Retention Rate

Case Study

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CLIENT BRIEF

OBJECTIVES

Concern about retention of high performing employees + how to improve

Seeking a model to predict which employees are most at risk of leaving

Provided data of current and past employees

Identify trends with employee turnover

Deeply analyze significant relationships

Segment groups to better understand turnover behaviour

Develop a model to predict potential leavers

Provide recommendations to reduce turnover

Data Overview

Age: Employees are between 18 and 60 years old, with an average age of 37.

Monthly Income: Income levels are fairly balanced across low, medium, and high, with medium being the most common.

Job History: On average, employees have worked at around 2-3 different companies, but some have worked for up to 9+ companies.

Work Location: Nearly half (46%) works from home, while the rest (54%) work onsite.

Commute Distance: Most employees live within 9.2 km of the office, but some commute up to 29 km.

Job Satisfaction: Employees generally rate their job satisfaction on the lower side, with an average score of 2.73 out of 4.

Complaints: Only 20% of our employees have filed complaints.

Complaint Duration: For those with complaints, they've been dealing with them for about 1 year on average.

Salary Increases: On average, employees receive a 15.2% salary hike (but this varies)

Performance: Performance ratings are generally moderate, with an average score of 2.87.

Career History: Employees have around 11 years of work experience on average and around 7 years spent at the company.

**Promotions:** It's been about 2 years since the last promotion for most employees, though this varies.

Trends

Higher Turnover in Low Income: Employees with lower salaries tend to have higher turnover rates.

Age: Employees aged 18-22 have higher turnover.

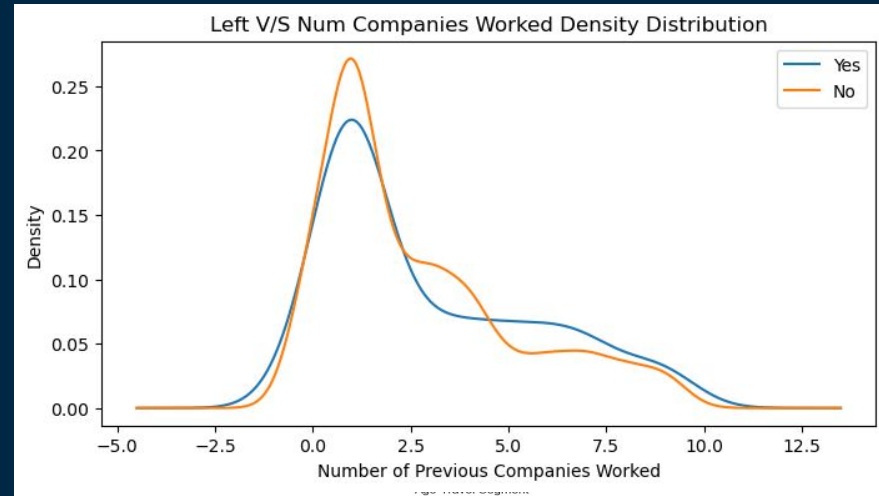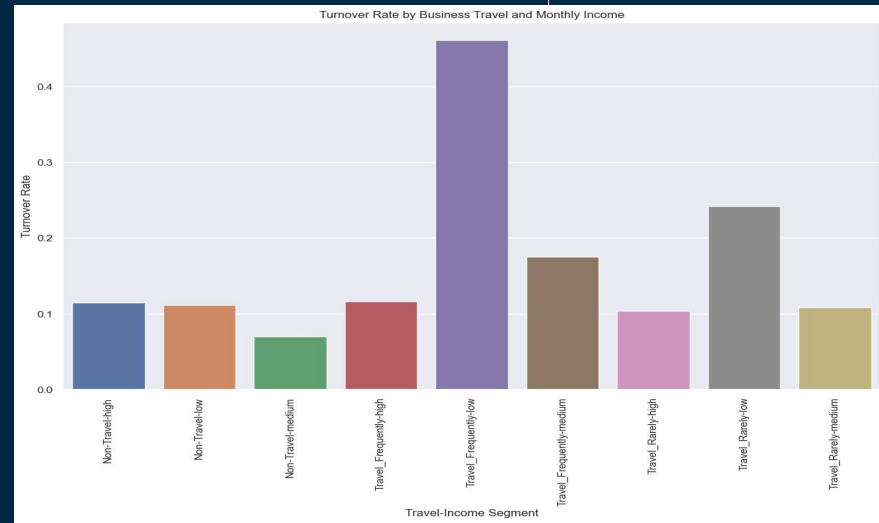**Frequent Business Travel**: Employees who travel frequently have a higher turnover rate.

Years at Company: Employees with 0-2 years at the company are more likely to leave.

