HR Analytics – Predicting Employee Attrition
Elevate Labs Internship Project
Ministry of MSME, Govt. of India
Intern: Rohan
Project Duration: 2 Weeks

🔹 Introduction

Employee attrition is a critical concern for organizations, especially in competitive industries where retaining talent directly impacts productivity, morale, and cost efficiency. Understanding why employees resign and predicting future attrition enables HR teams to take proactive measures to improve retention and workforce planning.

🔹 Abstract

This project focuses on analyzing HR data to uncover patterns behind employee resignation and build a predictive model to identify high-risk individuals. Using Python for data preprocessing and modeling, and Power BI for visualization, we explored key drivers such as OverTime, JobSatisfaction, and YearsSinceLastPromotion. A classification model was developed to predict attrition, and SHAP values were used to interpret feature importance. The final Power BI dashboard provides interactive insights for HR decision-makers.

🔹 Tools Used

- Python: Pandas, Seaborn, Scikit-learn, SHAP
- Power BI: Dashboard creation, DAX measures
- Jupyter Notebook: Model development and evaluation

🔹 Steps Involved

1. **Data Cleaning & Preparation**
   - Removed nulls and duplicates
   - Created salary bands and tenure buckets using DAX

2. **Exploratory Data Analysis (EDA)**
   - Analyzed attrition by department, salary level, and tenure
   - Identified trends using bar charts and slicers

3. **Modeling**
   - Trained a Logistic Regression model to predict attrition
   - Evaluated using accuracy and confusion matrix

4. **SHAP Analysis**
   - Used SHAP to explain model predictions
   - Exported top 5 drivers of resignation for visualization

5. **Dashboarding in Power BI**
   - Bar Chart: Attrition by Salary Band
   - Donut Chart: Key resignation drivers
   - Gauge Chart: Predictive risk score (optional)
   - Slicers: Department, Age Group, Tenure
   - KPIs: Attrition Rate, Average Salary, Average Tenure

🔹 Conclusion

- Top Resignation Drivers: OverTime, JobSatisfaction, YearsSinceLastPromotion
- High-Risk Groups: Mid-salary employees with low satisfaction and high overtime
- Recommendations:
  - Improve work-life balance in high-risk departments
  - Monitor promotion cycles and satisfaction scores
  - Use predictive scores to guide retention strategies

This project demonstrates how data-driven HR analytics can empower organizations to reduce attrition and enhance employee engagement.