HR Attrition Analysis

Introduction

Employee attrition is a critical challenge for organizations. High turnover rates increase recruitment costs, reduce productivity, and impact organizational stability. This project focuses on analyzing HR data to understand attrition patterns and identify employees at risk of leaving. By leveraging data science techniques, organizations can take proactive steps to improve employee retention.

Abstract

The objective of this project was to analyze synthetic HR employee data to identify the factors influencing attrition. Using Python and Power BI, we explored employee demographics, job roles, performance, income, and work-related variables. Exploratory Data Analysis (EDA) revealed that low job satisfaction, poor work-life balance, high overtime, and low income in early careers significantly contribute to higher attrition. The findings were visualized using Power BI dashboards, enabling HR teams to take targeted actions.

Tools Used

- **Python (Pandas, NumPy, Matplotlib, Seaborn):** For data generation, cleaning, pre-processing, and analysis.
- **Power BI:** For interactive dashboards and visualization of attrition trends.
- **Excel/CSV:** For handling and storing datasets.

Steps Involved in Building the Project

1. **Data Generation:** Created a synthetic HR dataset of 2000 employees including demographics, job roles, income, performance, satisfaction, and attrition status.
2. **Data Cleaning & Preparation:** Checked for missing values, converted data types, and handled outliers.
3. **Feature Engineering:** Created new features such as tenure buckets, income bins, satisfaction levels, and overtime status to enhance analysis.
4. **Exploratory Data Analysis (EDA):** Explored overall attrition rate (50.35%) and visualized attrition by gender, department, job role, income, and satisfaction.
5. **Insights & Recommendations:** Identified key risk factors like high overtime, low satisfaction, and low income in early careers. Suggested strategies such as improving work-life balance, department-specific retention programs, and fair salary reviews.
6. **Visualization (Power BI):** Built dashboards with KPIs, bar charts, and filters for interactive exploration of attrition patterns.

Conclusion

The project successfully demonstrated how HR data analysis can uncover hidden patterns in employee attrition. Key findings showed that dissatisfaction, workload imbalance, and inadequate compensation were primary drivers of turnover. By implementing targeted HR strategies such as improving work-life balance, providing competitive pay, and focusing on high-risk departments organizations can reduce attrition and improve workforce stability. The Power BI dashboard serves as a valuable decision-making tool for HR managers to monitor and act on employee retention trends.