

# **Employee Attrition Prediction**

**Using IBM HR Analytics Data  
ML Classification Techniques**

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# Employee Attrition Prediction with Machine Learning

This presentation explores predicting employee attrition. We use IBM HR Analytics data. The goal is to identify factors influencing employee turnover.



# Data Overview

**1,470**  
Employees

Total records analyzed.

35

## Features

Features

Categorical and numerical attributes.

# 84%

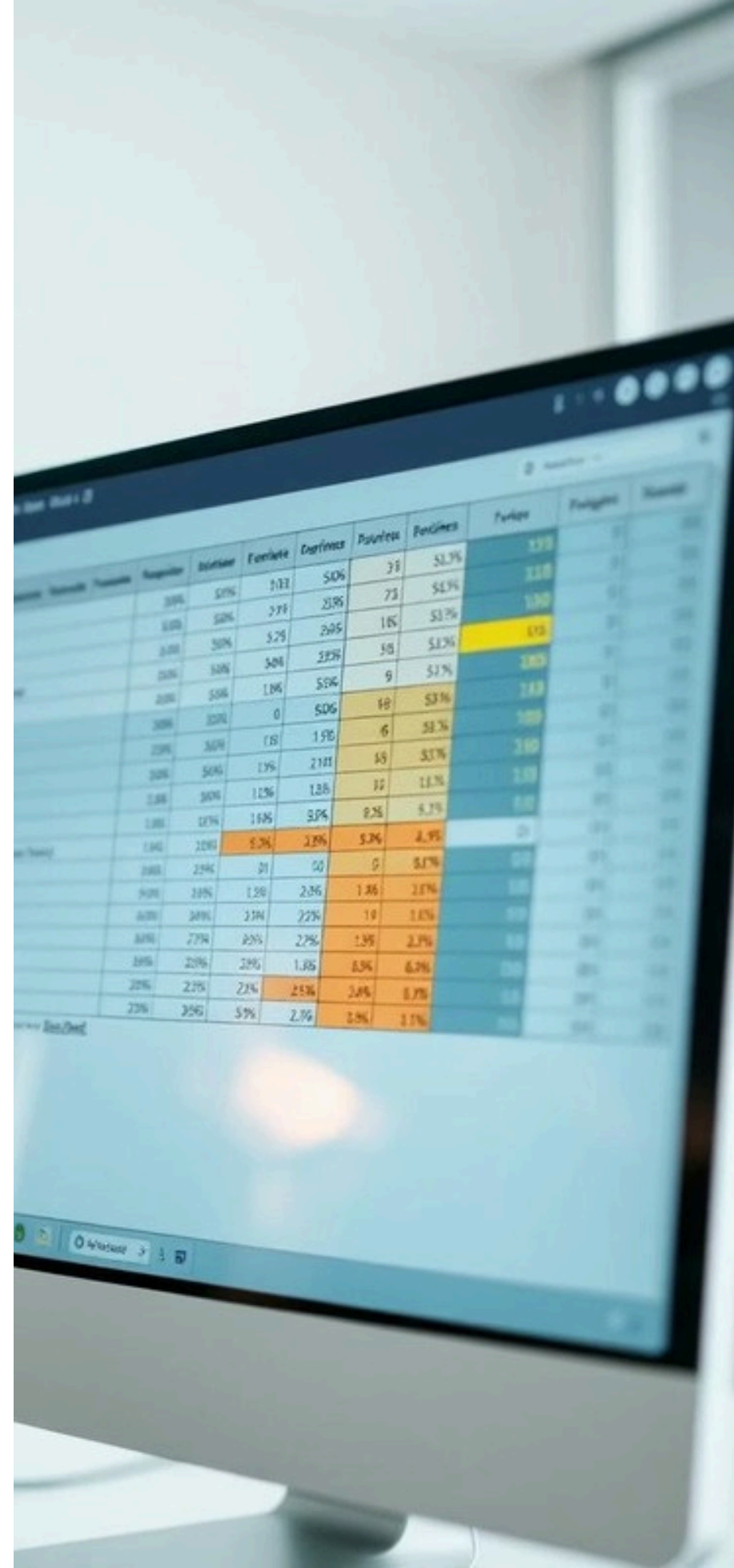
## Active

Employees remaining with the company.

