Title:- *Employee Attrition Analysis.*

Subtitle:- *An exploratory data analysis on factors influencing employee attrition.*

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Tools Used:- *Python, Jupyter Notebook, Matplotlib, Seaborn, Pandas.*

Introduction:-

Employee attrition is a critical issue faced by many organizations. High attrition rates can lead to increased recruitment costs, loss of valuable knowledge, and decreased employee morale. Understanding the factors that contribute to attrition is essential for developing effective retention strategies.

In this project, I performed an in-depth exploratory data analysis (EDA) using Python to identify key drivers of employee attrition. The dataset used contains various employee attributes such as age, gender, department, education, job level, performance rating, years since last promotion, and more.

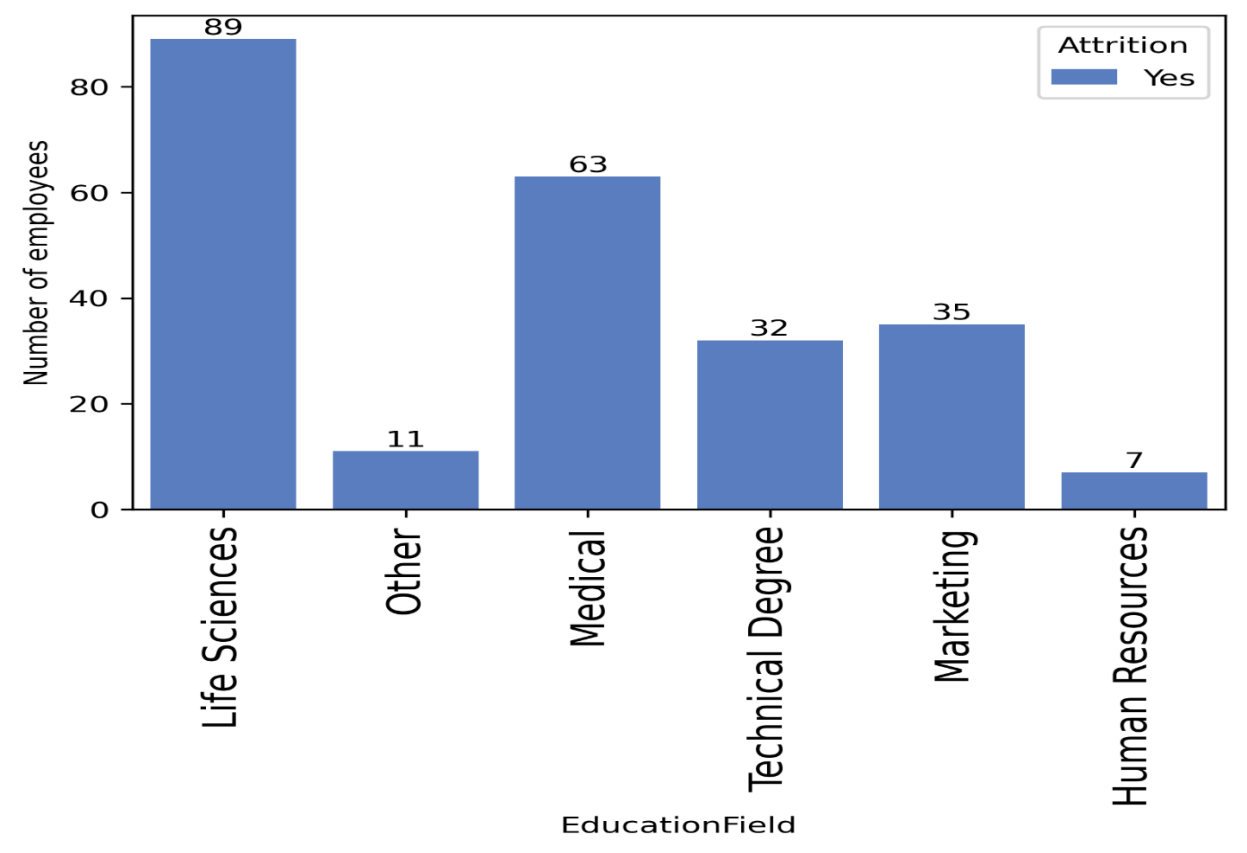
Our objective is to analyse these features and identify patterns or correlations that explain why employees are leaving the organization.

