Analysis of Shipment Delivery and Prediction of Delay

DATA-DRIVEN APPROACH ON DIGITAL TRANSPORT

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INTRODUCTION

90% of all goods are transported by land in the UK.

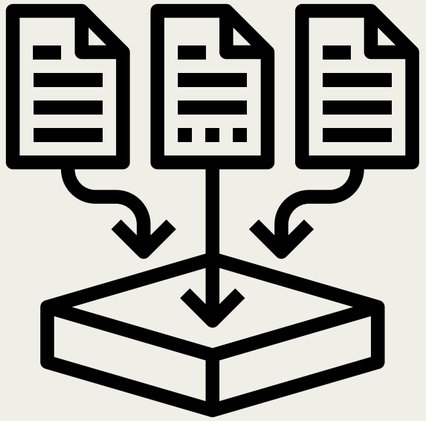
This project aims to consolidate and integrate data from both Carriers and Shippers to deliver seamless end-to-end logistics service.

Using data-driven approach, this presentation aims to accommodate important KPIs and prediction of likeliness of on-time delivery detection using real-time GPS data from carriers.

DATA OVERVIEW

Data Sources:

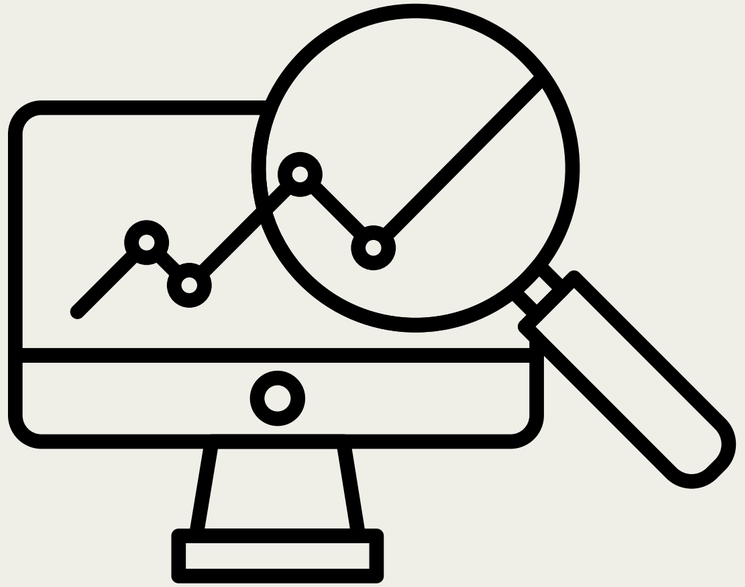
- **GPS Data:** real-time carrier location
- **Shipment Bookings:** details about each shipment accepted by a carrier
- **New Bookings:** details about future shipments, same as shipment bookings but different time intervals



EXPLANATORY DATA ANALYSIS

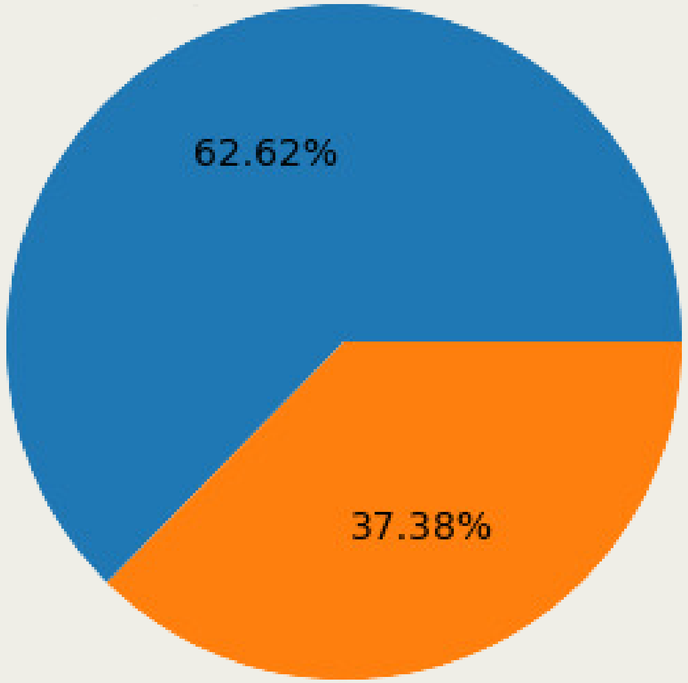
- Checking data types of all sources. Converting datetime columns to an appropriate dtype taking into account of BST.

- Making sure each data is ready to analyse, no null values and duplicates.



