HR Analytics – Predicting Employee Attrition

👩‍💻 Student Name: Kavya Chalichemala

🎓 College: Vel Tech Rangarajan Dr. Sagunthala R&D Institute of Science and Technology

🗓️ Internship Duration: 2 Weeks

📁 Tools Used: Google Colab (Python), Pandas, Matplotlib, Seaborn, Power BI

Abstract

This project focuses on identifying the key factors that lead to employee attrition (resignation) using HR data. Understanding attrition is critical for any organization to improve employee retention, reduce hiring costs, and boost morale.

Using IBM's HR analytics dataset, we performed Exploratory Data Analysis (EDA) to reveal hidden patterns and developed a dynamic Power BI dashboard to visualize attrition trends across departments, job roles, and employee demographics. The insights derived can help HR teams take proactive steps to reduce attrition rates.

Tools Used

- Python (Google Colab): Data cleaning and exploratory data analysis
- Pandas, Seaborn, Matplotlib: For statistical analysis and visualization
- Power BI: To build an interactive dashboard with slicers and filters

Steps Involved in Building the Project

1. Data Understanding & Cleaning:
   - Loaded dataset in Google Colab and removed inconsistencies
   - Checked for missing values, duplicates, and column types

2. Exploratory Data Analysis (EDA):
   - Analyzed attrition distribution
   - Explored attrition by department, gender, salary, and job role
   - Created correlation heatmap to understand relationships

3. Data Export for Visualization:
   - Saved the cleaned data from Colab as 'hr_cleaned.csv'

- Imported it into Power BI

4. Dashboard Development in Power BI:
  - Created visuals for:
    - Attrition % overall
    - Attrition by department and job role
    - Salary influence on attrition
  - Added slicers for gender, department, and overtime
  - Built a responsive and filterable dashboard

Key Insights

- OverTime is a major factor contributing to attrition.
- Sales Department showed the highest number of resignations.
- Employees with lower monthly income were more likely to leave.
- Job roles like Sales Executive and Laboratory Technician had higher attrition rates.
- Younger employees and those with less job satisfaction were more at risk.

Conclusion

The project successfully identified the core drivers behind employee attrition using data-driven insights. The Power BI dashboard enables interactive exploration of HR patterns, allowing decision-makers to drill down into specific employee groups and trends.

This approach not only supports predictive decision-making but also empowers HR teams to take preventive action. The project highlights the importance of data analytics in enhancing employee satisfaction and building a stronger workforce.

Future Scope

- Build a machine learning model to predict attrition risk in real-time
- Integrate feedback surveys and engagement scores
- Deploy dashboard online for HR executives

Submitted by:

Kavya Chalichemala
B.Tech CSE – Vel Tech University
Email: chalichemalakavya@gmail.com