Corporate Employee Attrition Analysis

A PROJECT REPORT

Submitted By

Team ID : PNT2022TMID34476

Team Leader : SANKAR RAJA J I (961819104076)

Team Member : JAISON V (961819104038)

Team Member : PASUPATHISH M (961819104061)

Team Member : MATHAN M (961819104055)

in partial fulfillment for the award of the degree

of

BACHELOR OF ENGINEERING

IN

COMPUTER SCIENCE AND ENGINEERING

PONJESLY COLLEGE OF ENGINEERING, NAGERCOIL

ANNA UNIVERSITY::CHENNAI 600025

TABLE OF CONTENTS

CHAPTER NO	TITLE	PAGE NO
1	**INTRODUCTION**	**4**
	1.1 Project Overview	**4**
	1.2 Purpose	**4**
2	**LITERATURE SURVEY**	**5**
	2.1 Existing problem	**5**
	2.2 References	**5**
	2.3 Problem Statement Definition	**5**
3	**IDEATION & PROPOSED SOLUTION**	
	3.1 Empathy Map Canvas	**6**
	3.2 Ideation & Brainstorming	**6**
	3.3 Proposed Solution	**8**
	3.4 Problem Solution fit	**9**
4	**REQUIREMENT ANALYSIS**	
	4.1 Functional requirement	**10**
	4.2 Non-Functional requirements	**10**
5	**PROJECT DESIGN**	
	5.1 Data Flow Diagrams	**11**
	5.2 Solution & Technical Architecture	**11**
	5.3 User Stories	**12**

6	**PROJECT PLANNING & SCHEDULING**	
	6.1 Sprint Planning & Estimation	**13**
	6.2 Sprint Delivery Schedule	**13**
	6.3 Reports from JIRA	
7	**CODING & SOLUTIONING**	
	7.1 Feature 1	**13**
	7.2 Feature 2	**14**
	7.3 Database Schema	
8	**TESTING**	
	8.1 Test Cases	**15**
	8.2 User Acceptance Testing	**15**
9	**RESULTS**	**17**
10	**ADVANTAGES & DISADVANTAGES**	**18**
11	**CONCLUSION**	**18**
12	**FUTURE SCOPE**	**19**
13	**APPENDIX**	**20**

1. INTRODUCTION

1.1 Project overview

Employee attrition has become a vital problem across the world. It is one of the crucial issues faced by business leaders within companies where they lose the most talented employees. A good employee is always an asset to the organization and their resignation can lead to various problems like financial losses, overall performance, and loss of acquired knowledge. Furthermore, hiring new employees is far exorbitant, taxing, and time-consuming in comparison to recruiting the existing one. It is very time-consuming to recruit a new employee as it takes him months for training, adjusting to the culture, rules, and environment. Therefore, upcoming trends and technology using Machine Learning Algorithms must be exploited for the benefit of business organizations. Knowing the reason beforehand for the employee attrition, companies can mitigate this loss. This analysis provides a conclusive review of employee attrition from the data set IBM HR Analytics Employee Attrition Performance.

1.2 Purpose

[1] Hardik P. K. (2016) , researched on “a study on employee attrition: with special reference to Kerala IT Industry”. His research examined the relationship between organizational factors and attrition of IT professional’s. The result can conclude that the organizational factors played significant role in predicting the variance in turnover intention (attrition) of Kerala IT professionals. Therefore, the HR managers in IT organizations may take into consideration the problems with organizational

factors of their workers to reduce the turnover intention of the skilled employees**.**

1. LITERATURE SURVEY

2.1 Existing Problem

The Existing system includes only few attributes for analysis and also deals with qualitative observations and simple statistical analysis.The qualitative observations deal with data and can be observed through human senses.They do not involve measurements or number. Due to the increase in IOT and connected device,we now have access to so much of data and along with it an increase needs to manage and understand data.

2.2 References

1. From Big Data to Deep Data to support people analytics for employee attrition prediction, Nesrine Ben Yahia, Hlel Jihen, Ricardo Colomo-Palacio(2021)

2.Machine Learning Approach for Employee Attrition Analysis.Dr. R. S. Kamath | Dr. S. S. Jamsandekar | Dr. P. G. Naik ,Published in International Journal of Trend in Scientific Research and Development (ijtsrd), (March 2019)

3. Investigation of early career teacher attrition(ECT) and the impact of induction programs in Western Australia, Janine E.Wyatt, MichaelO'Neill (2021)

2.3 Problem Statement Definition

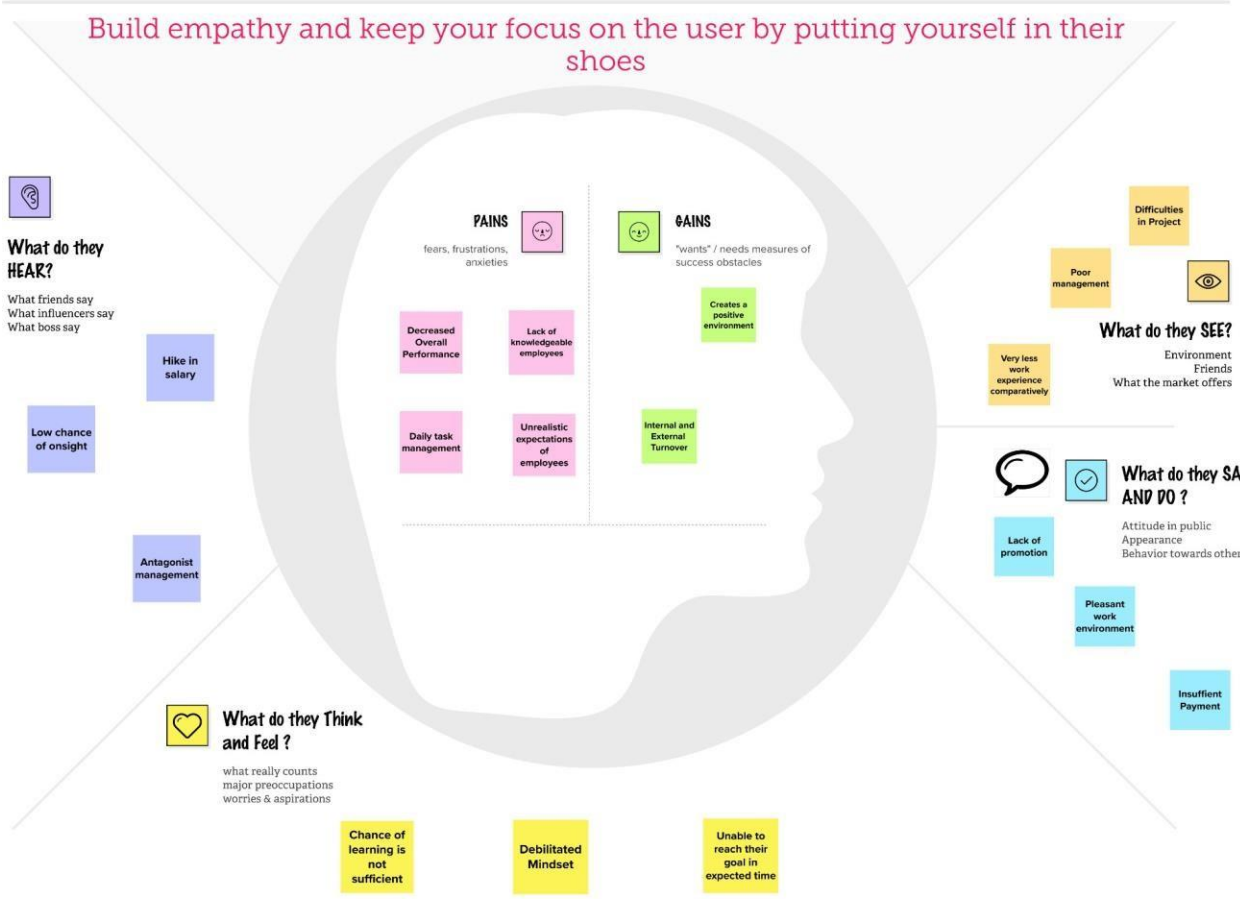
● To create a dashboard and perform analysis of employee attrition in corporates using IBM Cognos analytics platform.

