



# Optimizing Divvy Bike share and Maximizing Annual Memberships through User Behavior Analysis

**Big Data – Final project**

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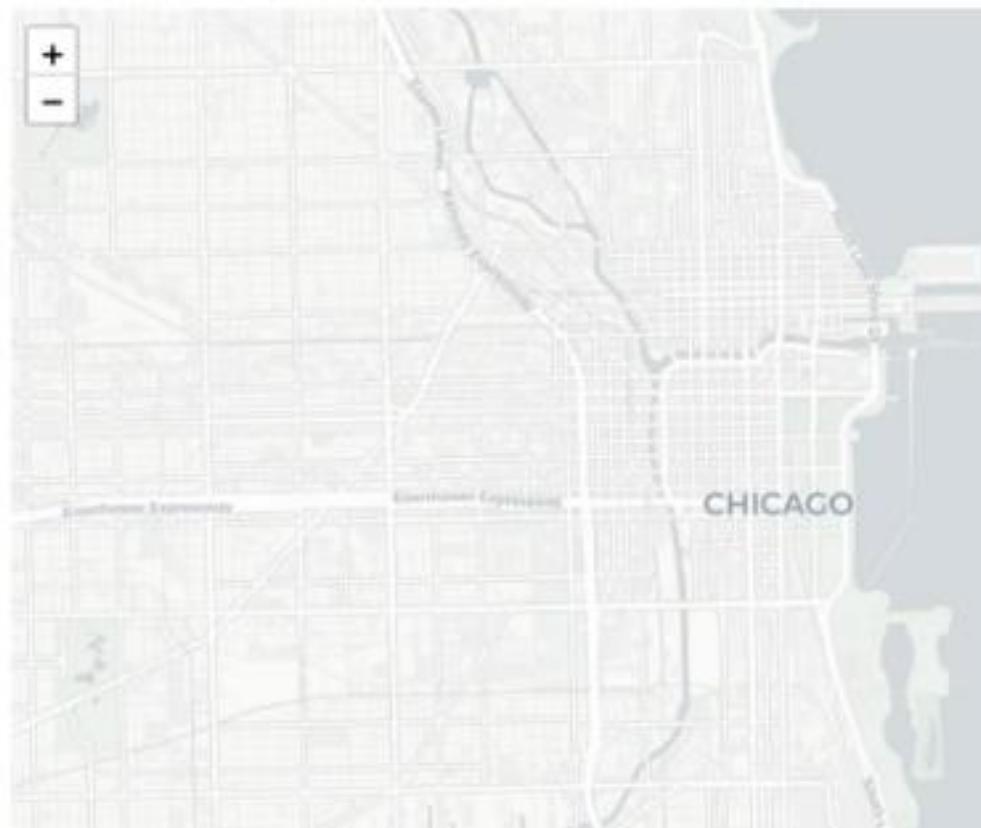
04/22/2024

