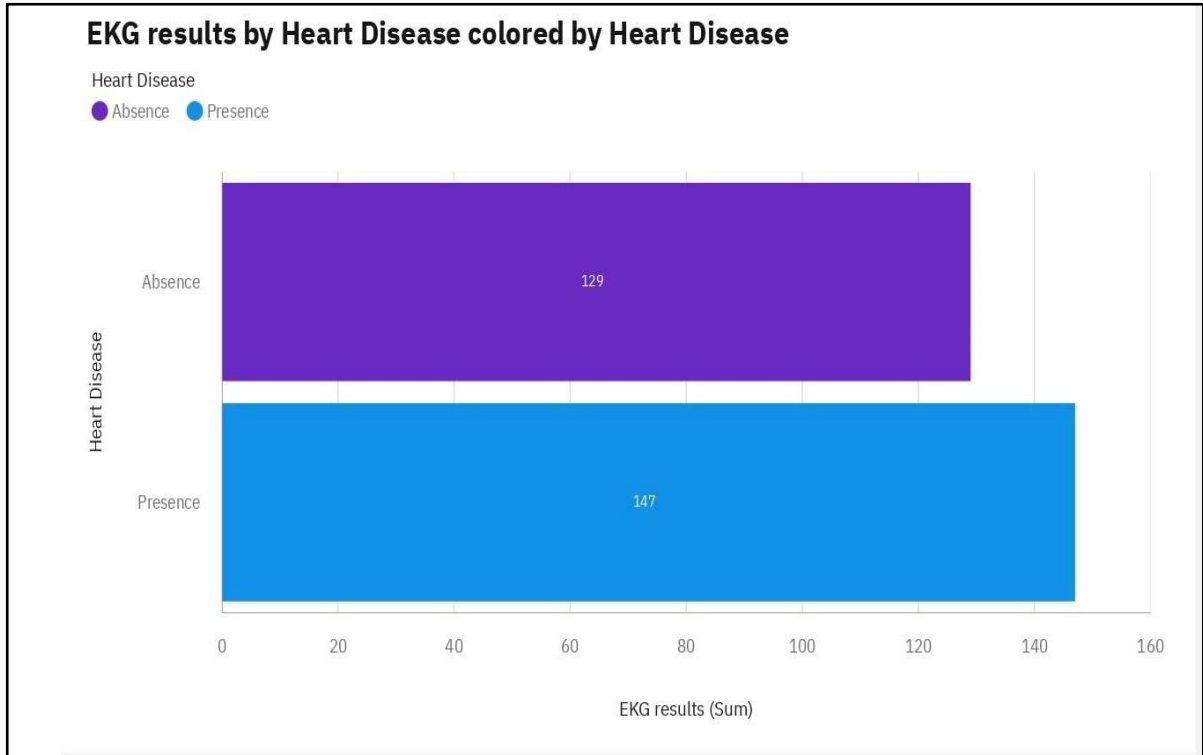
Cholesterol by FBS over 120 coloured by Cholesterol:

- ✓ The total number of results for **Cholesterol** is 270.
- ✓ The most common value of **FBS over 120** is 0, occurring 230 times, which is 85.2 % of the total.



