PROJECT REPORT: HR ANALYTICS- EMPLOYEE ATTRITION ANALYSIS

INTRODUCTION

Employee attrition is a major concern for HR departments across industries. Retaining valuable employees is essential for productivity, cost reduction, and maintaining a healthy work environment. This project focuses on building a data-driven solution to identify factors influencing attrition and predict which employees are likely to leave the company.

ABSTRACT

This project uses HR data to analyze patterns and build a machine learning model that predicts employee attrition. The analysis includes exploring variables like satisfaction level, evaluation score, average monthly hours, time spent at the company, salary level, and promotions. The output enables HR teams to take proactive retention measures.

TOOLS USED

- **Python (Pandas, Scikit-learn, Seaborn)** – for data analysis and model building
- **Power BI** – for interactive dashboard and visualizations
- **Google Colab (.ipynb)** – for full code workflow
- **Excel** – for initial data handling
- **Matplotlib/Seaborn** – for plotting confusion matrix and trends

STEPS INVOLVED IN BUILDING THE PROJECT

1. **DATA COLLECTION**

   Used a dataset named hr_analytics_attrition_dataset.xlsx with 10+ features including satisfaction level, number of projects, average monthly hours, and salary level.

2. **DATA CLEANING & PREPROCESSING**
   - Checked for missing values and corrected data types

- Created new columns such as time_spent_band
- Converted categorical variables using label encoding

3. EXPLORATORY DATA ANALYSIS (EDA)

- Analyzed attrition distribution by departments, salary, and work hours
- Created Power BI dashboard (HR_Attrition_Analysis.pbix) with key charts

4. MODEL BUILDING

- Trained Logistic Regression and Decision Tree Classifier
- Chose Decision Tree for deployment based on 99.5% accuracy

5. MODEL EVALUATION

- Classification Report and Confusion Matrix generated
- Top 3 influencing features from the model:
  - Satisfaction Level
  - Number of Projects
  - Average Monthly Hours

6. PREVENTION STRATEGY

- A PDF titled Attrition_Prevention_Strategy.pdf was created
- Suggestions included improving work-life balance and revising salary structures

CONCLUSION

The project successfully predicts employee attrition with high accuracy and identifies key factors that influence it. This enables HR managers to target at-risk employees and improve retention strategies. The Decision Tree model accurately predicted employee attrition using HR metrics. Decision tree model with 99.5% accuracy proved effective in identifying potential employee attrition. With proper analysis and interpretation, this solution empowers HR teams to retain talent proactively.