Employee Attrition Analysis and Prediction

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      This project looks into employee attrition using real-world HR data. I started by analyzing patterns in departments, satisfaction scores, salary levels, and recruitment channels to understand what might be driving employees to leave.

      After the initial analysis, I trained a logistic regression model to predict which employees are most likely to leave. The model reached 97% accuracy on the test set. The goal is to help HR teams identify high-risk cases early and reduce unnecessary turnover.

      This report summarizes key findings, visual insights, and the predictive model used.

## Department Attrition Analysis Report

Objective

To identify which departments have the highest employee attrition rates and explore where the organization may need to improve retention strategies.

Methodology

We used the Termd column (1 = employee left, 0 = still employed) and grouped by the Department field to calculate the attrition rate for each department.

Results

Department	Termd
Production	0.397129
Software Engineering	0.363636
Admin Offices	0.222222
IT/IS	0.2
Sales	0.16129
Executive Office	0

Department Attrition Rate
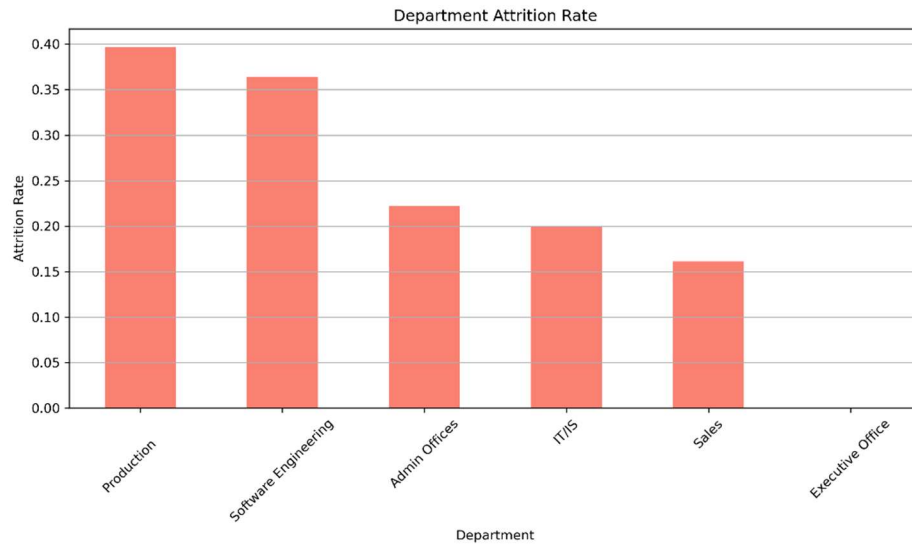
Insights

Production and Software Engineering departments have the highest attrition rates (nearly 40%). These are critical areas where turnover can severely impact operations and product quality.

Executive Office has no attrition, likely due to seniority or smaller team size.

Support departments like Admin Offices and IT/IS fall in the middle, but still show notable turnover.

Recommendations

Conduct internal surveys in Production and Engineering teams to uncover pain points (e.g. workload, burnout, lack of growth).

Implement retention incentives or mentorship for technical staff.

Monitor attrition trends quarterly and track the impact of interventions.

## Salary and Employee Attrition Analysis

Objective

To evaluate whether compensation is a key factor influencing employee attrition, by comparing average salaries of employees who stayed versus those who left.

Methodology

The dataset was grouped by employment status (Termd: 1 = left, 0 = still employed).

Results

Termd	Salary
Still Employed	70694.03
Left Company	65690.08

Average Salary by Employment Status
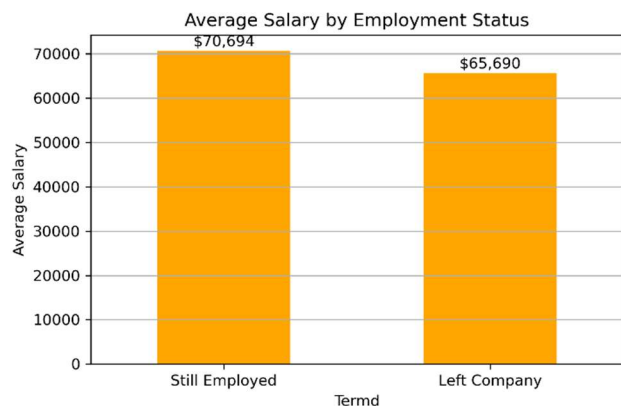
Insights

Employees who left the company earned $5,000 less on average than those who stayed.

While salary differences may not be the sole cause of attrition, lower pay appears to be associated with higher turnover, suggesting compensation may influence retention.

The impact of salary could also be intertwined with other factors such as job role, tenure, and satisfaction level.

Recommendations

Conduct a compensation benchmarking review, particularly for roles with high turnover.

Consider adding performance-linked bonuses or retention-based salary adjustments.

Pair salary strategy with non-monetary retention factors (growth path, team culture, etc.)

# Employee Satisfaction and Attrition Analysis

Objective

To understand how employee satisfaction levels correlate with attrition, and whether improving satisfaction could help reduce turnover.

Methodology

We grouped employees by their satisfaction score (EmpSatisfaction, on a scale of 1 to 5) and calculated the attrition rate within each group. Attrition is defined as Termd = 1.

Results

EmpSatisfaction	Termd
1	0
2	0.444444
3	0.305556
4	0.404255
5	0.295918
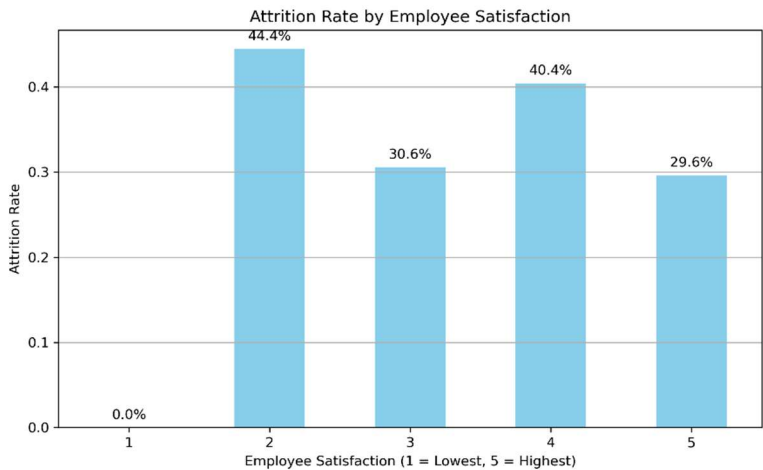
Insights

Employees with satisfaction level 2 had the highest attrition rate at 44.4%.

The lowest attrition was observed among employees with satisfaction level 5 (29.6%).

Surprisingly, satisfaction level 4 had a slightly higher attrition rate than level 3 or 5, suggesting non-linear patterns or external influences.

Satisfaction level 1 had 0% attrition, likely due to very small sample size, and shouldn't be over-interpreted.

Recommendations

Consider running internal engagement surveys to better understand satisfaction drivers, especially among employees with moderate scores (3–4).

Implement retention programs focused on employee recognition, feedback, and growth for those in mid-level satisfaction.

Monitor attrition and satisfaction regularly to ensure long-term alignment.