Applying Iterative Design Principles to a Live Product

Name: Moinak Pyne
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Step 1

Select KPIs

&

Evaluate Previous Multivariate Experiment Results

Select KPIs for Flyber Analyses

- For the data available, which KPI(s) best match Flyber's business model?

Ans:

1. Count of unique customers per day
2. Total rides daily/weekly/monthly/quarterly
3. Number of rides per neighborhood
4. Conversion rate between customers who open the app and customers who start a ride

Select KPIs for Flyber Analyses

- How would you calculate these KPI(s) using the available event data logs?

Answer:

1. **Count of Unique Customers per day:**
The count of unique ‘user_uuid’ can be estracted for each day based on ‘event_time’

2. **Total Rides Daily/Weekly/Monthly/Quarterly:**
Summation of ‘begin_rides’ grouped based on time range specified by ‘event_time’ (daily/weekly/monthly/quarterly)

3. **Number of Rides per Neighborhood:**
Daily/weekly/monthly ‘begin_rides’ grouped by neighborhoods

4. **Conversion rate between Customers who open the app and Customers who start a ride:**
Count of ‘begin_rides’ divided by ‘open’ events on a daily/weekly/monthly/quarterly basis

Select KPIs for Flyber Analyses

- List other KPIs that might be important to Flyber but are not calculable based on available data

Answer:
1. **Average duration of rides:** The duration of rides gives an idea of the usage patterns of customers

2. **Cost of rides:** As the cost of rides varies with timing of day, the cost patterns may provide insights on usage patterns throughout the day

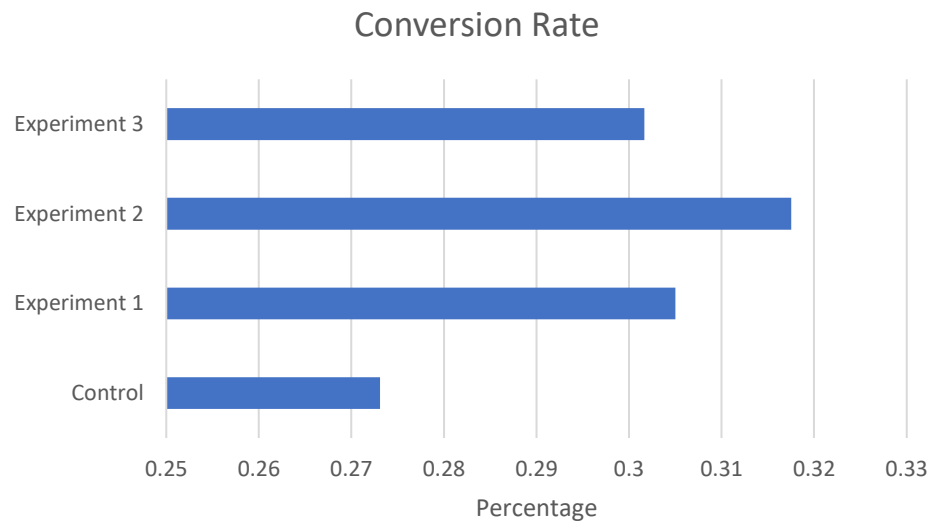
Describe the First Multivariate Experiment

- Describe the elements tested during the multivariate experiment. You can use the image below when referencing the tests

Experiment 1: *The "Book Flight" button is changed to "Fly Now" in comparison to Control*
Experiment 2: *The "*Tip Included" information is removed in comparison to Control*
Exerperiment 3: *Both the changes Exp. 1 and Exp. 2 are made in comparison to Control*

Review Multivariate Test Results: Visualization

- Provide a visual representation of the impact of the experiment on the conversion rate of users booking a flight (out of all users opening the app)



Review Multivariate Test Results: Significance Test

Determine if there was a significant difference between the experiments and control states.

- Explain how you would perform a t-test to determine if the experimental results had a greater impact on the booking conversion rate than the control state

Answer: For performing a t-test

1. The number of users in control and each test group would be taken
2. The number of conversions of each group would be taken
3. The confidence interval would be set to 95%
4. The t-test would be selected as two-tailed as the conversion rate can be better or worse than control

Review Multivariate Test Results: Significance Test

Determine if there was a significant difference between the experiments and control states.

- List the test results (p value) for each experiment compared to the control

Answer:
1. Control vs Experiment 1: p-value = 0.1590
2. Control vs Experiment 2: p-value = 0.0843
3. Control vs Experiment 3: p-value = 0.1848

Review Multivariate Test Results: Significance Test

Determine if there was a significant difference between the experiments and control states.

