JUMPMAN 23

New York City Market Analysis

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Position: Analytics Lead
Date: 08/19/2019

Project Outline

Objectives:

1. Provide an analysis of the New York market to the CEO
2. Provide detail around data integrity issues

Outline:

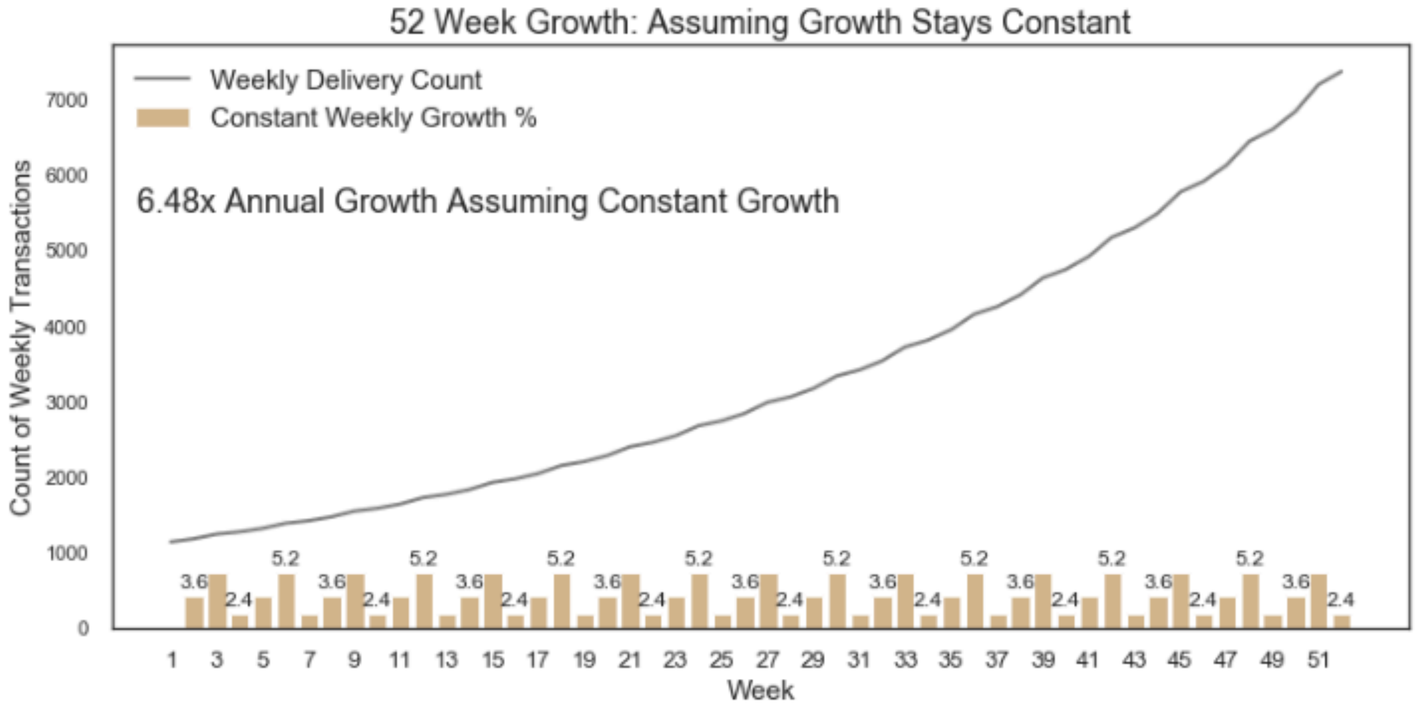
1. High Level Findings
2. Delivery
3. Jumpmen & Women
4. Merchants
5. Customers
6. Market
7. Data Integrity
8. Looking forward / Appendix

High Level Findings

Overall Market Condition: ***GOOD***

Chart 1: Shows the first three weeks of consistent, positive growth in October and applies same October growth rates to remaining 48 weeks of 52 week year

1. Active jumpmen growth matches delivery demand growth in month of October
2. 648% 52 week delivery growth assuming straight-lined growth rates



1. Above average in comparison to https://www.foodandwine.com/news/delivery-app-fastest-delivery-times

Unique Monthly Counts

Jumpmen	575
Merchants	1196
Customers	3172
Orders	5162

Week 1 - 4 Growth

Orders	+ 11.6%
Jumpmen	+ 11.4%
Potential Annual	648 %

Concerns:

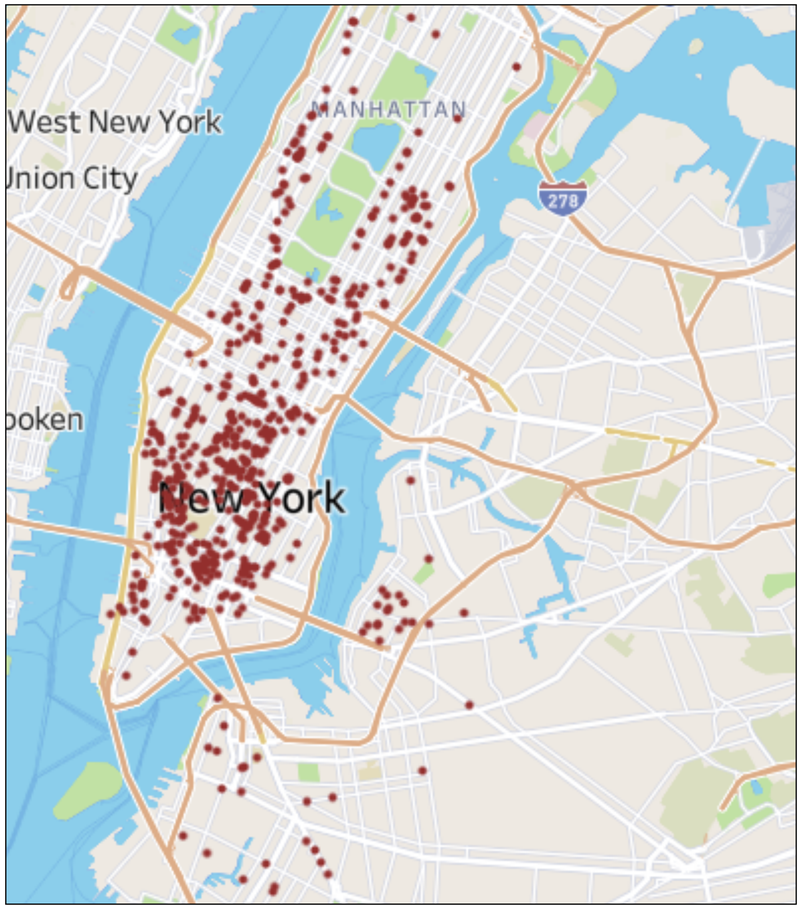
1. Above Avg. Delivery Time[1]
2. Low Merchant utilization due to long tail
3. Merchant Growth Stagnant

