Data Product Manager Nanodegree

Applying Data Science to Product Management

Final Project: Developing an MVP Launch Strategy for a Flying Taxi Service


Aybar

Section 1: Data Exploration

Back to the basics of product management, identify your customer and their pain points:

- What are taxis used for?
- What are the characteristics of the users that leverage them?
- What are existing pain points with taxis?
- What are the existing pain points with digital ride-sharing services?

Answer Slide

- What are taxis used for?
  - Taxis are used by people to move from one point to another
- What are the characteristics of the users that leverage them?
  - Users are commuters
  - Don’t own or use to wish their own vehicle in the city
  - Want more comfort than public transport
  - Are willing to pay more than public transport
- What are existing pain points with taxis?
  - Time required to reach the destination is not known because of uncertainty with traffic
  - Can be expensive
  - Finding a taxi can be difficult at times
  - Safety can be an issue in some parts of the world
  - Reliability and Predictability
- What are the existing pain points with digital ride-sharing services?
  - Ride-Sharing has increased the number of taxi cabs on the street hence lead to increase in more people choosing it instead of public transport in some places leading to more traffic congestion
  - The prices are variable and depend on supply and demand, it makes it uncertain for a person to predict how much they will have to pay
  - Quality of service can be variable

What user improvements do you hypothesize a flying taxi service would have over the existing state of taxis today?

What market improvements do you hypothesize a flying taxi service would have the existing taxi service industry & physical road infrastructure today?

Answer Slide

What user improvements do you hypothesize a flying taxi service would have over the existing state of taxis today?

- Much faster travel to the destination
- Users may not have to wait for long for the duration for their rides
- More reliability wrt travel times. No undue delays.
- More predictability

What market improvements do you hypothesize a flying taxi service would have the existing taxi service industry & physical road infrastructure today?

- Drivers will need to be qualified to fly a flying car, this limiting the supply of drivers, this ensures that drivers' interests are protected as partners in the industry.
- Has more scalability than physical infrastructure since no roads need to be built for routes
- Less congestion since cars can travel along 3 axis instead of just 2 that too along a route

Acquire a high-level understanding of the granularity and scope of the dataset, to inform the basis for your analyses:

- How many records are in the dataset
- What does each record represent?
- What is the primary key?
- What date range is your dataset bound to?
- What are the geographical bounds of this dataset? Is it limited to Manhattan, or is Brooklyn, Queens, Staten Island, the Bronx, and New Jersey included? Where are most of the data points centralized at? Are there outliers?

Answer Slide

Acquire a high-level understanding of the granularity and scope of the dataset, to inform the basis for your analyses:

- How many records are in the dataset
  - There are 1048468 records
- What does each record represent?
  - Each records represents a taxi ride, with data about no. of passengers, pick up and drop location and time, total duration of the trip and the total distance
- What is the primary key?
  - Id column is the primary key
- What date range is your dataset bound to?
  - The date spans from 1st Jan to 1st July, a total of 6 month period in the year 2016
- What are the geographical bounds of this dataset? Is it limited to Manhattan, or is Brooklyn, Queens, Staten Island, the Bronx, and New Jersey included? Where are most of the data points centralized at? Are there outliers?
  - Most of the data is for locations in Manhatten. However there are outliers in the areas of Brooklyn, Queens and Staten Island

You notice that the dataset does not contain explicit data points out-of the-box, we'll need to enrich the dataset with relevant fields:

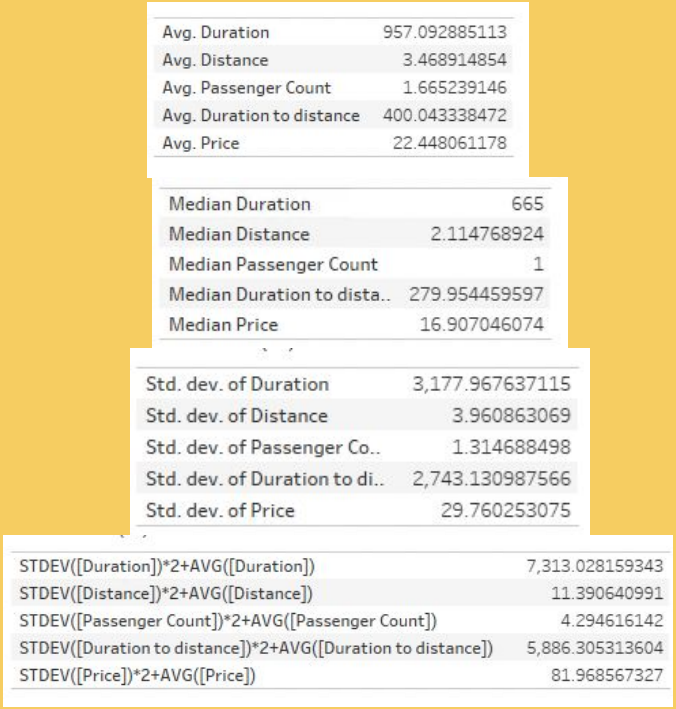
- You notice that ride price is not included, but figure it could be derived. Based on information about New York taxi prices gleaned from the internet, create a calculated field called `price` using the `duration`, `distance`, and `passenger count` fields.
- You hypothesize your target users will be those who take a relatively longer time getting to a destination that is relatively close, due to heavy traffic conditions and/or limitations to physical road infrastructure. To be able to analyze where this is happening, you will need to create a calculated field called `distance-to-duration ratio`.

Let’s understand the scope and distribution various dimensions within the dataset. Calculate the **average**, **median**, and the **first & second standard deviation of the mean** for the following measures:

- duration
- distance
- passenger counts
- duration-to-distance ratio
- price

Answer Slide

- Average
  - Duration: 15.95 minutes
  - Distance: 3.47 miles
  - passenger counts: 1.66
  - duration-to-distance ratio: 6.66 min/miles
  - Price: $22.45
- Median
  - Duration: 11.08 minutes
  - Distance: 2.114 miles
  - passenger counts: 1
  - duration-to-distance ratio: 4.66 minutes/miles
  - Price: $16.90
- Std Deviation (First and Second)
  - Duration: 52.966 Minutes and 121.88 Minutes
  - Distance: 3.96 miles and 11.39 miles
  - passenger counts: 1.314 and 4.29
  - duration-to-distance ratio: 45.71 min/miles and 98.105 min/miles
  - Price: $29.76 and $81.96



Avg. Duration	957.092885113
Avg. Distance	3.468914854
Avg. Passenger Count	1.665239146
Avg. Duration to distance	400.043338472
Avg. Price	22.448061178

Median Duration	665
Median Distance	2.114768924
Median Passenger Count	1
Median Duration to dista..	279.954459597
Median Price	16.907046074

Std. dev. of Duration	3,177.967637115
Std. dev. of Distance	3.960863069
Std. dev. of Passenger Co..	1.314688498
Std. dev. of Duration to di..	2,743.130987566
Std. dev. of Price	29.760253075

