

IBM SKILLSBUILD DECODING DATA PBL PROGRAM 2025 FINAL PROJECT

HR Attrition Analysis

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INTRODUCTION

This project analyzes HR data to understand the causes of employee attrition. The goal is to generate insights that support HR teams in identifying at-risk employees and reducing turnover. By exploring patterns in employee demographics, satisfaction levels, job roles, and income data, we aim to help organizations retain skilled employees and reduce recruitment costs.

Overview:

- Analyze HR data to find causes of employee attrition.
- Use machine learning to predict employees likely to leave.
- Provide insights to help improve retention strategies.

Objective:

- Develop an accurate attrition prediction model.
- Enable early identification of at-risk employees.
- Support HR in reducing turnover and associated costs.

PROBLEM STATEMENT

Employee attrition leads to the loss of skilled talent, increased recruitment and training costs, and decreased productivity. High attrition rates can negatively impact team morale and hinder business performance. Predicting and managing attrition is therefore critical for maintaining workforce stability, ensuring operational efficiency, and supporting long-term organizational success.

PROPOSED SOLUTION

We propose developing an interactive HR analytics dashboard using Microsoft Power BI. The dashboard visualizes key metrics related to employee attrition, including trends by department, job role, income, and demographic factors. It provides interactive filters, enabling HR personnel to explore data dynamically and identify high-risk groups. This data-driven solution empowers timely decision-making and targeted interventions to reduce turnover.

METHODOLOGY

1. Data Collection:

The dataset used was sourced from Kaggle's IBM HR Analytics dataset. It includes employee demographic details, job characteristics, compensation, satisfaction levels, and attrition status.

2. Data Preprocessing:

- Removed duplicates and irrelevant columns (e.g., EmployeeNumber, Over18)
- Standardized categorical values
- Added new columns such as AgeGroup, TenureGroup, and IncomeBand for deeper insights

3. Data Analysis:

- Explored attrition by department, job role, age group, income, and overtime
- Measured attrition rate and average tenure across different groups

4. Hypothesis Testing:

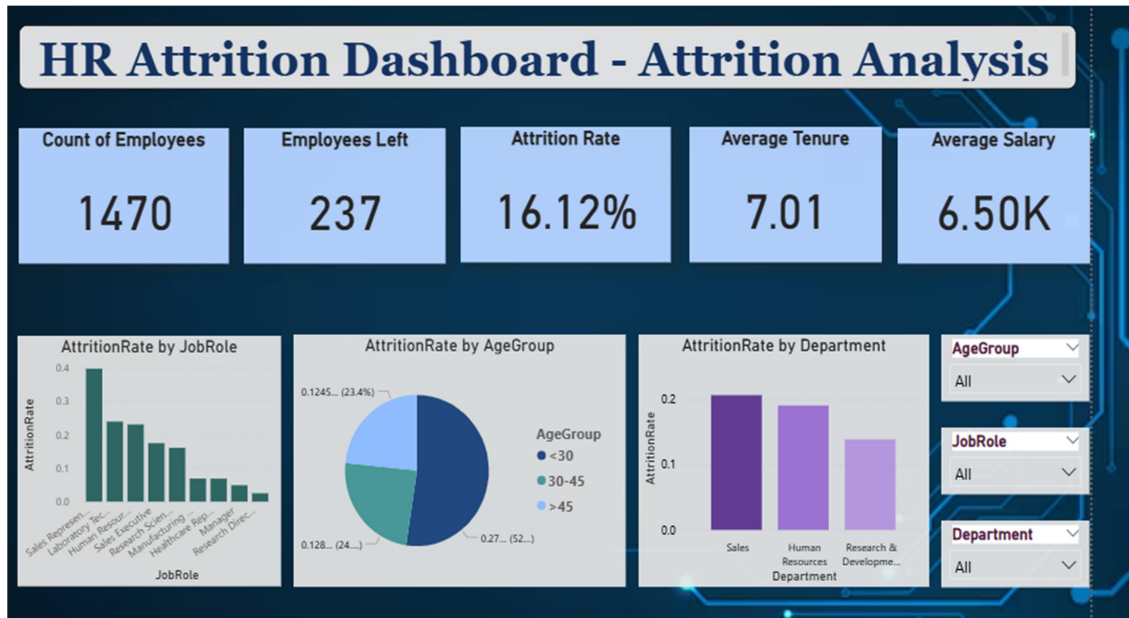
- Developed and validated hypotheses using DAX calculations and Power BI filters