Objective:-

The primary objective of this analysis is to investigate whether certain education fields are more associated with employee attrition and to identify patterns in their performance ratings, promotion history, and job levels.

Specifically, the goal is to:

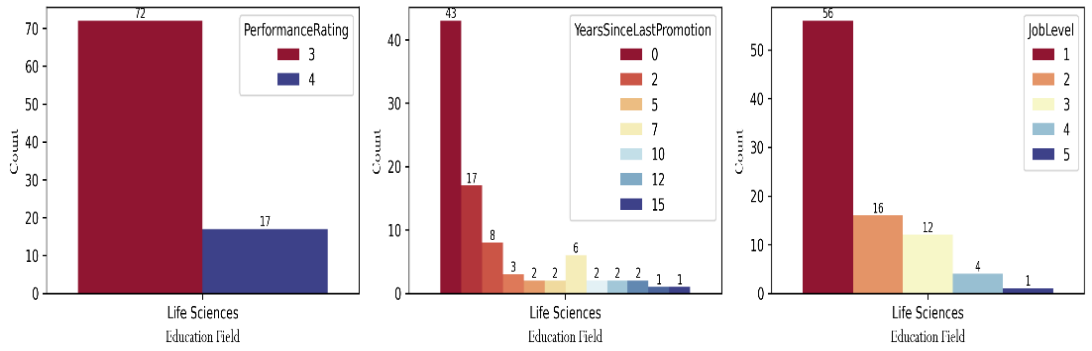
- *Explore how Education Field relates to attrition behavior.*
- *Understand if employees from certain fields (like Life Sciences or Medical) are more likely to leave due to low performance ratings, lack of promotions, or low job levels.*
- *Provide insights that can help HR departments develop targeted retention strategies.*



Observation

Most of the employees having education in Life Science have low performance rating, zero year since last promotion, and low job level.

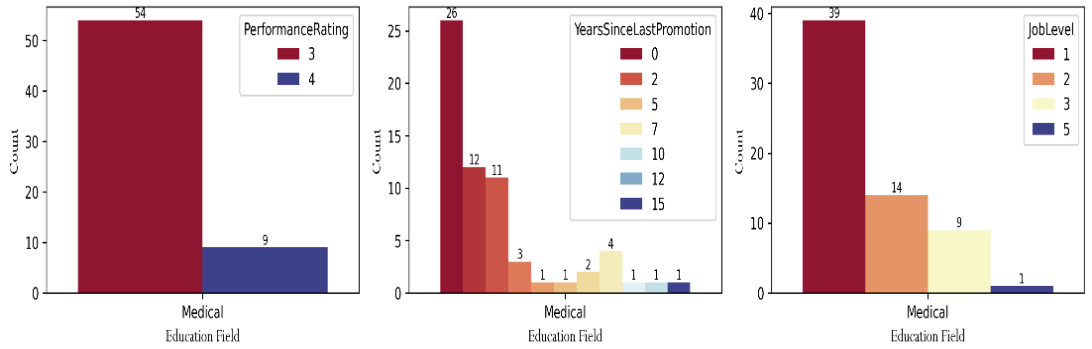
This may explain their attrition.



Observation

Most of the employees having education in Medical have low performance rating, zero years since last promotion, and low job level.

This may explain their attrition.



