# HR Analytics Report on Employee Attrition

## Problem Statement:

Employee attrition is a critical challenge faced by organizations worldwide. High attrition rates can lead to increased recruitment costs, loss of organizational knowledge, and disruptions in workflow. Identifying the key factors contributing to employee attrition is essential for developing strategies to retain valuable talent.

## Objective:

This report aims to:

1. Analyse employee attrition trends using key organizational metrics such as job satisfaction, work-life balance, and departmental affiliation.

2. Utilize machine learning (Multiple Linear Regression) to determine the most influential factors contributing to employee attrition.

3. Provide actionable insights to help the organization improve employee retention.

---

# Dashboard Insights

The visualized data reveals the following trends:

**1. Attrition Rate by Job Involvement:**

- Employees with the lowest job involvement (1) show the highest attrition rate (34%), indicating a strong correlation between engagement and retention.

**2. Attrition Rate by Job Satisfaction:**

- Employees with job satisfaction level 1 have the highest attrition rate (23%), highlighting dissatisfaction as a significant risk factor.

**3. Attrition Rate by Department:**

- Sales department employees experience the highest attrition rate (21%), followed by Human Resources (19%). Research & Development shows a comparatively lower rate (14%).

**4. Attrition Rate by Work-Life Balance:**

- Employees with a poor work-life balance (1) show the highest attrition rate (31%), emphasizing the importance of flexibility and personal well-being.

**5. Attrition Rate by Over Time:**

- Employees working overtime are at a higher risk of attrition (31%) compared to those who do not (10%).

**6. Attrition Rate by Education Field:**

- Human Resources and Technical Degree holders exhibit the highest attrition rates (26% and 24%, respectively), potentially signalling misalignment between expectations and job roles.

**7. Attrition Rate by Environment Satisfaction:**

- Lower environment satisfaction (1) correlates with a high attrition rate (25%), underlining the significance of a positive work environment.

**8. Attrition Rate by Job Role:**

- Sales Representatives show the highest attrition rate (40%), suggesting a need for focused retention strategies in this role.

**9. Attrition Rate by Marital Status:**

- Single employees have the highest attrition rate (26%), while divorced employees have the lowest (12%), indicating potential lifestyle influences on retention.

---

# Machine Learning Analysis on Employee Attrition

## Overview:

Using Multiple Linear Regression Analysis, we have identified key factors contributing to employee attrition. While the dashboard provides insights into attrition based on Job Satisfaction, Work-Life Balance, Department, and other factors, the machine learning model uncovered additional contributors that significantly impact an employee's likelihood of leaving the company.

## Key Factors Contributing to Employee Attrition (Beyond the Dashboard):

The following factors, which were not explicitly highlighted in the dashboard, also play a crucial role in predicting attrition:

1. **Age:**

   - Younger employees are more likely to leave due to career growth opportunities and exploration of better prospects.

   - Older employees tend to stay longer, likely due to stability and benefits.

2. **Distance from Home:**

   - Employees with a long commute are at a higher risk of attrition, as longer travel times contribute to dissatisfaction and work-life imbalance.

3. **Business Travel:**

   - Frequent travel negatively impacts employee retention, particularly for those who struggle with work-life balance.

4. **Education Field & Level:**

- Employees with technical or specialized degrees may have higher attrition rates if better opportunities arise elsewhere.

- Higher education levels correlate with a higher tendency to seek better roles, while lower levels might indicate stability in current positions.

5. **Overtime:**

   - Employees required to work frequent overtime tend to leave more due to burnout and dissatisfaction.

6. **Job Involvement:**

   - Employees with lower engagement and commitment to their work are more likely to leave.

   - Those who do not feel valued or impactful in their role may seek other opportunities.

7. **Relationship Satisfaction:**

   - Employees who do not have positive relationships with their colleagues or managers tend to leave sooner.

8. **Years Since Last Promotion:**

   - Employees who have not been promoted in a long time feel stagnant and undervalued, leading them to look for career growth elsewhere.

9. **Years With Current Manager:**

   - The length of time an employee has worked under the same manager impacts retention.

   - A good managerial relationship improves retention, while a poor one increases attrition.

10. **Number of Companies Worked:**

    - Employees with frequent job changes in the past are more likely to leave, as they may be habitual job-hoppers.

## Prediction of Employee Attrition Probability:

Using these factors, we applied Multiple Linear Regression to calculate the percentage likelihood of each employee leaving the company.

The model assigns a probability score to each employee, indicating their likelihood of resigning. This score can be used to identify high-risk employees and implement proactive retention strategies. By monitoring employees with a high attrition probability, HR teams can intervene early with engagement plans, career growth opportunities, and work-life balance improvements.

## Final Thoughts:

This analysis helps the company not only understand why employees leave but also predict who is most likely to leave next. By addressing these key factors, organizations can develop effective strategies to improve retention, boost employee satisfaction, and reduce overall attrition rates.