High Level Findings

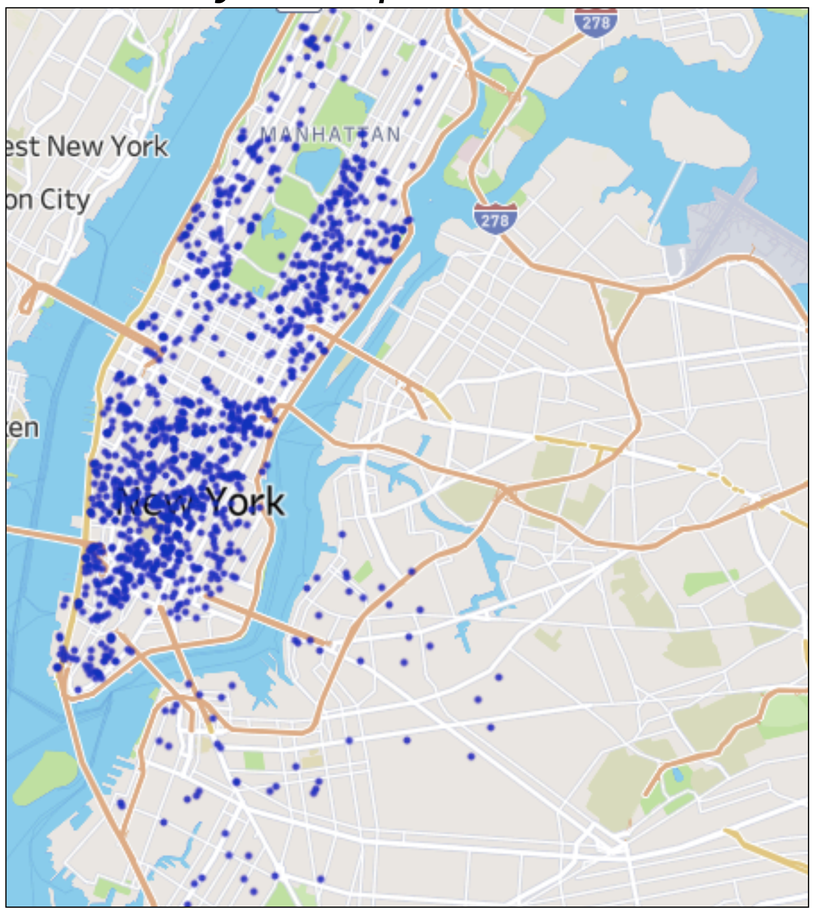
Merchants & Drop-off locations

- Concentrated in Manhattan's Lower, Midtown and Upper East and West Sides as well as a sparse scattering through Brooklyn

