# Employee Attrition Analysis Report

## Introduction

This report analyzes employee attrition data to identify the key factors contributing to workforce turnover. By examining variables such as department, salary, and promotion history, the goal is to uncover patterns and drivers behind employee exits, enabling data-informed strategies for improving retention.

## Abstract

This project explores employee attrition using HR data to identify contributing factors such as department, salary, and promotion history. A logistic regression model was developed to predict attrition, and SHAP values were employed to interpret the model's predictions and understand feature importance.

## Tools Used

Pandas, Matplotlib, Seaborn, Scikit-learn, SHAP

## Project Steps

1. Data Loading and Exploration: Imported and examined the dataset to understand key attributes.
2. Exploratory Data Analysis (EDA): Visualized feature-target relationships to identify potential patterns.
3. Feature Engineering: Applied label encoding to convert categorical features into numerical format.
4. Model Building: Trained a Logistic Regression model to predict employee attrition.
5. Model Evaluation: Assessed performance using accuracy score, confusion matrix, and classification report.
6. Model Interpretation: Leveraged SHAP values to explain individual predictions and global model behavior.

## Conclusion

The analysis revealed significant factors influencing employee attrition. These insights can help the HR team develop targeted retention strategies.