

# Yellow Taxi Cabs Data Analysis



Presented by:  
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# Objectives

- Overview & Problem Statement
- Data Analysis
  - Spatial Analysis
  - Cost Analysis
  - Clustering Analysis
- Recommendations & Conclusions
- Limitations
- Q&A



# Overview & Problem Statement

## Overview

- New York City is known as the taxi capital of America and home of the classic yellow taxicab. Traditional taxi industry is facing challenges from other ride share apps in the market. So overall this analysis was carried out to identify how we can help yellow taxi cab drivers
- Data for one month was considered to conduct the analysis

## Problems Addressed

- Overall Cost Analysis & Are yellow taxi cabs able to meet the threshold income?
- How can we optimize overall fleet for taxi drivers?

# Data Analysis: Spatial Analysis

## Spatial Analysis:

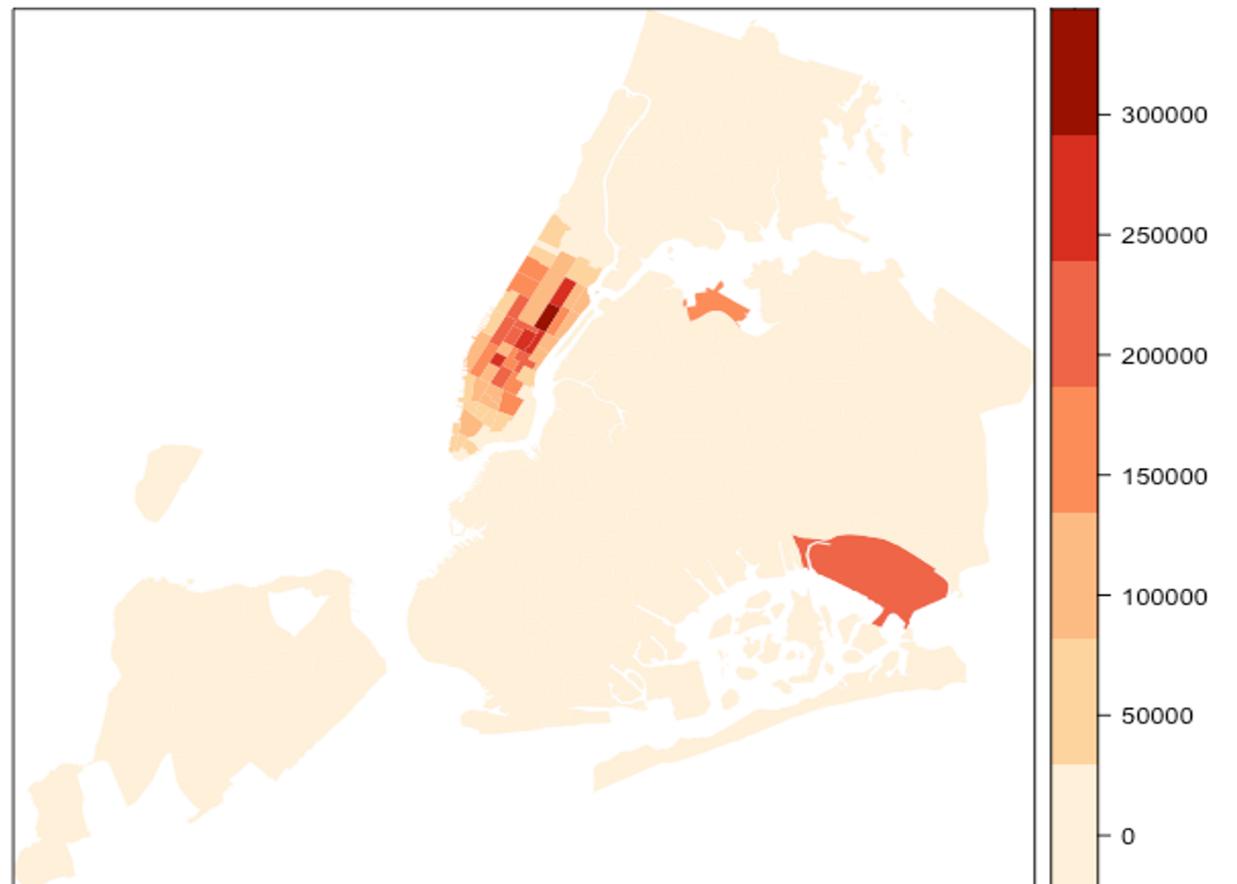
This approach was used in order to drive the overall NYC taxi statistics with regards to pick up location density.

