

SmartBridge Internship:

Project : Employee Attrition Analytics Using IBM Cognos

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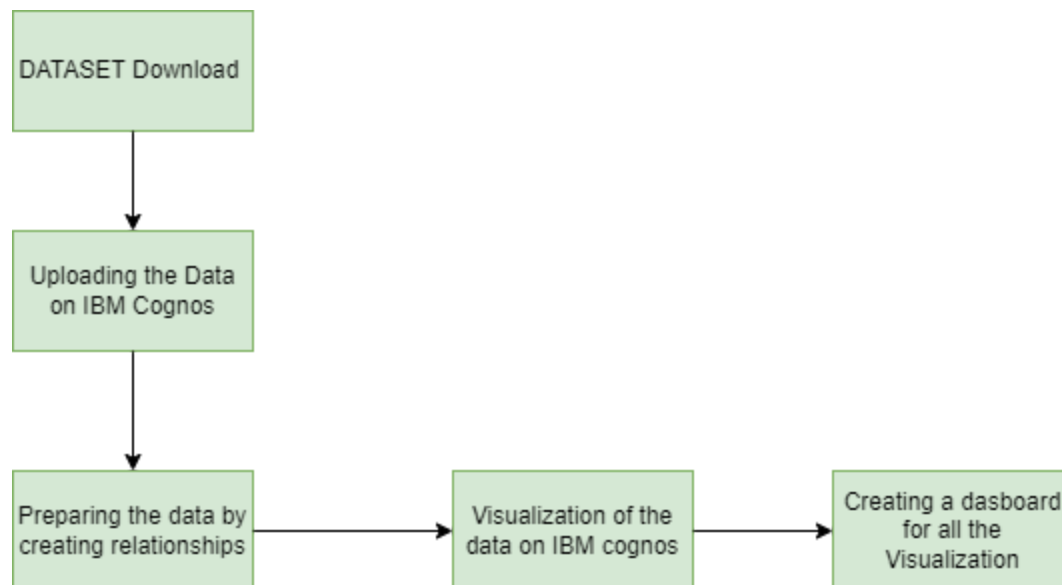
DemoLink:

https://drive.google.com/drive/folders/15BGalfq7nUikLeZZ_GOHmXVWcTEFH4rD?usp=sharing

Overview of the Project:

The given project about Employee Attrition in which the data set contains 6 csv file containing various fields in each of the file. Employee Attrition stands for the gradual reduction of the employees in an company. The aim of the project is to visualize the attrition trends corresponding to the various attributes of the employee and company's information for example Salary Hike %, Marital Status, Education, etc.

Project Flow:



The above given flow diagram briefly shows that how the project flow is. From downloading the dataset to visualization there are various steps that are required to be done before we create the dashboard for all the visualization.

IBM Cognos:

About:

IBM Cognos Analytics provides businesses with an easy and intelligent self-service that takes them through the process of extracting insights from the data acquired in order to build a compelling presentation. A user may be confident that Cognos will be able to address all of an organization's analytics needs in a single integrated solution that can be implemented on-premises or in the cloud.

Users may personalise material and create dashboards from any location at any time with a simple and engaging web experience.

IBM Cognos Analytics Advantages:

- Various data sources are used
- A simple and intuitive user interface
- Offline and online interactive content is provided.
- Experience tailored to you
- Alerts and scheduling
- Smart search is context-aware.

IBM Cognos Analytics has some Disadvantages.

Along with the aforementioned advantages of IBM Cognos Analytics, there are a few disadvantages to be aware of. The best approach to determine if this solution is good for you is to have a complete picture.

- The Total Cost of Ownership (TCO) of a tool is more important than the cost of other tools.
- Forecasting powers are limited.
- IBM's investment in Cognos R&D is dwindling.
- Large data sets with a lot of parameters won't work well.
- Cross-browser compatibility is a common issue.

Understanding the dataset: The data set that has been provided to us was downloaded by Kaggle. The size of the the data set was about 11MB and contained 6 csv files(data_dictionary, general_data, employee_survey, manger_survey, in_time, out_time). Of those 6 csv file the main 3 that were essential for our project were general_data, employee_survey, manger_survey.

1) **General_data:** The general_data file contains various fields about each of the employee such as Age, Attrition, Department, Education, Education Field, Marital Staus, etc. There are total of 24 fields in this file that tells us various information about the employee.

WPS Office

general_data.xlsx

data_dictionary.xlsx

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Here the Education is given as a numeric value from range 1-5 (1: Below College, 2: College , 3: Bachelors , 4: Masters , 5: Doctor)

2) Manager_Survey: The manager_survey file consists of only 3 fields EmployeeID, Job Involvement, Performance Rating of the corresponding employee.

EmployeeID	JobInvolvement	PerformanceRating
1	1	3
2	2	4
3	3	3
4	4	2
5	5	3
6	6	3
7	7	3
8	8	4
9	9	4
10	10	3
11	11	2
12	12	3
13	13	3
14	14	2
15	15	3
16	16	3
17	17	2
18	18	3
19	19	2
20	20	3
21	21	3
22	22	2
23	23	3
24	24	1
25	25	3
26	26	3
27	27	3
28	28	4
29	29	3
30	29	2

Again both Job Involvement and Performance Rating are given as numeric data.

Job Involvement (1 'Low' 2 'Medium' 3 'High' 4 'Very High')

PerformanceRating (1 'Low', 2 'Good', 3 'Excellent', 4 'Outstanding')

3) Employee_survey: The manager_survey file consists of only 3 fields EmployeeID, Environment Satisfaction, JobSatisfaction , WorkLifeBalance of the corresponding employee.

EmployeeID	EnvironmentSatisfaction	JobSatisfaction	WorkLifeBalance
1	1	3	4
2	2	3	2
3	3	2	1
4	4	4	3
5	5	4	1
6	6	3	2
7	7	1	3
8	8	1	2
9	9	2	4
10	10	2	1
11	11	3	4
12	12 NA		4
13	13	4	1
14	14	1	2
15	15	4	4
16	16	3	4
17	17	4	3
18	18	1	4
19	19	2	2
20	20	1	1
21	21	3	2
22	22	1	2
23	23	3	3
24	24	2	3
25	25	2	4
26	26	2	4
27	27	1	1
28	28	4	4
29	29	4	3

Environment Satisfaction, JobSatisfaction , WorkLifeBalance all numeric values.

