Data Product Manager Nanodegree

Applying Data Science to Product Management

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

Welcome to your first week at Flyber


Aybar

In this project, you will apply the skills acquired in this course to create the MVP launch strategy for the first flying car taxi service, Flyber, in one of the most congested cities in America -- New York City.

You are responsible for bringing the first flying car taxi service to market by analyzing data and building a product proposal.

You will need to use the SQL workspace provided in the Classroom, and Tableau Public, in order to successfully complete the project.

You'll present your answers, findings, and insights in the Answer Slides found in this deck. Feel free to include any additional slides, if needed.

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

→ Taxis are used for facilitating public transport.

→ Few characteristics of user who leverages them are : Who do not have transportation facilities nearby the start of their journey, one who does not own some means of transport such as car, users who do not want to self ride because of congestion in New York City.

→ Pain points with the taxis are : It takes time to reach the destination due to congestion, Sometimes the cab drivers are not professionals.

→ With the digital ride sharing app, the cab is not allotted instantly and it takes time to arrive for the pickup. Also, the cab drivers do not know the destination before they pickup the passengers . The price of the fare fluctuates with change in congestion or demand or bad weather.

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

→ In my opinion, flying taxis would save lot of travelling time of passengers And the fares would not depend on congestion,demand and bad weather. Also users will be able to travel longer journey with the help of flying taxi.

→ Employment would increase in transport and engineering sector. Less accidents and less traffic as number of cars on the road will be low. As taxis will be obsolete, car manufacturing companies would lower the car prices and this will benefit customers wishing to own a private car.

Upload this dataset into Tableau Online.

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

Let’s begin exploration!

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

→ There are 1048468 records.
→ Each record represents taxi rides.
→ id -
Query ⇒ SELECT count(distinct(id)) FROM taxi_rides;

→ Max date range ⇒ 6/30/2016 11:59:00 PM
Min date range ⇒ 1/1/2016 12:00:00 AM

→ Geographical bounds are from Toronto to North Carolina to Concord and sea. New Jersey is not included. Most of data points are centralized near New York and yes, there are outliers which can be seen in the portion of water.

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`.

- **Calculated fields : Price**

  (3+(1.56*[Distance]*1.61)+([Duration]/3600)*30)

  Source : https://www1.nyc.gov/site/tlc/passengers/taxi-fare.page

- **Calculated fields : Duration to Distance Ratio**

  IIF([Distance]>0.007 AND [Distance]<100 AND [Duration]>0.1 AND [Duration]<=101060, [Duration]/([Distance]),0)

  This field is adjusted after cleaning data

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

Duration :
Average = 962.2 Seconds
Median = 662 Seconds
1 std Deviation = 5853 seconds
2 std deviation = 12668.2 seconds

Distance :
Average = 3.4 miles
Median = 2.1 miles
1 std Deviation = 4.382 miles
2 std Deviation = (1 std deviation)* 2 + mean
= 12.164 miles

Answer Slide

Passenger Count :
Average = 1.664
Median = 1
1 std Deviation = 1.314
2 std deviation = 4.292

Duration to Distance ratio :
Average = 469 seconds per mile
Median = 279.5 seconds per mile
1 std deviation = 13553 seconds per mile
2 std deviation = 27575 seconds per mile

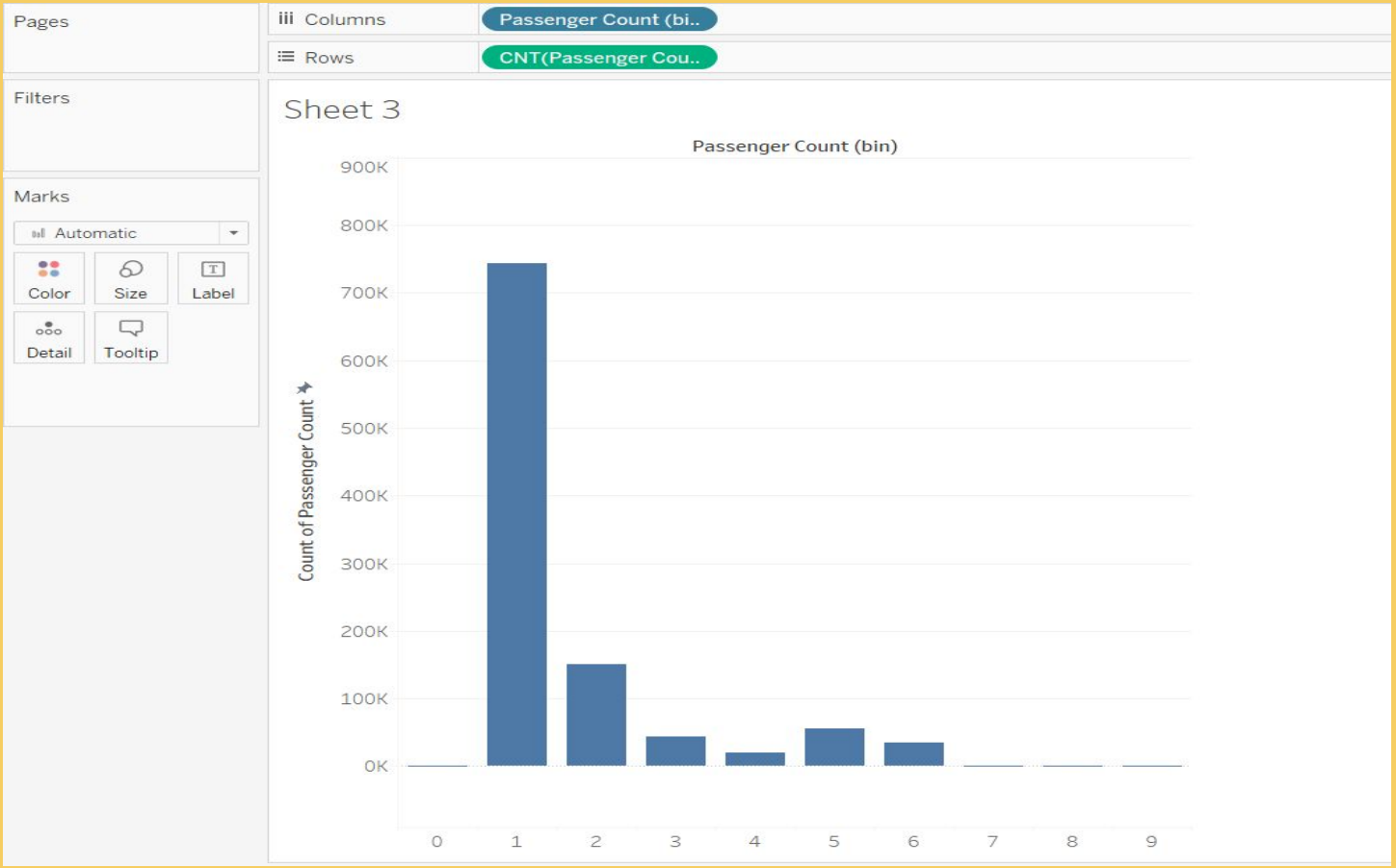
Answer Slide

Price :
Average = 19.66
Median = 14.05
1 std Deviation = 50.90
2 std deviation = 121.46 // (2 std deviation = (1 std deviation * 2)+mean

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



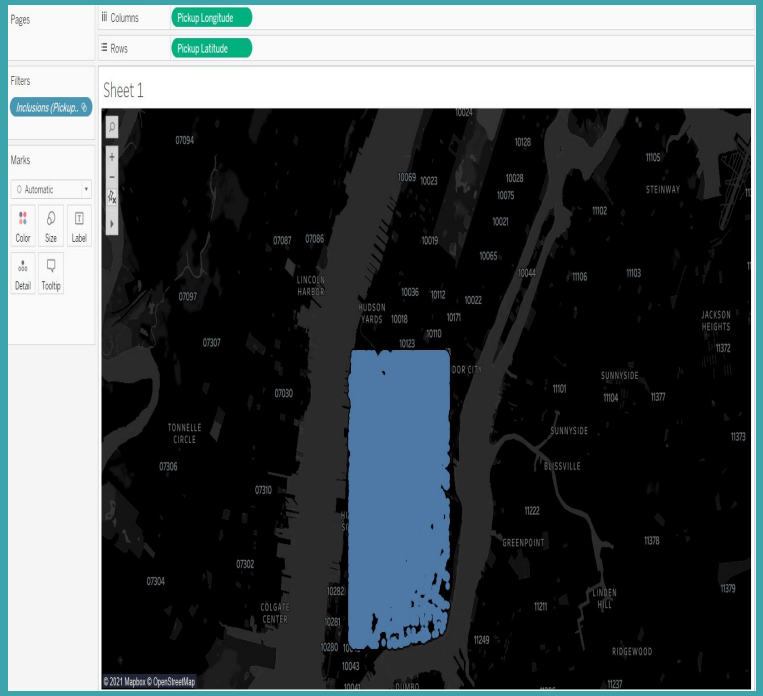
From the graph we can infer that the 1 passenger has highest count. The 4 has the lowest.

