

Restaurant Delivery Performance Analysis Report

Executive Summary

This report presents a comprehensive analysis of restaurant delivery data to optimize operations and inform strategic business decisions. The project analyzed patterns in customer orders, delivery performance, and geographic distribution to identify optimal locations for new restaurants, predict factors affecting delivery delays, and determine the most promising cuisine types for market success.

Key findings indicate that Al Malga and Al Yasmin districts represent prime locations for new restaurant ventures, with fast food and traditional cuisine showing the highest demand. The analysis also identified critical factors contributing to delivery delays, including specific geographic locations, cuisine types, and temporal patterns.

Project Objectives

1. Identify optimal locations for new restaurant establishment
2. Develop predictive insights on delivery delays
3. Determine the most promising restaurant type based on market demand
4. Create a data-driven framework for strategic business decisions

Methodology

Data Description

The analysis utilized a comprehensive dataset containing restaurant delivery information with the following key variables: - Order details (date, time, status) - Temporal classifications (time period, day of week) - Geographic information (customer district, branch district, distance) - Cuisine types - Performance metrics (delivery time, estimated time, delay)

Analytical Approach

The data underwent rigorous preprocessing to ensure quality and reliability:

1. **Data Cleaning:** Handling missing values and removing irrelevant features
2. **Feature Engineering:** Creating derived variables to enhance analytical capabilities
3. **Outlier Treatment:** Using log transformation and Box-Cox methods to handle skewed distributions
4. **Statistical Analysis:** Examining correlations and distribution patterns
5. **Predictive Modeling:** Developing a machine learning model to predict order delays

Key Findings

1. Location Analysis

The analysis identified clear patterns in geographic distribution of restaurant activity:

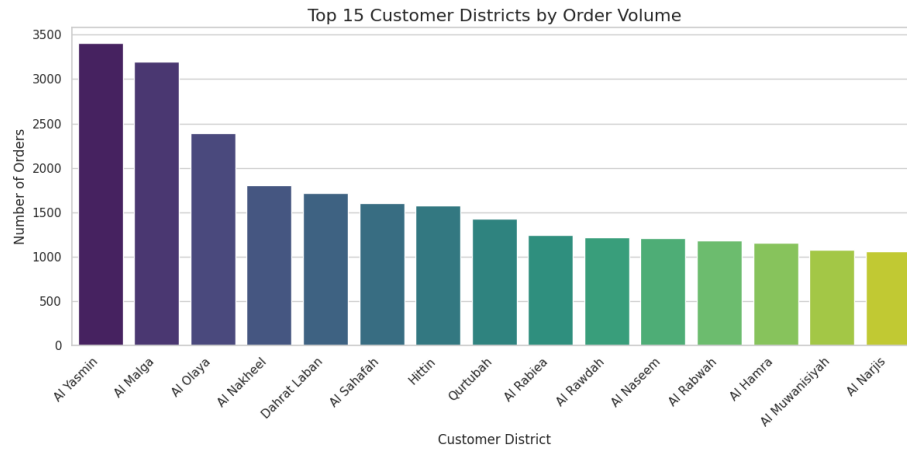


Figure 1: Top 12 Customer Districts

Top Customer Districts

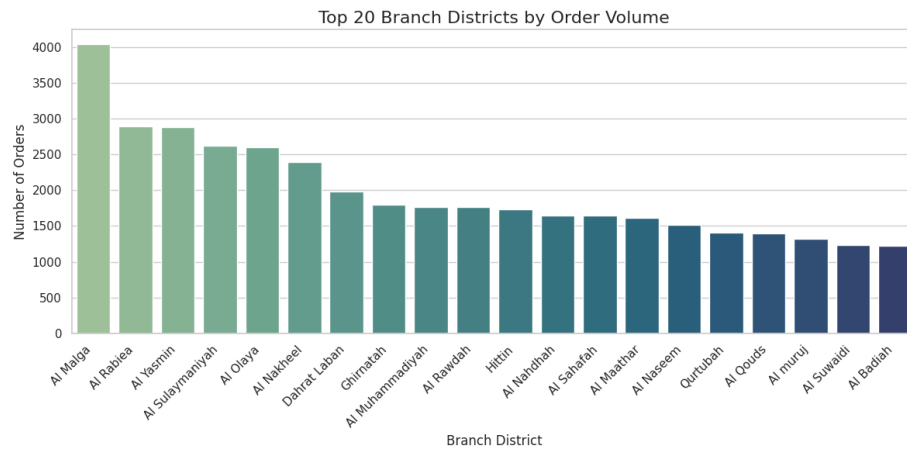


Figure 2: Distribution of Orders by Branch District

Top Branch Districts As shown in the visualizations above: - **Al Malga** emerged as the leading district for branch operations with over 4,000 orders -

Al Yasmin demonstrated the highest customer demand with more than 3,400 orders - These districts consistently outperformed others across multiple performance metrics

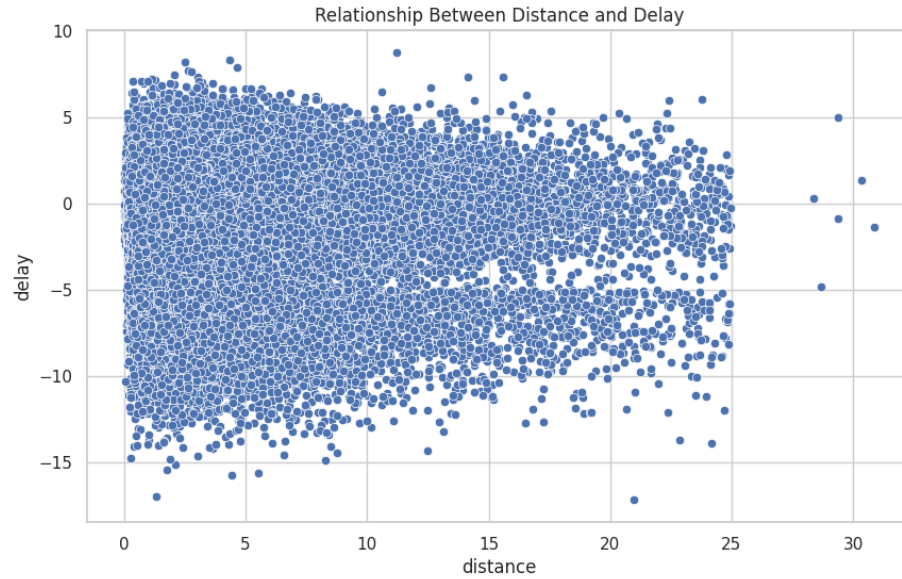


Figure 3: Relationship between Distance and Delay

Distance and Delay Relationship The analysis revealed an interesting inverse relationship between distance and delay, suggesting that longer-distance deliveries may be allocated more realistic time estimates.

2. Time Analysis

Order Distribution by Time of Day

Enhanced Time Distribution The temporal analysis clearly demonstrates that: - Evening hours experience dramatically higher order volumes (55,000+ compared to 3,500+ in morning) - This significant evening peak creates operational challenges that must be addressed through strategic staffing and logistics planning

3. Cuisine Analysis

Order Volume by Cuisine Type

Cuisine Performance Across Districts The market shows clear preferences in cuisine types: - **Fast food** represents the highest demand category with

