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Predicting delivery times per sector

From previous analysis we've found, that the delivery times in Sector 1 are significantly higher compared to other sectors. Considering the impact the location has on the order's delivery time, it would be sensible to take it into account for predictions. To go off of the already-existing method, to implement the new one we'd need to calculate delivery time for each order (removing outliers and missing/erroneous data). Then we'd group by sector and calculate the average times for each sector. That should give a more realistic idea of an expected time.

Alternative prediction algorithms

From additional analysis, we've found that delivery times are also dependent on multiple other variables (weight of the order, day of the week order was made and order's driver). I believe that what could work (but would obviously require testing and fine-tuning) is taking chosen variables into account during calculations. First, we'd need to predict delivery times per sector using the method described previously. Then, based on the variables mentioned earlier, we'd need to assign each of them a numerical weight, that the planned delivery time would be multiplied by. For an example, as we found that the day of the week has a smaller impact on the time compared to the order's driver it would have a smaller weight, but still it would've been taken into account. Obviously the method would require more exact calculations and polishing up, but that is the main idea.

Why could some deliveries take longer?

I am assuming, that the driver is required to hand-off the order to the customer (unless specified otherwise). There's many variables that could impact delivery time. Lack of elevators could be one of them, as in the case of orders made to apartments on higher floors, the driver would need to use the stairs instead. I'll try to classify most of the other variables into few chosen categories.

1. The customer might want to inspect the order first, whether it is to check if it was damaged during delivery, or it's to check order's completeness, it can for sure impact the delivery time.
2. For many different situations the driver might be required to wait for the customer, which will prolong the delivery time (customer not hearing the doorbell; customer not waiting for the driver; customer absent etc.)
3. Erroneous address data can also impact delivery time. For an example if the customer inputted the wrong apartment number then the mistake can take a while to fix.
4. Building type definitely has an impact on the delivery time. For single-family houses the driver can walk up to the front door, while for orders to flats he needs to first be let into the building, then (if there is no reception) move to the correct floor before finally delivering the order.

Additional data to collect in the future

I am assuming the question relates to the “STOP” delivery time, not the “DRIVE” one.

1. Building type (single-family house, large multi-family accommodations with a few general divisions based on number of floors as in Poland buildings with 4 floors or more are required to have elevators, etc.).
2. Floor of the apartment the order was made to.
3. If a contactless-delivery was requested (if the possibility exists).

Risks of over- and under-estimating the delivery time

Here are some chosen risks that I deemed most significant.

1. If the information about the planned delivery time is disclosed to the customer, under-estimating can greatly lower customer satisfaction, as they’ll be upset by their orders arriving late.
2. Both over- and under-estimating the delivery time can interfere with accurate driver evaluation. It can lead to cases where well-performing drivers can be disciplined for under-performing, or where under-performing drivers are awarded and as a result the efficiency can drop.
3. If there is an expected amount of orders to be completed during a workday, over- and under-estimating the delivery time can give false information as to whether the company is under- or over-performing. Also, dependent on the way the orders function, over-estimating delivery time could lead to a lower orders completed in a day.