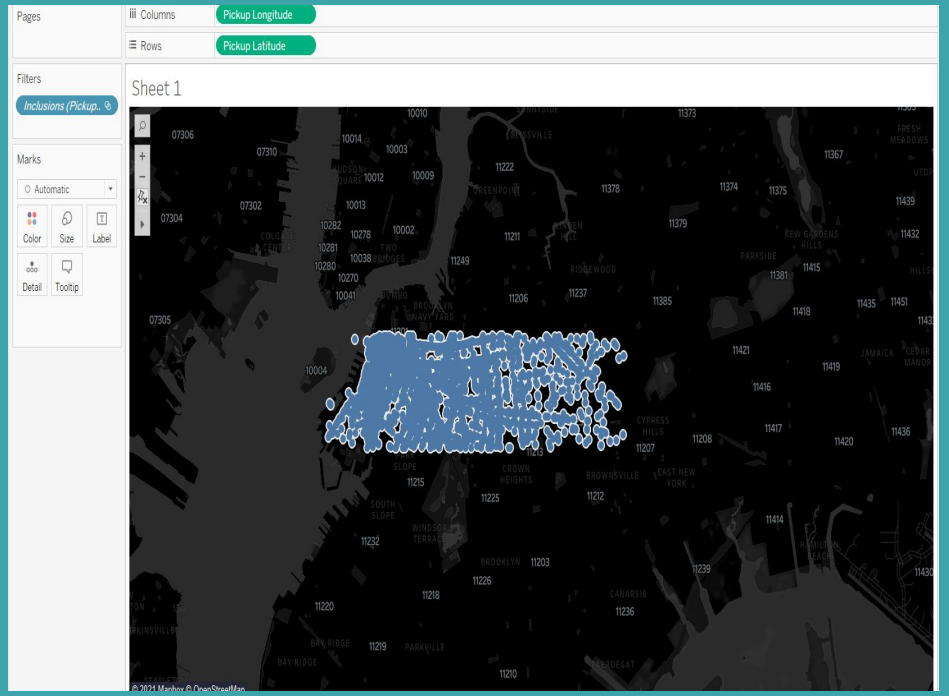
For the initial MVP launch (& most likely GA), we have a finite amount of monetary resources to build Flyber pick-up / drop-off nodes. We'll need to be strategic on where we'll place them:

- 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 - Pick Off

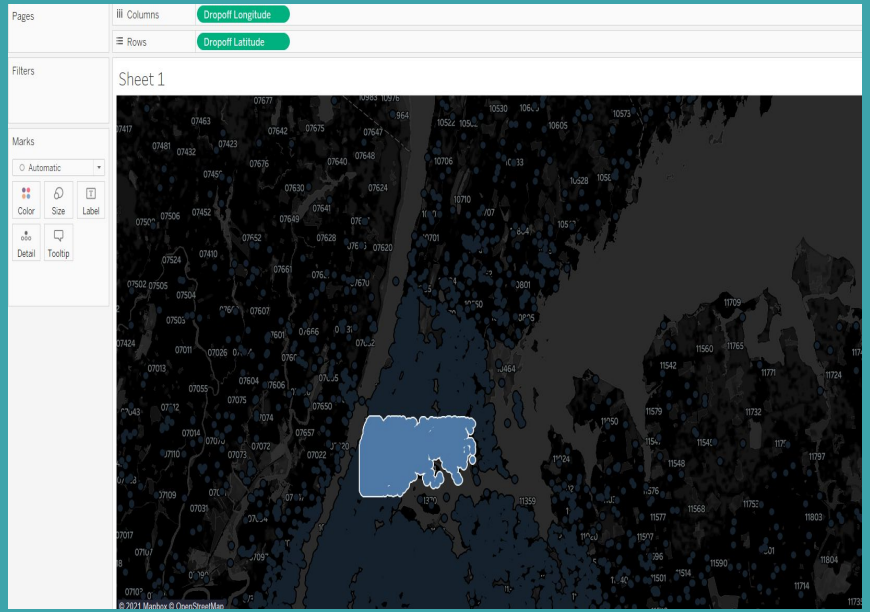
→ Washington Square village, 10010,1123, bedford stuyvesant

