Cyclistic Bicycles

How Member and Casual Customer Use Differs

8/28/2023

Goals

1. Explain how bicycle use differs between members and casual customers
- Day of Week/Time of Day
- Trip Duration
- Type of Bicycle
- Starting Location

1. Suggest Recommendations

Data Source

Cyclistic Trip Data

-Made available by Motivate International Inc.

-Data was saved and uploaded to BigQuery for query and addition of calculated columns

-Scope: Only data from files with format DATE-divvy-trip-data.zip were included in this study

-Main table after all loading and cleaning (~16 million records)

Index of bucket "divvy-tripdata"

Data Computation

1. Add column for duration computed by:

   #hours * 60 + #minutes >> round to nearest integer value (stored as integer)

1. Add column for day of the week for each record

Data Cleaning

1. Delete from table rows where duration is >= 1 day. Save these records in separate table first to keep this data available.

1. Delete from table rows where duration is <= 0. Save these records in separate table first to keep this data available.

Data Cleaning: Data where Trip Duration <= 0

-(~360,000) Total Records (removed from main table)

-Locations for these data all appear in country of Georgia, due to positive sign instead of minus sign for starting longitude.

-Implication is that trip duration was computed incorrectly due to diff in timezones.

-Data is added back to main table, sign of longitude data is changed where lon < 0 in data, and duration and weekday are re-calculated.

-Only two records with duration = 0 remain (problem fixed).


Frequency
1
10,000
20,000
30,000
40,000
52,309
Imereti
Shida Kartli
Georgia
Guria
Autonomous
Republic
of Adjara
1

Data Cleaning: Data where Trip Duration >= 1 Day

-Not significant (only ~14,000 records)

-Records have no incorrect lat/lon data as with records where duration was found to be negative.

-These data were not added back in to the main table.