# Introduction to Divvy

## A Trip

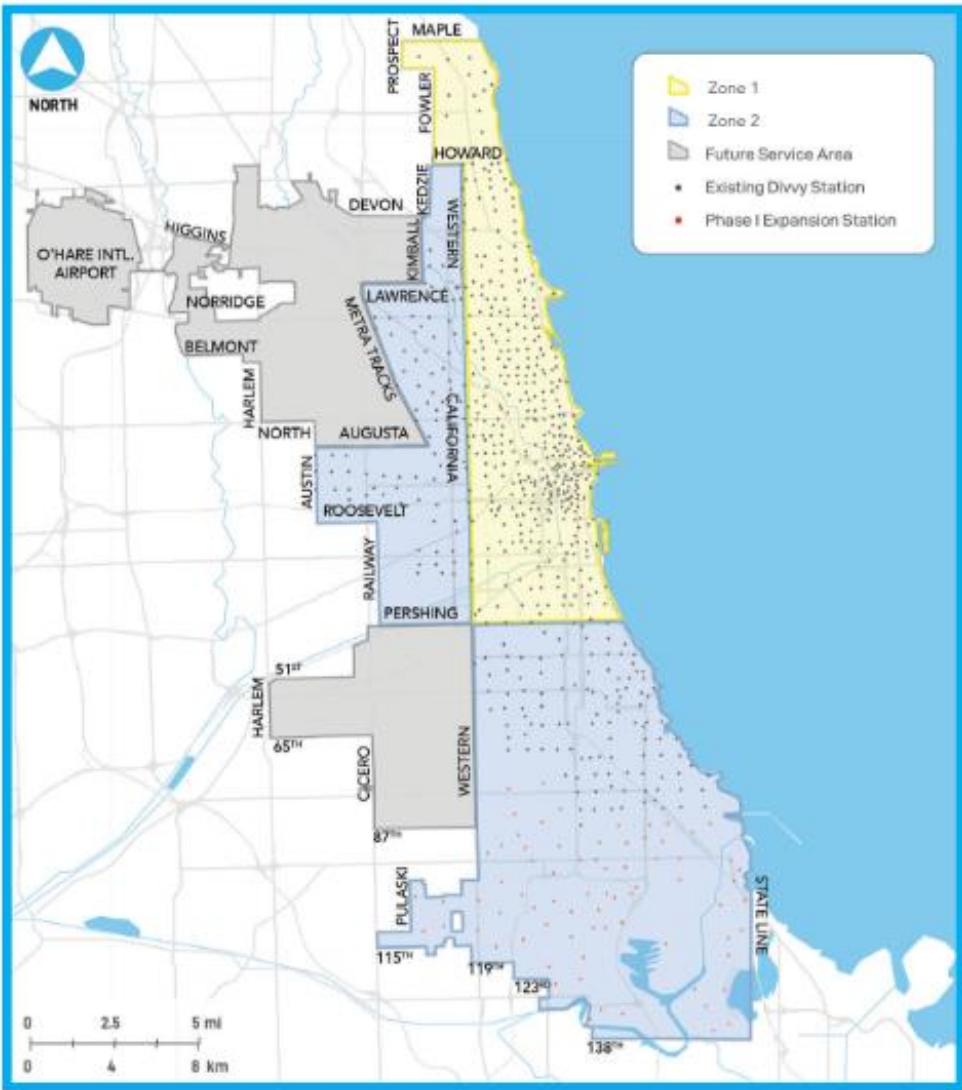
Preferred Gender  Start Station

End Station



- Divvy bike share system: Chicago and Evanston
- 5,800 bicycles and 600 docking stations
- Bikes type: **Electric and Classic**
- Rider types:
  - **Casual Riders** – Members who purchase Single-Ride or Full-Day passes
  - **Member Riders** – Members who purchase Annual Memberships
- Market research suggests annual members are profitable than casual riders

# Zones served in Chicago



Divvy Classic Bike .....



Divvy E-Bike .....

# Pricing policy

	<b>ZONE 1</b>		<b>ZONE 2</b>
<b>Classic Bikes</b>	<ul style="list-style-type: none"><li>Non-members: current \$3 Single Ride and \$15 Day Pass; each ride 30 minutes included</li><li>Divvy and Divvy for Everyone* members: unlimited 45 minute rides</li></ul>	<b>Classic Bikes</b>	<ul style="list-style-type: none"><li>Non-members: current \$3 Single Ride and \$15 Day Pass; each ride 30 minutes included</li><li>Divvy and Divvy for Everyone* members: unlimited 45 minute rides</li></ul>
<b>Ebikes</b>	<ul style="list-style-type: none"><li>\$0.05/min Divvy for Everyone Member</li><li>\$0.15/min Member</li><li>\$0.20/min Non-member</li></ul>	<b>Ebikes</b>	<ul style="list-style-type: none"><li>Non-members: \$3 Single Ride up to 30 minutes**</li><li>Members: no ebike fees up to 45 minutes**</li></ul>
<b>Parking Fees</b>	<p>No parking fee if ebike is:</p> <ul style="list-style-type: none"><li>Docked at a station</li><li>Locked to a Divvy E-station (coming soon!)</li></ul> <p>\$2 anywhere else</p> <p>\$1 Divvy for Everyone members</p>	<b>Parking Fees</b>	<p>Out of station parking fees waived**</p> <ul style="list-style-type: none"><li>\$25 fee for improper parking</li></ul>