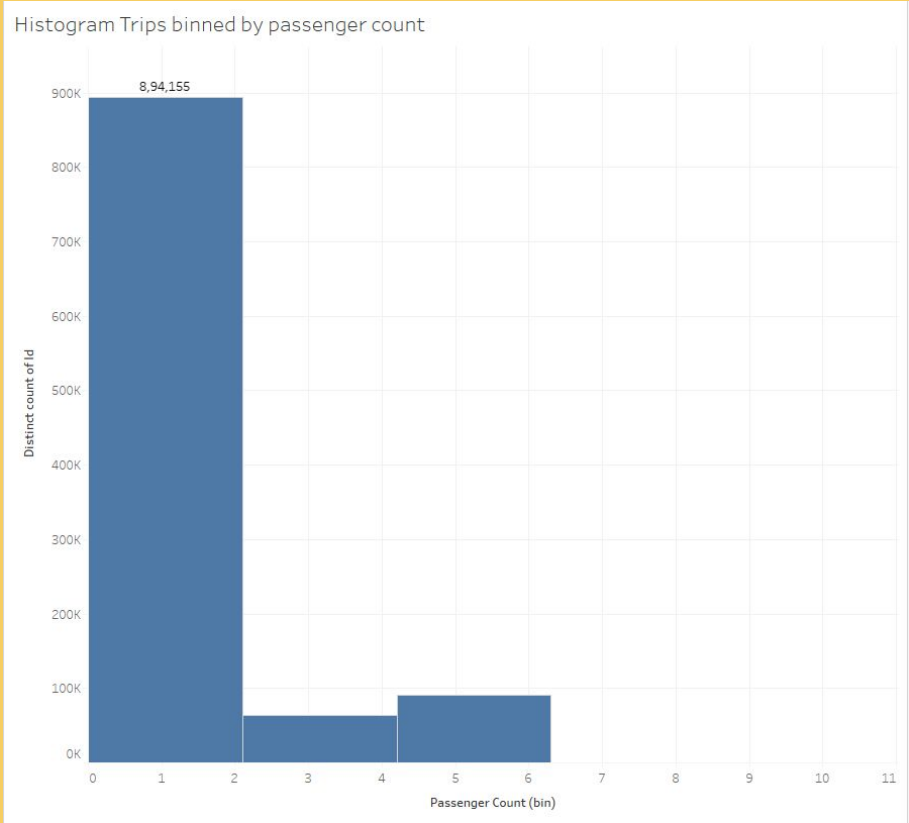
STDEV([Duration])*2+AVG([Duration])	7,313.028159343
STDEV([Distance])*2+AVG([Distance])	11.390640991
STDEV([Passenger Count])*2+AVG([Passenger Count])	4.294616142
STDEV([Duration to distance])*2+AVG([Duration to distance])	5,886.305313604
STDEV([Price])*2+AVG([Price])	81.968567327

Flying cars may have to have to be a lower weight for efficiency & take-off. Or you may just decide to leverage mini-copters for your initial MVP.

Create a histogram that visualizes the number of total rides grouped by passenger counts to analyze the potential market volume of low passenger pickups (1-2 passengers).

Answer Slide

For Passengers less than 2, there were around 894155 Trips taken. This is the highest group, and the lower hanging fruit to target first.



For the initial MVP launch (& most likely GA), we have a finite amount of monetary resources to build Flyber pick-up / drop-off nodes. We'll need to be strategic on where we'll place them:

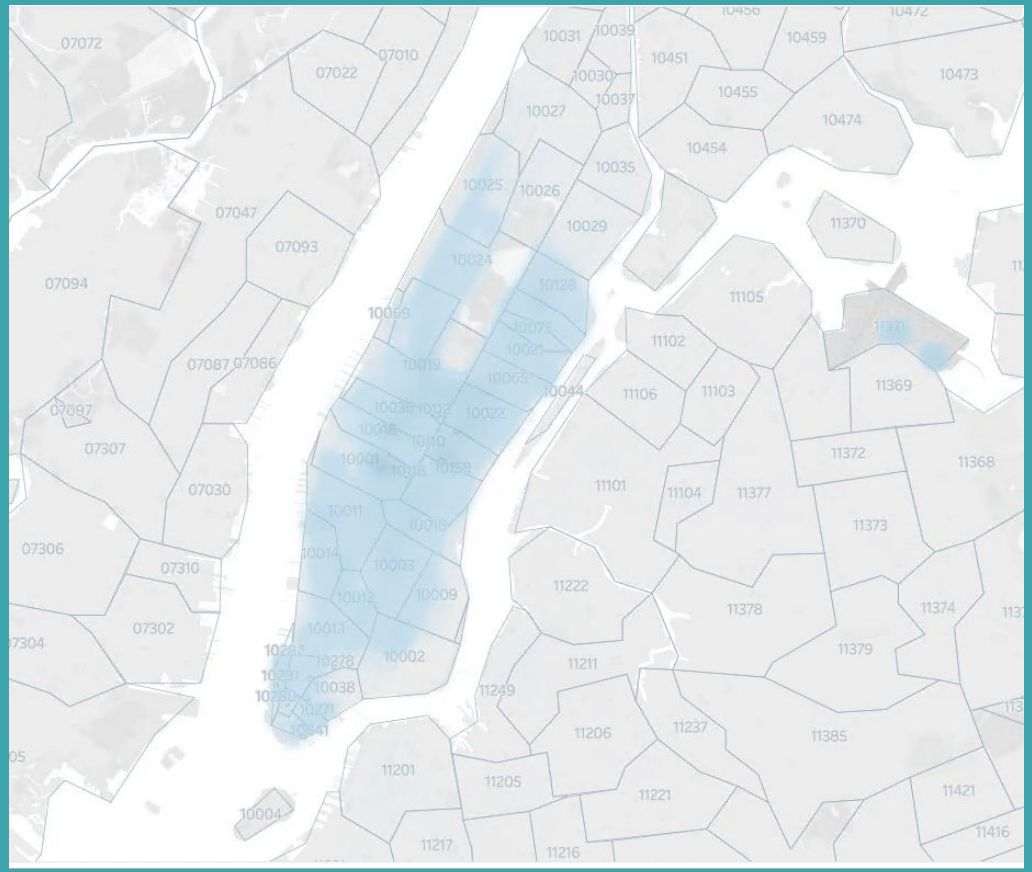
- Which neighborhoods/zip codes tends to experience a relatively higher density of pick-ups?
- Which neighborhoods/zip codes tends to experience a relatively higher density of drop-offs?
- Which neighborhoods/zip codes tends to have the highest duration-to-distance ratios, based on pick-up?
- Which neighborhoods/zip codes tends to have the highest duration-to-distance ratios, based on drop-off?
- For any of the neighborhoods identified, are there any potential areas within the neighborhood that are optimal for flying taxi pick-up / drop-off? What makes them suitable?

Answer Slide

- Which neighborhoods/zip codes tends to experience a relatively higher density of pick-ups?
  - The Zipcodes: 10178,10017,10171,10022,10019,10036,10001
- Which neighborhoods/zip codes tends to experience a relatively higher density of drop-offs?
  - 10001, 10016, 10022, 10019, 10110, 10178, 10021
- Which neighborhoods/zip codes tends to have the highest duration-to-distance ratios, based on pick-up?
  - 11430, 11101, 11106, 11371, 10019, 10010, 10003
- Which neighborhoods/zip codes tends to have the highest duration-to-distance ratios, based on drop-off?
  - 11430, 11201,10456, 10065, 10069, 10019, 10003
- For any of the neighborhoods identified, are there any potential areas within the neighborhood that are optimal for flying taxi pick-up / drop-off? What makes them suitable?
  - Areas that are a little distance away from crowded locations so that the flying taxi can land without having to wait for the road to be clear to land.

