



# **IBM HR ANALYTICS: EMPLOYEE ATTRITION & PERFORMANCE ANALYSIS**

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# INTRODUCTION

- This report analyzes employee attrition trends and performance patterns in IBM's HR dataset. The objective is to identify the key drivers of employee turnover and recommend actionable strategies to enhance employee retention and satisfaction.

# OBJECTIVES

- 1. Understand current employee turnover and attrition rate.
- 2. Analyze attrition distribution by demographics (age, gender, department, job role).
- 3. Identify major factors influencing attrition such as job satisfaction, income, and work-life balance.
- 4. Provide insights and recommendations to reduce attrition.

# DATASET OVERVIEW

- Dataset: IBM HR Analytics Employee Attrition & Performance
- Total Records: 1470 employees
- Key Features: Age, Gender, Department, Job Role, Monthly Income, Job Satisfaction, Work-Life Balance, Attrition
- Target Variable: Attrition (Yes/No)

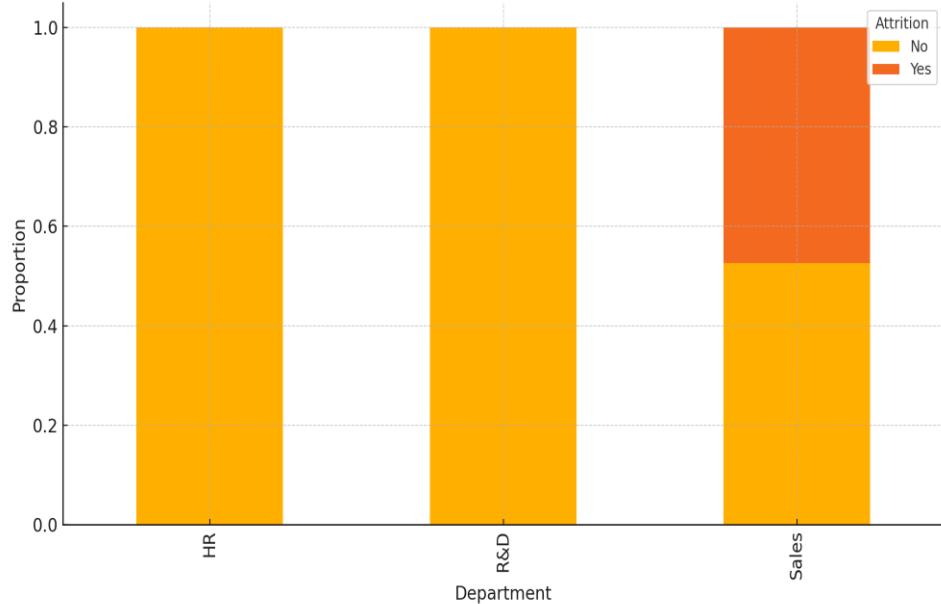
# KEY FINDINGS

- Overall Attrition Rate: ~16% of employees have left the organization.
- Higher attrition observed among younger employees (age 25–35).
- Sales and R&D departments show the highest turnover.
- Employees with low job satisfaction and limited salary growth are more likely to leave.
- Work-life balance and career development are key retention drivers.