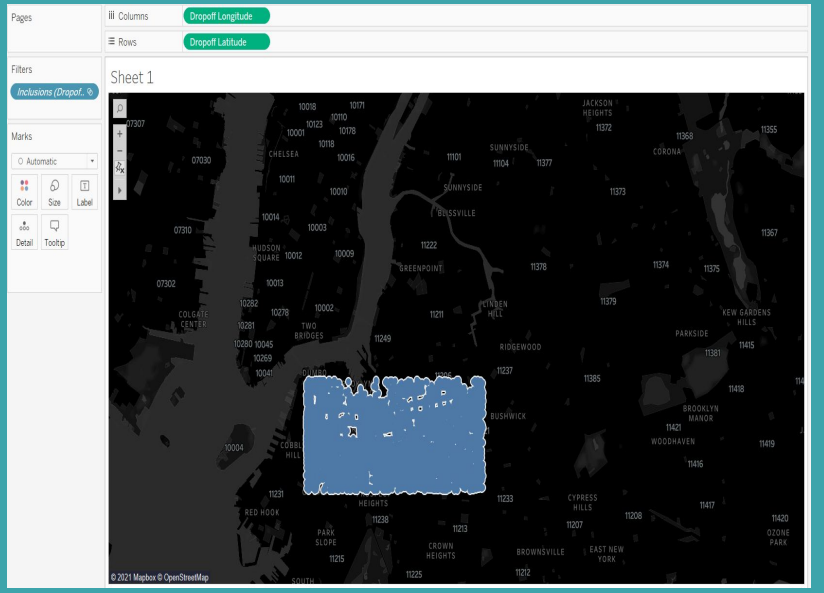




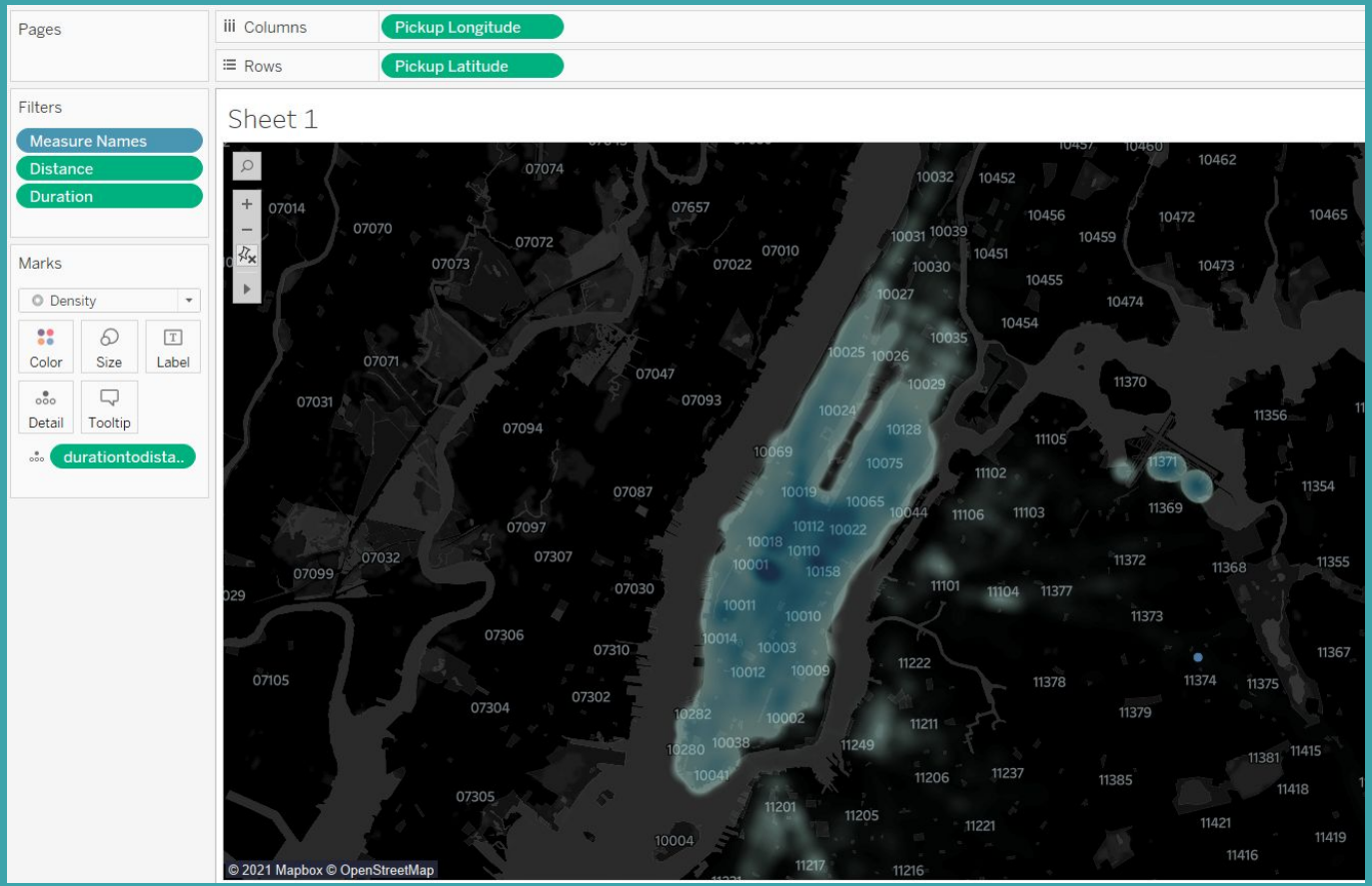
Answer - Drop Off

→ 10451, 10456, Fort Greene, Clinton Hill,11221

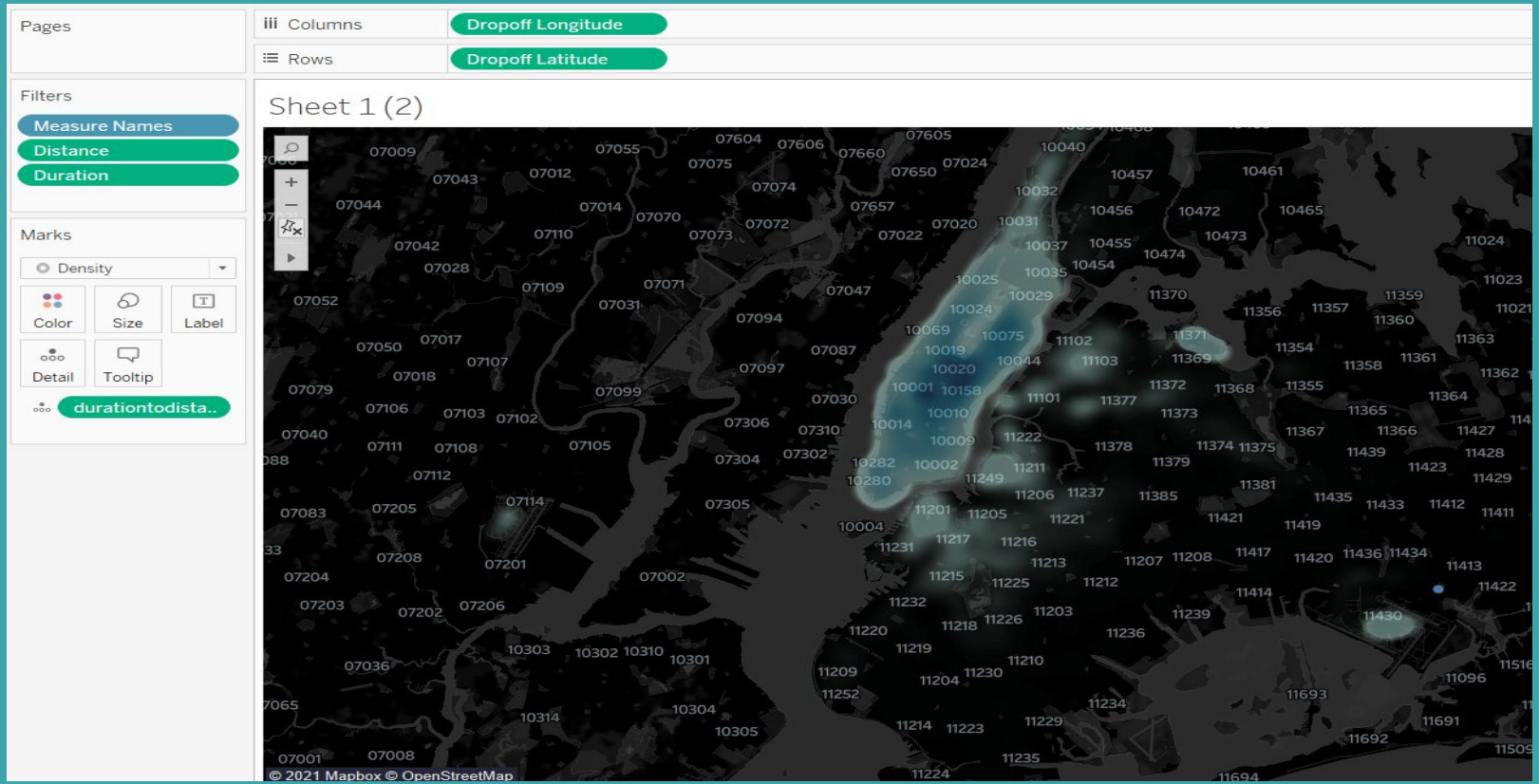




Answer - Highest duration-to-distance ratios, based on pick-up



Answer - neighborhoods/zip codes tends to have the highest duration-to-distance ratios, based on drop-off



Answer - neighborhoods identified, are there any potential areas within the neighborhood that are optimal for flying taxi pick-up / drop-off

Drop off -10020, 10158, 10001

Pick up - 10001, 10158, 10112

These are the zip codes where the MVP should be launched for pick up and drop off since these are the most optimal area as per duration to distance ratio.

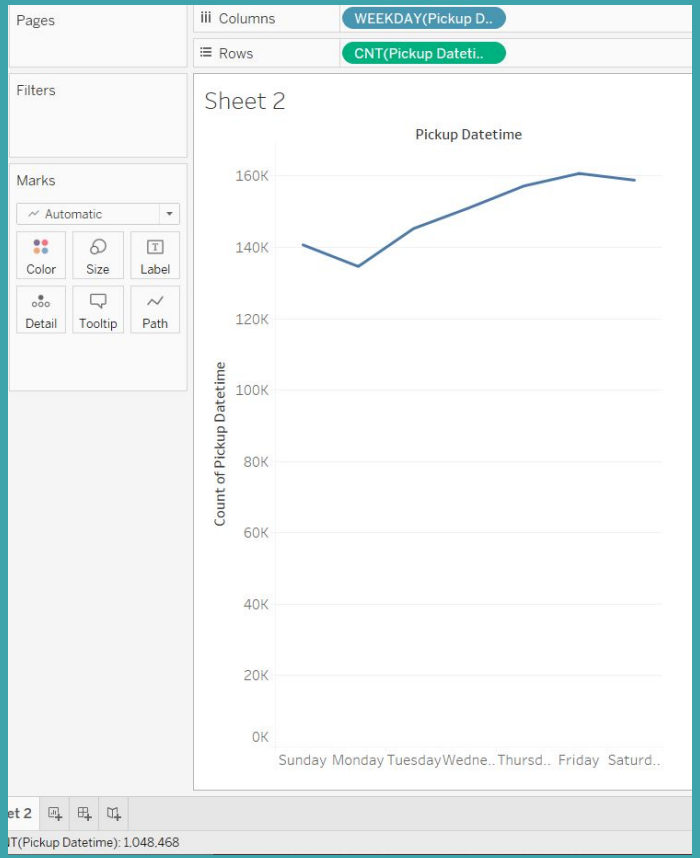
It may not make operational sense to have the service running 24/7, for now.

