



BAIN & COMPANY

# Employee Attrition Analytics

PRESENTED BY

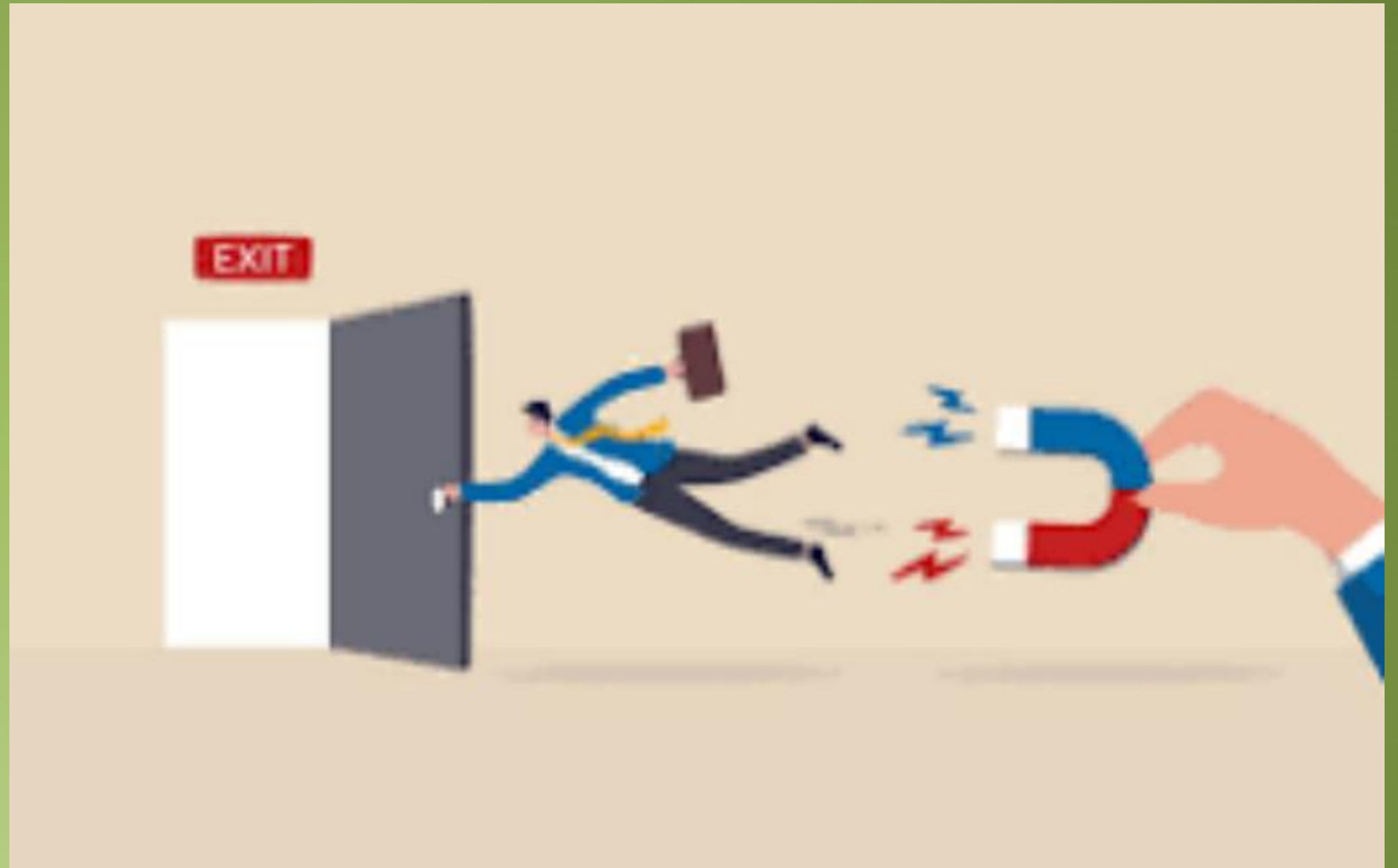
Bernard Zephaniah Addo-Addo  
Data Analyst

# The Challenge

Bain and Company faces an unprecedented amount of employee attrition/churn rates

## Objective:

The goal is to predict employee attrition and provide actionable recommendations for retention.