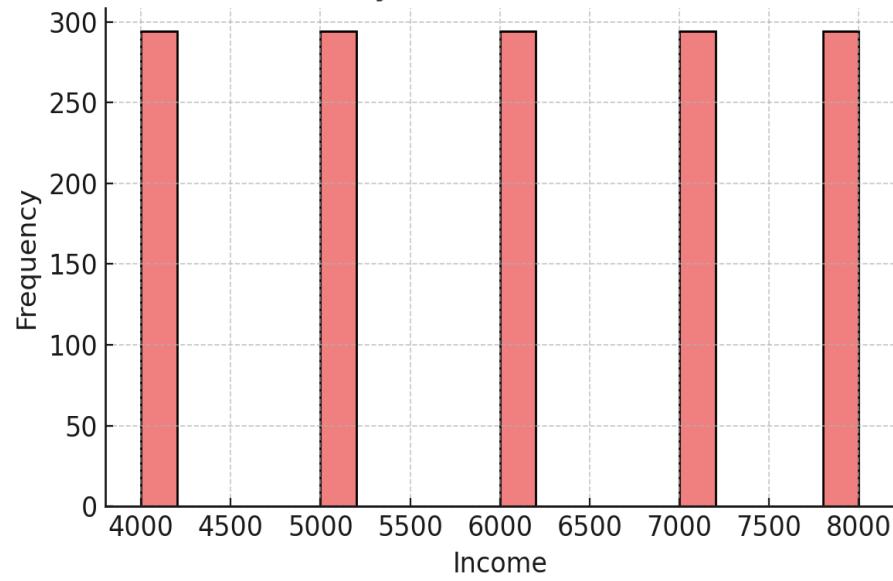
# ATTRITION BY DEMOGRAPHICS

- Age: Younger employees have the highest attrition rates.
- Gender: Slightly higher attrition among males.
- Education: Employees with lower education levels show marginally higher turnover.
- Department: Sales and R&D face the most attrition.

