

Date	19 November 2022
Team ID	PNT2022TMID00859
Project Name	Project - Corporate Employee Attrition Analytics
Team Members	Team Lead – Balachandar Member 1 – DIWAKAR Member 2 – ARUN Member 3 – Aravind

1. INTRODUCTION

Corporate agencies and Industries are the 2 major elements that guide to the development and increase of the Country. Workforce or manpower are very important constituent of an employer. The overall performance and the increase of the employer rely upon the sustainability of the employees. Attrition and Re-anxiety are two major contrary phenomenon's which serves distinctive functions however the crux of the connection is that one makes manner for the other. World markets are becoming aggressive with time which has modified the lifestyle of the workspace. The presence of labor force, emergent imbalance with inside the deliver and the call for of certified employees and multiplied emphasis on paintings existence stability has created demanding situations for the employer's HR and supervisor to discover the proper character to hire for proper position. Attrition and retentions are the two faces that represents the manner to discover the enterprise employments trends, usual enterprise increase, motivation and increase. It is found as in international aggressive employer are making an investment vast quantity of interest, money and time at the worker attrition due to the fact dropping a legitimate worker bad effect with inside the form of information value, frightened colleagues, misplaced capital,

lack of correct call of the employer and ends in the failure of the employer or employer.

1.1 PROJECT OVERVIEW

The organization's success depends on its ability to draw in and keep outstanding talent. Identifying the factors that retain employees at the organization and those that cause others to quit is a crucial responsibility for HR. A number of data points on the personnel who are either still employed by the company or have left it are provided in the data. To stop the organization from losing good employees, it is important to recognize and address these factors.

1.2 PURPOSE

To examine the elements that reasons the worker attrition through predictive evaluation and to present guidelines with the aid of using modeling strategies to lessen the purpose of retention. Visualization Charts are organized to spotlight the insights for the given dataset. Creating dashboard for the HR and bosses for know how the motives for attrition and to take vital measures with inside the agency.

2. LITERATURE SURVEY

Employee attrition is referred as discount in wide variety of personnel in an agency. For Corporate enterprise, worker attrition has grown to be a known undertaking on account those ultimate decades. Employees go away the agency for various motives. A few motives are, call for of excessive salary, alternate in generation or role, expert demanding situations etc. High attrition results in price over multiple attributes and capabilities with inside the company. Recruitment, Training and Development charges will increase ordinary value at the personnel.

2.1 EXISTING PROBLEM

In current years, the enterprise and worker each have misplaced perception in every other. The former feels that worker can go away the agency whenever and the latter apprehends that she or he may be expelled whenever with the aid of using the previous one. Whosoever is responsible, regardless of this; lack of personnel is inevitable. This lack of personnel for any cause is referred to as attrition. Irrespective of the kind of enterprise or the shape of the agency, attrition is a not unusual place hassle in each agency which now no longer simplest hampers manufacturing however additionally effects in heavy long-run charges and lack of goodwill to the agency. Therefore, there arises a want to delve into this multi-dimensional hassle and pop out with possible

solutions.

2.2 REFERENCES

Attrition Defined Attrition, in Human Resource Management (HRM), refers to the state of affairs of personnel leaving the company. It is measured with a measuring unit known as attrition rate, which calculates the variety of personnel leaving the company (both resigning voluntarily and involuntarily laid off through the company. (www.mbaskool.com/enterprise-concepts/human-resources, 2013). Employee attrition & retention is manifestation of worker motion in an enterprise, that's deliberated through researcher in HR. They are aspects of identical coin. Employee attrition & retention can be end result of the bad or nice effect of the numerous elements (Zhang, 2005). According to Cascio and W.Bourdeau (2008) voluntary attrition takes place whilst an worker resigns an enterprise to seize any other profession opportunity, he can also additionally relocate together along with his own circle of relatives to distinct location or certainly depart the enterprise for his private reasons. Retirement is one largest shape of voluntary turnover, i.e leaving a process at his very own will. Voluntary turnover is an extreme trouble for modern companies nowadays due to the fact skilled and highbrow capital is an increasing number of important for sustained competitiveness (Boudreau & Ramstad, 2007; Lepak & Snell, 2002). Corey Harris (Walden University 2018) researched on "Employee Retention Strategies withinside the Information Technology Industry" and stated that "Productivity declines whilst personnel voluntarily depart an enterprise" Dr.Shikha N. Khera ¹, Ms. Karishma Gulati² (Delhi 2012),

concluded of their examine on “Human Resource Information System and its effect on Human Resource Planning: A perceptual evaluation of Information Technology companies” that Being an records gadget of human resources, it is able to keep voluminous data approximately the personnel, that now no longer handiest facilitates in figuring out the occupied and unoccupied positions however additionally whether or not the man or woman at unique role is suit for the process or now no longer. Hardik P. K. (2016), researched on “a examine on worker attrition: with special connection with Kerala IT Industry”. His studies tested the relationship among organizational elements and attrition of IT professional’s the end result can finish that the organizational elements performed great function in predicting the variance in turnover purpose (attrition) of Kerala IT professionals. Therefore, the HR managers in IT companies can also additionally think about the problems with organizational elements in their employees to lessen the turnover purpose of the professional personnel. Bodjrenou Kossivi, Ming Xu, Bomboma Kalgora (May 2016) published “Study on Determining Factors of Employee Retention”. The examiner concluded: Employees are the maximum precious property of an enterprise. Their importance to companies requires now no longer handiest the want to draw the exceptional abilities Mukta Shabd Journal Volume IX, Issue VII, JULY/2020 ISSN NO: 2347-3150 Page No: 2752 however additionally, the need to hold them for a protracted term. Broad elements are development opportunities, compensation, paintings-existence balance, management/leadership, paintings surroundings, social support, autonomy, training, and development. Brijesh Kishore Goswami, Sushmita Jha (April 2012) of their examine on “Attrition Issues and Retention Challenges of Employees” have said that, Organizations making plans ought to be

giving near interest to why attrition is going on withinside the pre-set. To forget about why human beings are leaving the enterprise is to disregard the enterprise's best asset – its human beings. People are wanted to perform the task; however human beings are greater than simply responsibilities they perform. They are dreams, hopes, ambitions, creativity, and innovation. To apprehend and domesticate those precious property is one of the most suitable methods to construct an enterprise that leads in place of follows in home and global markets. Thus, Organizations ought to create surroundings that fosters ample boom opportunities, appreciation for the paintings executed and a friendly cooperative environment that makes a worker sense linked in every appreciate to the enterprise. Retention plans are a cheaper manner of improving administrative centre productiveness and attractive personnel emotionally. Proficient personnel preserve the exceptional up and enterprise operations run easily alongside the value saving withinside the longer run paper. S.Guru Vignesh, V.Sarojini, S.Vetrive (Jan 2018),in “Employee Attrition and Employee Retention Challenges & Suggestions” nation that, retention plans are an cheaper manner of improving administrative center productiveness and attractive personnel emotionally. Proficient personnel preserve the exceptional up and enterprise operations run easily alongside the value saving withinside the longer run.

2.3 PROBLEM STATEMENT DEFINITION

Problem

- A large company named XYZ, employs, at any given point of time, around 4000 employees. However, every year, around 15% of its employees leave the company and need to be replaced with the talent pool available in the job market. The management believes that this level of attrition (employees leaving, either on their own or because they got fired) is bad for the company

Current situation

- 1. The former employees' projects get delayed, which makes it difficult to meet timelines, resulting in a reputation loss among consumers and partners
- 2. A sizeable department has to be maintained, for the purposes of recruiting new talent
- 3. More often than not, the new employees have to be trained for the job and/or given time to acclimatise themselves to the company

Corporate concern

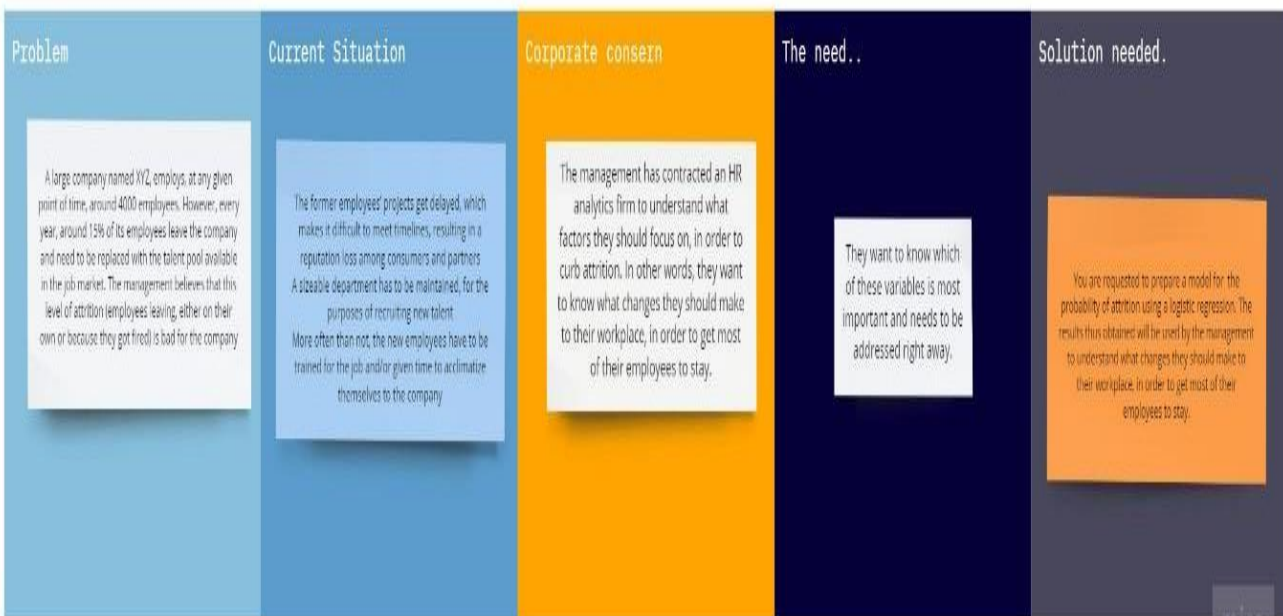
- the management has contracted an HR analytics firm to understand what factors they should focus on, in order to curb attrition. In other words, they want to know what changes they should make to their workplace, in order to get most of their employees to stay.

Needed...

- they want to know which of these variables is most important and needs to be addressed right away

Solution needed..

- You are required to model the probability of attrition using a logistic regression. The results thus obtained will be used by the management to understand what changes they should make to their workplace, in order to get most of their employees to stay.



A large company named XYZ, employs, at any given point of time, around 4000 employees. However, every year, around 15% of its employees leave the company and need to be replaced with the talent pool available in the job market. The management believes that this level of attrition (employees leaving, either on their own or because they got fired) is bad for the company, because of the following reasons -

1. The former employees' projects get delayed, which makes it difficult to meet timelines, resulting in a reputation loss among consumers and partners
2. A sizeable department has to be maintained, for the purposes of recruiting new talent
3. More often than not, the new employees have to be trained for the job and/or given time to acclimatise themselves to the company

Hence, the management has contracted an HR analytics firm to understand what factors they should focus on, in order to curb attrition. In other words, they want to know what changes they should make to their workplace, in order to get most of their employees to stay. Also, they want to know which of these variables is most important and needs to be addressed right away.

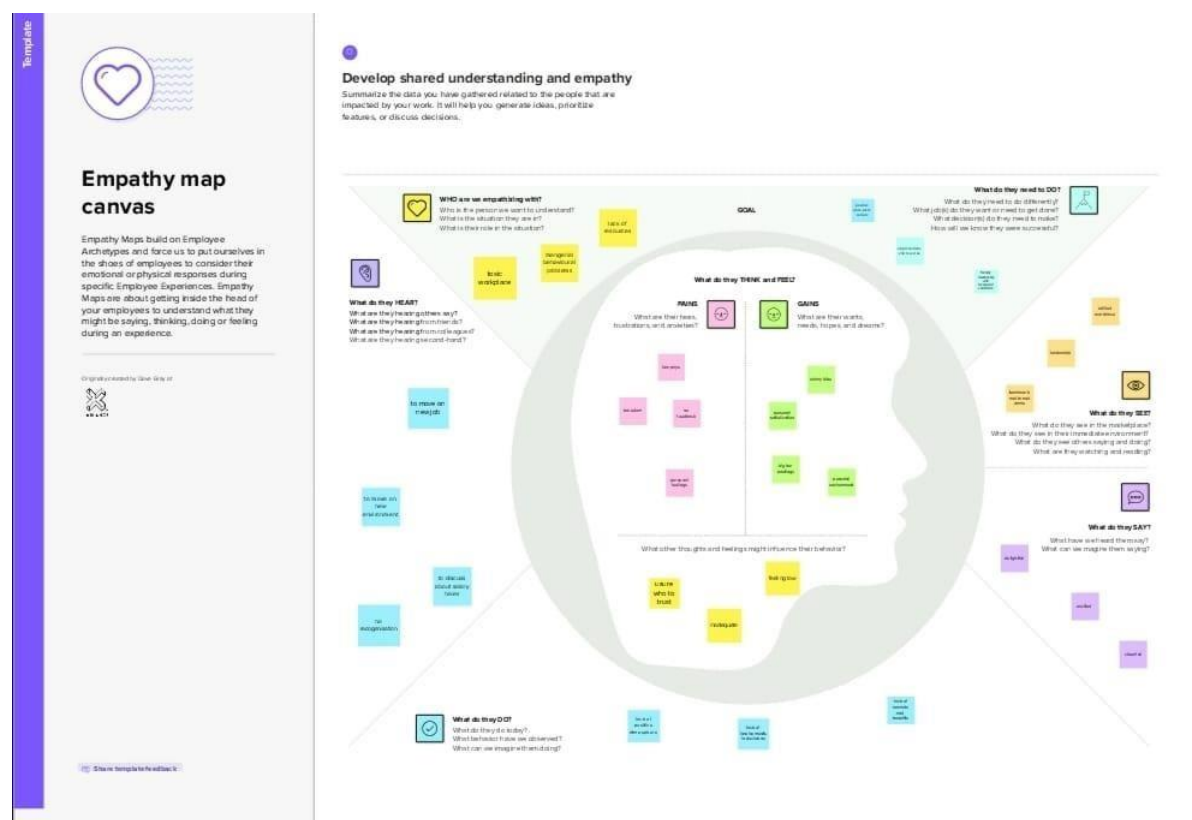
Since you are one of the star analysts at the firm, this project has been given to you.