Analysis:

*The count plot reveals that the majority of employees who left the organization had educational backgrounds in **Life Sciences** and **Medical**.*

For these fields, we observe:

- *Most employees had a **performance rating of 3**, suggesting an average or below-average performance.*
- *The **years since last promotion** is predominantly **zero**, indicating that they were either recently promoted or had **not received a promotion** at all.*
- *Their **job levels** are mostly concentrated at **Level 1 or 2**, implying they held **entry-level or junior positions**.*

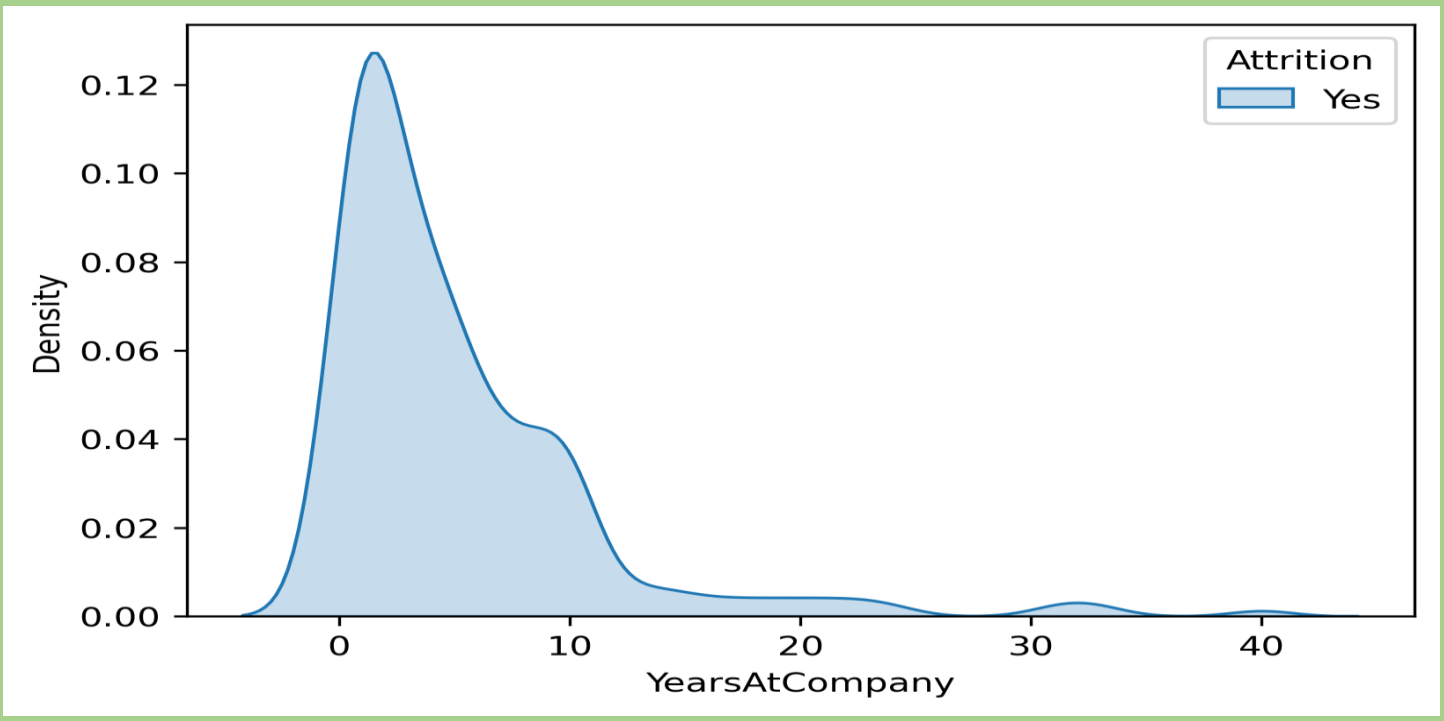
*In contrast, employees from other fields such as **Technical Degree**, **Human Resources**, or **Marketing** are much less represented in attrition data, implying either better job satisfaction or stronger retention.*

Insights:

*This suggests a possible trend: **employees from Life Sciences and Medical backgrounds in lower job roles with limited promotions and average performance are more likely to leave**.*