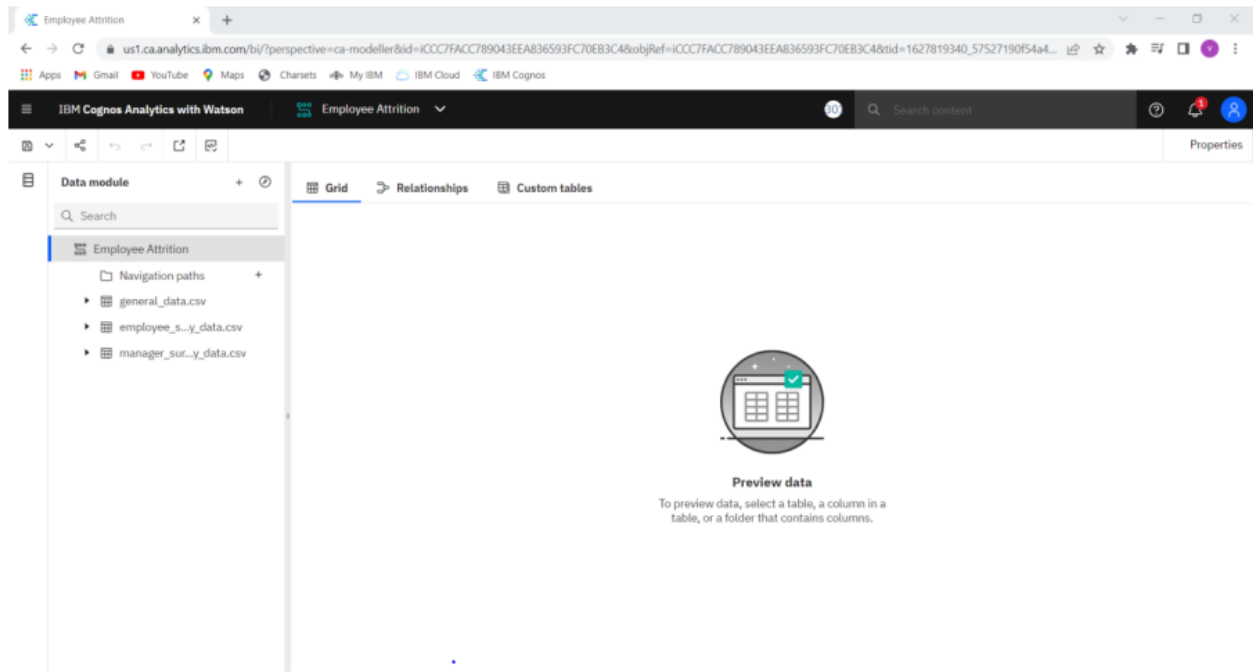
EnvironmentSatisfaction (1 'Low' 2 'Medium' 3 'High' 4 'Very High')

JobSatisfaction (1 'Low' 2 'Medium' 3 'High' 4 'Very High')

WorkLifeBalance (1 'Bad', 2 'Good', 3 'Better', 4 'Best')

Project Implementation of IBM Cognos:

1: Loading the Dataset To IBM Cognos



2: Preparing the data:

The preparation of the data is done by creating relationships between the general, manager_survey, employee_survey.

The screenshot shows the IBM Cognos Analytics interface. On the left, the 'Data module' pane lists the 'Employee Attrition' data source with its navigation paths: 'general_data.csv', 'employee_survey_data.csv', and 'manager_survey_data.csv'. The main workspace displays a 'Relationships' diagram with three tables: 'general_data.csv', 'employee_data.csv', and 'manager_data.csv'. The relationships are defined as 1-to-1 between 'general_data.csv' and 'employee_data.csv', and between 'employee_data.csv' and 'manager_data.csv'. A 'Diagram settings' panel on the right indicates 'Cardinality' is set to 1 and 'Focus mode' is set to 1. The bottom of the screen shows a Windows taskbar with various application icons and a search bar.

Creating a relationship:

a) There is the 1 to 1 relationship between general and employee data taking EmployeeID as the common field.

The screenshot shows the 'Edit relationship' dialog box in IBM Cognos Analytics. It displays two tables: 'Table 1: general_data.csv' and 'Table 2: employee_survey_data.csv'. The relationship is defined as 1-to-1. The 'Match selected columns' section shows the 'EmployeeID' column from both tables being matched. The 'Inner join, 1-to-1' and 'No filtering' options are selected. The 'Matched columns (1)' section shows the 'EmployeeID' column. Below the dialog, a data table is visible with columns: StockOptionLevel, TotalWorkingYears, TrainingTimesLastYear, YearsAtCompany, YearsSinc...Promotion, YearsWith...rrrManager, EmployeeID, and EmployeeID. The data rows are as follows:

StockOptionLevel	TotalWorkingYears	TrainingTimesLastYear	YearsAtCompany	YearsSinc...Promotion	YearsWith...rrrManager	EmployeeID	EmployeeID
0	1	6	1	0	0	1	1
1	6	3	5	1	4	2	2
3	5	2	5	0	3	3	3
3	13	5	8	7	5	4	4

b) There is a 1 to 1 relationship between general and manager data with the common field taken again as the EmployeeID

The screenshot shows the IBM Analytics interface with two tables selected: 'Table 1: general_data.csv' and 'Table 2: manager_survey_data.csv'. A relationship is established between the two tables based on the 'EmployeeID' column, indicated by a blue line with '1' and '1' at each end. The column lists for Table 1 include Row Id, Attrition, BusinessTravel, Department, and Education. The column lists for Table 2 include Row Id, EmployeeID, and JobInvolvement. The 'Match selected columns' button is visible. Below the column lists, a preview table shows the joined data with columns: StockOptionLevel, TotalWorkingYears, TrainingTimesLastYear, YearsAtCompany, YearsSinc...Promotion, YearsWith...rrrManager, and EmployeeID. The data rows show a 1-to-1 relationship for each EmployeeID.

