



EMPLOYEE ATTRITION ANALYTICS

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given rise to the increasingly widespread business application of data science. [2]

Abstract - Employee attrition is referred to as reduction in the number of employees in an organization. Employees leave the organization for various reasons. A few reasons are, demand for a high salary, change in technology or role, professional challenges etc. High attrition leads to expense over multiple attributes and functions in the company. Recruitment, Training and Development cost increases overall cost on the employees. The project main aim is to identify the reasons for the employee attrition.

Key Words: Employee Attrition, Data Analysis, Dashboard, Job Satisfaction Rate, Educational Field, Employee Feedback

With our HR Analysis Dashboard, we've combined cutting-edge technology and robust analytics to provide you with a holistic view of your workforce. By integrating data from various HR systems and leveraging advanced algorithms, we deliver real-time and actionable insights into key metrics and trends, ensuring you have the information you need at your fingertips. **Attrition rate in India surged to 20.3% in 2022 from 6% in 2020.** [3]

1.1 LITERATURE REVIEW

1. INTRODUCTION (Size 11, cambria font)

Welcome to our state-of-the-art HR Analysis Dashboard, A much better way than the traditional way for comprehensive workforce management. Data Science is a multidisciplinary approach based mainly on the methods of statistics and computer science [1]. With vast amounts of data now available, companies in almost every industry are focused on exploiting data for competitive advantage. The volume and variety of data have far outstripped the capacity of manual analysis, and in some cases have exceeded the capacity of conventional databases. At the same time, computers have become far more powerful, networking is ubiquitous, and algorithms have been developed that can connect datasets to enable broader and deeper analyses than previously possible. The convergence of these phenomena has

Most research cognizance [4], [5] on analyzing and tracking clients and their behavior, and do now no longer cope with the primary property of a company, as represented via way of means of its employees. Many research analyzed worker attrition. A present study confirmed that worker demographics [6] and job-associated attributes are the elements that maximum that have an effect on worker attrition, together with the profits and the length of the employment relationship. Other studies evaluated the effects of demographic attributes and worker absenteeism on attrition. Authors centered simplest on work-particular elements [7]. They in comparison with a Naïve Bayes classifier and the selection tree set of rules J48 in predicting the chance of a worker departing from the company. In particular, methodologies had been evaluated for every set of rules: tenfold cross-validation and percent break up 70. The outcomes confirmed an accuracy of 82.4% and the accuracy of being in wrong category is of 17.6% with J48 the usage of tenfold cross-validation, even as there has been an accuracy of 82.7% and a wrong category of 17.3%

the usage of percent break up 70. In contrast, the Naïve Bayes classifier received an accuracy of 78.8% and a wrong category of 21.2% the usage of tenfold cross-validation, even as an accuracy of 81% and a wrong category of 19% turned into received the usage of percent break up 70. Authors [9] explored the software of Logistic Regression while predicting worker turnover and received an accuracy of 85% and a fake bad price of 14%.

2. RESULTS



2.1 KPI: A Key Performance Indicator is a measurable value that demonstrates how effectively a company is achieving key business objectives. KPI are business metrics used by corporates and managers to track and analyze factors which are crucial for the success of the company. Findings: We have taken the average of: age, daily rate, distance from home, education level, environment satisfaction, hourly rate, job involvement job level, job satisfaction, monthly income, monthly rate, no of companies worked, percent salary hike, performance rating, relationship satisfaction, standard hours, stock option level, total working years and count of employees.

Employee Count	Attrition Count	Attrition Rate	Active Employees	Avg. Age
1,818	303	16.67%	1,515	37