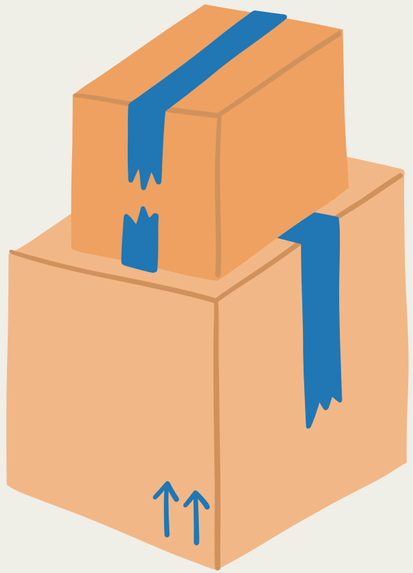
ANALYSIS OF LATE DELIVERIES

- Percentage of on-time shipment deliveries is found as 62.62%.
- Analysis was held using data between dates October 1st and December 31st, 2023.
- Latest update on GPS locations were taken into account, as that indicates the latest update from the carrier.
- The distance between the carrier and the latest delivery location is calculated. Carriers within 50 meters of their last delivery point are considered to have arrived.



ANALYSIS OF POTENTIAL LATE DELIVERIES 1/2

- Assuming the drivers' speed are 30 mile/h on average:
- Detected if the carrier can deliver the parcel on time using the distance of their location to delivery point.
- If the last time of scheduled delivery time period is further than the current time added by the expected time carrier will drive, then the shipment will be delivered on time.



ANALYSIS OF POTENTIAL LATE DELIVERIES 2/2

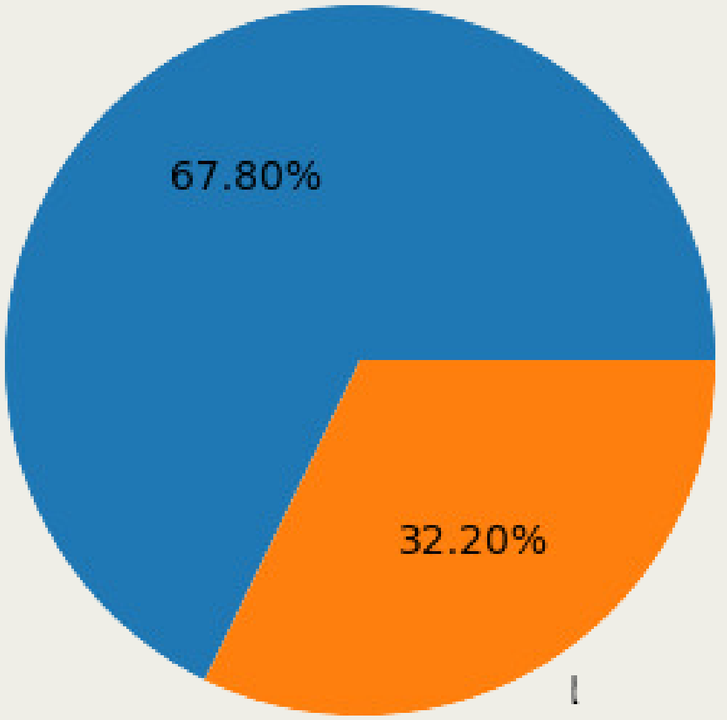
- Several potential deliveries were identified.
- It is advised to send a notification of expected late delivery to the carrier during their earliest delivery schedule.
- Doing this, the carrier is notified beforehand and have time to arrange their schedule to meet the delivery on-time.

```
Expected Late Delivery: 09585ac3-30ad-4115-b56c-878a25db4b76
- Shipment Number: SEZHUK-231212-272534
- Late Delivery Notification Time: 2023-12-12 20:00:00
- Distance to the Delivery Location: 0.09926823918056973

Expected Late Delivery: 192cd5b5-978c-4681-b206-2f4d04e081ec
- Shipment Number: SEZHUK-231114-262627
- Late Delivery Notification Time: 2023-11-16 12:00:00
- Distance to the Delivery Location: 21.49977662365562
- Shipment Number: SEZHUK-231127-266920
scroll output; double click to hide
ication Time: 2023-11-29 06:35:00
- Distance to the Delivery Location: 0.11230793264998938
- Shipment Number: SEZHUK-231115-263171
- Late Delivery Notification Time: 2023-11-17 17:30:00
- Distance to the Delivery Location: 6.228928982129479
- Shipment Number: SEZHUK-231115-263131
- Late Delivery Notification Time: 2023-11-17 09:50:00
- Distance to the Delivery Location: 0.17817604149056826
- Shipment Number: SEZHUK-231108-260557
- Late Delivery Notification Time: 2023-11-10 10:30:00
- Distance to the Delivery Location: 28.00037538928359
- Shipment Number: SEZHUK-231109-261351
- Late Delivery Notification Time: 2023-11-14 08:30:00
- Distance to the Delivery Location: 174.57162893142333
```

PREDICT FUTURE DELAYS

- Shipment Bookings data is used as a training dataset, and New Bookings is used as test dataset to build a predictive model.
- A predictive model is build to understand the percentage of expected delays on the future bookings using historic data.
- The model predicted that the percentage of on-time deliveries is 67.4%.



CONCLUSION

- Analysis indicates that strong strength for on-time deliveries.
- The high percentage of on-time deliveries indicates effective logistics operations for most shipments.
- Improved prediction methods would help utilising resources.

Thank you!

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