

PROJECT TWO

EMPLOYER ATTRITION

INTRODUCTION

Employee attrition, also known as employee turnover, is a critical issue faced by organizations across various industries. It refers to the natural and voluntary process where employees leave the organization, leading to a reduction in the workforce. Unlike layoffs, which are often a result of organizational restructuring or economic downturns, attrition encompasses voluntary resignations, retirements, dismissals, and other forms of separation that occur over time.

Understanding and managing employee attrition is essential for several reasons. High attrition rates can lead to significant costs related to recruitment, training, and onboarding of new employees. Additionally, the departure of experienced employees often results in the loss of valuable institutional knowledge and skills, which can impact productivity and overall organizational performance. Frequent turnover can also affect the morale and engagement of remaining employees, potentially leading to further attrition.

OVERVIEW

A comprehensive analysis of employee attrition was conducted to address a persistent 15% annual turnover rate at a company established a few years ago. This high attrition rate significantly impacts productivity, team morale, and operational costs. The Employee Attrition Project aims to analyze patterns, identify key factors, and develop strategies to mitigate undesirable turnover.

OBJECTIVE

The primary objective of studying employee attrition is to identify the underlying causes and develop effective strategies to reduce turnover. By analyzing factors such as job satisfaction, work-life balance, compensation, and career development opportunities, organizations can gain insights into what drives employees to leave. This understanding enables the development of targeted interventions aimed at improving employee retention, enhancing organizational stability, and fostering a positive work culture.

Ultimately, addressing employee attrition goes beyond cost reduction; it involves sustaining a motivated and skilled workforce that propels the organization toward its objectives. By conducting thorough analyses and adopting proactive management strategies, organizations can lessen the adverse effects of attrition, fostering a more resilient and productive work environment.

PROBLEM STATEMENT:

A Company which was established a few years back is facing around a 15% attrition rate for a couple of years. And it's majorly affecting the company in many aspects. In order to understand why employees are leaving the company and reduce the attrition rate, we proposed conducting a HR analytics study. This data-driven approach will enable the company to make informed decisions, potentially reducing the attrition rate to below 10% within the next fiscal year and saving financial losses for the company and building a dashboard which can help the organization in making data-driven decisions.

DATASET INFORMATION:

The dataset will be used to:

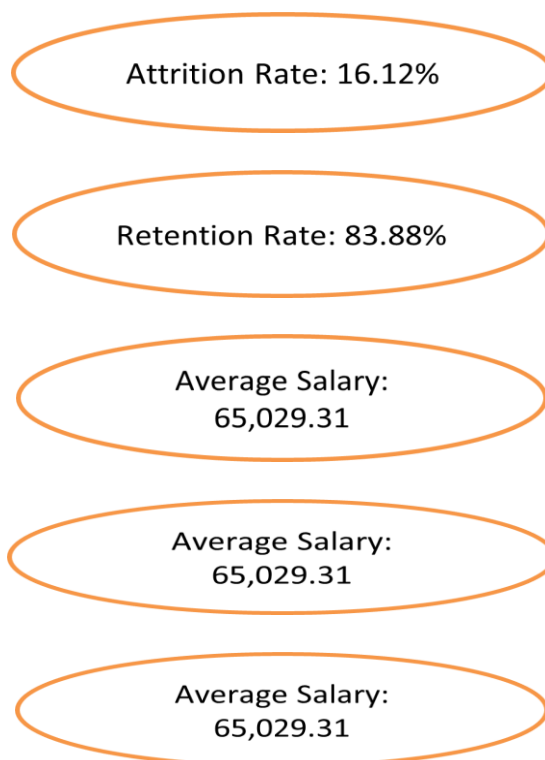
- Identify patterns and trends in employee attrition.
- Analyze demographic and job-related factors that contribute to higher attrition rates.
- Develop predictive models to identify employees at risk of leaving.
- Create visualizations and dashboards to support data-driven decision-making.
- Propose targeted interventions to improve employee retention.
- Below is an example of the type of information that should be included in the dataset:
 - Employee information
 - Employee details
 - Work Environment
 - Engagement and satisfaction
 - Benefits and perks
 - Reason for leaving
 - Demographic information