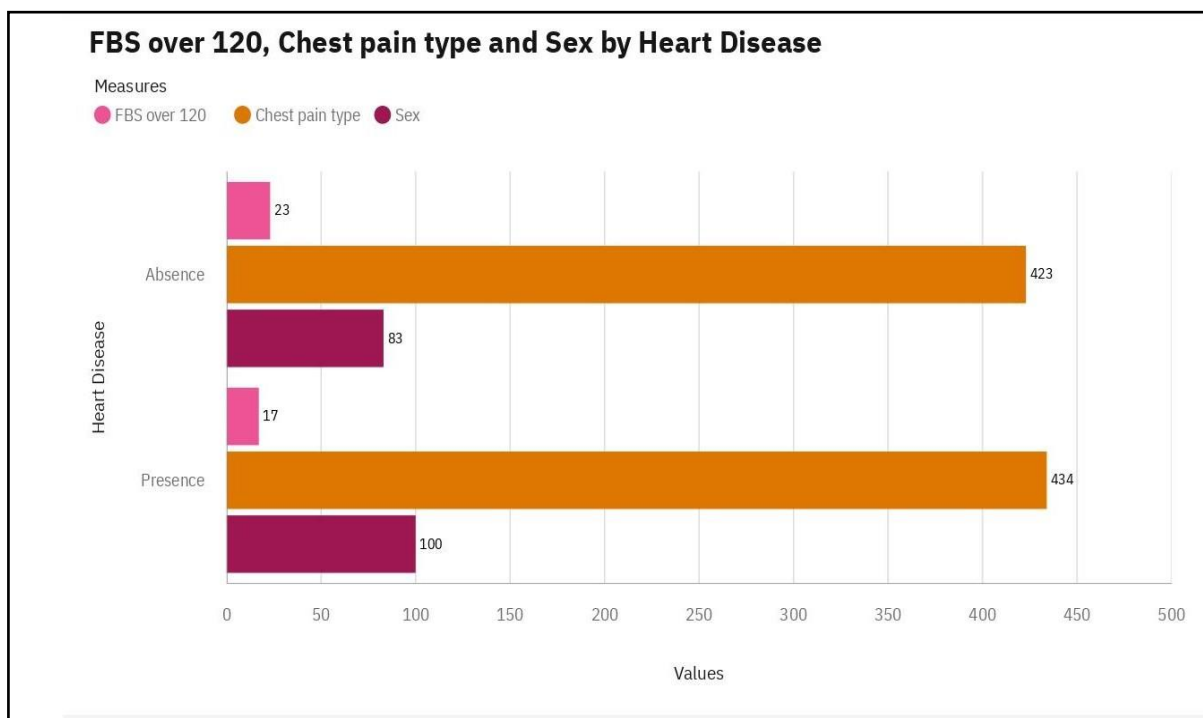
EKG results by heart disease colored by heart disease:

- For **EKG results**, the most significant value of **heart disease** is Presence, whose respective **EKG results** values add up to 147, or 53.3 % of the total.
- Over all **heart diseases** and **heart diseases**, the sum of **EKG results** is 276.
- The summed values of **EKG results** range from 129 to 147.



FBS over 120, Chest pain type and Sex by Heart Disease:

- ✓ **FBS over 120** ranges from 17, when **heart disease** is Presence, to 23, when **heart disease** is Absence.
- ✓ **Chest pain type** ranges from 423, when **heart disease** is Absence, to 434, when **heart disease** is Presence.
- ✓ **Sex** ranges from 83, when **heart disease** is Absence, to 100, when **heart disease** is Presence.
- ✓ The total number of results for **Sex**, across all **heart diseases**, is 270.
- ✓ Over all **heart diseases**, the average of **Sex** is 0.6778.
- ✓ The most common value of **heart disease** is Absence, occurring 150 times, which is 55.6% of the total.
- ✓ The total number of results for **Chest pain type**, across all **heart diseases**, is 270.
- ✓ Over all **heart diseases**, the average of **Chest pain type** is 3.174.
- ✓ The total number of results for **FBS over 120**, across all **heart diseases**, is 270.
- ✓ Over all **heart diseases**, the average of **FBS over 120** is 0.1481.



Age and Max HR for Sex:

- The total number of results for **Age**, across all **sexes**, is 2.
- The total number of results for **Max HR**, across all **sexes**, is 2.
- The average values of **Age** range from 53.84, occurring when **Sex** is 1, to 55.68, when **Sex** is 0.

us3.ca.analytics.ibm.com/bi/?perspective=dashboard&id=i59B4C7B6B42E443C86D5E4AA764490ED&options%5BdisableGlassPrefetch%5D=true&options%5B...

IBM Cognos Analytics with Watson | *Heart_Diseas ... Dashboard_01 | 27 | Search content

Analytics | Filters | Fields | Properties

Selected sources / Heart_Disease_Prediction.csv

Heart_Disease...ediction.csv

- Age
- Sex
- Chest pain type
- BP
- Cholesterol
- FBS over 120
- EKG results
- Max HR
- Exercise angina
- ST depression
- Slope of ST
- Number of vessels fluro
- Thallium
- abc Heart Disease

Tab 1 Tab 2 Tab 3 Tab 4 Tab 5 +

Average Age for Different Types of chest pain in Existing Heart Disease

Heart Disease	1	2	3	4	5
0	4	16	32	35	
1	16	26	47	94	
Summary	20	42	79	129	

No visualization selected
Select a visualization to manage the field settings.