Goal of the case study

You are required to model the probability of attrition using a logistic regression. The results thus obtained will be used by the management to understand what changes they should make to their workplace, in order to get most of their employees to stay.

3. IDEATION & PROPOSED SOLUTION

3.1 EMPATHY MAP CANVAS



3.2 IDEATION & BRAINSTORMING

Step-1:

Team

Gathering

Brainstorming Reasons for Corporate Employee Attrition

These are some of the reasons for Corporate Employee Attrition

These are some of the factors causing attrition in the company

- 1. Lack of training
- 2. Lack of support
- 3. No designated mentor
- 4. No appreciation
- 5. No promotion
- 6. No feedback
- 7. No recognition
- 8. No growth
- 9. No challenge
- 10. No development
- 11. No learning
- 12. No innovation
- 13. No creativity
- 14. No initiative
- 15. No responsibility
- 16. No accountability
- 17. No ownership
- 18. No commitment
- 19. No dedication
- 20. No passion
- 21. No enthusiasm
- 22. No energy
- 23. No motivation
- 24. No inspiration
- 25. No encouragement
- 26. No reinforcement
- 27. No encouragement
- 28. No encouragement
- 29. No encouragement
- 30. No encouragement

What is Employee Attrition?

Employee attrition occurs when the size of your workforce diminishes over time due to unavoidable factors such as employee resignation for personal or professional reasons. Employees are leaving the workforce faster than they are hired, and it is often outside the employer's control. For example, let's say that you have opened a new office designated as the Sales Hub for your company. Every salesperson must work out of this office – but a few employees cannot relocate and choose to leave the company. This is a typical reason for employee attrition.

THESE ARE SOME OF THE TOP REASONS FOR EMPLOYEE ATTRITION

Problem Statement

Employee Attrition also known as Employee or Labour Attrition. Companies in India and also in other foreign countries face a formidable challenge in recruiting and retaining talents, while at the same time having to manage talent loss through attrition be that due to industry downturns or through voluntary individual attrition. Attrition may be defined as gradual reduction in membership or personnel as through retirement, resignation or death. In other words, attrition can be defined as the number of employees leaving the organization which includes both voluntary and involuntary separation. Losing an employee and talent results in huge loss to the organization because there is a huge loss in cost such as the recruitment cost, training cost and other cost that are incurred in making an employee more skillful. Certain Factors such as Layoffs and Termination is not included in the case of Attrition. The attrition rate tends to vary from skilled and unskilled labour. When an employee has been turned over then a new employee has to be replaced in place of them. Here the would also increase the cost of recruitment and cost of training. Churn rate means the person who leaves the Company or the organization in a given period of time due to the Attrition, which includes the employees being fired due to unethical behavior or practices in the organization. The high Churn rate in the organization will affect the Cost of Recruitment and Training of the new Employee. In order to create a successful organization, the employer must find all possible ways in retaining his employees, despite it is also important to gain the trust and loyalty of the employee so they have a less of desire to leave their organization in the future. It is important for an employer to retain employee because good, faithful, trained and hardworking employees are required to run the business successfully. They have acquired a good knowledge about their product or service in the long run and also a trained and experienced employee would be able to handle the customers better.

Step-2: Brainstorm, Idea Listing and Grouping

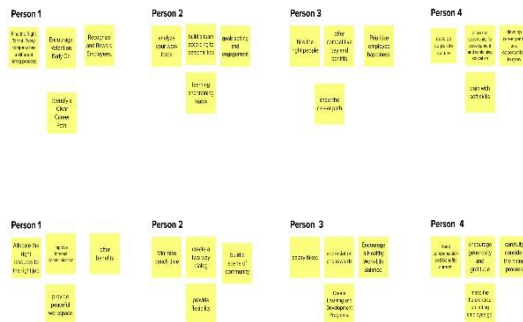
2

Brainstorm

Write down any ideas that come to mind that address your problem statement.

10 minutes

TIP
You can select a sticky note and hit the pencil icon to start drawing.



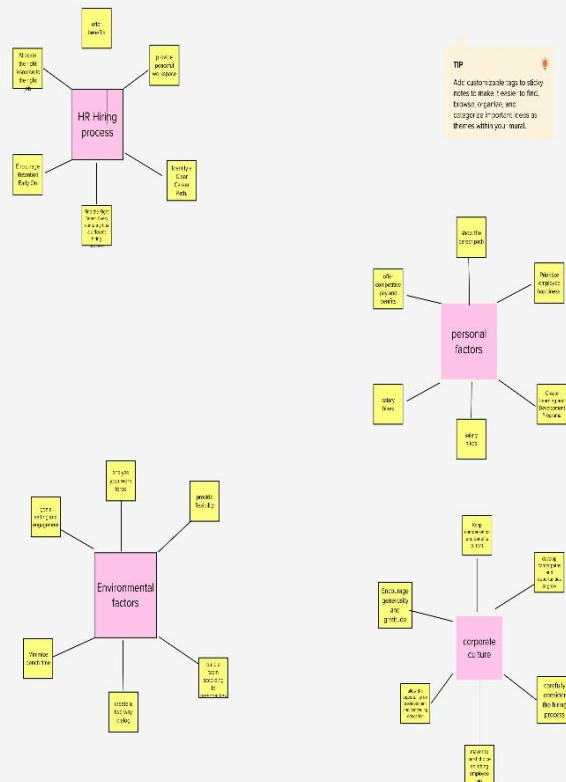
3

Group ideas

Take turns sharing your ideas while clustering similar or related notes as you go. Once all sticky notes have been grouped, give each cluster a sentence-like label. If a cluster is bigger than six sticky notes, try and see if you can break it up into smaller sub-groups.


20 minutes

TIP
Ask customizable tags to sticky notes to make it easier to find, browse, organize, and categorize or sort sticky notes as there's within your mind.



Step-3: Idea Prioritization

Template



Idea prioritization

Employee attrition is the **gradual reduction in employee numbers**. Employee attrition happens when the size of your workforce diminishes over time. This means that employees are leaving faster than they are hired. Employee attrition happens when employees retire, resign, or simply aren't replaced.

[Show template feedback](#)

Idea bank

Take current team members' ideas and encourage them to contribute to the company's success

Prioritize professional growth

Appoint the right leadership

Give employees creative freedom

Communicate well and often

Offer competitive compensation and benefits

Train employees with effective tools

Offer support and share appreciation

Salary hike

Employee engagement

Adapt an environment of team work

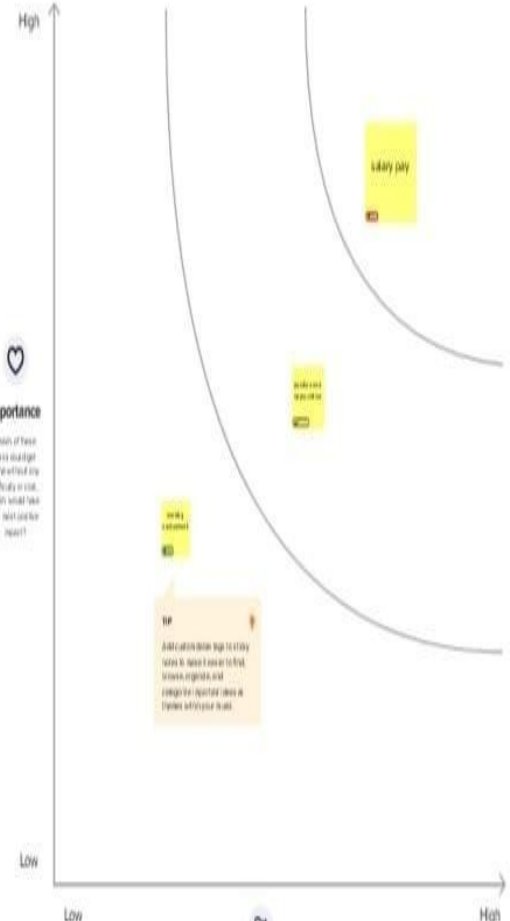
Take responsibility clearly

Importance

Rank of these ideas that might come without any difficulty or cost, which would lead to the best practice report?

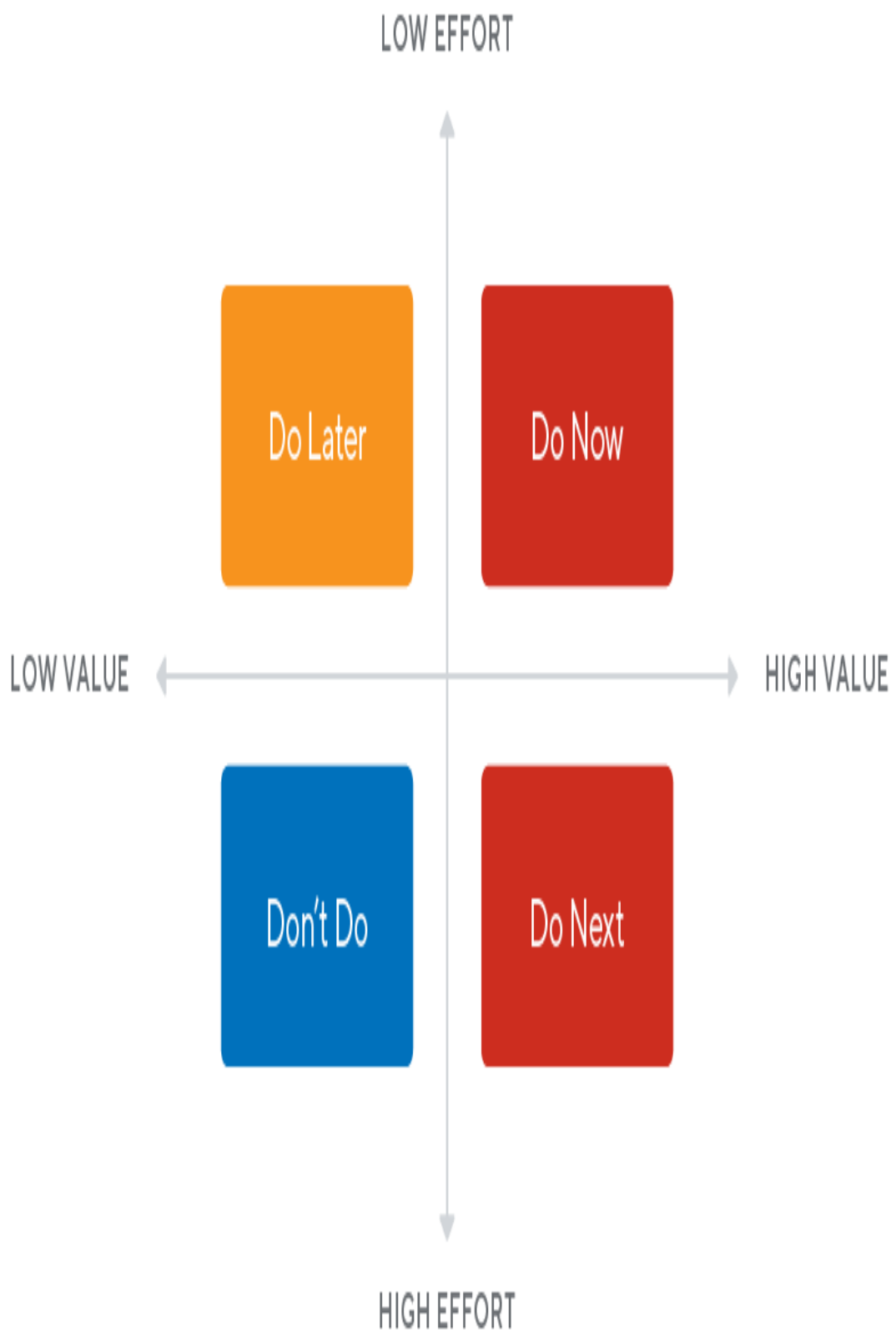
Feasibility

Ranking of these reports, which become more feasible based on the effort, cost, and time effort complexity etc.



The matrix plots ideas on two axes: Importance (Y-axis, Low to High) and Feasibility (X-axis, Low to High). Two curved lines represent the Pareto frontier. Ideas are represented by yellow sticky notes with icons.