● To reduce the employee attrition rate through data analytics,

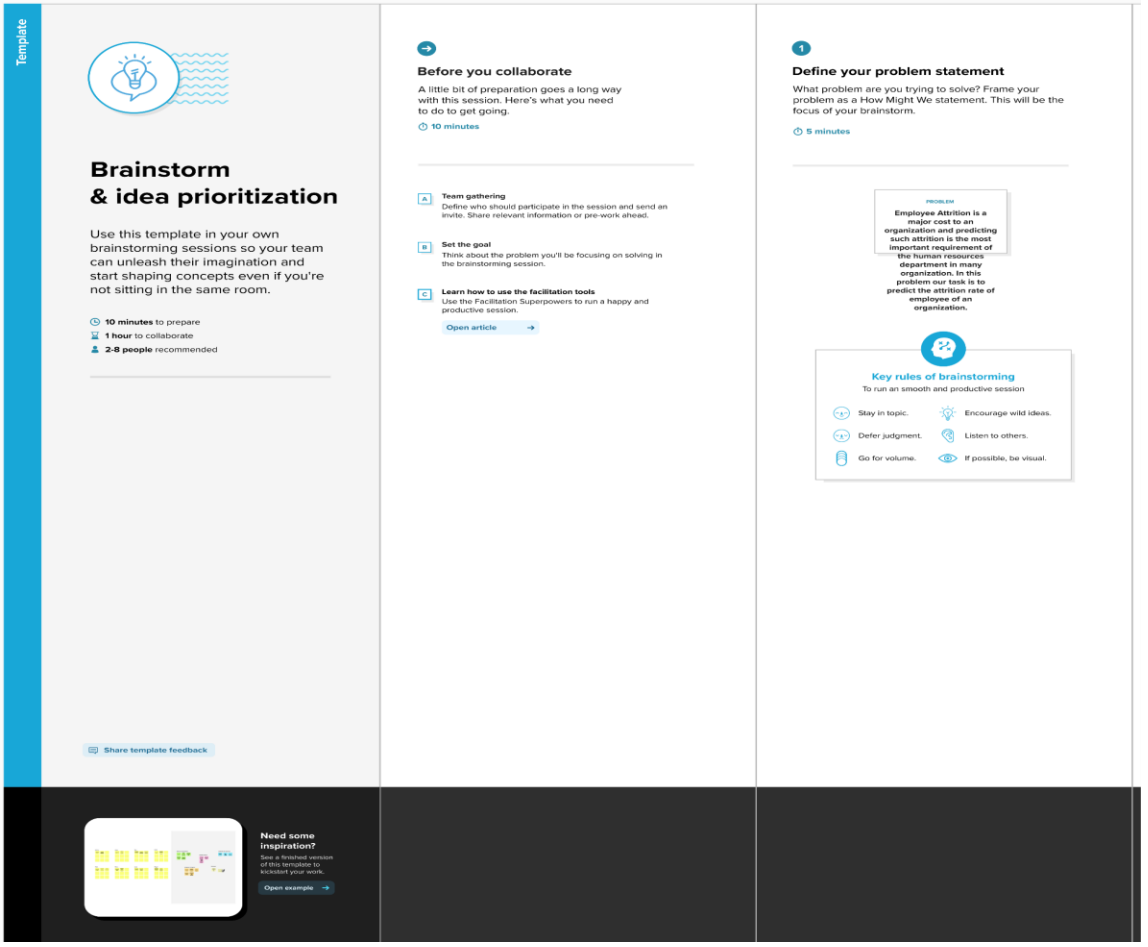
data visualization by analysing the major factors that causes attrition.

