Analytical Report

Prepared By

Arjun Prasad Sarkhel,

Ayush Patel,

February 16, 2022

Overview

This report shows the analysis conducted to determine the likelihood of an order getting cancelled before delivery. With the help of this analysis & the correct measures, the chances of the cancellation can be minimalized so that it can be reassigned to a different rider before it gets cancelled.

Scope

This report analyses the various ways some features or behaviours can influence the probability of the rider cancelling the order. By studying these behaviours, and taking proper measures we can reduce the likelihood of the cancellation so the order can be re-assigned.

Methodology

The data used for creating the reports & the findings are provided by Shadowfax. This data was gathered from delivering food orders from clients such as Swiggy and Zomato to their respective customers.

Flowchart

This is what the typical order flowchart looks like.
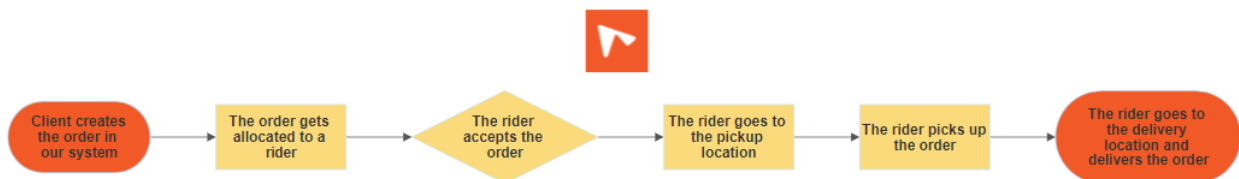
Understanding the Problem Statement

The problem statement in hand is to predict whether the delivery rider will cancel the order or not based on some given previous data of the driver. So, this is a binary-classification problem, where the dependent feature is whether the order is not cancelled (read 0) or cancelled (read 1), and the independent features are the various historical data about the driver.

Analysis & Findings

1. Taking a look at the Target variable

For our problem statement:
- 0 – order is not cancelled
- 1 – order is cancelled

Count of Total Orders by cancelled

444782

Key Notes: -
· 0 accounted for 98.84% of Count of cancelled.
· 0 had 4,44,782 Count of cancelled and 1 had 5,218.3
· This was a key-point in modeling as the binary-classes are highly-imbalanced, so necessary measures need to be taken else it will be a biased model.