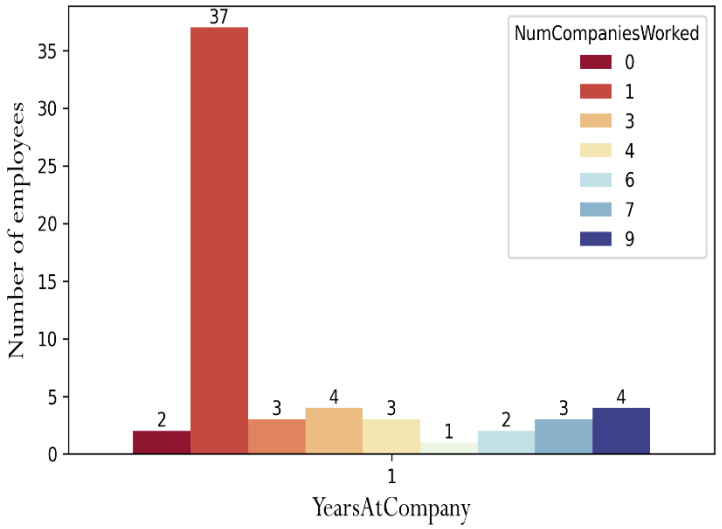
Objective:

To identify and understand the pattern of employee attrition based on tenure at the current company and prior job history, in order to gain actionable insights that can help reduce early attrition rates.



Observation

Most of the employees who worked in this company
for 1 year leave the company.
And out of them
most have previously worked only in one company.



Analysis:

A KDE (Kernel Density Estimation) plot was used to examine the distribution of "Years at Company" among employees. The plot revealed that a significant portion of employees who had worked ***only one year*** *at the company showed a* ***higher likelihood of attrition*** *compared to those with longer tenures.*

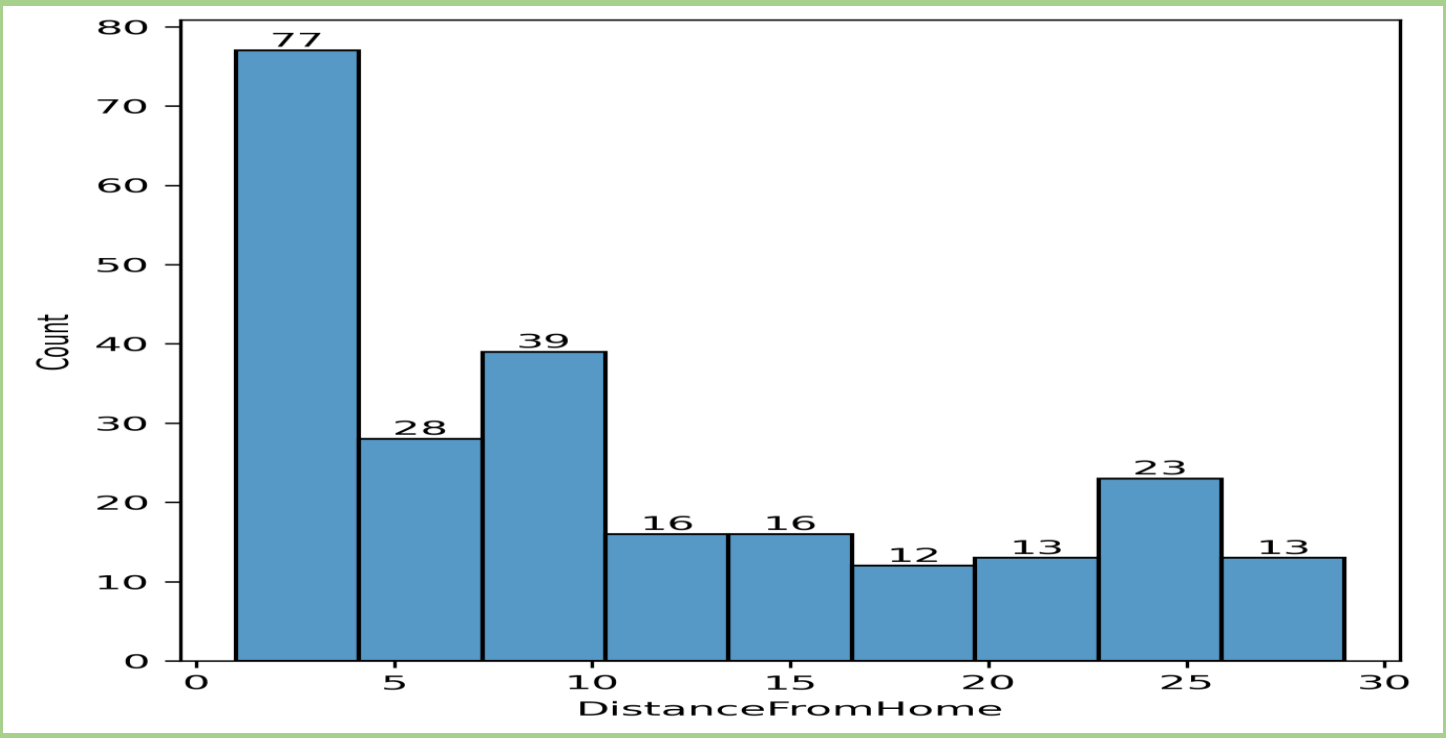
*To delve deeper, a bivariate analysis was conducted by filtering only those employees who had **exactly one year** of service at the company. A count plot with a hue on "Number of Companies Worked" was used to further analyse this subgroup. It was found that the majority of these one-year employees had **previously worked at only one other company**. This indicates a pattern where employees with limited prior experience (only one prior job) tend to leave within a year of joining the company.*