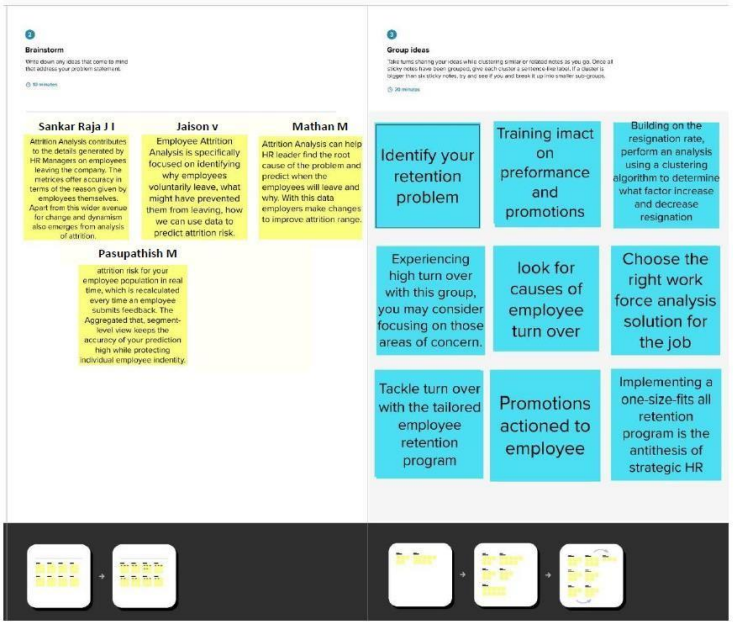
3. IDEATION AND PROPOSED SOLUTION

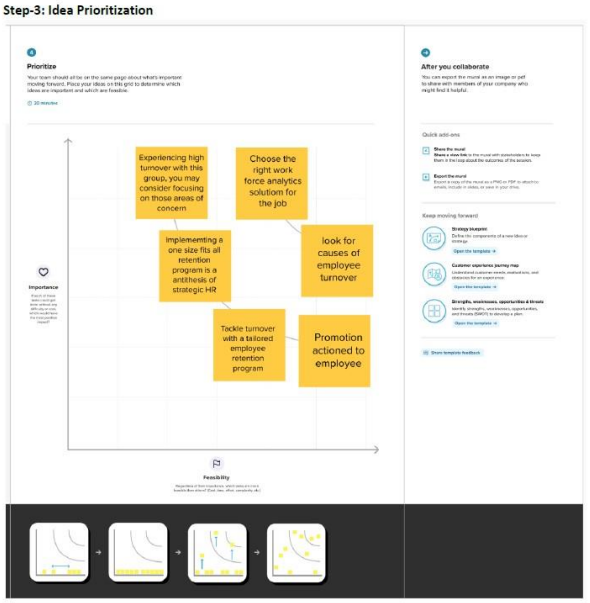
3.1 Empathy Map Canvas



3.2 Ideation & Brainstorming



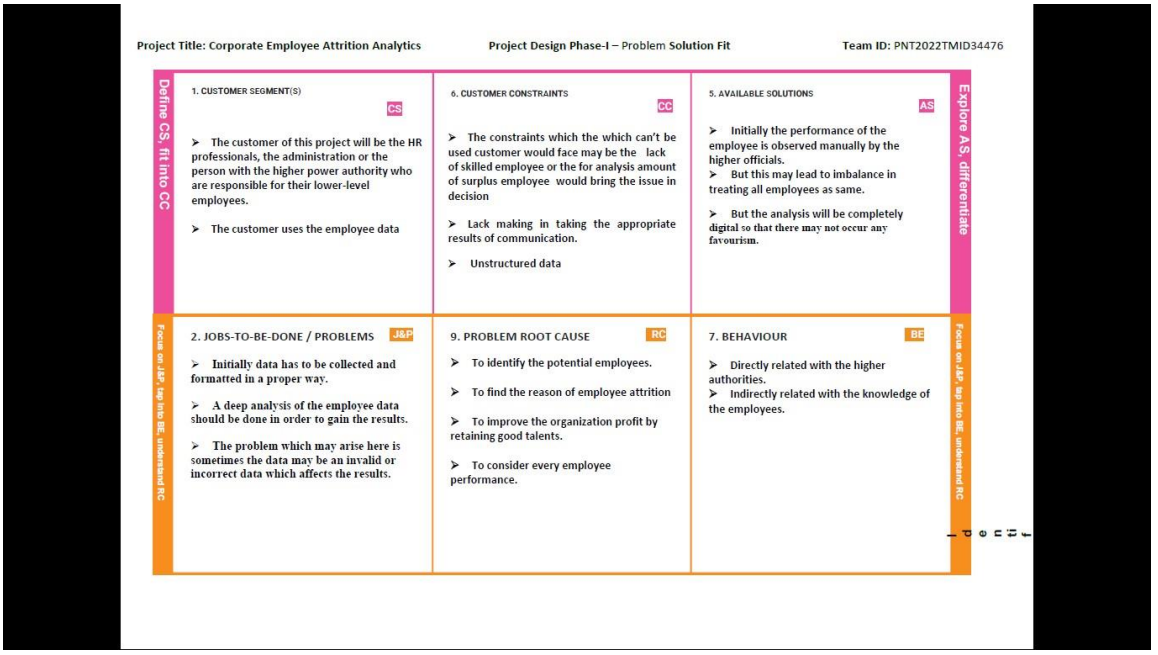




3.3 Proposed Solution

The Existing system includes only few attributes for analysis and also deals with qualitative observations and simple statistical analysis. The qualitative observations deal with data and can be observed through human senses.They do not involve measurements or number. Due to the increase in IOT and connected device,we now have access to so much of data and along with it an increase needs to manage and understand data.

3.4 Problem Solution fit



Project Title: Corporate Employee Attrition Analytics | Project Design Phase-I – Problem Solution Fit | Team ID: PNT2022TMID34476

Define CS, fit into CC

1. CUSTOMER SEGMENT(S) — CS

- The customer of this project will be the HR professionals, the administration or the person with the higher power authority who are responsible for their lower-level employees.
- The customer uses the employee data

6. CUSTOMER CONSTRAINTS — CC

- The constraints which the which can't be used customer would face may be the lack of skilled employee or the for analysis amount of surplus employee would bring the issue in decision
- Lack making in taking the appropriate results of communication.
- Unstructured data

5. AVAILABLE SOLUTIONS — AS

- Initially the performance of the employee is observed manually by the higher officials.
- But this may lead to imbalance in treating all employees as same.
- But the analysis will be completely digital so that there may not occur any favourism.

Explore AS, differentiate

Focus on J&P, tap into BE, understand RC

2. JOBS-TO-BE-DONE / PROBLEMS — J&P

- Initially data has to be collected and formatted in a proper way.
- A deep analysis of the employee data should be done in order to gain the results.
- The problem which may arise here is sometimes the data may be an invalid or incorrect data which affects the results.