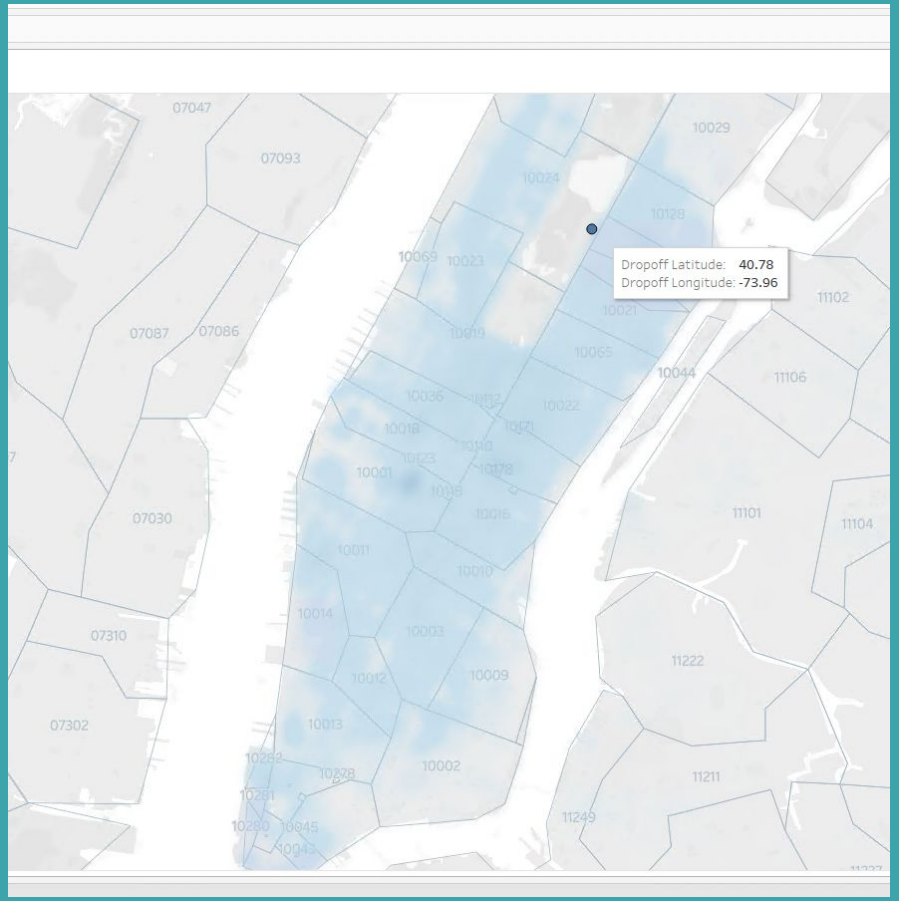
Answer Slide

- Density of pick ups



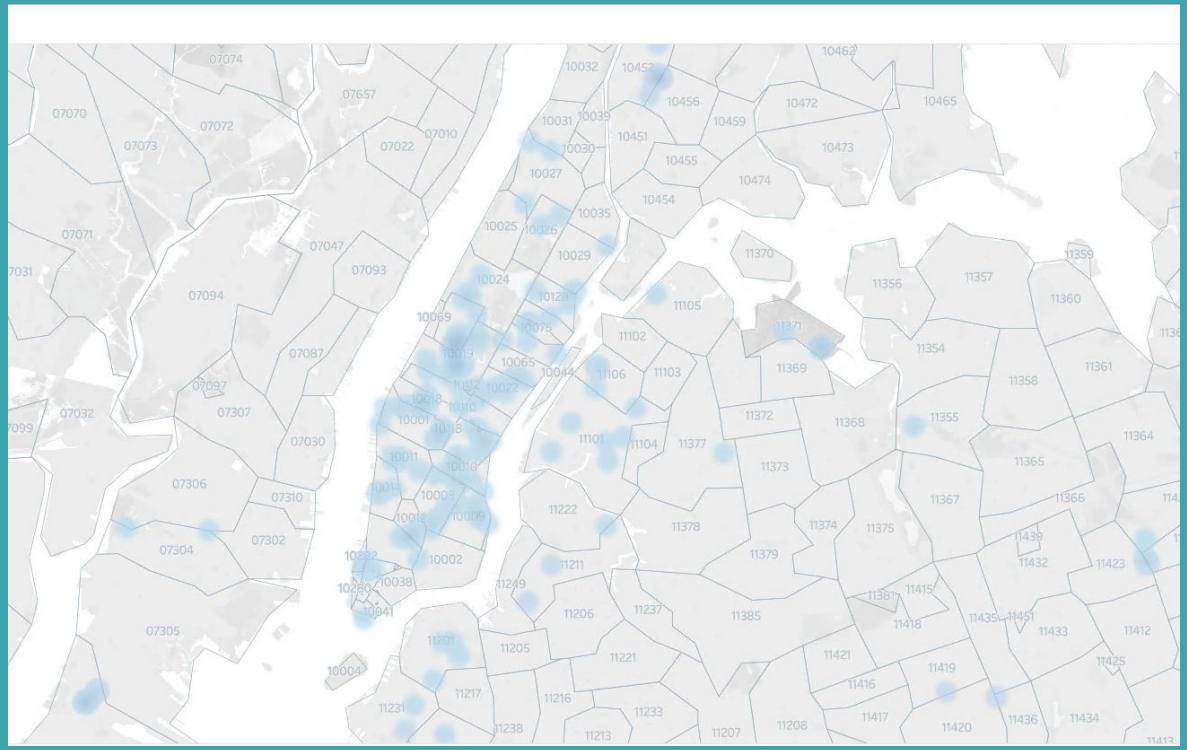
Answer Slide

- Density of drop offs



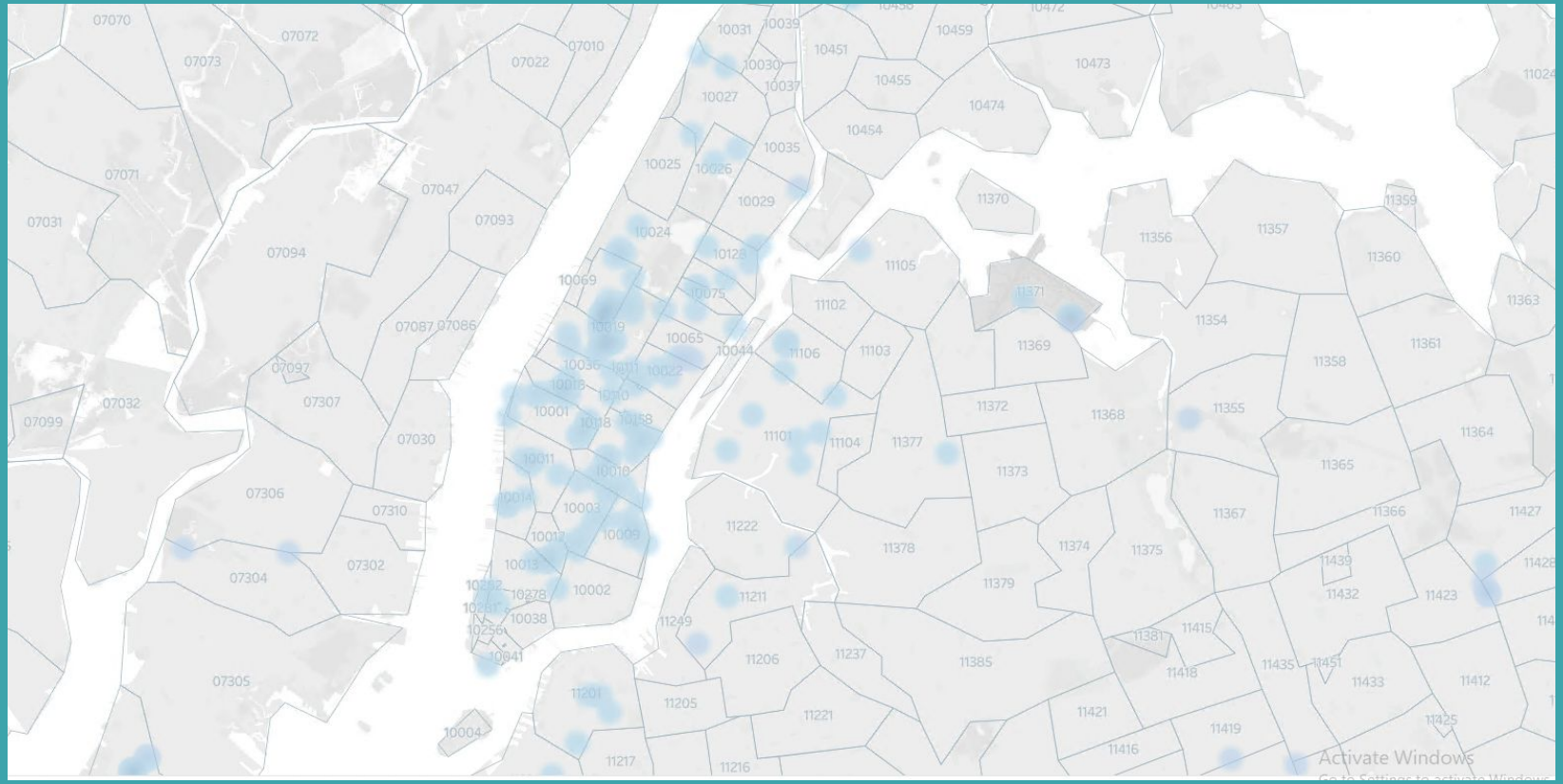
Answer Slide

- Density of drop offs with distance to ratio greater than 72,21,637



Answer Slide

- Density of pick ups with distance to ratio greater than 72,21,637



It may not make operational sense to have the service running 24/7, for now.

- What times throughout the day experience relatively higher volumes of ride pick-ups?
- What days throughout the week experience relatively higher volumes of ride pick-ups?
- Pinpoint any periods throughout the year that experience trend fluctuation or seasonality around ride pick-up volumes. This will help us in our post-launch analyses to determine if any spikes or dips were influenced by seasonality or through actual feature adoption/regression.

Answer Slide