Merchants



Delivery Drop-Off Locations

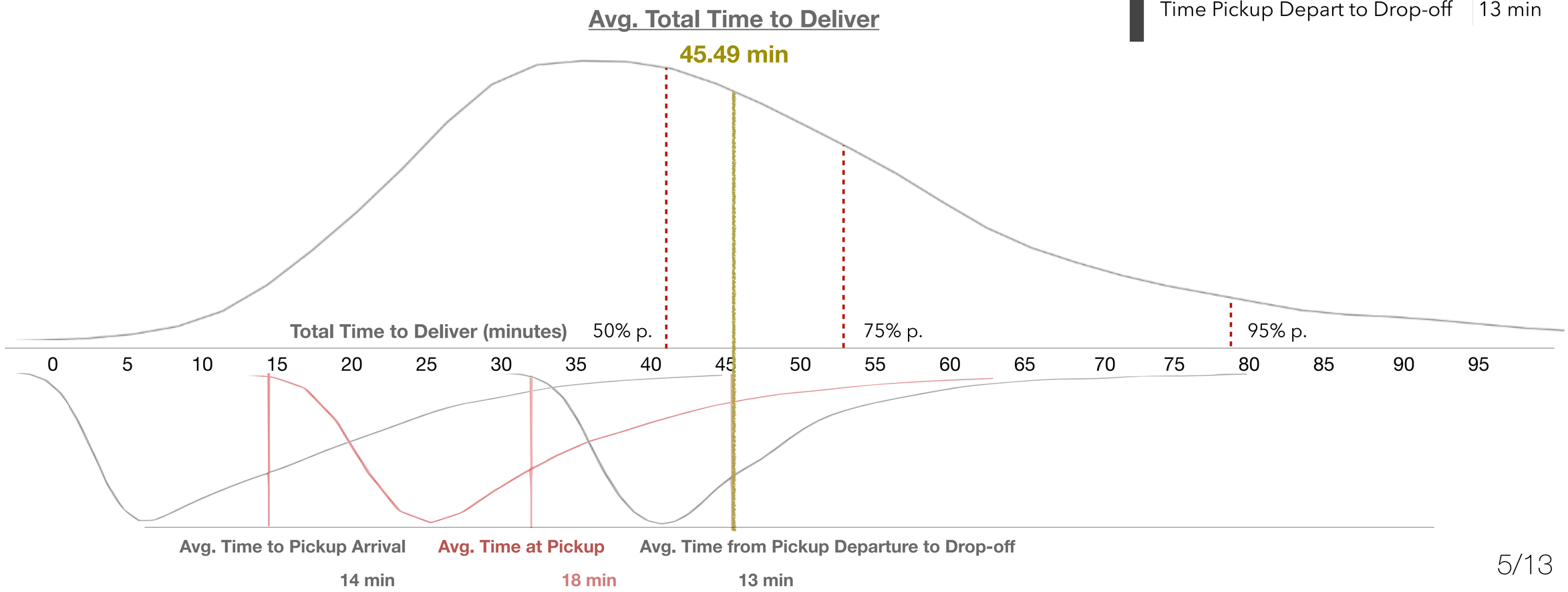


The Delivery

Three main segments totalling an avg. of 45.49 minutes to deliver

1. Time from start to pickup arrival: 14 min
2. Time from pickup arrival to departure from pickup: 18 min
3. Time from pickup departure to drop-off: 13 min

Delivery Times	
Avg. Total Time	45 min
Median Time	41 min
75% Percentile	53 min
95% Percentile	79 min
Pickup to Arrival	14 min
Time Pickup Arrival to Depart	18 min
Time Pickup Depart to Drop-off	13 min



The Delivery: to Drop-off

Measuring Distance and Duration to Drop-off

Chart 1 Distance: 50% of all deliveries are <= 1 mile | 75% <= 2 miles
Chart 2 Duration: Avg. Travel Duration = 13.6 min compared to expected duration[1] of 11 min
Chart 3 Duration Error: 14% of *drop-off delivery times* arrive > 7min later than the expected duration.
Removing just these 14% reduces avg. time to drop-off by 2.5 minutes to 11.17 min

Delivery to Drop-off Metrics

Deliveries < 1 mile	50 %
Deliveries < 2 mile	75 %
Deliveries < 3 mile	90 %
Exp. Avg. Duration to Drop-off	11 min
Avg. Duration to Drop-off	13.6 min
Those > 7 min slower than exp. time	14 %

