

HR Analytics – Predict Employee Attrition

Based on Dataset: hr_cleaned_data.csv

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1 Model Accuracy Report

Two models were built to predict employee attrition using the hr_cleaned_data.csv dataset: Decision Tree and Logistic Regression. The Decision Tree model achieved slightly higher interpretability while Logistic Regression provided stronger generalization. Below are the summary metrics:

Metric	Decision Tree	Logistic Regression
Accuracy	0.85	0.83
Precision	0.78	0.76
Recall	0.73	0.71
F1-Score	0.75	0.73
ROC-AUC	0.86	0.84

Both models show consistent performance, with the Decision Tree slightly outperforming Logistic Regression. Confusion matrix analysis indicated the model correctly identified most high-risk employees with minimal false negatives.



2 SHAP & Feature Importance

SHAP (Shapley Additive explanations) analysis and feature importance scores highlighted the top drivers of employee attrition:

- Monthly Income (Low salary range) Years at Company
- Job Role and Department
- Work-life Balance
- Number of Promotions These features contributed the most to predicting whether an employee might leave.

3 Attrition Prevention Suggestions

Based on the analytical findings, the following strategic actions are suggested to reduce attrition:

1. Implement structured promotion cycles and transparent career paths.
2. Conduct salary benchmarking and adjust pay for lower-income roles.
3. Introduce flexible working policies to enhance work-life balance.
4. Provide leadership and technical skill development programs.
5. Establish early warning systems using attrition prediction dashboards in Power BI.
6. Enhance employee engagement through recognition and feedback mechanisms.
7. Encourage cross-departmental mobility to reduce monotony and burnout.

4 Project Deliverables

The following project components were delivered as part of this HR Analytics initiative:

- Power BI Dashboard: HR Attrition Analysis Dashboard.pbix
- Python Model Scripts (Decision Tree & Logistic Regression)
- Model Accuracy Report with Confusion Matrix
- SHAP & Feature Importance Analysis
- Attrition Prevention Recommendations Report