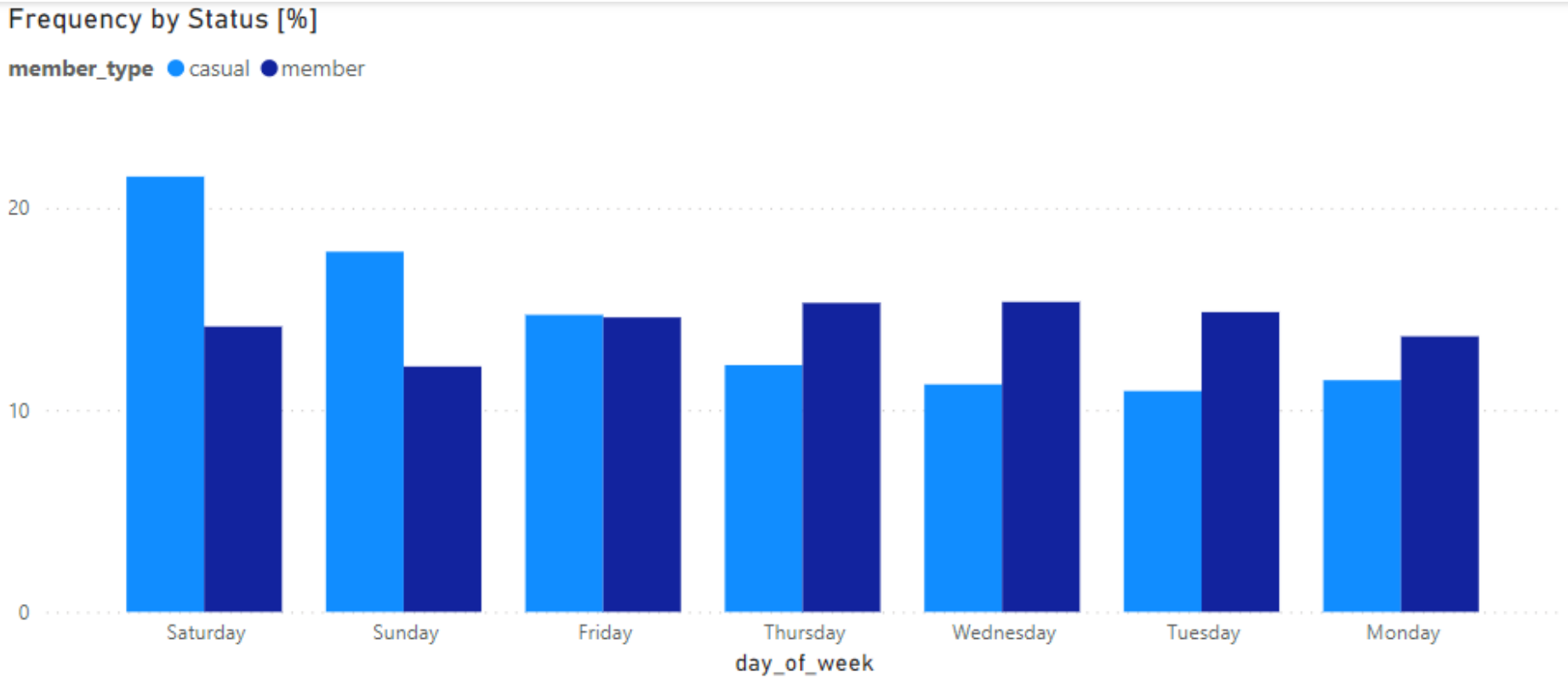
Analysis

Number of Trips by Day of Week

-Overall, highest total frequency (members + non-members separately) on Saturday and Sunday.

-Trips taken M-Th are dominated by members, while trips taken on Saturday and Sunday are dominated by casual customers.

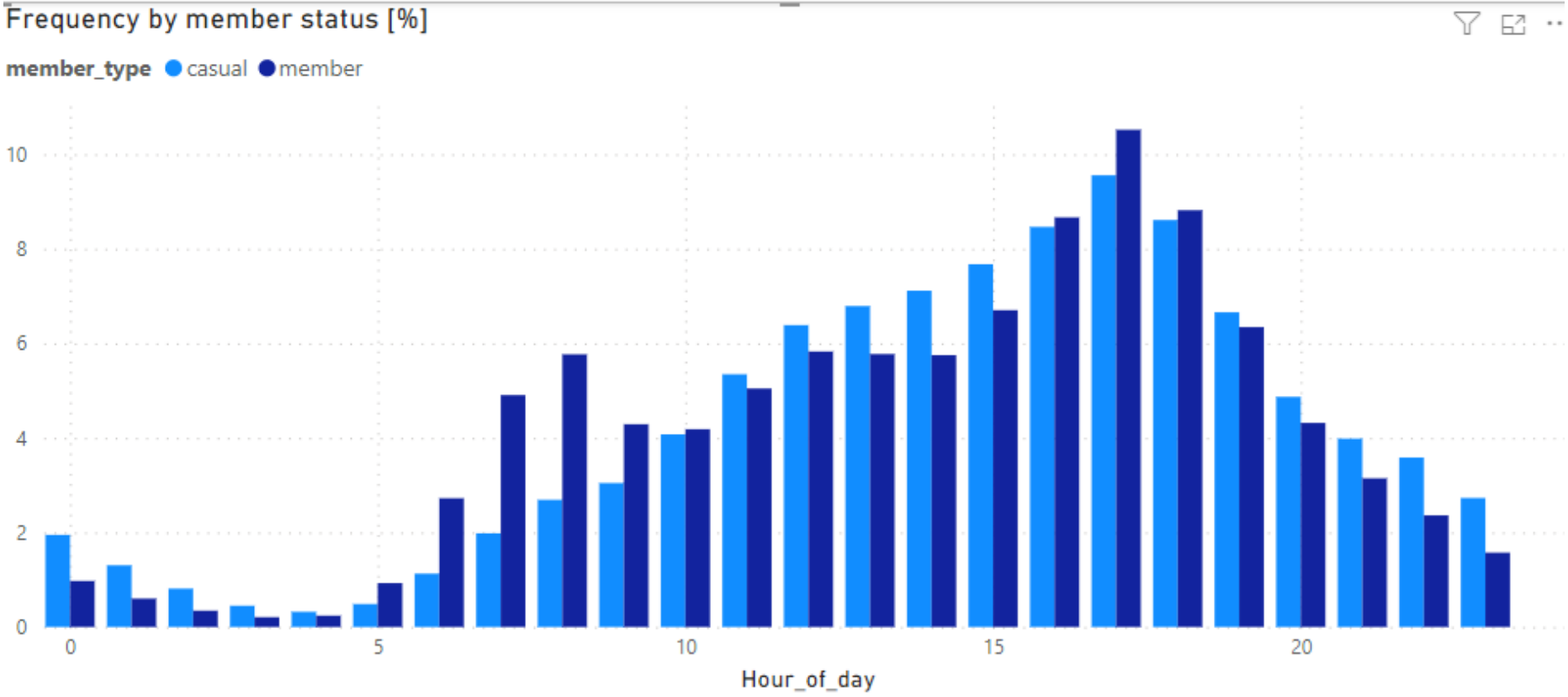
-Approximately equal percentages on Friday