5218

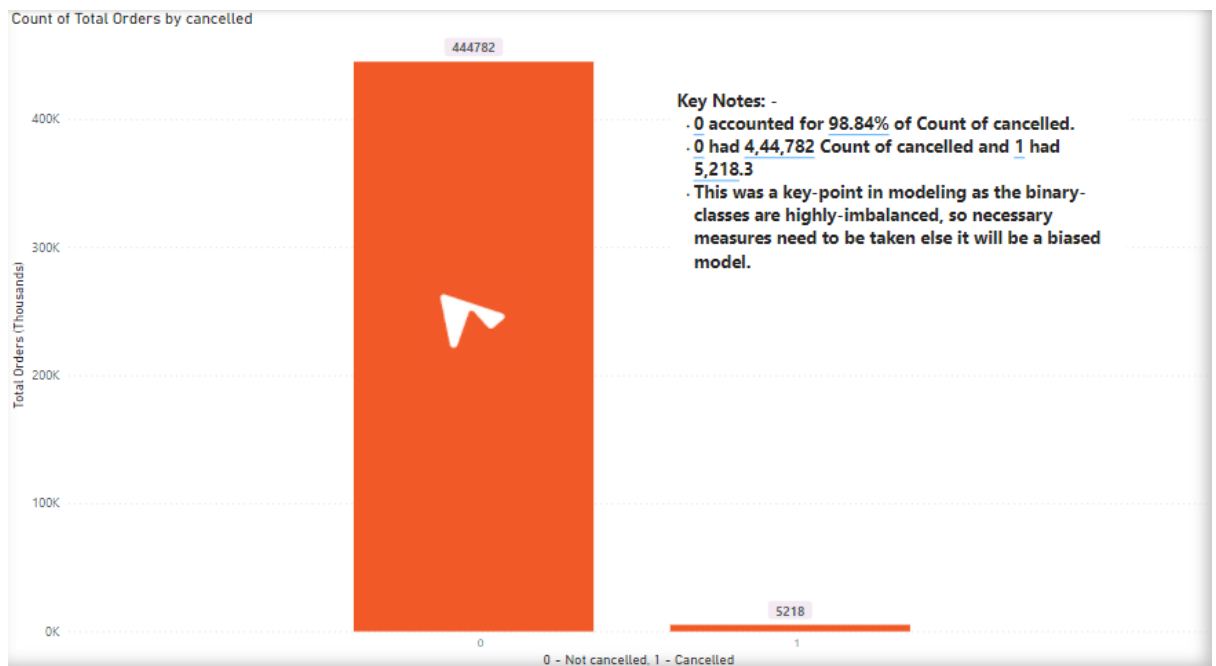0 - Not cancelled, 1 - Cancelled

Figure 1

From '*Figure 1'*, we can see that it's a highly unbalanced class, which if we put simply we can say that chances of an order getting cancelled is very less (~0.115%) than that of an order not getting cancelled. For the business even this small amount can lead to huge amount of loss, hence it is very necessary to address this issue.

2. Taking a quick glance at some of the numbers!

So, basically we are given data starting from 26th January 2021 – 06th February 2021, below table gives us an overview of the average data of the orders.

Daily average Order	Daily Average Active Riders	Daily Average Cancelled Orders	Daily Average Reassigned Orders
37499	7885	434	1146

3. What are the main reasons an order gets cancelled?

So the delivery riders have the option to get the order cancelled before delivery by calling the client's call-centre. Let's have a look at the various reasons as to why an ordered is cancelled before delivery.
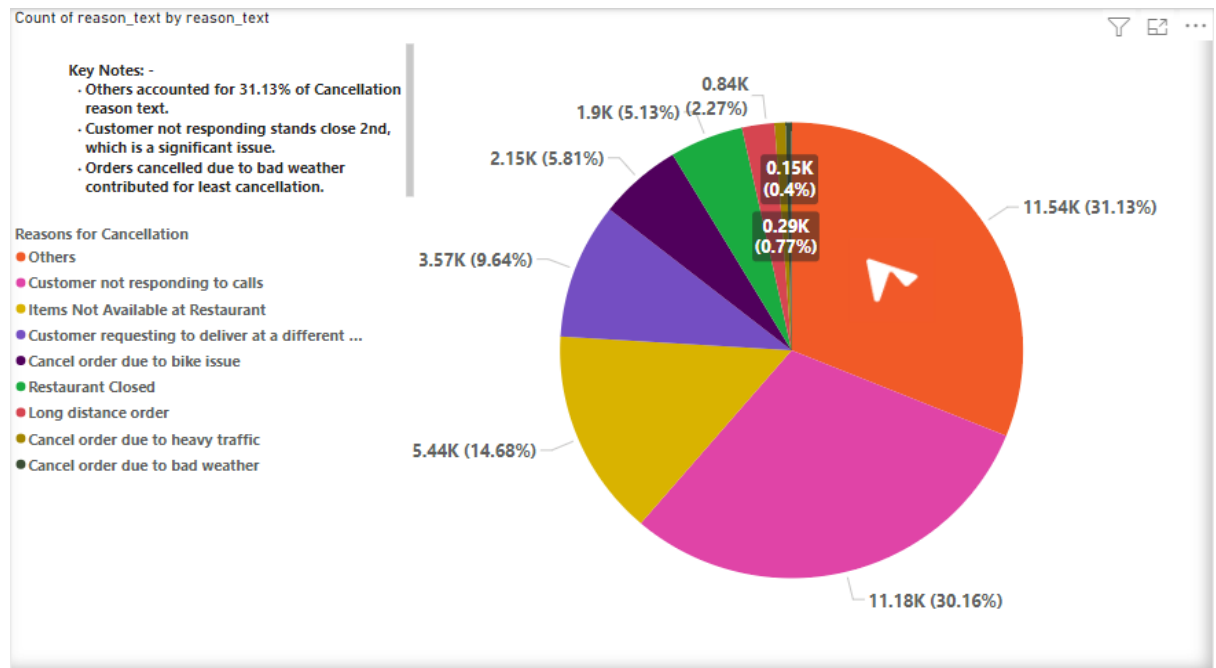

Key Notes: -
- Others accounted for 31.13% of Cancellation reason text.
- Customer not responding stands close 2nd, which is a significant issue.
- Orders cancelled due to bad weather contributed for least cancellation.