# Dataset Overview



Dataset characteristics:	
Size	1.4 GB
No of columns	25
No of records	45,77,957
Numerical columns	15
Categorical columns	8
Date-time	2

- **15 months** ride details from **April 2020 to June 2021**
- **Features:**
  - Member type
  - Trip duration/distance
  - Start & End geo-coordinates
  - time stamp
- Tech stack used: **Excel, Spark, Tableau**

# Key Questions to Address



How can Divvy effectively highlight savings and service upgrades to attract casual riders, particularly those who prefer electric bikes?

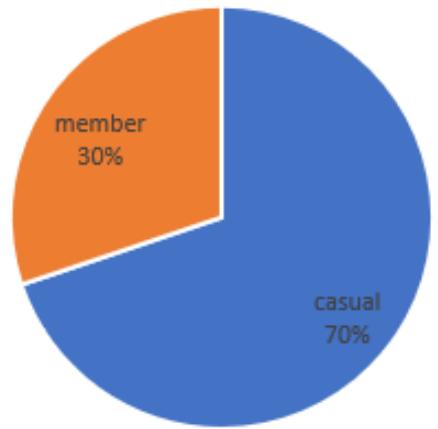


How can Divvy adjust its operations for the weekend rush from casual riders, like extending free time or offering weekend bonuses, to encourage them to become annual members?

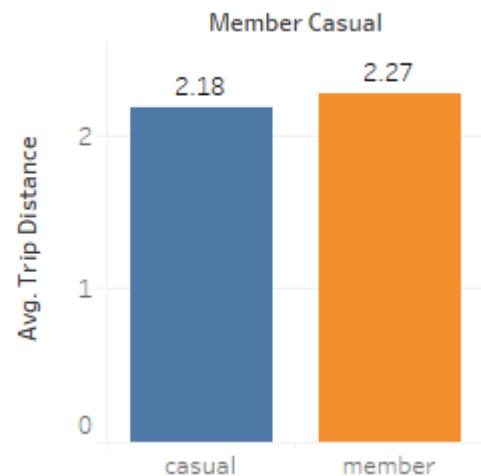
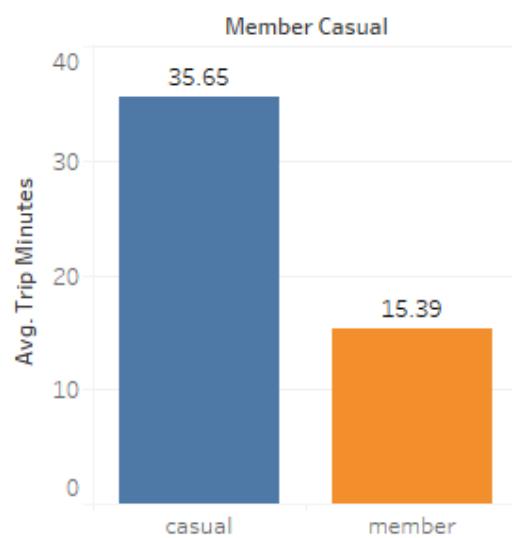
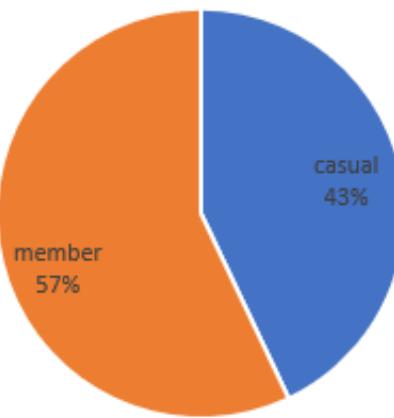


What promotions or perks can Divvy offer, such as seasonal discounts or free trial subscriptions, to attract casual riders and convert them into annual members?