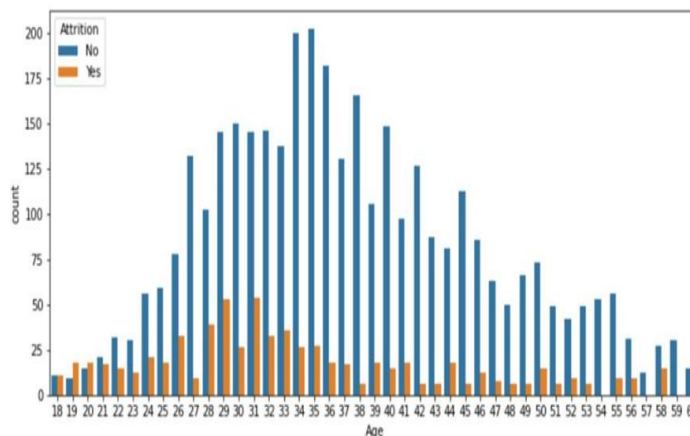
Fig. 1 Key Performance Indicators

In this above presentation out of 1,818 employees ,attrition count is 303 i.e. 16.67% approximately 20% which proves that attrition rate in India surged to 20.3% in 2022 [3] is almost true.

2.2 Attrition by age: In fig.2 there are two color “blue” represents “No attrition” and “Orange” represents “attrition”. In Y axis

we find the “Employee count” i.e. no of employee on the other hand, X axis represents the “Age” of employee.

At age 29 and 30 the employee count is almost 50 which is higher than others age



In this above chart we can see that attrition frequency of employees age between 29 to 31 years are more than others.

2.3 Job Satisfaction: Job satisfaction and employee loyalty are better in companies that allow their staff the freedom to unleash their creativity and never fail to appreciate a job well done. Satisfied, highly motivated, and loyal employees form the core of a company and also have an impact on the productivity of an organization.

The data contains four ratings for job satisfaction i.e., 1 ‘Low’, 2 ‘Medium’, 3 ‘High’, 4 ‘Very High’. Job satisfaction and employee loyalty are better in companies that allow their staff the freedom to unleash their creativity and never fail to appreciate a job well done. Satisfied, highly motivated, and loyal employees form the core of a company and also have an impact on the productivity of an organization. The pie shows that the attrition rate decreases as the job satisfaction rating increases. Out of all the people who rated 'Low', 31% have left the company. Whereas, among the people who rated 'Very High', only 19.1% have left the company. This means that companies must offer better training, opportunities, and appraisals to avoid attrition.

2.4 Job Involvement: Out of all the people who rated 'Low', 59.0% have left the company. Whereas, among the people who rated 'Very High', only 5.6% have left the company. Organizations can increase employees’ involvement by creating open forums for honest employee feedback and express their ideas and opinions.

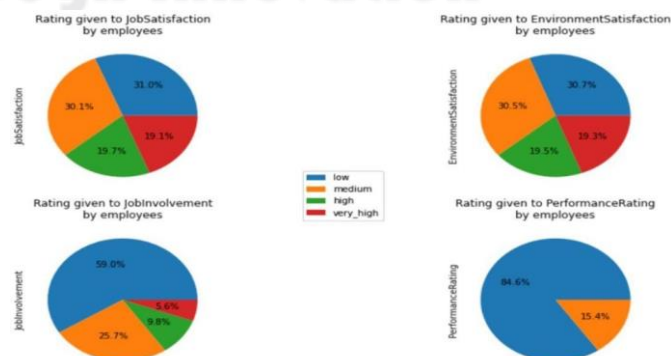
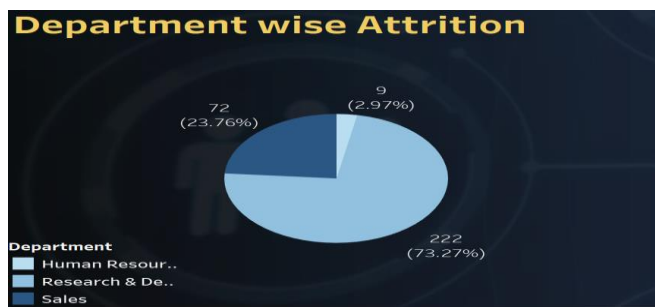