StockOptionLevel	TotalWorkingYears	TrainingTimesLastYear	YearsAtCompany	YearsSinc...Promotion	YearsWith...rrrManager	EmployeeID
0	1	6	1	0	0	1
1	6	3	5	1	4	2
3	5	2	5	0	3	3
3	13	5	8	7	5	4

Inner join, 1-to-1
No filtering

Matched columns (1)

c) There is a 1 to many relationship between employee survey and manager data with the common field taken again as the EmployeeID

The screenshot shows the IBM Analytics interface with two tables selected: 'Table 1: employee_survey_data.csv' and 'Table 2: manager_survey_data.csv'. A relationship is established between the two tables based on the 'EmployeeID' column, indicated by a blue line with '1' and 'N' at each end. The column lists for Table 1 include Row Id, EmployeeID, EnvironmentSatisfaction, JobSatisfaction, and WorkLifeBalance. The column lists for Table 2 include Row Id, EmployeeID, and JobInvolvement. The 'Match selected columns' button is visible. Below the column lists, a preview table shows the joined data with columns: Row Id, Environmen...isfaction, JobSatisfaction, WorkLifeBalance, EmployeeID, Row Id, JobInvolvement, and Performa... The data rows show a 1-to-many relationship where one EmployeeID from the employee survey is linked to multiple rows in the manager survey.

Row Id	Environmen...isfaction	JobSatisfaction	WorkLifeBalance	EmployeeID	Row Id	JobInvolvement	Performa...
1	3	4	2	1	1	3	3
2	3	2	4	2	2	2	4
3	2	2	1	3	3	3	3
4	4	4	3	4	4	2	3

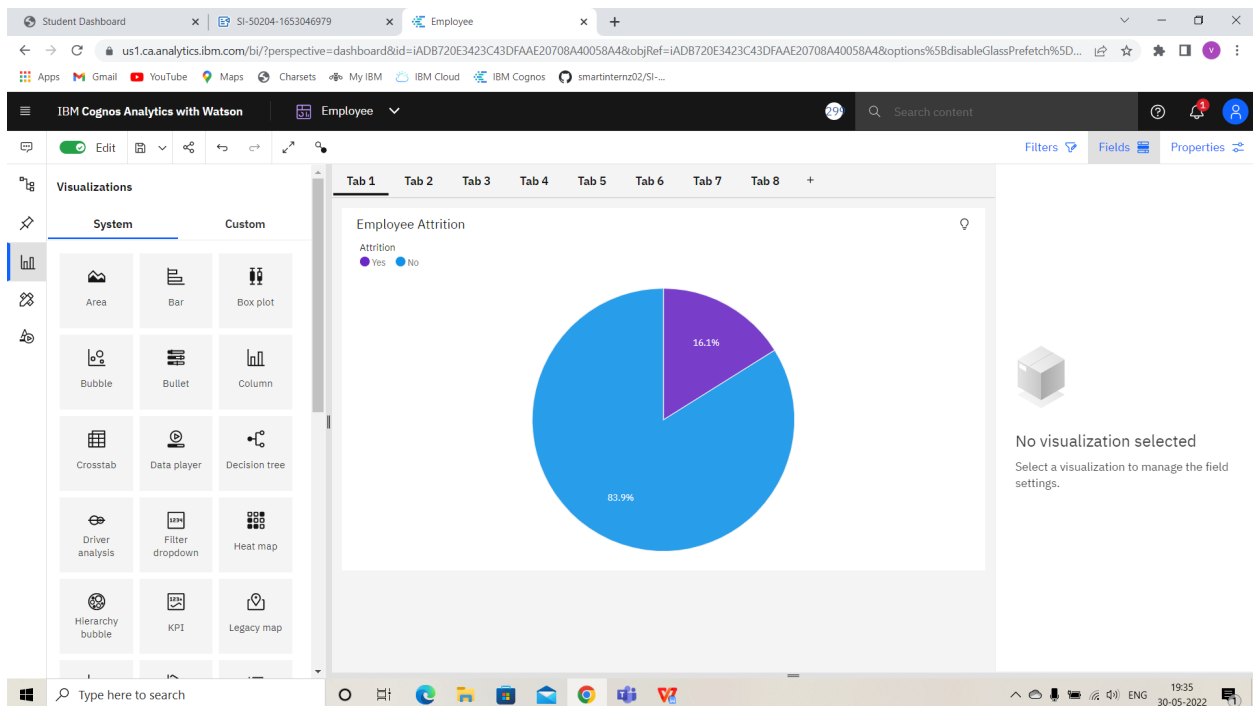
Inner join, 1-to-many
No filtering

Matched columns (1)

DATA VISUALIZATION:

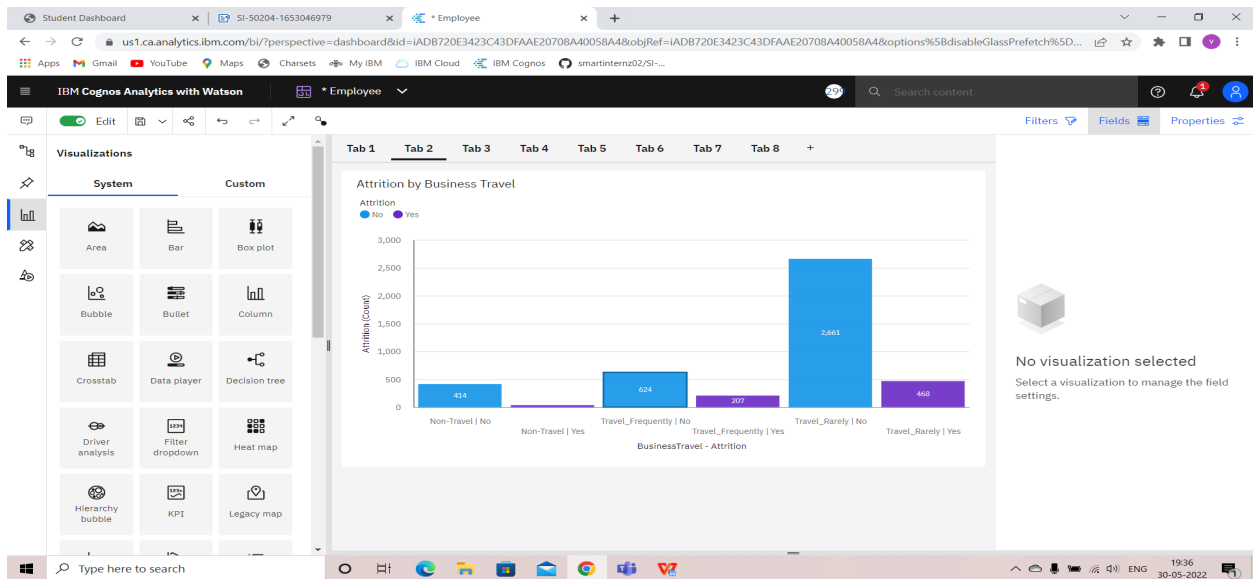
A. Attrition Status (YES or NO)

Visualization of the Attrition on the basis of simple YES/NO on pie chart using the Cognos dashboard. The Size and the segment field is given as Attrition.