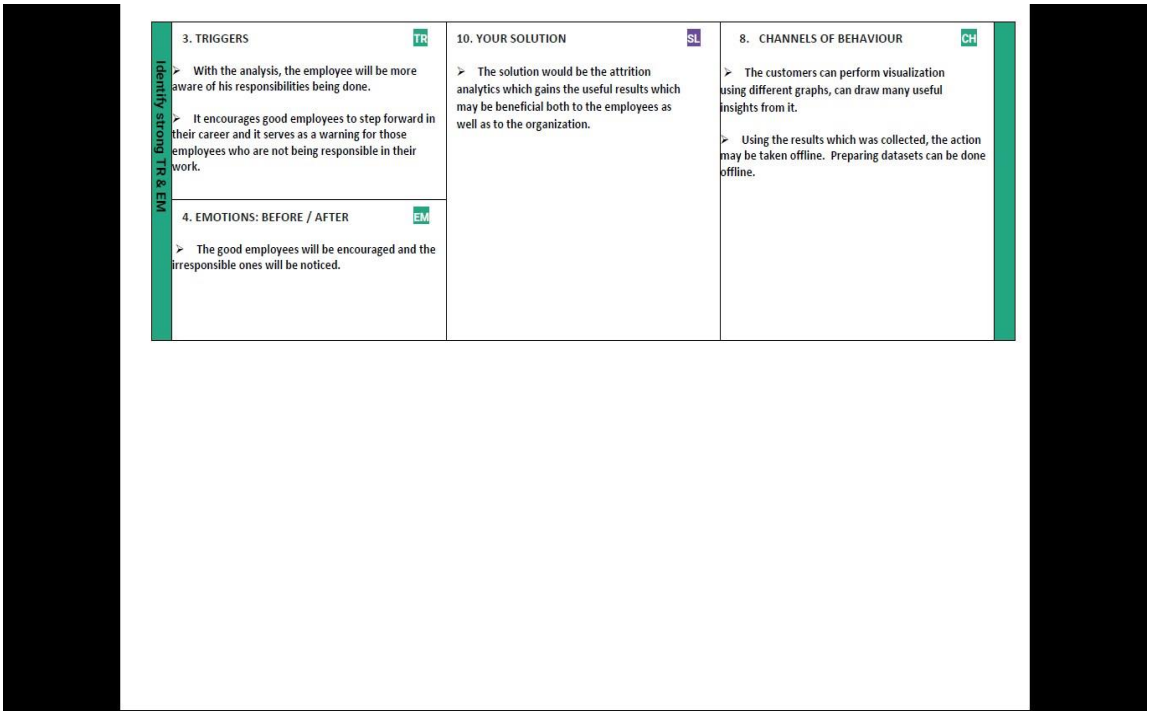
9. PROBLEM ROOT CAUSE — RC

- To identify the potential employees.
- To find the reason of employee attrition
- To improve the organization profit by retaining good talents.
- To consider every employee performance.

7. BEHAVIOUR — BE

- Directly related with the higher authorities.
- Indirectly related with the knowledge of the employees.

Focus on J&P, tap into BE, understand RC



Identify strong TR & EM

3. TRIGGERS — TR

- With the analysis, the employee will be more aware of his responsibilities being done.
- It encourages good employees to step forward in their career and it serves as a warning for those employees who are not being responsible in their work.

4. EMOTIONS: BEFORE / AFTER — EM

- The good employees will be encouraged and the irresponsible ones will be noticed.

10. YOUR SOLUTION — SL

- The solution would be the attrition analytics which gains the useful results which may be beneficial both to the employees as well as to the organization.

8. CHANNELS OF BEHAVIOUR — CH

- The customers can perform visualization using different graphs, can draw many useful insights from it.
- Using the results which was collected, the action may be taken offline. Preparing datasets can be done offline.

4. REQUIREMENT ANALYSIS

4.1 Functional requirement

FR No.	Functional Requirement (Epic)	Sub Requirement (Story / Sub-Task)
FR-1	User Registration	Registration through Form Registration through Gmail Registration through LinkedIN
FR-2	User Confirmation	Confirmation via Email Confirmation via OTP
FR-3	User Feedback	Feedback through Form Feedback through Gmail Feedback through Instagram polls Feedback through LinkedIn
FR-4	User Rating	Rating via Mail Rating through Message
FR-5	Employee Management	Validating and managing the employee details
FR-6	Attrition Analytics	Analysing and finding out the major reason for the attrition of employees using dataset