Insight:

*This suggests that **employees who are early in their careers or have limited job-switching experience** may be at a **higher risk of early attrition**. This insight could help HR departments to design **targeted onboarding and engagement strategies** for such employees to improve retention.*

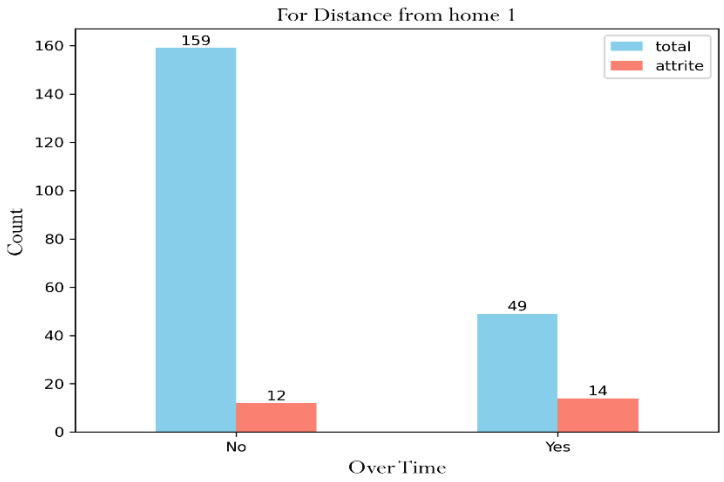
Objective:

To analyse the impact of commute distance and overtime work on employee attrition, and identify patterns that contribute to a higher attrition rate within the organization.



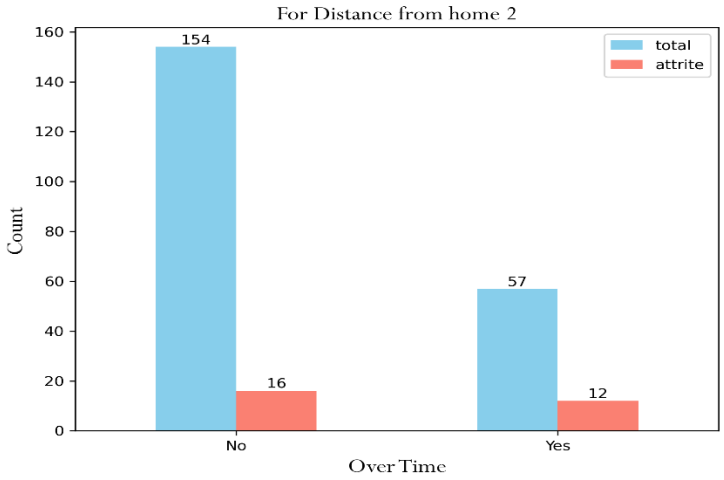
Observation

Distance from home equal to 1 has higher attrition level (28.5%) vs average attrition level(12.5%) in overtime, states that Employees who do overtime are more likely to leave the company compared to those who don't, based on the current data.