- Using the statistical significance calculator of your choice, determine which experiments, if any, had a significant result at the 95% level. Include your calculations as part of your explanation

Answer:

1. Control vs Experiment 1: p-value = 0.1590, which is not < 0.025, hence not statistically significant!

2. Control vs Experiment 2: p-value = 0.0843, which is not < 0.025, hence not statistically significant!

3. Control vs Experiment 3: p-value = 0.1848, which is not < 0.025, hence not statistically significant!

Review Multivariate Test Results: Significance Test

Determine if there was a significant difference between the experiments and control states.

- Based on your statistical significance calculations, recommend if any of the experiments should be expanded

Answer:
Based on the observations of p-value, none of the 3 experiments should be expanded as all of them turned out to be statistically insignificant.

Step 2

Funnel & Cohort Analyses

User Funnel

Identifying the different stages the user funnel

- Based on the event types in the data provided, list the 3 or more steps a user can take from opening the app to final booking of a ride

Answer:

The steps are:

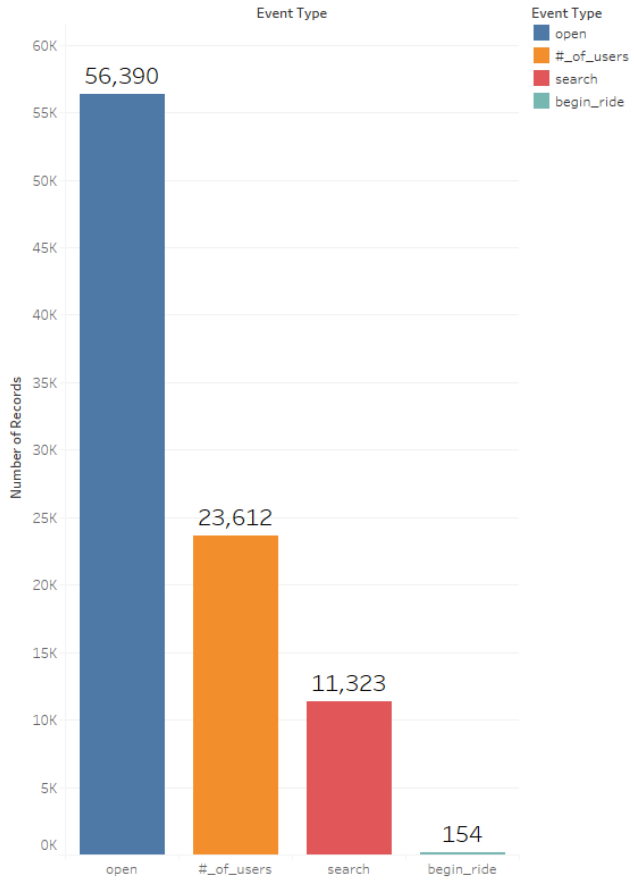
1. Open App
2. Choose the number of users
3. Search for a ride
4. Begin ride

User Funnel

Identifying the different stages the user funnel

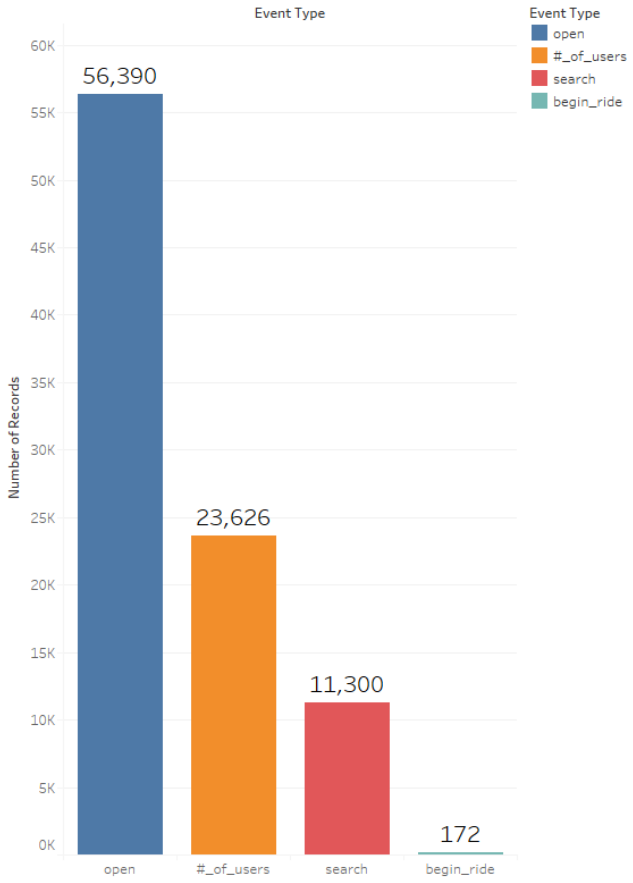
- Provide a graph showing the funnel from step to step, including drop off rates.