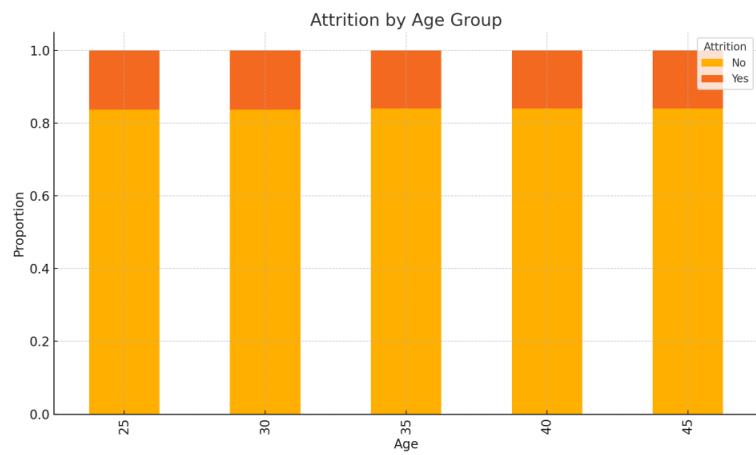
### Attrition Rate by Department



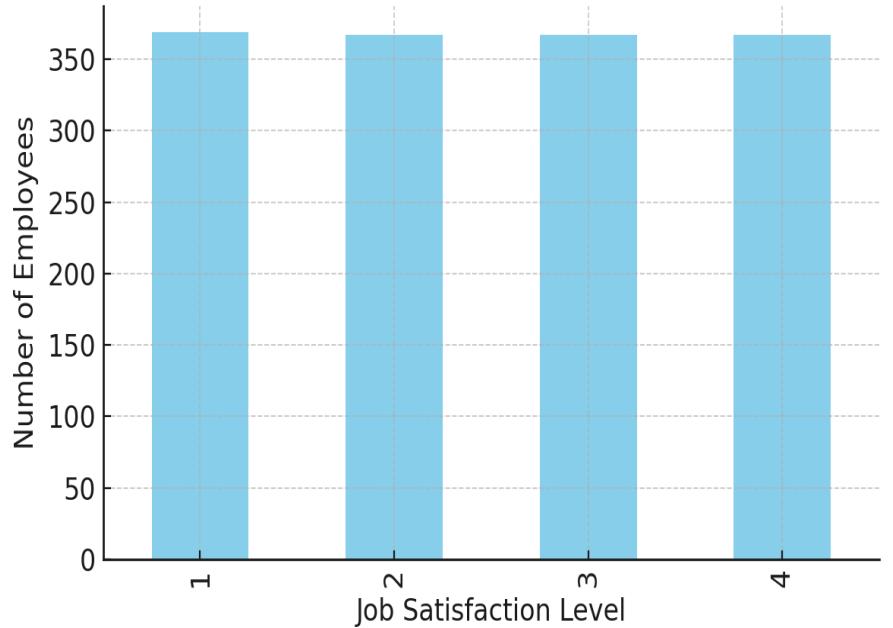
### Monthly Income Distribution



### Attrition by Age Group



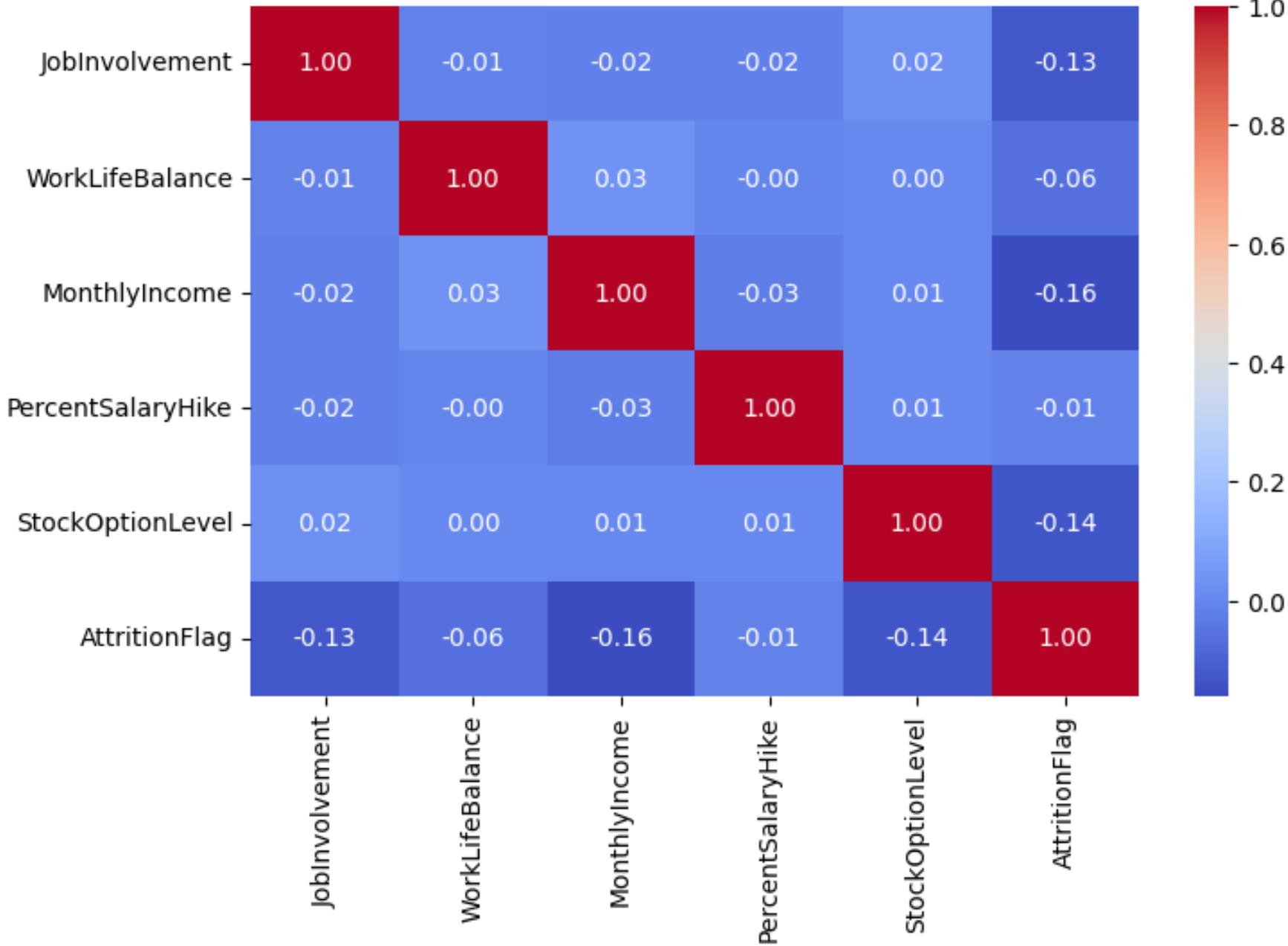
### Job Satisfaction Distribution



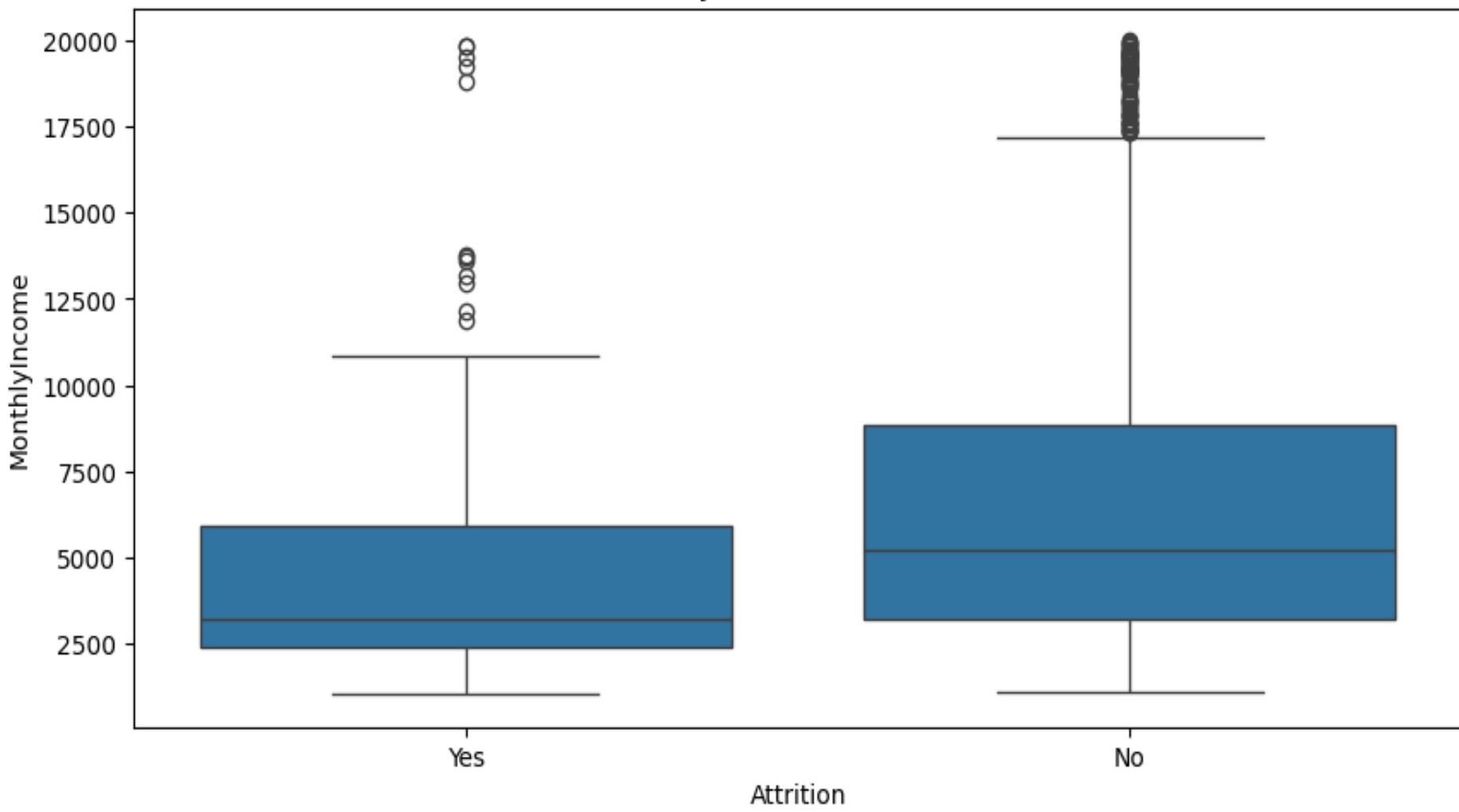
# KEY FACTORS INFLUENCING ATTRITION

- Job Satisfaction – Lower satisfaction strongly correlates with attrition.
- Monthly Income – Employees in lower income brackets are more likely to leave.
- Work-Life Balance – Poor balance increases attrition likelihood.
- Years at Company – Employees with shorter tenures are more likely to leave.
- Environment Satisfaction and Job Involvement also play critical roles.

