

Employee Attrition Analysis Report

1 Introduction

This report presents an in-depth statistical analysis of employee attrition using structured feature selection, correlation analysis, and data visualization. The goal is to understand the key factors influencing employee turnover, extract meaningful patterns, and provide actionable business insights.

2 Feature Engineering & Selection

To improve model accuracy and insights, we derived new features:

Feature Name	Definition
Salary_Performance_Ratio	Monthly Income ÷ Performance Rating
WorkLife_Satisfaction_Score	Work-Life Balance × Job Satisfaction
Income_JobLevel_Ratio	Monthly Income ÷ Job Level
Tenure_Group	Categorized 'Years at Company' (Short, Medium, Long Tenure)

Why Feature Engineering?

- These new features highlight hidden trends (e.g., do high-performing employees leave due to low salary?).
- Improve model accuracy by reducing noise in raw features.

3 Statistical Insights & Feature Importance

Correlation Analysis

- Strong Positive Correlations:

✓ 'Job Level' & 'Monthly Income' → Higher positions get paid more.

✓ 'Work-Life Balance' & 'Job Satisfaction' → Employees with good balance report higher satisfaction.

- Strong Negative Correlations with Attrition:

✗ 'Monthly Income' (-0.46) → Lower salaries = higher attrition.

✗ 'Years at Company' (-0.33) → New hires leave more often.

Key Insight:


- Salary and career growth heavily influence employee retention.
- Job satisfaction and work-life balance are moderate predictors of attrition.

Visual Insights (Advanced Data Visualization)


Attrition by Job Role

 Finding: Some roles experience higher attrition rates (e.g., Sales, Customer Support).


Monthly Income & Attrition (KDE Plot)

 Observation: *Employees earning below \$5,000 show a steeper decline, indicating salary dissatisfaction as a major attrition driver.

Work-Life Balance & Job Satisfaction (Box Plot)

 Employees with lower work-life balance exhibit higher variance in job satisfaction, correlating with higher attrition rates.

Feature Interaction (Pair Plot)

 Why it matters?

- Employees with low job satisfaction + low tenure + low salary are most at risk.

Business Recommendations

Improve Retention Strategies:

- Implement salary adjustments for underpaid roles.
- Offer career growth plans to reduce high attrition among new hires.
- Encourage remote work flexibility to improve work-life balance.


Predictive Model Optimization:

- Focus on key predictors: Salary, Job Level, Tenure, Job Satisfaction.
- Utilize feature-engineered variables for better attrition risk classification.

Next Steps

 Run predictive modeling using refined features.

 Deploy an attrition dashboard for real-time tracking.




 Implement HR interventions to address key attrition factors.

Final Thoughts

This advanced data-driven analysis provides deep insights into employee attrition patterns. The key takeaways help businesses reduce turnover and improve employee satisfaction effectively.

Key Statistical Insights

Here are the main findings from the data analysis:

-  Employees with lower salaries and fewer promotions are more likely to leave.
-  Work-life balance and job satisfaction play a significant role in attrition.
-  Remote work flexibility can help reduce employee turnover.