Complaint Resolution: Employees with unresolved complaints have a higher turnover rate.
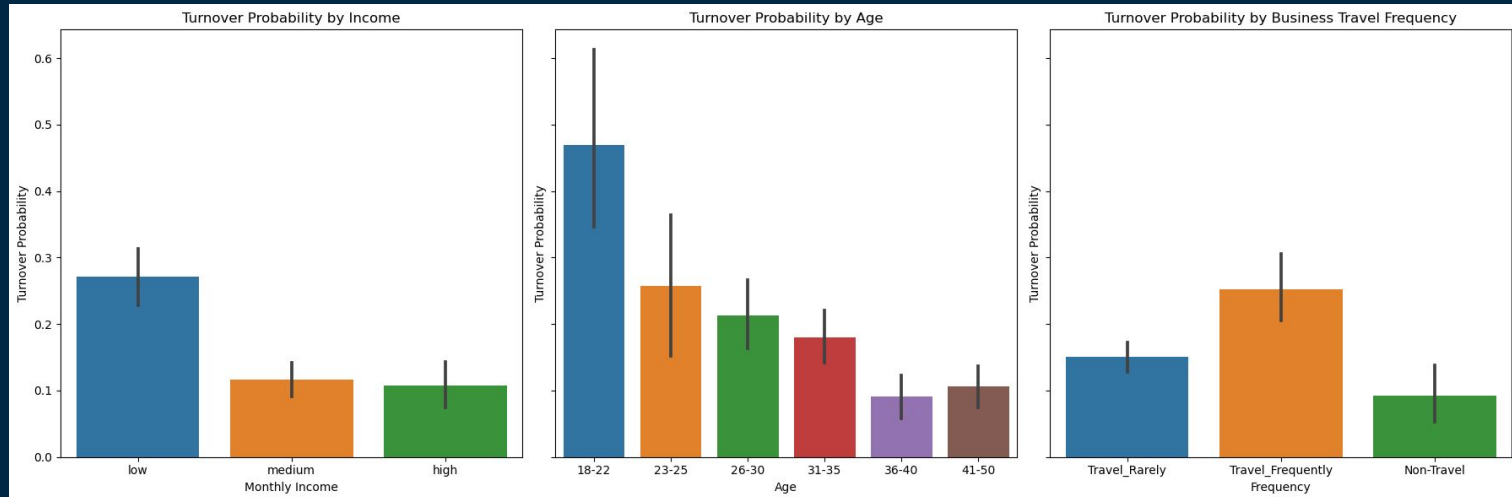
GROUPING

- **Age and Income**:

  - **Young and Low Income**: Highest turnover.

  - **Young and Medium Income**: High turnover.

  - **Older Employees**: Lower turnover across income levels.

- **Frequent Travelers**:

  - **High Risk**: 18-22 age group, regardless of other factors.

- **Complaints:**

  - **High Risk**: Young employees with unresolved complaints.

Turnover Rate by Business Travel and Monthly Income

Left V/S Num Companies Worked Density Distribution

In Depth Analysis

Frequent Travelers (Age 18-22):

- This group is highly likely to leave, which might be due to stress or dissatisfaction from frequent travel. Addressing this age groups needs or reducing travel requirements could greatly improve turnover rates.

Job-Hopping (5+ Companies):

- Employees with a history of 5+ companies/job changes have some likelihood of leaving. This could suggest job dissatisfaction or just seeking new opportunities. Improving job satisfaction and career development could help keep these employees.

Unresolved Complaints (4+ Years):

- Unresolved complaints that reach 4 years are strongly correlated with higher turnover. Resolving complaints before this time limit could reduce some turnover.

Income & Age Interaction:

- Younger employees with lower to medium incomes have high turnover rates. Providing career growth opportunities or benefits for this group might help improve retention.

Predictive Model

XGBoost

Features: Age, Monthly Income, Distance from Home, Business Travel, Years at Company, Complaint Resolved, etc.

Performance Metrics:

- **Accuracy** - 86.23% on test data
- **Precision** - High for 'No', moderate for 'Yes'
- **Recall** - High for 'No', moderate for 'Yes'
- **F1** - High for 'No', moderate for 'Yes'

METRICS

	PRECISION	RECALL	F1 SCORE
NO	0.87	0.99	0.92
YES	0.69	0.14	0.23

So what?

MAIN TAKEAWAYS

High Turnover Groups: Young, low-medium income employees who travel frequently.

Model Success: XGBoost provides adequate predictive performance with this dataset.

Irrelevant Factors: Gender, distance from home, and years since promotion did not significantly impact turnover.

BUSINESS SUGGESTIONS

Focus on High-Risk Groups: Target interventions for young, low-med income employees.

Update Travel Policies: Adjust business travel expectations or improve support for frequent travelers.

Add Time Series to Data: Add time series analysis, could better pinpoint periods where turnover is high

Recommendations

- **Adjust Compensation**: Increase salaries or offer additional benefits to low-income employees.

- **Career Development**: Offer growth opportunities and career guidance to young employees.

- **Lower Travel Demands**: Reduce frequency of travel, specifically for younger employees

- **Resolve Complaints:** Resolve filed complaints before 4 year mark

Thank You!