Frequency by Status [%]
member_type
casual
member
20
10
0
Saturday
Sunday
Friday
Thursday
Wednesday
Tuesday
Monday
day_of_week

Number of Trips by Time of Day

-Most frequency among both members and non-members occurs around 5 PM.

-Greater proportion of members ride in early morning hours.


Frequency by member status [%]
member_type
casual
member
10
8
6
4
2
0
0
5
10
15
20
Hour_of_day

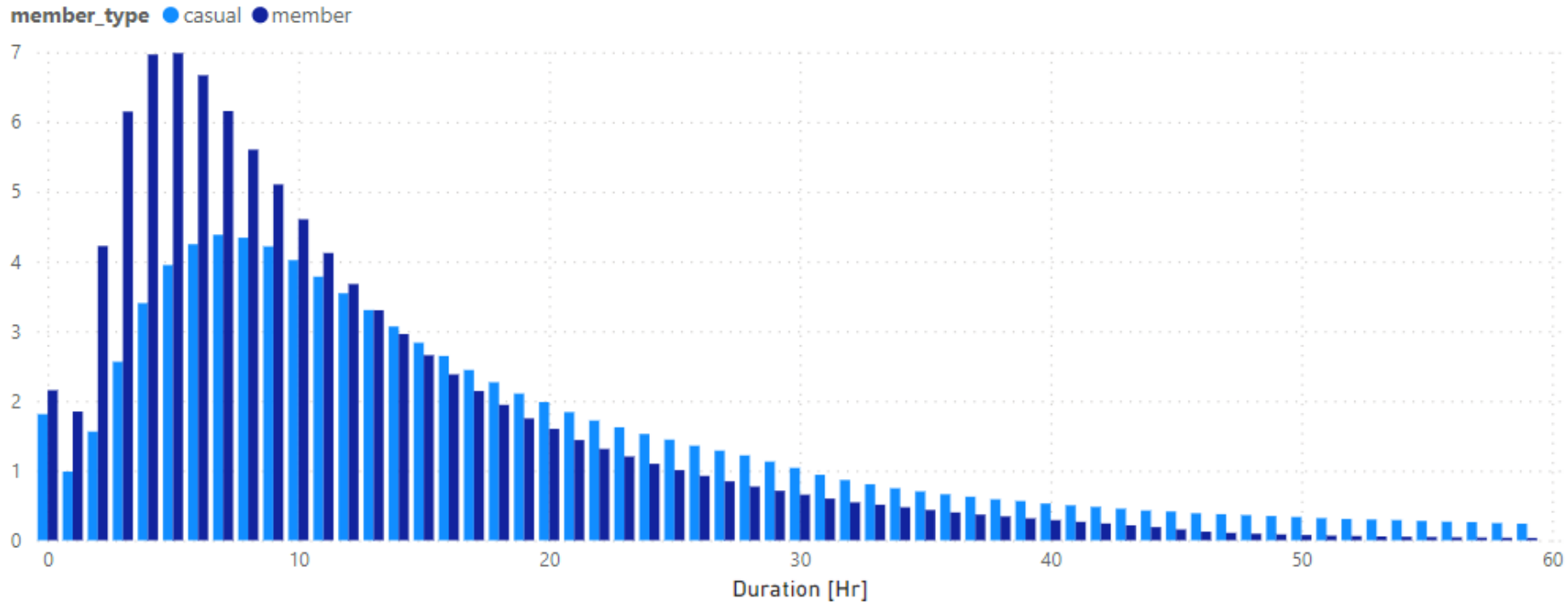
Distribution of Trip Times by Total Time (Normalized)

-Highest proportion in range from ~2 - 20 minutes

-Distribution for non-members shows more frequency of longer trips than for members.