chart 1

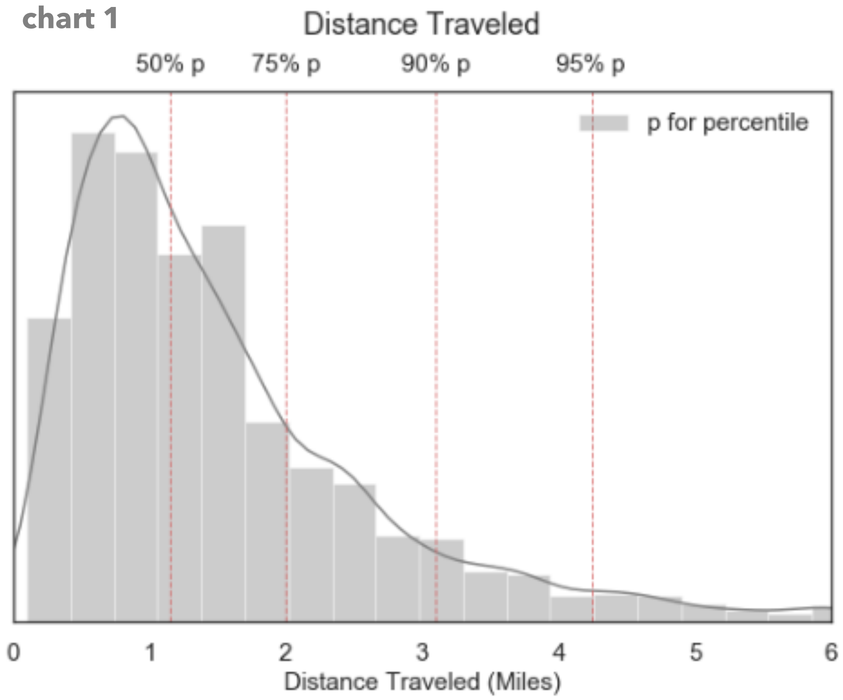


chart 2

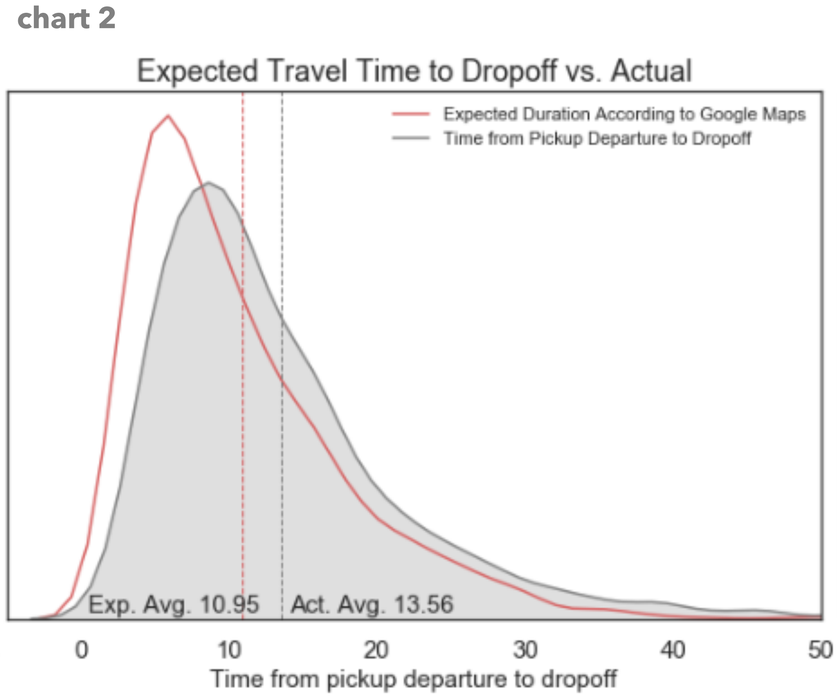
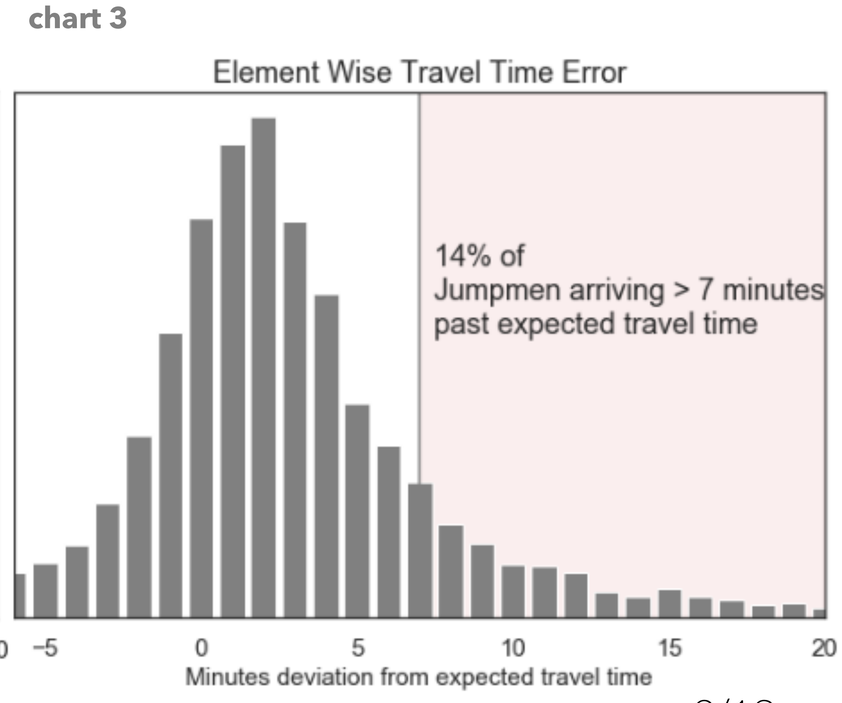


chart 3



1. Expected Duration determined by inputing start and arrival lat/lon with mode of transport and time of day into google maps API

The Delivery: Pickup

The time at pickup appears ***abnormally long***

Chart 1: Depicts how the avg. wait is approx. 18 min. Bad for customers and jumpmen
Chart 2: Predicting pickup wait times using a Random Forest Regressor generates the most important features for prediction (should be done with more data)

1. The most indicative features are delivery times
   - the total wait time could be longer because the pickup time is abnormally long
   - or the pickup time is naturally longer when then full time of delivery is longer
2. Removing grocery stores from calculation reduces average wait only by 1 min

Pickup Wait Time Metrics	
Wait Time @ Pickup	18 min
Wait Time (excl. Grocery)	17 min
Wait Time (place = Grocery)	40.3 min

chart 1

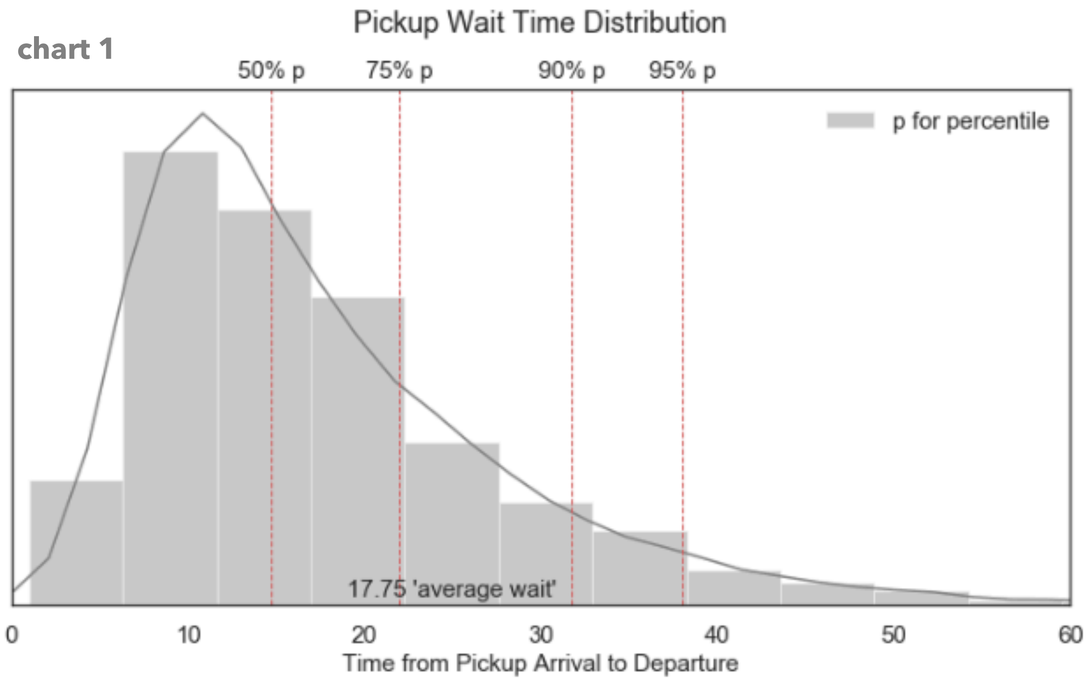
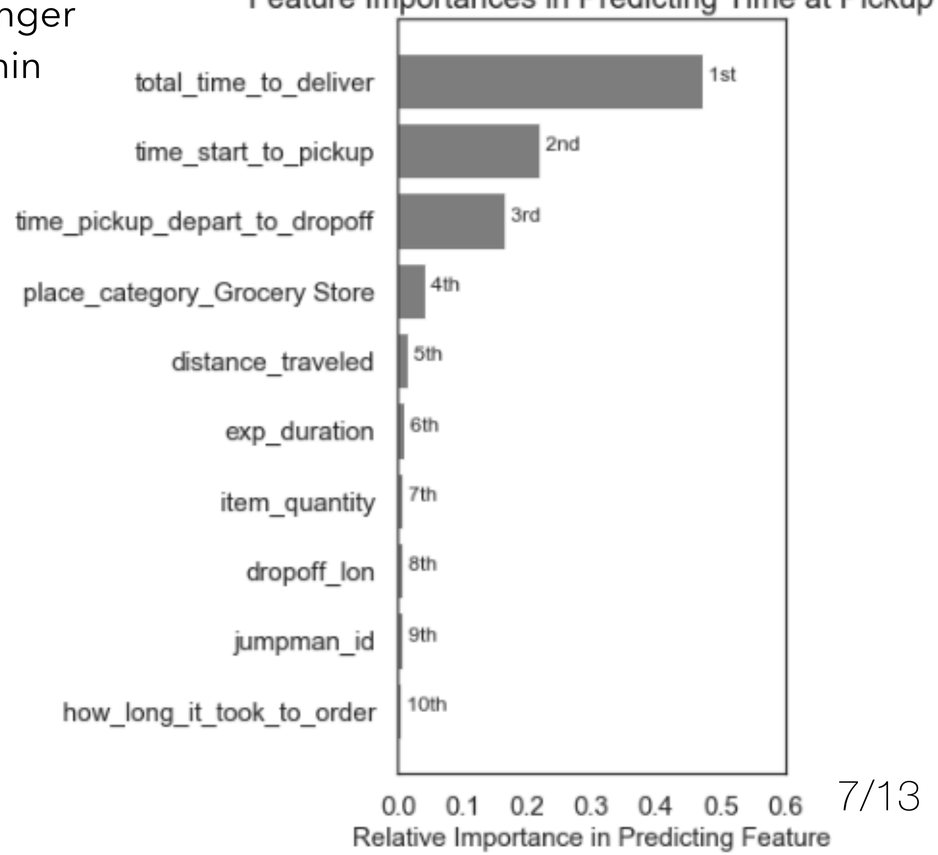