Inference: There are about 83.9% of employee who do not leave the company while 16.1% of the employees do leave the company.

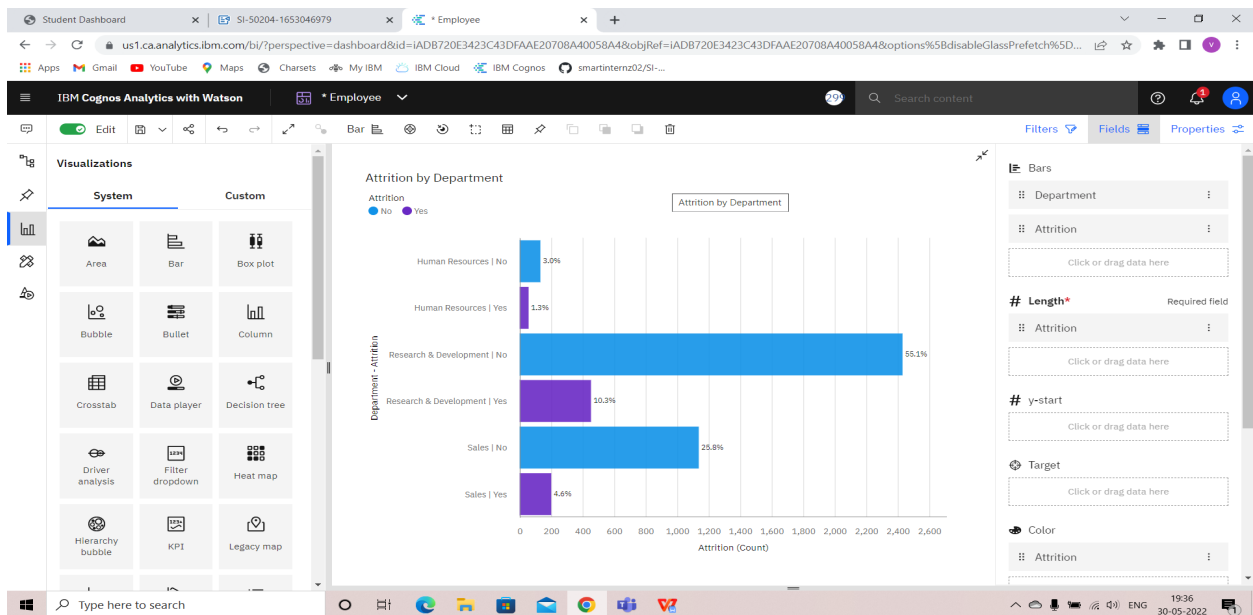
B. Attrition Based On Business Travel (Yes / No): The next visualization shows the attrition based on the Business Travels. The bars include the fields of attrition and travels while the lengths denotes the attrition



Inference: We can clearly see that Employees who travel rarely have the maximum number in having Attrition as no (2,661) while Non-travelers who leave the company are minimum.

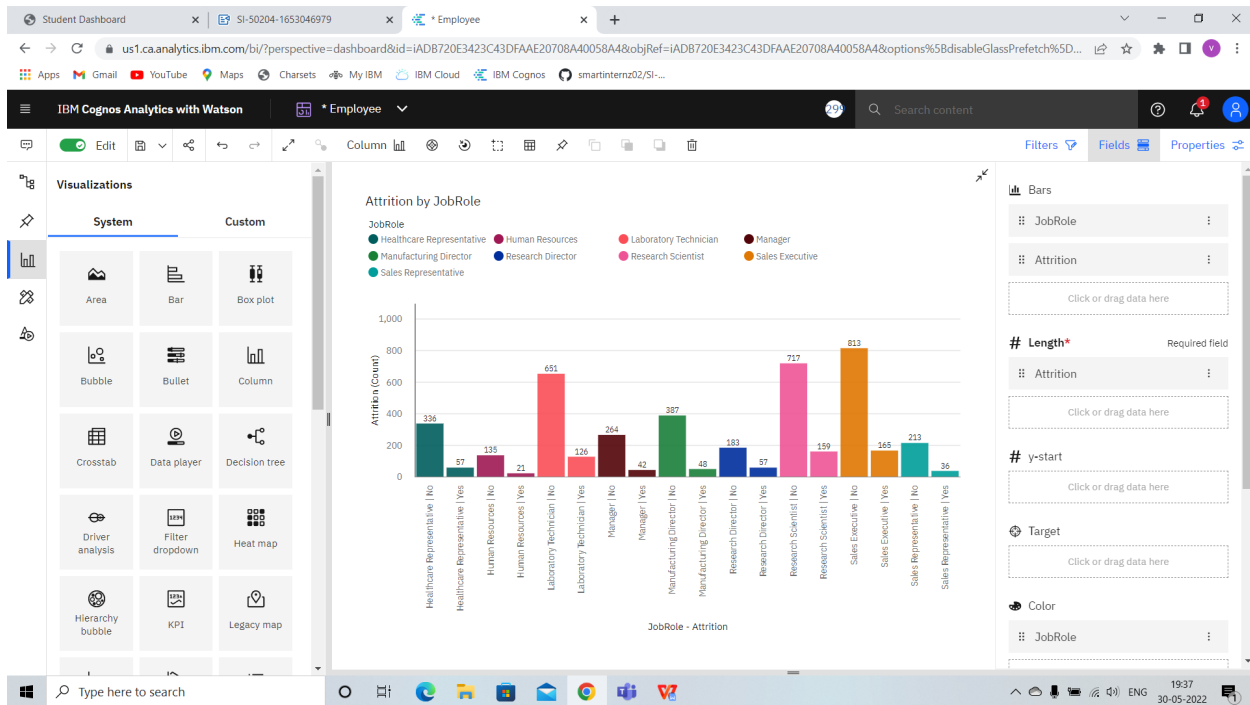
C. Attrition Based On Department , Job Role , Education And Marital Status