Observation

Distance from home equal to 1 has higher attrition level (21.5%) vs average attrition level(13.2%) in overtime, states that Employees who do overtime are more likely to leave the company compared to those who don't, based on the current data.



Analysis:

*A histogram of DistanceFromHome revealed that employees living **1–2 km away** from the company are **more likely to attrite**. This could be due to unmet expectations about work-life balance or job satisfaction despite proximity.*

*To explore this further, employees who lived within **1–2 km** from the office were isolated and analysed based on their **OverTime** status.*

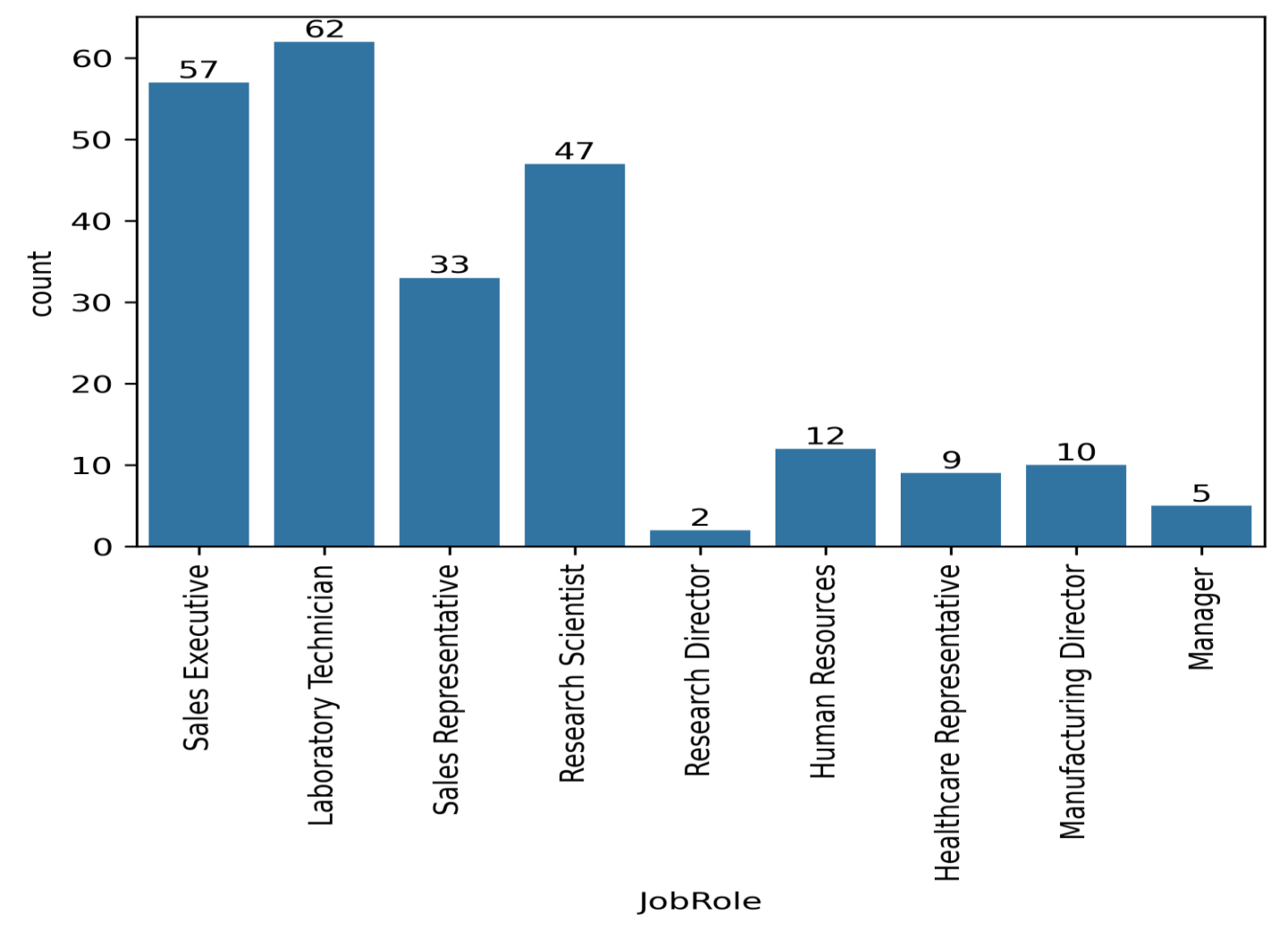
- *Among this filtered group, a significant number of employees who **work overtime** showed a **higher attrition rate**.*
- *While the **overall attrition rate** in the company is approximately **12.5%**, the **attrition rate among employees who work overtime** rises to **28.5%**.*