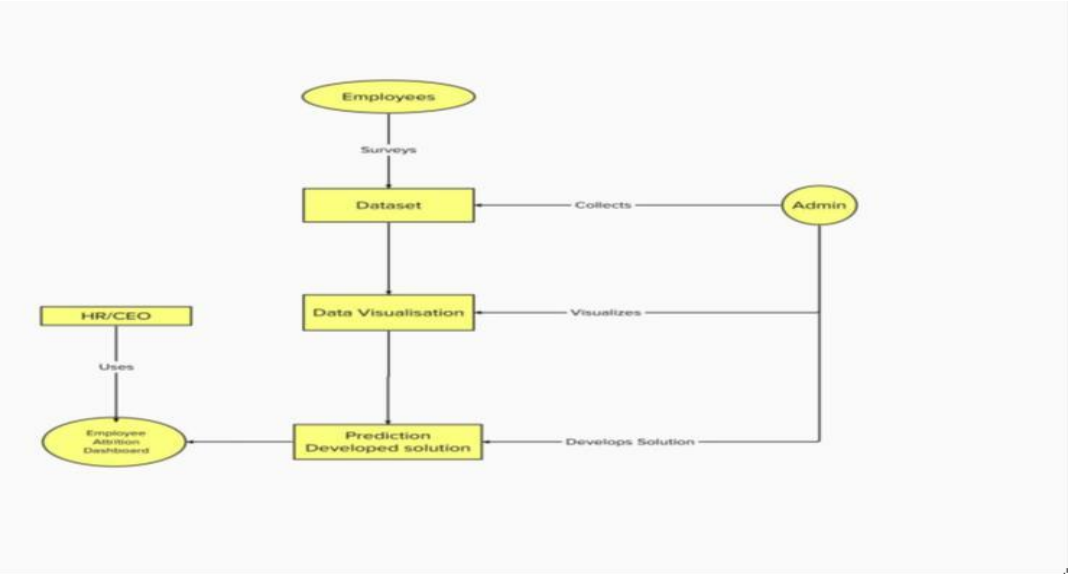
4.2 Non-Functional requirements

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

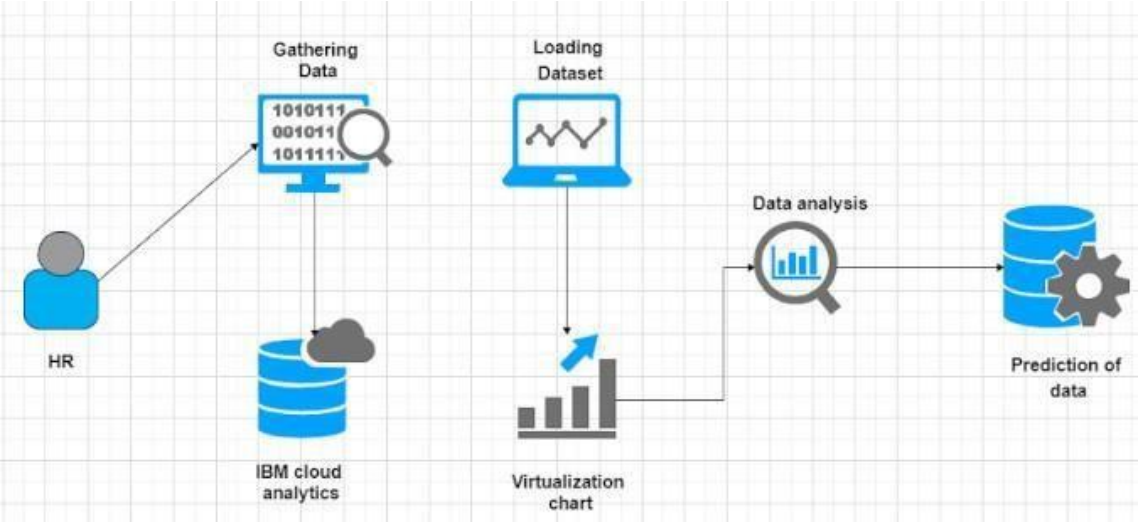
FR No.	Non-Functional Requirement	Description
NFR-1	**Usability**	This Data Visualization shall be easy to use for all users with minimal instructions. 100% of the languages on the graphical user interface (GUI) shall be intuitive and understandable by non-technical users.
NFR-2	**Security**	The employee data is kept secure and their identity is hidden for the organization.
NFR-3	**Reliability**	The Link shall be operable in all conditions. The system must be less prone to errors
NFR-4	**Performance**	This software is portable and inter-operable. It works smoothly without generating errors. It also provides a faster response
NFR-5	**Portability**	The link shall be portable to all operating platforms. Therefore, this link should not depend on the different operating systems.
NFR-6	**Scalability**	Our solution is scalable for large and small datasets. It provides an efficient solution despite the size of the dataset.

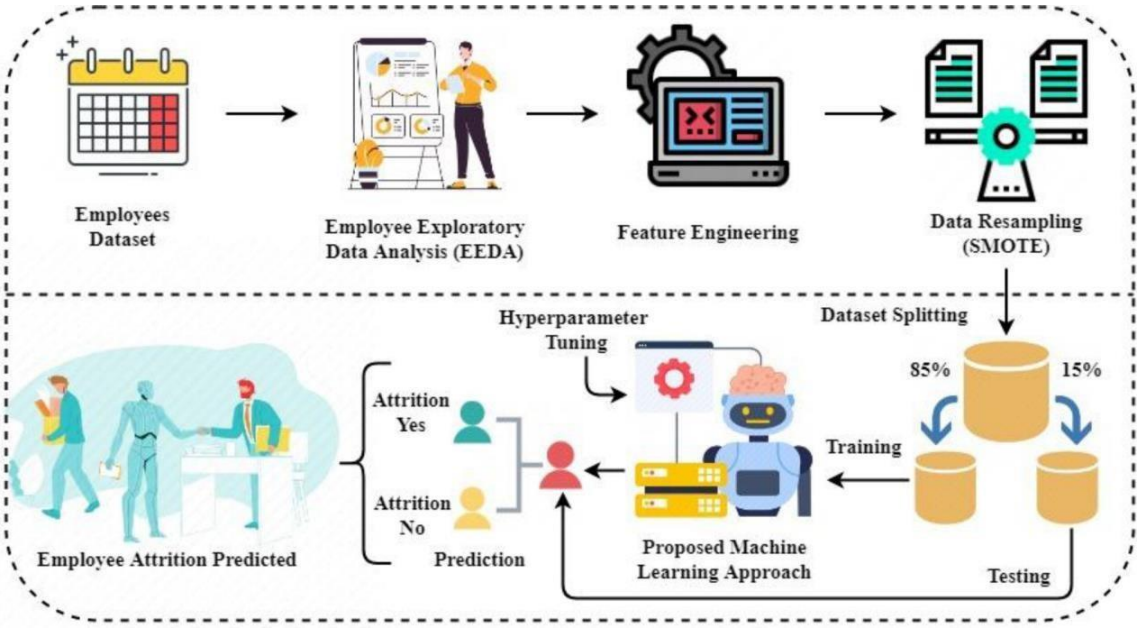
5. PROJECT DESIGN

5.1 Data Flow Diagrams



5.2 Solution & Technical Architecture





5.3 User Stories

User Type	Functional Requirement (Epic)	User Story Number	User Story / Task	Acceptance criteria	Priority	Release
Customer (Web user)	Registration	USN-1	As a user, I can register for the application by entering my email, password, and confirming my password.	I can access my account / dashboard	High	Sprint-1
		USN-2	As a user, I will receive confirmation email once I have registered for the application	I can receive confirmation email & click confirm	High	Sprint-1
		USN-3	As a user, I can register for the application through Facebook	I can register & access the dashboard with Facebook Login	Low	Sprint-2
		USN-4	As a user, I can register for the application through Gmail	I can register & access the dashboard with Gmail Login	Medium	Sprint-1
	Login	USN-5	As a user, I can log into the application by entering email & password	I can access my account / dashboard	High	Sprint-1
	Dashboard	USN-6	Uploading the Dataset	I can be able to upload my dataset	High	Sprint-2
		USN-7	Working With Dataset	I can be able to access my dashboard	High	Sprint-2
		USN-8	Visualization	I can be able to view the visual attrition rate of my dataset	High	Sprint-3
		USN-9	Working with Dashboard	I can be able to view the various views of the attrition rate	High	Sprint-3
Customer Care Executive		USN-10	Asking Help / Feedback	I can be able to ask help if I can face any issues or problems while using the webpage	Medium	Sprint-4
Administrator		USN-11	Managing the Database	I can assure that my data is in secure state	High	Sprint-4
		USN-12	Managing the over all process	I can assure that my data and process is going good	High	Sprint-4

6. PROJECT PLANNING

6.1 Sprint Planning & Estimation

6	Project Development Phase		
Activity number	Activity name	Detailed activity description	
6.1	Coding & Solutioning	Sprint-1 Delivery: Develop the Code, Test and push it to GitHub.	Sankar Raja J I, Jaison V, Mathan M, Pasupathish M
6.2	Acceptance Testing	Sprint-2 Delivery: Develop the Code, Test and push it to GitHub. Sprint-3 Delivery: Develop the Code, Test and push it to GitHub.	Sankar Raja J I, Jaison V, Mathan M, Pasupathish M
6.3	Performance Testing	Sprint-4 Delivery: Develop the Code, Test and push it to GitHub.	Sankar Raja J I, Jaison V, Mathan M, Pasupathish M

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	29 OCtober 2022	05 Novembet 2022
Sprint-2	20	6 Days	31 Oct 2022	05 Nov 2022	05 November 2022	06 November 2022
Sprint-3	20	6 Days	07 Nov 2022	12 Nov 2022	08 November 2022	09 November 2022
Sprint-4	20	6 Days	14 Nov 2022	19 Nov 2022	11 November 2022	16 November 2022