Reasons for Cancellation
- Others
- Customer not responding to calls
- Items Not Available at Restaurant
- Customer requesting to deliver at a different ...
- Cancel order due to bike issue
- Restaurant Closed
- Long distance order
- Cancel order due to heavy traffic
- Cancel order due to bad weather

Figure 2

From *'Figure 2'*, we can see that customers not responding to call is one of the main reason for the riders cancelling the orders, this fact should be taken into consideration as it's not in the hand of the delivery rider.

Another interesting finding is that the orders due reasons being related to heavy traffic & bad weathers have the lowest occurrences among all the others.

4. What are the main reasons for an order to be re-assigned?

Let us first understand the context of the term 're-assigned' here. Here re-assigned means that either the order will get re-assigned to a new driver manually or automatically by the system. However this doesn't ensures that the order will get cancelled or not.

Below are the Re-assignment methods:-

- Auto – It means order got automatically re-assigned
- Manual – It means that the order had to be re-assigned by a human mostly the client's call-centre.

Below are the Re-assignment reasons:-

- Auto Reassignment basis Inaction
- Reassignment Request from SE portal.
- Reassign

Let us have a look at the number of orders re-assigned to get a broader idea.

cancelled	Count of cancelled	Count of reassignment_method	Count of reassignment_reason
0	444782	13025	13031
1	5218	719	722
Total	**450000**	**13744**	**13753**

Figure 3

From *'Figure 3'*, we can assume the following:
- For Not-Cancelled Order – 13031 (~0.029%) orders were re-assigned.
- For Cancelled Order – 722 (~0.138%) orders were re-assigned.

Note – We have assumed there are some calculation errors as count of reassignment method & count of reassignment reason should be the same.

Let's have a closer look at the re-assignment methods & reasons w.r.t our target variable i.e 0 (read order is not cancelled) & 1 (read order is cancelled).

cancelled	Count of cancelled	reassignment_reason	reassignment_method
0	431751		
1	4496		
0	3	Auto Reassignment basis Inaction. coreengine.tasks.repush_order_to_aa_bucket	
0	6849	Auto Reassignment basis Inaction. coreengine.tasks.repush_order_to_aa_bucket	auto
0	175	Auto Reassignment basis Inaction. coreengine.tasks.repush_order_to_aa_bucket	manual
1	1	Auto Reassignment basis Inaction. coreengine.tasks.repush_order_to_aa_bucket	
1	175	Auto Reassignment basis Inaction. coreengine.tasks.repush_order_to_aa_bucket	auto
1	9	Auto Reassignment basis Inaction. coreengine.tasks.repush_order_to_aa_bucket	manual
0	942	Reassign	auto
0	26	Reassign	manual
1	263	Reassign	auto
1	10	Reassign	manual
0	3	Reassignment Request from SE portal.	
0	4907	Reassignment Request from SE portal.	auto
0	126	Reassignment Request from SE portal.	manual
1	2	Reassignment Request from SE portal.	
1	247	Reassignment Request from SE portal.	auto
1	15	Reassignment Request from SE portal.	manual
Total	**450000**		

Figure 4

From *'Figure 4'*, we have observed the following points -:
- For orders which are not cancelled, Reassignment reason - Auto Reassignment basis Inaction stands & Reassignment method – auto stands out to be the most common.
- For orders which are cancelled, Reassignment reason – Reassign & Reassignment method – auto stands out to be the most common