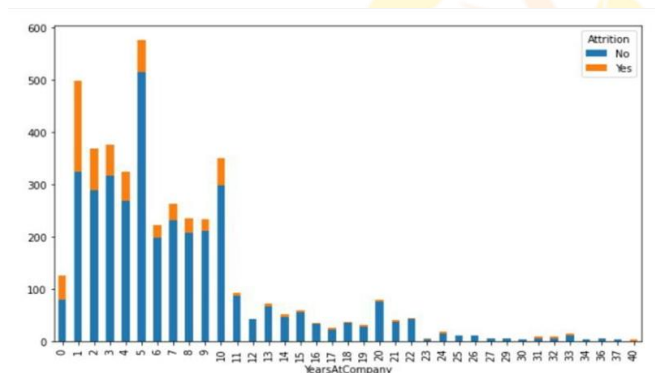
Fig -3

2.5 Departments: we are going to analyze the attrition with respect to the department. The dataset has three departments. This analysis can help us know which department has flaws and the department managers can further take measures to improve their employee satisfaction. Findings: The pie chart shows that the department of Research & Development has the highest attrition rate with 73.27% of total attrition in the company, followed by Sales department with 23.76% and the least is in Human Resources with 2.97%.



2.6 Employment year: In this bar we are going to analyze the employment year when employee

left the workplace. In this bar chart we find that after 5 years they left most.



We collect data from Kaggle. Dashboard link: [Click here](#)

3 Machine Learning Model: Our model is designed to predict employee attrition, a vital concern for organizations seeking to retain talent and maintain productivity. With this remarkable accuracy rate, our model excels in identifying factors and patterns that contribute to employee turnover, thus enabling organizations to take proactive measures to mitigate attrition.

The success of our model can be attributed to the rigorous training process and feature engineering, where we harnessed a wealth of data related to employee demographics, performance metrics, job satisfaction, and other pertinent factors. Through this comprehensive dataset, our model can discern nuanced correlations and offer actionable insights to HR practitioners and management.

With such a high level of accuracy, our Employee Attrition ML Model represents a significant advancement in HR analytics and a valuable tool for any organization aiming to reduce attrition rates and improve workforce stability. Its performance underscores the importance of leveraging data-driven approaches in addressing complex human resources challenges and underscores the promise of machine learning in this domain.

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+ Code + Text
Connect + A

Random Forest

from sklearn.ensemble import RandomForestClassifier
from sklearn.metrics import accuracy_score, classification_report, confusion_matrix

rf = RandomForestClassifier(n_estimators=100)

rf.fit(X_train, y_train)

# RandomForestClassifier
RandomForestClassifier()

rf_predictions = rf.predict(X_test)

accuracy_score_test, rf_predictions

0.90798558276834

print(classification_report(X_test, rf_predictions))

precision recall f1-score support
0 1.00 1.00 1.00 736
1 1.00 1.00 1.00 706
accuracy 1.00 1.00 1.00 1442
macro avg 1.00 1.00 1.00 1442
weighted avg 1.00 1.00 1.00 1442
    
```

Our ML model returns approx. 99% of accuracy score in prediction.

4.Outcomes:

It is found that Out of 1818, 303 employees left from the company which is 16.2% of all the employees.

- Most of the employees are working in the sales department.
- 84% of employees have low performance rating.
- The employees who travel frequently are most likely to churn.
- The employees whose experiences are below 10 years are most likely to churn.
- The employees who are working in the same role for less than 2 years are most likely to churn.
- The employees whose age is between 25 to 37 are most likely to churn.
- This dashboard gives us 85% of accuracy.

CONCLUSION: In conclusion, an HR analytical dashboard is a valuable tool for organizations, providing real-time insights and data-driven decision-making in HR management. Whether through commercial solutions like Oracle HCM Cloud and Tableau, open-source options like Apache Superset and Metabases, or utilizing cloud service providers, organizations have various sources to choose from based on their specific needs. These dashboards enable organizations to analyze HR data, optimize workforce planning, enhance operational efficiency, and improve employee engagement and satisfaction. By leveraging the power of data analysis, organizations can gain valuable insights, make informed decisions, and

drive organizational growth. Selecting the right HR analytical dashboard source requires careful consideration of features, scalability, ease of use, and cost, ensuring that it aligns with the organization's requirements and goals. Overall, an HR analytical dashboard is a key tool for HR professionals to unlock actionable insights and optimize HR management processes.

We can create a Machine learning model or an AI model to predict employee attrition [8]. Some companies in India also started a diagnostic study of employee attrition [9]. Hence it is important for the employers to minimize the attrition rate and help in both individual as well as organizational growth [10]

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