7. CODING & SOLUTIONING

7.1 Feature 1

```
#GENERAL
import pandas as pd
import numpy as np
import seaborn as sns
import matplotlib.pyplot as plt
path  = '/content/general_data.csv'
df =pd.read_csv(path)
```

```
df

df.shape

df.info()
df.select_dtypes('int64' ,'float64').columns
cat_cols = df.select_dtypes('object').columns
cat_cols
df.describe().T
df
for cat in cat_cols:
   print(cat ,'-> ' , df[cat].unique())
   print()
print("All columns Unique values count")
for col in df:
   print(col, len(df[col].unique()), sep=': ')
plt.figure(figsize =(14,5))
plt.subplot(1,2,1)
sns.countplot(df['Attrition'] ,color ='b' ,hue =df['Gender'])
plt.title('Attrition by Gender')
plt.subplot(1,2,2)
plt.pie(df['Attrition'].value_counts() ,colors =['r' ,'c'] ,explode =[0,0.1]  ,autopct =
'%.2f' ,labels =['No' ,'Yes'])
plt.title('Attrition')
#HANDLING CATEGORICAL OUTPUT VARIABLE
df['Attrition'].replace({'Yes':1 ,'No':0} ,inplace = True)
df['Attrition'].head()
plt.figure(figsize =(20 ,8))
sns.boxplot(x ='JobRole', y = 'MonthlyIncome' ,data = df ,hue ='Attrition' ,color ='red')

col = ['YearsInCurrentRole' ,'YearsSinceLastPromotion' ,'YearsWithCurrManager'
,'YearsAtCompany']
plt.figure(figsize = (10 ,10))
for i,c in enumerate(col):
   plt.subplot(2 ,2,i+1)
   sns.distplot(df[c] ,color ='b')
```

7.2 Feature 2

```
#GENERAL
import pandas as pd
import numpy as np
import seaborn as sns
import matplotlib.pyplot as plt
#FEATURE ENGINEERING
from sklearn.preprocessing import LabelEncoder
from imblearn.over_sampling import SMOTE
path  = '/content/general_data.csv'
df =pd.read_csv(path)
df
df.shape
df.info()
df.select_dtypes('int64' ,'float64').columns
```

```
cat_cols = df.select_dtypes('object').columns
cat_cols
df.describe().T
df
for cat in cat_cols:
    print(cat ,'-> ' , df[cat].unique())
    print()
print("All columns Unique values count")
for col in df:
    print(col, len(df[col].unique()), sep=': ')
plt.figure(figsize =(14,5))
plt.subplot(1,2,1)
sns.countplot(df['Attrition'] ,color ='b' ,hue =df['Gender'])
plt.title('Attrition by Gender')
plt.subplot(1,2,2)
plt.pie(df['Attrition'].value_counts() ,colors =['r' ,'c'] ,explode =[0,0.1] ,autopct =
'%.2f' ,labels =['No' ,'Yes'])
plt.title('Attrition')
#HANDLING CATEGORICAL OUTPUT VARIABLE
df['Attrition'].replace({'Yes':1 ,'No':0} ,inplace = True)
df['Attrition'].head()
df.drop(columns = no_use , axis = 1 , inplace = True)
df.columns
df['Gender'].replace({'Male':1 ,'Female':0} ,inplace = True)
df['OverTime'].replace({'Yes':1 ,'No':0} ,inplace = True)
(df.Attrition.value_counts()/1470)*100
smote = SMOTE(sampling_strategy='minority')
x ,y = smote.fit_resample(x ,y)
print(x.shape ,y.shape)
#now balanced
y.value_counts()
sns.countplot(y ,palette='viridis')
plt.title('Now Class is Balanced')
```

8. TESTING

8.1 Test Cases

8.2 User Acceptance Testing

1. Purpose of Document

The purpose of this document is to briefly explain the test coverage and open issue of corporateemployee attrition at the time of the release.

2. Defect Analysis

Resolution	Severity 1	Severity 2	Severity 3	Severity 4	Subtotal
By Design	3	2	0	0	5
Duplicate	4	0	2	0	6
External	3	2	0	0	5
Fixed	1	0	1	0	2
Not Reproduced	0	3	3	0	6
Skipped	0	0	3	2	5
Won't Fix	0	0	1	0	1
Totals	11	7	10	2	30

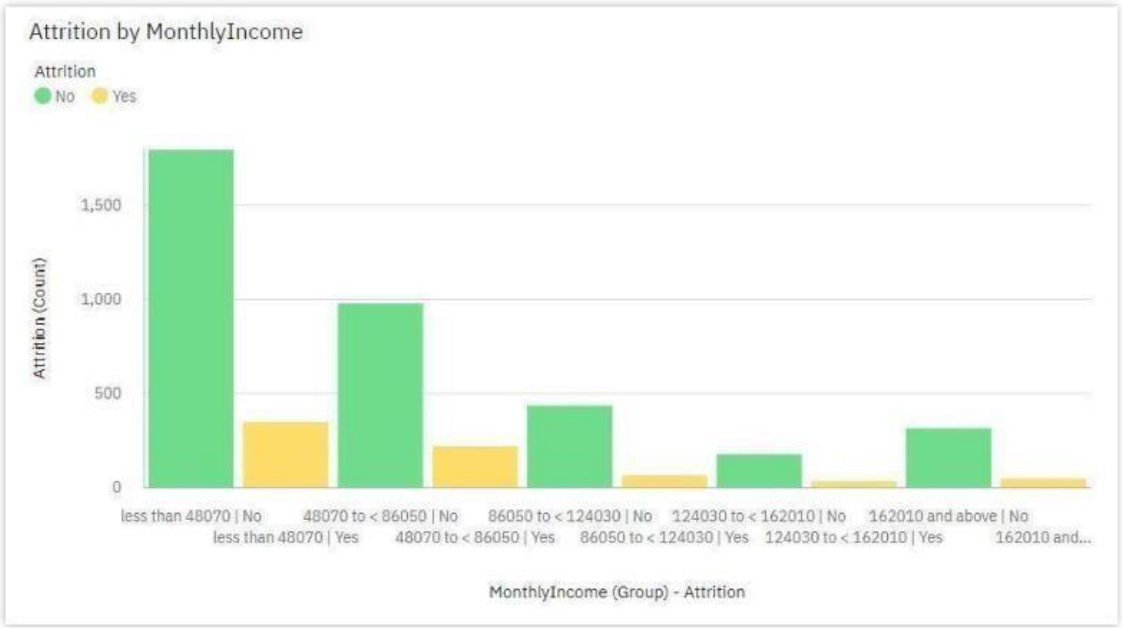
3. Test Case Analysis

Database	2	0	0	2
Dashboard	1	0	0	1
Visualize the data	8	0	0	8
Logistic Regression	4	0	0	4