- What times throughout the day experience relatively higher volumes of ride pick-ups?
  - 1700 to 2300 experience relatively higher volumes of pickup
- What days throughout the week experience relatively higher volumes of ride pick-ups?
  - Friday, Saturday and Thursday experience relatively higher volumes of ride pick-ups
- Pinpoint any periods throughout the year that experience trend fluctuation or seasonality around ride pick-up volumes. This will help us in our post-launch analyses to determine if any spikes or dips were influenced by seasonality or through actual feature adoption/regression.
  - The months of march april and may experience higher pick up rates in Q1 & Q2. Every week of each month see a pattern where the number of pickups increase from monday to saturday then drop-off to the lowest point on the next monday

Answer Slide

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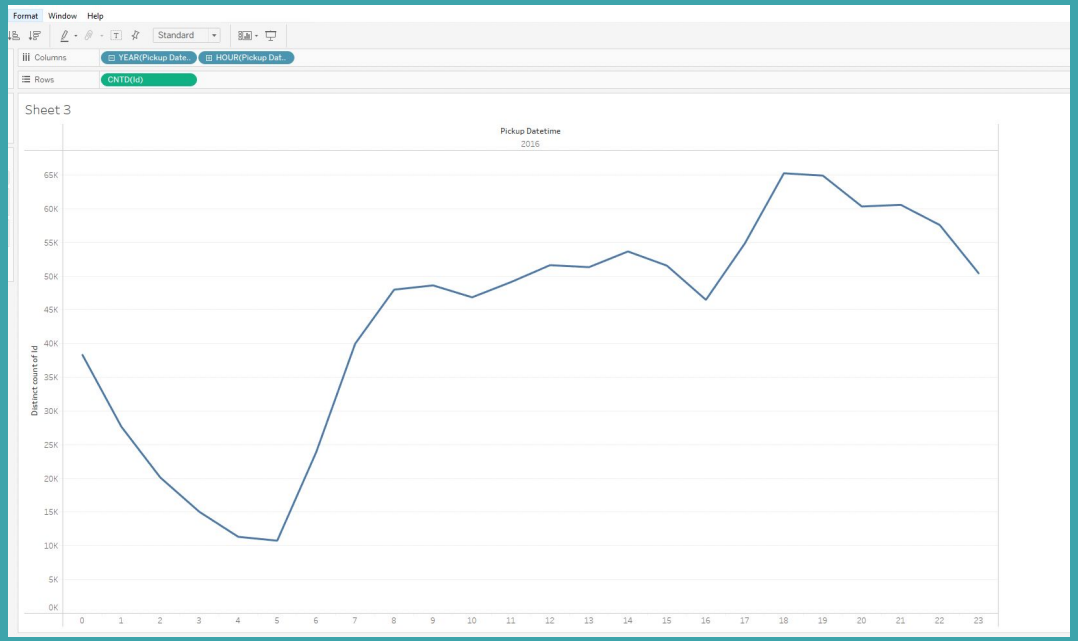