Let us have a look at the most common reassignment reasons irrespective of whether the order is cancelled or not.
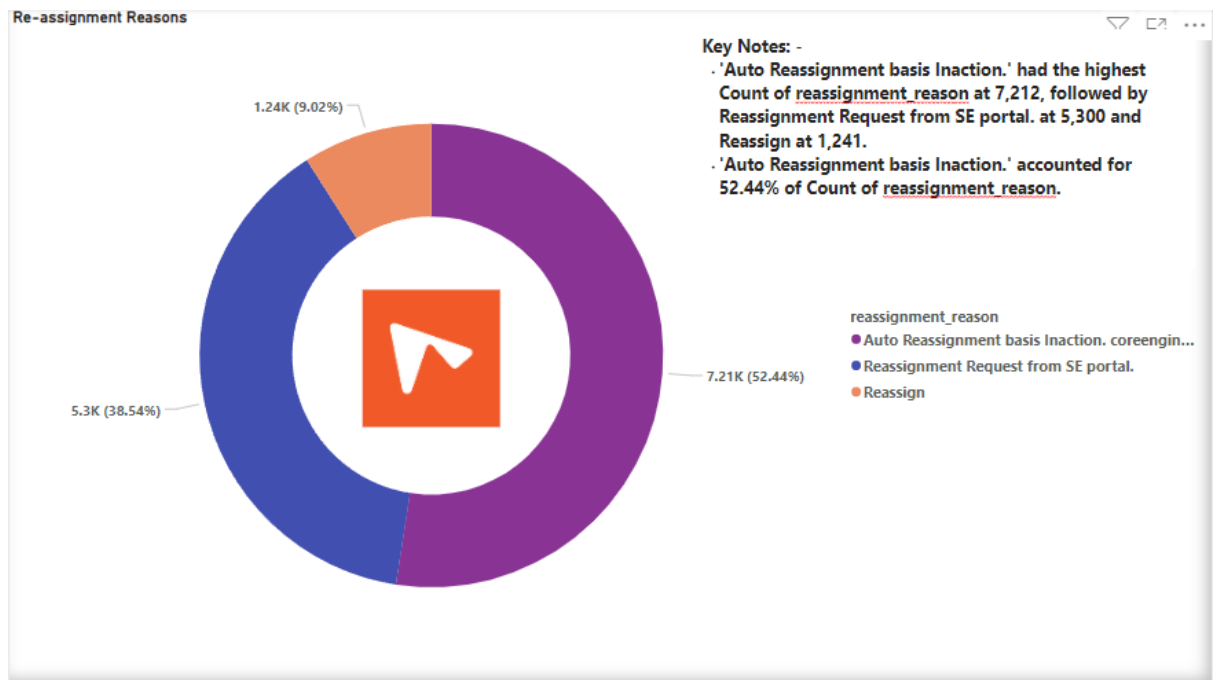

Figure 5

From *'Figure 5'*, we can see that 'Auto Reassignment basis Inaction' accounts for more than 50% of the reassignment reason.

5. Do orders that are re-assigned have higher chances of getting cancelled?

Let us have a closer look if the chances of an order getting cancelled increases if the order is re-assigned.

Cancelled	Orders Re-assigned	Orders not Re-assigned
0 – (Not cancelled)	13031	431751
1 – (Cancelled)	722	4496
Total	**13753**	**436247**

From the above table, we can say the following points:
- Chance of an order getting cancelled if order is re-assigned is ~0.05%
- Chance of an order getting cancelled if order is not re-assigned is ~0.01%

So, we can come to the conclusion that the orders getting re-assigned doesn't have a strong influence on the orders getting cancelled.

6. Does cancellation depends upon Orders placed in Weekdays/Weekends?

Now, one can question does the cancellation increases/decreases with weekdays and weekends. We can expect a surge in order in weekends, let's take a look at what it looks like. (Note: - 0 – means Order not cancelled, 1 – means Order is cancelled)

Figure 6

cancelled	WeekDay	Weekend	Total
0	368472	76310	444782
1	4441	777	5218
Total	372913	77087	450000

Figure 7

From *'Figure 6' & 'Figure 7'*, we can say the following:-

1. Both Cancelled & Not-cancelled Orders have same ratio of orders in weekday & weekend ~.207 & ~.175.
2. We can see that on Saturdays there are more order cancelled than other days, while Monday & Sunday have the lowest cancelled.
3. Thus we can conclude that Cancellation have some significant influence on the day type.