-Short trips are dominated by members.

Frequency by Member Status [%]



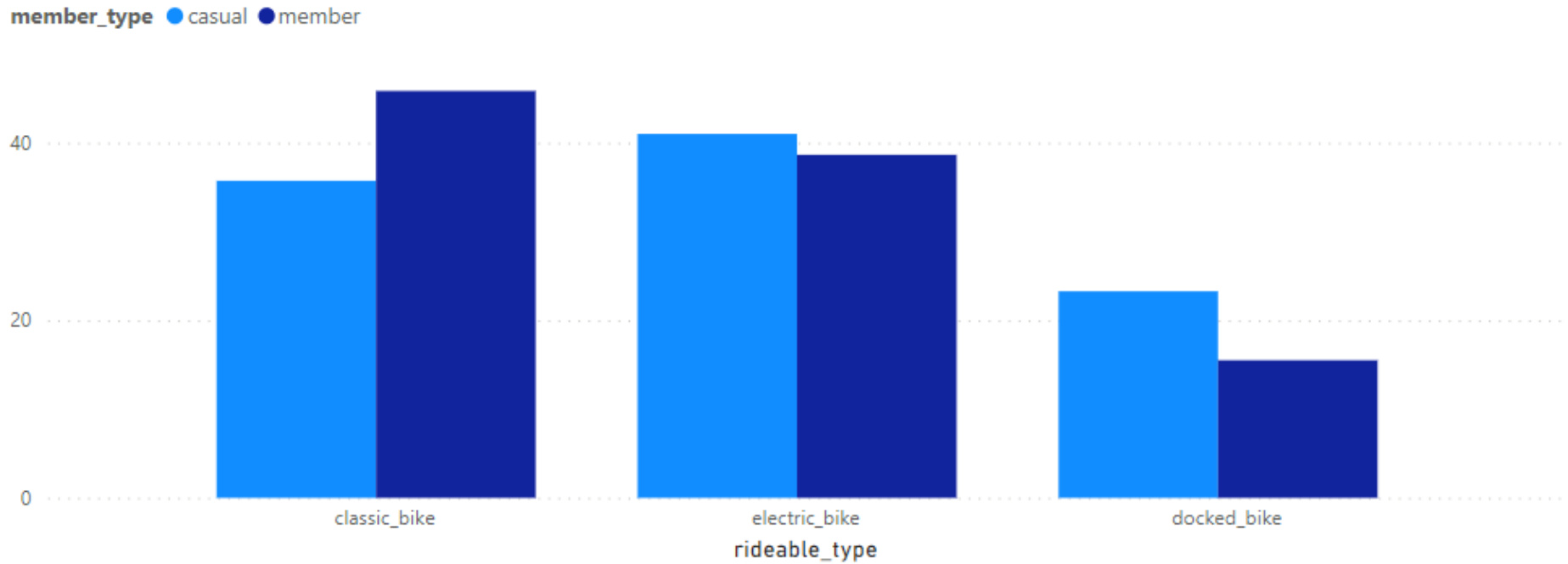
Trips Taken by Bicycle Type

-Most trips taken use the classic bike

-However, proportionately more casual customer trips utilize the electric bike.

-Use of docked bikes (bikes that are retrieved and returned & locked up at stations) is dominated by casual customers.

