Problem Statement:

- Analyse the given data set with relevant features.
- Analyze delivery times across different timeframes (such as the beginning of the month and end of the month)
- Identify factors impacting the delivery process.
- Compare the given OSRM Analysis with actual data.

Observations:

Total number of data entries =14787

Number of Features= 18

Feature engineering:

- Convert “od_start_time” and “od_end_time” into date time format to extract dates

- Unique column is created for unique identification of trip id, source center and destination center. These columns are ["segment_actual_time" , "segment_osrm_distance", "segment_osrm_time"]

- Creating segment to read data data speciallly actual time ,osrm_time with help of dictionary create_seg_dict.

- Create feature ['destination_state', 'destination_city', 'destination_place', 'destination_code'] from column ‘destination_name’

- Features ['trip_year', 'trip_month', 'trip_hour', 'trip_day', 'trip_week', 'trip_dayofweek'] are crested from column ['trip_creation_time']

-

Hypothesis Testing:

1. hypothesis testing on how actual time is different from segment time
#Ha: Actual and segment time are same
#Ho: Actual and segment time are different

Insight: `Fail to reject H0`
`actual time is different from segment time`

2. #hypothesis testing on how actual distance is different from osrm_distance
#Ha: Actual and OSRM distance are same
#Ho: Actual and OSRM distance are different

Insight: `Reject H0`
`Actual and OSRM distance are same`

3. #hypothesis testing on how actual time is different from osrm_time
#Ha: Actual and OSRM time are same
#Ho: Actual and OSRM time are different
Insight: `Actual and osrm time are same.`

`4.` hypothesis testing between osrm time aggregated value and segment osrm time aggregated value
#Ha: segment osrm time and osrm time aggregated value are same
#Ho: segment osrm time and osrm time aggregated value are different

Insight: `Reject H0`
`Actual and OSRM agrregated time are same`

Analysis Highlights:

1. **These are the list of top ten busy city routes**

```
source_city  destination_city
bengaluru    bengaluru           718
bangalore    bengaluru           477
hyderabad    hyderabad           355
mumbai       mumbai              354
bengaluru    bangalore           344
bhiwandi     mumbai              332
pune         pune                241
gurgaon      delhi               241
mumbai hub   mumbai              227
chennai      chennai             223
Name: count, dtype: int64
```

Most of these are common city except "Bhiwandi to Mumbai" and "Gurgaon to Delhi" and "Mumbai Hub to Mumbai"

2. **Most orders are coming from which state?**

```
maharashtra                2714
karnataka                  2143
haryana                    1823
tamil nadu                 1039
telangana                   784
uttar pradesh               760
gujarat                     750
delhi                       725
west bengal                 665
punjab                      536
rajasthan                   514
andhra pradesh              435
bihar                       351
madhya pradesh              318
kerala                      289
assam                       268
jharkhand                   160
uttarakhand                 114
orissa                      107
chandigarh                   93
goa                          65
chhattisgarh                 43
himachal pradesh             34
jammu & kashmir              17
dadra and nagar haveli       15
pondicherry                  12
nagaland                      5
mizoram                       4
arunachal pradesh             4
Name: count, dtype: int64
```

From above result it is clear that most orders are coming from Maharastra and least are coming from Arunanchal Pradesh

4. **from which city customers are placing most orders?**

```
bengaluru      1221
mumbai          968
gurgaon         877
delhi           554
bangalore       551
```

It is clear from above analysis that benguluru placed most orders then Mumbai and then Gurgaon

5. **from which state customers are placing most orders?**

maharashtra	2561
karnataka	2294
haryana	1640
tamil nadu	1084
uttar pradesh	805
telangana	784
gujarat	734
west bengal	697

From above analysis that Maharastra placed most orders and least orders are placed from Tripura,Daman& Diu and Nagaland

6. Busiest day/month/week Analysis

Only two months data is here and in 9th-month orders are more as compared to 10th month

In which day customers place most orders?

trip_day	
18	791
15	783
13	750
12	747
22	740
21	740

The busiest day is the 18th, 15th and 13th. and least orders are placed in the beginning of the month 1 and 2 ns or at the end of the month 30 th.

Overall Insights:

- From above analysis it is clear that OSRM analysis is quiet different from actual distance time and other parameter.
- Busiest day is mid of the month.
- We can provide some offers at the beginning and end of the month to improve the transaction
- From state point of view, we have heavy traffic in Maharashtra followed by Karnataka.
- These 2 states need our immediate focus, especially during peak seasons.