## Outcomes:

### Main locations:

- Upper East Side North
- Upper East Side South
- Midtown Center
- Time Square /Theatre Districts
- JFK/LaGuardia

**NYC Taxi Stats**

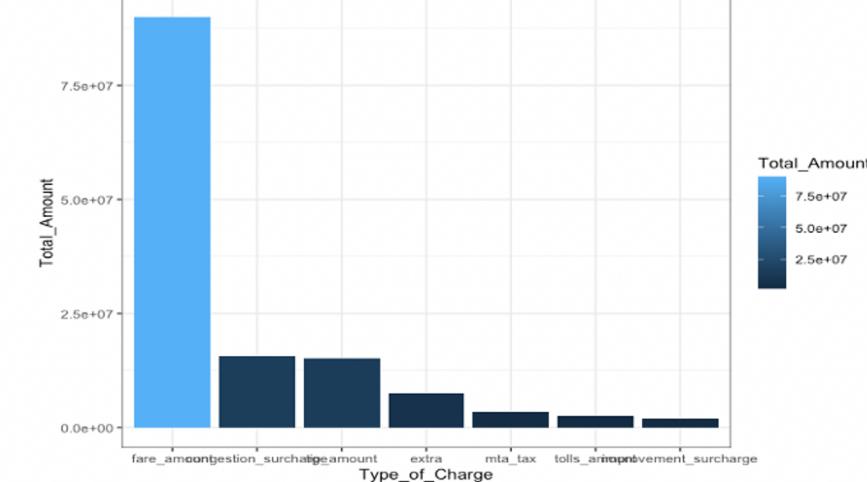


**Pick Up Location Density**

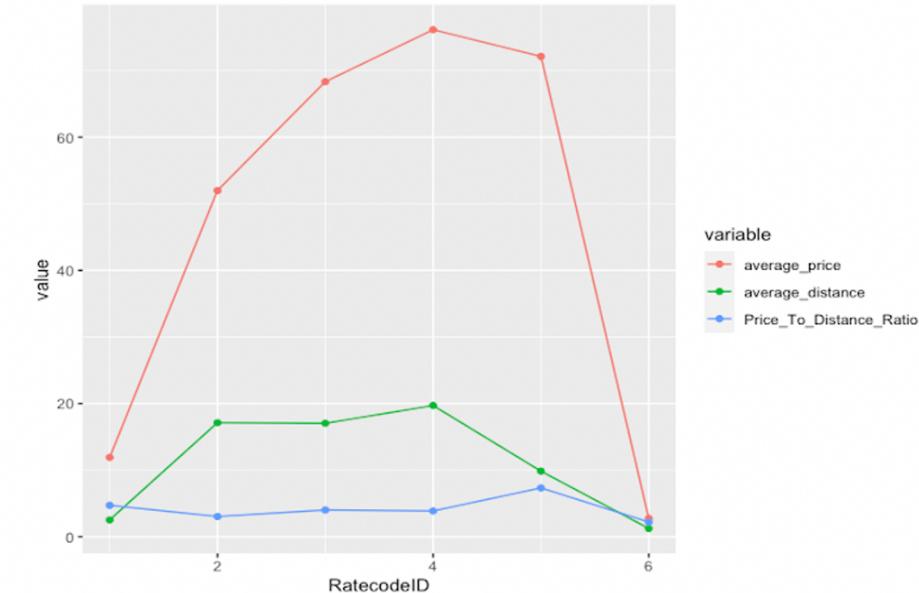
# Data Analysis: Cost Analysis

- Overall revenue Bifurcation
- Profitable routes identified by Rate Code ID

Revenue_bifurcation		
Type_of_Charge	Total_Amount(USD)	%age
fare_amount	89917684	66.00%
extra	7470098	5.48%
mta_tax	3362287	2.47%
tip_amount	15261600	11.20%
tolls_amount	2531853	1.86%
improvement_surcharge	2026132	1.49%
congestion_surcharge	15677292	11.51%
<b>Total_revenue</b>	<b>136246946</b>	



RatecodeID	average_distance	average_price	Distance to Price Ratio
1	2.53	11.90	4.70
2	17.10	52.00	3.04
3	17.00	68.30	4.02
4	19.70	76.10	3.86
5	9.84	72.10	7.33
6	1.24	2.75	2.22



# Data Analysis: Cost Analysis - cont.

- Overall operational costs for a single taxi per month is 44.70%
- Various operating costs are considered based on external sources
- Income for a single taxi excluding all costs is approx. 29%