Idea	Importance	Feasibility
Salary hike	High	High
Employee engagement	Medium	Medium
Adapt an environment of team work	Low	Low
Take current team members' ideas and encourage them to contribute to the company's success	Medium	Low
Prioritize professional growth	Medium	Medium
Appoint the right leadership	Medium	Low
Give employees creative freedom	Medium	Medium
Communicate well and often	Medium	High
Offer competitive compensation and benefits	Medium	Low
Train employees with effective tools	Medium	Medium
Offer support and share appreciation	Medium	High
Salary hike	Low	Low
Employee engagement	Low	Medium
Adapt an environment of team work	Low	Low
Take current team members' ideas and encourage them to contribute to the company's success	Low	Low
Prioritize professional growth	Low	Medium
Appoint the right leadership	Low	Low
Give employees creative freedom	Low	Medium
Communicate well and often	Low	High
Offer competitive compensation and benefits	Low	Low
Train employees with effective tools	Low	Medium
Offer support and share appreciation	Low	High
Salary hike	Low	Low
Employee engagement	Low	Medium
Adapt an environment of team work	Low	Low



3.1 PROPOSED SOLUTION

S.No.	Parameter	Description
1.	Problem Statement (Problem to be solved)	<p>A large company named XYZ, employs, at any given point of time, around 4000 employees. However, every year, around 15% of its employees leave the company and need to be replaced with the talent pool available in the job market. The management believes that this level of attrition (Employees leaving, either on their own or because they got fired) is bad for the company, because of the following reasons -</p> <ol style="list-style-type: none">1. The former employees' projects get delayed, which makes it difficult to meet timelines, resulting in a reputation loss among consumers and partners2. A sizeable department has to be maintained, for the purposes of recruiting new talent3. More often than not, the new employees have to be trained for the job and/or given time to acclimatise themselves to the company <p>Hence, the management has contracted an HR analytics firm to understand what factors they should focus on, in order to curb attrition. In other words, they want to know what changes they should make to their workplace, in order to get most of their employees to stay. Also, they want to know which of these variables is most important and needs to be addressed right away</p>

2.	Idea / Solution description	You are required to model the probability of attrition using a logistic regression. The results thus obtained will be used by the management to understand what changes they should make to their workplace, in order to get most of their employees to stay
3.	Novelty / Uniqueness	The solution will give idea or changes that they should make to their workplace, in order to get most of their employees to stay. Also, they will come to know which of these variables is most important and needs to be addressed right away
4.	Social Impact / Customer Satisfaction	<p>1. The former employees' projects will not be delayed, which makes it to produce on time, resulting in a good reputation among consumers and partners</p> <p>2. A sizeable department will be maintained, for the purposes of recruiting new talent</p> <p>3. the new employees will be trained for the job and/or given time to acclimatise themselves to the company</p>
5.	Business Model (Revenue Model)	If there is no attrition in the company, then the revenue and the profit of the company gets increased.
6.	Scalability of the Solution	Analysis and Models will be helpful in understanding the reason for attrition and the steps to be taken by the company to reduce it

3.1 PROBLEM SOLUTION FIT

Define CS, fit into CC	1. CUSTOMER SEGMENT(S) CS <p>*) THE EMPLOYEE ATTRITION IS ONE OF THE GROWING PROBLEMS IN CORPORATES. WE MUST DO AN ANALYSIS FOR THE CAUSES OF ATTRITION.</p> <p>*) ATTRITION IS OF TWO TYPES EXTERNAL AND INTERNAL CAUSES</p>	6. CUSTOMER CONSTRAINTS CC <p>*) CORPORATE COMPANY FACE LOSS DUE TO REDUCED WORKING POWER.</p> <p>*) PRODUCTS OR WORK THAT HAS TO BE DONE ON TIME GETS DELAYED DUE TO ATTRITION OF EMPLOYEE.</p> <p>*) HR IS IN THE POSITION TO EXPLAIN THE EMPLOYEE ATTRITION, BECAUSE OF THIS HIS JOB MAY BE DANGER ZONE</p>	5. AVAILABLE SOLUTIONS AS <p>1) Hire the right people.</p> <p>2) Keep up with the market rate and offer</p> <p>3) competitive salaries and total compensation.</p> <p>4) Closely monitor toxic employees.</p> <p>5) Reward and recognize employees.</p> <p>6) Offer flexibility.</p> <p>7) Prioritize work-life balance.</p> <p>8) Pay attention to employee engagement</p>	Explore AS, differentiate
	2. JOBS-TO-BE-DONE / PROBLEMS J&P <p>THESE ARE PROBLEMS FACED BY THE EMPLOYEE THAT ARE SOME CAUSES FOR ATTRITION</p> <p>1) LACK OF JOB SECURITY</p> <p>2) LACK OF CAREER ADVANCEMENT</p> <p>3) DESIRE FOR CHANGE IN NEW OPPORTUNITIES</p> <p>4) ANTICIPATING HIGHER PAY</p> <p>5) PROBLEMS WITH SUPERVISORS</p>	9. PROBLEM ROOT CAUSE RC <p>THESE ARE SOME OF THE ROOT CAUSES FOR THE ATTRITION OF EMPLOYEE</p> <p>1) Employees are overwhelmed by the amount of work.</p> <p>2) Lack of recognition.</p> <p>3) Company culture.</p> <p>4) Poor relationship with the Manager.</p> <p>5) Lack of flexibility.</p> <p>6) Remuneration and benefits.</p> <p>7) Poor learning and development opportunities.</p>	7. BEHAVIOUR BE <p>Poorly behaved employees may be less productive, more prone to accidents, and more likely to cause conflict with others. This can lead to a decrease in morale and an increase in turnover. Additionally, poor work behavior can reflect poorly on a company and make it difficult to attract and retain top talent.</p>	Focus on J&P, fit into BE, understand RC
Identify strong TR & EM	3. TRIGGERS TR <p>Too much work and, subsequently, too much stress is also a major factor in an employee's decision to leave your organization and find work elsewhere</p>	10. YOUR SOLUTION SL <p>The solution to the problem can be identified using analysis and modelling techniques</p>	8. CHANNELS of BEHAVIOUR CH <p>RESPONSIBILITY FOR THE CAUSES OF ATTRITION FALLS ON BOTH EMPLOYEES AS WELL AS COMPANIES.</p> <p>SUGGESTIONS BASED ON THE ANALYSIS DONE, CAN BE USEFUL TO THE COMPANY FOR REDUCING THE ATTRITION RATE</p> <p>NECESSARY ACTIONS MUST BE TAKEN IN FAVOR OF EMPLOYEES TO REDUCE ATTRITION OF EMPLOYEE IN CORPORATE</p>	Identify strong TR & EM
	4. EMOTIONS: BEFORE / AFTER EM <p>Positive attrition refers to staff turnover that actually benefits the organization.</p> <p>Negative attrition, especially in industries with the highest turnover rates, is expensive. The organization must once again recruit, assess, hire and train a new employee, and until the position is filled, team productivity declines.</p>			

4. REQUIREMENT ANALYSIS

4.1 FUNCTIONAL REQUIREMENTS:

Following are the functional requirements of the proposed solution.

FR No.	Functional Requirement (Epic)	Sub Requirement (Story / Sub-Task)
FR-1	Dataset	Sign up through Kaggle Registration through Gmail
FR-2	Uploading the dataset	Sign up into IBM Cloud Account Invitation through mail id Sign up into IBM Cognos Analytics Invitation through mail id
FR-3	Data Visualization Charts	Sign p into IBM Cognos Analytics Invitation Through mail id
FR-4	Coding	Sign in Jupyter
FR-5	Modelling and testing	Sign in Python Direct Collaboration through google collabs

4.2 NON-FUNCTIONAL REQUIREMENTS:

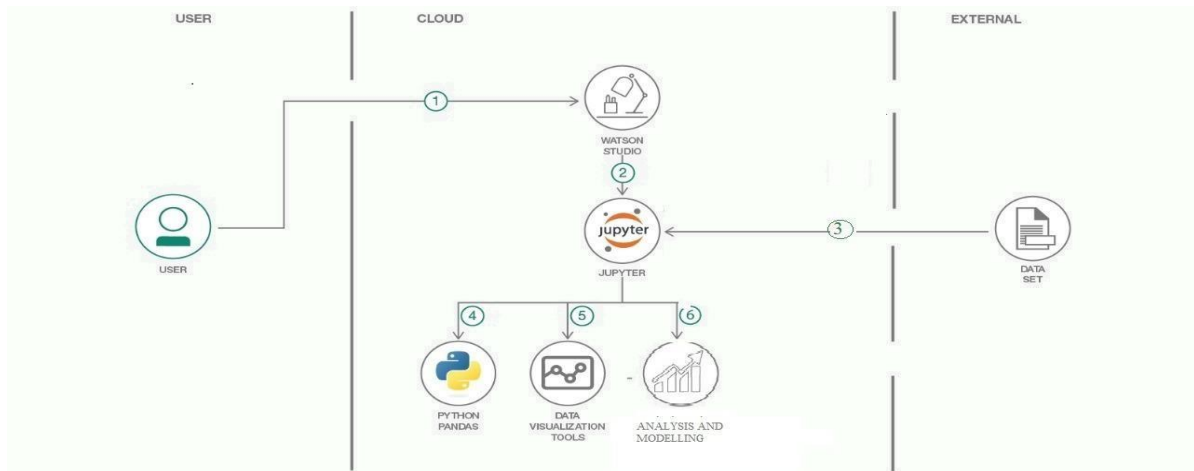
Following are the non-functional requirements of the proposed solution.

FR No.	Non-Functional Requirement	Description
NFR-1	Usability	The dataset is obtained from the external sources must be safe and recommended for analysis
NFR-2	Security	Organizations must protect their most critical business assets—your data—against unauthorized or unwanted use. They must combine people, processes, and technology to protect data throughout its lifecycle. Use a unified platform that integrates data security information across your entire enterprise and that ensures scalability on environments of any size across public cloud, on-premises, and hybrid cloud deployment
NFR-3	Reliability	The analysis gives suggestions and steps that can be carried to whole company's attrition problem, as a long-time solution

NFR-4	Performance	The performance of the analysis must be solving the problem fully, so that it gives a permanent solution to the problem faced
NFR-5	Availability	The dataset is analysed and solution is given to the problem faced and the solution must be available for the full process
NFR-6	Scalability	Data is growing at an exponential rate. Keeping up with new data sources across environments creates complexity at an unprecedented scale

5. PROJECT DESIGN

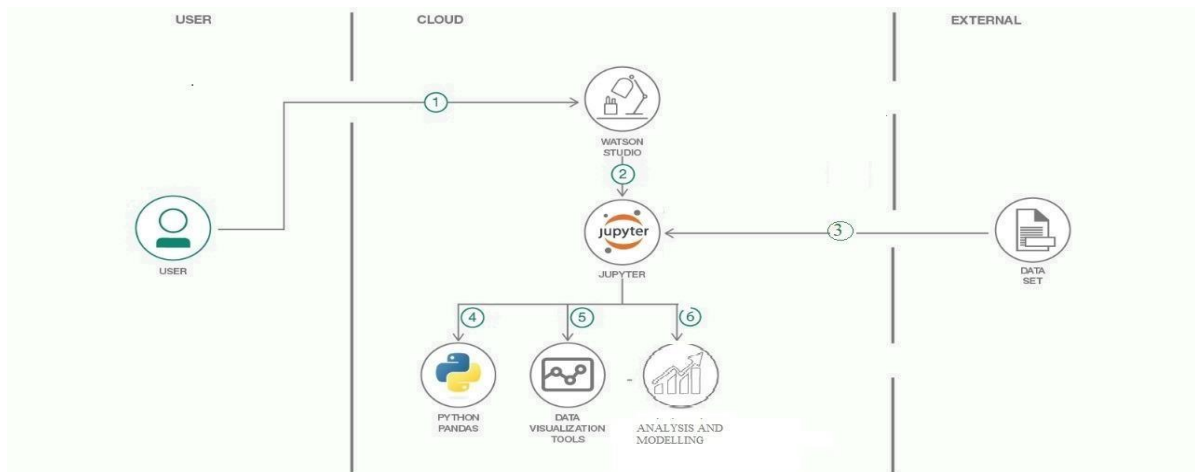
5.1 DATA FLOW DIAGRAMS



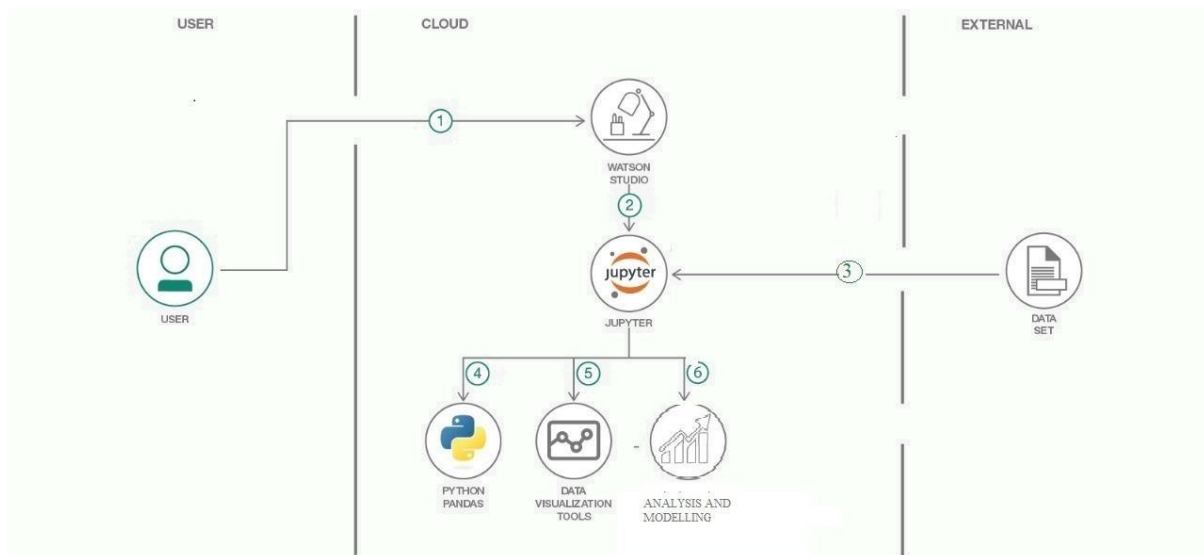
1. User configures credentials for the Watson Natural Language Understanding service and starts the app.
2. User selects data file to process and load.
3. Extracted text is passed to Watson NLU for enrichment.
4. Enriched data is visualized in the UI using the D3.js library
5. Python cloud is used for coding
6. The outcomes are analysed and modelled in Python
7. The external data is obtained as solution