Attrition based on Department: Bars denote the Department and Attrition and length shows attrition:



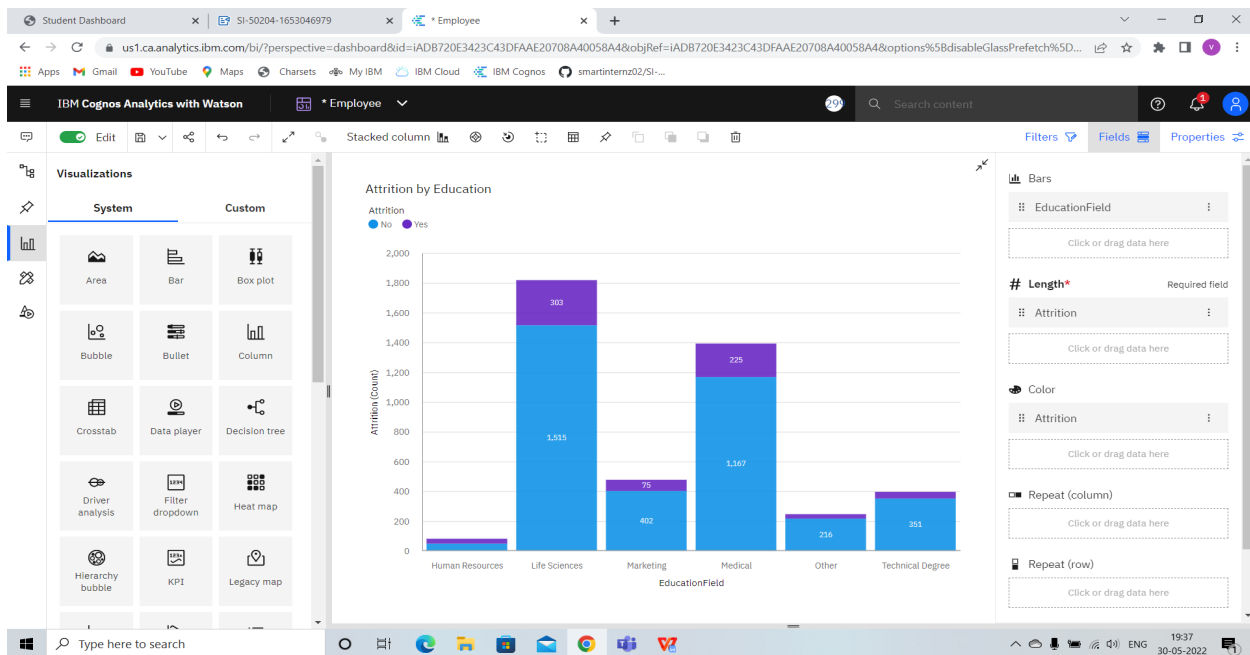
Inference: The employees working in the Research and Development have the maximum share Attrition for both as YES(55.1%) and NO(10.3%)

Attrition based on Department: Bars denote the JobRole and Attrition and length shows attrition:



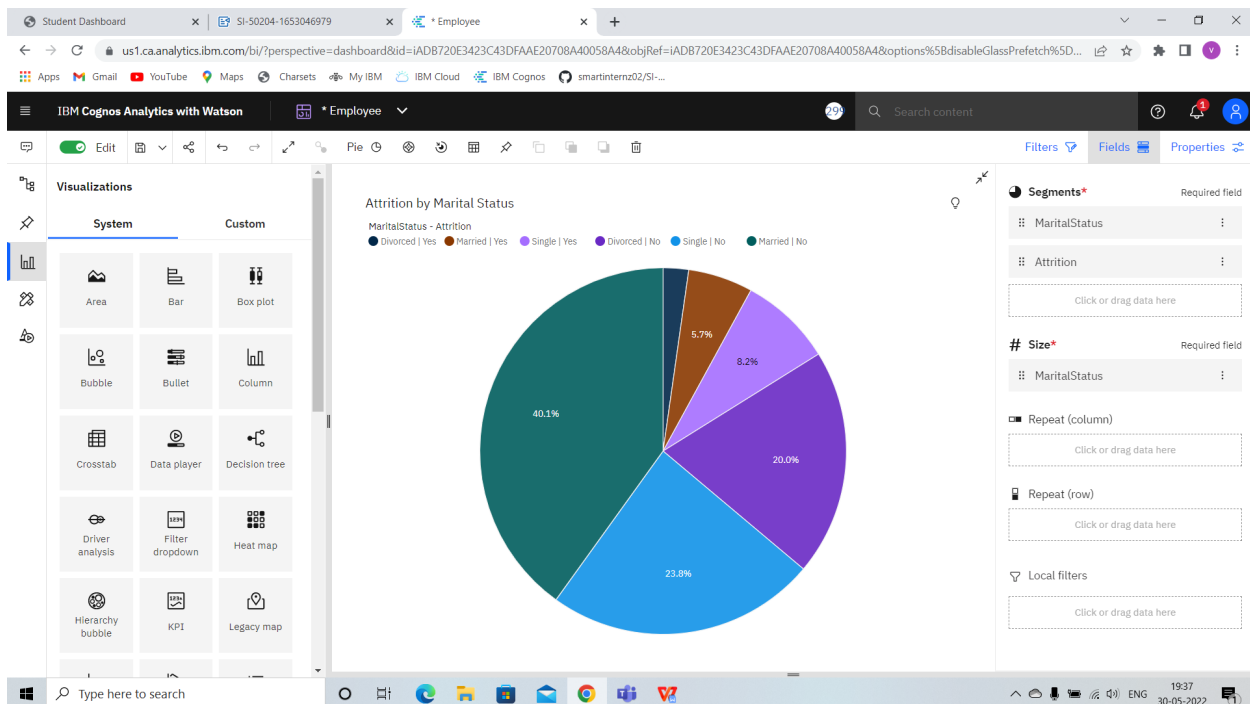
Inference : The Attrition as NO is maximum for the employee working as the sales executives (813).

