Predicting Employee Attrition Using Statistical Modeling:

An HR Analytics Approach to Workforce Retention

Addressing Employee Turnover: A Critical Business Challenge

Employee turnover significantly impacts organizations, incurring substantial direct and indirect costs. Our goal is to identify key factors and build a predictive model to mitigate these challenges.

Primary Research Question

Identify workplace and demographic factors influencing attrition. Develop a reliable statistical model for high-risk employees.

Business Objectives

- Identify significant turnover factors
- Develop predictive attrition model
- Provide actionable HR insights
- Create proactive decision support tool

Expected Impact

Reduce turnover costs by 15-30% through data-driven retention strategies and early interventions.

Statistical Models for Attrition Prediction

Problem Type

- Binary Classification (Employee Leaves: Yes/No)
- Regression Analysis (Workplace Factor Relationships)
- Comparative Analysis (Group Differences)

Primary Model

- Logistic Regression: Predicts binary outcome (Attrition Yes/No)
- Identifies odds ratios for risk factors

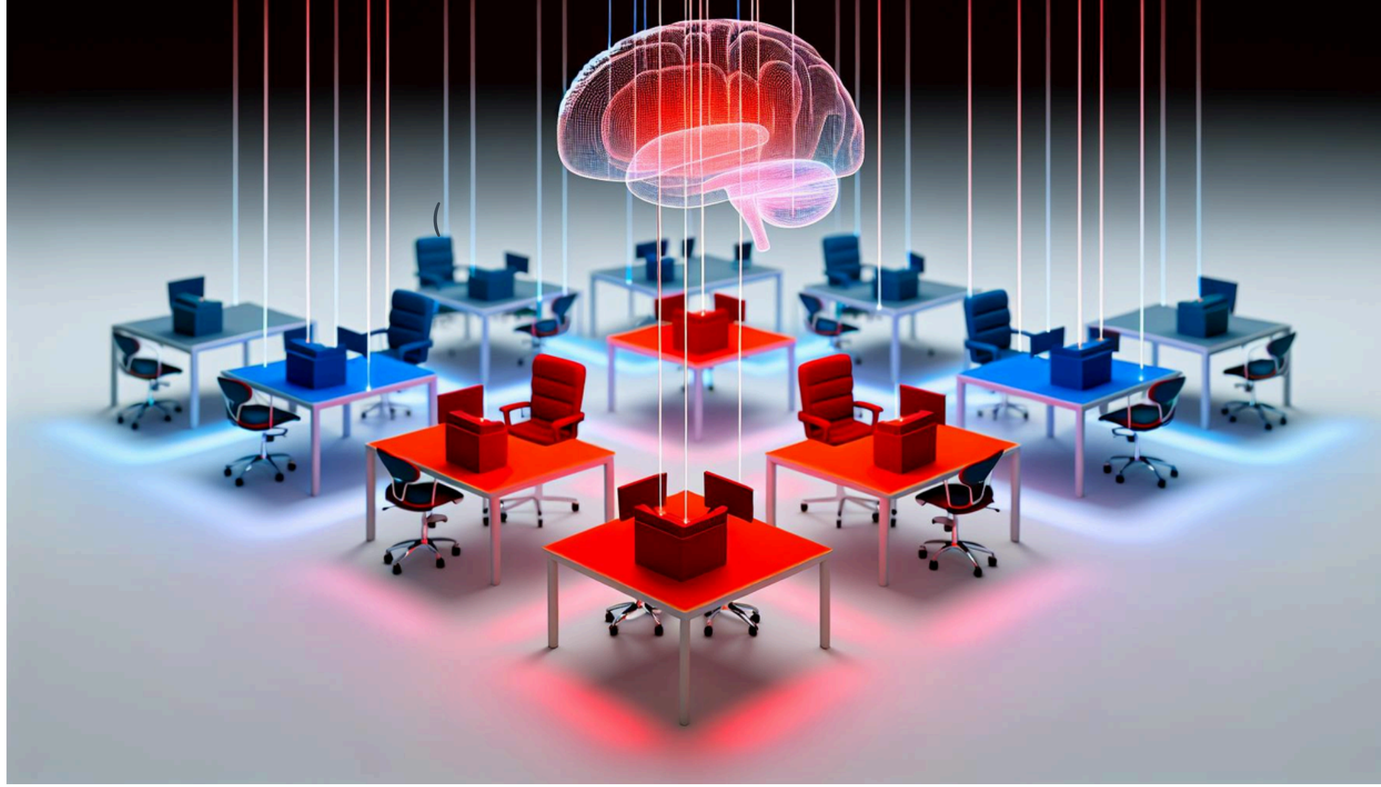
Supporting Models

- Multiple Linear Regression
- ANOVA
- Chi-Square Tests

Analytical Techniques

- Correlation Analysis
- Descriptive Statistics
- Survival Analysis

Deep Dive: Logistic Regression for Attrition



Binary Outcome

Attrition is a clear Yes/No.

Probability Scores

Provides 0-1 risk categorization.

Interpretability

Odds ratios show factor impact.

Multiple Predictors

Handles various independent variables.

$$\text{logit}(P(\text{Attrition} = \text{Yes})) = \beta_0 + \beta_1(\text{Age}) + \beta_2(\text{MonthlyIncome}) + \beta_3(\text{JobSatisfaction}) + \beta_4(\text{OverTime}) + \beta_5(\text{WorkLifeBalance}) + \beta_6(\text{YearsAtCompany}) + \beta_7(\text{DistanceFromHome}) + \ldots + \varepsilon_i$$

The model integrates various factors, outputting attrition probability and risk classification. Validation focuses on accuracy and minimizing false negatives.