- 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 - Daily

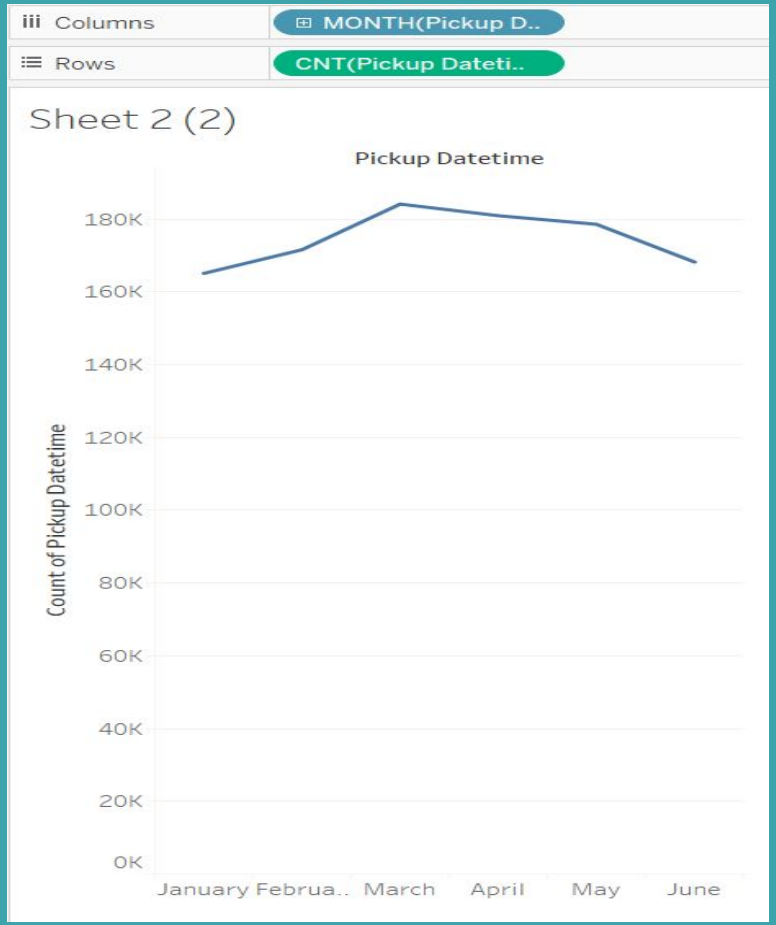
The maximum volume can be observed in 18-19th hour that is around 6-7 PM in NY with 65k.

Answer - Weekdays



Highest volume in the weekdays can be seen at Friday. Stands around 160k

Answer Slide - Trend fluctuation/ Seasonality



This graph shows how the trend fluctuates over the period of 6 months from Jan to June. The highest volume can be seen in March.

You and the user research team ran a quantitative survey on existing taxi and/or rideshare users in New York City to determine sentiment around potentially using a flying taxi service.

Dive into the survey results dataset in order to extract insights from explicit feedback.

Upload this dataset into Tableau Online or a SQL database (the classroom contains a workspace with the data for you as well).

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

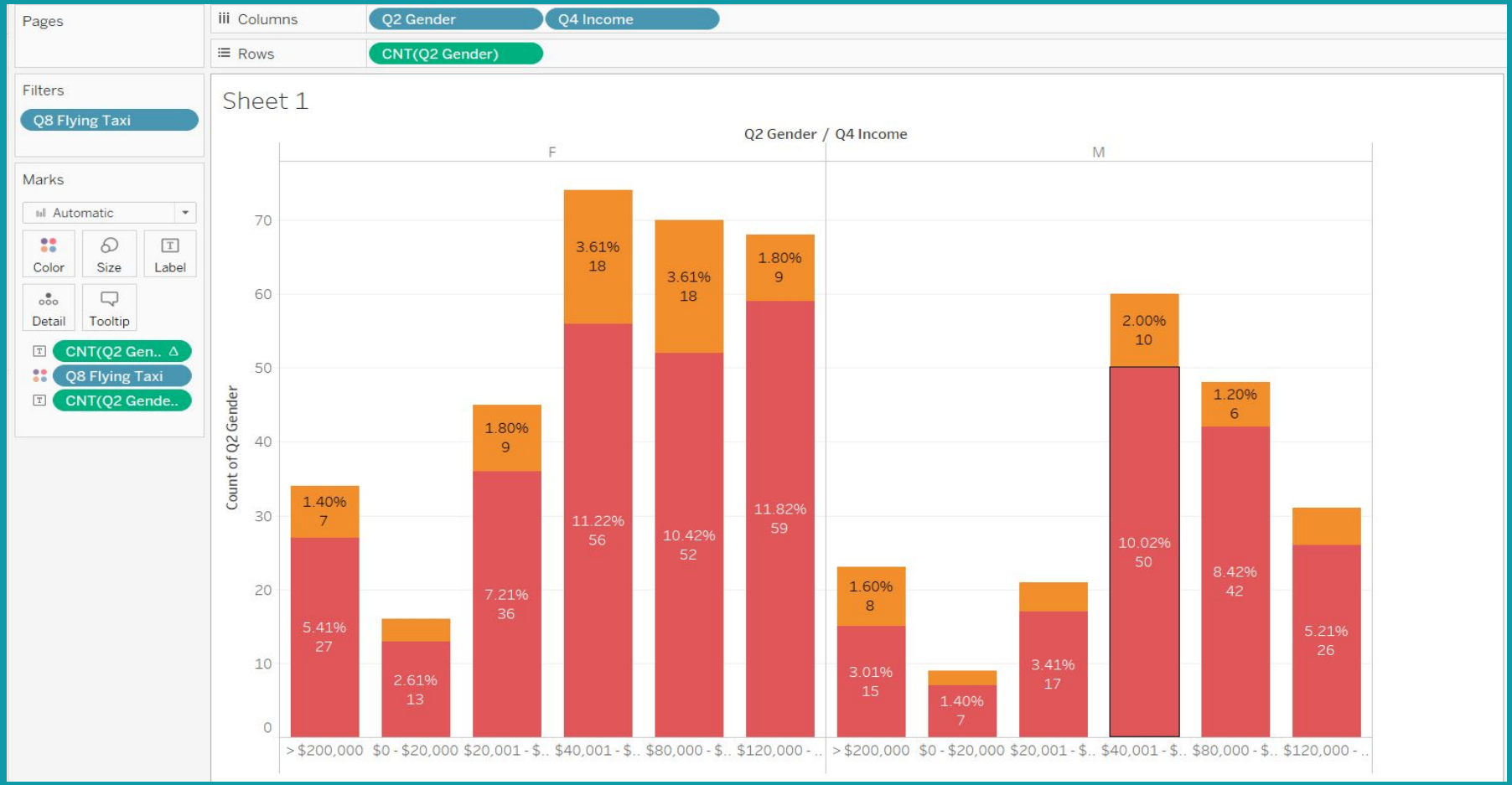
Question schema:

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?