5.2 SOLUTION & TECHNICAL ARCHITECTURE

SOLUTION ARCHITECTURE



TECHNICAL ARCHITECTURE



5.3 USER STORIES

User Type	Functional Requirement (Epic)	User Story Number	User Story / Task	Acceptance criteria	Priority	Release
Customer (Mobile user)	Registration	USN-1	As a user, I can register IBM Cloud Account by entering my email, password, and confirming my password. As a user, I will receive confirmation email once I have registered for the application	I can access my account / dashboard I can receive confirmation email & click confirm	Low	Sprint-1
Customer (Mobile user)	Registration	USN-2	As a user, I can register IBM Cognos Analytics -by entering my email, password, and confirming my password As a user, I will receive confirmation email once I have registered for the application	I can receive confirmation email & click confirm. I can access my account / dashboard	High	Sprint-2
Customer (Mobile user)	Registration	USN-3	Jupyter is signed in through google collabs	I can receive confirmation email & click confirm. I can access my account / dashboard	High	Sprint-2
Customer Third party	Login	USN-4	As a user, I can register for the application through Kaggle	I can register & access the dashboard with Gmail Login. I can receive confirmation email & click confirm	Medium	Sprint-3
Customer Cloud	Login and Register	USN-5	As a user, I can register for the python through Gmail	I can register & access the dashboard with Gmail Login. I can receive confirmation email & click confirm	High	Sprint-4

Customer (Mobile user)	Registration	USN-2	As a user, I can register IBM Cognos Analytics -by entering my email, password, and confirming my password As a user, I will receive confirmation email once I have registered for the application	I can receive confirmation email & click confirm.I can access my account / dashboard	High	Sprint-2
Customer (Mobile user)	Registration	USN-3	Jupyter is signed in through google collabs	I can receive confirmation email & click confirm.I can access my account / dashboard	High	Sprint-2
Customer Third party	Login	USN-4	As a user, I can register for the application through Kaggle	I can register & access the dashboard with Gmail Login.I can receive confirmation email & click confirm	Medium	Sprint-3
Customer Cloud	Login and Register	USN-5	As a user, I can register for the python through Gmail	I can register & access the dashboard with Gmail Login. I can receive confirmation email & click confirm	High	Sprint-4

6. PROJECT PLANNING & SCHEDULING

6.1 SPRINT PLANNING & ESTIMATION

Product Backlog, Sprint Schedule, and Estimation

Sprint	Functional Requirement (Epic)	User Story Number	User Story / Task	Story Points	Priority	Team Members
Sprint-1	Registration and Authentication	USN-1	As a user, I should be able to register in the application and the registered user should be authenticated and verified and logged in.	5	High	Balachandar B , Diwakar, Arun R, Aravind
Sprint-2	Dataset upload and creating dashboards.	USN-3	As a user, I should be able to upload the dataset and do exploratory analysis and explore patterns.	2	Medium	Balachandar B , Diwakar, Arun R, Aravind

Sprint-2		USN-4	I present the data using analytical tools and present the data using charts and graphs.	3	Medium	Balachandar B , Diwakar,Arun R, Aravind
Sprint-3	Model creation and testing	USN-5	I split the data into test and train data and create the model.	5	High	Balachandar B , Diwakar,Arun R, Aravind
Sprint-4	Model Output	USN-6	The model is used to predict the attrition rate.	5	High	Balachandar B , Diwakar,Arun R, Aravind

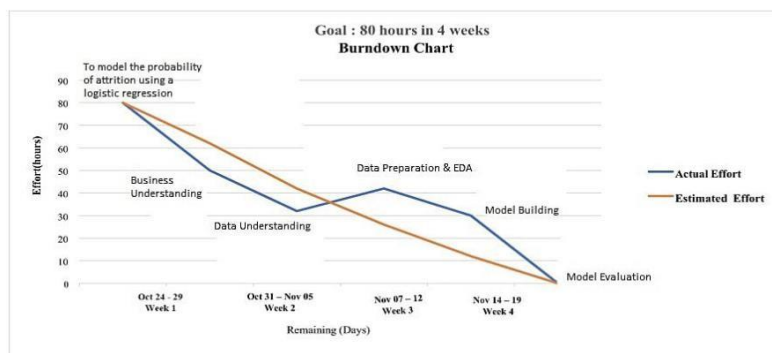
Project Tracker, Velocity & Burndown Chart:

Sprint	Total Story Points	Duration	Sprint Start Date	Sprint End Date (Planned)	Story Points Completed (as on Planned End Date)	Sprint Release Date (Actual)
Sprint-1	20	6 Days	24 Oct 2022	29 Oct 2022	20	29 Oct 2022
Sprint-2	20	6 Days	31 Oct 2022	05 Nov 2022	20	05 Nov 2022
Sprint-3	20	6 Days	07 Nov 2022	12 Nov 2022	20	12 Nov 2022
Sprint-4	20	6 Days	14 Nov 2022	19 Nov 2022	20	19 Nov 2022

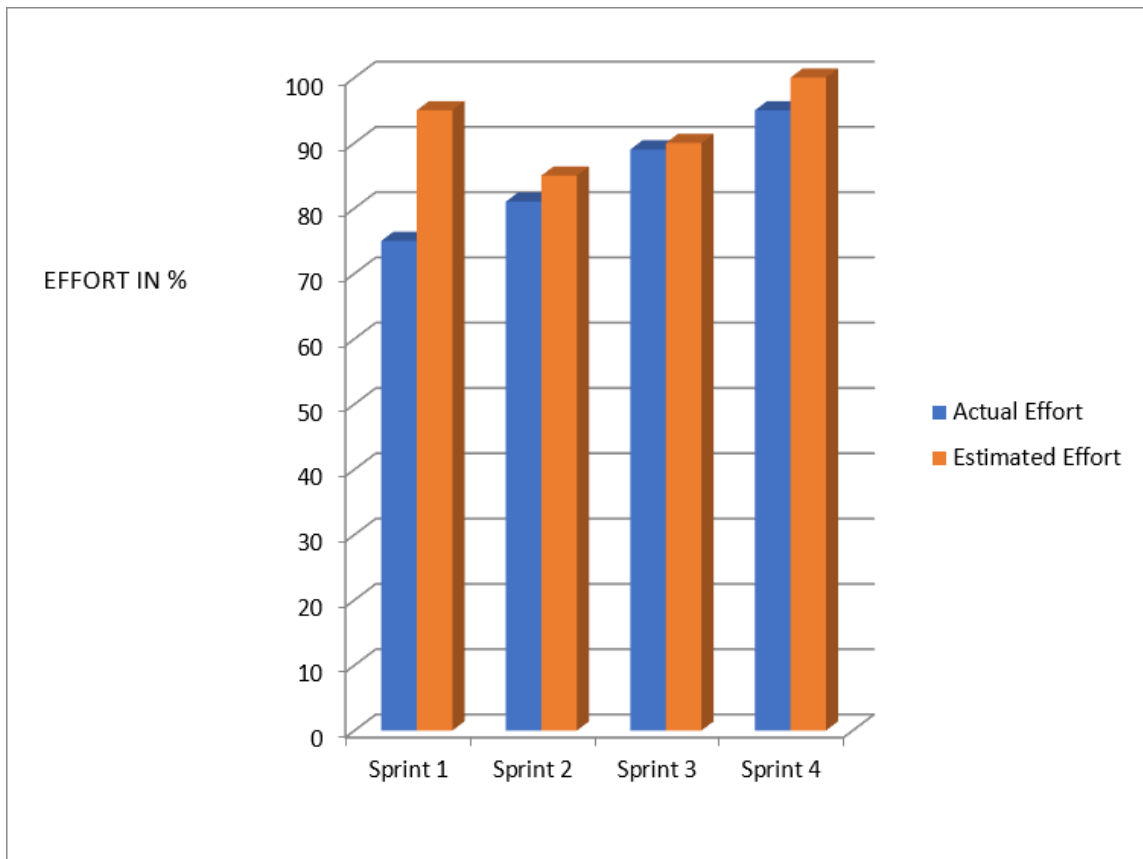
Velocity:

$AV = \text{sprint duration} / \text{velocity} = 20/10 = 2$

BURNDOWN CHART:



VELOCITY CHART:

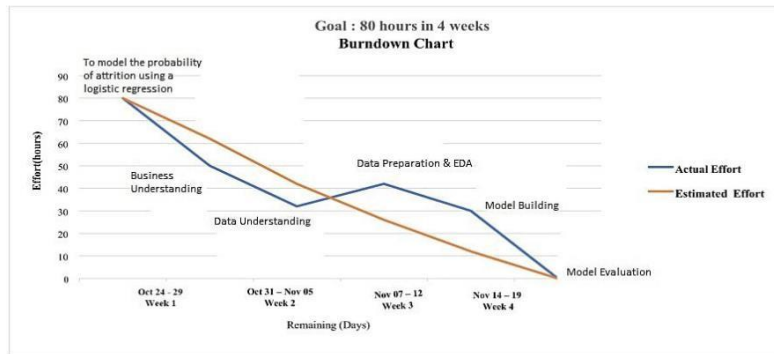


6.2 SPRINT DELIVERY SCHEDULE

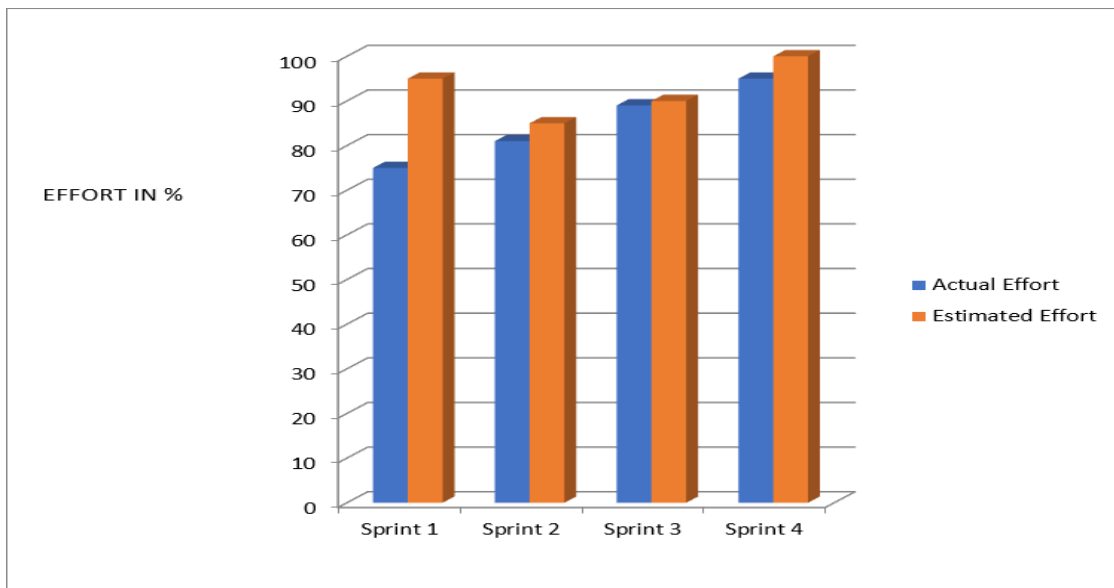
Sprint	Total Story Points	Duration	Sprint Start Date	Sprint End Date (Planned)	Story Points Completed (as on Planned End Date)	Sprint Release Date (Actual)
Sprint-1	20	6 Days	24 Oct 2022	29 Oct 2022	20	29 Oct 2022
Sprint-2	20	6 Days	31 Oct 2022	05 Nov 2022	20	05 Nov 2022
Sprint-3	20	6 Days	07 Nov 2022	12 Nov 2022	20	12 Nov 2022
Sprint-4	20	6 Days	14 Nov 2022	19 Nov 2022	20	19 Nov 2022

3.1 REPORTS FROM JIRA

BURNDOWN CHART:



VELOCITY CHART:





4. CODING & SOLUTIONING

4.1 Feature 1

DATASET :

- Employee Attrition Analysis (Logistic Regression Model)
- Employee Attrition Analysis (Logistic Regression Model)

<https://www.kaggle.com/vjchoudhary7/hr-analytics-case-study>

DATA UNDERSTANDING:

The data received for the analysis can be divided into 4 broad categories -

- General Data – General data, acquired from HR
- Employee Survey Data – Data collected from yearly employee survey
- Manager Survey Data – Data collected from yearly manager survey
- Biometric Data – Daily in and out times for each employee, collected using biometric attendance machines

General Data	Manager Survey Data	Employee Survey Data	Biometric Data
Age	Job Involvement	Environment Satisfaction	In Time
Attrition (Yes/No)	Performance Rating	Job Satisfaction	Out Time
Department		Work Life Balance	
Education Field			

UNDERSTANDING THE DATASET:

Let us try to understand each field of the data (general_data.csv)

Below are the values each column has. The column names are pretty self-explanatory.