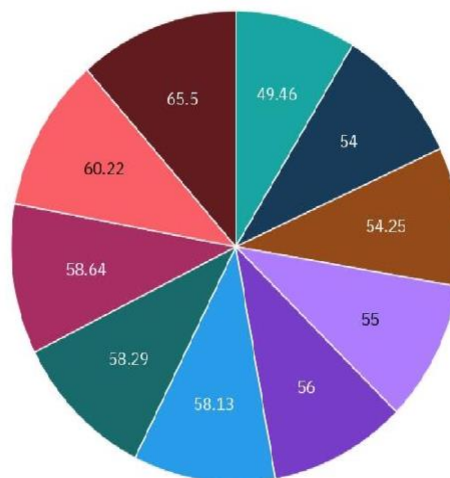
Age by Thallium, Sex and Heart Disease:

- ❖ Over all **thallium - sex - heart diseases**, the average of **Age** is 0.3222.
- ❖ The average values of **Age** range from 0, occurring when **Thallium - Sex - heart disease** is 3|1|Absence, to 1, when **Thallium - Sex - heart disease** is 3|1|Absence.
- ❖ **Age** is unusually low when **Thallium - Sex - heart disease** is 3|1|Absence.
- ❖ The most common values of **Thallium - Sex - heart disease** is 3|1|Absence (56.3 %) and 7|1|Absence (38.5%), together occurring 256 times, which is 94.8 % of the total.

Age by Thallium, Sex and Heart Disease

Thallium - Sex - Heart Disease

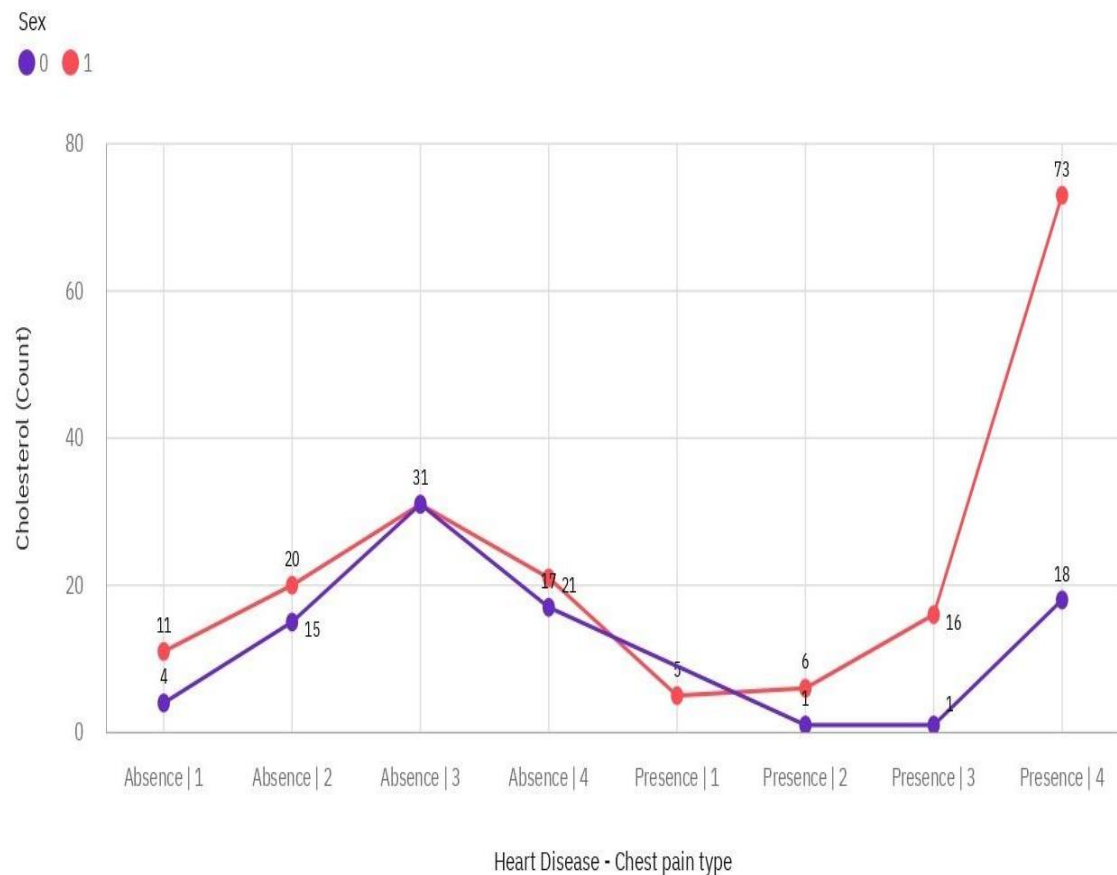
3|1|Absence 7|1|Absence 3|0|Absence 7|1|Presence 6|1|Absence 6|1|Presence 3|1|Presence
 7|0|Presence 3|0|Presence 7|0|Absence