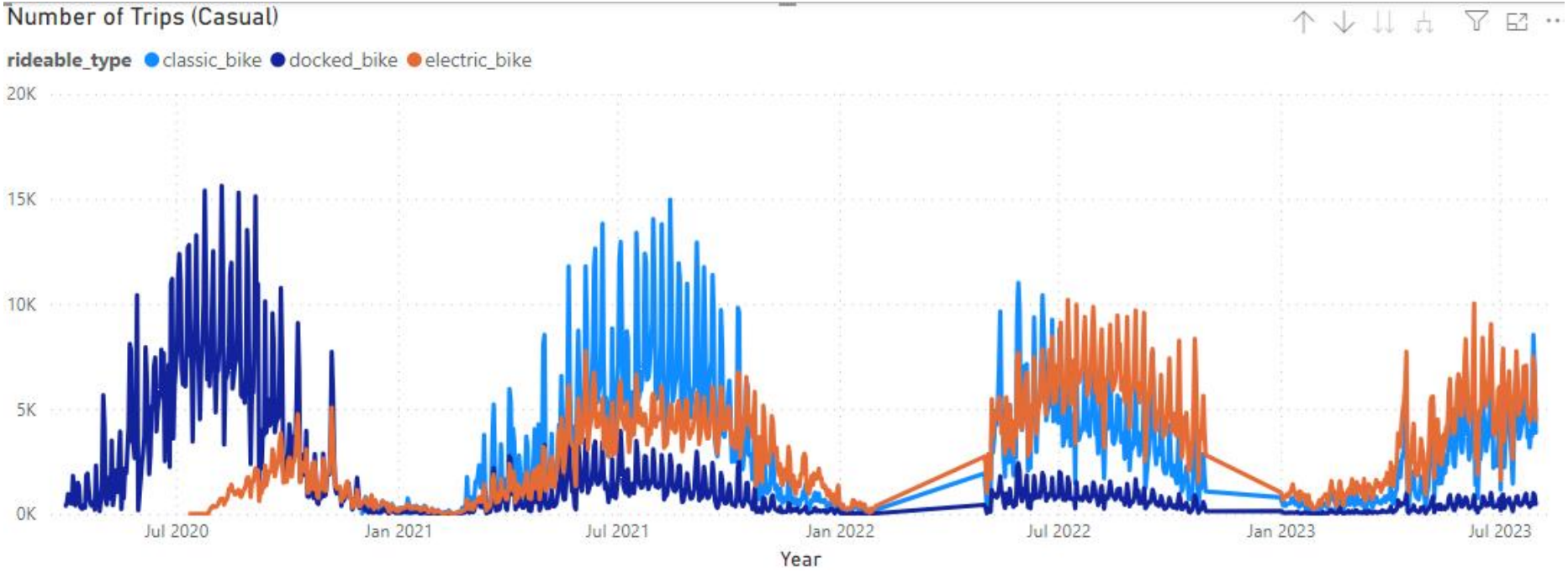
Frequecy by member status [%]