TOOLS USED:

- **Python** – For Data cleaning and Exploratory Data Analysis (EDA)
- **Pandas** - For Data manipulation and analysis
- **Matplotlib and Seaborn** - For Data Visualization
- **Power Bi** - For Data visualization using Dashboards

- **Scikit-Learn** - For Feature Analysis and Predictive Analysis

KEY PERFORMANCE INDICES (KPI'S):



- Key Performance Indicators (KPI's) are critical metrics that help in evaluating the effectiveness and overall health of the organization.
- It provides insights into various aspects such as attrition and retention rate, salary, performance, and employee satisfaction.
- High attrition rate in certain departments while average ratings on job satisfaction and work-life balance can guide improvements in workplace policies and practices.

DATA CLEANING:

Data Cleaning process involves fixing or removing incorrect, corrupted, incorrectly formatted, duplicate, or incomplete data within a dataset, to prepare data for analysis.

- **Dropping Unnecessary Columns:** Three columns have been identified where the values remain constant across all entries, rendering them irrelevant for analysis. These columns will therefore be dropped.
- **Handling Missing Values:** Identifying and dealing with missing data points in the dataset, which could involve imputation techniques or deciding to drop incomplete records based on the impact on analysis.

- **Standardizing Formats:** Ensuring consistency in data formats across different fields, such as dates or categorical variables, to facilitate accurate analysis and modeling.
- **Removing Duplicates Entries:** Identifying and removing duplicate entries that can skew analysis results and create biases in attrition predictions.

KEY FINDINGS:

1. **Exit Interviews:** Exit interview data highlights common reasons for leaving the company, such as employees find better job offers elsewhere, have a lack of career advancement, poor management practices, and work-related stress.
2. **Predictive Factors:** Predictive modeling identified key factors contributing to attrition, including low job satisfaction, limited career advancement, work-life imbalance, and low compensation. These factors can be used to identify at-risk employees.
3. **Demographic Insights:** Younger employees (18-22 years) and single individuals showed significantly higher attrition rates. Male employees exhibited a slightly higher tendency to leave (16.67%) compared to females (15.31%).
4. **Impact of Work environment:** Work environment factors, such as physical workspace, company culture, and team dynamics, also play a significant role in employee retention. Poor work environments contribute to higher attrition rates.
5. **Salary and financial Incentives:** Monthly income emerged as the most influential factor (importance score: 0.097). Employees with lower stock option levels and minimal salary hikes were more likely to leave. Surprisingly, higher salary hikes (21-25%) correlated with increased attrition, suggesting factors beyond compensation influence turnover.
6. **Career Progression:** Employees at lower job levels and those with fewer years since their last promotion showed higher attrition rates. Lack of training opportunities significantly increased turnover risk.
7. **Commute and Travel:** Employees with longer commutes (especially around 20km) had higher chance of attrition rates. Frequent business travellers were more likely to leave (23.78% attrition) compared to non-travelers (9.02%).

PREDICTIVE ANALYSIS:

- **Increase in Monthly Income:** Increased 15% in monthly income for employees, 10% increased in percent salary hike, and increased stock option level by 1. These changes

