HR Analytics – Predict Employee Attrition

# 1. Project Overview

This project analyzes HR data to identify factors contributing to employee attrition and predicts the likelihood of future resignations. The goal is to help organizations reduce turnover and retain talent.

# 2. Objectives

- Understand the key drivers of employee attrition.  
- Analyze patterns based on department, salary, promotion history, and work-life balance.  
- Build a predictive model to identify employees at risk of leaving.

# 3. Dataset

Dataset used: Employee HR dataset containing attributes like department, job role, salary, years at company, promotion history, and attrition status. A cleaned version of the dataset (attrition\_cleaned.csv) is used for analysis.

# 4. Tools & Technologies

- Python (Pandas, Seaborn, Matplotlib, Scikit-learn)  
- Jupyter Notebook for analysis and modeling  
- Power BI (optional for dashboard visualization)

# 5. Steps Performed

1. Data Cleaning: Handled missing values, converted data types, and ensured consistency.  
2. Exploratory Data Analysis (EDA): Visualized attrition trends by department, salary, and job role. Identified correlations between employee features and attrition.  
3. Predictive Modeling: Built classification models (Decision Tree / Logistic Regression), evaluated model performance with accuracy and confusion matrix, and determined feature importance.  
4. Insights & Recommendations: Derived actionable insights for retention programs, career development, and better compensation.

# 6. Key Insights

- Higher attrition in Sales and Technical departments.  
- Employees with lower salary increments or no promotions are more likely to leave.  
- Long commute and poor work-life balance contribute to attrition.

# 7. Recommendations

Implement targeted retention programs, provide career development opportunities, and improve compensation and work-life balance.

# 8. Deliverables

- Jupyter Notebook: Complete EDA and predictive modeling.  
- Cleaned Dataset: attrition\_cleaned.csv  
- PDF Report: HR\_Attrition\_Report.pdf (summary of insights and recommendations)