Control Group



Sum of Number of Records for each Event Type. Color shows details about Event Type. The data is filtered on Experiment Group, which keeps control.

Experiment 1



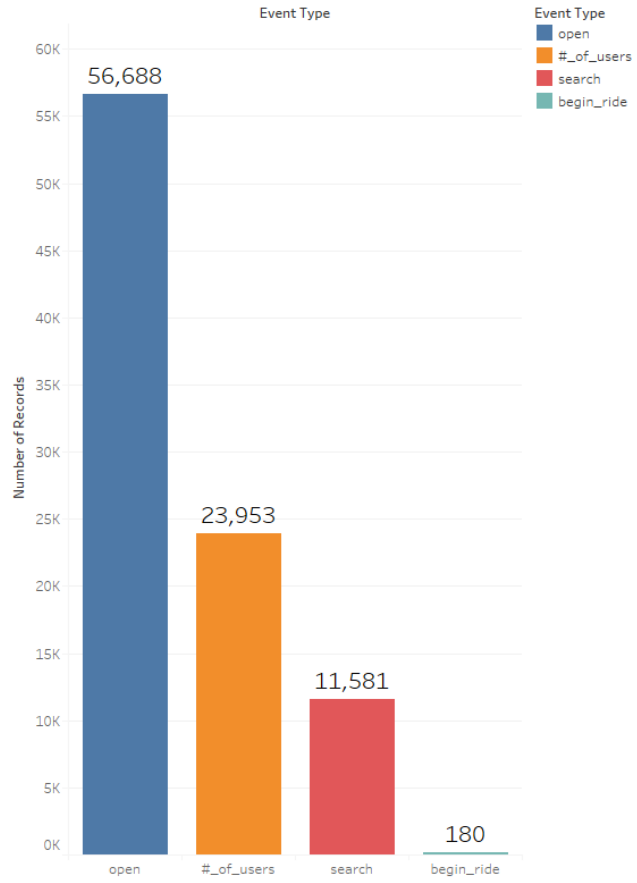
Sum of Number of Records for each Event Type. Color shows details about Event Type. The data is filtered on Experiment Group, which keeps experiment_1.

User Funnel

Identifying the different stages the user funnel

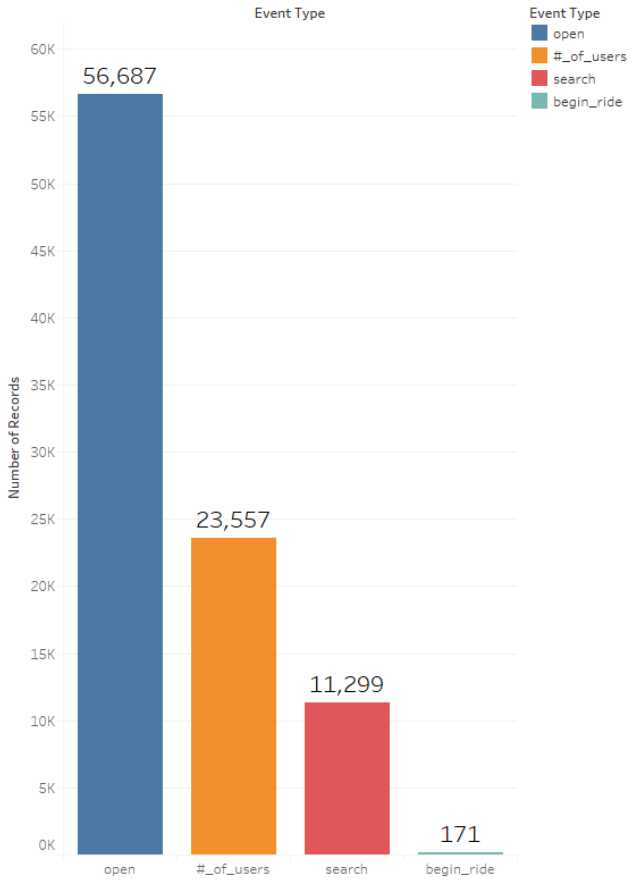
- Provide a graph showing the funnel from step to step, including drop off rates.

Experiment 2



Sum of Number of Records for each Event Type. Color shows details about Event Type. The data is filtered on Experiment Group, which keeps experiment_2.

Experiment 3



Sum of Number of Records for each Event Type. Color shows details about Event Type. The data is filtered on Experiment Group, which keeps experiment_3.

