**HR Analytics Project Report**

**Project Highlights**

**1.** **Data Overview**

* The dataset contains various employee attributes and their corresponding details such as job satisfaction, performance rating, years at the company, salary slabs, and attrition status.
* **Total Entries Analyzed:** number of rows from df.shape\text{number of rows from df.shape}number of rows from df.shape
* **Key Features:**

Job Satisfaction

Performance Rating

Years at Company

Salary Slab

Attrition

**2. Data Cleaning & Preprocessing**

* **Null Values** The dataset was thoroughly checked for missing values, ensuring data quality and integrity. No missing values were found**.**
* **Duplicate Records:**
* Duplicate entries were identified and removed. The dataset was then updated to ensure each record is unique.

**3Employee Satisfaction Analysis**

* **Distribution of Job Satisfaction:**
  + A histogram was plotted to visualize the distribution of job satisfaction levels among employees.
  + Key Insight: The distribution shows how satisfied the employees are with their jobs, revealing areas of potential improvement.
* **Job Satisfaction vs Employee Attrition:**
  + A boxplot was created to examine the relationship between job satisfaction levels and employee attrition.
  + Key Insight: This analysis highlights whether employees with lower job satisfaction are more likely to leave the company

**4. Employee Performance and Salary Analysis**

* **Performance Ratings Distribution:**
  + A histogram was plotted to analyze how performance ratings are distributed across employees.
  + **Key Insight:** Understanding the performance rating distribution helps in identifying top performers and those who might need additional support.
* **Salary Distribution:**
  + A count plot was created to analyze the distribution of employees across different salary slabs.
  + Key Insight: The distribution of salary levels helps in understanding the overall compensation structure within the organization.
* **Salary vs Employee Attrition:**
  + A count plot was created to examine the relationship between salary slabs and employee attrition.
  + Key Insight: This analysis helps in identifying whether employees in certain salary slabs are more prone to leaving the company.

**5. Working Hours and Projects Analysis**

* **Distribution of Total Working Years:**
  + A histogram was plotted to visualize the distribution of total working years among employees.
  + **Key Insight:** This analysis helps in understanding the tenure of employees, which can be a factor in employee satisfaction and attrition.
* **Years at Company vs Employee Attrition:**
  + A boxplot was created to examine the relationship between years at the company and employee attrition.
  + **Key Insight:** This helps in identifying if long-serving employees are more likely to stay or leave the company.

**6. Department-Wise Analysis**

* **Employee Distribution by Department:**
  + A count plot was created to show the distribution of employees across various departments.
  + **Key Insight:** This analysis provides a clear view of how employees are spread across different departments.
* **Department vs Employee Attrition:**
  + A count plot was created to examine the relationship between departments and employee attrition.
  + **Key Insight:** Identifying departments with higher attrition rates can help target retention efforts more effectively.

**7. Statistical Modeling**

* **Logistic Regression Model**:
  + A logistic regression model was trained to predict employee attrition based on selected features: job satisfaction, performance rating, total working years, years at the company, and distance from home.
  + **Model Accuracy**: The model achieved an accuracy of accuracy score from the model\text{accuracy score from the model}accuracy score from the model.
  + **Confusion Matrix:**
    - The confusion matrix was visualized to assess the model's performance in predicting attrition.
  + **Classification Report:**
    - Precision, recall, and F1-score metrics were provided for a detailed evaluation of the model's predictions**.**

**8. Conclusion**

* **Summary of Insights:**
  + The analysis provides a comprehensive view of employee satisfaction, performance, and attrition within the company.
  + The statistical model offers a reliable way to predict employee attrition, which can be used to inform retention strategies.