chart 2



The Jumpmen & Women

Avg. 1.74 orders/day per active jumpman which equals approximately 1 hour 20 minutes of work[1]

Chart 1: The distribution of the number of monthly deliveries by jumpmen

1. Approximately 75% of jumpmen deliver less than 10 deliveries each per month

Chart 2: Unique daily deliveries and active jumpmen count through October

2. Only the top 5% of jumpmen deliver on average one delivery a day for the whole month

Jumpmen Mode of Transport	
Bicycle	71.6%
Car	20.3%
Walker	4.5%
Van	1.3%
Scooter	1.2%
Truck	0.7%
Motorcycle	0.4%

Avg. deliveries / day	1.74
Jumpen w/ <12 deliveries	75 %
Jumpmen w/ >30 deliveries	5 %

chart 1

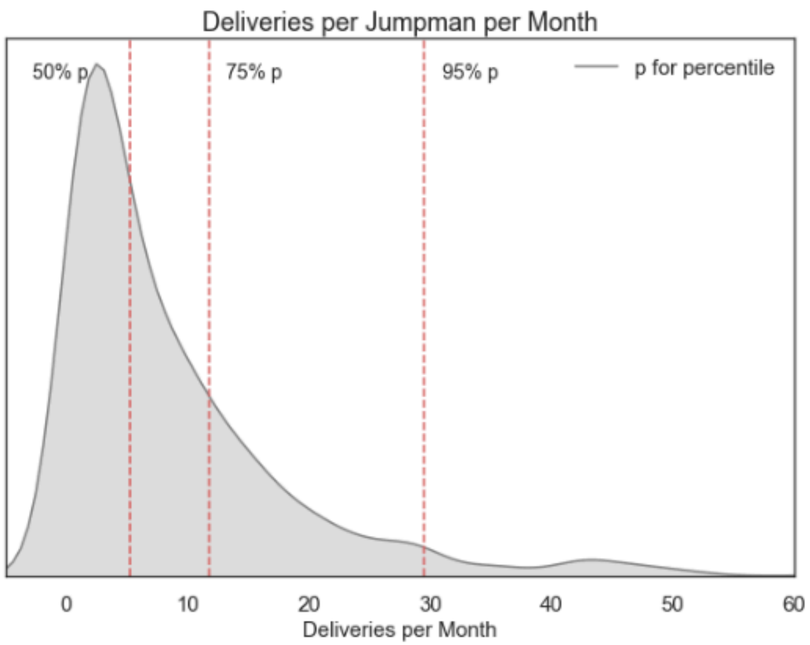
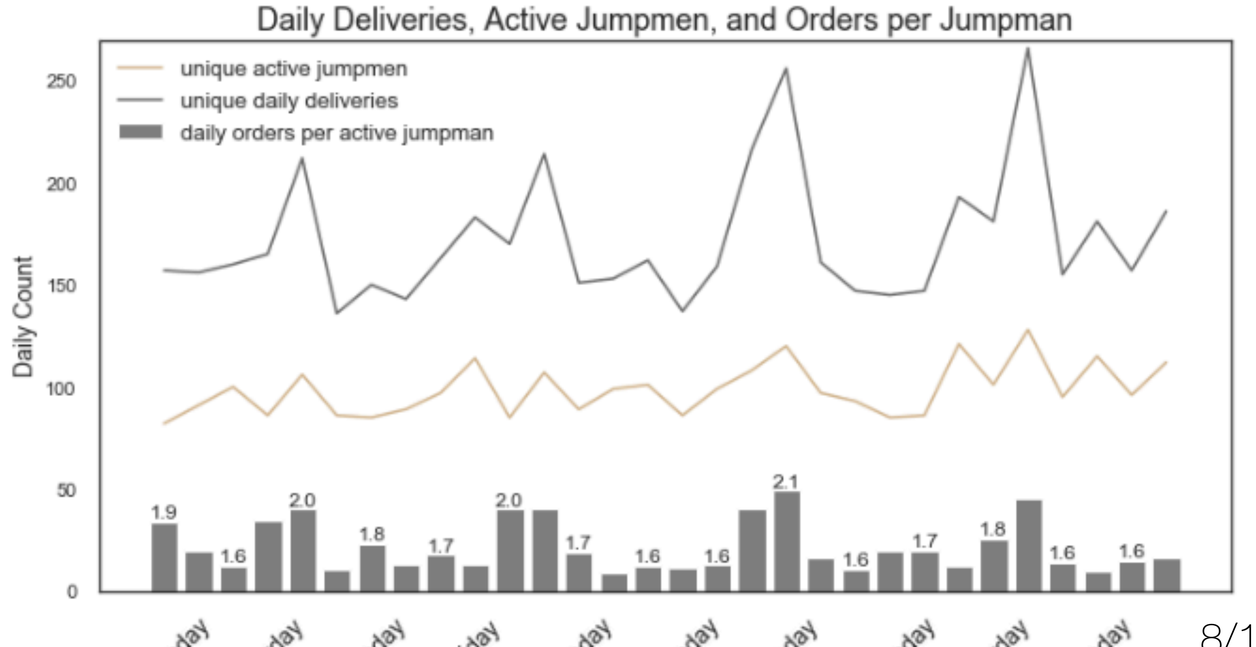


