HR Analytics for Employees Attrition Report

Project Title:

HR Analytics on Employees Dataset

Objective:

The primary goal of this analysis is to understand the key factors influencing employee attrition. The notebook investigates various demographic and job-related features to identify patterns in employee resignations. This can help organizations retain valuable talent and improve employee satisfaction.

Dataset Overview:

The dataset includes various attributes like:

- **Age**

- **Job Role**

- **Monthly Income**

- **Distance from Home**

- **Education Background**

- **Attrition (target variable)**

Key Steps in the Notebook:

1)Importing Libraries:

- **Used libraries include: pandas, NumPy, matplotlib, seaborn, SkLearn, xgboost, imblearn, shap**

2)Data Loading and Preprocessing:

- Dataset is loaded using `pandas`.
- Label encoding is used for categorical features.
- SMOTE is used to address class imbalance (common in attrition data).

3)Exploratory Data Analysis (EDA):

- Visual analysis using Seaborn and Matplotlib.

- Trends in attrition across departments, income levels, commute distance, etc.

4)Modeling:

1) Two machine learning models are used:

- **Random Forest Classifier**

- **XGBoost Classifier**

5)Model Interpretation:

SHAP (SHapley Additive exPlanations) helps interpret the model predictions and identify key influencing features.

Model Performance:

Metric	Random Forest	XGBoost
Accuracy	87%	**89%**

Business Insight Report

1. What factors are causing employees to leave?

According to model analysis and SHAP interpretation:

- **Low Monthly Income** is a strong predictor of attrition.

- **Long Commute Distances** negatively affect employee satisfaction.

- **Job Role Mismatch** — employees in Sales or HR roles have higher attrition rates.

- **Education Level vs Job Position** mismatch often causes dissatisfaction.

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2. What departments should they focus on?

- **Sales Department**: Consistently shows the highest attrition rates.

- **Human Resources**: Needs attention due to burnout or possible misalignment with company culture.

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3. Actionable Suggestions:

- **Competitive Compensation**: Regular reviews of salary structures, especially for at-risk roles.

- **Remote/Hybrid Work Policies**: Reduce commuting burdens for employees living far from the office.

- **Career Development Plans**: Offer upskilling and internal mobility programs.

- **Regular Feedback Loops**: Implement pulse surveys and feedback channels to catch dissatisfaction early.

- **Department-specific Retention Strategies**: Tailor support and incentives for high-risk departments.