Analyzing Factors Influencing Employee Turnover:

An Applied Study Using Python

Final Project within the PACE Strategy

Advanced Data Analysis

(Salifort Motors Company)

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Introduction

Project Overview:
This project aims to analyze factors influencing employee turnover at Salifort Motors using data related to work hours, satisfaction levels, incentives, and project counts. The primary goal is to identify the key reasons behind employee departures and offer recommendations for improving the work environment.

Importance of the Project:
Analyzing this data helps pinpoint issues related to high turnover rates, assisting in developing more effective retention policies and enhancing the workplace.

Objectives of the Analysis

- **Understanding Influential Factors:** Identify the key features affecting employee decisions to stay or leave.
- **Identifying Improvement Points:** Discover the factors that can be enhanced in the work environment to boost employee satisfaction.
- **Providing Practical Recommendations:** Develop strategies to improve the work environment and organizational policies.

1. Planning Stage

- **Understanding the Problem:** Determine the factors causing employees to leave, helping improve the work environment and reduce turnover.
- **Key Questions:** What are the primary factors influencing employees' decisions to leave? How can the company improve policies to reduce turnover?
- **Required Outputs:** A comprehensive analysis of influencing factors and recommendations to enhance policies.

2. Analysis Stage

Exploratory Data Analysis (EDA):
Used visualizations and correlation analysis to understand distributions and patterns, focusing on features like job satisfaction and monthly work hours.
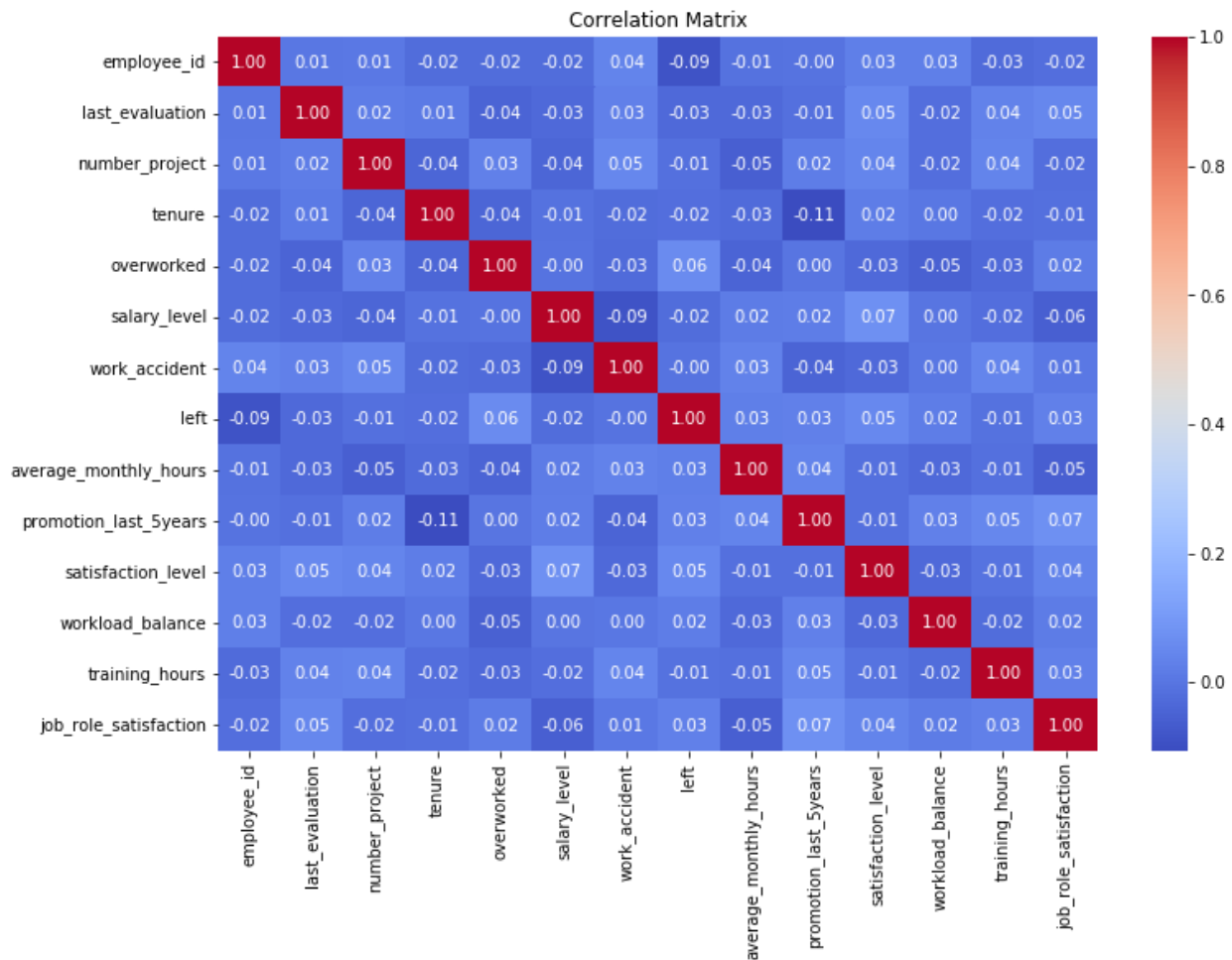
Addressed missing data and restructured data where necessary to improve predictive models.

