

# Employee Attrition Analysis

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# Introduction

**Employee attrition poses a significant challenge for organizations, influencing various aspects of their operations. The impacts include:**

## Reduced Positivity

Frequent turnover disrupts established workflows, leading to delays in project timelines and decreased overall efficiency. Teams may struggle to maintain momentum, resulting in unfinished tasks and unmet deadlines.

## Decreased Team Morale

The loss of valued team members can diminish the collective spirit of remaining employees. This can foster an environment of insecurity, reducing engagement levels and commitment to organizational goals.

## Increased Operational Cost

High attrition rates lead to substantial costs associated with recruiting, onboarding, and training new employees. These financial burdens can strain resources and divert attention from strategic initiatives, ultimately impacting the company's bottom line.



# Problem Statement

A Company, established a few years ago, is facing an attrition rate of **15%**, significantly impacting employee performance and organizational stability.

Our Objective is to conduct a comprehensive analysis of employee data to identify the underlying causes of attrition and propose effective, data-driven solutions to reduce turnover and enhance retention.

# Data Overview



<div>Data Set Size</div> <div>Total of <b>4410</b> entries with <b>29</b> features, including demographics, job roles, satisfaction levels, and performance metrics.</div>	<div>Key Attributes</div> <div><div><b>Demographics:</b> Age, Gender, Marital Status</div><div><b>Job-Related Features:</b> Department, Job Role, Job Level, Years at Company</div><div><b>Compensation:</b> Monthly Income, Stock Option Level, Percent Salary Hike</div><div><b>Satisfaction Metrics:</b> Job Satisfaction, Work-Life Balance, Environment Satisfaction</div><div><b>Performance:</b> Performance Rating, Training Times Last Year, Years Since Last Promotion</div></div>	<div>Attrition Rate</div> <div><div>Current attrition rate is <b>16.2%</b></div><div>This elevated attrition rate highlights a significant issue with employee retention that requires immediate attention.</div></div>
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# Tools Used

- Python for data cleaning and EDA
- Pandas for Data manipulation and analysis
- Matplotlib and Seaborn for Data Visualisation
- Scikit-Learn for Feature and Predictive Analysis



# Key Performance Indicators

Key Performance Indicators (KPIs) are measurable values that help an organization track progress toward specific business objectives. In the context of employee attrition, KPIs help evaluate factors affecting employee retention and turnover.

- Current Attrition Rate - 16.12%
- Retention Rate - 83.88%
- Average Overall Salary - ₹65.029
- Average Salary (Employees who left) - ₹61,682
- Average Salary Hike - 15.21%
- Average Performance Rating - 3.15
- Departmental Attrition - Highest(R&D) - 63.7%, Lowest(HR) - 8.02
- Overall Average Tenure: 7.01 years
- Average Tenure (Employees who left): 5.13 years

# Data Cleaning

## 1. Handling Missing Data

- Imputed missing values for numerical data, like - Total working years, using mean and for categorical data, like - Job satisfaction, missing values were filled based on mode.

## 2. Dropping Irrelevant Columns

- Removed EmployeeID, Over18, and StandardHours as they add no value to the analysis.

## 3. Encoding Categorical Data

- Applied One-Hot Encoding for features like Job Role and Department.
- Used Label Encoding for ordinal variables like Education and Job Level.

## 4. Outlier Handling

- Addressed outliers in Monthly Income and Years at Company by capping extreme values.

## 5. Normalization & Transformation

- Normalized continuous features (e.g., Age, Monthly Income) and applied log transformation where necessary.

# Data Analysis



# Data Analysis



## 1. Attrition Breakdown

Attrition Rate: 16.12% overall.

## 2. Department-wise Attrition:

Research & Development: 63.7% of total attrition.

Sales: 28.3%

Human Resources: 8.0%

## 3. Salary Insights

Average Monthly Income: \$65,029.

Higher Job Levels correlate with increased salaries; Job Level 4 earns the most on average.

## 4. Tenure and Experience

Average Tenure: 7.01 years.

Employees with less tenure are more likely to leave (Attrition average: 5.13 years).



# Data Analysis

## 5. Correlation Analysis

- Job Level and Monthly Income show a strong positive correlation.
- Total Working Years also correlates with Monthly Income.
- Weak Correlations: Factors like Age and Years at Company show a minor negative correlation with attrition.

## 6. Predictive Analysis

- Random Forest Classifier predicts attrition with an accuracy of 82%.
- Important features: Age, Total Working Years, Monthly Income, Years at Company.

## 7. Feature Importance

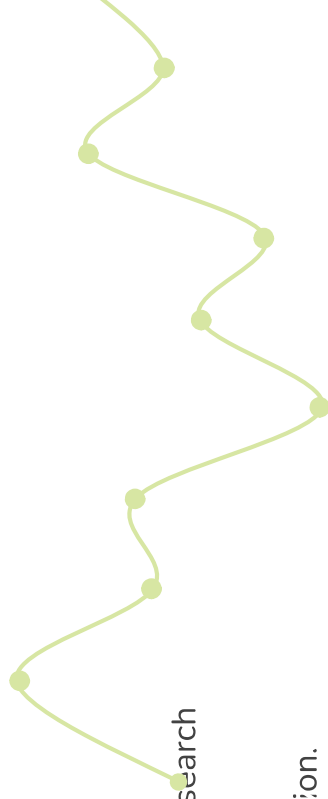
- Top Influential Features: Age, Total Working Years, Monthly Income, Years at Company, and Job Satisfaction are key predictors of attrition.

# Conclusion



## Key Findings

- **Attrition Rate:** Currently at 16.12%, affecting productivity and costs.
- **High-Risk Departments:** Significant attrition in Research & Development and Sales.
- **Influencing Factors**
- **Tenure:** Shorter tenures correlate with higher attrition.
- **Compensation:** Competitive salaries reduce turnover.
- **Job Satisfaction:** Lower satisfaction leads to increased exits.



## Recommendations

- **Boost Engagement:** Implement initiatives to enhance job satisfaction.
- **Review Compensation:** Regular salary adjustments to align with market rates.
- **Promote Growth:** Create development opportunities to retain talent.

## Next Steps

- Monitor attrition trends and gather employee feedback.