Answer Slide

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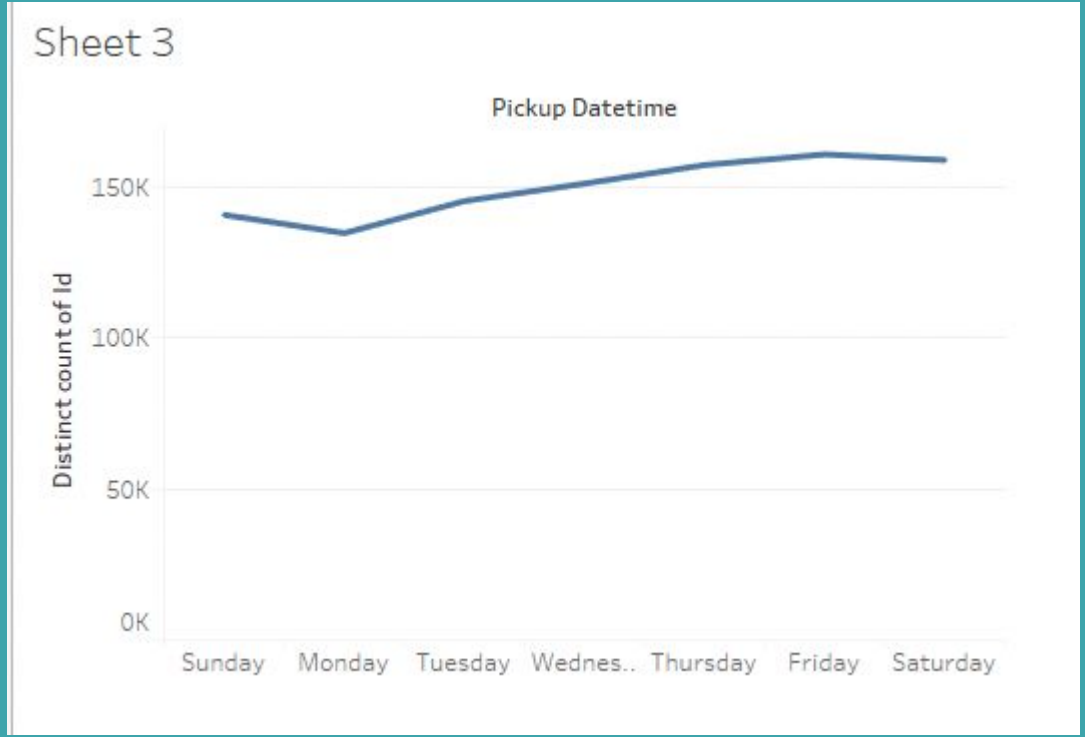


Answer Slide

- Pinpoint any periods throughout the year that experience trend fluctuation or seasonality around ride pick-up volumes. This will help us in our post-launch analyses to determine if any spikes or dips were influenced by seasonality or through actual feature adoption/regression.
    - The months of march april and may experience higher pick up rates in Q1 & Q2. Every week of each month see a pattern where the number of pickups increase from monday to saturday then drop-off to the lowest point on the next monday

Ensure the fields are parsed correctly, field headers are included in the first row of the CSV.

Question schema:

Q1 - What is your email?
Q2 - What gender do you identify as?
Q3 - What is your age?
Q4 - What is your annual income? (income bands)
Q5 - What neighborhood do you reside in?
Q6 - Do you currently use taxis? (Y/N)
Q7 - Do you currently use ridesharing services? (Y/N)
Q8 - Would you use a flying taxi service, if such a concept existed? (Y/N)
Q9 - If yes to Q8, how much would you be willing to pay per mile for such a service? (USD)
Q10 - If no to Q8, what is the reason?

To inform our future product marketing efforts, we'll want to extract the following:

- Is there an inclination of better Flyber adoption based on gender, age, income level, or neighborhood of residence?
- What is the distribution of potential price per mile based on gender, age, income level, and neighborhood of residence?
- What is the different personas/segments of negative sentiment towards not using a flying taxi car service?

Answer Slide

- Is there an inclination of better Flyber adoption based on gender, age, income level, or neighborhood of residence?
  - A total of 400 people would want to try Flyber, out of these around 243 are women, which represents 79.15% of all 307 females surveyed and 157 are males out of 192 of total surveyed males which represents 81.77%. Thus since in %age terms both figures are closeby we cannot say with certainty there is a inclination for one or the other.
  - Age: We see that even amongst age groups inclination to try flyber is uniform across age groups

Age Groups	18-30	31-45	46-60	61-76
Total	113	124	120	142
Willing to try Flyber	90	98	97	115
%age of Total	79.64	79.03	80.83	80.98

Answer Slide (contd.)

- Income: We can see the income group 120k to 200k has a relatively higher inclination to try out flyber. This could perhaps be because of higher paying capacity. However we see the highest income group has the lowest relative inclination of all groups, suggesting they may already have other alternatives to manage their travel or may not require travelling longer distances as they can afford staying lose to their place of work

	0 - $20k	$20k - $40k	$40k - $80k	$80k - $120k	$120k - $200k	> $200k
Total	25	66	134	118	99	57
Willing to Try Flyber	20	53	106	94	85	42
%age of Total	80	80.30	79.10	79.66	85.85	73.68

- Neighbourhood: The following town see a higher interest in Flying Taxis

Row Labels	Count of Q8
Midtown	15
Battery Park City	14
Financial District	12
Tribeca	11
Tudor City	11
Columbus Circle	10

Answer Slide (contd.)

- What is the distribution of potential price per mile based on gender, age, income level, and neighborhood of residence?

Distribution of Price Per Mile

	Q2 Gender	
	F	M
Avg. Q9 Price Flying Taxi	23.29	23.01
Median Q9 Price Flying Taxi	23.00	22.00
Std. dev. of Q9 Price Flying Taxi	9.38	9.15
Variance of Q9 Price Flying Taxi	87.97	83.65

Distribution of Price Per Mile

	Q3 Age (bin)				
	18-30	30-45	45-60	60-75	75+
Avg. Q9 Price Flying Taxi	24.07	22.09	21.65	24.78	23.90
Median Q9 Price Flying Taxi	24.00	20.50	21.00	24.00	24.50
Std. dev. of Q9 Price Flying Taxi	9.92	9.25	8.82	8.99	8.96
Variance of Q9 Price Flying Taxi	98.42	85.49	77.83	80.88	80.32

Distribution of Price Per Mile

	Q4 Income					
	$0 - $20,000	$20,001 - $40,000	$40,001 - $80,000	$80,000 - $120,000	$120,000 - $200,000	> $200,000
Avg. Q9 Price Flying Taxi	11.70	15.43	18.33	22.13	31.05	37.10
Median Q9 Price Flying Taxi	11.00	15.00	18.00	22.00	30.00	38.00
Std. dev. of Q9 Price Flying Taxi	4.66	5.38	5.46	5.13	6.46	6.13
Variance of Q9 Price Flying Taxi	21.69	28.94	29.84	26.31	41.71	37.55

Answer Slide (contd.)

- What is the distribution of potential price per mile based on gender, age, income level, and neighborhood of residence?