7. Unfortunately, 53% of the total orders were cancelled after pickup!

We found out that around 53% of the total cancelled orders were after the ordered was picked up. Let us visualize this first. Let's have a look at the various times of the day when the users places the order.
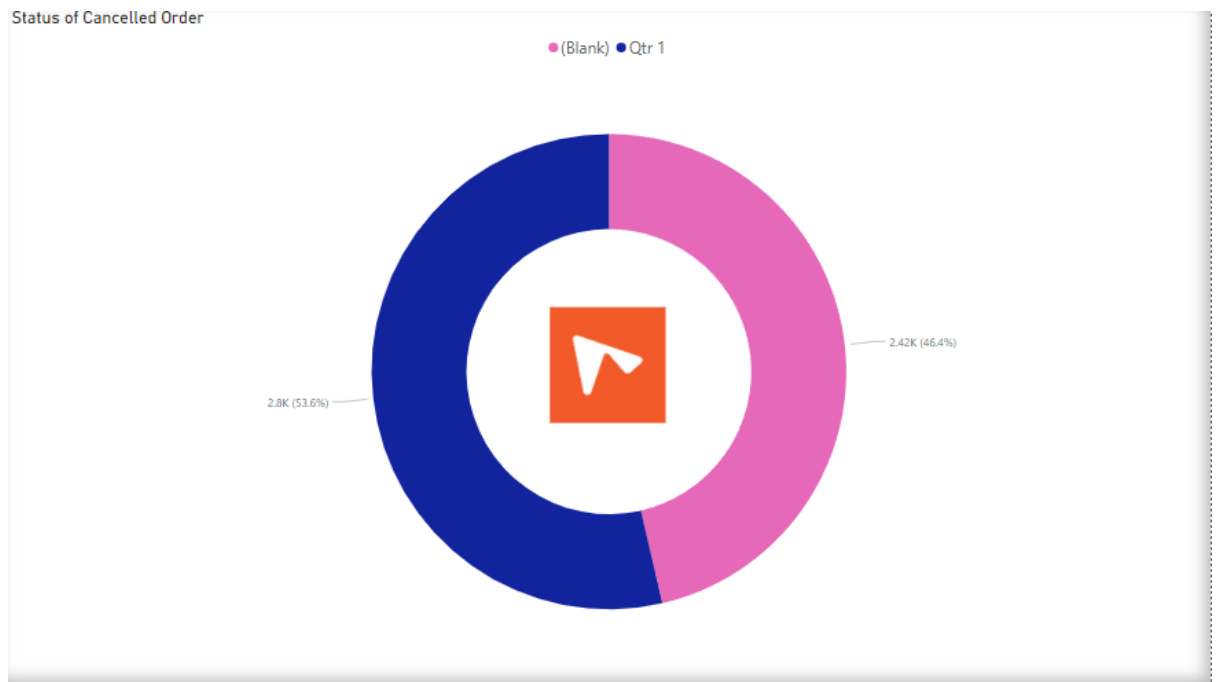
Status of Cancelled Order

(Blank) ● Qtr 1

2.42K (46.4%)

2.8K (53.6%)

Figure 7

In *'Figure 8'*, 'Blank' means order wasn't picked up & 'Qtr 1' shows the orders picked up. Hence, we can see what we had stated clearly. This can be a considerable loss for the company so necessary measures need to be taken like confirming with the customer they are certain they will take the order & then only pick-up the order.