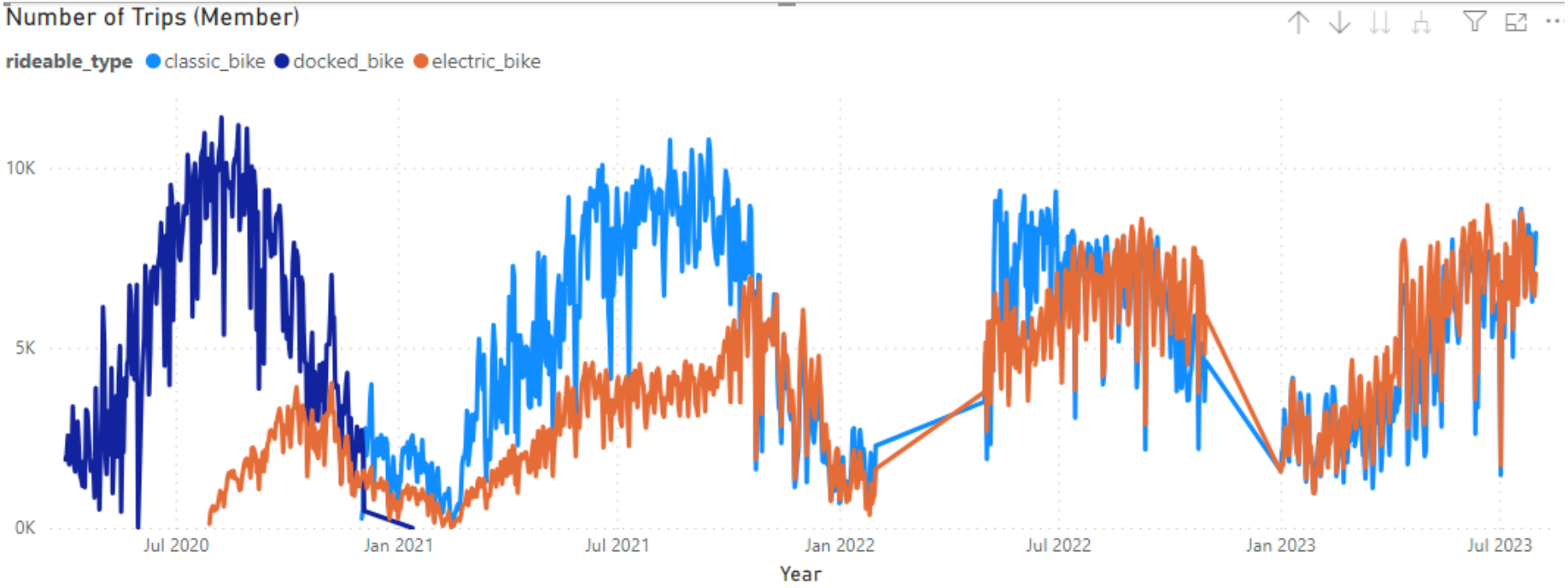


Trends in type of bikes used

-Both members and non-members are increasing their use of electric bikes over time.

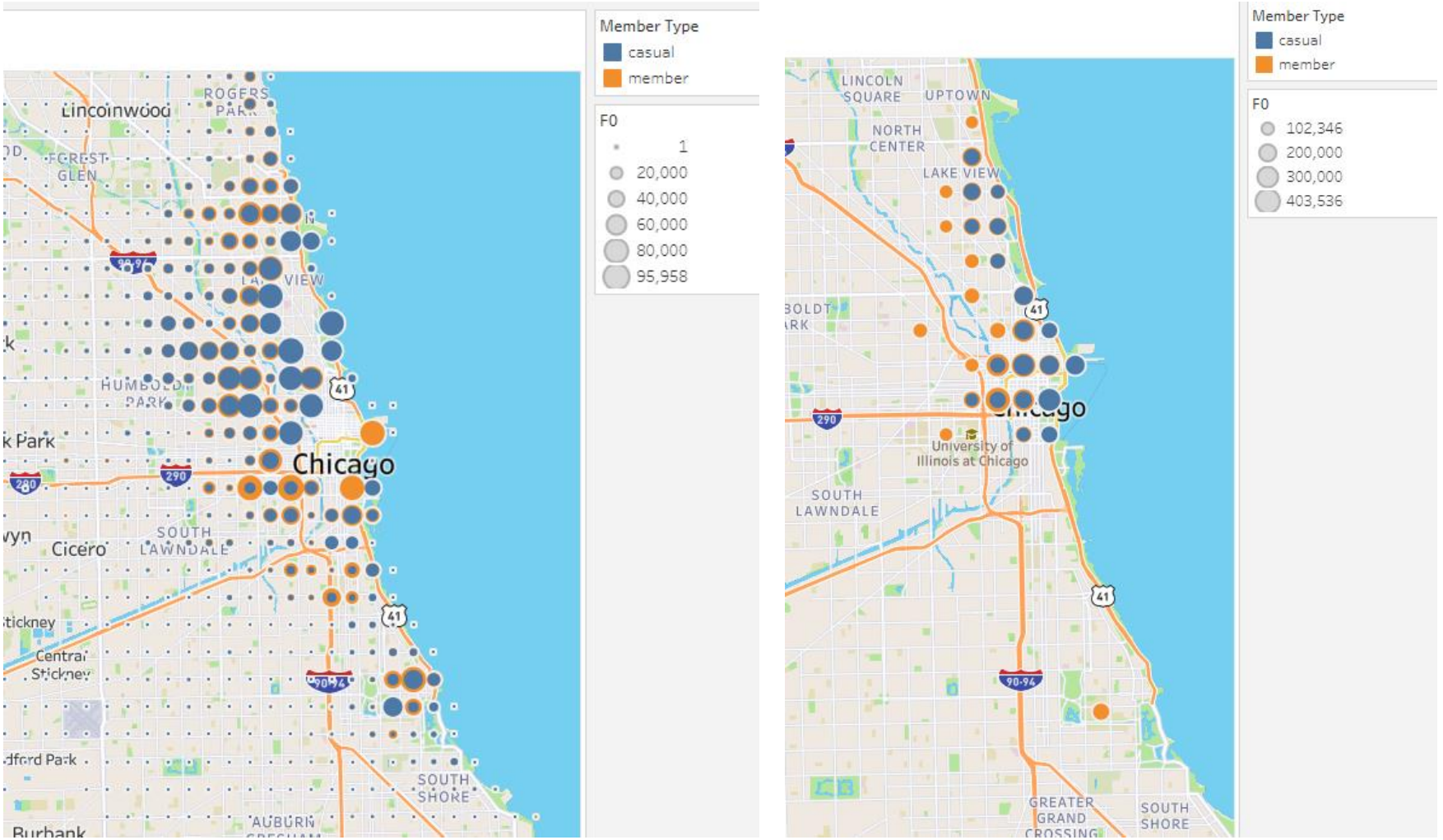
-Demand for docked bikes is dying off. Customers might prefer the convenience of being able to retrieve and return bikes at any location in the city (similar to electric scooter brands like Bird and Lime).