Distribution of Price Per Mile

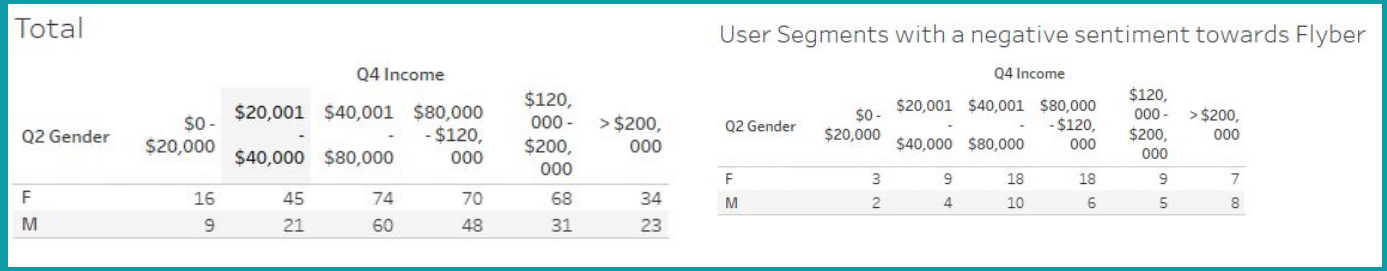
Q5 Neighbourhood	Avg. Q9 Price Flying Taxi	Median Q9 Price Flyin..	Std. dev. of Q9 Price Flyi..	Variance of Q9 Price Flyi..
Bowery	32.8	37.0	11.4	130.2
Battery Park City	32.7	35.0	9.5	90.5
Inwood	34.0	34.0		
Financial District	32.8	33.5	10.3	105.4
Tribeca	29.4	31.0	11.1	123.5
Columbus Circle	30.1	30.5	10.3	106.8
Nolita	24.6	30.0	9.7	93.8
Midtown East	25.4	29.0	11.5	132.0
Lower East Side	28.0	28.0	0.0	0.0
Downtown Manhattan	27.0	28.0	9.5	91.0
Little Australia	24.6	27.0	8.8	78.3
Lenox Hill	24.8	26.5	7.1	50.9
Midtown West	24.9	26.0	7.8	60.9
West Village	27.3	25.0	9.7	94.3
St. Nicholas Historic Distr..	24.5	25.0	1.7	3.0
Garment District	24.1	25.0	12.7	160.1
Five Points	24.8	25.0	8.6	73.6
Madison Square	24.8	24.5	10.2	104.2
Little Italy	25.3	24.0	2.3	5.3
Hell's Kitchen	22.7	24.0	11.1	124.0
Harlem	25.3	24.0	13.4	178.9
Fort George	25.0	24.0	3.6	12.7
Diamond District	26.3	24.0	9.9	97.6
Sugar Hill (Central Harlem)	23.2	23.5	5.2	27.4
Greenwich Village	23.5	23.5	11.8	140.3
West Harlem	23.0	23.0		
Upper West Side	21.6	23.0	7.5	56.8
Rockefeller Center	23.2	23.0	8.2	66.4
Upper Manhattan	22.0	22.0	3.1	9.6
Tudor City	23.6	22.0	10.1	102.1
Little Brazil	22.8	22.0	6.9	47.4
Cooperative Village	19.7	22.0	11.7	136.3
Carnegie Hill	18.4	22.0	7.8	61.3
Marble Hill	21.0	21.5	4.9	24.4
Upper East Side	24.5	21.0	12.8	163.7
Two Bridges	19.0	21.0	6.2	39.0
Midtown	22.2	21.0	5.8	33.5
East Village	19.0	21.0	7.2	51.5

Distribution of Price Per Mile

Q5 Neighbourhood	Avg. Q9 Price Flying Taxi	Median Q9 Price Flyin..	Std. dev. of Q9 Price Flyi..	Variance of Q9 Price Flyi..
Cooperative Village	19.7	22.0	11.7	136.3
Carnegie Hill	18.4	22.0	7.8	61.3
Marble Hill	21.0	21.5	4.9	24.4
Upper East Side	24.5	21.0	12.8	163.7
Two Bridges	19.0	21.0	6.2	39.0
Midtown	22.2	21.0	5.8	33.5
East Village	19.0	21.0	7.2	51.5
NoHo	18.8	20.5	8.8	78.3
Lincoln Square	21.3	20.5	9.2	85.1
Koreatown	20.1	20.5	5.3	27.8
Sutton Place	22.3	20.0	10.5	110.3
Murray Hill	22.8	20.0	8.1	65.6
Morningside Heights	21.0	20.0	10.0	100.8
Marcus Garvey Park, Mou..	19.3	20.0	8.0	64.3
Le Petit Senegal (Little Se..	23.8	20.0	9.5	90.7
Little Germany	22.0	19.5	6.9	47.3
Yorkville	19.8	19.0	3.1	9.6
Tenderloin	17.9	19.0	6.2	38.5
Manhattanville	20.8	19.0	4.0	15.7
Hudson Yards	19.7	19.0	5.7	32.3
Civic Center	16.8	18.5	5.4	29.6
Central Harlem	19.0	18.5	7.5	56.7
South Street Seaport Hist..	19.3	18.0	6.1	37.3
SoHo	24.2	18.0	11.6	133.7
Manhattan Valley, Bloomi..	20.0	18.0	4.6	21.5
Chinatown	18.5	18.0	7.0	49.0
Hudson Heights	19.8	17.5	8.9	79.0
Washington Heights	16.8	17.0	6.2	38.2
Theater District	22.3	17.0	13.3	177.2
Astor Row (Central Harle..	20.6	17.0	10.8	116.8
Turtle Bay	19.8	16.0	9.6	91.9
East Harlem (Spanish Har..	20.8	15.5	13.7	186.9
Herald Square	19.4	15.0	9.1	83.7
Radio Row	20.3	14.0	11.8	140.3
Little Syria	19.0	14.0	10.4	109.0
Alphabet City and Loisaida	16.5	13.5	10.4	108.3
Hamilton Heights	22.3	13.0	17.9	321.3
Times Square	18.0	12.0	12.2	149.3

Answer Slide (contd.)

- What is the different personas/segments of negative sentiment towards not using a flying taxi car service?



Total

Q2 Gender	Q4 Income: $0 - $20,000	$20,001 - $40,000	$40,001 - $80,000	$80,000 - $120,000	$120,000 - $200,000	> $200,000
F	16	45	74	70	68	34
M	9	21	60	48	31	23

User Segments with a negative sentiment towards Flyber

Q2 Gender	Q4 Income: $0 - $20,000	$20,001 - $40,000	$40,001 - $80,000	$80,000 - $120,000	$120,000 - $200,000	> $200,000
F	3	9	18	18	9	7
M	2	4	10	6	5	8

% of Total	0 - $20k	$20k - $40k	$40k - $80k	$80k - $120k	$120k - $200k	> $200k
F	18.75	20	24.32	25.71	13.23	20.58
M	22.22	19.05	16.66	12.5	16.13	34.78

We identify 2 segments in this and investigate them further to identify age groups within that

1. Female; Income: 40-80k
2. Female; Income: 80-120k
3. Male; Income: 200k+

Answer Slide (contd.)

We see that there isn't a big difference across age groups wrt Negative Sentiment. Hence we conclude that the segments with Negative sentiment are:

1. Female; Income: 40-80k
2. Female; Income: 80-120k
3. Male; Income: 200k+

Segments with negative sentiment

		Q4 Income					
Q2 Gender	Q3 Age (bin)	$0 - $20,000	$20,001 - $40,000	$40,001 - $80,000	$80,000 - $120,000	$120,000 - $200,000	> $200,000
F	15.1		1	5	3	2	2
	30.2	1	2	5	6	2	1
	45.3	1	2	2	4	3	1
	60.4	1	4	5	5	2	2
	75.5			1			1
M	15.1		1	2	2	1	4
	30.2	1	1	3	2	2	
	45.3		1	4	2	1	2
	60.4	1	1	1		1	2

Section 2: Proposal Synthesis

Identify a product objective for Flyber's launch. Your product objective will guide your KPIs, so identify what Flyber should optimize for. Your objective should be centered around one the following focus areas:

- User Acquisition
- User Engagement
- User Retention
- Profitability

Explain your reasoning. Include both why you feel your focus area is more relevant than the others for Flyber at this time of the product development cycle.