User Segments

- Identify 2 demographic attributes present in the data that allow for segment analysis

Answer: ‘age’ and ‘user_neighborhood’

- For each demographic attribute, provide the number of users in each segment group

Answer: The number of users are:

Age	User Count
18-29	57,364
30-39	38,356
40-49	95,168
50+	176,195

Neighborhood	User Count
Bronx	10,802
Brooklyn	73,880
Manhattan	257,259
Queens	18,088
Staten Island	7,054

User Segments

- For each demographic attribute, identify the segment group with the largest number of users

Answer:
For Age, the largest segment group is 50+ with 176,195 users.
For Neighborhoods, the largest segement group is Manhattan with 257,259 users.

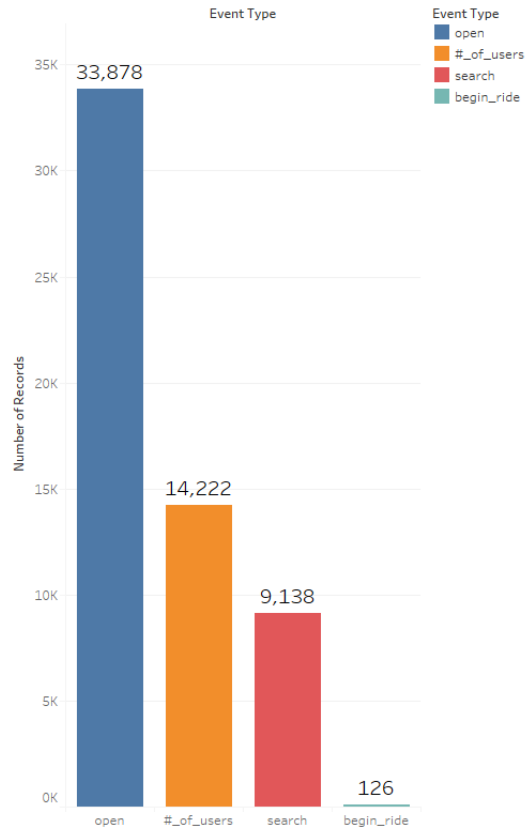
Segment Analysis of Funnel

Identify Opportunities for Improvement

- Perform a funnel analysis by segment for all identified demographic attributes and describe the results

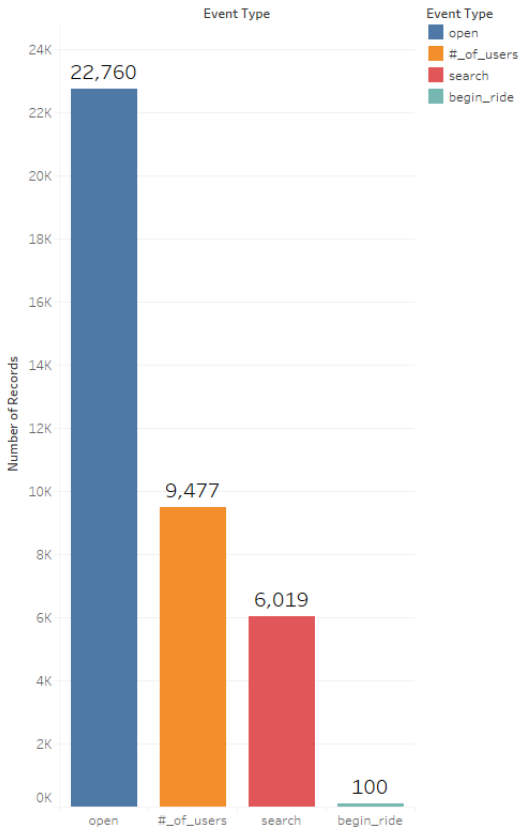
Age:

Age 18-29



Sum of Number of Records for each Event Type. Color shows details about Event Type. The data is filtered on Age, which keeps 18-29.

Age 30-39



Sum of Number of Records for each Event Type. Color shows details about Event Type. The data is filtered on Age, which keeps 30-39.