Attrition based on Eduaction: Bars denote the EduactionFields and length shows attrition:



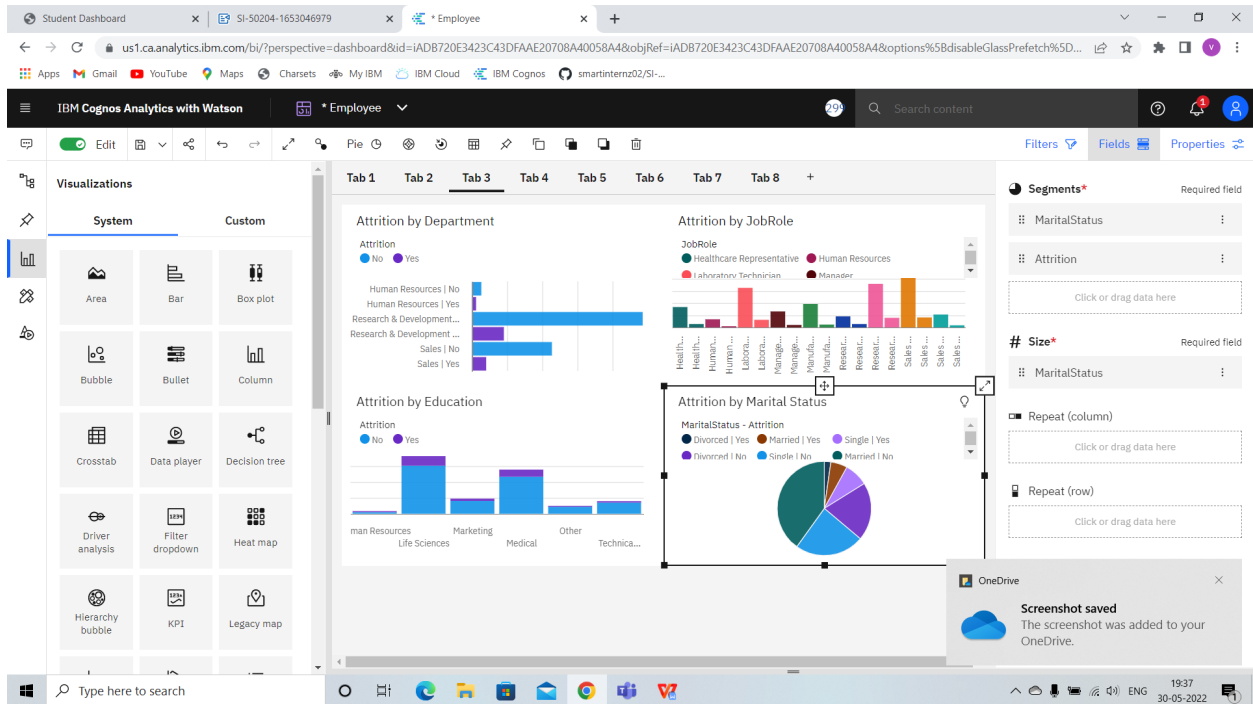
Inference: In this visualization we can see that employees having the Education background as Life Sciences the Attrition is max in both case of YES(1,515) and NO(303)

Attrition based on Marital Status: Segments of the PieChart denote the Marital Status and Attrition and size shows attrition:

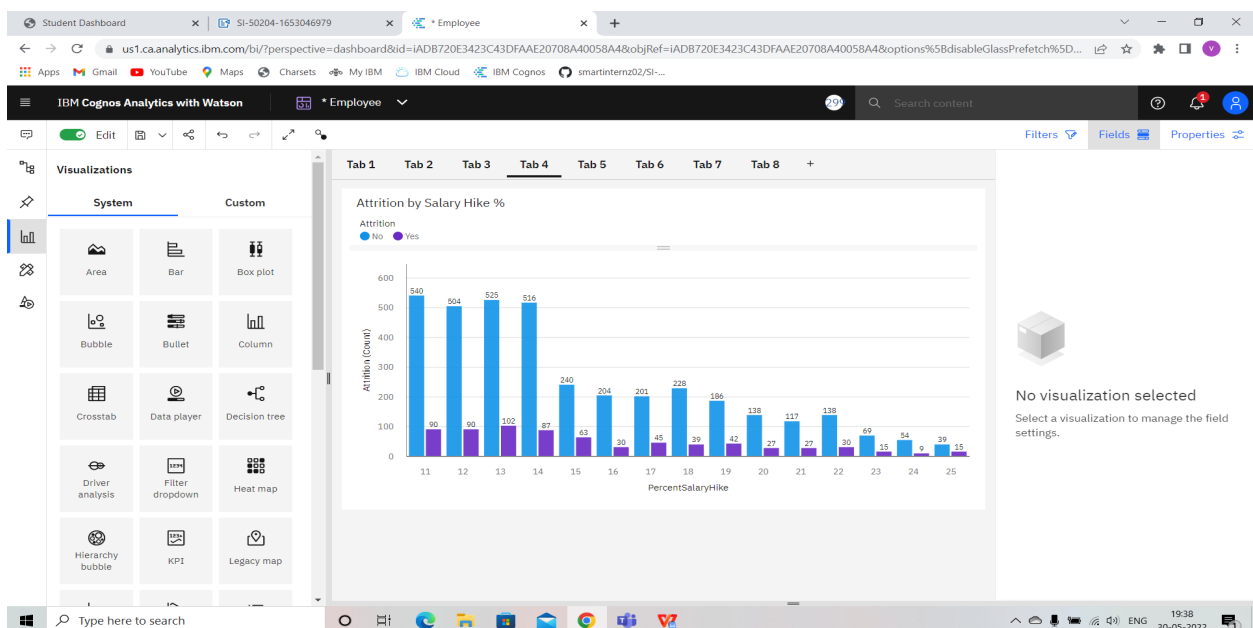


Inference: We can see that Employees that stay in company are maximum married. While the employees leaving the company are maximum Single.