Details on factors used for operating costs	
Variables	Count/cost
Count of Taxis	1387
Fuel cost	2.5(miles per gallon)
occupancy factor	1.5
Mileage	15
Insurance cost	87.5(USD per month)
maintenance cost	166.6667(USD per month)
License cost	3000(USD per month)
Depreciation cost	777.7778(USD per month)

Cost Analysis per Taxi	
Variable	Cost (in USD)
Total revenue monthly per taxi	9832.355
Total Tolls/Taxes Monthly per taxi	1702.935
Average tip (Only credit card/recoded ones included)	1101.364
Monthly Revenue single Cab	7028.057

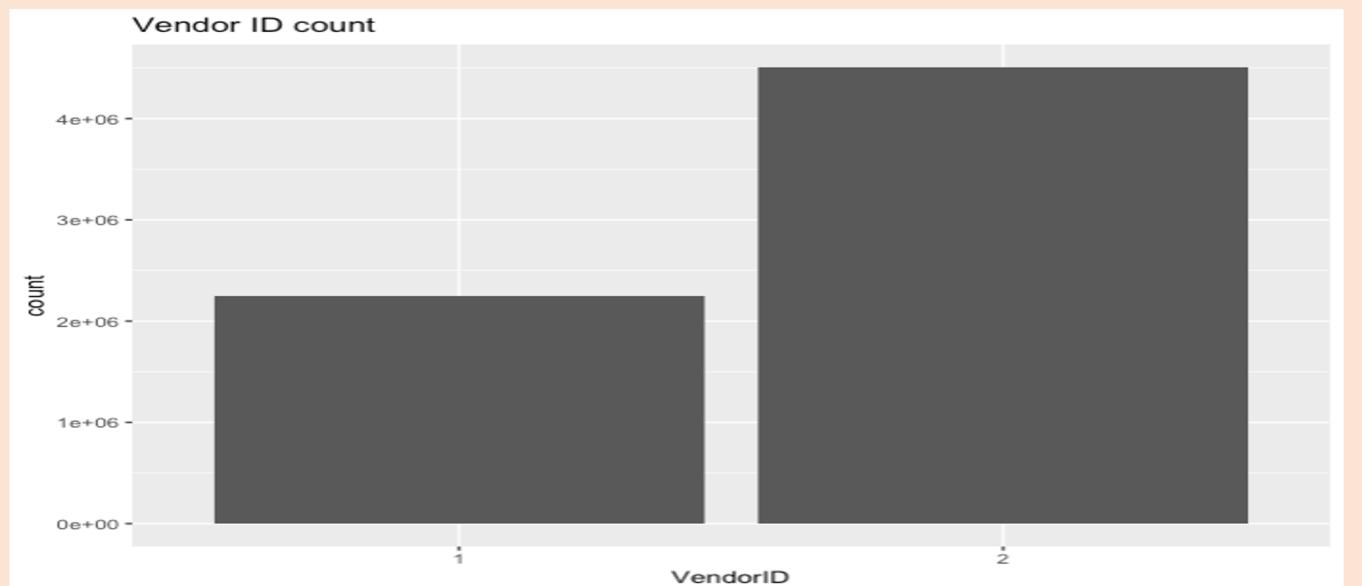
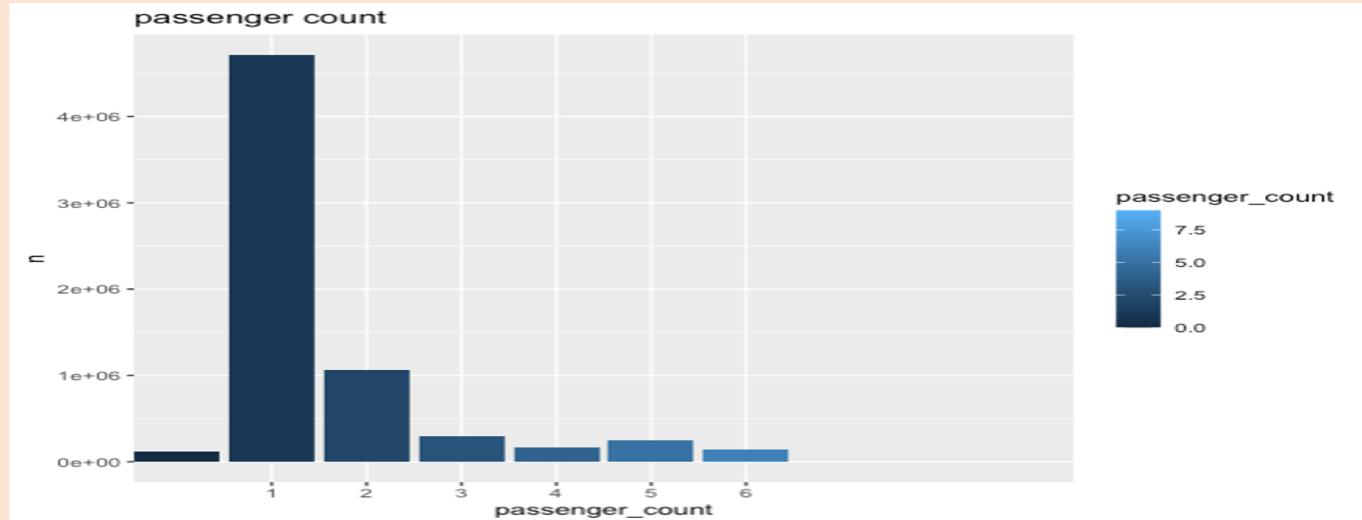
Operational cost	4394.667	44.70%
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Income per taxi	2946.238	29.96%
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Tax Percentage	1702.935	17.32%
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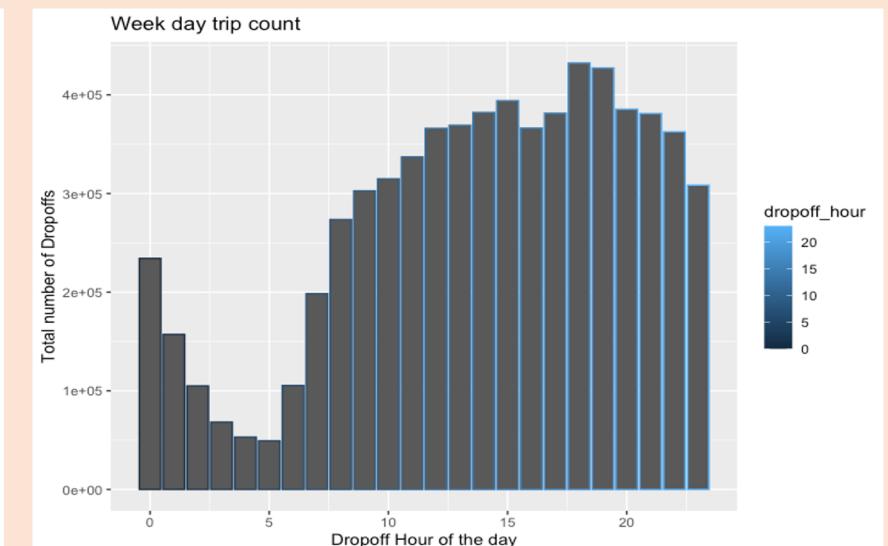
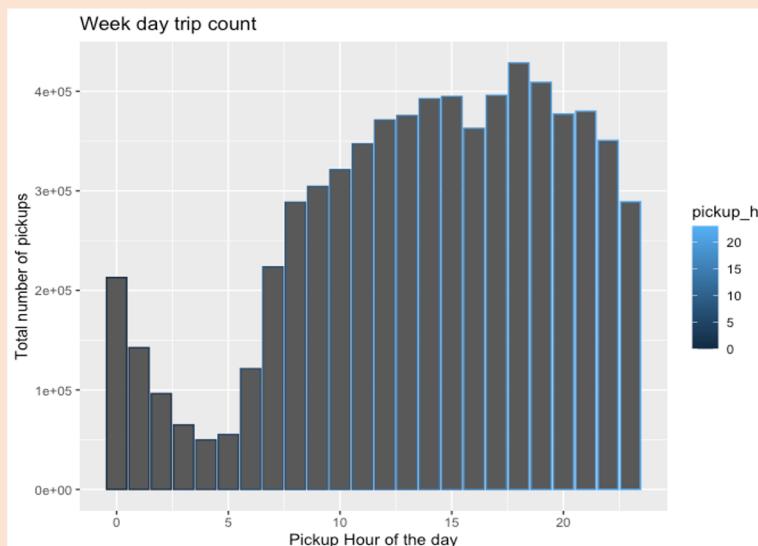
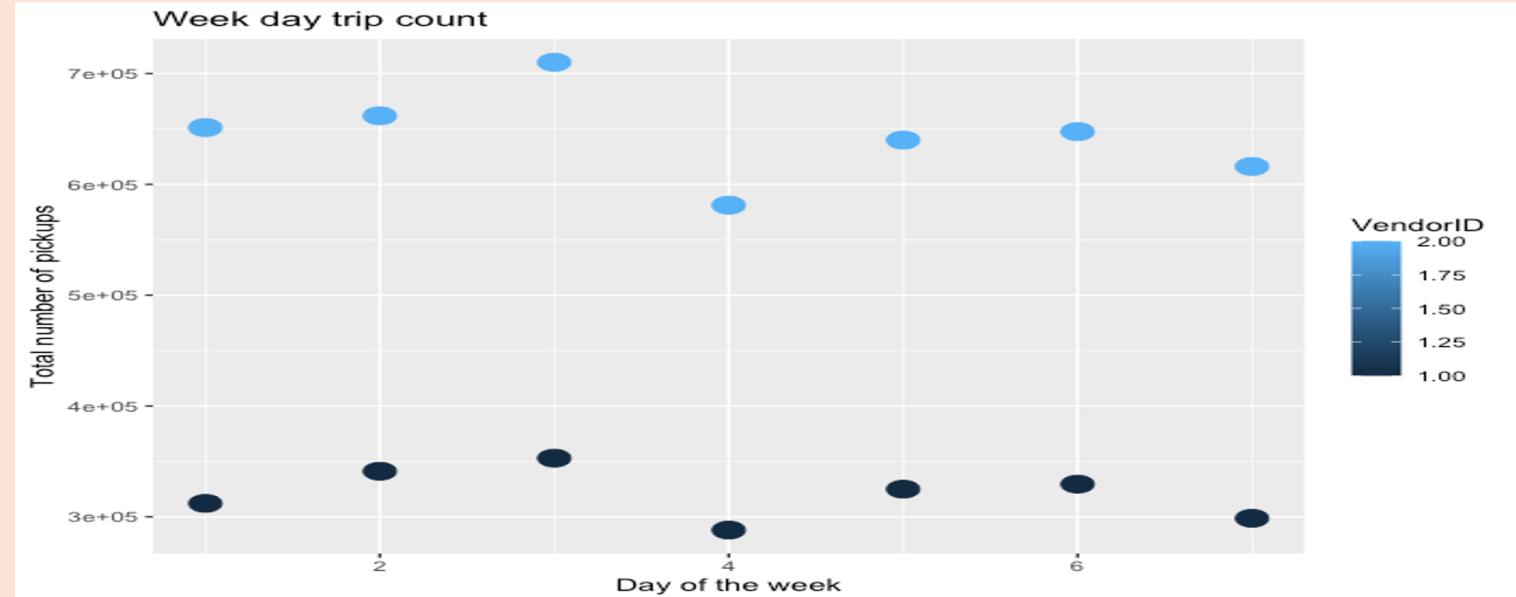
# Data Analysis: Clustering Analysis