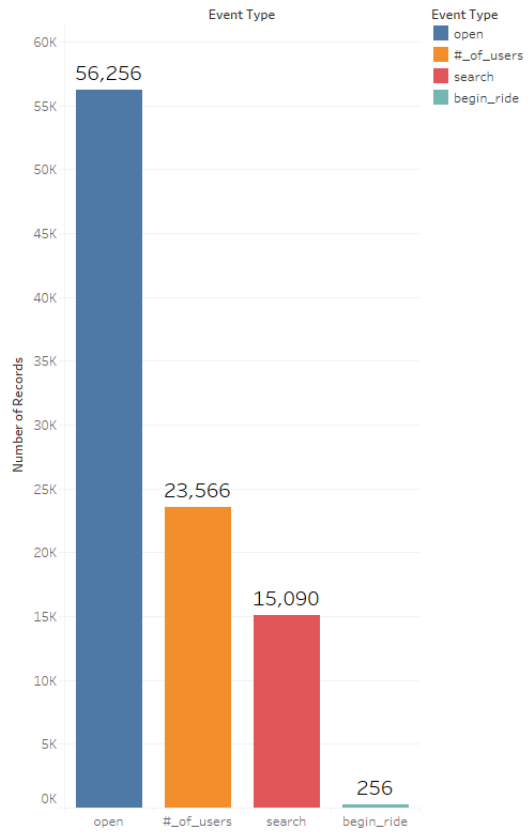
Segment Analysis of Funnel

Identify Opportunities for Improvement

- Perform a funnel analysis by segment for all identified demographic attributes and describe the results

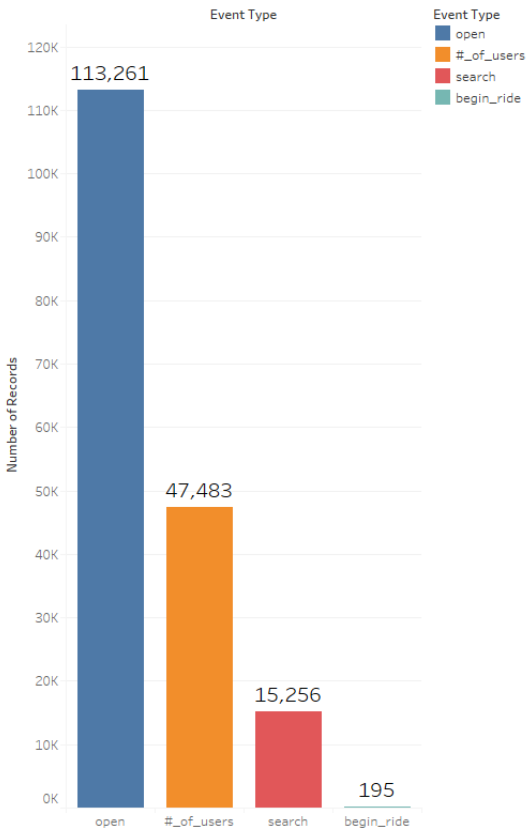
Age:

Age 40-49



Sum of Number of Records for each Event Type. Color shows details about Event Type. The data is filtered on Age, which keeps 40-49.

Age 50+



Sum of Number of Records for each Event Type. Color shows details about Event Type. The data is filtered on Age, which keeps 50+.

Segment Analysis of Funnel

Identify Opportunities for Improvement

- Perform a funnel analysis by segment for all identified demographic attributes and describe the results

Age:

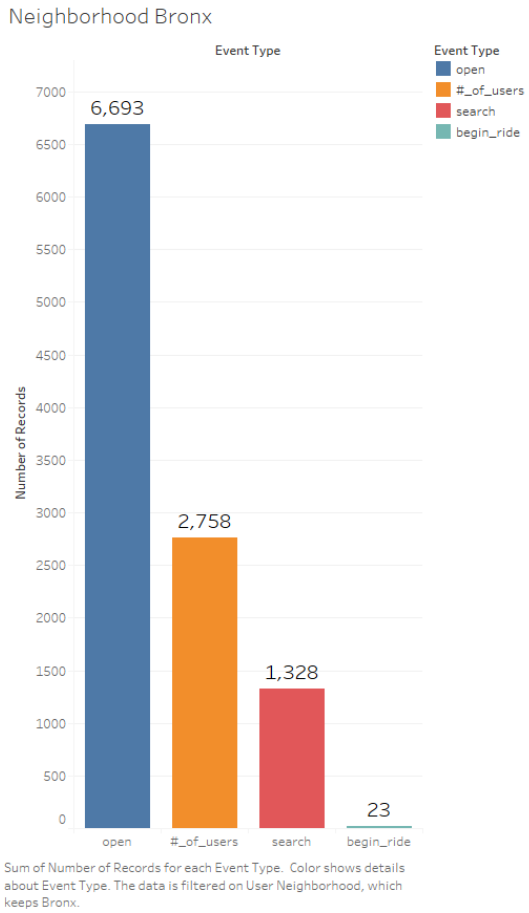
In the Age demographic, the highest drop-off is observed in the last segment of all four age groups, i.e., going from 'search' to 'begin ride'.