Cholesterol by Heart Disease and Chest pain type colored by Sex:

- ✓ The most common value of **heart disease - Chest pain type** is Absence | 1, occurring 150 times, which is 55.6 % of the total.
- ✓ The most common value of **Sex** is Sex_CAT3, occurring 129 times, which is 47.8 % of the total.
- ✓ The most common value of **Sex** is 1, occurring 42 times, which is 67.7 % of the total.
- ✓ The total number of results for **Cholesterol**, across all **heart disease - chest pain types**, is 270.

Cholesterol by Heart Disease and Chest pain type colored by Sex

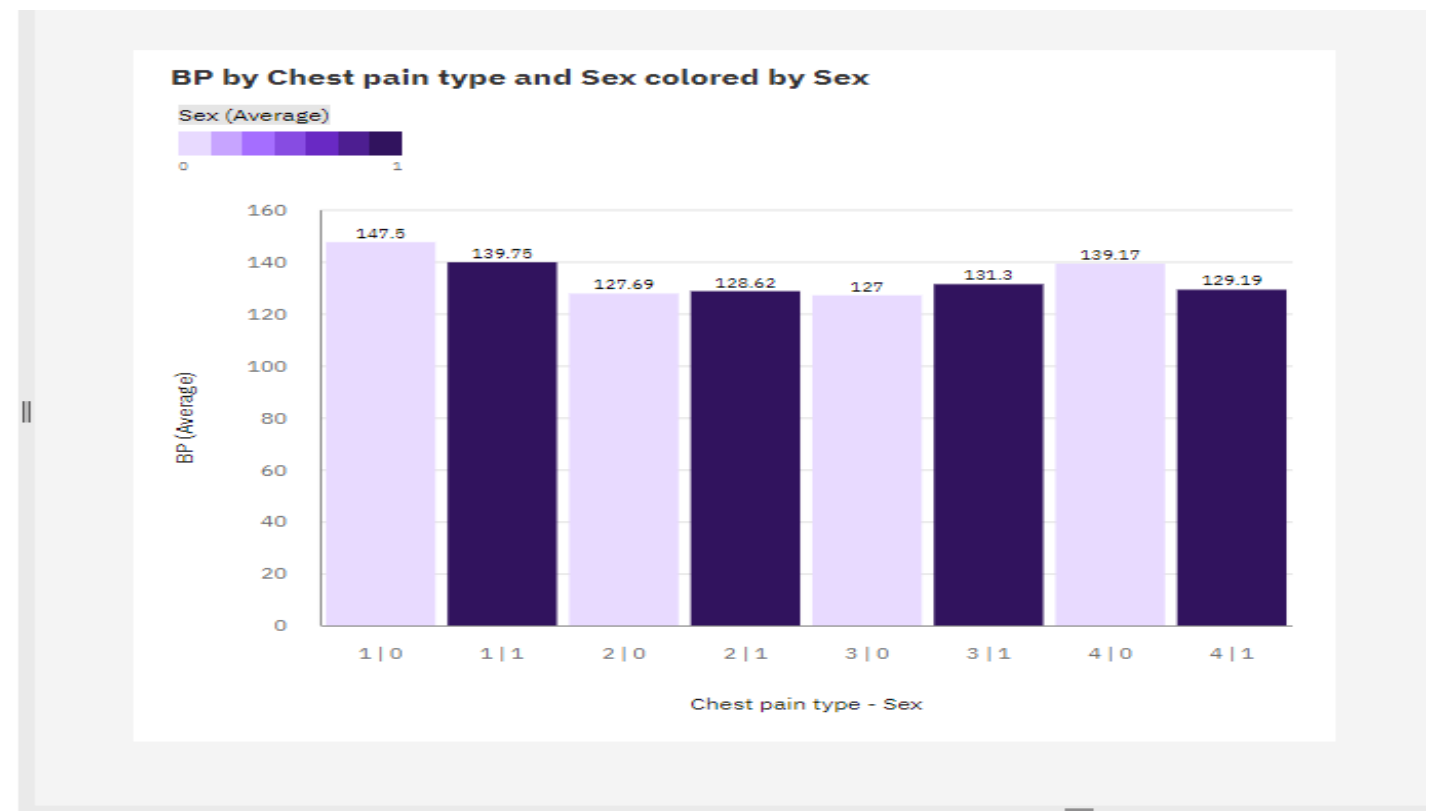
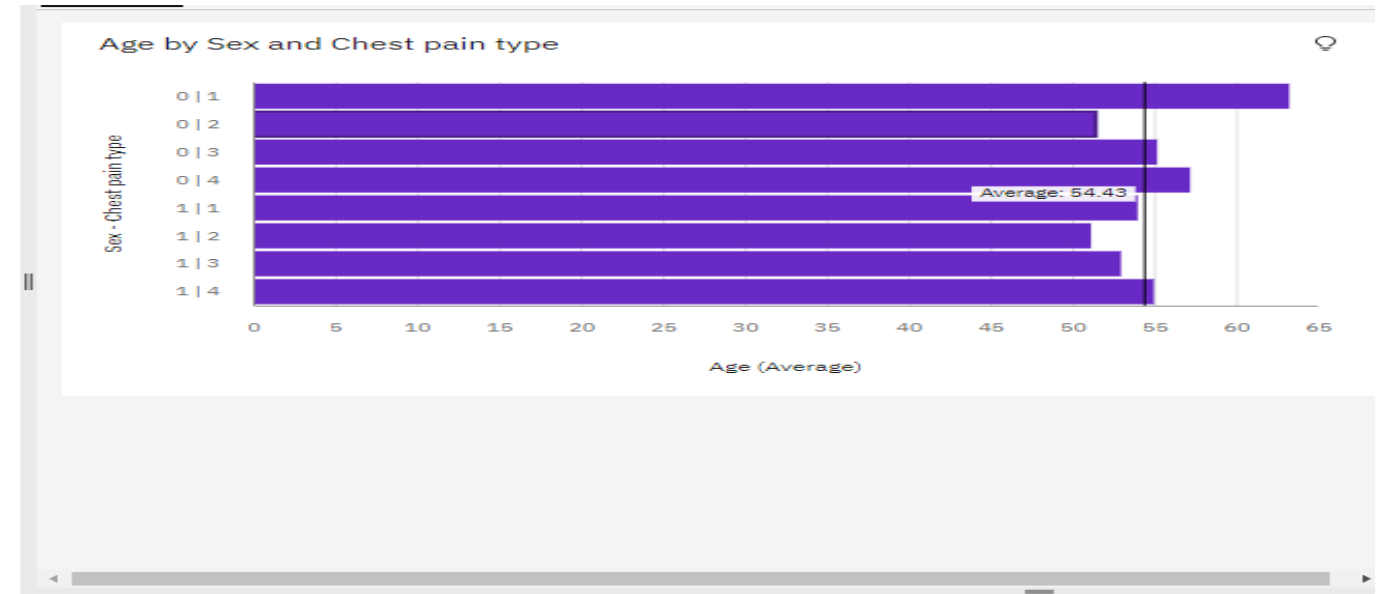