Flyber Adoption - Gender and Income



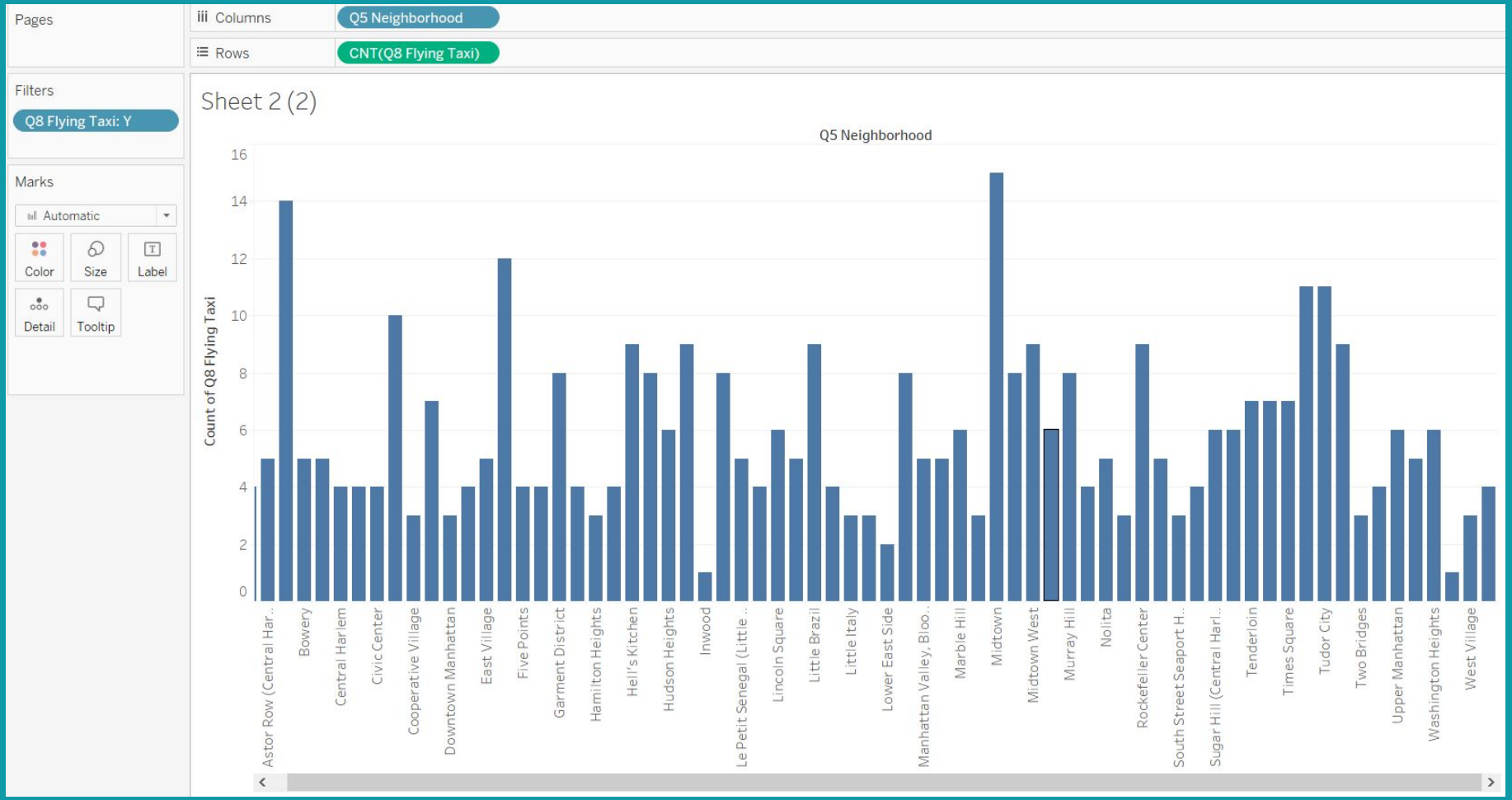
Flyber Adoption - Gender and Income

→ Left half of the graph shows Female users while right half shows male users. The red color depicts the gender group who said “yes” to flyber and the orange depicts the passengers who said “no” to flyber.

From the graph we can depict that Female users are more adopted.

Also, both Male and Female users who belong to 120k -140k $ has adopted the most from all income levels.

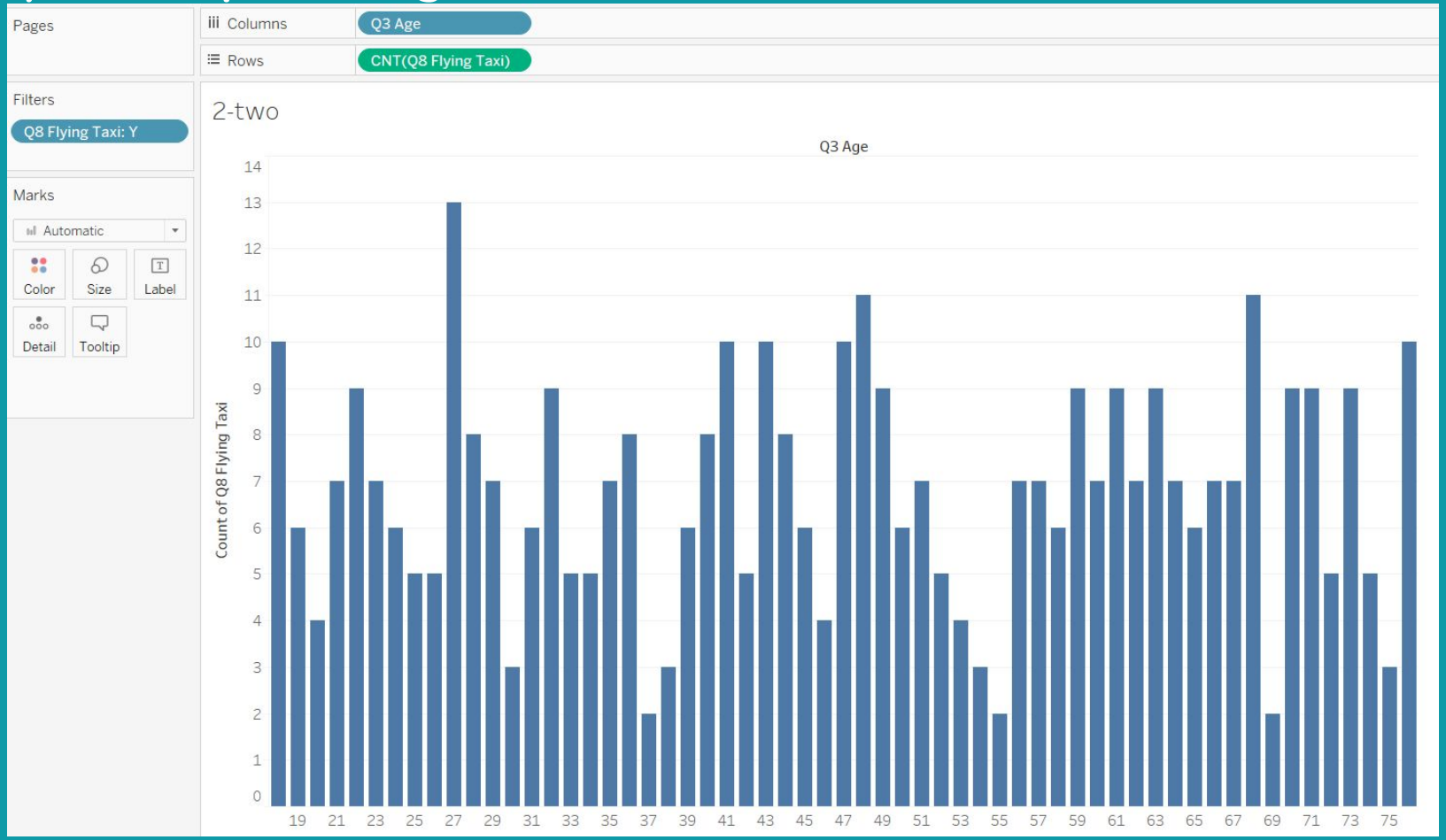
Flyber Adoption - Neighborhood



Flyber Adoption - Neighborhood

→ Midtown adopted the most and followed by neighbourhoods such as Astor Row.

