**TITLE : HR Analytics - Predict Employee Attrition**

**1. Introduction :**

Employee attrition (also known as employee turnover) is a major concern for organizations as it affects team dynamics, company morale, and profitability. By leveraging machine learning models and explainability tools like SHAP, organizations can predict potential attrition cases and take preventive actions.

**2. Dataset Overview :**

The dataset used contains demographic, professional, and performance-related attributes of employees, such as:

Age , Gender, Department , Years at Company , Job Role , Salary Band , Marital Status , Training Hours , Job Satisfaction , Work-Life Balance , Performance Rating , Attrition .

**3. Python – Based Modelling :**

**1. Exploratory Data Analysis (EDA) Summary -**

We analysed key factors influencing attrition such as department, age, salary band, years since last promotion, and job satisfaction. Patterns revealed that employees in certain departments, those with lower satisfaction, or long gaps since promotion had higher attrition rates.

**2. Modelling and Predictive Analysis -**

A logistic regression model was trained to predict whether an employee will leave the organization. After preprocessing and scaling, the model achieved good accuracy. SHAP was used to interpret feature importance, revealing that variables like overtime, job level etc .

**3. Dashboard Insights -**

Power BI dashboards were created to visualize trends and highlight actionable insights. For example, attrition trends over time, departmental attrition rates, and salary band analysis helped identify which segments need intervention

**4. Dashboard Development in Power BI (Summary) :**

The dashboard was designed to visually analyse attrition trends using key HR metrics. It includes KPIs like overall attrition rate, average job satisfaction, and training hours. Interactive visuals like bar charts, donut charts, and slicers allow filtering by department, job role, or gender. This setup helps stakeholders understand attrition drivers and take targeted action.

**5. Key Insights and Recommendations :**

* **Tenure Impact**: Most attrition occurs within the first 3 years of employment.
* **Role and Department**: Technical and sales departments showed higher attrition.
* **Satisfaction and Training**: Low job satisfaction and fewer training hours strongly correlate with attrition.
* **Compensation and Promotions**: Employees in lower salary bands with no recent promotion are more likely to leave.
* **Demographic Patterns**: Young, single employees with high commute distances show a higher likelihood of attrition.

**Recommendations**:

* Implement early onboarding engagement strategies.
* Increase training hours and track their effectiveness.
* Review compensation policies for fairness and equity.
* Encourage transparent promotion opportunities.

**6. Conclusion :**

Combining predictive analytics with explainability and visualization allows businesses to understand and address employee attrition effectively. SHAP values enhanced trust in the model, while Power BI dashboards allowed stakeholders to interact with and explore attrition data in real time.