Section	Total Cases	Not Tested	Fail	Pass
Login Page	1	0	0	1
Employee Attrition Details	1	0	0	1

9. RESULTS

9.1 Performance Metrics



9. ADVANTAGES & DISADVANTAGES

9.1Advantages

Data Collection : The study is conducted among working IT professionals of two different categories. This categorization mainly was focused on experience level and role in the organization. It was important to know the views of candidates who seek for the job for various reasons as well as the views of interviewers involved in the process of hiring the candidates. The research study involves reference of both primary and secondary data. Primary Data Primary data is collected through a field survey with the help of a structured self-administrated Questionnaire. The survey consisted of close ended questions by the means of convenience sampling. The scaling technique installed in the questionnaire is 5-point rating scale. Total 120 respondent were IT professionals belonging to the organizations from Nagpur, Pune and Mumbai cities in Maharashtra. Secondary Data Secondary data is collected by referring to the Journals, research papers and published data in the form of books and newspapers.

Type of Research :

The research paper adopted the descriptive research design methodology. Sample Design, Sample Size and Sampling Method The sample selected for the study is an Indian Information Technology Industry. The nature of the sample is restricted to working professionals in Information Technology sector and is collected through the convenience sampling technique. The sample size was 120 respondents.

9. CONCLUSION

Employees as well as organizations must be clear with their expectations regarding the job profile. Any sort of mismatch leads to discrepancy and employees may fail to perform at theirjob. This eventually leads to attrition. Organizations should state the requirements and expectations unambiguously. This helps candidates decide upon to accept the job position or not. This eventually avoids further conflicts in the employment terms.

10. FUTURE SCOPE

Research findings suggest that attrition reasons in IT organizations primarily revolve around professional growth and challenges in the organization. Although economic factors happen to the most influential factor, professionals may settle for second best criteria of their preference that is career growth and supportive work policies in the organization. On the other hand, candidates who aspire to have a better job than the one in hand are more interested in securing the next job. Young talent wants to work on latest technology and functional domain. IT professionals who are young career makers are less influenced by Brand name or geographical area. Most of the IT professionals look for challenging role and position in the organization. Candidates as well as senior professionals believe that challenging work motivate them to maintain the interest in the work life. Employees as well as organizations must be clear with their expectations regarding the job profile. Any sort of mismatch leads to discrepancy and employees may fail to

perform at their job. This eventually leads to attrition. Organizations should state the requirements and expectations unambiguously. This helps candidates decide upon to accept the job position or not. This eventually avoids further conflicts in the employment terms. Further this research can make more detailed conclusions over “mapping of candidates’ expectations with organizations’ requirement” by collecting the data focusing on all the steps of recruitment and selection process.

11. APPENDIX

12.1 Source Code

```
import numpy as np
import pandas as pd
import matplotlib.pyplot as plt
%matplotlib inline
import seaborn as sns
```

DATASET 1

```
df1=pd.read_csv('/content/drive/MyDrive/attrition/employee_attrition_train.csv')
```

```
from google.colab import drive
drive.mount('/content/drive')
```

```
Drive already mounted at /content/drive; to attempt to forcibly remount, call drive.mount("/content/drive", force_remount=True).
```

```
df1
```

	Age	Attrition	BusinessTravel	DailyRate	Department	DistanceFromHome	Education	EducationField	EmployeeCount	EmployeeNumber	...	RelationshipSatisfaction	Sta
0	50.0	No	Travel_Rarely	1126.0	Research & Development	1.0	2	Medical	1	997	...	3	
1	36.0	No	Travel_Rarely	216.0	Research & Development	6.0	2	Medical	1	178	...	4	
2	21.0	Yes	Travel_Rarely	337.0	Sales	7.0	1	Marketing	1	1780	...	2	
3	50.0	No	Travel_Frequently	1246.0	Human Resources	NaN	3	Medical	1	644	...	3	
4	52.0	No	Travel_Rarely	994.0	Research & Development	7.0	4	Life Sciences	1	1118	...	4	
...	...	...	...	...	...	...	...	...	...	...	...	...	
1024	NaN	No	Travel_Rarely	750.0	Research & Development	28.0	3	Life Sciences	1	1596	...	4	
1025	41.0	No	Travel_Rarely	447.0	Research & Development	NaN	3	Life Sciences	1	1814	...	1	
1026	22.0	Yes	Travel_Frequently	1256.0	Research & Development	NaN	4	Life Sciences	1	1203	...	2	
1027	29.0	No	Travel_Rarely	1378.0	Research & Development	13.0	2	Other	1	2053	...	1	
1028	50.0	No	Travel_Rarely	264.0	Sales	9.0	3	Marketing	1	1591	...	3	

1029 rows × 35 columns

In [ ]:
```
df1.columns
```

Out[ ]:
```
Index(['Age', 'Attrition', 'BusinessTravel', 'DailyRate', 'Department',
       'DistanceFromHome', 'Education', 'EducationField', 'EmployeeCount',
       'EmployeeNumber', 'EnvironmentSatisfaction', 'Gender', 'HourlyRate',
       'JobInvolvement', 'JobLevel', 'JobRole', 'JobSatisfaction',
       'MaritalStatus', 'MonthlyIncome', 'MonthlyRate', 'NumCompaniesWorked',
       'Over18', 'OverTime', 'PercentSalaryHike', 'PerformanceRating',
       'RelationshipSatisfaction', 'StandardHours', 'StockOptionLevel',
       'TotalWorkingYears', 'TrainingTimesLastYear', 'WorkLifeBalance',
       'YearsAtCompany', 'YearsInCurrentRole', 'YearsSinceLastPromotion',
       'YearsWithCurrManager'],
      dtype='object')
```

In [ ]:
```
df1.dtypes
```

Out[ ]:
```
Age                         float64
Attrition                    object
BusinessTravel               object
DailyRate                   float64
Department                   object
DistanceFromHome            float64
Education                     int64
EducationField               object
EmployeeCount                 int64
EmployeeNumber                int64
EnvironmentSatisfaction       int64
Gender                       object
HourlyRate                    int64
JobInvolvement                int64
JobLevel                      int64
JobRole                      object
JobSatisfaction               int64
MaritalStatus                object
MonthlyIncome                 int64
MonthlyRate                   int64
NumCompaniesWorked            int64
Over18                       object
OverTime                     object
PercentSalaryHike             int64
PerformanceRating             int64
RelationshipSatisfaction      int64
StandardHours                 int64
StockOptionLevel              int64
TotalWorkingYears             int64
TrainingTimesLastYear         int64
WorkLifeBalance               int64
YearsAtCompany                int64
YearsInCurrentRole            int64
YearsSinceLastPromotion       int64
YearsWithCurrManager          int64
dtype: object
```