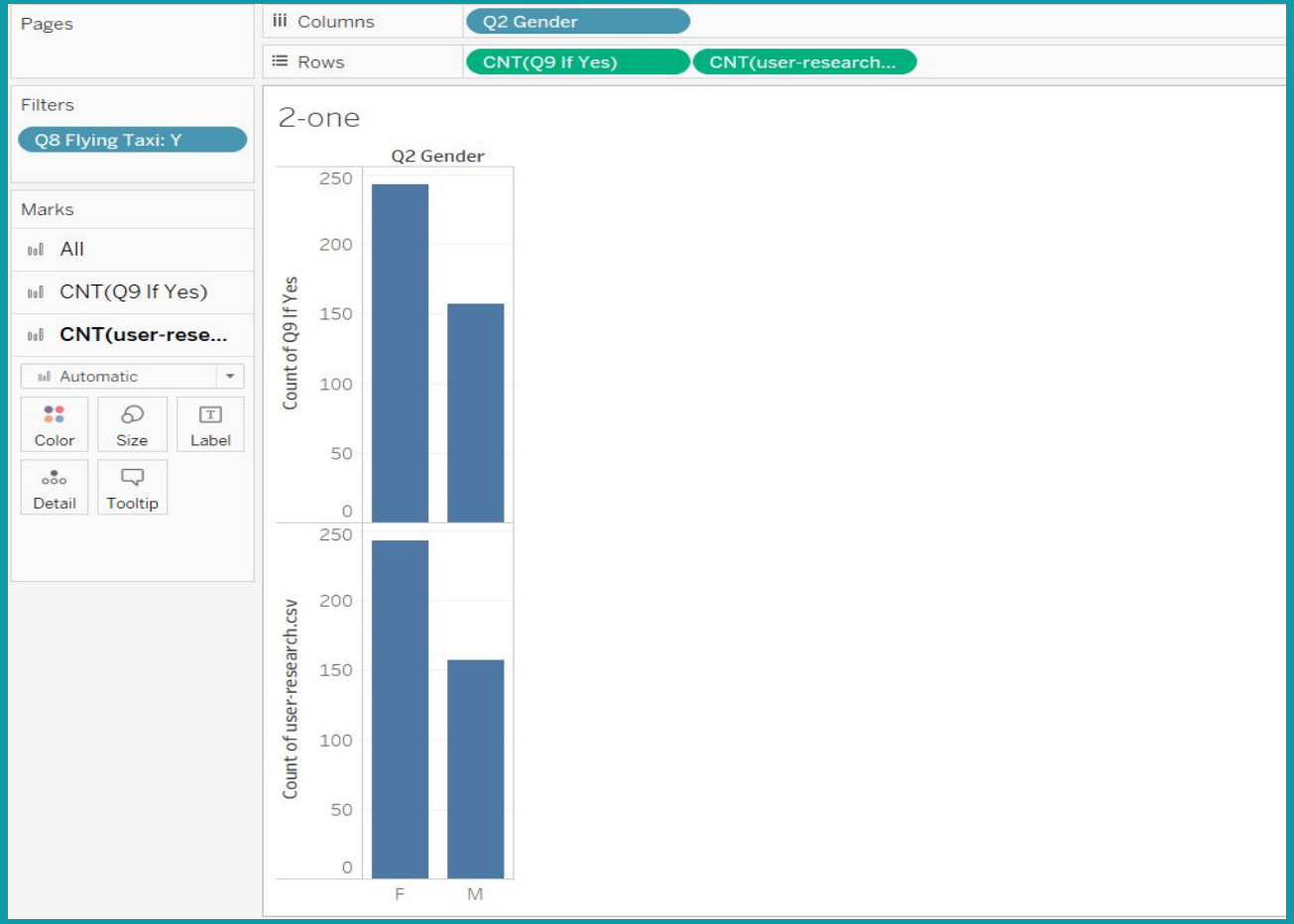
Flyber Adoption - Age



Flyber Adoption - Age

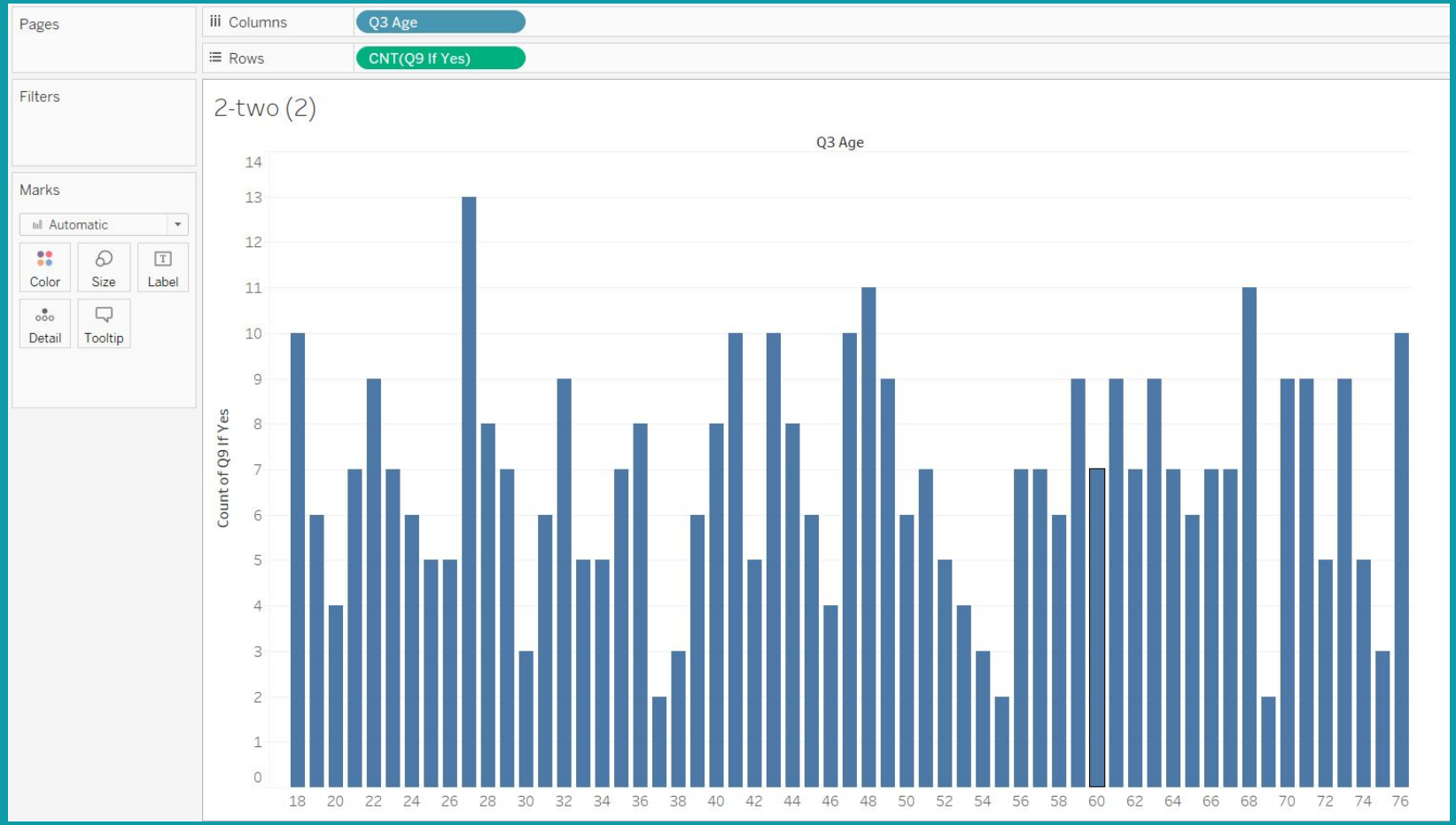
→ 27 years of Age adopted the most followed by 48 and 68 years of Age.

Potential Price Per mile - Gender

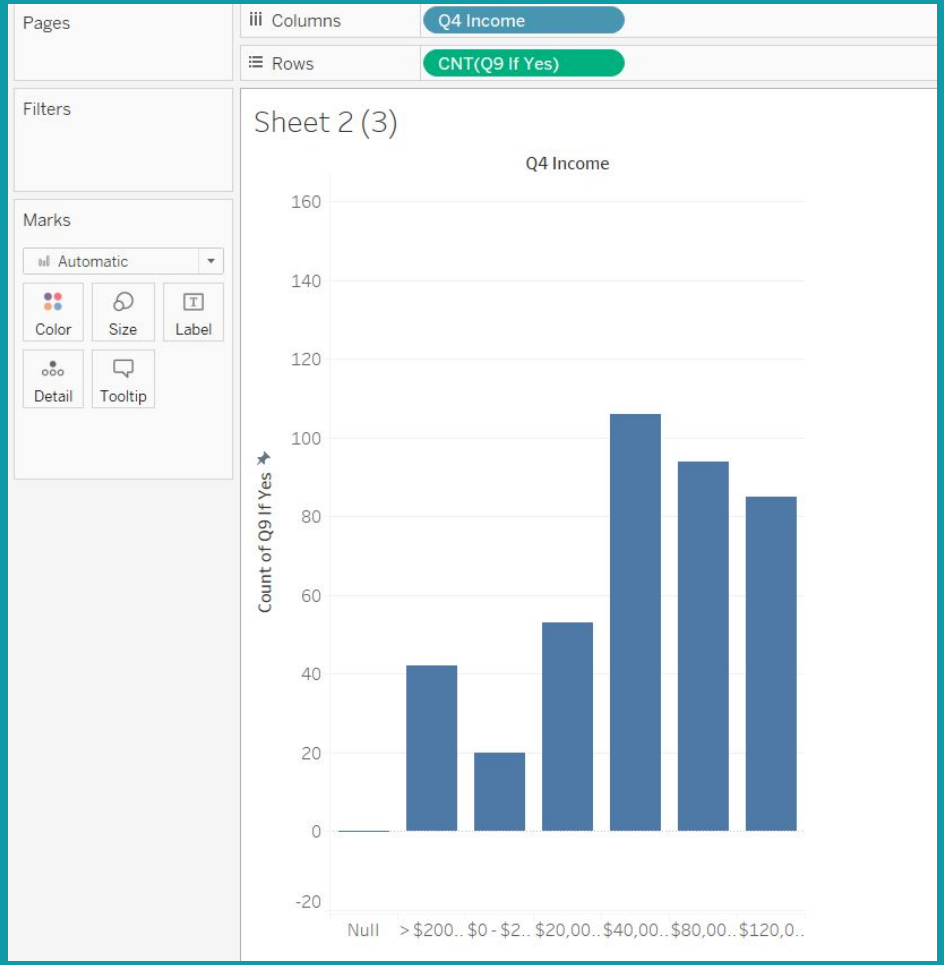


Female were higher for “yes” as compared to male.