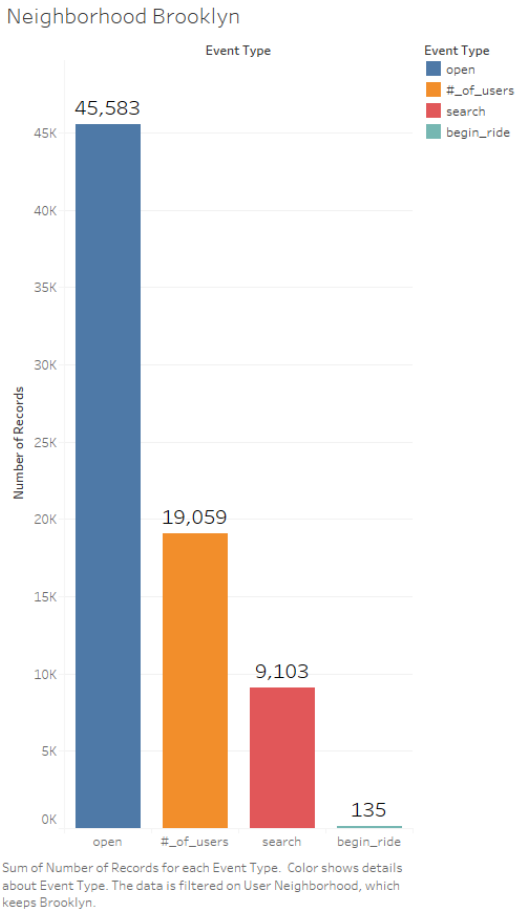
Segment Analysis of Funnel

Identify Opportunities for Improvement

- Perform a funnel analysis by segment for all identified demographic attributes and describe the results

Neighborhood:



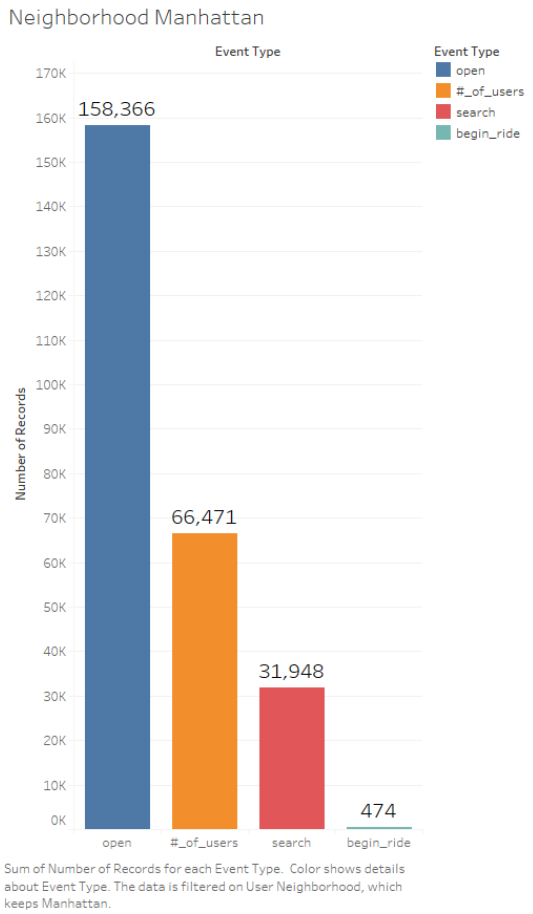


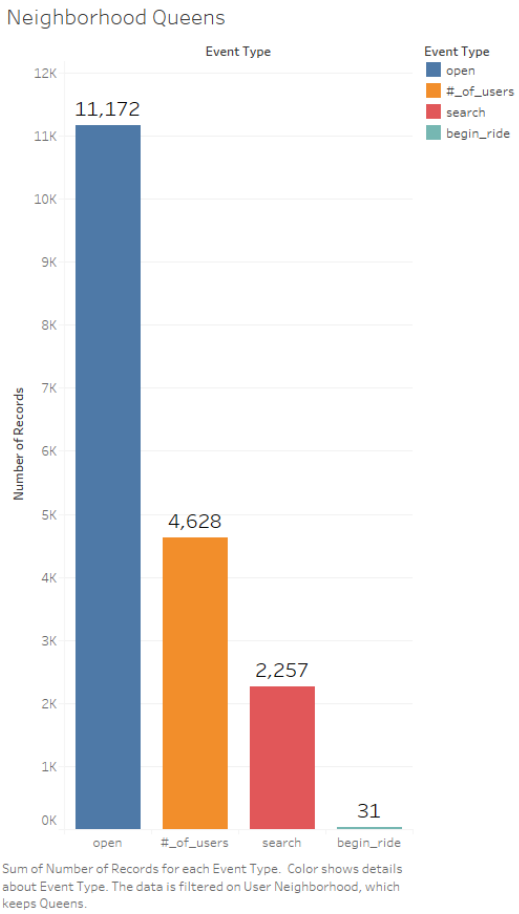
Segment Analysis of Funnel

Identify Opportunities for Improvement

- Perform a funnel analysis by segment for all identified demographic attributes and describe the results

