

Introduction

This report addresses the need to improve delivery time predictions in the system. The goal is to explore alternative methods, such as predicting delivery time per sector, to improve accuracy.

Predicting delivery times per sector.

Validating the hypothesis of predicting delivery times per sector involves gathering and preprocessing delivery data. It can be done by setting up a predictive model using the differences in the length of delivery in each sector and verify this by backtesting and assessing whether the average error has decreased. It should be noted that the prediction error value should be absolute, because the goal is to observe a deviation.

Methods that will predict delivery times

Given the significant correlation between the drivers' performance and the weight of orders, it would be necessary to perform a linear regression using these two parameters to see how best to adjust the coefficients of sensitivity to these variables.

However, it should be taken into consideration, that the use of drivers' performance may not be ideal, because drivers may change relatively often and there will be problems with a new employee. Therefore, it would be better to focus on the weight of the order and possibly the number of products included in its composition.

Reasons for delivery time differences

Some deliveries may take more time due to various factors such as the customer availability. Delays can occur if customers are unavailable to receive deliveries at the scheduled time. This could result in drivers having to wait, make additional attempts, or reschedule deliveries, all of which can extend delivery times. Other factors impacting delivery times could include adverse weather conditions and neighborhood characteristics. For example closed-gated community which could cause waiting to open the gate.

Additional data

In order to predict delivery times more accurately, it's essential to identify additional factors that may influence delivery durations and that can be aggregated in the future

analysis in this area. Some of them were mentioned above, but here are some extended suggestions:

1. Address type: As mentioned, the distinction between single-family homes and apartment buildings can significantly affect delivery times. Collecting data on address types can provide valuable insight into delivery time trends.
2. Weather: Weather conditions such as rain, snow, or extreme temperatures can have a significant impact on delivery time. Bad weather may lead to increased traffic, causing delays in deliveries.
3. Neighborhood Characteristics: Characteristics of the neighborhood, such as whether it's a gated community or if access codes are required for entry, can affect delivery times. The first one may require additional time for drivers to navigate entry procedures, potentially leading to longer delivery times.

Risk of over-estimating and under-estimating the delivery times

The risk of over-estimation of actual time delivery is first of all, additional cost for delivery company as the particular driver will take less orders than he can deliver and as a result will need to go back for additional packages to the warehouse which results in waste of time and fuel. On the other hand, underestimating delivery time can have significant impact on timeliness and can lead to overtime for drivers or some packages can be not delivered on time and because of that the company can lose some clients.