1. AGE Numerical Value
2. ATTRITION Employee leaving the company (0=no, 1=yes)
3. BUSINESS TRAVEL (1=No Travel, 2=Travel Frequently, 3=Travel Rarely)
4. DEPARTMENT (1=HR, 2=R&D, 3=Sales)
5. DISTANCE FROM HOME Numerical Value - THE DISTANCE FROM WORK TO HOME

6. EDUCATION Numerical Value. (1 'Below College' 2 'College' 3 'Bachelor' 4 'Master' 5 'Doctor')
7. EDUCATION FIELD (1=HR, 2=LIFE SCIENCES, 3=MARKETING, 4=MEDICAL SCIENCES, 5=OTHERS, 6= TECHNICAL)
8. EMPLOYEE COUNT Numerical Value
9. EMPLOYEE ID Numerical Value
10. GENDER (1=FEMALE, 2=MALE)
11. JOB LEVEL Numerical Value
12. JOB ROLE (1=HR REP, 2=HR, 3=LAB TECHNICIAN, 4=MANAGER, 5= MANAGING DIRECTOR, 6= RESEARCH DIRECTOR, 7= RESEARCH SCIENTIST, 8=SALES EXECUTIVE, 9= SALES REPRESENTATIVE)
13. MARITAL STATUS (1=DIVORCED, 2=MARRIED, 3=SINGLE)
14. MONTHLY INCOME Numerical Value - MONTHLY SALARY
15. NUMCOMPANIES WORKED Numerical Value - NO. OF COMPANIES WORKED AT
16. OVER 18 (1=YES, 2=NO)
17. PERCENT SALARY HIKE Numerical Value - PERCENTAGE INCREASE IN SALARY
18. STANDARD HOURS Numerical Value - STANDARD HOURS
19. STOCK OPTIONS LEVEL Numerical Value - STOCK OPTIONS (Higher the number, the more stock option an employee has)
20. TOTAL WORKING YEARS Numerical Value - TOTAL YEARS WORKED
21. TRAINING TIMES LAST YEAR Numerical Value - HOURS SPENT TRAINING
22. YEARS AT COMPANY Numerical Value - TOTAL NUMBER OF YEARS AT THE COMPANY
23. YEARS SINCE LAST PROMOTION Numerical Value - LAST PROMOTION
24. YEARS WITH CURRENT MANAGER Numerical Value - YEARS SPENT WITH CURRENT MANAGER

b. Let us try to understand about each field of the data (employee_survey_data.csv)

1. Employee ID
2. Environment Satisfaction (1 'Low' 2 'Medium' 3 'High' 4 'Very High')
3. Job Satisfaction (1 'Low' 2 'Medium' 3 'High' 4 'Very High')
4. Work Life Balance (1 'Bad', 2 'Good', 3 'Better', 4 'Best')

c. Let us try to understand about each field of the data (manager_survey_data.csv)

1. Employee ID
2. Job Involvement (1 'Low' 2 'Medium' 3 'High' 4 'Very High')
3. Performance Rating (1 'Low', 2 'Good', 3 'Excellent', 4 'Outstanding')

SOLUTION REQUIRED:

- To model the probability of attrition using a logistic regression

- Business Understanding
- Data Understanding – sources of the data, meaning of the data
- Data preparation & EDA
- Model Building
- Model Evaluation
- Data Visualization charts
- Dashboard Creation

METHODOLOGY USED:

- Predictive modelling of attrition
- Recommending ways for company XYZ to decrease its level of attrition

4.2 DATABASE SCHEMA

DATA VISUALIZATION CHARTS AND DASHBOARD CREATION

Using the given dataset, we need to create various graphs and charts to highlight the insights and visualizations. For the given problem statement, try to build the following visualizations that suit the solution requirements.

- Employee Attrition by Age
- Attrition by Business Travel
- Attrition by Department, Job Role, Education Level and Marital Status
- Attrition by Salary Hike Percent
- Attrition by No. of Companies Worked
- Attrition by Income Groups
- Attrition by Work Experience Groups
- Dashboard of Attrition of Employees based on Employment details
-

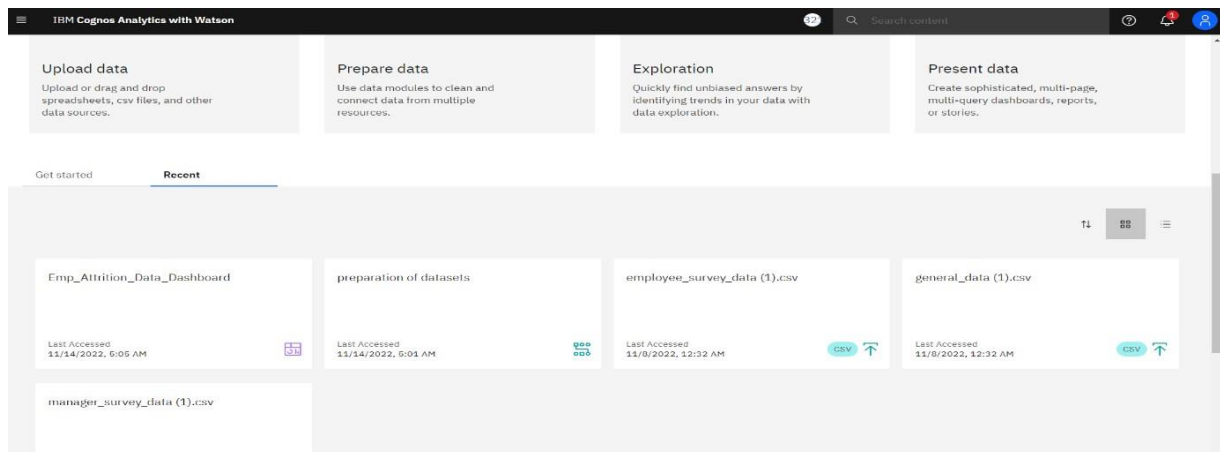
IBM COGNOS ANALYTICS

To create data visualization charts and dashboard we need to login into IBM Cognos analytics. IBM® Cognos® Analytics integrates reporting, modeling, analysis, dashboards, stories, and event management so that you can understand your organization data, and make effective business decisions. This tool is used to give better understanding about the dataset.

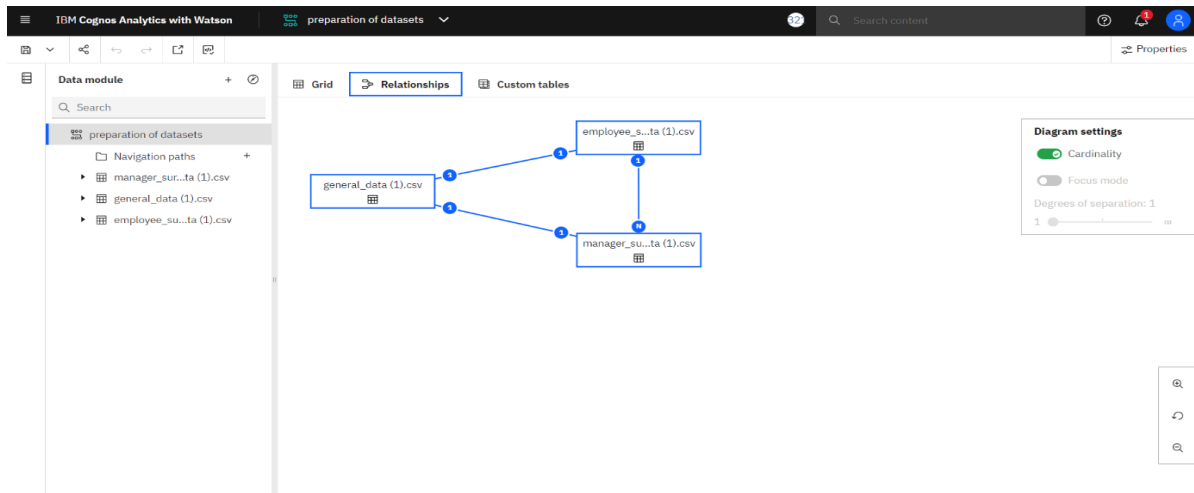
STEPS TO CREATE VISUALIZATION CHARTS AND DASHBOARD CREATION

- Uploading of data
- Preparing the data
- Exploration of data
- Creation of Visualization Charts
- Dashboard creation

LOADING THE DATASET :



PREPARING THE DATA & EXPLORATION OF DATA



IBM Cognos Analytics with Watson preparation of datasets

Edit relationship

Table 1: **general_data (1).csv**

Table 2: **employee_survey_data (1).csv**

Search

Row Id

Attrition

BusinessTravel

Department

Education

Search

Row Id

EmployeeID

EnvironmentSatisfaction

JobSatisfaction

WorkLifeBalance

Match selected columns

Row Id	Age	Attrition	BusinessTravel	Department	DistanceFromHome	Education	Education
Data will appear here							

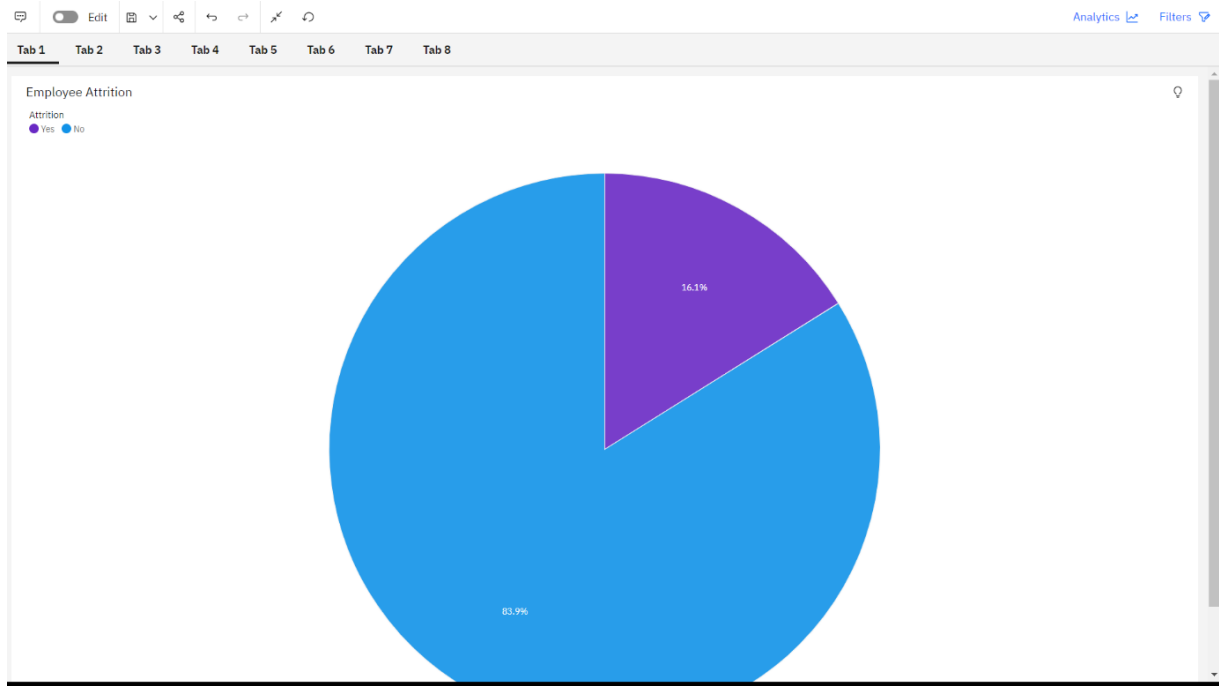
Refresh

Inner join, 1-to-1
No filtering

Matched columns (1)