[Image Source](#)

# Importance of Churn Analysis

**Not addressing the root causes of employees' attrition could cause more to leave the organization voluntarily or involuntarily.**

## **Impact of Attrition:**

- **Costly: Recruitment, training, and lost productivity.**
- **Disruptive: Team dynamics and knowledge loss.**
- **Negative Perception: Affects employer brand.**

# Exploratory Data Analysis (EDA)

**Dataset:** We analyzed the data, including features like job satisfaction, work-life balance, and performance ratings.

Detailed Insights in Appendix



# Modeling Techniques



# Modeling Techniques

## 1. Decision Trees

### Strengths:

- Captures complex patterns.
- Easy to interpret.
- Handles missing values.

### Weaknesses:

- Prone to overfitting.
- Instability.
- Bias towards dominant classes.

## 2. Logistic Regression

### Strengths:

- Simple and interpretable.
- Well-suited for binary classification.
- Regularization options.

### Weaknesses:

- Assumes linear relationship.
- Limited expressiveness.
- Sensitive to outliers.

# Predictive Modeling Process

## 1. Data Preprocessing:

- Handle missing values.
- Encode categorical features.
- Split data into training and test sets.

## 2. Data Preprocessing

## 3. Feature Engineering

## 4. Model Training and Evaluation:

- Train decision tree and logistic regression models.
- Evaluate accuracy, precision, recall, F1-score, and ROC curves.
- Analyze feature importance results

## 5. Model Comparison:

- Decision tree: High accuracy but prone to overfitting.
- Logistic regression: Simplicity and interpretability.



# Predictive modelling results





# Modeling Techniques

## 1. Decision Trees

**Accuracy : 0.85**

- Approximately 85% of predictions are correct overall.

**Precision (Attritio) : 0.69**

- When predicting attrition, the model is correct 69% of the time.

**Recall (Attritio) : 0.15**

- The model captures only 15% of actual attrition cases.

## 2. Logistic Regression

**Accuracy : 0.83**

- Approximately 83% of predictions are correct overall.

**Precision (Attritio) : 0.83**

- When predicting attrition, the model is correct 83% of the time.

**Recall (Attritio) : 0.83**

- The model captures 83% of employees who actually leave

# Recommended Model

Based on the findings, I recommend using the Decision Tree model with some precautions:

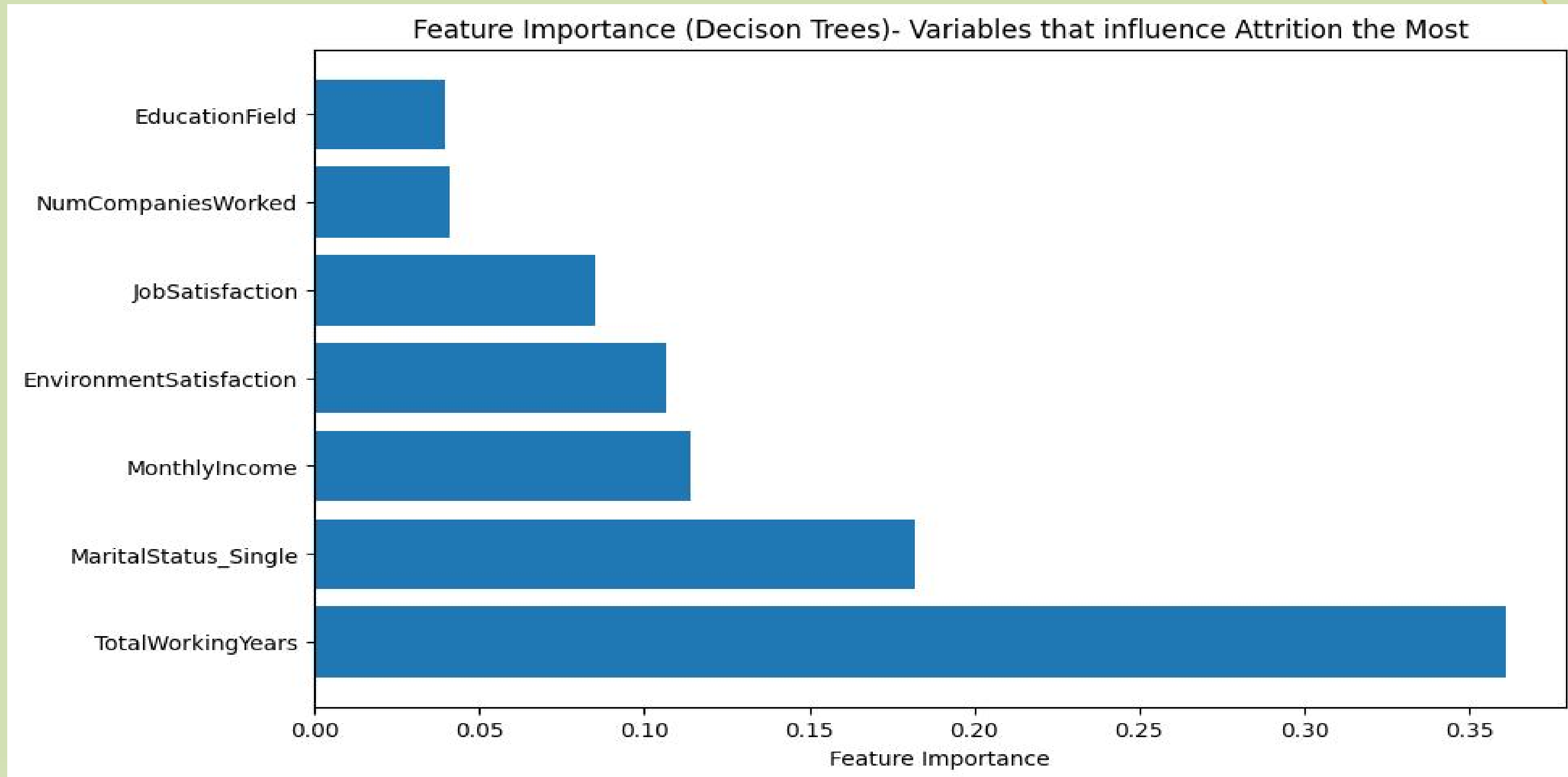
## Recall for Attrition:

- The Decision Tree model has a recall of 0.15 for attrition (employees who actually leave).
- Although this recall is low, it still captures some attrition cases, which is crucial for organizations to prevent talent loss.

## Trade-offs:

- The Decision Tree sacrifices precision (higher false positives) to achieve better recall.
- In attrition prediction, missing actual cases (false negatives) can have significant consequences. Therefore, prioritizing recall is essential.

# Feature Importance





# Feature Importance

## Top Features influencing Attrition :

- Total Working Years.
- Environment Satisfaction.
- Job Satisfaction.

# Recommendations for Bain and Company



# Recommendations

## Total Working Years:

Employees with more years of experience tend to stay longer with the company.

## Recommendations:

- **Career Development:** Invest in continuous learning and development opportunities for employees.
- **Mentorship Programs:** Pair experienced employees with newer ones to foster growth.
- **Recognition:** Acknowledge and celebrate long-serving employees to boost morale



# Recommendations

## Environment Satisfaction:

Employees satisfied with their work environment are less likely to leave.

## Recommendations:

- **Culture Enhancement:** Foster a positive workplace culture through open communication, inclusivity, and employee well-being initiatives.
- **Feedback Mechanisms:** Regularly seek feedback from employees to address pain points.
- **Physical Environment:** Ensure comfortable workspaces and amenities.

# Recommendations

## Job Satisfaction:

Satisfied employees are less likely to churn.

## Recommendations:

- **Job Design:** Align job roles with employees' strengths and interests.
- **Recognition and Rewards:** Recognize achievements and provide fair rewards.
- **Career Growth:** Offer clear career paths and opportunities for advancement.