# Employee Attrition Analysis

PROJECT 3

2025

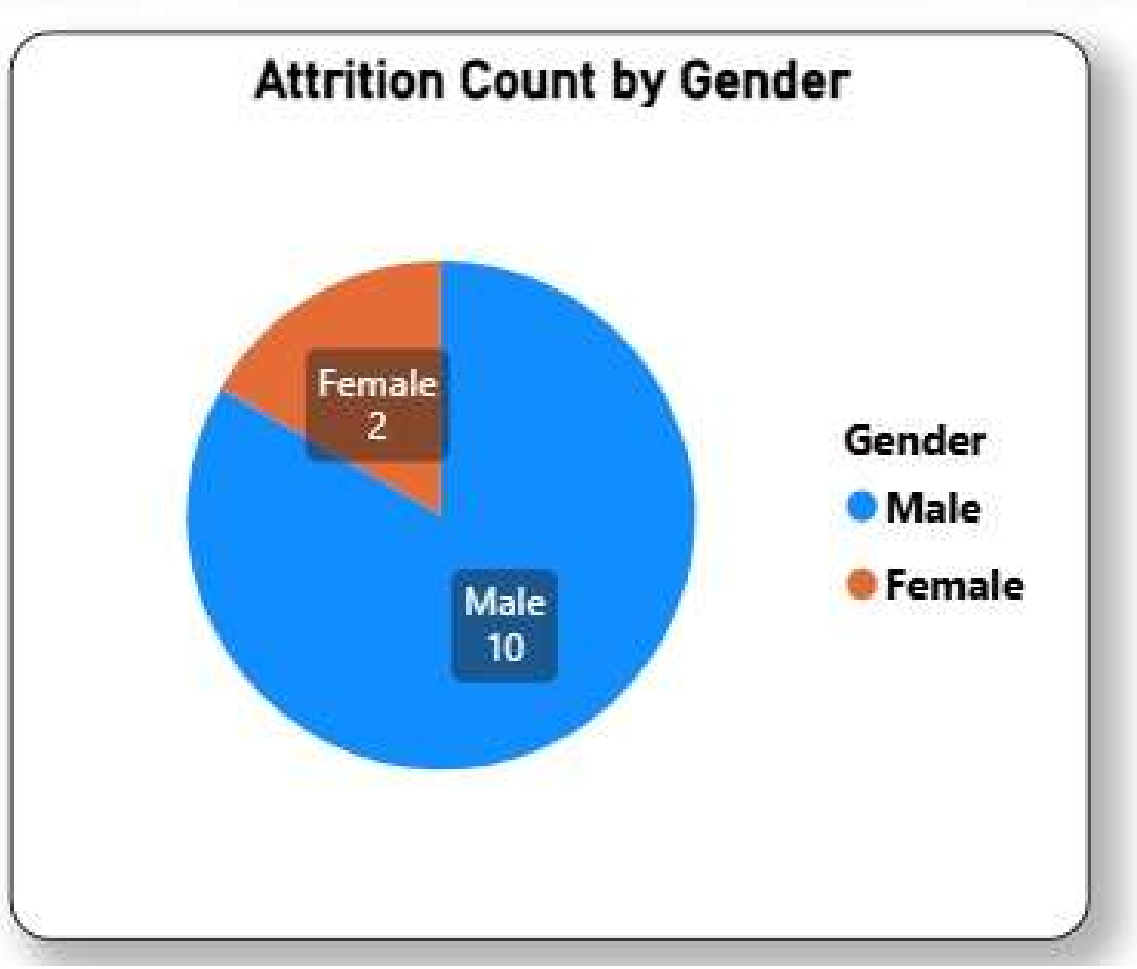
# Project Background

- This project analyzes employee data to understand the reasons behind attrition and predict turnover trends. Using **Python** for **analysis** and **machine learning**, along with **Power BI** dashboards for **visualization**, it provides actionable insights to help HR improve employee retention and make informed, data-driven decisions.