CREATION OF VISUALIZATION CHARTS

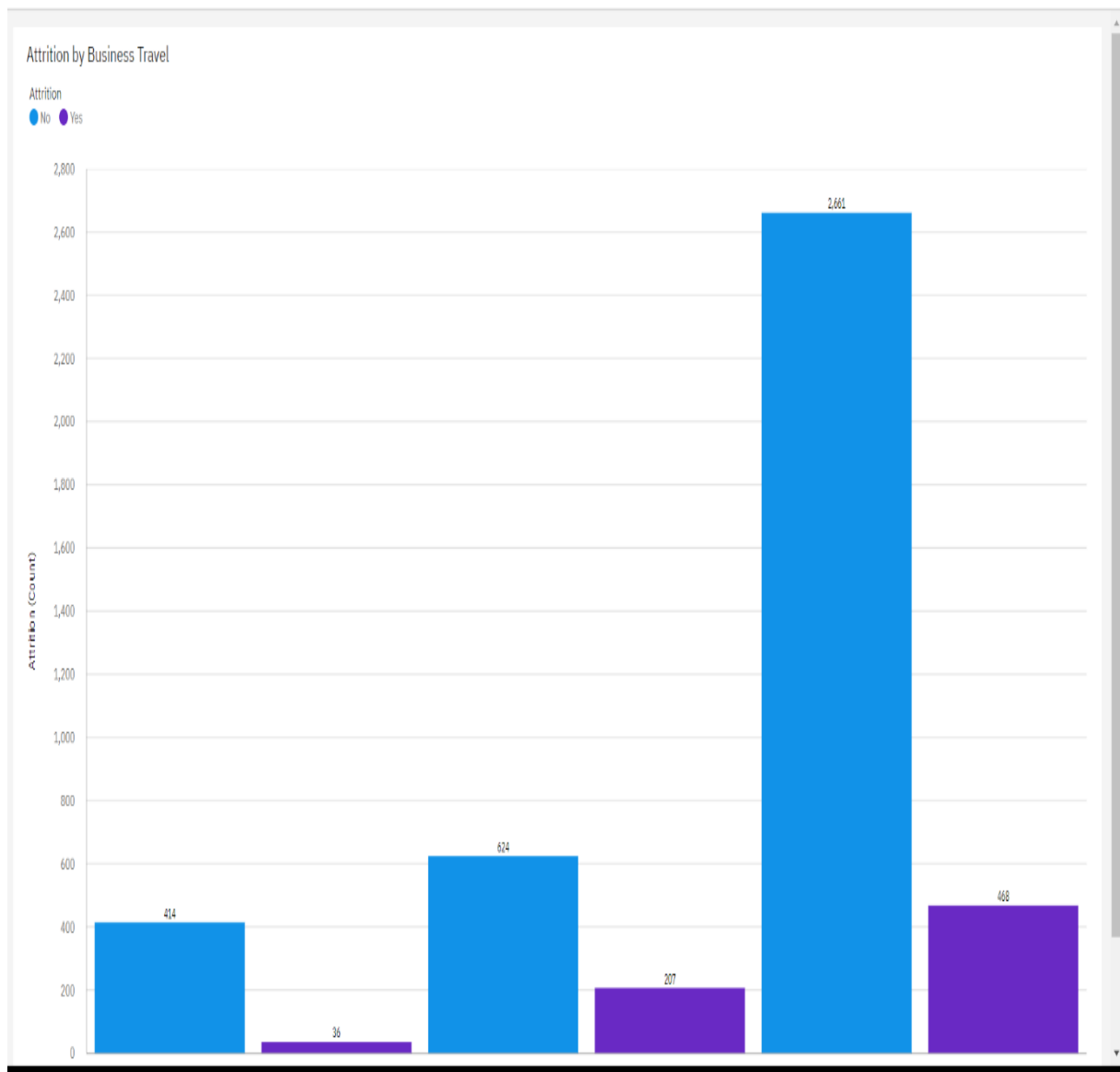
- EMPLOYEE ATTRITION STATUS:



- INFERENCES :

We can understand from the above pie chart that 16.1% of people are willing to leave and 83.3% say no to it

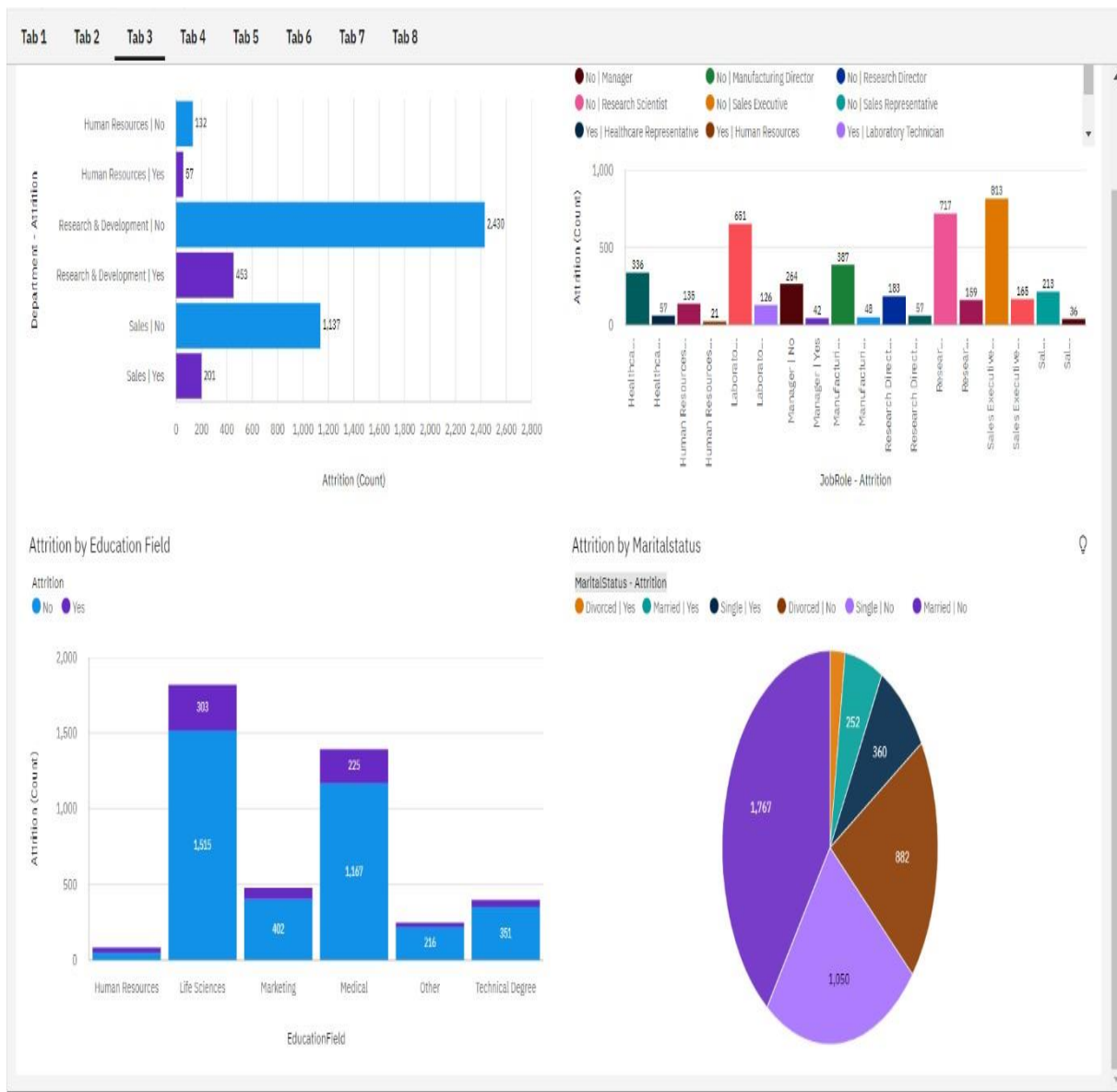
- ATTRITION BY BUSINESS TRAVEL



○ INFERENCES :

We can understand from the above column chart that 468 people are willing to leave

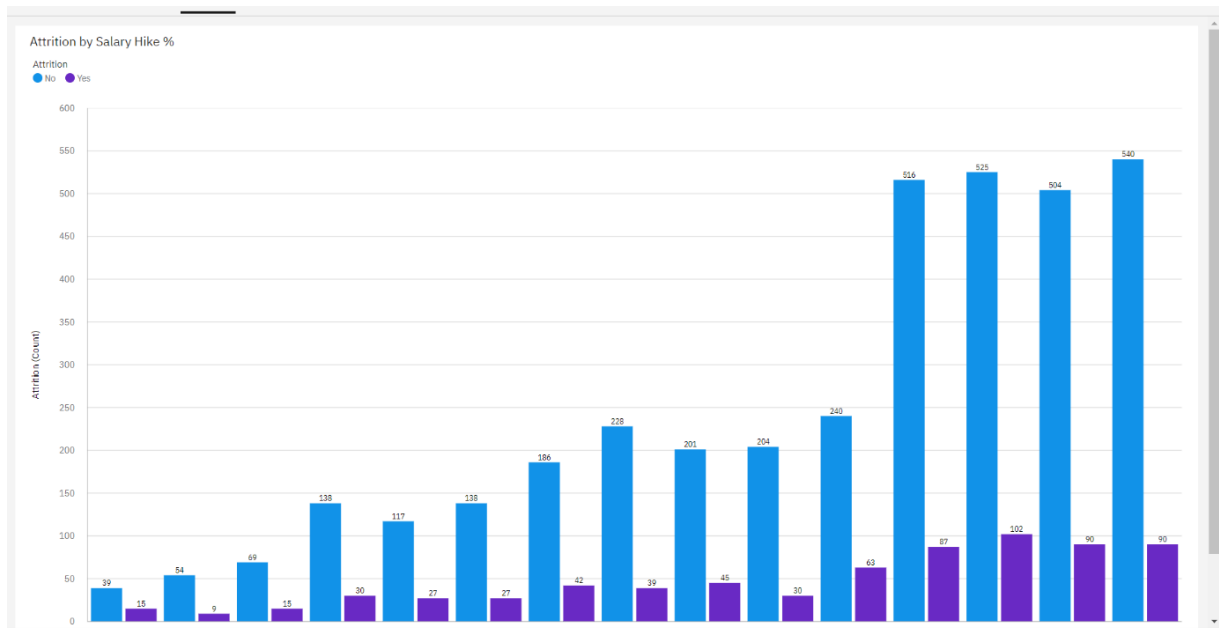
- ATTRITION BY DEPARTMENT, JOB ROLE, EDUCATION LEVEL AND MARITAL STATUS



○ INFERENCES :

We can understand from the above 4 division charts , people are willing to leave % is higher.

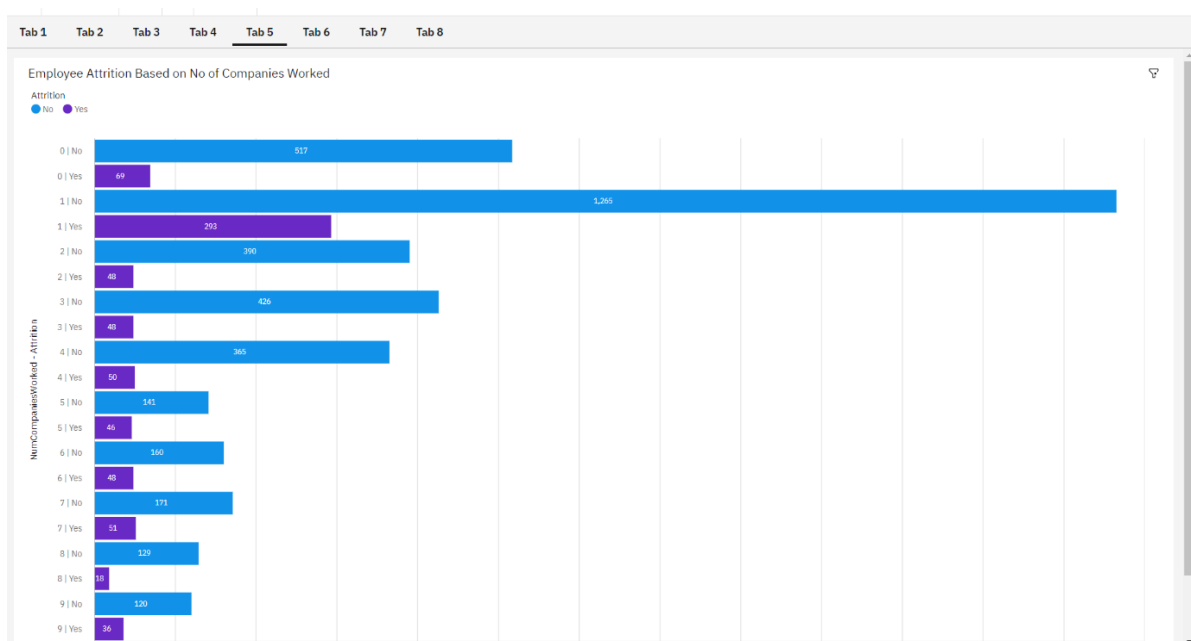
• ATTRITION BY SALARY HIKE PERCENT



○ INFERENCE:

We can understand from the above charts that % of people leaving and staying.

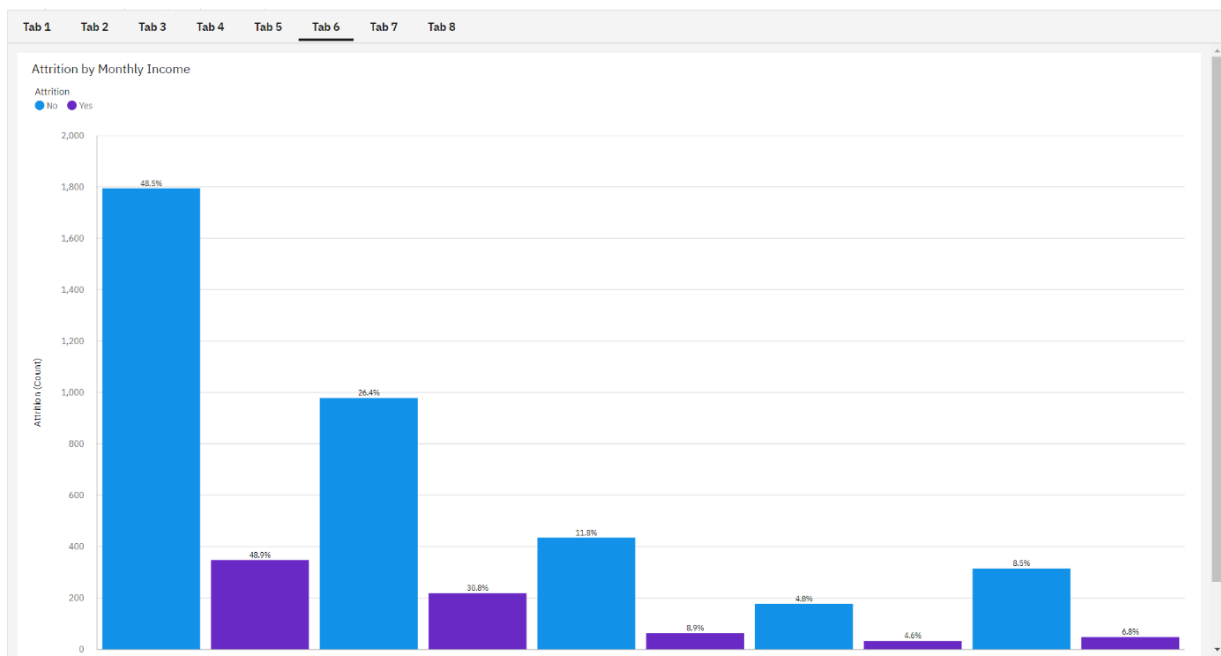
• ATTRITION BY NO. OF COMPANIES WORKED



- INFERENCES:

We can understand from the above charts that % of people leaving and staying.