chart 2



1. Determined by multiplying average delivery time by # orders per day per active jump man

The Merchants

Merchants have long tails

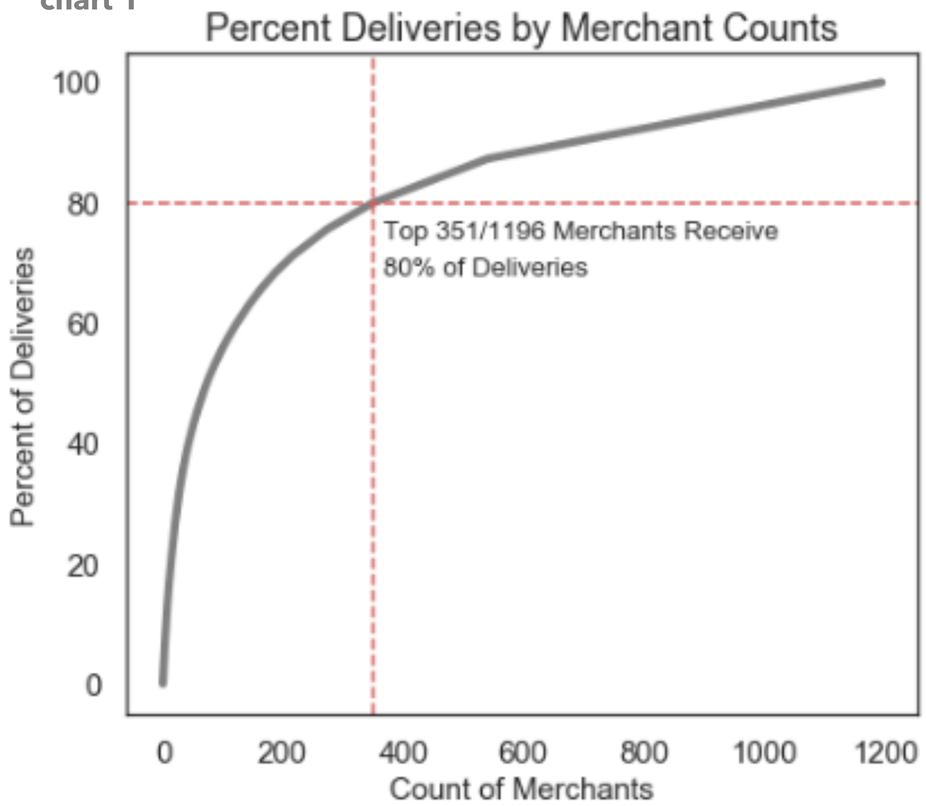
Chart 1: Shows the # of merchants per percentage share of total deliveries. Approximately the top 1/3 receive 80% of deliveries: (Important to maintain dispersion of top merchants in key locations)

1. The long tail inflates the average # of deliveries a month making the metric useless
2. Slow Week 1 to Week 4 merchant growth. Negative growth from W2 to W4
3. 95% of deliveries deliver prepared food

October Merchant Metrics

Total Unique Merchants	1196
Unique Merchant Categories	58
Top 350/1196 Delivery Share	80 %
% Merchants w/ >50 Deliveries	1 %
Deliveries for Prepared Food	95 %

chart 1



The Customer

Avg. 1.63 orders/month per active October customer

Chart 1: Shows the proportion of delivery orders placed by the top n customers
Chart 2: Presents a chart of the time it takes for customers to place an order

1. Customer ordering is much more egalitarian than the spread of deliveries across merchants
2. 80% of customer orders are placed within 10 minutes on the app