# Employee Attrition Analysis Dashboard

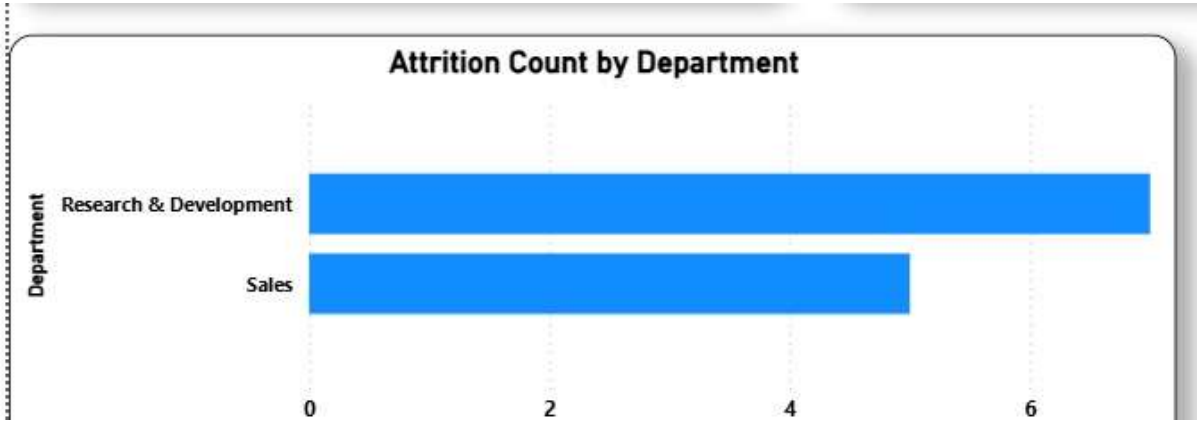
# Attrition Count by Gender

- The **"Attrition Count by Gender"** pie chart shows that out of **12 total** employees who left the company, **10** were **male** and only **2** were **female**. This indicates a significant gender imbalance, with male employees representing the majority of our recent attrition.