Answer Slide

- We know from our user study that the 80%+ of income groups that earn between 80k to 200k are willing to try flyber while also willing to pay higher price per mile. This will be our initial 'innovator' target segment. We will be targeting people within this group with a duration to distance ratio of more than 1000 since above this number since above 1000 the average speed of the vehicle falls below 3.6 making it faster for a person to walk to the destination than through a car. According to data thats available (data) assuming an average household size of 2 we find that number of people who earn more than $80k individually are around 500k. Of these according to our survey data around 80% will be willing to try flyber which is around 400k. We will be launching our MVP in the top 5 locations where these customers reside according to our survey and according to the taxi data. We assume around 50% of 400k would be residing in these locations, giving us a TAM of 200k people for our MVP.
- **Objective: Launch MVP in 5 locations and acquire the initial set of 'innovator' customers in the first quarter**
- Because we will be launching our MVP our primary goal should first be to acquire our initial set of customers before we can focus on engaging and retaining them. We can think about profitability once we have customer stickiness.
- We define the '**Baseline conversion'** to be the conversion rate for any new ridesharing service launched in the region. We assume this to be 20%. We define the 'experiment' to be the launch of a flying car taxi as a variation of the baseline case(control).

Q5 Neighborhood	
Columbus Circle	8
Diamond District	7
Herald Square	7
Midtown	11
Midtown West	7

Top 5 neighbourhoods for people earning between $80k to $200k according to user survey

Answer Slide

- **Target Group:**
  - **Living in NY in the neighbourhoods based on both taxi data and user data(intersection):**
    - **Midtown**
    - **Midtown East**
    - **Herald Square**
    - **Diamond District**
    - **Theatre District**
  - **Both Genders**
  - **Income group $80k - $2000k**
  - **All ages**
  - **Considering we are only launching in 5 neighbourhoods for the use case where the distance to duration ratio is high, and also in order to keep our costs low while we experiment, we would want to limit our taxi fleet to a small number for us to be nimble in iterating our MVP. Assuming we launch around 20 flying cars, 4 each in each neighbourhood and each flying car service around 50 trips a day, we would be serving approx 1k customers. Thus we should target to convert and retain atleast 30% of our monthly active users to use our MVP by the end of the quarter.**

Answer Slide

- **Objective: Launch MVP in 5 neighbourhoods in NY and acquire the initial set of ‘innovator’ customers in the first quarter**
  - **Key Result 1: Acquire Driving Partners who have flying school experience**
  - **Key Result 2: Market and advertise to target group customers and acquire signups of the target group**
  - **Key Result 3: Drive retention amongst first try users to above 30%**
  - **Key Result 4: Iterate on product based on feedback**

Formulate 3-5 Key Performance Indicators (KPIs), to measure if the product is heading towards the right direction based on your objective

Answer Slide

- Objective: Acquire the initial set of ‘innovator’ customers in the first quarter after launch in the first quarter
  - Key Result 1: Acquire Driving Partners who have flying school experience
    - KPI: Number of New partner recruited
  - Key Result 2: Market and advertise to target group customers and acquire signups of the target group keeping CAC below $30
    - KPIs
      - Customer Acquisition Cost (CAC)
      - Customer lifetime value (CLTV)
      - Conversion Rate
  - Key Result 3: Drive retention amongst first try users to above 30%
    - KPIs
      - Retention Rate
      - Churn Rate
      - Daily Active Users
      - Monthly Active Users
      - DAU/MAU
  - Key Result 4: Iterate on product based on feedback
    - KPIs
      - Customer Satisfaction Score

Create hypotheses around what thresholds your KPIs would need to hit in order to determine success

Answer Slide

- Number of New driver partner recruited: In 3 months from launch we would need 30 driving partners with flying school experience (Refer slides 36,37 for explanation)
- Customer Acquisition Cost (CAC): Reduce CAC to below $30 in the first 3 months
- Conversion Rate: Improve conversion rate to 30% by the end of the quarter
- Retention Rate: We need to retain at least 30% of people who try our product by the end of the quarter
- Daily Active Users: Should keep fleet at close to full utilisation 90%+ utilisation, i.e. more than 900 customers should be daily users in the first 3 months

As the product manager, you make decisions based on the insights you extract, we'll need to know the feature set we'll include in the MVP to measure viability, while keeping operational expenditure under control:

- What times/days of operation should the service run for?
- How many pick-up / drop-off nodes should we have?
- Where should the nodes be located?
- Should we initially use copters or homegrown hardware?
- Should the pricing be fixed or dynamic? At what rates?

Answer Slide

Based on the data analysis on taxi data and user survey we can say

- What times/days of operation should the service run for?
  - Based on data gleaned from taxi_data we can see that for duration to distance ratio of more than 1000, taxis should be operating all 7 days a week. In terms of timing, one can target the time slot between 0700 to 2100, since customers are also likelier to pay to travel faster during this time frame.
- How many pick-up / drop-off nodes should we have?
  - In terms of pickup we are looking at an area of 24 sq miles in Manhattan for our initial locations. Pick up and drop off locations will be within these. We assume around 10 pick up and drop stations to be appropriate to service 24 sq miles in Manhattan.
- Where should the nodes be located?
  - These nodes need to be located in zones where commuters can easily reach in each neighbourhood. Nodes can be placed outside of 10 busiest subway stations in NYC.
- Should we initially use copters or homegrown hardware?
  - Copters require a huge area to land and clearance from other vehicles and traffic. However investing in homegrown hardware is a huge cost upfront, justification for which we don't have yet. Hence we can partner with vendors such as airbus to launch their concept flying car designs to first test the viability of the service, before investing in developing hardware.
- Should the pricing be fixed or dynamic? At what rates?
  - For the purpose of the MVP, the price can be higher than taxi since it has the added benefit of faster travel. The average price for a taxi ride with duration to distance ratio larger than 1000 is $50 based on our data. We need to consider our costs to run while putting a price ceiling so as not to discourage customers from trying our service during MVP launch. Our survey says our target customers are willing to pay an average of $26, thus we need to strike a balance between the two and price dynamically based on demand between $30 to $60.