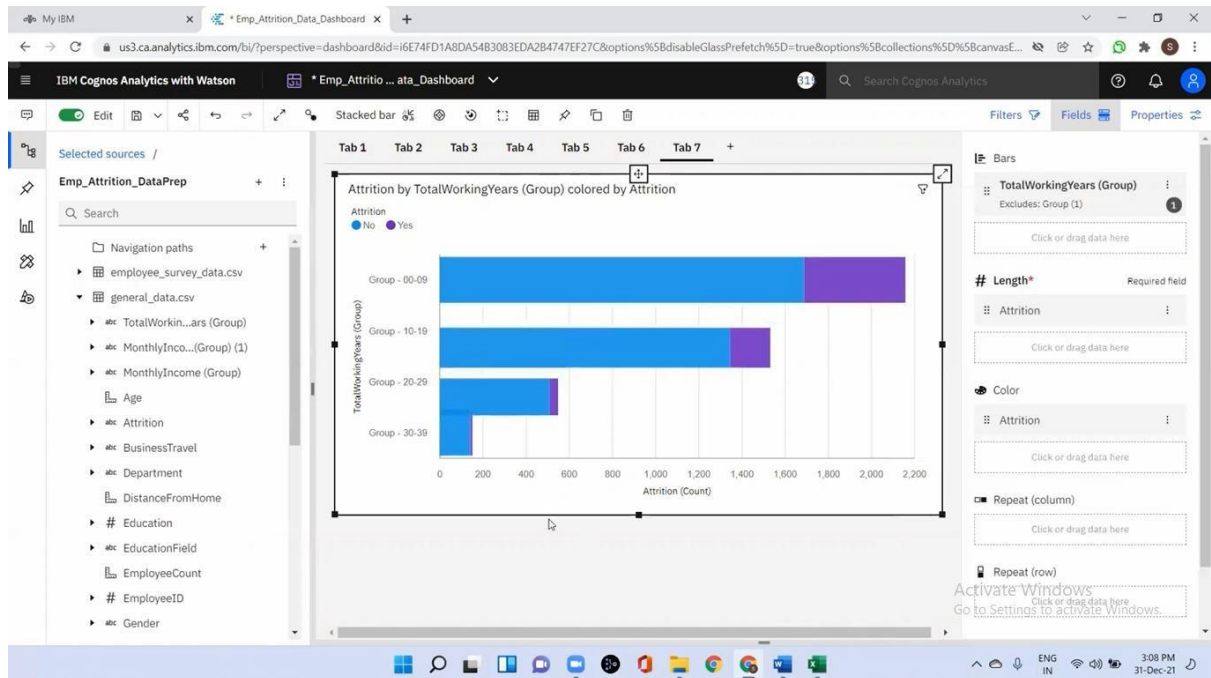
- ATTRITION BY INCOME GROUPS



- INFERENCE:

We can understand from the above charts that % of people leaving and staying.

- ATTRITION BY WORK EXPERIENCE GROUPS



- INFERENCES:

We can understand from the above charts that % of people leaving and staying.

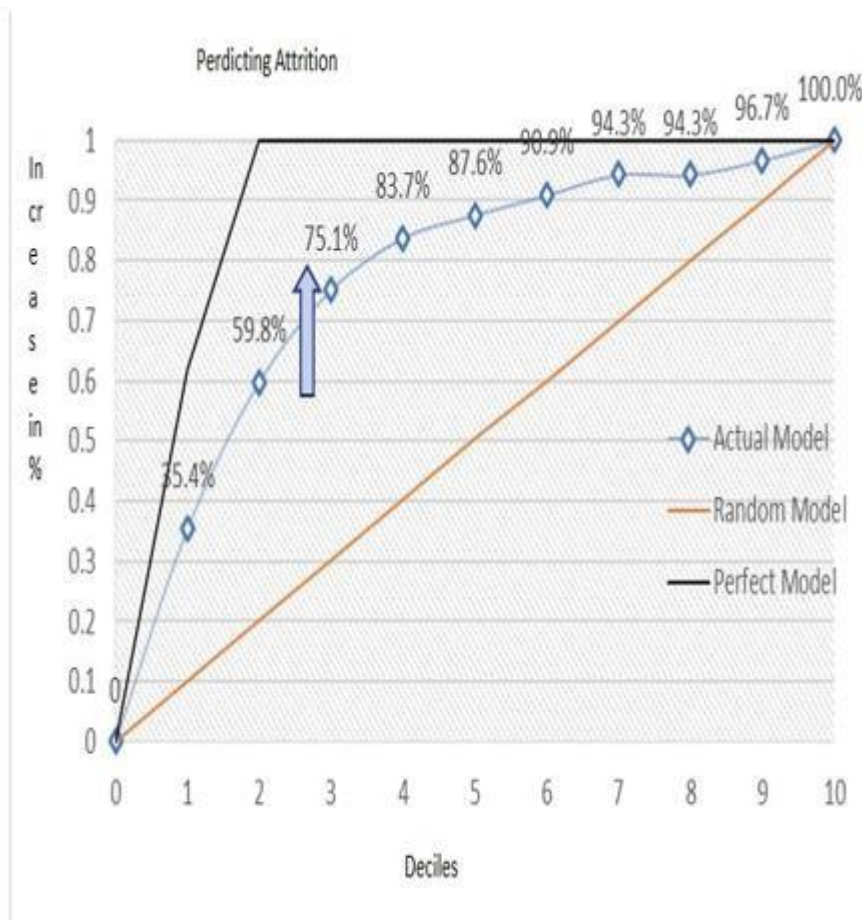
- DASHBOARD OF ATTRITION OF EMPLOYEES BASED ON EMPLOYMENT DETAILS

- Hence, it would be beneficial to target 30% of your employees most likely to leave, and work on making them stay.
- Targeting fewer employees (top 20% or top 10%) will not identify enough employees likely to leave

Targeting more employees (top 40% or top 50%) will be inefficient

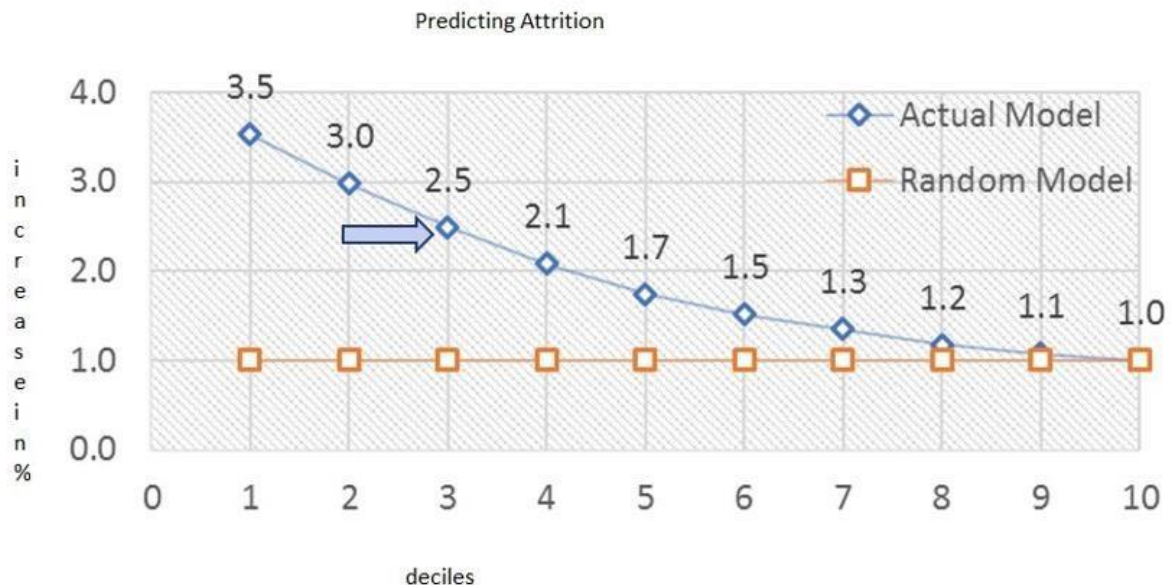
➤ Predicting Attrition – Model is able to capture 75% of employees likely to leave

- Model is able to identify 75% of the employees likely to leave in the first 3 deciles



➤ Predicting Attrition – Model performs 2.5 times better than a random reach out

- Using the model offers a “lift” of 2.5 for the 3rd decile



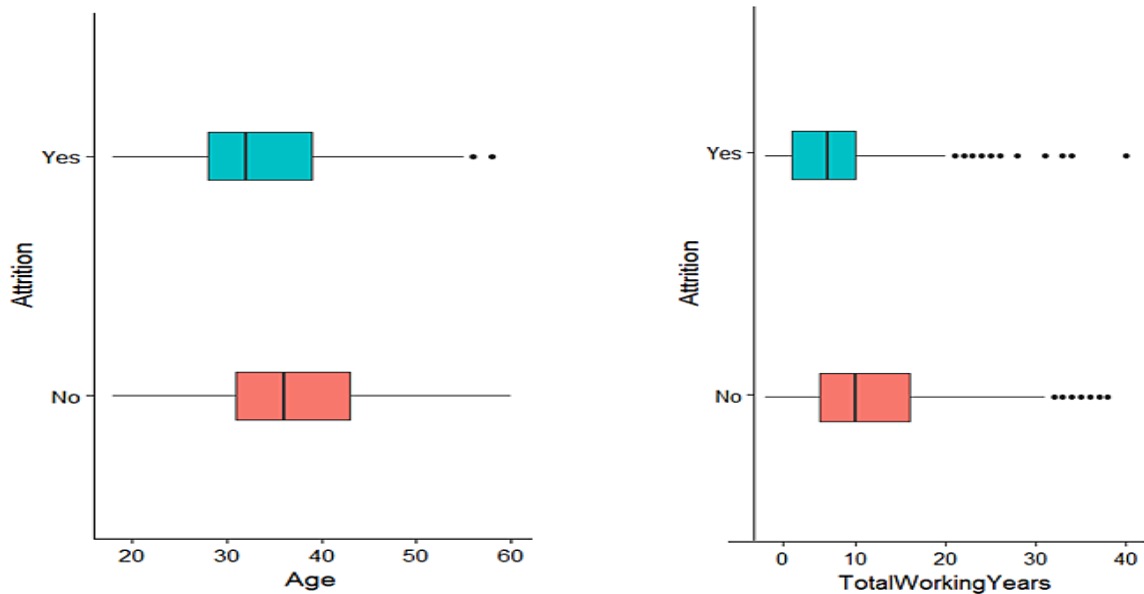
- RECOMMENDATIONS – WHAT FACTORS MAKE EMPLOYEES STAY/LEAVE? (1/4)

➤ EXPERIENCE

- Employees that have worked for a total of 7 years or less are more likely to leave*
- Employees that have worked for a total of 10 years or more are more likely to stay*

➤ AGE

- Employees aged 36 years and above are more likely to stay*
- Employees aged 32 years and below are more likely to leave*