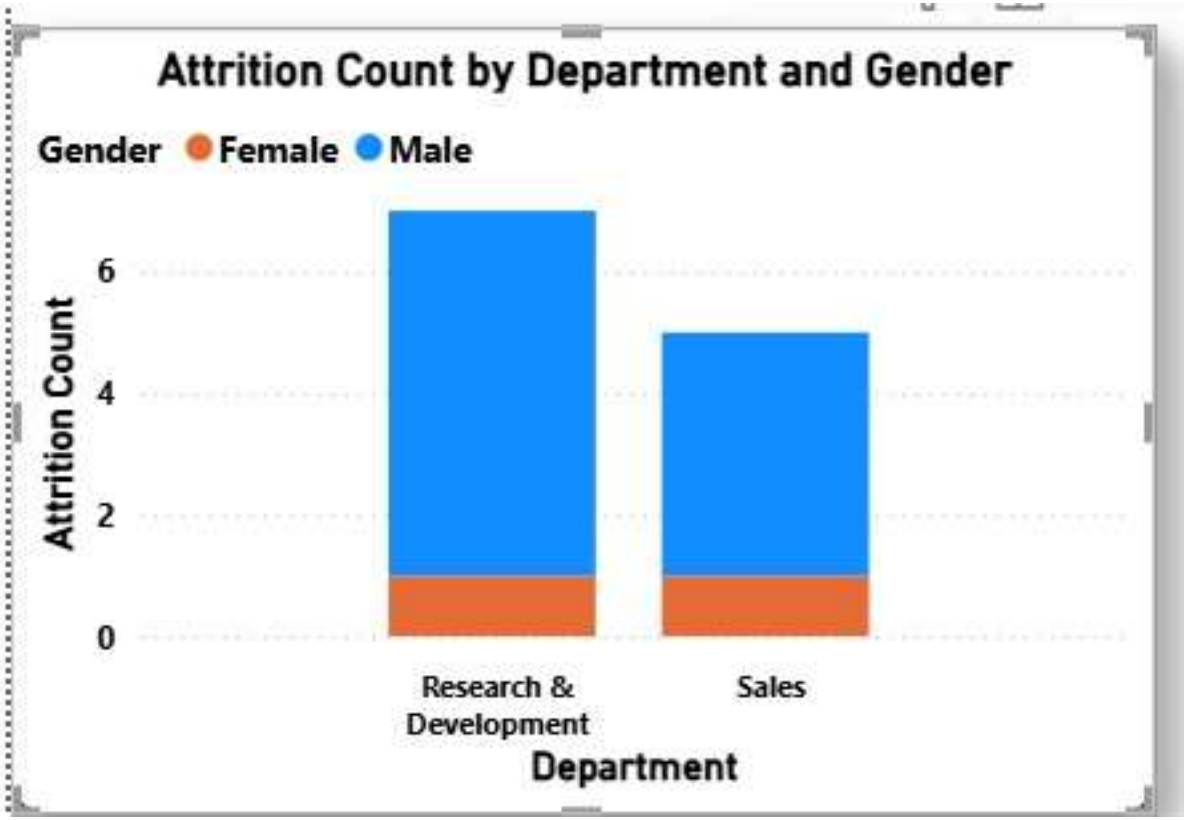
# Attrition Count by Department

- The chart shows that employee attrition is not evenly distributed across departments. The **Research & Development department** experienced the highest number of departures with **7 employees** leaving. In contrast, the **Sales department** had a lower attrition count of **5 employees**. This data suggests that the Research & Development team is currently facing a higher rate of turnover.



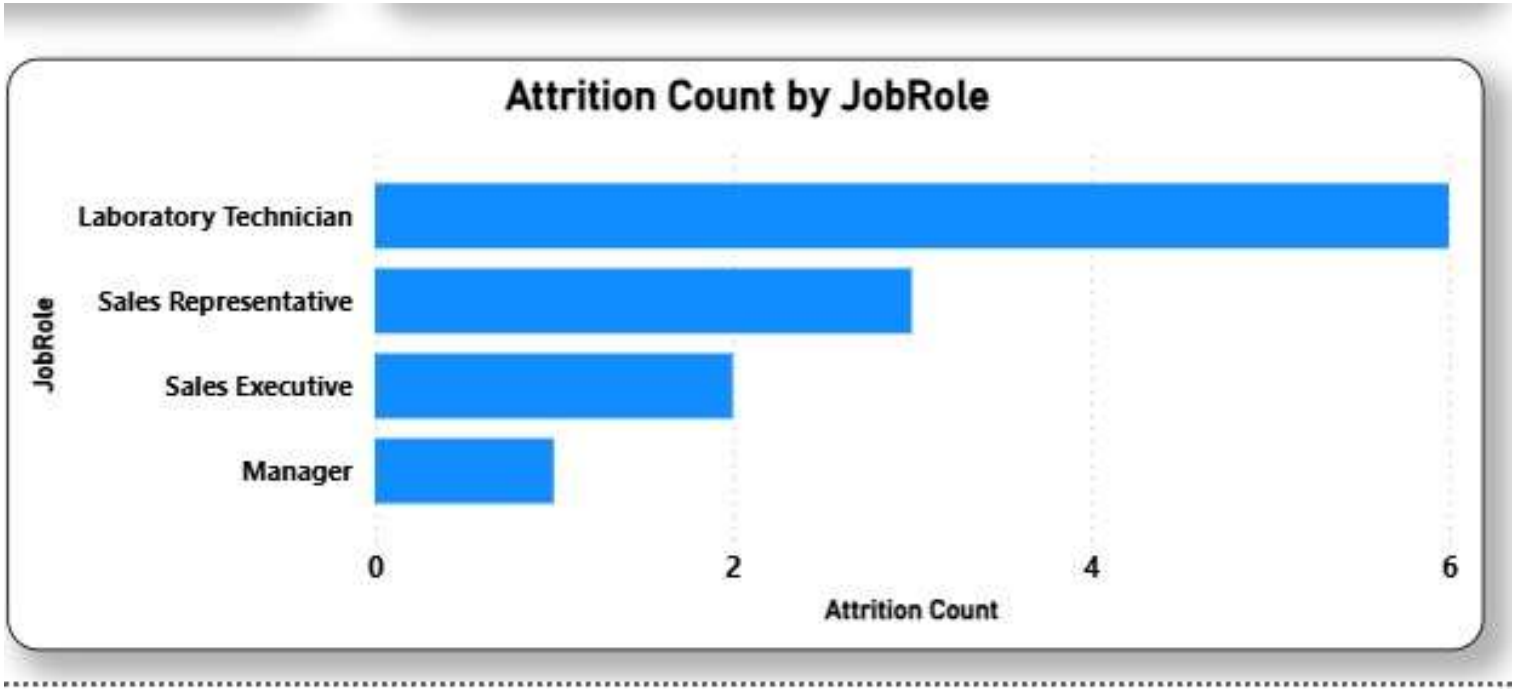
# Attrition Count by Department and Gender