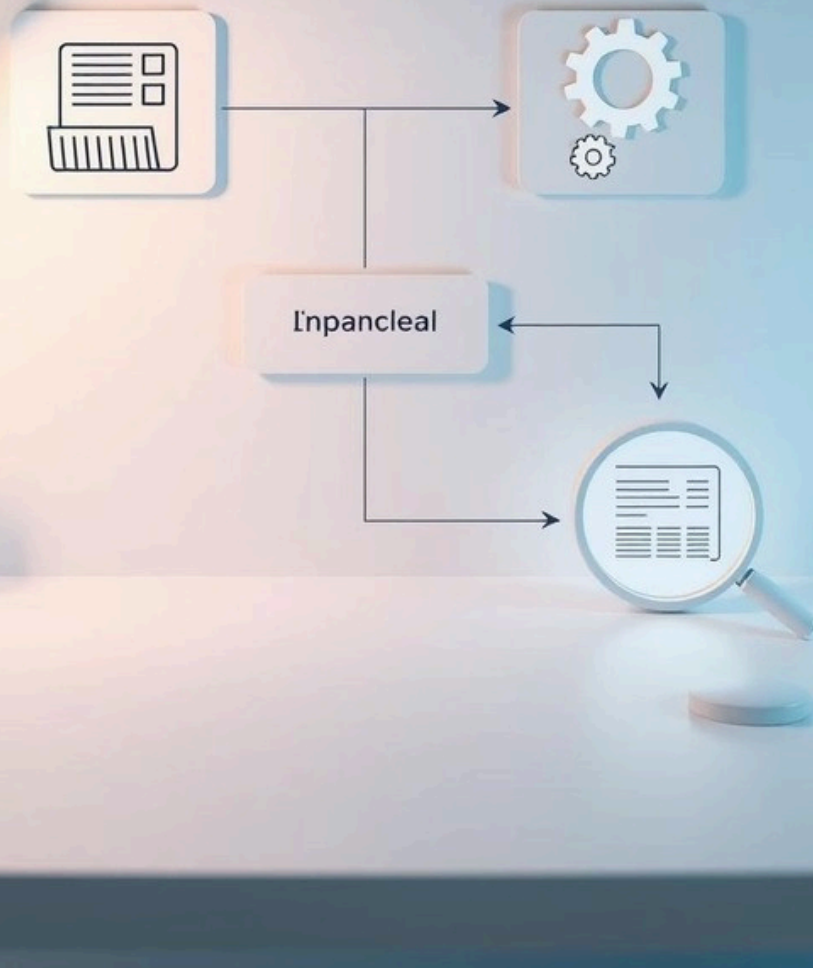
# 16%

## Attrited

Employees who left the company.



# Data Preprocessing and Feature Engineering



1

## Handle Missing Values

Impute any missing data points.

2

## Encode Categorical Variables

Apply One-Hot Encoding.

3

## Feature Scaling

Use Standardization for consistent ranges.

4

## Address Class Imbalance

Utilize SMOTE oversampling technique.