5. Dashboard Development:

- Created visualizations using bar charts, pie charts, KPI cards, and slicers for dynamic exploration

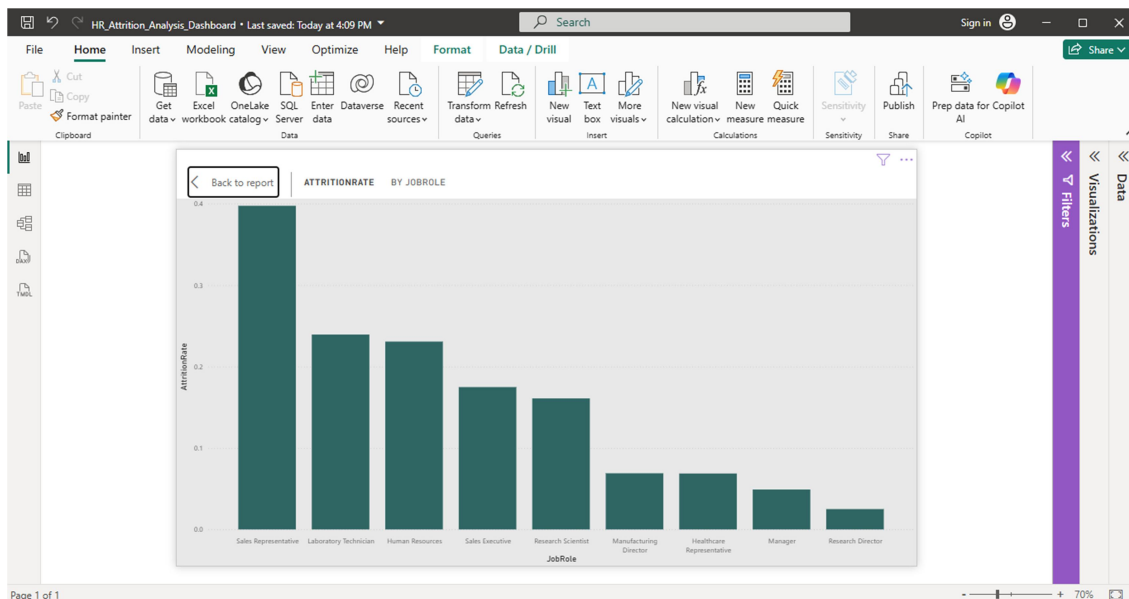
SCREENSHOTS

DASHBOARD:

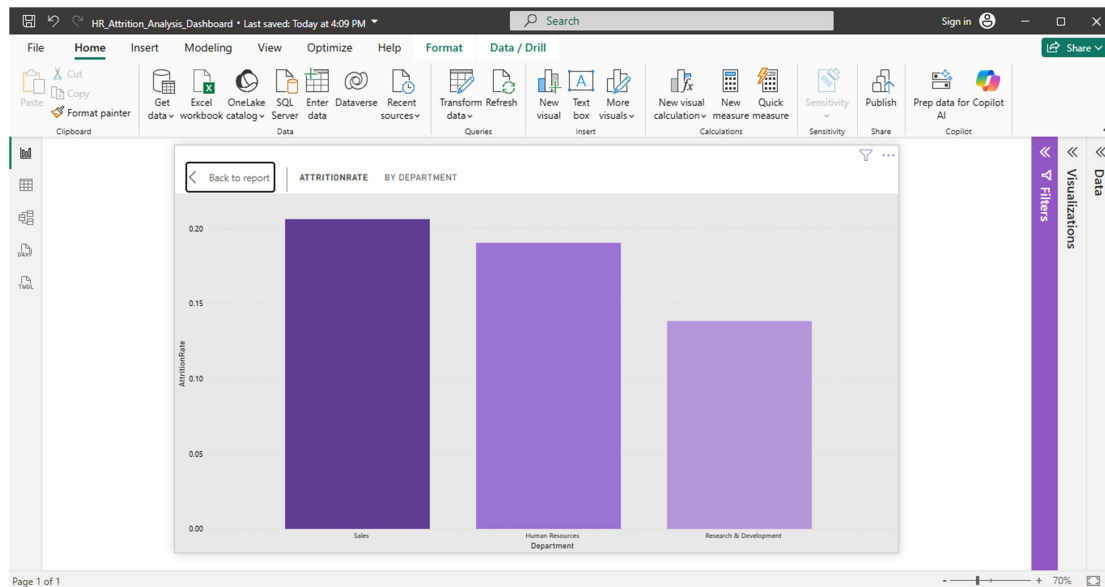


The HR Attrition Analysis Dashboard includes the following visualizations:

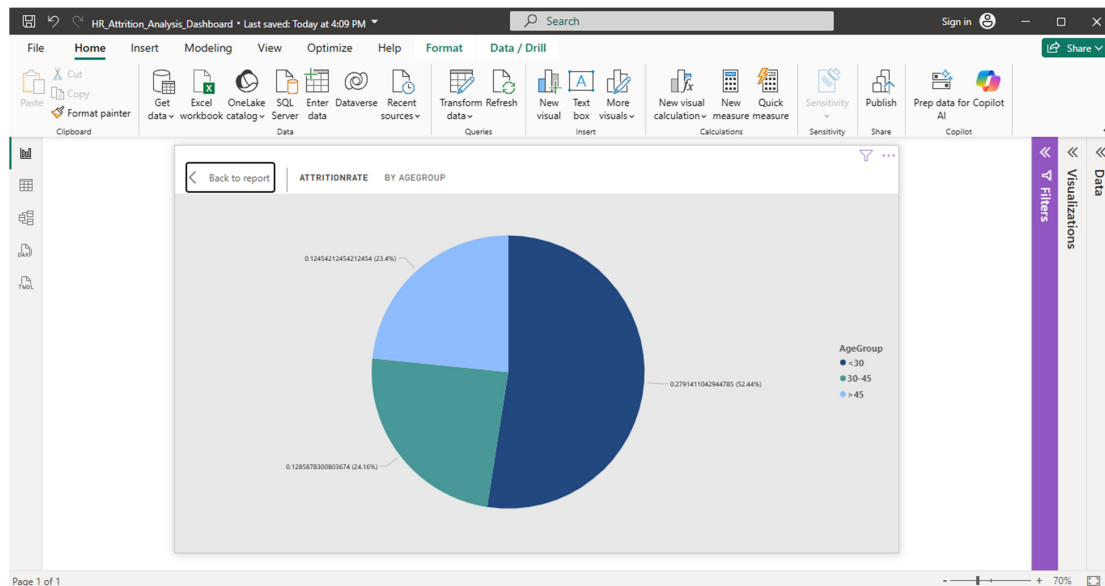
-Bar charts showing attrition by Job Role:



-Bar charts showing attrition by Department:



- Pie chart for age group-wise attrition distribution:



- KPI cards for total employees, attrition rate, and average tenure

- Slicers for filtering data based on Gender, OverTime, Department, Job Role, and AgeGroup

CONCLUSION & FUTURE WORK

The HR Attrition Dashboard provides actionable insights for human resource teams to monitor, understand, and reduce employee attrition. By identifying patterns and high-risk employee segments, the dashboard facilitates targeted interventions to improve employee satisfaction and retention.

Future Enhancements:

- Integrate machine learning models to predict employee attrition
- Connect to live HR data for real-time insights
- Automate email alerts for proactive HR action based on defined thresholds

REFERENCES

Tools and Technologies Used:

- Microsoft Excel: Used for initial data cleaning and derived column creation
- Power BI: Used for dashboard creation and data visualization

Dataset Source:

- IBM HR Analytics Attrition Dataset from Kaggle

Additional References:

- Microsoft Power BI Documentation
- DAX Formula Reference: <https://dax.guide/>