- The chart breaks down employee attrition by both department and gender. It shows that in the **Research & Development department**, a total of **7 employees** left, with a high number of **males** and only **one female**. In the **Sales department, 5 employees** left, with a more balanced split of attrition between genders. The data indicates that male attrition is a significant factor in both departments, particularly in Research & Development.

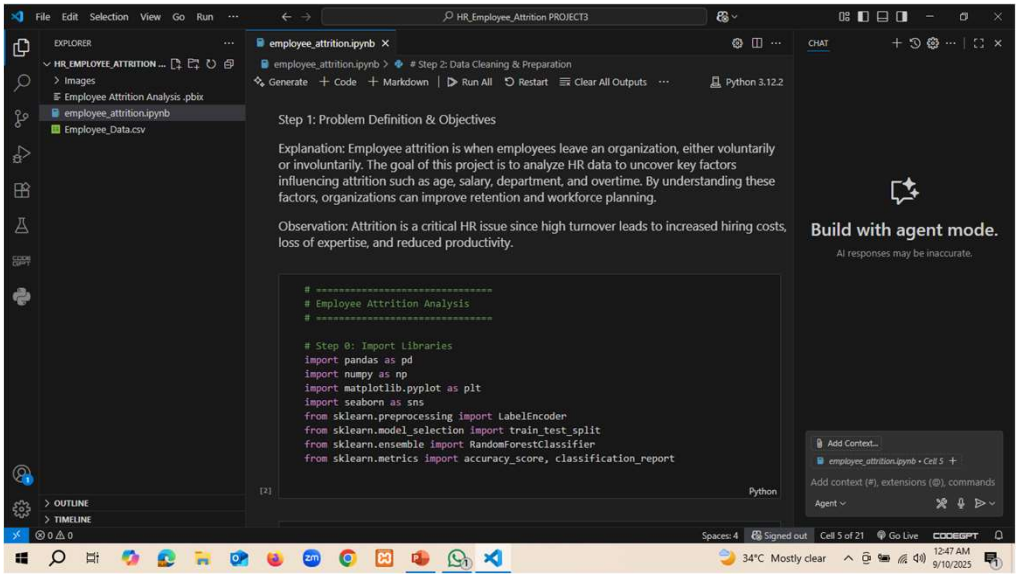


# Attrition Count by JobRole

- The chart illustrates employee attrition across different job roles. **Laboratory Technicians** experienced the highest turnover, with **6 employees** leaving. This is followed by **Sales Representatives** with **3 departures**, **Sales Executives** with **2**, and **Managers** with **1**. The data clearly shows that attrition is most concentrated within the Laboratory Technician role.