In [ ]:
```
df1.shape
```

In [ ]:
```
df1.info()
```

```
RangeIndex: 1029 entries, 0 to 1028
Data columns (total 35 columns):
 #   Column                    Non-Null Count  Dtype
---  ------                    --------------  -----
 0   Age                       893 non-null    float64
 1   Attrition                 1029 non-null   object
 2   BusinessTravel            1024 non-null   object
 3   DailyRate                 1002 non-null   float64
 4   Department                1029 non-null   object
 5   DistanceFromHome          934 non-null    float64
 6   Education                 1029 non-null   int64
 7   EducationField            1029 non-null   object
 8   EmployeeCount             1029 non-null   int64
 9   EmployeeNumber            1029 non-null   int64
 10  EnvironmentSatisfaction   1029 non-null   int64
 11  Gender                    1029 non-null   object
 12  HourlyRate                1029 non-null   int64
 13  JobInvolvement            1029 non-null   int64
 14  JobLevel                  1029 non-null   int64
 15  JobRole                   1029 non-null   object
 16  JobSatisfaction           1029 non-null   int64
 17  MaritalStatus             1024 non-null   object
 18  MonthlyIncome             1029 non-null   int64
 19  MonthlyRate               1029 non-null   int64
 20  NumCompaniesWorked        1029 non-null   int64
 21  Over18                    1029 non-null   object
 22  OverTime                  1029 non-null   object
 23  PercentSalaryHike         1029 non-null   int64
 24  PerformanceRating         1029 non-null   int64
 25  RelationshipSatisfaction  1029 non-null   int64
 26  StandardHours             1029 non-null   int64
 27  StockOptionLevel          1029 non-null   int64
 28  TotalWorkingYears         1029 non-null   int64
 29  TrainingTimesLastYear     1029 non-null   int64
 30  WorkLifeBalance           1029 non-null   int64
 31  YearsAtCompany            1029 non-null   int64
 32  YearsInCurrentRole        1029 non-null   int64
 33  YearsSinceLastPromotion   1029 non-null   int64
 34  YearsWithCurrManager      1029 non-null   int64
dtypes: float64(3), int64(23), object(9)
memory usage: 281.5+ KB
```

In [ ]:
```
df1.describe()
```

Out[ ]:

	Age	DailyRate	DistanceFromHome	Education	EmployeeCount	EmployeeNumber	EnvironmentSatisfaction	HourlyRate	JobInvolvement	JobLevel	...	Relati
count	893.000000	1002.000000	934.000000	1029.000000	1029.0	1029.000000	1029.000000	1029.000000	1029.000000	1029.000000	...	
mean	37.930571	800.528942	9.930407	2.892128	1.0	1024.367347	2.683188	66.680272	2.713314	2.043732	...	
std	9.395978	408.109828	8.421791	1.053541	0.0	606.301635	1.096829	20.474094	0.710146	1.118918	...	
min	18.000000	102.000000	1.000000	1.000000	1.0	1.000000	1.000000	30.000000	1.000000	1.000000	...	
25%	31.000000	458.250000	2.000000	2.000000	1.0	496.000000	2.000000	48.000000	2.000000	1.000000	...	
50%	37.000000	801.500000	8.000000	3.000000	1.0	1019.000000	3.000000	67.000000	3.000000	2.000000	...	
75%	44.000000	1162.000000	16.000000	4.000000	1.0	1553.000000	4.000000	84.000000	3.000000	3.000000	...	
max	60.000000	1496.000000	29.000000	5.000000	1.0	2068.000000	4.000000	100.000000	4.000000	5.000000	...	

8 rows × 26 columns

In [ ]:
```
df1.isnull().sum()
```

Out[ ]:
```
Age                        136
Attrition                    0
BusinessTravel               5
DailyRate                   27
Department                   0
DistanceFromHome            95
Education                    0
EducationField               0
EmployeeCount                0
EmployeeNumber               0
EnvironmentSatisfaction      0
Gender                       0
HourlyRate                   0
JobInvolvement               0
JobLevel                     0
JobRole                      0
JobSatisfaction              0
MaritalStatus                5
MonthlyIncome                0
MonthlyRate                  0
NumCompaniesWorked           0
Over18                       0
OverTime                     0
PercentSalaryHike            0
PerformanceRating            0
RelationshipSatisfaction     0
StandardHours                0
StockOptionLevel             0
TotalWorkingYears            0
TrainingTimesLastYear        0
WorkLifeBalance              0
YearsAtCompany               0
YearsInCurrentRole           0
YearsSinceLastPromotion      0
YearsWithCurrManager         0
dtype: int64
```

In [ ]:
```
df1
```

Out[ ]:

	Age	Attrition	BusinessTravel	DailyRate	Department	DistanceFromHome	Education	EducationField	EmployeeCount	EmployeeNumber	...	RelationshipSatisfaction	Sta
0	50.0	No	Travel_Rarely	1126.0	Research & Development	1.0	2	Medical	1	997	...	3	
1	36.0	No	Travel_Rarely	216.0	Research & Development	6.0	2	Medical	1	178	...	4	
2	21.0	Yes	Travel_Rarely	337.0	Sales	7.0	1	Marketing	1	1780	...	2	
3	50.0	No	Travel_Frequently	1246.0	Human Resources	NaN	3	Medical	1	644	...	3	
4	52.0	No	Travel_Rarely	994.0	Research & Development	7.0	4	Life Sciences	1	1118	...	4	
...	...	...	...	...	...	...	...	...	...	...	...	...	
1024	NaN	No	Travel_Rarely	750.0	Research & Development	28.0	3	Life Sciences	1	1596	...	4	
1025	41.0	No	Travel_Rarely	447.0	Research & Development	NaN	3	Life Sciences	1	1814	...	1	
1026	22.0	Yes	Travel_Frequently	1256.0	Research & Development	NaN	4	Life Sciences	1	1203	...	2	
1027	29.0	No	Travel_Rarely	1378.0	Research & Development	13.0	2	Other	1	2053	...	1	
1028	50.0	No	Travel_Rarely	264.0	Sales	9.0	3	Marketing	1	1591	...	3	

1029 rows × 35 columns