HR Analytics - Predict Employee Attrition

Introduction:

Employee attrition is one of the key challenges faced by organizations today. High attrition rates lead to increased recruitment costs, loss of experienced personnel, and lowered productivity. This project aims to leverage HR analytics to uncover the underlying factors contributing to employee resignations and develop a predictive model that can help HR teams proactively manage attrition.

Abstract:

This project was done to evaluate employee data to find the causes for employee turnover and build a predictive model which can predict future resignations from the employees. The analysis will be done using data visualization and machine learning techniques, explainable AI methods, as well as explanation values of the predictive model. This is done at an individual level to provide information that helps for data driven HR decision-making and tools for the design and implementation of business solutions to decrease the employee turnover in the company.

Steps Involved in Building the Project:

Step 1: Data Collection and Preprocessing

- Loaded HR dataset (employee records, job roles, salaries, etc.).
- Handled missing values, encoded categorical variables.

Step 2: Exploratory Data Analysis (EDA)

- Visualized attrition by department, salary band, job level.

- Trends in promotion history, job satisfaction and years with company.

Step 3: Model Building

- Split data into training and testing sets.

- Built a classification model using Logistic Regression / Decision Tree.

- Evaluated model performance using accuracy, confusion matrix, and classification report.

Step 4: SHAP Analysis

- To explain the most influential factors of attrition predictions we used SHAP values.

Step 5: Power BI Dashboard

- Implemented a dashboard showing overall attrition, departmentally and salary level filters.

- Enabled interactive analysis for HR decision-makers.

Step 6: Recommendation Report

- Drafted actionable suggestions for reducing attrition based on analytical findings.

Conclusion:

The project on HR analytics was extremely successful in identifying the most important factors affecting employee turnover, like the lack of promotions, poor job satisfaction, departmental stress points and also the classification model had good predictive accuracy, while the SHAP analysis on the other hand provided an additional layer of transparency for making decisions. The HR managers were able to observe trends dynamically in the Power BI dashboard.