October Customer Metrics

Total Customers	3172
Avg. Orders/Customer	1.6
Top 5% Customers % Deliveries	20 %
% of Orders placed in 10 min	80 %

chart 1

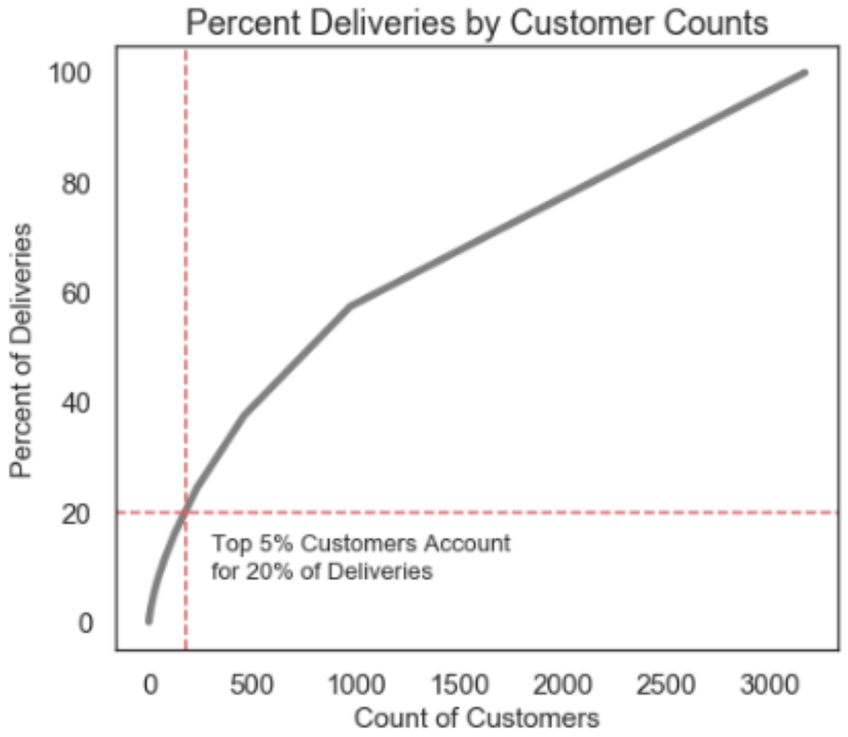


chart 2

The Market

Despite the apparent geographic reach of merchants and deliveries on pg. 4, delivery penetration is still concentrated to Lower and, parts of, Midtown Manhattan

Map 1:

Colored are all zip codes in which Jumpman23 has delivered

1. Red represents high population to deliveries ratio signifying high penetration potential but low actual penetration. Ex. 130 would mean that for every 130 zip code residents, one delivery was made in a month
2. Green is where penetration is already high relative to population

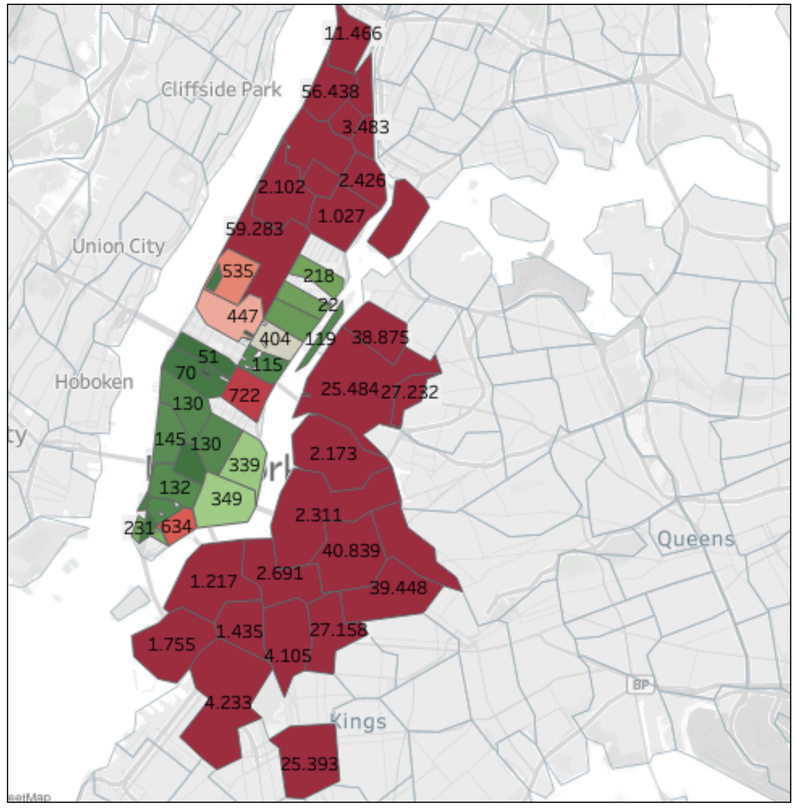
Map 2:

Colored are all zip codes in which Jumpman23 has delivered

1. Red represents low delivery to merchant ratio and signifies needed demand to match with local merchant suppliers
2. Green signifies healthier supply/demand relationship and could even signify opportunity for supply growth in low penetration geographies such as Brooklyn