All 4 Visualization in a single Tab:

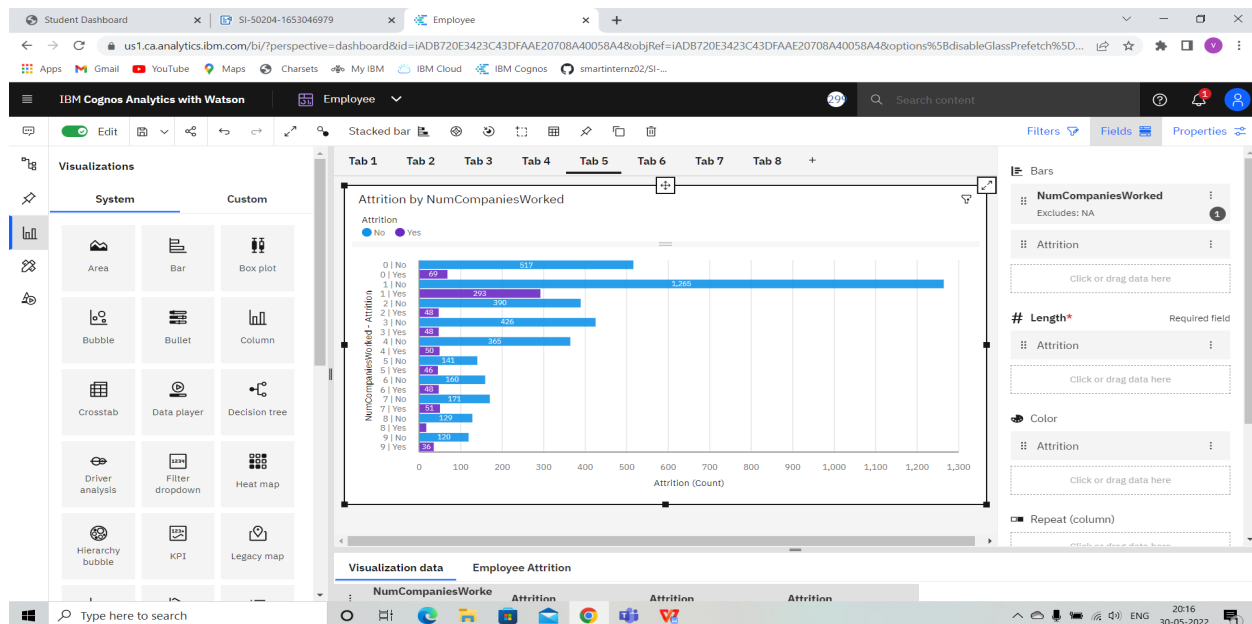


D. Attrition by Salary Hike % : Bars denote SalaryHike and Attrition and length shows attrition.



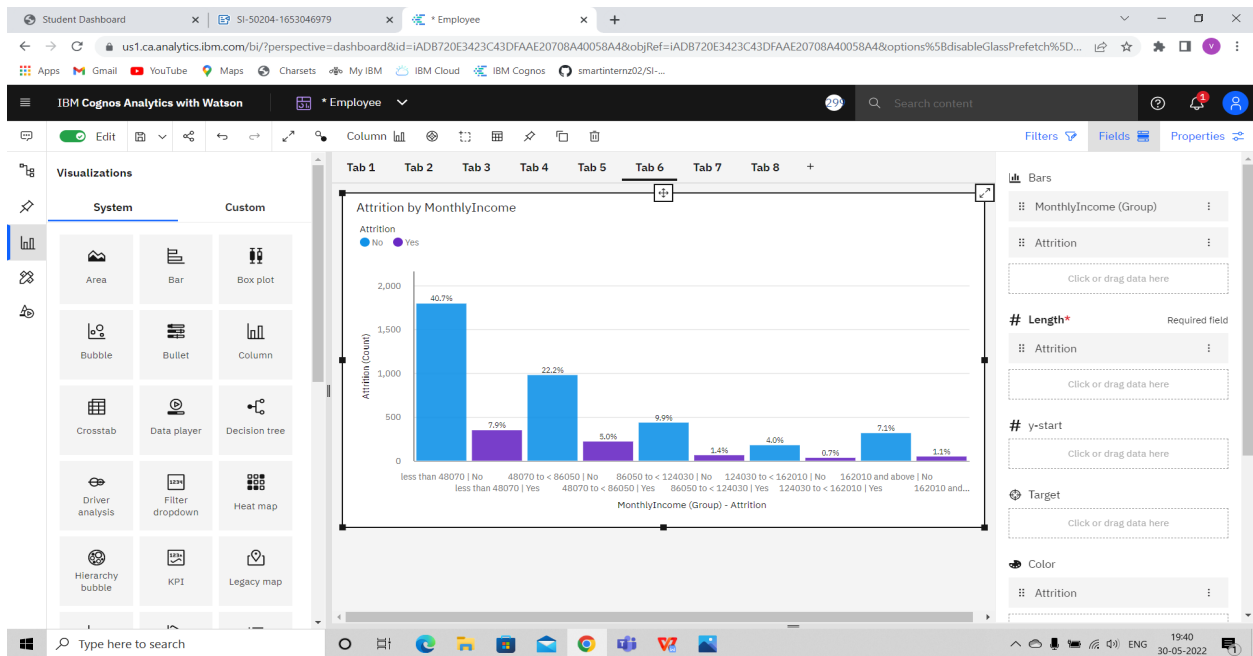
Inference: We can see that the salary hike from 11-14% is maximum for the employees as well as the Attrition is also maximum for that.