Insights:

- ***Overtime work is strongly correlated with higher attrition**, especially among employees who live closer to the company.*
- *This suggests that proximity to the workplace does **not** compensate for poor work-life balance caused by excessive working hours.*
- *Reducing overtime or implementing better work-life policies could **significantly lower attrition rates**, particularly for employees who are otherwise more accessible to the workplace.*

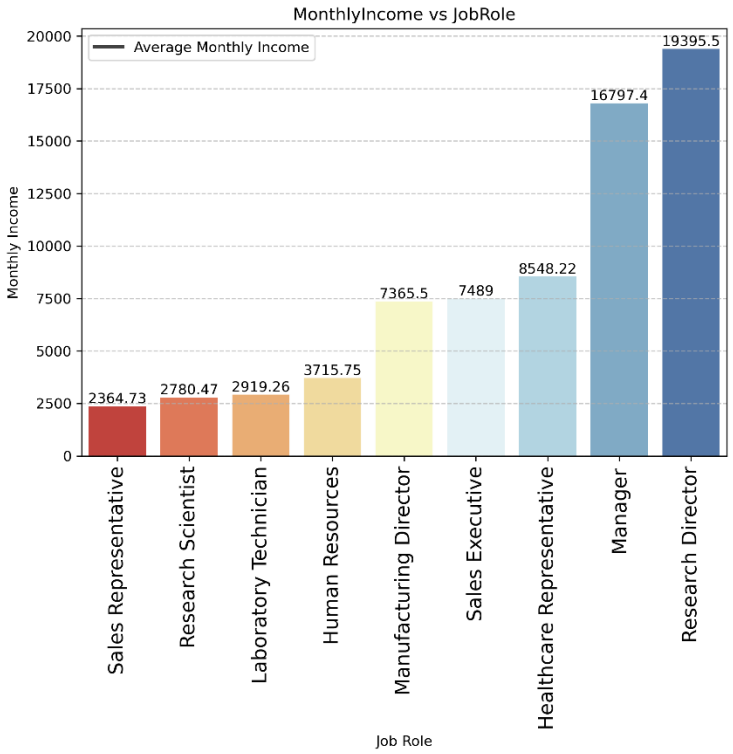
Objective:

*To examine the relationship between employee **job roles**, their **monthly income**, and their **likelihood of attrition**, in order to identify vulnerable roles and salary-related attrition patterns.*



Observation

The average income for Labratory technician, Sales Representative and Research scientist are less compared to other job roles, reason why most of the employee from these job roles likely to attrite,



Analysis:

- *A categorical analysis of the **JobRole** feature showed that **Sales Representative, Laboratory Technician**, and **Sales Executive** roles have the **highest attrition rates** in the company.*
- *To explore the reason, the **MonthlyIncome** variable was analysed across different job roles. It was found that these high-attrition roles also have comparatively **lower salaries** than other roles such as **Managers, Research Directors,** or **Healthcare Representatives.***

Insights:

- *There is a **clear pattern of higher attrition among lower-paying roles**, particularly in **Sales Representative**, **Sales Executive**, and **Lab Technician** positions.*

- *This suggests that **low compensation may be a key factor driving attrition** in these roles.*
- *Addressing this issue with **salary reviews**, **performance-based incentives**, or **career growth opportunities** for employees in these roles could help reduce attrition and improve retention.*