Story card of Heart Disease dataset Analytics using Cognos Analytics

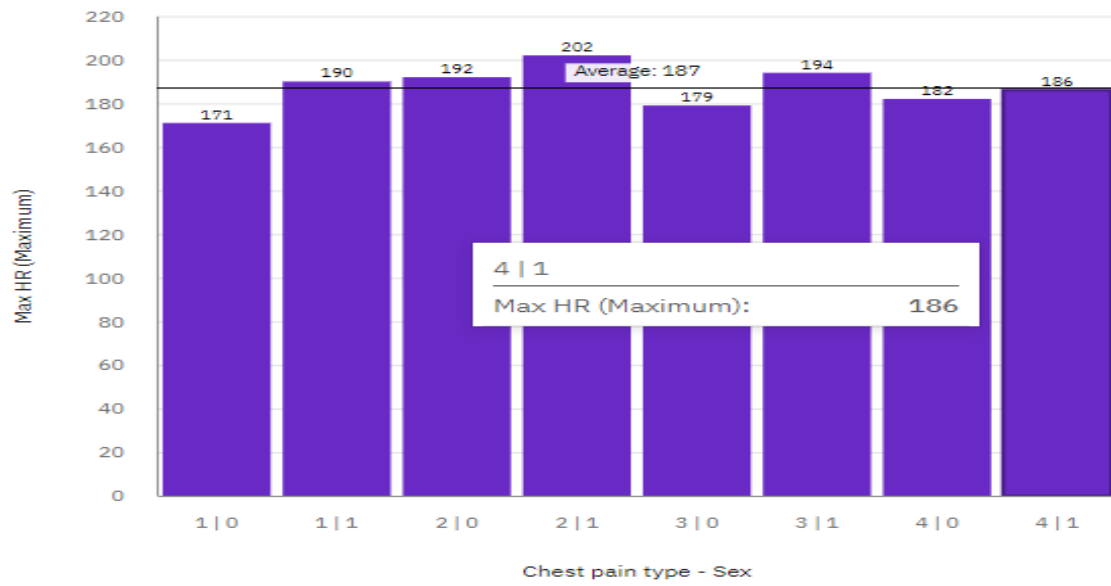
USN:6,7:

As a Data analyst, I create a predicted model by also preparing story card with using explored data

As a Data Analyst, I will analysis of the heart disease patient's datasets



Max HR by Chest pain type and Sex



Tab 1

Tab 2

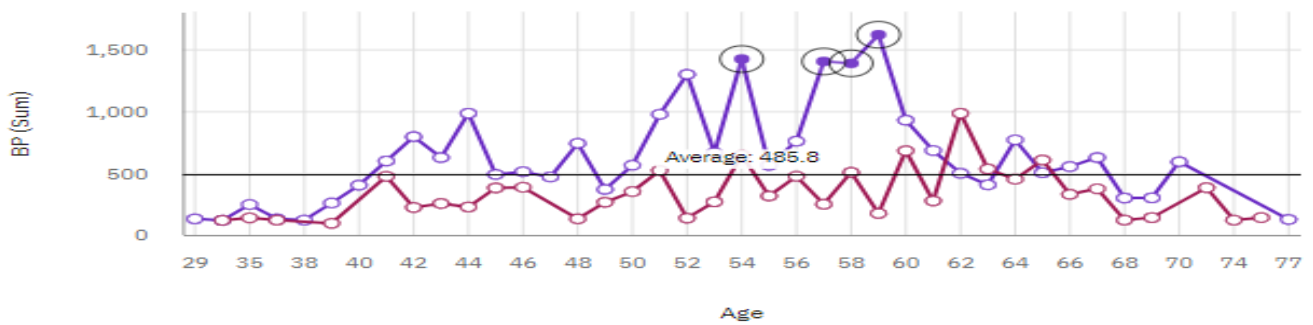
Tab 3

+

BP Variation with Respect to Age

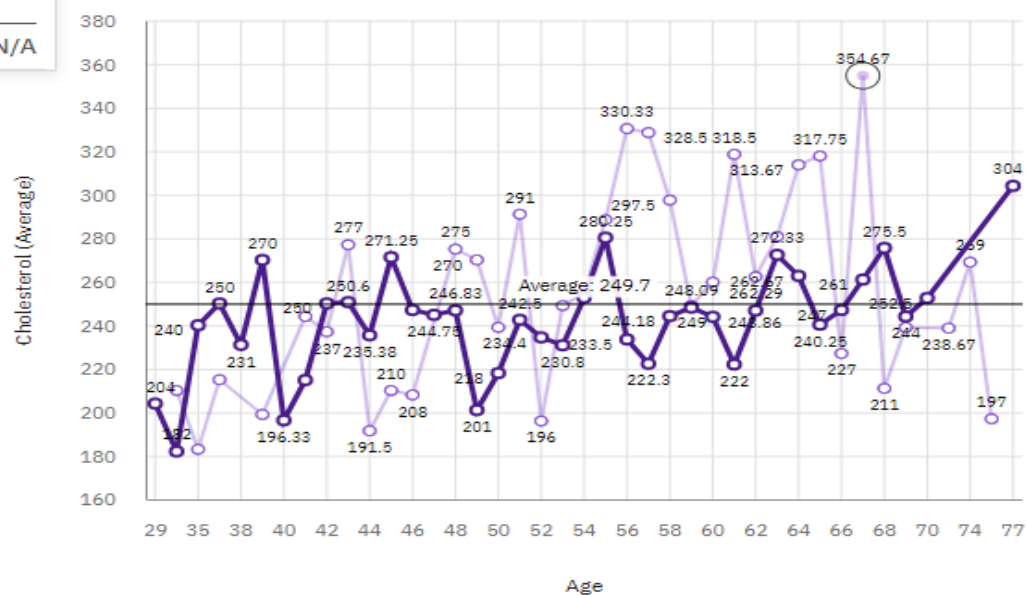
Sex

0 1



Cholesterol by Age colored by Sex

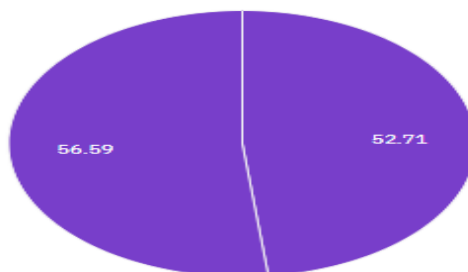
Sex
0 1