E. Attrition by Number of Companies Worked: The bars denote the No of companies worked and Attrition while the length is denoted by Attrition



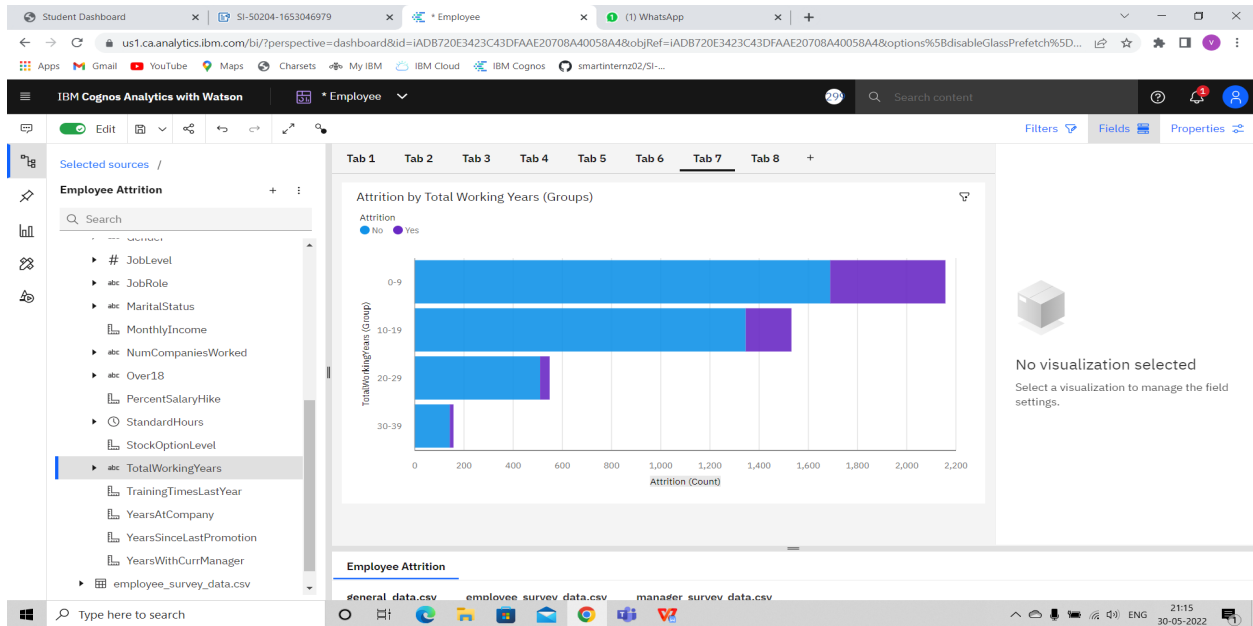
Inference: Employees who have worked in only in a single company have the Maximum Attrition of YES and NO. It shows that the employee tend to leave the company more if they have worked only in 1 company before.

F. **Attrition by MonthlyIncome** : Bars denote the Monthly Income and Attrition and length shows attrition:



Inference: Employees having the Salary less than 48070 are maximum. Since the almost 50% of the employees fall in this range so the Attrition of YES and NO is also Maximum for this range of salary.

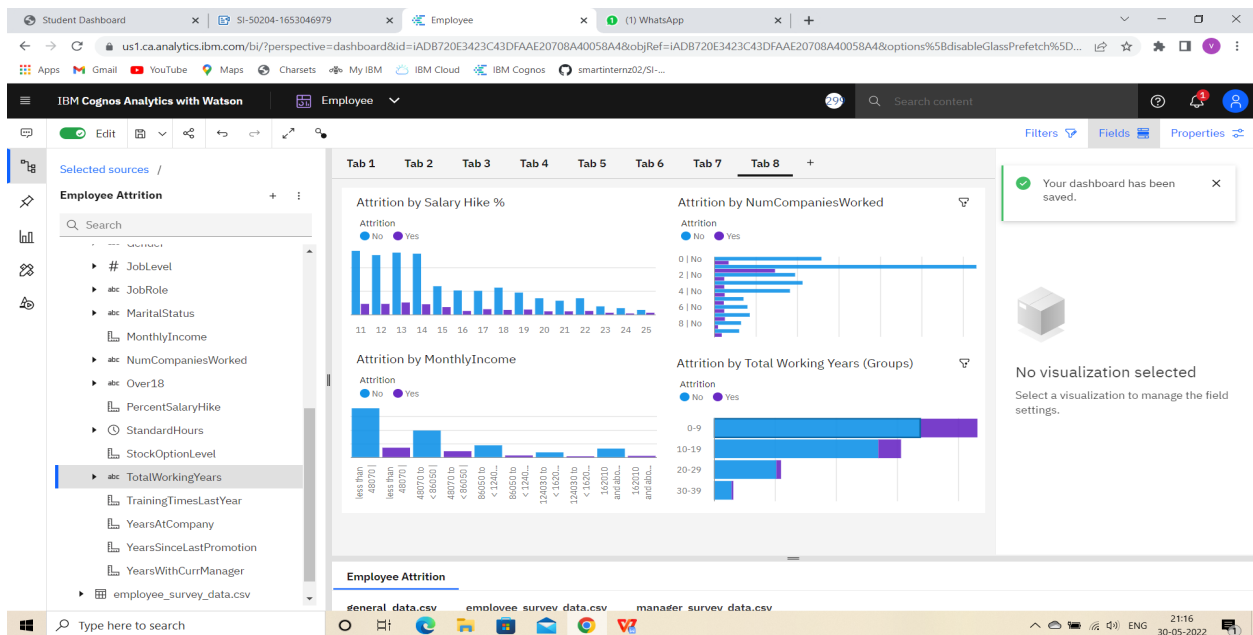
G. **Attrition based on Working Years**: The next visualization shows the stacked bar graph of Attrition by Total years worked.



Inference: This visualization shows the how Total Working Years affect the Attrition. Employees who have worked for about 9 years tend to stay in the company(1690) and the maximim group of people leaving the company are also from this group.

DASHBOARD:

Making a Dashborad using the 4 part Template to add the last 4 tab visualization on the dasboard:



Conclusion:

The given project of Employee Attrition using Cognos Analytics was completed successfully and all the visualization were performed as mentioned. Each every visualization that was created gave a insight of the trends between the Employee Attrition and the various other attributes for the Employee. Education, Salary Hike, Marital Staus, Department, Total Working Years, etc were some attributes of the employee and how the Attrition changed with them were visualized using IBM cognos.

Link for the Dashboard:

https://us1.ca.analytics.ibm.com/bi/?perspective=dashboard&pathRef=.my_folders%2FEmployee&action=view&mode=dashboard&subView=model000001810bc501c0_00000000