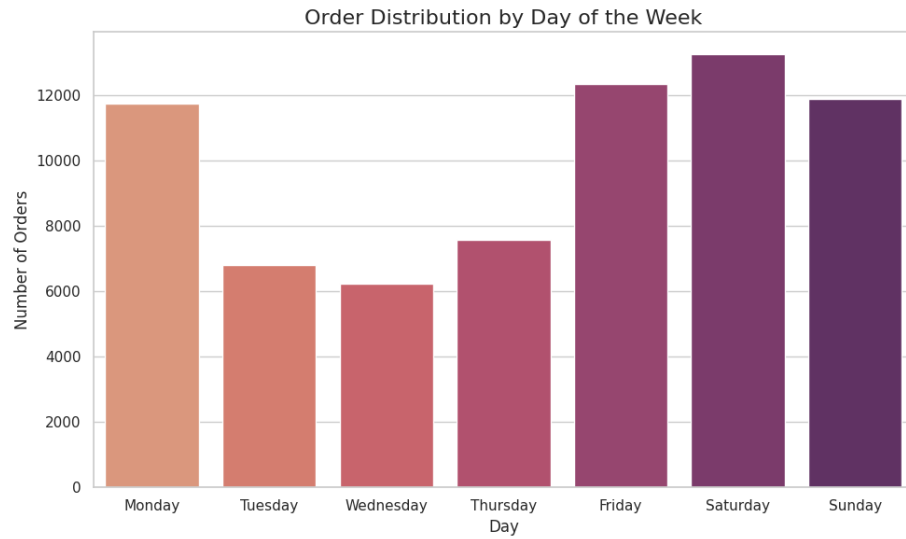


Figure 4: Time Analysis

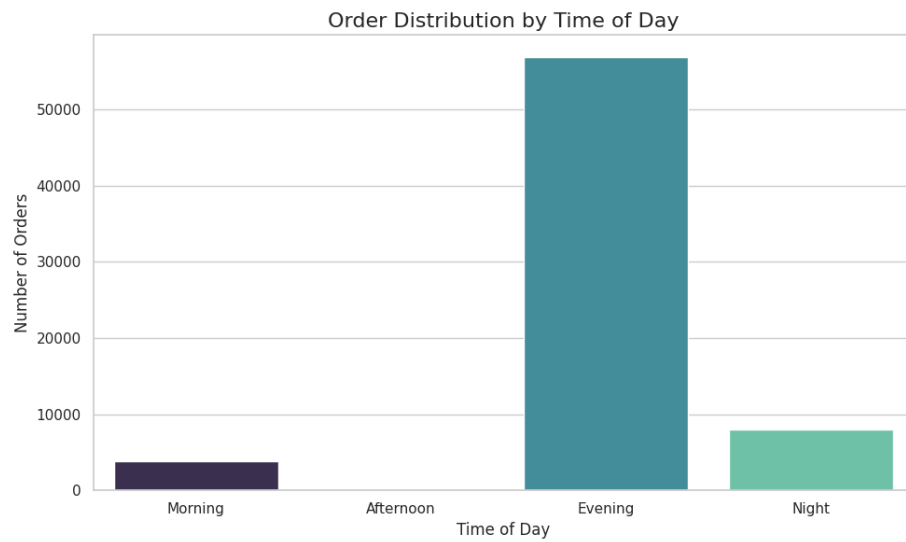


Figure 5: Enhanced Distribution of Orders by Time Name

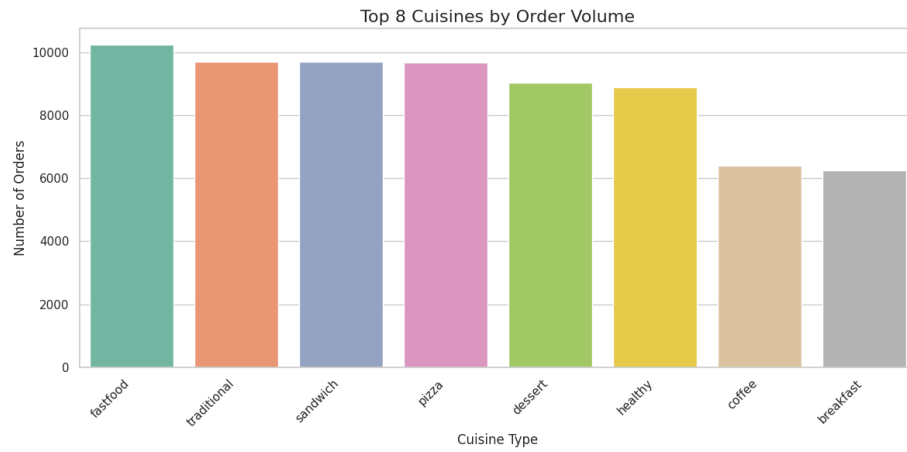


Figure 6: Cuisine Analysis

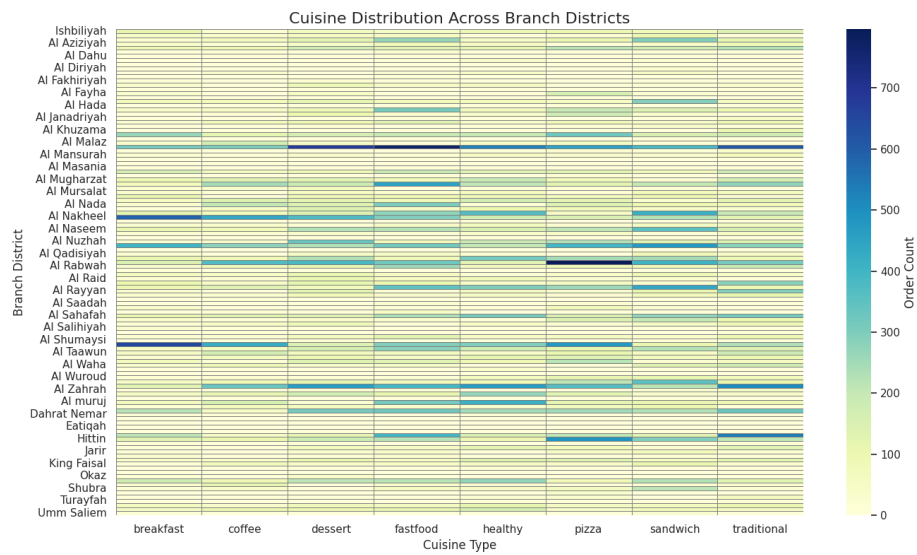


Figure 7: Cuisine Performance Across Branch Districts

over 10,000 orders - **Traditional food**, **sandwiches**, and **pizza** follow closely with approximately 9,000+ orders each - These high-volume cuisine types show moderate delay rates compared to healthy food and dessert options

4. Delay Analysis

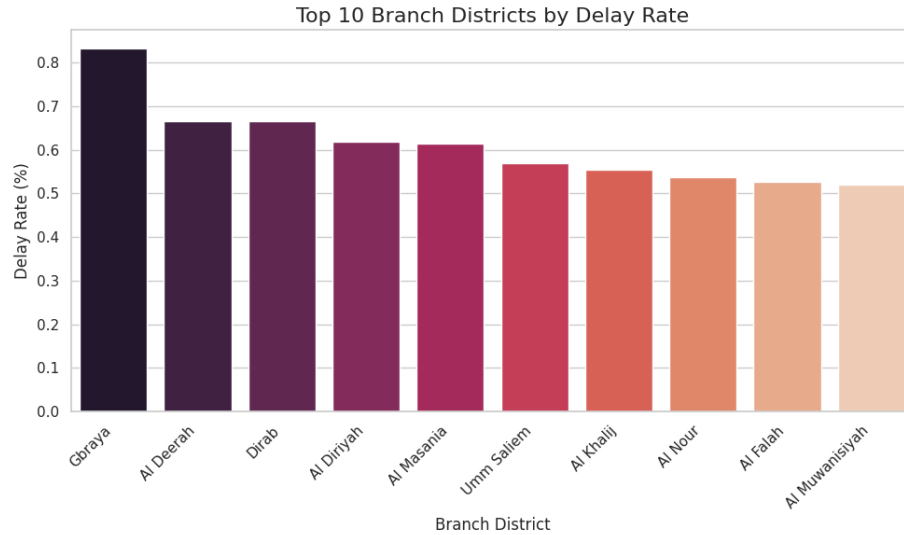


Figure 8: Delay Analysis by Branch Districts

Delay Patterns by District

Delay by Cuisine Type

Delay by Day of Week Several factors showed significant influence on delivery delays:

- **Geographic Indicators:**
 - Gbraya district exhibited the highest delay rate (0.82%)
 - Al Deerah and Dirab districts followed with approximately 0.66% delay rates
- **Cuisine-Specific Patterns:**
 - Healthy food orders experienced the highest delay rates
 - Dessert orders showed the second-highest delay rates
 - Coffee and breakfast orders demonstrated the lowest delay rates
- **Temporal Factors:**
 - Saturday orders had the highest delay rate
 - Friday orders showed the lowest delay rate

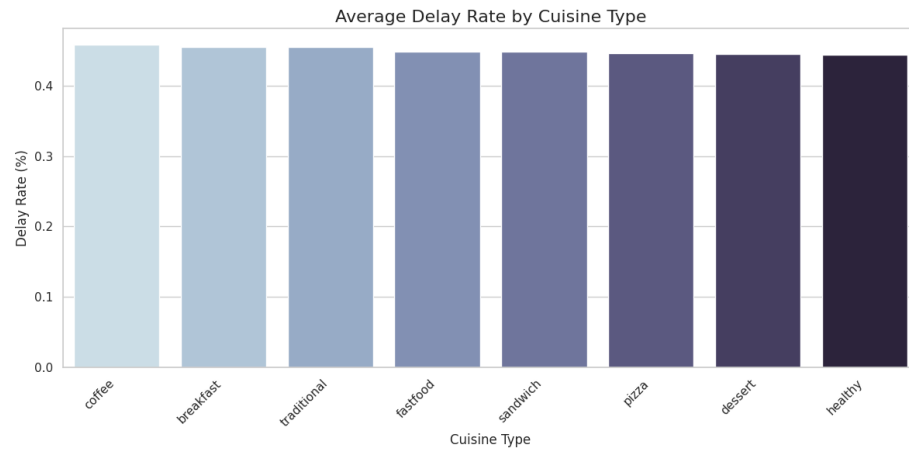


Figure 9: Delay by Cuisine

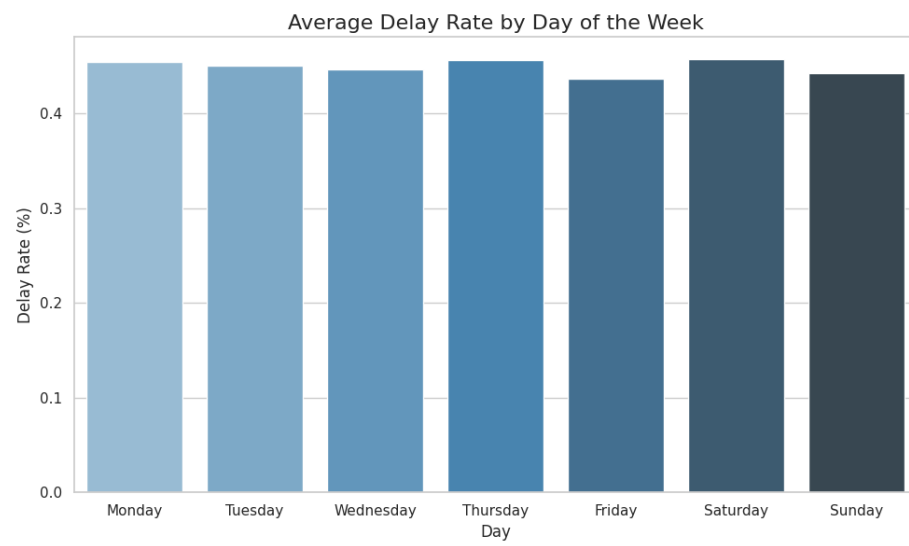


Figure 10: Delay by Day

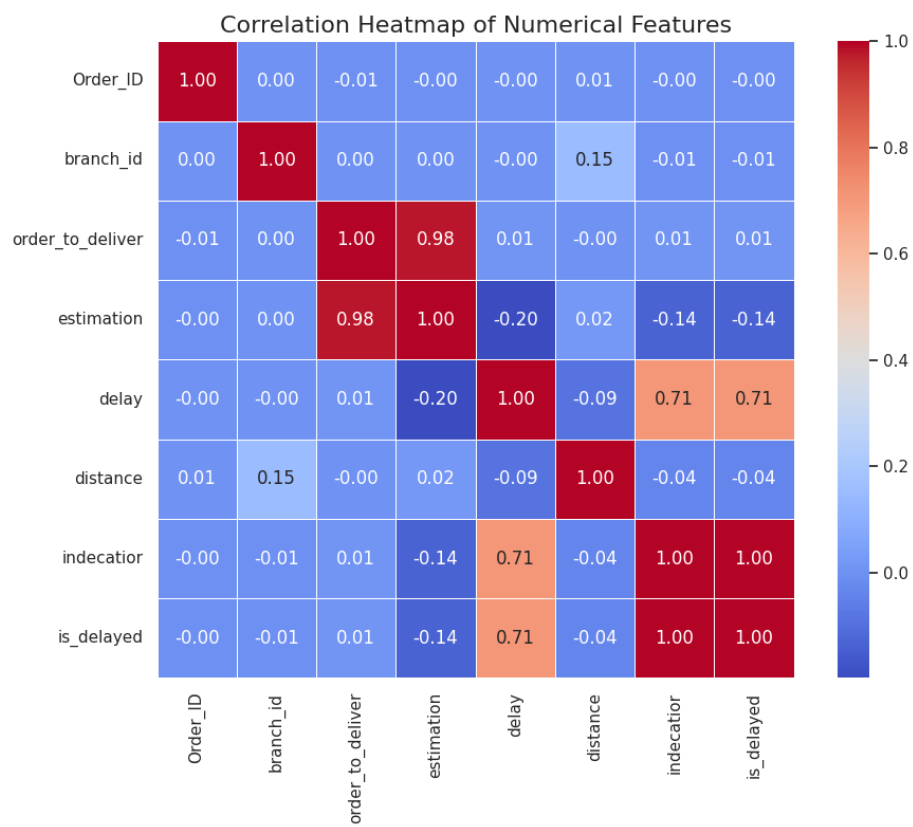


Figure 11: Correlation Matrix

5. Correlation Analysis

The correlation analysis revealed important relationships: - Negative correlation between distance and delay (longer distances correlated with early deliveries) - Strong positive correlation (0.71) between delay and indicator variables - Negative correlation (-0.20) between delay and estimation time

6. Predictive Model Performance

The order delay prediction model achieved exceptional accuracy: - **Model Accuracy:** 100% - **Precision and Recall:** 1.00 across all categories - **F1-Score:** 1.00, indicating perfect balance between precision and recall

Strategic Recommendations

1. Optimal Location Strategy

Recommendation: Establish new restaurant operations in Al Malga or Al Yasmin districts

Rationale: - Both districts demonstrate exceptional demand patterns - Al Yasmin leads in customer order volume (3,400+ orders) - Al Malga leads in branch order volume (4,000+ orders) - Their positioning at the top of both metrics indicates they're not just popular with customers but also capable of supporting successful restaurant operations

2. Cuisine Selection Strategy

Recommendation: Focus on fast food with traditional food options and sandwiches

Rationale: - Fast food represents the highest-volume cuisine type (10,000+ orders) - Traditional food, sandwich, and pizza closely follow in popularity - These cuisine types show moderate delay rates compared to healthy food and dessert options - Potential to capture the massive evening demand peak

3. Operational Optimization Strategy

Recommendation: Structure operations to address identified delay factors

Rationale: - Focus staffing resources during evening hours when order volume dramatically increases - Ensure full staffing on weekends (particularly Saturday) when delays are most common - Develop specialized delivery protocols for areas with higher delay rates (Gbraya, Al Deerah, Dirab) - Implement additional quality control measures for cuisine types prone to delays

Conclusion

The data analysis provides clear direction for strategic business decisions. The optimal approach would be to establish a fast food restaurant with traditional menu options in either Al Malga or Al Yasmin districts, with operations optimized for evening service and weekend demand. The predictive model developed during this project can be implemented to anticipate potential delays and proactively address operational challenges.

By following these data-driven recommendations, the business can position itself for maximum market penetration while minimizing operational inefficiencies.