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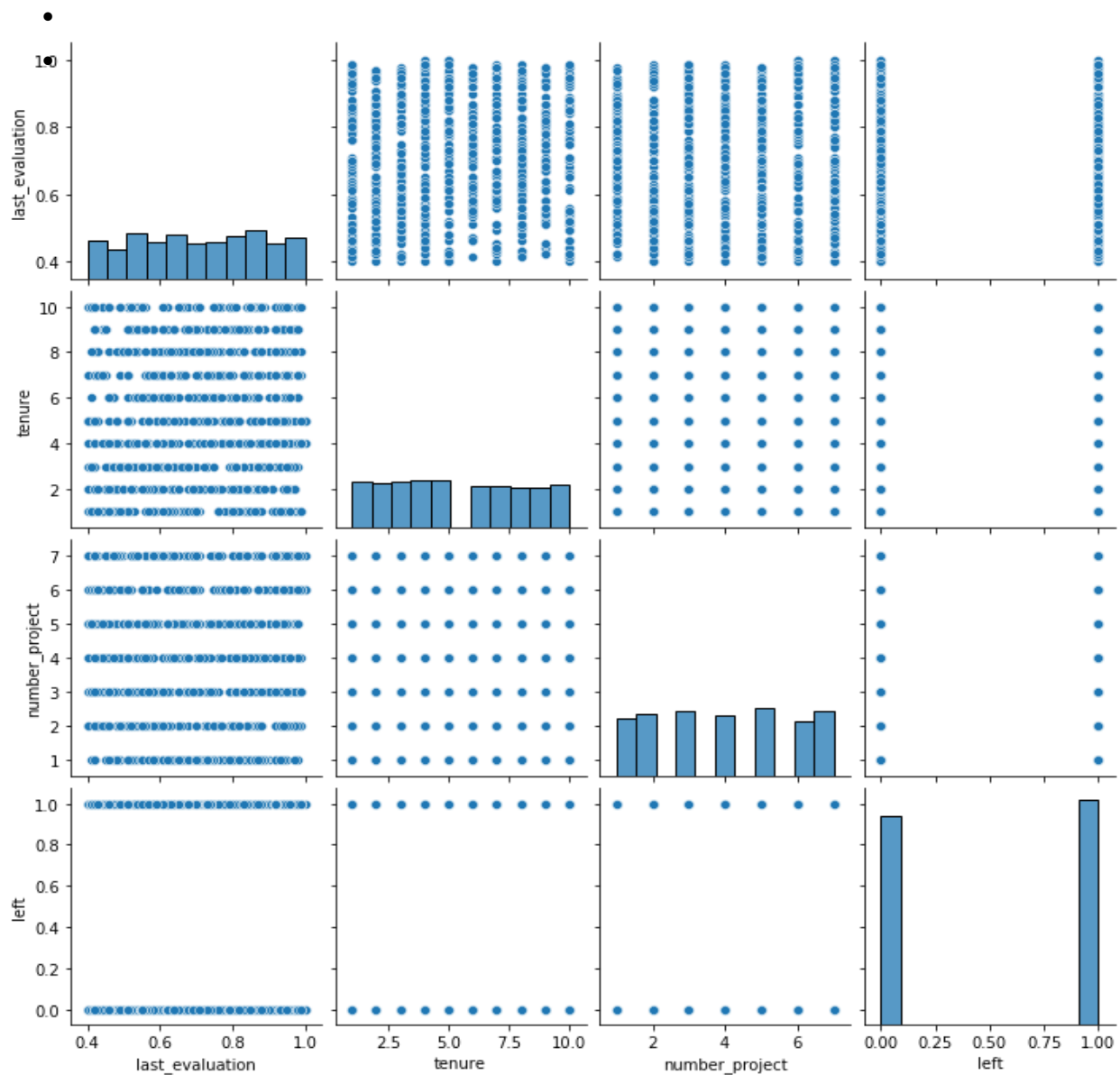
- **Modeling:**
  Applied Decision Tree and Random Forest models to assess predictive capabilities. Random Forest performed better due to its ability to handle feature interactions.

3. Construct Stage

- **Building Models:** Improved Decision Tree and Random Forest models by tuning parameters and testing hypotheses related to model performance.
- **Assumption Verification:** Ensured data did not violate model assumptions, adjusting models to improve accuracy and stability.

4. Execute Stage

- **Performance Evaluation:** Decision Tree achieved 45% accuracy, while Random Forest reached 51%. The models highlighted the significance of features like satisfaction levels and monthly work hours in predicting employee decisions.
- **Sharing Results with Stakeholders:** Results indicate the need to improve the work environment and enhance job satisfaction programs to reduce turnover.

5. Results

- **Decision Tree Model:** Showed limited performance due to the complexities within the data and difficulty handling complex feature relationships.
- **Random Forest Model:** Delivered better performance with higher accuracy, demonstrating the importance of models that can manage feature interactions.

6. Analysis

- **Feature Impact:** The most influential features were satisfaction levels and monthly work hours.
- **Imbalanced Classes:** This led to prediction challenges and necessitates strategies to improve data balance.

7. Final Recommendations

- **Improving Work Environment:** Redistribute tasks and reduce project loads to minimize fatigue.
- **Enhancing Employee Satisfaction:** Provide regular support programs and performance-based rewards.
- **Continuous Performance Monitoring:** Utilize periodic analytics tools to track changes and regularly refine policies.

Table: Model Comparison

MODEL	ACCURACY	KEY FEATURES
DECISION TREE	45%	Struggles with complex data
RANDOM FOREST	51%	Handles feature interactions well

Conclusion

The results highlight the importance of improving the work environment and employee retention policies. Continuous analysis can help enhance job performance and reduce turnover, supporting the company's goals in maintaining a positive and motivating work environment.