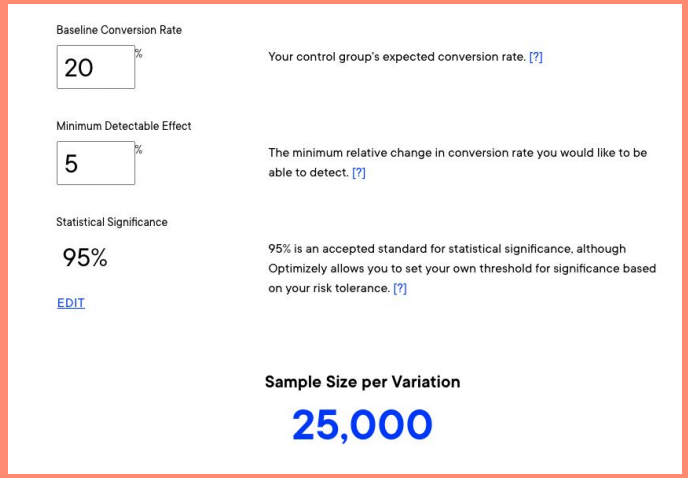
Weekday of Pickup Dat..	
Sunday	2,118
Monday	2,177
Tuesday	3,071
Wednesday	3,507
Thursday	3,466
Friday	3,196
Saturday	2,711

Hour of Pickup Datetime	
0	525
1	415
2	317
3	247
4	197
5	109
6	169
7	510
8	844
9	1,149
10	1,100
11	1,307
12	1,619
13	1,520
14	1,432
15	1,239
16	1,080
17	1,336
18	1,322
19	1,075
20	713
21	669
22	720
23	632

Determine the MVP sample size & time period allotted estimated to come to a conclusion on your hypotheses.

Answer Slide

- We have estimated from our data in that our TAM size is around 200k (refer slides 36).
- We define the '**Baseline conversion'** to be the conversion rate for any new ridesharing service launched in the region. We assume this to be 20%. We define the 'experiment' to be the launch of a flying car taxi as a variation of the baseline case(control).
- We need to measure the change in conversion rate within 5% percentage change.
- Accordingly we see that we need nearly 25k sample size
- We assume that we will be running 3 different variations of our experiment based on neighbourhoods



Answer Slide

- We then calculate the number of days the experiment needs to run as:
  - Total number of visitors needed = 25k(sample size) X 3 (number of variations in an experiment) = 75k
  - Our TAM is 200k, hence the total number of visitors is within this figure.
  - Estimated number of days to run the experiment = 75000/900 = 83.33 days approx 90 days
  - Hence we need to run this experiment for 1 quarter

Calculation #1

Sample size
× Number of variations in your experiment

--
Total number of visitors you need

Calculation #2

Total number of visitors you need
÷ Average number of visitors per day

-
Estimated number of days to run experiment

Create an instrumentation plan for the events you need collected and logged, in order to be able to physically measure your KPIs.

Answer Slide

- Number of New driver partner recruited:
  - newPartnerSignUp: Triggered when a Driver Signs up on the platform
    - driver_id
- Customer Acquisition Cost (CAC), Customer lifetime value (CLTV), Conversion Rate:
  - newSignUps: Triggered when a new user signs up using the sign up registration page
    - user_id
  - tripBookingSuccessfull: Triggered after a user successfully books a cab
    - trip_id
    - driver_id
  - adClick: Triggered whenever a potential customer clicks an ad
    - user_id
    - ad_id
- Retention Rate, Churn Rate, Daily Active Users, Monthly Active Users:
  - tripStartTime: Triggered when the driver marks the trip to begin
    - trip_id
    - driver_id
  - tripEndTime: Triggered when the driver marks the trip as complete
    - trip_id
    - driver_id
  - tripBookingSuccessful: Triggered after a user successfully books a cab
    - trip_id
    - Driver_id
  - newSession: Triggered whenever the user opens the app after being inactive for a specified amount of time
    - user_id
    - session_id
    - device_id

Create a qualitative feedback survey questions for users after their ride, to further understand and optimize the product for future iterations.

Answer Slide

- A 5 point scale from 1 to 5 post trip for
  - Overall Ratings
  - Driver Ratings
- Thumbs up/down for
  - App usage experience
  - Mid trip feedback
  - Quality of cleanliness
  - Turbulence
  - Pickup Experience
  - Drop Experience
  - “Would you like to ride with us again?”
- Based on the previous two responses we mail them a survey or get in touch with them for answering more detailed questionnaire. In the survey the following questions need to be asked
  - 10 point rating scale for
    - Overall experience
    - Driver related questions
    - Hygiene related
    - Pickup Experience
    - Drop Experience
    - Are you happy with the travel time
    - How likely are you to recommend us to your friends?
    - How likely are you to use our service again?
  - Descriptive questions for
    - What are the benefits you receive from a flying taxi service
    - What purpose do you wish to use our service for
    - Please describe any issues you’ve faced if any
    - What further improvements or features would you like to see?

Summarize everything you have learned into your final proposal

- Identify the target population. Why did you select that target population? What are their pain points?
- Create a product proposal containing claim, evidence, estimated impact, and risks
- Claims should be backed by quantitative evidence, impact should assess market needs/benefits
- Risks involve any known unknowns that we'll still need to monitor post-launch
- State cross-functional stakeholder teams that will need to be involved

Answer Slide

- Target Population and their pain points
  - From our user survey, we identify the demographics of our target population (refer slide 36 & 37)
  - Target Population: Income groups $80k to $200k have a higher willingness to try our service and also a higher willingness to pay as well. This is consistent across all ages and genders. This constitutes our target population
  - Pain Point: Individuals in our target population earn relatively higher than average ($79k is average). They prefer more comfortable mode of transport (taxi/personal cars vs subway/bus). However, they often have to suffer long travel times when travelling closeby because of traffic. This can significantly impact quality of life since average one way commute time in NYC is a total of 66 mins (source). For our target population, distance of around 5 miles can take upto 2 hours to travel back and forth (source).

Answer Slide

- User Impact
  - Improving the quality of life of commuters by providing a faster way to travel resulting in significant time savings.
  - Improving the predictability and reliability of travel times for the consumer.
- Market Impact
  - Drivers will need to be qualified to fly a flying car, this limiting the supply of drivers, this ensures that drivers' interests are protected as partners in the industry.
  - Has more scalability than physical infrastructure since no roads need to be built for routes.
  - Less congestion since cars can travel along 3 axis instead of just 2 that too along a route.
  - Improve travel times for taxis as well as a side effect of reduction in traffic. More price sensitive customers might end up choosing this option
  - Competing Ride Sharing Companies may enter the flying taxi service as well.

Answer Slide

- Business Impact
  - Acquiring initial set of users
  - Feedback from customers to experiment and iterate the product and test revenue model
  - Generate initial revenue to lower costs and keep the service running (assuming the service would take significant investments and lose money in the initial few years)
- Solutions
  - Launch a flying car taxi service in 5 neighbourhoods of Manhattan with a fleet of total 20 cars.
  - Create dedicated pick up and drop points.
  - Reduce travel time to destinations significantly.
  - Service would be dedicated to reduce travel times between two locations that are closeby (within 10 miles) however take too long to travel by taxis because of traffic.

Answer Slide

- Risks and Assumptions
  - Customers are too price sensitive, such that running the service isn't profitable
  - Assumption: the pick up and drop off points would be free from traffic, this may not always be the case and eventually lead to delays
  - Assumption: Air traffic eventually created won't lead to bottlenecks
  - Assumption: Flying cars would be somewhat comparable in fuel efficiency with taxis, so as to keep the cost comparable
  - Assumption: People are ready to pay a premium over taxis for travelling faster on a regular basis
- Stakeholders who need to be involved in the whole launch
  - Manufacturing Vendors
  - Driver Partners
  - Government for clearances
  - Product team
    - Engineering
    - Testing
    - Design
    - User Researcher
  - Marketing Team
  - Operations Team
  - Customer Service Team
  - The proposal would be pitched to the CXOs