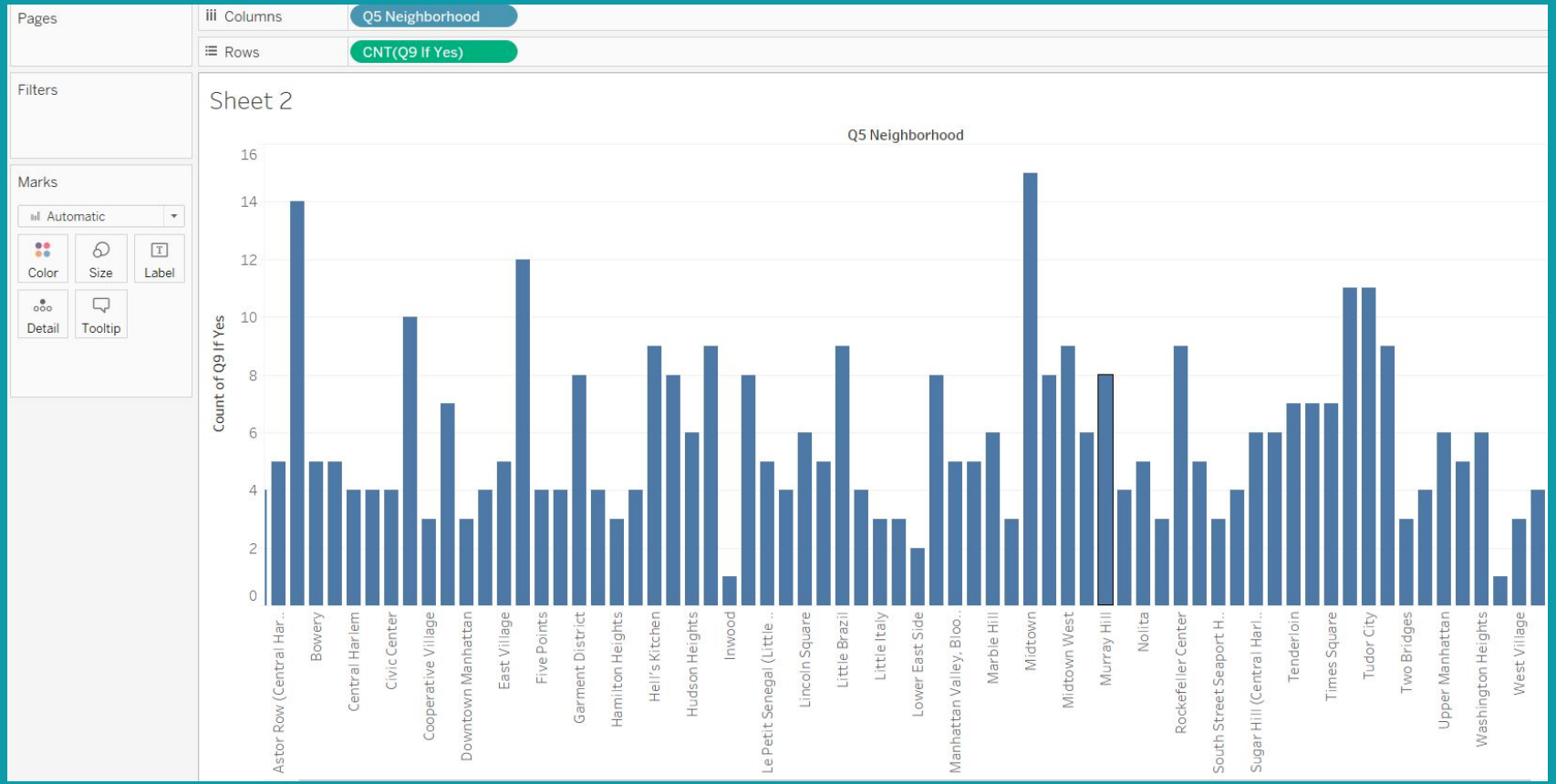
Potential Price Per mile - Age



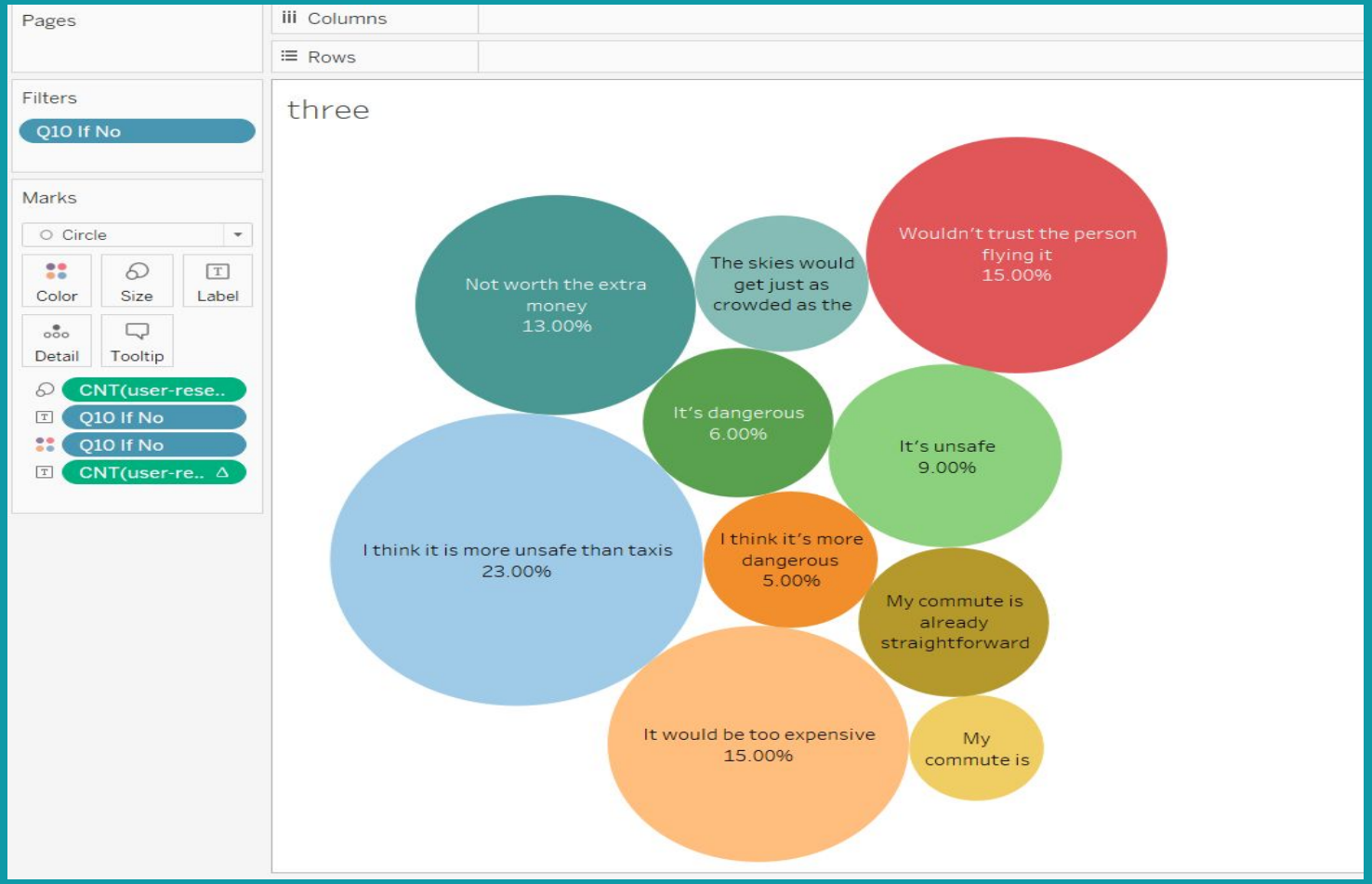
Potential Price Per mile - income



Potential Price Per mile - Neighborhood



Negative Sentiment



This depicts the reason why people were hesitant to use flyber. Unsafe than taxi recorded the most count.

