HR Analytics Using SQL and Power BI/Tableau

Objective

The goal of this project is to analyze employee data and gain insights related to employee attrition, satisfaction, job roles, and financial metrics using SQL for data processing and Power BI/Tableau for data visualization. The objective is to provide actionable recommendations that can help HR departments improve employee retention and overall job satisfaction.

By the end of the project, learners will:

- Conduct exploratory data analysis (EDA) to identify trends and factors influencing attrition.
- Use SQL for data cleaning, transformation, and aggregation.
- Create interactive dashboards in Power BI/Tableau to visualize key HR metrics.
- Provide insights and recommendations for improving employee retention and satisfaction.

Project Overview

The dataset contains detailed information about employees, including demographic data, job satisfaction, salary details, and attrition status. This analysis will help in understanding the factors that contribute to employee turnover and other critical HR-related insights.

Dataset Details

- **Dataset Name:** HR Analytics
- **Dataset Link:** CSV | Excel
- **Total Records:** 1470+

Columns Overview:

- **Employee Information:**
  - EmpID: Unique identifier for each employee
  - Age: Age of the employee
  - Gender: Male / Female
  - MaritalStatus: Marital status (Single/Married/Divorced)
  - Department: The department the employee works in (Sales, R&D, etc.)
  - JobRole: Employee's job role (e.g., Sales Representative, Research Scientist)
- **Job and Performance Details:**
  - Attrition: Whether the employee left the company (Yes/No)

- Job Satisfaction: Employee's job satisfaction (1 to 4)
- PerformanceRating: Employee's performance rating (1 to 4)
- JobInvolvement: Level of involvement in the job (1 to 4)
- Overtime: Whether the employee works overtime (Yes/No)

- **Financial Metrics:**
  - MonthlyIncome: Monthly income of the employee
  - DailyRate: Daily rate of pay
  - HourlyRate: Hourly rate of pay
  - PercentSalaryHike: Percentage increase in salary
  - StockOptionLevel: Level of stock options

Tasks to Be Performed

Task 01: Data Preparation (SQL)

1. **Import & Load Data:**
   - Upload the dataset into an SQL database using tools like LOAD DATA or via SQL import functions.
2. **Clean and Preprocess Data:**
   - **Remove Duplicates and Missing Values:** Ensure no duplicate records or missing values remain.
   - **Standardize Categorical Fields:** Normalize fields such as Gender, Marital Status, JobRole, OverTime, and Attrition for consistency.
   - **Transform Data:** Convert numerical columns like Age, MonthlyIncome, and DailyRate into the proper formats.

Task 02: Exploratory Data Analysis (EDA) with SQL

1. **SQL Queries:**
   - **Attrition Analysis:** Analyze the distribution of attrition across different departments, job roles, and age groups.
   - **Job Satisfaction vs. Attrition:** Compare job satisfaction levels for employees who left vs. those who stayed.
   - **Salary Trends:** Calculate average salaries across departments, job roles, and levels.
   - **Overtime and Job Involvement:** Analyze the impact of overtime work and job involvement on employee satisfaction and attrition.

Task 03: Interactive Dashboards in Power BI/Tableau

1. **HR Overview Dashboard (Page 1):**
    - **KPIs:**
        - Total Employees
        - Attrition Rate
        - Average Job Satisfaction
        - Average Monthly Income
    - **Visualizations:**
        - Bar Chart: Attrition by Department and Job Role
        - Pie Chart: Gender distribution of employees
        - Line Chart: Attrition trend over time
2. **Salary and Performance Dashboard (Page 2):**
    - **Visualizations:**
        - Scatter Plot: Performance vs. Monthly Income
        - Heatmap: Job satisfaction by department and performance rating
        - Matrix: Salary range by job role and department
    - **Filters & Slicers:**
        - Department-based analysis
        - Job role segmentation
        - Age group and marital status filters

Task 04: Data Analysis & Insights

1. **SQL Analysis for Key Business Questions:**
    - **Key Factors Influencing Attrition:** Identify factors such as job satisfaction, salary, work-life balance, and job involvement that contribute to attrition.
    - **Average Salary Analysis:** Compare the average salaries across different departments and job levels.
    - **Impact of Overtime on Attrition and Satisfaction:** Examine whether employees who work overtime are more likely to leave the company or report lower job satisfaction.
2. **Insights Example:**
    - Employees in higher job levels tend to have higher job satisfaction and lower attrition.
    - Employees with overtime tend to report lower satisfaction and higher attrition rates.
    - Salary disparities exist across departments, and adjustments may be needed.

Task 05: Recommendations

1. **Reduce Attrition:** Focus on improving job satisfaction, especially in departments with high attrition rates.
2. **Salary Adjustments:** Investigate pay discrepancies between job roles and departments and provide recommendations for salary equity.
3. **Work-Life Balance:** Develop policies that reduce overtime work and promote a better work-life balance.
4. **Employee Engagement:** Implement programs that increase job involvement and overall employee satisfaction.

Final Report & Submission Guidelines

Deliverables:

1. **SQL Outputs:** Save SQL outputs (queries and results) as .csv or .xlsx files.
2. **Power BI/Tableau Dashboards:** Create interactive dashboards and export them in .pbix (Power BI) or .twbx (Tableau) formats.
3. **Report:** A detailed report documenting the analysis process, insights, and recommendations.

Submission Checklist:

1. **SQL Scripts:** Document all queries used for data processing and analysis.
2. **Power BI/Tableau Dashboard:** Submit interactive dashboards.
3. **Report Structure:**
    - Introduction & Objective
    - EDA & SQL Queries
    - Key Findings & Trends
    - Visual Analysis Screenshots
    - Conclusion & Business Insights

Evaluation Criteria:

1. **Data Cleaning & SQL Queries (25%)**
2. **EDA & SQL Insights (25%)**
3. **Power BI/Tableau Dashboards (25%)**
4. **Report Quality & Interpretation (25%)**

Submission Details:

- **Report Format:** PDF
- **Dashboard File:** .pbix (Power BI) / .twbx (Tableau)
- **SQL Code:** Documented .sql file
- **GitHub Repository:** Provide a link with organized project files
- **Submission via email to:** projects@emergingindiagroup.com