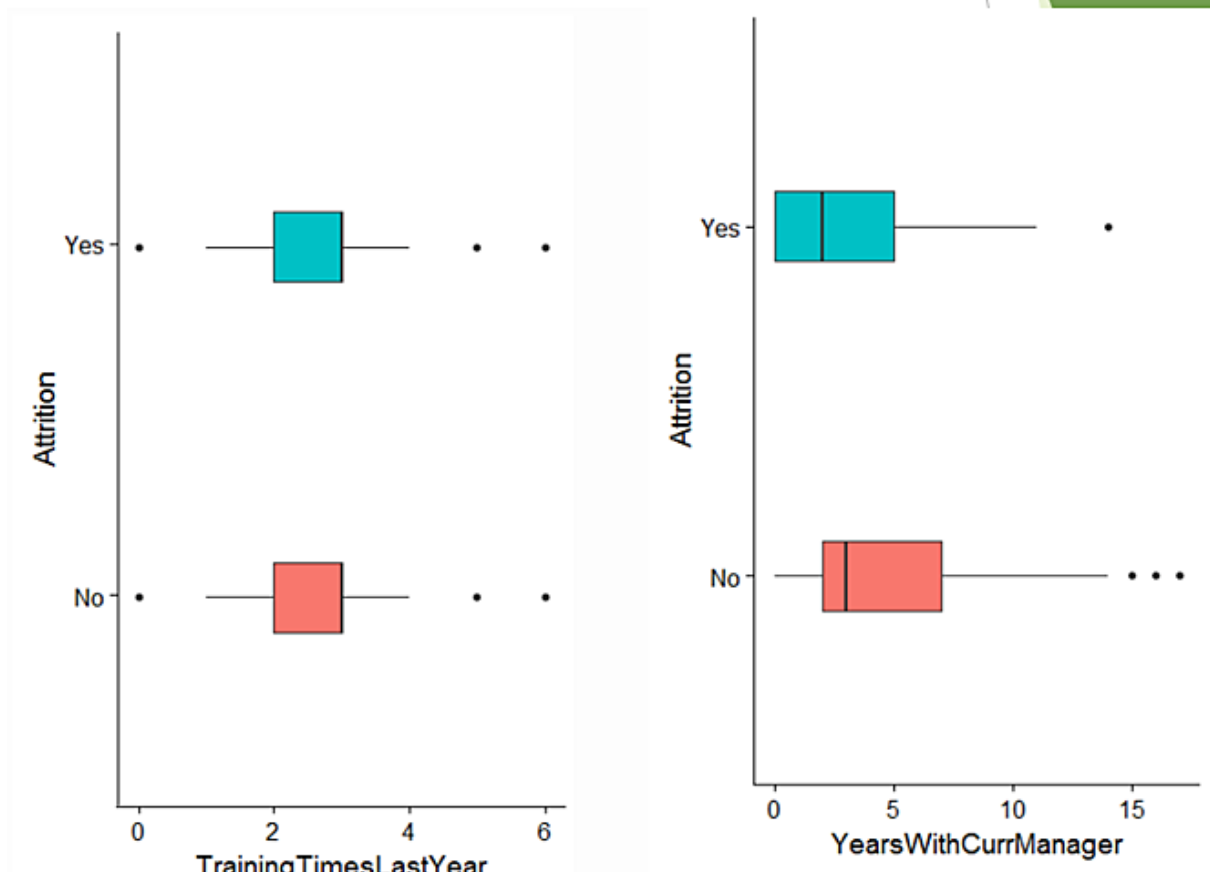
• RECOMMENDATIONS – WHAT FACTORS MAKE EMPLOYEES STAY/LEAVE? (2/4)

► TRAINING

- Employees that got 3 or more training sessions last year are more likely to stay*
- Employees that got 2 or fewer training sessions last year are more likely to leave*

► YEARS WITH CURRENT MANAGER

- Employees that have spent 3 years or more under the same manager are more likely to stay*
- Employees that have spent 2 years or less under the same manager are more likely to leave*



RECOMMENDATIONS – WHAT FACTORS MAKE EMPLOYEES STAY/LEAVE? (3/4)

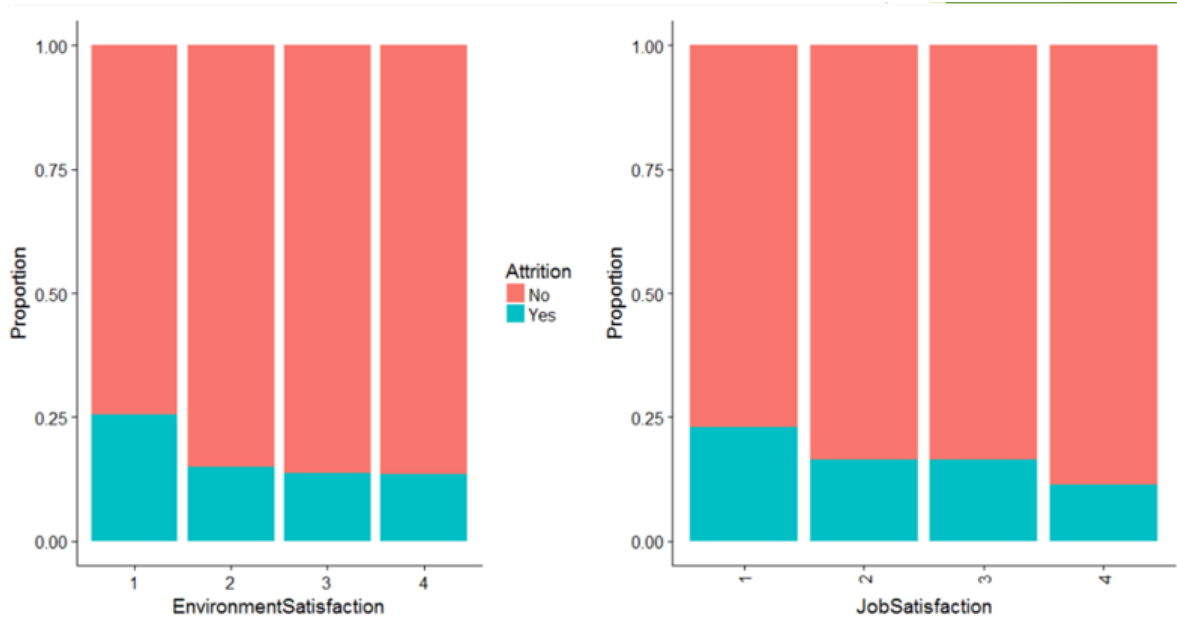
► JOB SATISFACTION

- Employees that have medium, high or very high levels of job satisfaction, are more likely to stay*
- Employees that have low levels of job satisfaction, are more likely to leave*

► ENVIRONMENT SATISFACTION

- Employees that have medium, high or very high levels of environment satisfaction, are more likely to stay*

- Employees that have low levels of environment satisfaction, are more likely to leave*



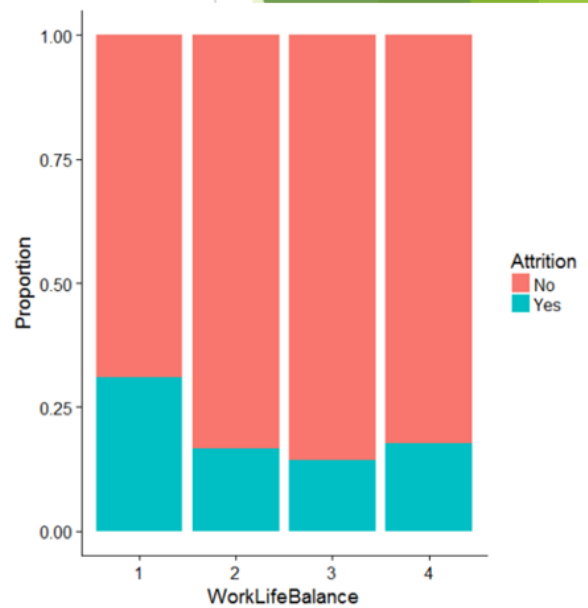
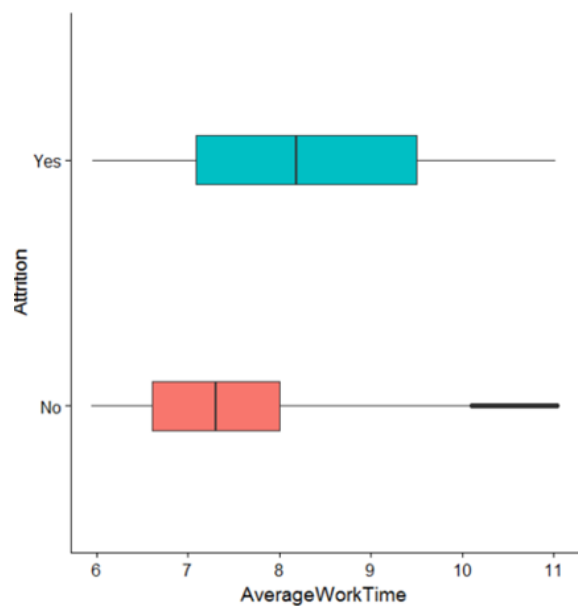
• RECOMMENDATIONS – WHAT FACTORS MAKE EMPLOYEES STAY/LEAVE? (4/4)

➤ AVERAGE WORK HOURS

- Employees that, on average work for 7.3 hours or less, are more likely to stay*
- Employees that, on average work for 8.2 hours or more, are more likely to leave*

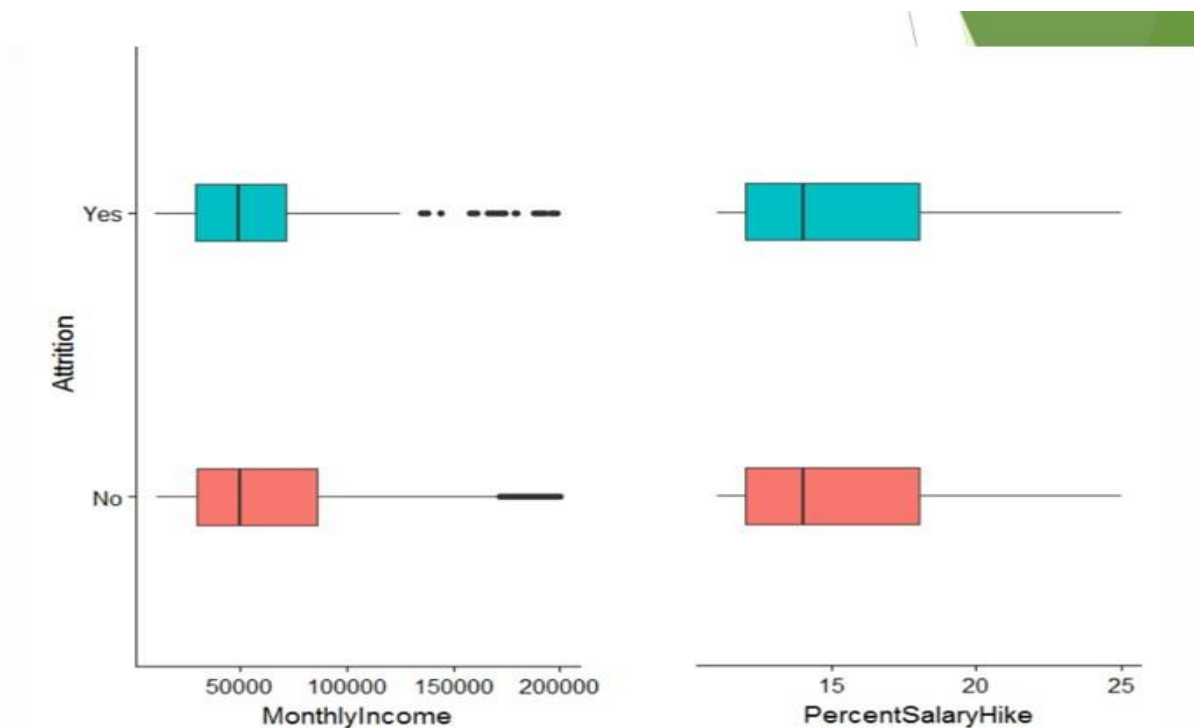
➤ WORK LIFE BALANCE

- Employees that rated their work life balance as good, better or best, are more likely to stay**
- Employees that rated their work life balance as bad, are more likely to leave**



- RECOMMENDATIONS – FACTORS THAT SURPRISINGLY DON'T AFFECT ATTRITION

- ◊ ► Monthly Income and Percent Salary Hike do not affect attrition*



RECOMMENDATIONS

◆ **CURRENT EMPLOYEES:**

- Work life balance should be improved
- Work environment should be improved
- The manager of an employee should not be changed very often
- Employees should be provided relevant training regularly, especially for its younger employees

◆ **FUTURE EMPLOYEES (CHANGES IN HIRING PROCESS):**

- The company should follow either one of the strategies given below –
 - Hire older people with decent work experience
 - Hire young people and train them appropriately
- It could also opt for a combination of the two

9. ADVANTAGES & DISADVANTAGES

CURRENT High Turnover	ALTERNATIVE High Retention
<ul style="list-style-type: none">• Cost: 16-212% employee annual salary per lost employee• Lost productivity• Disrupted work environment• Low morale• Increased miscommunication• More mistakes or accidents• Low employee engagement and little employee-driven improvement	<ul style="list-style-type: none">• Greater profits (from increased sales as well as saving on costs)• Better workplace culture• Stronger employee relationships• Improved communication• Higher workplace morale• Happier customers and more promoters• Employee-driven innovation

10. CONCLUSION

The following suggestion are given based on the analysis and modelling result:

CURRENT EMPLOYEES:

- Work life balance should be improved
- Work environment should be improved
- The manager of an employee should not be changed very often
- Employees should be provided relevant training regularly, especially for its younger employees

FUTURE EMPLOYEES (CHANGES IN HIRING PROCESS):

- The company should follow either one of the strategies given below –

- Hire older people with decent work experience
- Hire young people and train them appropriately
- It could also opt for a combination of the two

11. FUTURE SCOPE

The future scope of the research is that these analysis and modelling helps in forecasting the cause of employee disengagement, enables HR managers develop long-term strategies to reduce attrition, Competitive measures to enhance company brand image, Develops and shapes drills that benefit both the management and the employees. The scope of this research can be extended to many numbers of samples and to other working fields other than corporates

12. APPENDIX

Nowadays, employee attrition became a serious issue regarding a company's competitive advantage. It's very expensive to find, hire and train new talents. It's more cost-effective to keep the employees a company already has. A company needs to maintain a pleasant working atmosphere to make their employees stay in that company for a longer period. A few years back it was done manually but it is an era of machine learning and data analytics. Now, a company's HR department uses some data analytics tool to identify which areas to be modified to make most of its employees to stay.



CONCLUSION:

We have successfully learned how to analyze employee attrition using “LOGISTIC REGRESSION” with the help of R software. Only with a couple of codes and a proper data set, a company can easily understand which areas needed to look after to make the workplace more comfortable for their employees and restore their human resource power for a longer period.