# Python Code


File Edit Selection View Go Run
HR_Employee_Attrition PROJECT3
EXPLORER
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Images
Employee Attrition Analysis .pbix
employee_attrition.ipynb
Employee_Data.csv
employee_attrition.ipynb
# Step 2: Data Cleaning & Preparation
Generate Code Markdown Run All Restart Clear All Outputs
Python 3.12.2
Step 1: Problem Definition & Objectives
Explanation: Employee attrition is when employees leave an organization, either voluntarily or involuntarily. The goal of this project is to analyze HR data to uncover key factors influencing attrition such as age, salary, department, and overtime. By understanding these factors, organizations can improve retention and workforce planning.
Observation: Attrition is a critical HR issue since high turnover leads to increased hiring costs, loss of expertise, and reduced productivity.
# ==============================
# Employee Attrition Analysis
# ==============================
# Step 0: Import Libraries
import pandas as pd
import numpy as np
import matplotlib.pyplot as plt
import seaborn as sns
from sklearn.preprocessing import LabelEncoder
from sklearn.model_selection import train_test_split
from sklearn.ensemble import RandomForestClassifier
from sklearn.metrics import accuracy_score, classification_report
[2]
Python
CHAT
Build with agent mode.
AI responses may be inaccurate.
Add Context...
employee_attrition.ipynb • Cell 5
Add context (#), extensions (@), commands
Agent
OUTLINE
TIMELINE
Spaces: 4
Signed out
Cell 5 of 21
Go Live
CODEGPT
34°C Mostly clear
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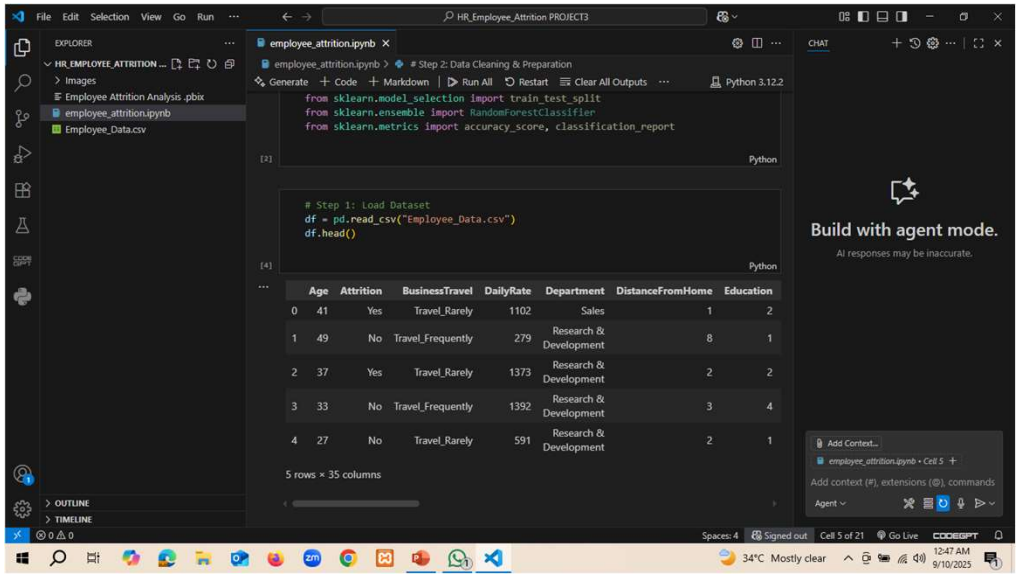
9/10/2025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Python 3.12.2
from sklearn.model_selection import train_test_split
from sklearn.ensemble import RandomForestClassifier
from sklearn.metrics import accuracy_score, classification_report
[2]
Python
# Step 1: Load Dataset
df = pd.read_csv("Employee_Data.csv")
df.head()
[4]
Python
Age Attrition BusinessTravel DailyRate Department DistanceFromHome Education
0 41 Yes Travel_Rarely 1102 Sales 1 2
1 49 No Travel_Frequently 279 Research & Development 8 1
2 37 Yes Travel_Rarely 1373 Research & Development 2 2
3 33 No Travel_Frequently 1392 Research & Development 3 4
4 27 No Travel_Rarely 591 Research & Development 2 1
5 rows × 35 columns
CHAT
Build with agent mode.
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Add context (#), extensions (@), commands
Agent
OUTLINE
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# Business Recommendations

## Investigate

Investigate Male Attrition: Conduct a deeper analysis to understand why male employees are leaving at a disproportionately high rate.

## Address

Address R&D Turnover: Focus on retaining employees in the Research & Development department, as it has the highest attrition count.

## Support

Support Key Roles: Develop a specific retention plan for Laboratory Technicians, addressing factors like compensation, workload, and career growth.

## Review

Review Management: Provide targeted training and support for managers in departments with high turnover to help them better retain their teams.

# CONCLUSION

*Based on the data provided, the conclusion of this attrition analysis is clear*: employee turnover is not a company-wide issue but is instead highly concentrated in specific areas. The most significant finding is the disproportionately high attrition among **male employees**, particularly those in the **Research & Development department** and within the **Laboratory Technician** job role. To effectively reduce turnover, the company must focus its efforts on these key segments, investigating the specific reasons for their departure and developing targeted retention strategies rather than implementing broad, company-wide initiatives.

# THANK YOU!