# Model Selection and Training

## Model Types

- Logistic Regression
- Random Forest
- Gradient Boosting

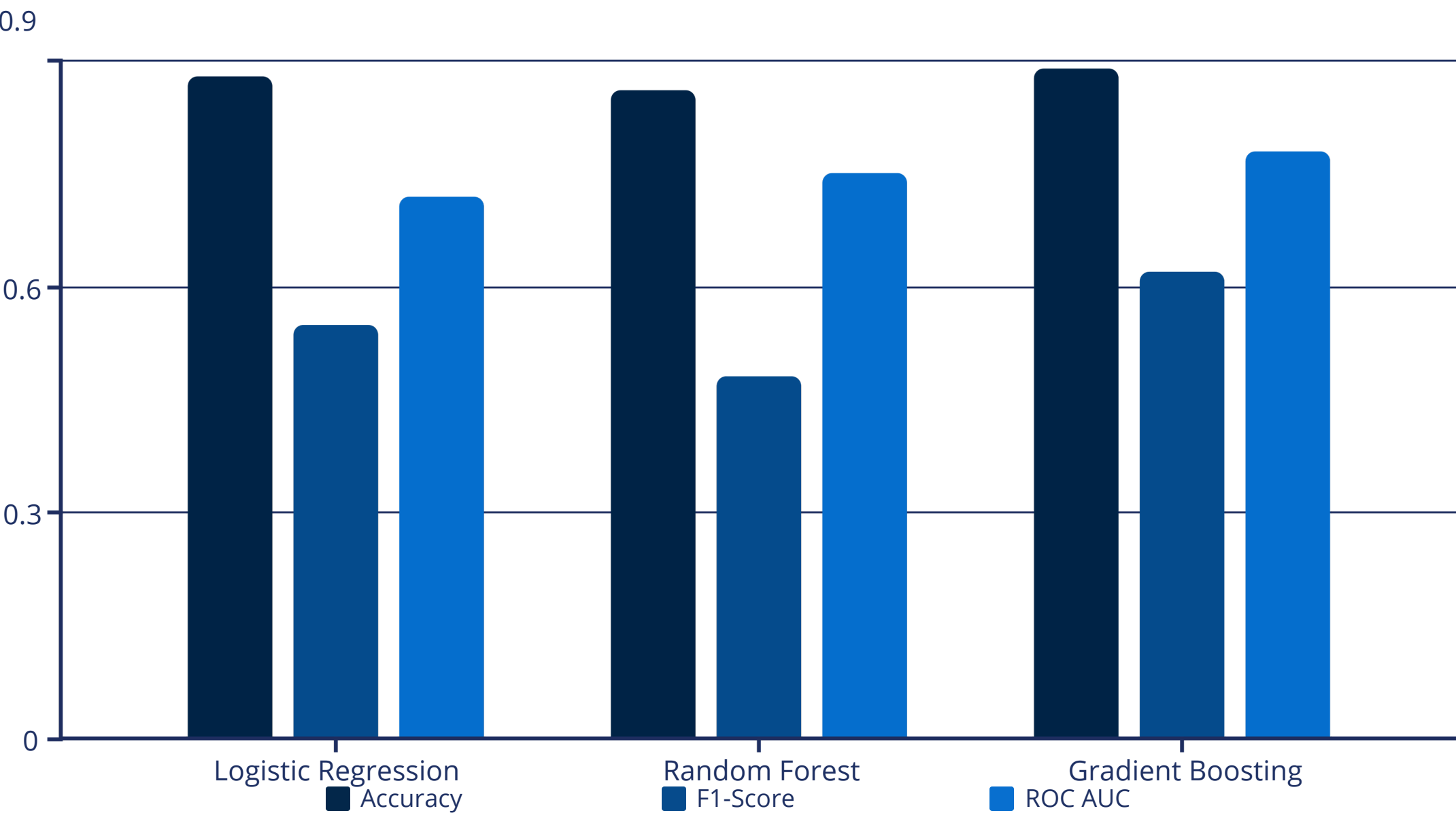
## Data Splitting

- Training Set: 80%
- Test Set: 20%

## Tuning & Evaluation

- GridSearchCV for hyperparameters
- Accuracy, Precision, Recall, F1-score, ROC AUC

# Model Evaluation and Comparison



Gradient Boosting achieved the highest ROC AUC score. This indicates superior predictive capability. It also outperformed other models in F1-score.

# Feature Importance Analysis

## 1 Overtime

Importance: 0.12, highest impact.

## 2 Job Level

Importance: 0.09, significant factor.

## 3 Monthly Income

Importance: 0.08, third most impactful.

## 4 Age

Importance: 0.07, a key demographic.

## 5 Years At Company

Importance: 0.06, tenure matters.



# Actionable Insights



## Work-Life Balance

High overtime correlates with attrition.



## Career Advancement

Low job level is a driver.



## Competitive Salaries

Lower income increases attrition risk.



## Employee Engagement

Younger employees and short tenure are risks.







# Conclusion

## Effective Prediction

ML models accurately forecast attrition.

## Key Insights

Feature importance reveals critical factors.

## Proactive HR

Analytics enables strategic retention.