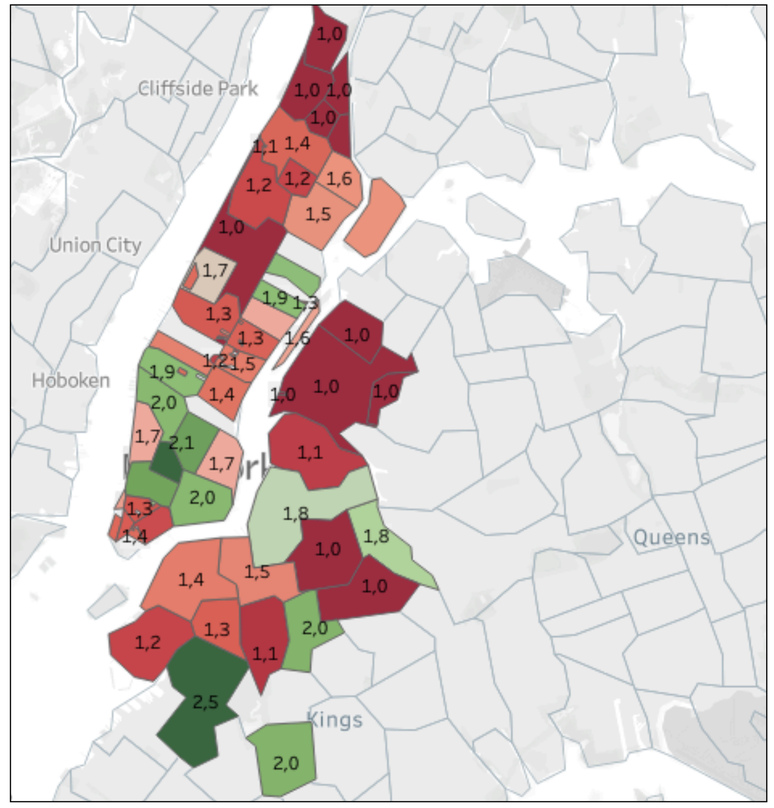
map 1

Population per Delivery



map 2

Deliveries per Merchant



Data Integrity

Table 1: Identifies, quantifies, and articulates the core data integrity issues and the actions taken to overcome them. 1. duplicate rows, 2. backward timestamps, and 3. null values

- Null value removal or exclusion was only done on an individual metric basis when calculating aggregations
- Used machine learning to predict a. how_long_it_took_to_order: results were only slightly better than baseline (taking the mean) and didn't justify moving forward with the predictions

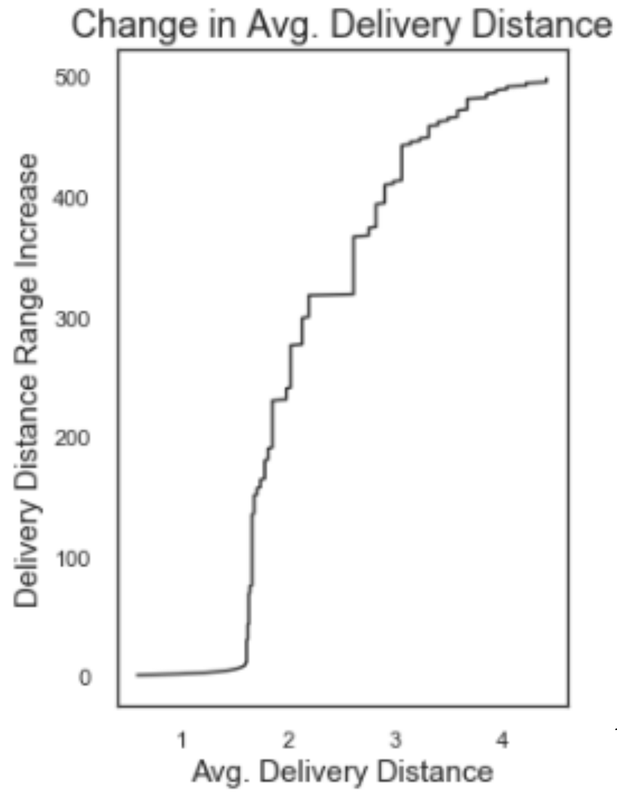
Table 1

Issues	% Affected	Action
1. Duplicate Rows	0.30%	dropped duplicates
2. Negative Time to Pickup Time	8.37%	exclude values for aggregate calculation
3. Missing Values		
a how_long_it_took_to_order	49.20%	removed when aggregating field
b item_category_name	20.60%	didn't use
c item_name	20.60%	didn't use
d item_quantity	20.60%	filled with 1
e place_category	14.80%	filled with 'Unknown'
f when_the_Jumpman_arrived_at_pickup	9.20%	excluded from aggregation
g when_the_Jumpman_left_pickup	9.20%	excluded from aggregation

Chart 1: Dealing with skewness of the data. Chart 1 depicts how the avg. delivery distance (X) is affected as the delivery distance range (Y) increases

1. Identified the 99th percentile for delivery distance range as being from 0 to 10 miles. The final 1% therefore covered a distance range from 10 to 500 miles. These outliers caused avg. distance traveled to inflate
2. Removed the outliers from **all** analysis causing avg. distance traveled to drop from 4.2 to 1.6, a much more indicative measure of performance

Chart 1



Looking forward:

Progress Goals for NYC:

Postmates Avg. Delivery Time is 40 minutes according to https://www.foodandwine.com/news/delivery-app-fastest-delivery-times.

Therefore… We can do better and believe we can both decrease delivery time and scale up deliveries by focusing on these four goals.

1. **Total Delivery Time:**
    a. Reduce the 14% of drivers arriving seven or more minutes late to drop-off
    b. Reduce the wait time at merchant by working to better predict expected prep time and time the jumpman's arrival accordingly. This will enhance the jumpman experience and deepen our merchant relationships
2. **Three-way growth:** Ensure the even growth of merchants and jumpmen as deliveries continue to increase
3. **Merchant Distribution:** Merchants have long tails so one must ensure an even distribution of top merchants in all growth areas. To avoid merchant churn, it's important to boost merchant utilization for those quality merchants that help represent the Jumpman23 brand
4. **Target geographical zones:** Direct energy towards growing brand in both Manhattan and Brooklyn zips with high population / delivery ratios as well as those that have low delivery to merchant ratios. For those geographies with high delivery to merchant ratios but low population to deliveries, Jumpman23 should consider expanding their merchant base

Appendix:

Project assumptions:

1. Jumpman23 was still in its infancy and that the dataset is representative of the complete NYC dataset from October, 2014
2. That no alternative Jumpman23 data was available for comparison
3. The Data Integrity issues are not structural and therefore don't need to be included in goals for NYC
4. That long range deliveries are of no interest to Jumpman23 and their business proposition. Thereby excluding long distance deliveries actually improves that representativeness of the data

Thank you Postmates!

Please don't hesitate to reach out with questions! You can contact me via…
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www.linkedin.com/in/riddlej/
www.jyriddle.com

You can find the GitHub repo for this project @
www.github.com/riddlej3/Jumpman23

ps. I've made the GitHub repo public so please let me know if I should set it to private