Hooray! End of Section 1.

You will complete Section 2 at the end of this course.

Please submit this file for review for Section 1.

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.

Product Objective - User Acquisition

→ Flyber, objective is to create brand awareness and have diligent marketing in order to acquire users. The Go - To - market strategy has to be exemplary in order to have 10 % market share in NY city at the end of 5 months.

KR 1 - Increasing drop off and pick up location by 20 %
KR 2 - Collaborating with companies and giving discount to their employees for daily commute would bring in 30 % market share of regular taxis.
KR 3 - Referral program with Flyber App interface will bring in more users. Average NPS to be above 80.

→ At this stage, User Acquisition is the most important objective for the Flyber as the company needs to have users. The company only has a data based on research survey. Once the company has small MAU or DAU then the company can focus on factors such as customer retention, profitability and how to engage users with the product. I think, if the company have an access to actual user data in large amount then there are various possibilities, strategies company can utilise to enhance the product and the business.

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

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

KPI 1 - Increase in number of passengers and thus revenue boost by increasing drop off and pick up locations at the end of 5 months.

KP 2 - Number of increase in purchase of tickets by the daily commuters.

KP 3 - Average NPS and the number of downloads per week.

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

Answer - Hypotheses

Hypotheses 1 - Increase in number of passengers by 20 % and Revenue boost by almost 2% in period of 3 months

Hypotheses 2 - The daily commuters should contribute minimum 50% of the number of increased passengers in span of 2 months.

Hypotheses 3 - The number of downloads per week should see significant rise by 5000 downloads a week followed by increase in DAU by 25% in 2 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

→ The operation should run in 18-19 or 21th hour usually on friday / Saturday.

→ Since the company is just forming, it is going to have financial constraints and thus I would prefer to have around 5-6 nodes in total. I will place nodes very demand is high to have revenue boost.
Nodes - Pick up - 10123, diamond district, 10111
Nodes - Drop off - 13068, 13859

→ The company should use copters since at this stage it is very important to know what user thinks about this idea of flying taxi and what is the potential of this business. Homegrown hardware would cost a lot for the company at this stage and in the iteration phase this will prove costly. User validation and initial traction would be easily obtained with the help of copters. Which is the end purpose of MVP.
→ **Dynamic Pricing =**
Total amount of flight time + 0.35(Total amount of flight time) + 1.75(Total miles) + booking fee

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

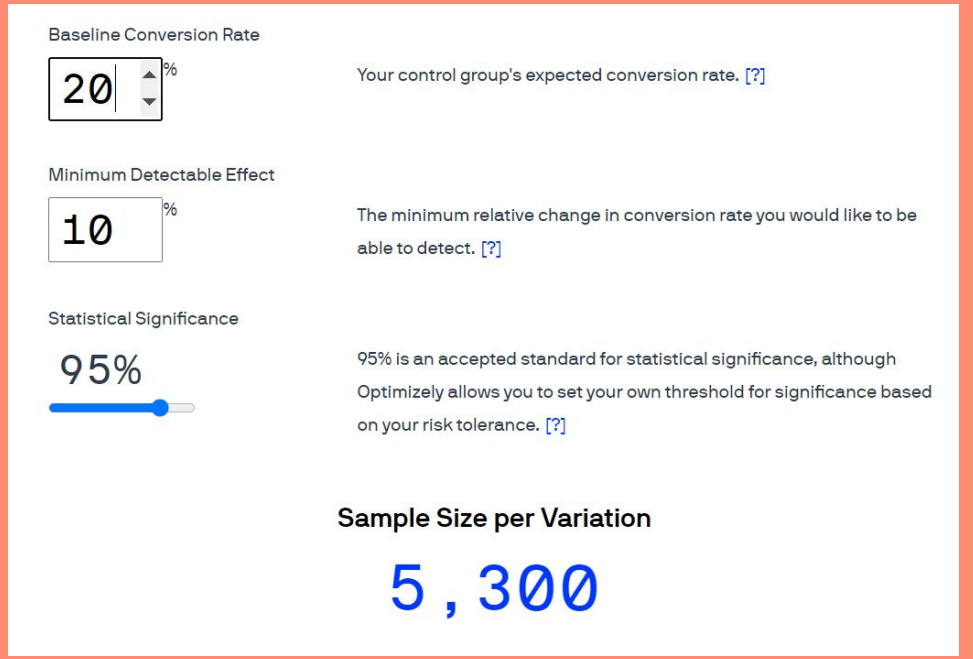
Answer Slide

→ 10 % market size in 5 months of NY city ride share - Objective

→ Assuming = 5 million users
Therefore, SOM = 10% * 5 million = 500,000 users
Conversion(booked) = 20% of 500000

DURATION

Sample size = 5300
DAU = 80
Therefore, duration = 5300/80
= 66 Days.



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

Instrumentation

KPI 1 - Increase in number of passengers and thus revenue boost by increasing drop off and pick up locations at end of 5 months.

Instrumentation Strategy 1 -

Event 1 = passenger_Count
Definition : Triggered whenever a passenger books a ticket
Properties 1 = ride_id, ride_begin_location, ride_end_location

Event 2 = revenue_newlocation_Count
Definition : Triggered whenever passenger books a ticket from new station and there is an impact on the overall revenue from this booking.
Properties 2 = new_location_pickup_revenue_count, new_location_revenue_dropoff_count,
`

By counting passenger count in Event 1, we will know the increase in number of passengers by introducing new pick up and drop off locations.

By calculating revenue through revenue_newlocation_Count in Event 2 we will be able to measure revenue produced by introducing new locations.

Instrumentation

KP 2 - Number of increase in purchase of tickets by the daily commuters.

Instrumentation Strategy 2 -

Event = ticketemployeePurchased
Definition : Will be triggered when an employee of our collaborating company books a ticket.
Properties = company_name, employee_id, ticket_id, pickup_location, dropoff_location

Counting ticketemployeePurchased will show the increase in purchase of tickets by the company collaborating with the flyber for employee (Daily commuters)

Instrumentation

KPI 3 - Average NPS and the number of downloads per week.
Instrumentation Strategy 1 -

Event = downloadsApp
Properties = user_signup, user_name, user_booking
Definition = Triggered when the App is downloaded from the App store.

Event = appReferral
Definition: Triggered when the user sends a referral link.
Properties = appReferral_Id, appReferral_link, appReferral_sent

The both events will show how many new users we have acquired through Downloading the App and sending the referral.

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

Answer - Feedback

→ Rating - How much on scale of 1 to 5, you would recommend flying taxi ?
→ Rating - How much comfort and safe is to use Flying taxi on scale of 1 to 5.
→ Short Answer - Please type few words where we can improve your ease of use and ease of accessing it.
→ Short Answer - Where do you think the station for pick and drop off should be constructed ?
→ Rating - Rate App interface and usage on scale of 1 to 5

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

The target for flyber launch as per analysis would be the person having the **income level** in the range of 40000$ to 120000$. Also, target would include **employee** since we can see surge in using the service around 18:00-19:00.

The pain points faced by these two targets are :

1) The cost of individual taxi is comparatively higher for the people having income between 40000 to 120000$ in NYC. Thus, they are looking for means of shared transportation.
2) This income range are usually of employees, therefore they are looking for a solution which will save their daily commute time from NYC traffic congestion.

Answer - Product Proposals

→ The NYC city is facing issue such as traffic congestion, deaths due to accidents, unpredictability in public transport.

→ Due to the traffic congestion, a person losses more than 5 days due to rush in an year as per TomTom research. As per health official of NY, 292 deaths are recorded each year.

→ The market impact, number of taxis on the road will reduce and thus traffic congestion will be reduced. However, due to flying taxi incorporation, the employment in sectors such as Technology, Infrastructure will see a significant rise. Cars prices would be affordable upto certain point. Assuming the main fuel is Kerosene fuel, the global warming impact would be much higher than all the cars combined in NYC.

Answer - Risks

→ Engineering failure risks
→ Crime risks
→ Maintenance of Air traffic i.e control of Air traffic
→ Human error Risks
→ Regulatory risks because of residential community present

Answer - Cross Functional Stakeholders

→ Data science
→ Date engineering team
→ Marketing Team
→ Business and Sales Team
→ Mechanical and Electrical Engineering team
→ Aerospace Engineering team
→ Structure and Construction Team
→ Software Engineering Team
→ Legal Compliance Team
→ Operators
→ Various Vendors