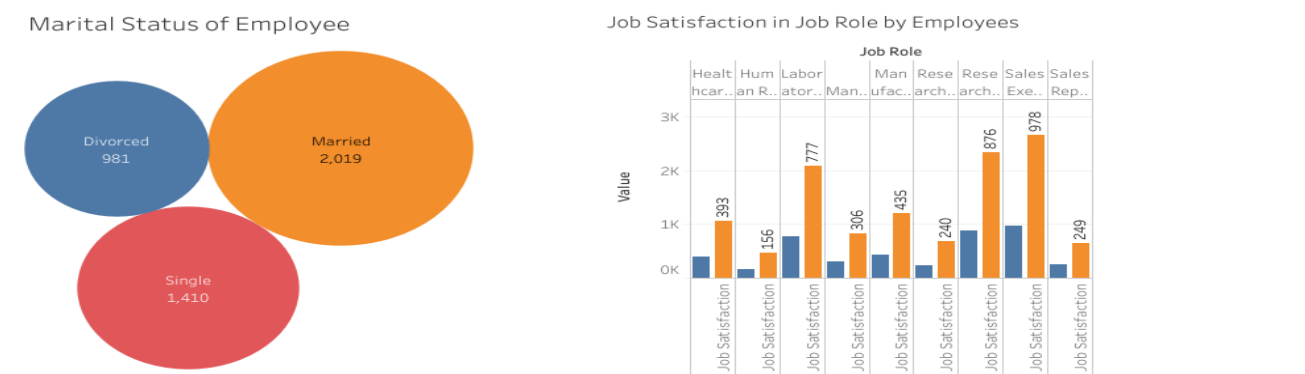
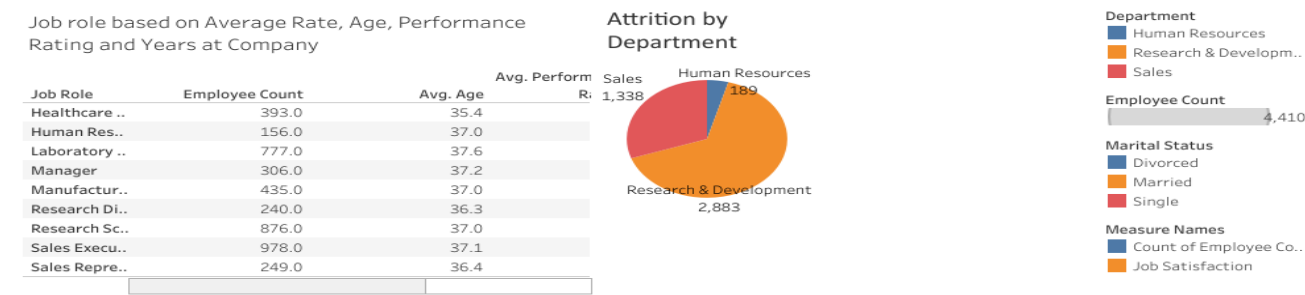
predicted a 6.47% decrease in the attrition rate, reducing it from 16.15% to 15.09% identified as high risk to improve retention.

- **Job Satisfaction Improvements:** Enhance work-life balance, provide career development opportunities, and recognize employee achievements.
- **Competitive Compensation:** Offer competitive salaries and benefits to retain top talent.
- **Targeted Interventions:** Focus retention efforts on high-risk groups, such as new hires and employees in high-turnover departments.
- **Enhanced Onboarding:** Improve the onboarding process to ensure new hires are well-integrated and supported.

