✅ Final Project Report – HR Employee Attrition Analysis

📘 **Title: HR Employee Attrition Analysis**

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🎓 **Internship:** Data Analyst Intern, Elevate Labs
📅 **Duration:** June 2025
🛠️ **Tools Used:** Python (Colab), Pandas, Seaborn, Scikit-learn, SHAP, Power BI

◆ 1. Introduction

The objective of this project is to understand the causes behind employee attrition using data analytics and predictive modeling. The project involved performing exploratory data analysis, creating a machine learning model to predict attrition, and visualizing insights through an interactive Power BI dashboard.

◆ 2. Abstract

Employee attrition is a critical issue in HR analytics. Using an open-source dataset from Kaggle containing 1,470 records with employee information, the project identifies patterns and trends associated with attrition. Through Python and Power BI, the project reveals high-risk groups and builds a predictive model to assist in proactive decision-making.

◆ 3. Tools & Techniques Used

- **Python**: Data cleaning, EDA, logistic regression model
- **Libraries**: Pandas, Seaborn, Matplotlib, Scikit-learn, SHAP
- **Power BI**: Dashboard creation, KPI cards, line charts, donut and bar charts
- **SHAP**: Explainability of model predictions

◆ 4. Steps Followed

1. **Data Cleaning**: Removed redundant columns, standardized column names
2. **EDA**: Analyzed trends by department, overtime, gender, tenure
3. **Modeling**: Logistic Regression achieved 88% accuracy
4. **Interpretability**: Used SHAP to explain key features influencing predictions
5. **Dashboard**: Built 2-page Power BI dashboard with KPIs and interactive visuals

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◆ 5. Conclusion

The project successfully highlights key attrition drivers such as low monthly income, high overtime, and short tenure. The combination of data analysis and dashboard storytelling empowers HR teams to take proactive steps to reduce attrition and improve retention.

Key Insights:

- Highest attrition in Lab Technician and Sales Rep roles
- Employees with < 4 years tenure have higher attrition
- Overtime significantly increases attrition probability
- Environment satisfaction level 1 correlates with high exits
- SHAP shows income and overtime as top attrition drivers

Project Deliverables:

- Cleaned CSV dataset
- Python notebook with modeling
- SHAP interpretability visuals
- Power BI dashboard
- Final report (this PDF)