8. Does Cancellation depends on the time of the day when an Order is placed?

Here, we will try to analyse if the cancellation of an order have a higher chance during any particular time of the day when an order is placed.
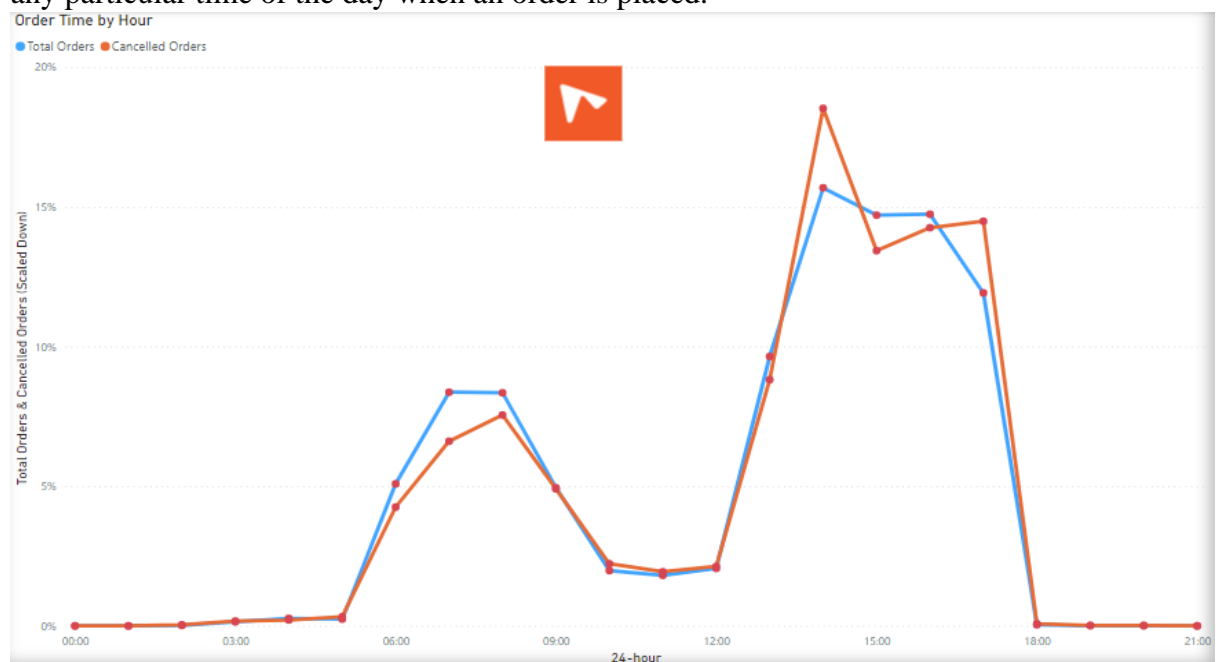

Figure 8

So, from *'Figure 9'* here we can see that for both total orders & cancelled orders, there is a rise from 6:00 am to 9:00 am, which we can make an assumption people order for breakfast. Then again there is a sharp rise from 12:00pm to 6:00 pm which we can make an assumption is due to the inflow of orders for lunch, snacks & dinner.

Also, if we notice carefully at the highest peak of total orders, the behaviour is same for cancelled orders also, by this we can inference that due to huge surge in orders, some orders get cancelled by the delivery rider.

Conclusion

This report aims to increase the level of awareness of the intellectual and technical issues surrounding the analysis of the data. Here we have analysed the various behaviours & the features that possibly increases the chances of cancellation of orders, thus enabling the orders to get re-assigned before it gets cancelled.

We believe, if over time there are more data collected, it would have been much clearer and some behaviour could be inferenced with more confidence, which in-turn will help us to minimize the cancellation of orders. Again it's not possible to fully reduce the cancellation of orders, because a lot of factors contribute to this practically.

To conclude, we hope from our analysis report would be helpful in drawing insights & reducing the chances of cancellation of orders.

Shadow Fax

Thank You!

We would like to express our sincere thanks and appreciation to **Consulting and Analytics Club. IIT Guwahati**, for hosting CASCADE CUP 2022. We would also like to thank **Shadowfax** for providing us with such an insightful and exciting problem statement & dataset. It was overall a wonderful learning experience for us, we got to learn a lot in the last few weeks. Looking forward to more such events in the future.