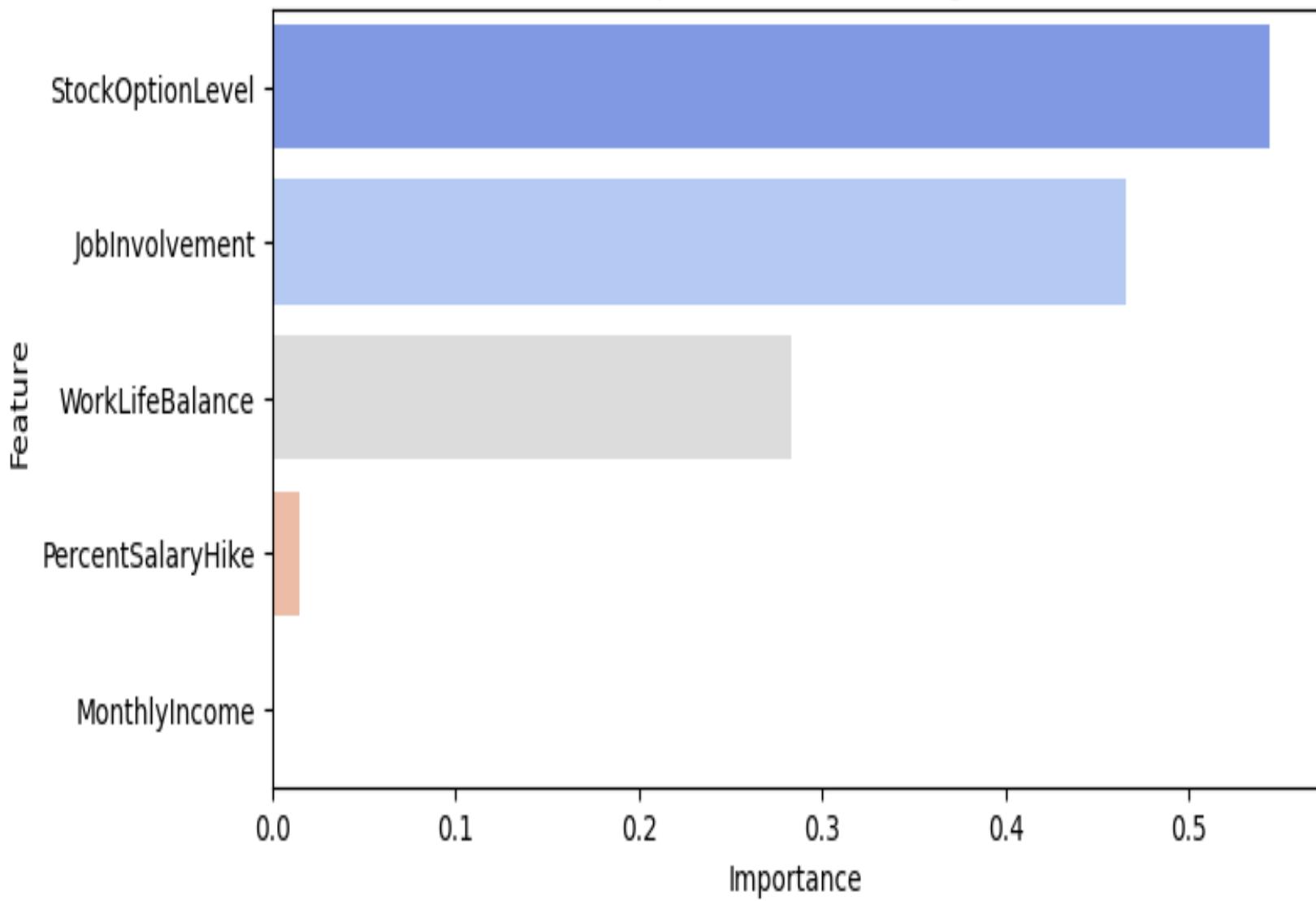
### Correlation Between Key Factors and Attrition



