

# Milestone 2: Delivery Performance & Demand Forecasting

## Delivery Performance Overview

Delivery delay was calculated as the difference between actual and estimated delivery dates. Positive values represent late deliveries, zero indicates on-time delivery, and negative values represent early deliveries.

## Key KPIs

- Average Delivery Delay (days) - Percentage of Late Deliveries - Percentage of On-Time Deliveries
- Percentage of Early Deliveries - Average Total Delivery Time

## **Delivery Bottlenecks**

Customer state and seller state combinations were analyzed to identify problem routes. Routes with high average delays and high percentage of late deliveries were flagged. Seasonal performance variations were also observed, particularly during peak months.

## **Demand Forecasting Methodology**

Top product categories were selected based on order volume and stability. Daily time series were created and split into training (80%) and testing (20%). Two forecasting methods were implemented: - 7-day Moving Average - Exponential Smoothing ( $\alpha = 0.1, 0.3, 0.5$ ) Models were evaluated using MAE, RMSE, and MAPE.

## Forecast Results & Recommendations

Best-performing models achieved acceptable forecasting accuracy (MAPE target < 15%). 30-day forecasts were generated for inventory planning. Recommendations: - Improve logistics in high-delay regions - Pre-stock high-demand categories before peak seasons - Consider regional warehouse optimization - Use forecasting outputs for safety stock planning