
📄 HR Analytics: Predicting and Preventing Employee Attrition

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1. Introduction

The goal of this project is to analyze employee attrition patterns and generate actionable insights to reduce future attrition using interactive Power BI dashboards. The project was developed as part of the **Data Analyst (Power BI)** learning track at DataCamp and aims to simulate a real-world HR analytics solution using a large dataset.

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2. Abstract

HR attrition is one of the biggest challenges faced by organizations today. This project focuses on identifying key drivers behind employee exits using a structured data-driven approach. We used Microsoft Excel and Power BI's Query Editor to clean and transform the dataset of over 80,000 records (76,000 after cleaning), and built dynamic visual dashboards to evaluate KPIs such as job satisfaction, department-wise attrition, overtime trends, and more. The final report includes a simulated model accuracy evaluation and concrete recommendations for reducing employee turnover.

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3. Tools Used

- **Query Editing:** Microsoft Excel, Power BI Query Editor
- **Visualization Tool:** Microsoft Power BI
- **Dataset Size:** Original – 80K+ rows; Cleaned – 76K rows

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4. Steps Involved in Building the Project

1. **Data Collection & Cleaning:**
    - Imported raw HR dataset with 80K+ records
    - Removed duplicates and irrelevant columns (e.g., Employee ID)

- Handled missing values and standardized formatting
- Encoded categorical values like Gender, Department, and Job Role

2. **Data Transformation:**
    - Merged key HR KPIs such as satisfaction score, income band, tenure, etc.
    - Created calculated columns for attrition rate, promotion gap, overtime ratio
3. **Visualization:**
    - Built dashboards using slicers and filters for department, age group, and gender
    - Visualized trends in attrition, performance, demographics, and overtime
4. **Model Simulation (Confusion Matrix):**
    - Simulated binary classification using rule-based thresholds in Power BI
    - Confusion matrix created based on filtered outputs (e.g., employees with high overtime and low satisfaction)

	Predicted: Left	**Predicted: Stayed**
Actual: Left	1,200	400
Actual: Stayed	350	2,500

- **Accuracy:** 83.1%, **Precision:** 77.4%, **Recall:** 75.0%

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5. Attrition Prevention Suggestions

Based on the analysis, the following strategies are recommended:

1. **Improve Work-Life Balance:** Reduce overtime dependency and introduce hybrid/flexible working options.
2. **Career Progression Planning:** Employees without promotion in the last 3 years showed high attrition. Build clear growth tracks.

3. **Department-Specific Retention:** Focus on Sales and HR teams with tailored engagement plans.
4. **Satisfaction Monitoring:** Conduct regular satisfaction surveys, especially for employees under 30.
5. **Early Risk Alerts in Dashboard:** Use Power BI to flag employees showing multiple risk indicators (e.g., low pay, low satisfaction, high overtime).

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6. Conclusion

This HR Analytics project demonstrates how Power BI can be used to track employee performance, identify attrition risks, and suggest actionable solutions using data-driven dashboards. It blends data cleaning, transformation, visualization, and basic modeling logic to build a portfolio-ready project suitable for showcasing Power BI and data analysis skills in interviews.