Neighborhood:





Segment Analysis of Funnel

Identify Opportunities for Improvement

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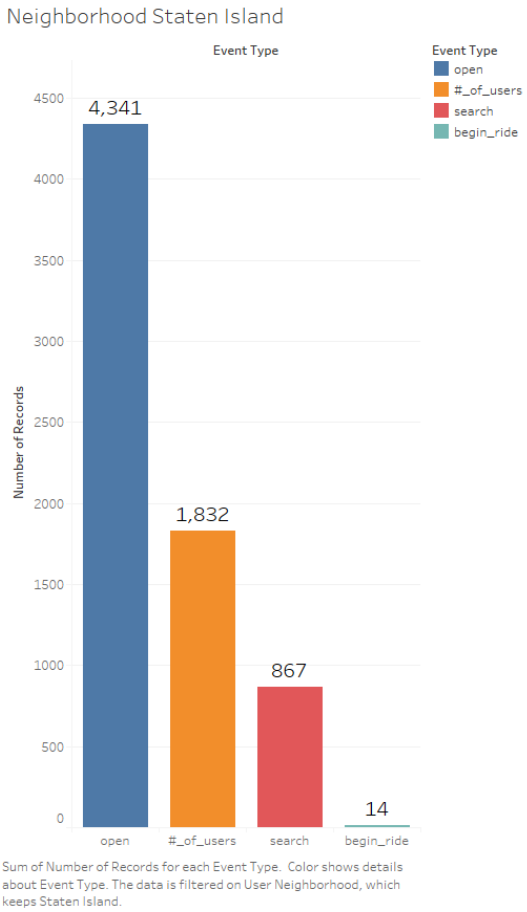
Neighborhood:



Segment Analysis of Funnel

Identify Opportunities for Improvement

- Perform a funnel analysis by segment for all identified demographic attributes and describe the results

Neighborhood:

In the Neighborhood demographic, the highest drop-off is observed in the last segment of all four age groups, i.e., going from 'search' to 'begin ride'.

Segment Analysis of Funnel

Identify Opportunities for Improvement

- If underperformance for a segment in an attribute is identified, add a visual showing the average funnel conversion by segment group for that demographic

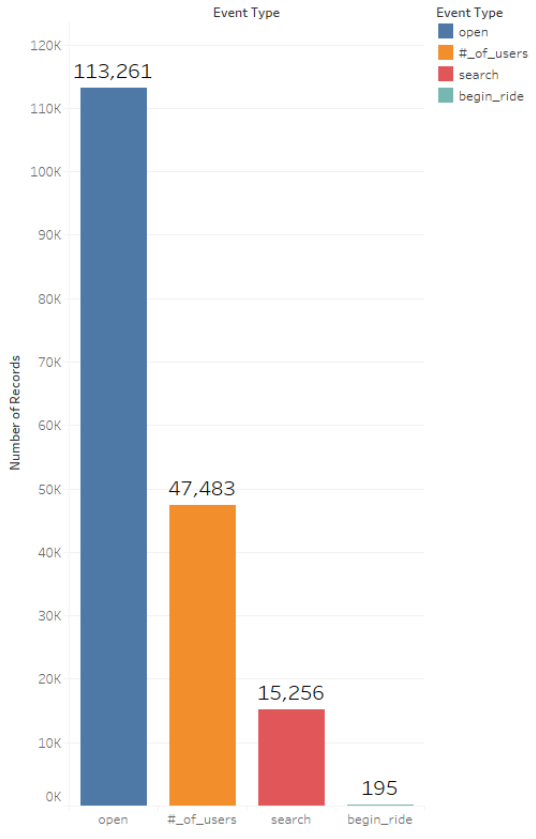
Answer:

Underperformance is visible in the conversion rates between ‘search’ and ‘begin_ride’ in:

Age: in the age group of 50+

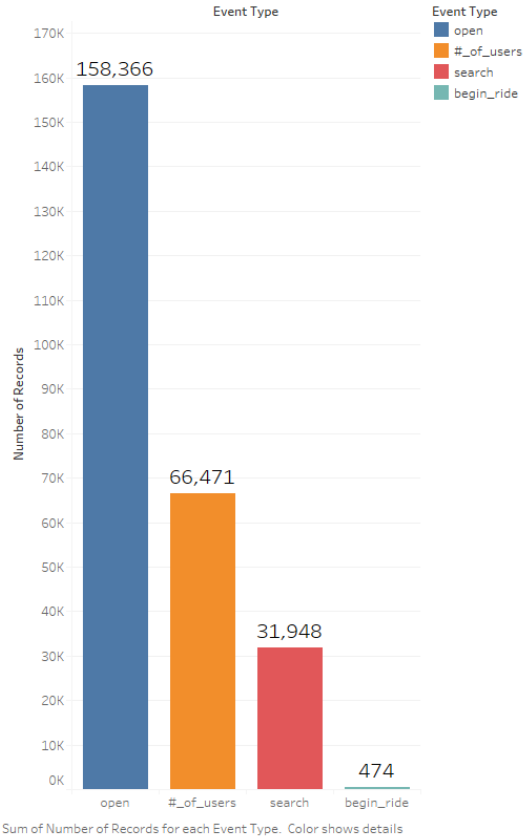
Neighborhood: in Manhattan

Age 50+



Sum of Number of Records for each Event Type. Color shows details about Event Type. The data is filtered on Age, which keeps 50+.

Neighborhood Manhattan



Sum of Number of Records for each Event Type. Color shows details about Event Type. The data is filtered on User Neighborhood, which keeps Manhattan.

Step 3

Hypothesis & Next Steps

Review Qualitative Data

- Read user interviews to understand “why” any funnel under-performance seen in Step 2 might occur

Answer:

The major drop-off in the conversion funnel is between search and begin ride for the 50+ group.

Based on the interviews some of the highlights are:

1. If Flyber would have a text-to-speech, it would highly help in saving time for booking a ride.
2. The intructions are too small for one user and its difficult for him to book.

Review Qualitative Data

- List your hypothesis for what customer need is being under-served

Answer:
Customers, especially in the 50+ age bracket face difficultties using the app as the instructions are small and the steps to booking a ride might be too time consuming. Improving the layout and booking process can address these issues.

Review Qualitative Data

- Provide 3 or more quotes as evidence for this hypothesis

Answer:

1. First quote is from Charlie Johnson (75), “I call up our local pilot, Bob. He's not always available but I don't need to fiddle around with an app and hitting tiny buttons”.
2. Second is from Robbie Gates (67), “Luckily my daughter was around to help me book the ride”.
3. Third is from Louis Jones (70) and a Oil Magnate, “But I let my assistant actually book the Flyber because the first few times I tried booking, the instructions were too small”.

Suggested Features & Experimentation Plan

- Share your hypothesis using the following format:

Answer:

We believe ~90% loss in customer conversion rate between ‘search’ and ‘begin ride’ for the age group of 50+ because the booking process is cumbersome, and the font sizes may be too small. And that by changing the layout and simplifying the booking process for customers above 50, we will see an improvement of 0.2% in conversion rate, which converts to an average increase of 4 more ‘book rides’ from current state.

Suggested Features & Experimentation Plan

- Share your hypothesis using the following format:

Answer:

Calculation:

Avg. count of ‘book rides’ in the 50+ age group = 24

Assumed avg. profit per ride = $20

Assumed cost of development of 2 features = [$70/hr. x 40hr. labor] + [$5000 computation and storage cost] = $7800

Assuming an increase in average daily ‘begin rides’ of 20% = 28 rides

Hence, $7800/ (4 rides x $20) = 97.5 days =~3 months.

Hence, for an 8-day window, the count of ‘book rides’ should go up from 195 to 224, which represents a 0.2% improvement in conversion rate a very feasible number).

Suggested Features & Experimentation Plan

- Suggest 2 or more features that would match your hypothesis and determine a plan for multivariate testing, including describing the control and experimental conditions

Answer: The features along with multivariate testing framework would be:

1. Control: no change
2. Exp 1: Providing an option to change font size
3. Exp 2: Simple booking process with fewer steps
4. Exp 3: Font change + simple booking process
5. Additional Experiments: Save frequently used locations, text-to-speech feature

Suggested Features & Experimentation Plan

- Determine who should be exposed to the experimental changes

Answer:

For validating these experimental changes, customers with an age of 50+ should be exposed to these changes.

- List any additional metrics that would be helpful to collect from your suggested features

Answer: The additional features might be:

1. Duration between opening and booking a ride for each customer

2. Wait times displayed in the app for customers just before booking a ride.

3. Button click count on suggested feature

4. Ratings for instructions page