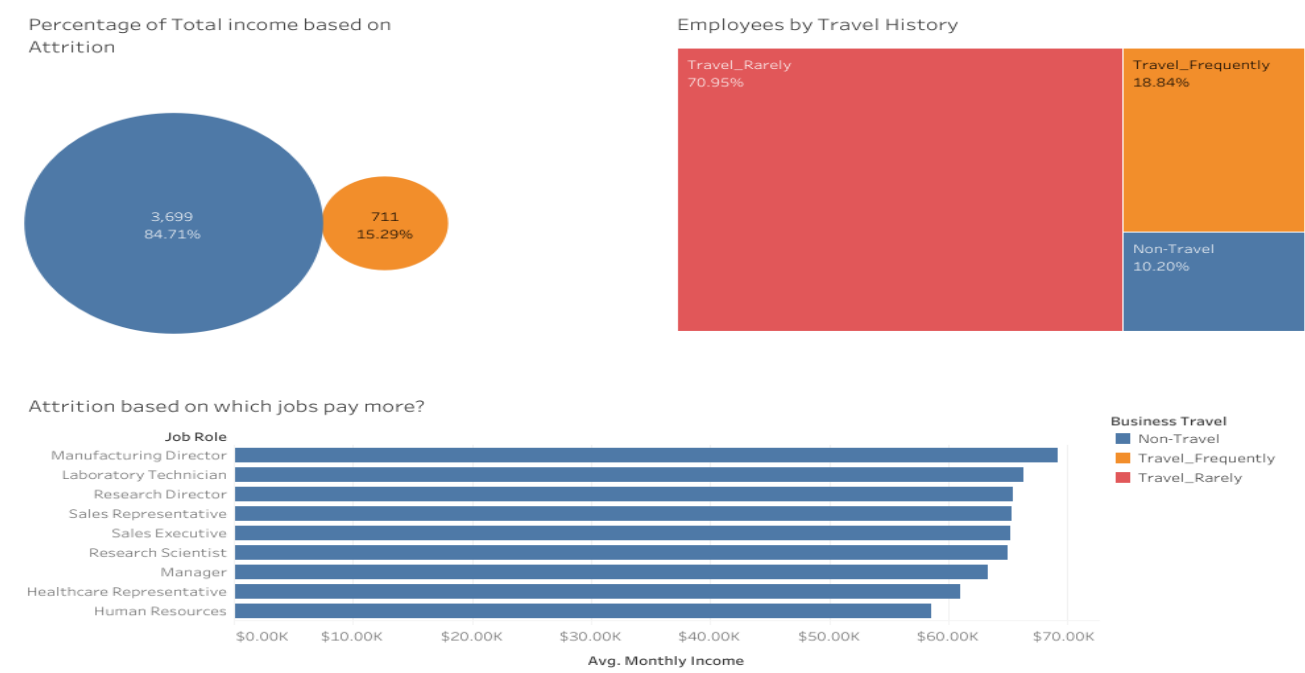
LIMITATIONS:

- **Data Quality Issues:** The accuracy and reliability of predictions heavily depend on the quality of the data used. Incomplete, outdated, or biased data can lead to inaccurate insights and predictions.
- **Limited Scope:** The analysis focuses primarily on internal company data and may not account for external factors such as industry trends, economic conditions, or regional job markets.
- **Complexity of Factors:** Employee attrition is influenced by a wide range of factors such as job satisfaction, work-life balance, compensation, career development, and organizational culture. Capturing all relevant factors and their interactions can be challenging.
- **Changing Dynamics:** Workforce dynamics can change rapidly due to internal and external factors (e.g., economic conditions, industry trends, company policies). Models trained on historical data may not always capture these changes effectively.
- **Privacy and Ethical Concerns:** Employee attrition projects often involve sensitive personal information. Ensuring data privacy and ethical use of data is crucial to maintain trust and comply with regulations such as GDPR or CCPA.
- **Overfitting:** Machine learning models may overfit to historical data, making them less effective at predicting future trends accurately. Regular model validation and tuning are essential to mitigate this risk.