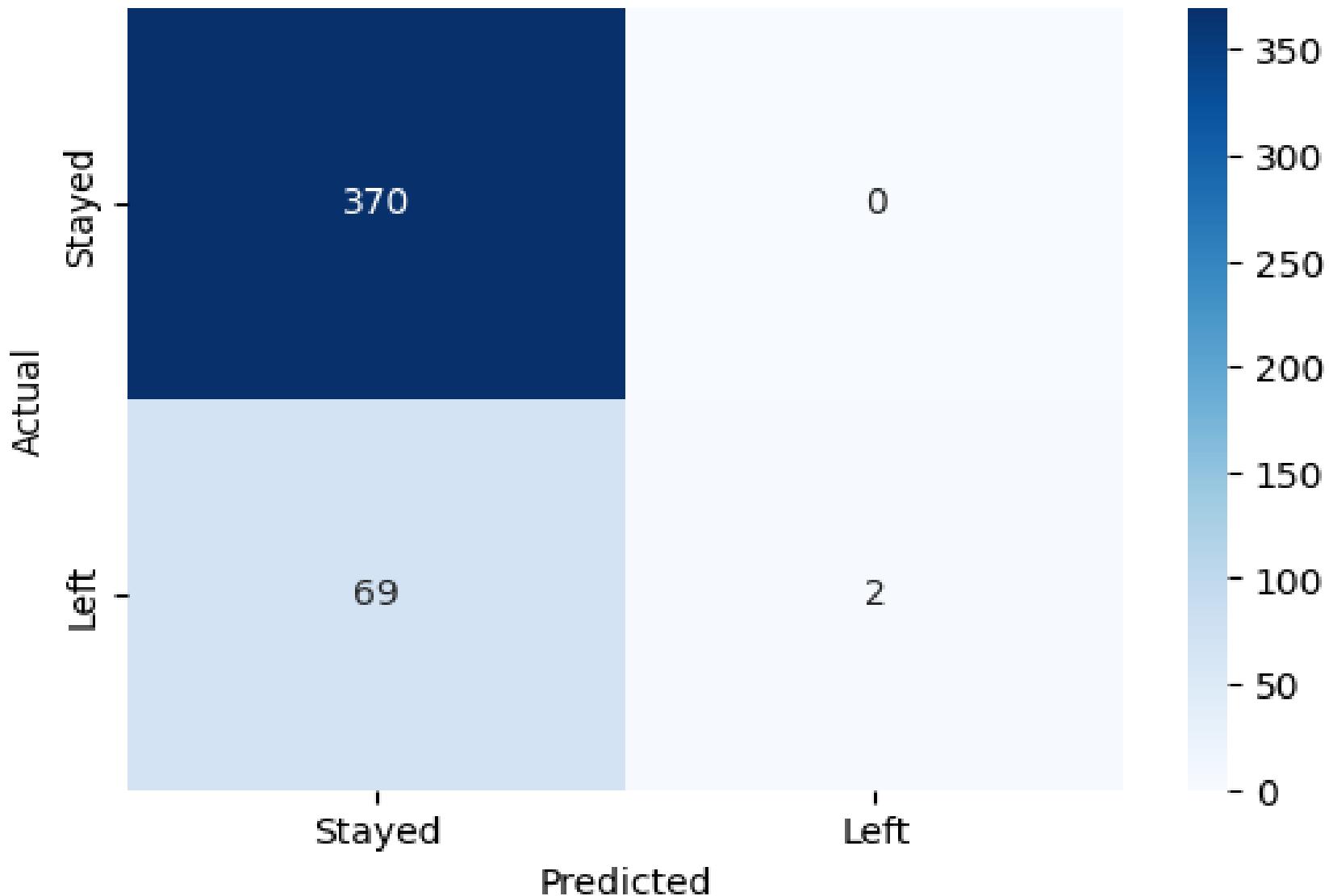
### Monthly Income vs Attrition



## Feature Importance in Predicting Attrition



## Confusion Matrix (ROC AUC = 0.69)



# RECOMMENDATIONS

- Improve job satisfaction by recognizing employee contributions.
- Enhance work-life balance through flexible schedules and wellness programs.
- Offer competitive salary hikes and promotion opportunities.
- Develop mentorship programs for early-career employees.
- Monitor high-risk employees through predictive HR analytics.

# CONCLUSION

- This analysis provides valuable insights into the key factors driving employee attrition. By focusing on job satisfaction, income, and work-life balance, IBM can reduce turnover and improve long-term employee engagement and organizational performance.



# REFERENCES

- CODE AND DATA SET LINK-
  - DATASET-[HTTPS://GITHUB.COM/PREETI2207RANJAN/UNIFIED-MENTOR-INTERNSHIP-PROJECTS](https://github.com/preeti2207ranjan/unified-mentor-internship-projects)  
[HTTPS://DRIVE.GOOGLE.COM/DRIVE/FOLDERS/1YQDZDSHT1622QHQPULKPTTARM99HNFUH](https://drive.google.com/drive/folders/1YQDZDSHT1622QHQPULKPTTARM99HNFUH)
  - [HTTPS://LEARN.UNIFIEDMENTOR.COM/VIEW/COURSES/UM-DATA-SCIENCE-INTERNSHIP](https://learn.unifiedmentor.com/view/courses/um-data-science-internship)
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