Number of Trips (Casual)
rideable_type
classic_bike
docked_bike
electric_bike
20K
15K
10K
5K
0K
Jul 2020
Jan 2021
Jul 2021
Jan 2022
Jul 2022
Jan 2023
Jul 2023
Year


Number of Trips (Member)
rideable_type
classic_bike
docked_bike
electric_bike
10K
5K
0K
Jul 2020
Jan 2021
Jul 2021
Jan 2022
Jul 2022
Jan 2023
Jul 2023
Year

Trips by Duration and Starting Location

-This following plot shows data for trips of count < 100,000 (left) and > 100,000 (right).

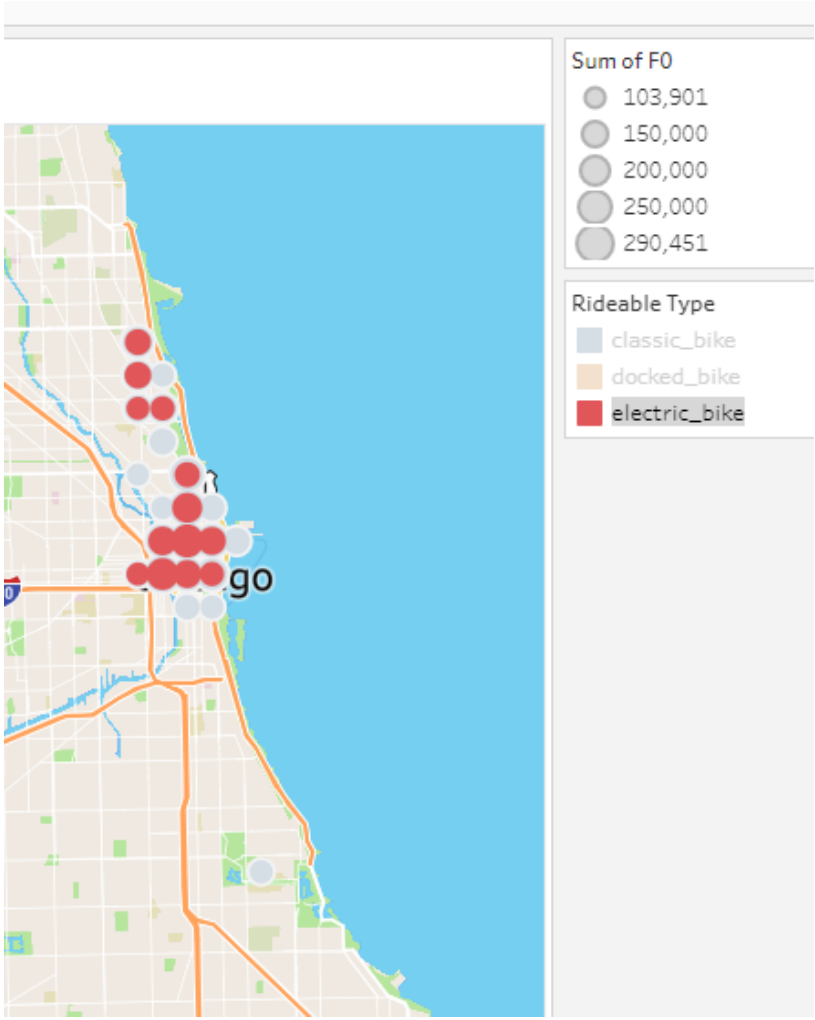

Member Type
casual
member
F0
1
20,000
40,000
60,000
80,000
95,958
Lincolnwood
ROGERS PARK
FOREST GLEN
LAKE VIEW
HUMBOLDT PARK
Chicago
Cicero
SOUTH LAWNDALE
SOUTH SHORE
AUBURN
Member Type
casual
member
F0
102,346
200,000
300,000
403,536
LINCOLN SQUARE
UPTOWN
NORTH CENTER
LAKE VIEW
University of Illinois at Chicago
SOUTH LAWNDALE
GREATER GRAND CROSSING
SOUTH SHORE

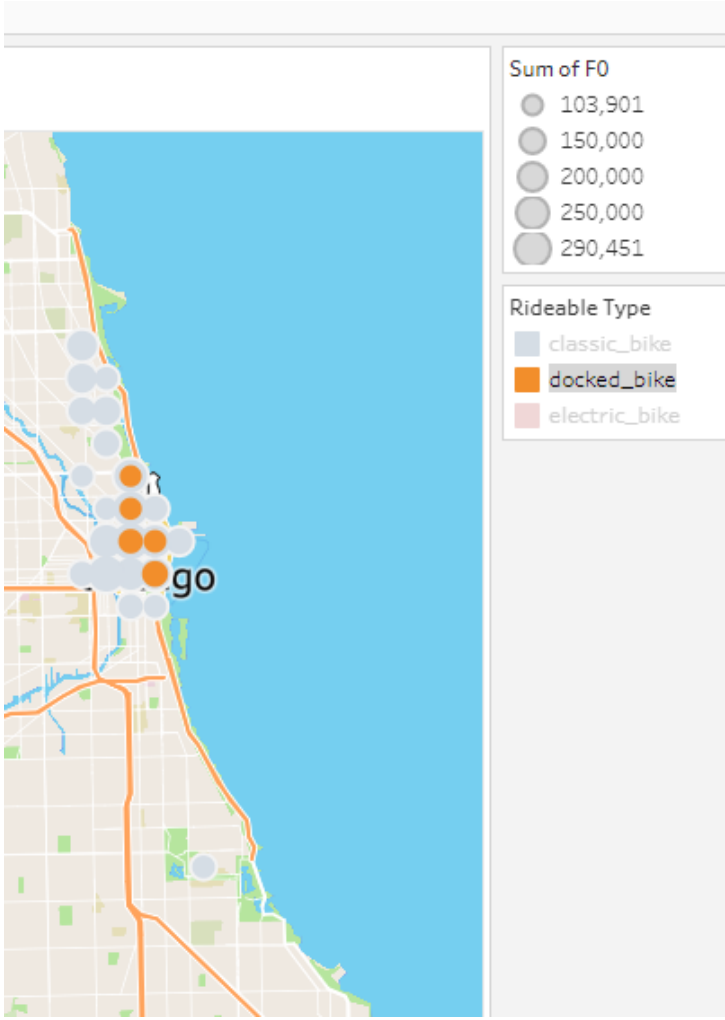
Trips by Duration and Starting Location

-Data suggest that highest concentration of member use appears to be slightly inland of the coast and also closer to the South Shore, while high concentrations of casual customer use appears to be at the coast.

Location by Bike Type

-Most locations are dominated by use of classic and electric bikes.


Sum of F0
103,901
150,000
200,000
250,000
290,451
Rideable Type
classic_bike
docked_bike
electric_bike
go


Sum of F0
103,901
150,000
200,000
250,000
290,451
Rideable Type
classic_bike
docked_bike
electric_bike
go

Key Recommendations

-Make more electric bikes available and advertise this to casual customers.

- Advertise to casual customers all available locations they can ride to ensure they are not avoiding membership due to assumption that bikes are unavailable in southern Chicago and further inland.

-Ensure that plenty of bikes are stocked and available in morning hours. Non-members might be deterred by limited availability in morning hours (further investigation is needed).

Questions