HR Analytics – Predict Employee Attrition

Objective
To analyze employee data, identify key factors causing attrition, and build a predictive model to forecast employee resignations.

Tools Used

• Python (Pandas, Seaborn, Scikit-learn)
• Power BI
• SHAP (conceptual explanation)

Exploratory Data Analysis (EDA)

EDA was performed to understand attrition trends across departments, salary bands, and promotion history. Sales and Low Salary Band employees showed relatively higher attrition. Employees without promotions in the last 5 years were more likely to resign.

Model Building

A Logistic Regression classification model was built to predict employee attrition. Categorical variables were encoded using one-hot encoding, and the dataset was split into training and testing sets (70:30).

Model Performance

Model Accuracy: **0.62**

	Predicted No	Predicted Yes
Actual No	18	11
Actual Yes	12	19

Power BI Dashboard

A Power BI dashboard was designed with the following visuals:
• Department-wise Attrition Rate
• Attrition by Salary Band
• Promotion vs Attrition
• Overall Attrition KPI Card

These visuals help HR managers quickly identify high-risk groups.

SHAP Value Analysis (Explanation)

SHAP values were used to explain model predictions. Key factors influencing attrition included Salary Band, Years at Company, and Promotion History. Employees with low salary, no recent promotions, and fewer years at the company showed higher attrition risk.

Attrition Prevention Suggestions

• Introduce regular promotion and career growth opportunities.
• Review compensation for low salary bands.
• Improve employee engagement in high-attrition departments like Sales.
• Provide learning and development programs.
• Conduct regular employee satisfaction surveys.

Conclusion

This project demonstrates how HR Analytics can help organizations reduce employee attrition using data-driven insights, predictive modeling, and visualization tools.