- Clustering Analysis was used to segment the trips in order to further drill down data:
  - Majority of the trips only have one passenger.
  - Vendor ID 1 (boro taxi) has only half of the number of yellow cab rides due to the fleet size



# Data Analysis: Clustering Analysis-Cont.

- Tuesdays turns out to be the busiest days
- Evening timings around 6 PM are peak hours
- $h = 6$  is the best fit



# Recommendations , Conclusions & Limitations

## Recommendations

- Carpool Recommended
- Overlap driver's working shifts in the evening time in order to optimize the fleet.
- Cab drivers shall move to nearest of the central locations namely Upper East Side North, Upper East Side South, Midtown Center, Time Square /Theatre Districts, LaGuardia, JFK locations to fetch a pickup
- For taking a break, Wednesdays as the recommended due to lowest trip numbers

## Conclusions

- Single taxi cab is only able to earn 29.96% of the overall revenue
- Yellow taxi cabs are not able to even meet the lowest bracket of income of a driver's salary
- Routes with Rate code ID 5 are more profitable routes
- Pickup and drop-off numbers are at peak in evening at 6pm

## Limitations

- Dataset for only one month considered
- With Pandemic, situation might have changed
- Dataset was not clean so many observations were dropped
- Variable License cost
- Number of cars considered can vary on month to month based on availability

# Reference

Source of dataset:

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\*Occupancy factor: Occupancy factor is considered with the fact that every time a taxi does not have rider & they may have to commute more to pick up ride so no amount is paid for that trip

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**THANK YOU**