< Tab 4 Tab 5 Tab 6 Tab 7 Tab 8 Tab 9 Tab 10 **Tab 11** +

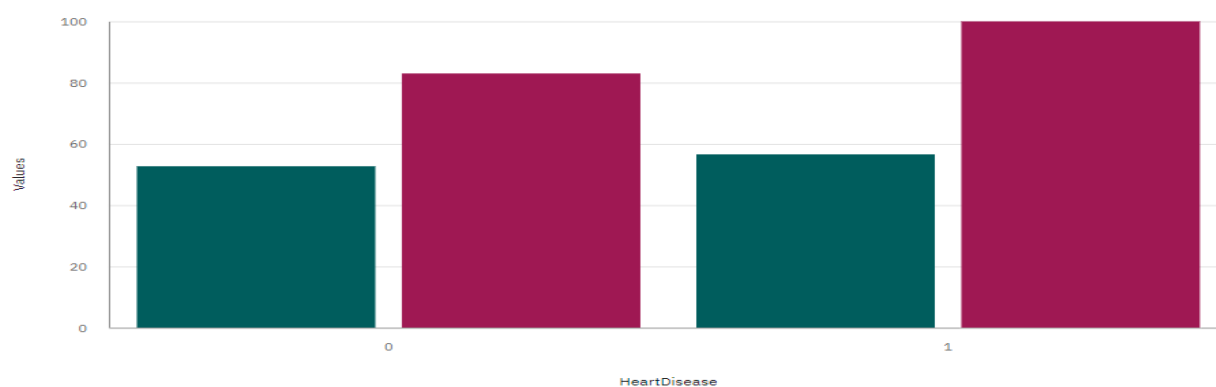
Age by HeartDisease

HeartDisease
0 1



Age and Sex by HeartDisease

Measures
Age Sex

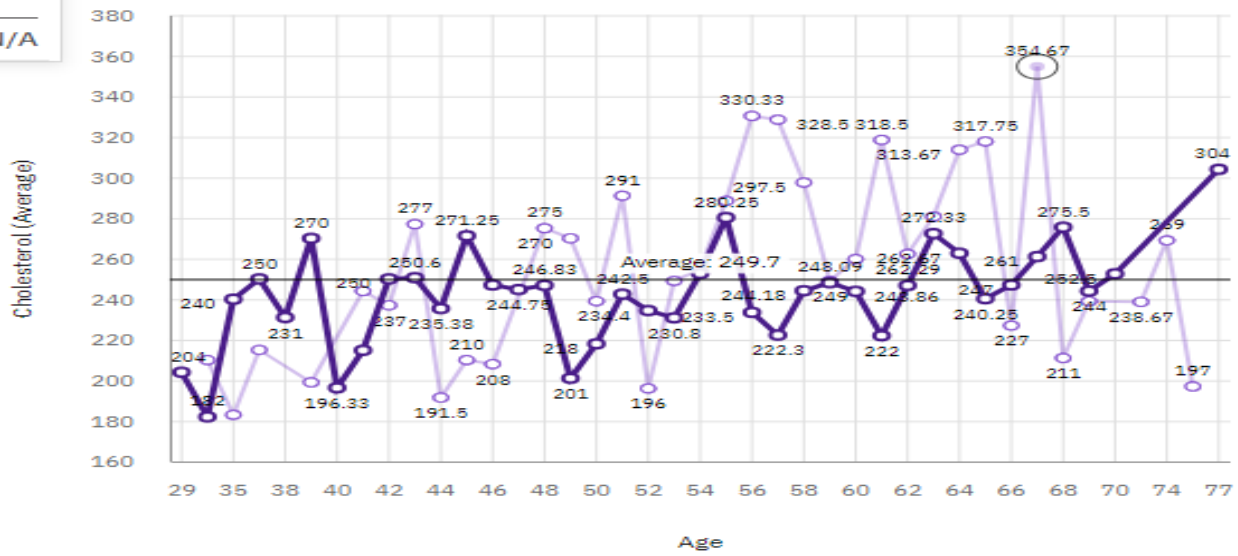


Cholesterol by Age colored by Sex

Sex

0 1

N/A

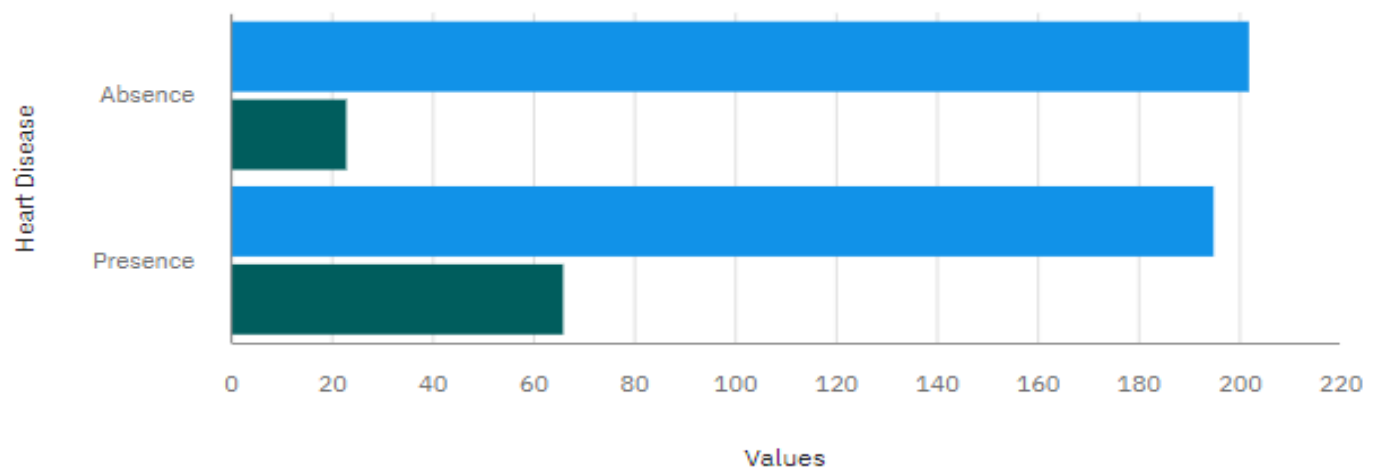


Maximum Heart Rate in Existing Heart Disease By Exercise Angina

Measures

Max HR

Exercise angina



FINAL DASHBOARD



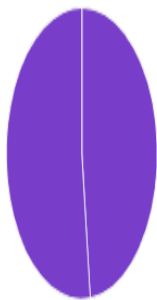
VISUALIZING AND PREDICTING HEART DISEASE WITH AN INTERACTIVE DASHBOARD



Age by HeartDisease

HeartDisease

0 1



Age by HeartDisease and Chest pain type

HeartDisease - Chest pain type

0|2 0|3 0|4 0|1 1|4
1|1 1|2 1|3



Thallium by Chest pain type and based on Gender

Chest pain type - Sex

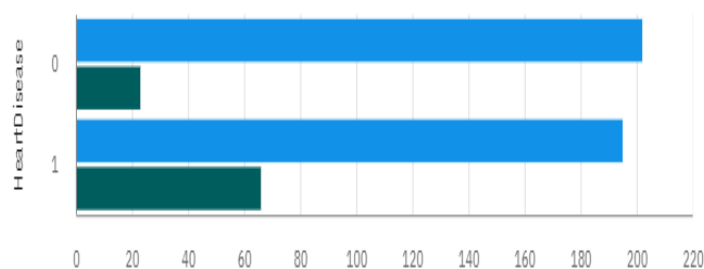
1|0 2|0 1|1 3|0 2|1 4|0 3|1 4|1



Max HR and Exercise angina by HeartDisease

Measures

Max HR Exercise angina



BP Variation with respect to Age

Sex

0 1