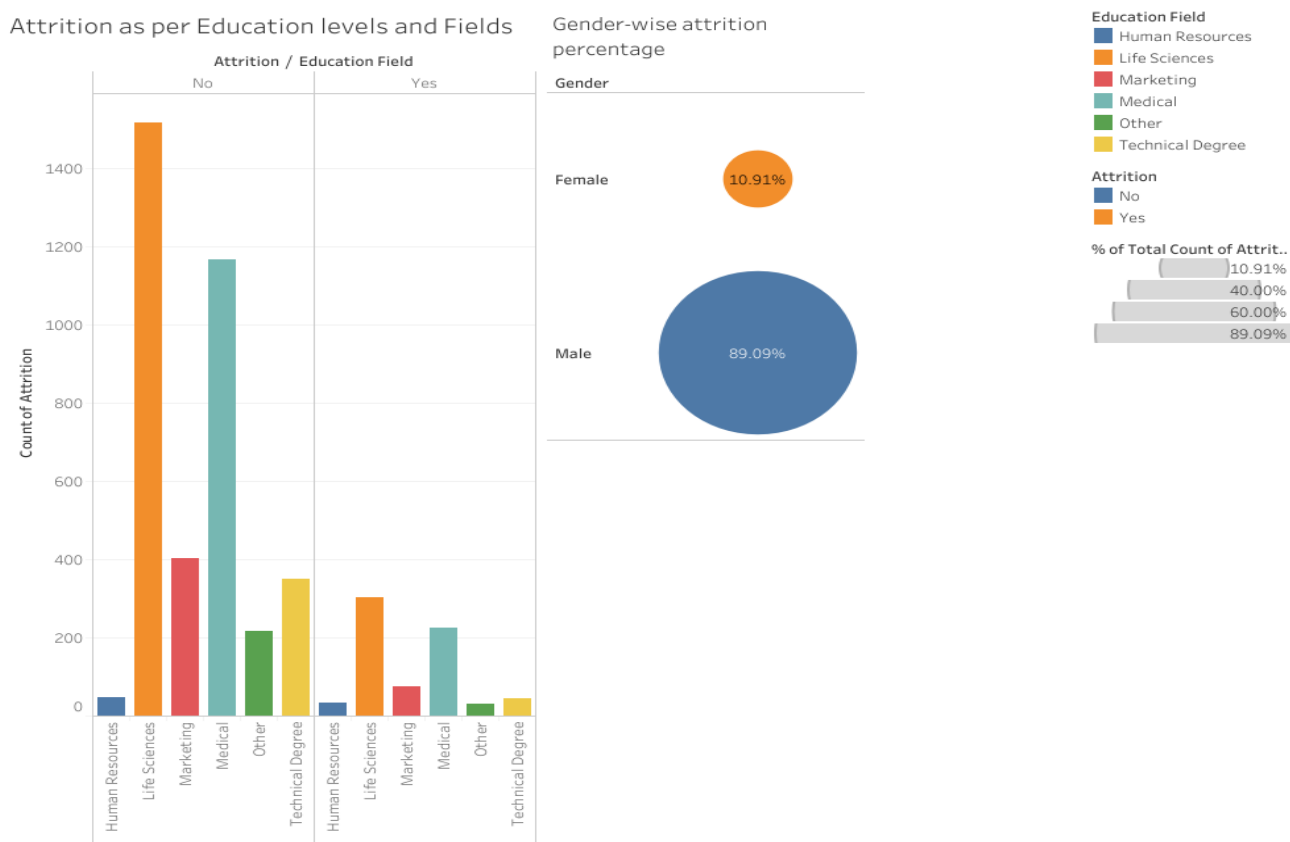
DASHBOARDS



In this Dashboard 1, I have included Attrition by Department which can see in pie chart form that has Sales, Human resources and Research and Development. Marital status of employees that included Divorced, Married and single and Job satisfaction as well.



This is Dashboard 2 that I have added the sheets of percentage of Total income based on Attrition, Employees by Travel History and Attrition based on which jobs pay more.



Dashboard 3 has Attrition as per Education levels and Fields and Gender-wise attrition percentage.

CONCLUSION:

Predictive analysis of employee attrition provides valuable insights for reducing turnover and improving employee retention. By identifying key factors such as job satisfaction, compensation, and career development, organizations can implement targeted strategies to address these issues. Despite limitations like data quality, bias, and dynamic workforce changes, predictive models can significantly enhance decision-making. Continuous refinement of models and ethical data use are essential for creating a resilient and productive work environment.