% Ride length and user types



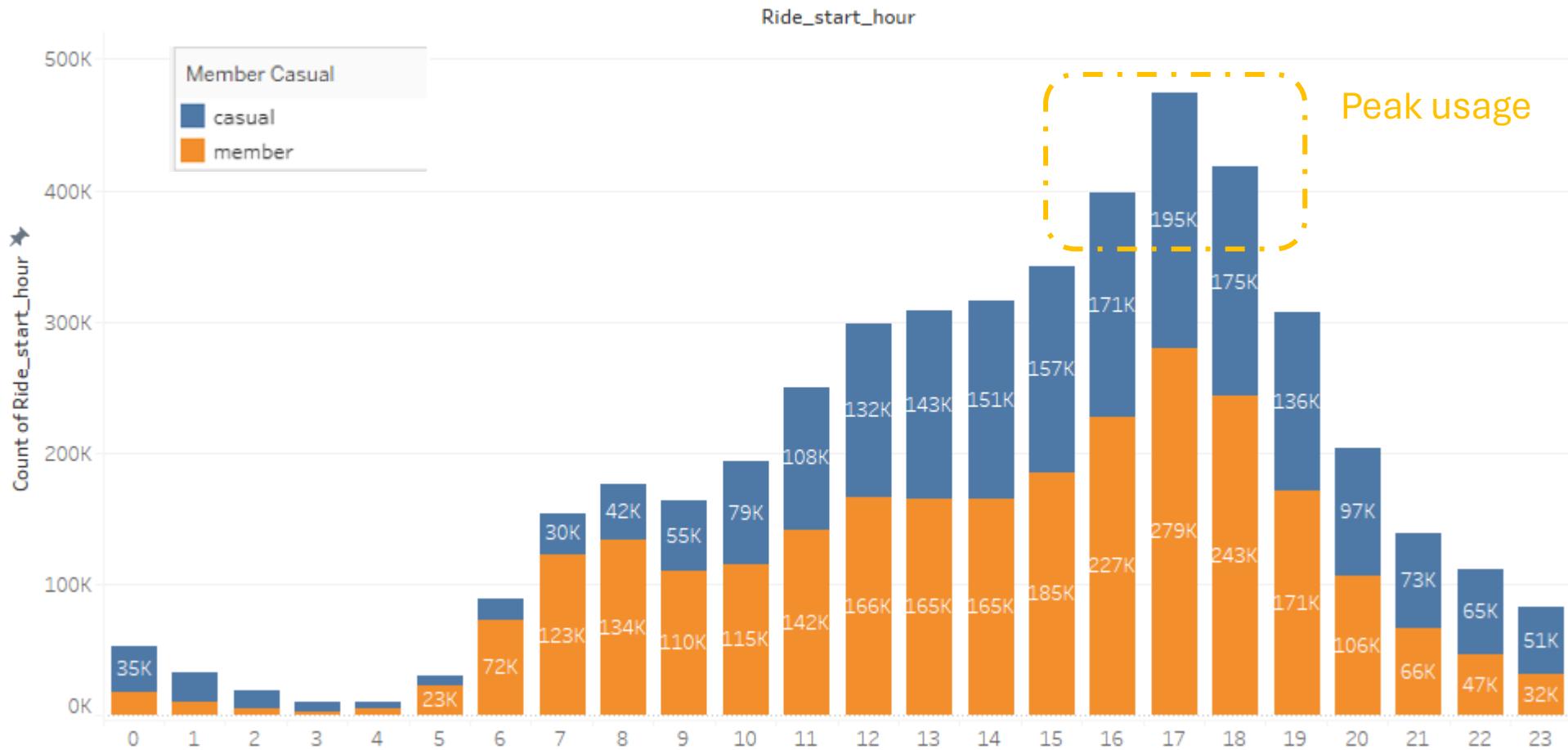
% Ride frequency and user type



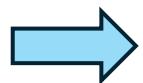
## Profiling Customers

- The ride duration and distance distribution among members and casual riders were identified.
- Here, average ride length for casual riders (**35.65 minutes long**) was almost twice longer than member riders (**15.39 minutes long**), member riders took **14%** bigger number of rides compared to casual users.

# Hour-wise trip analysis

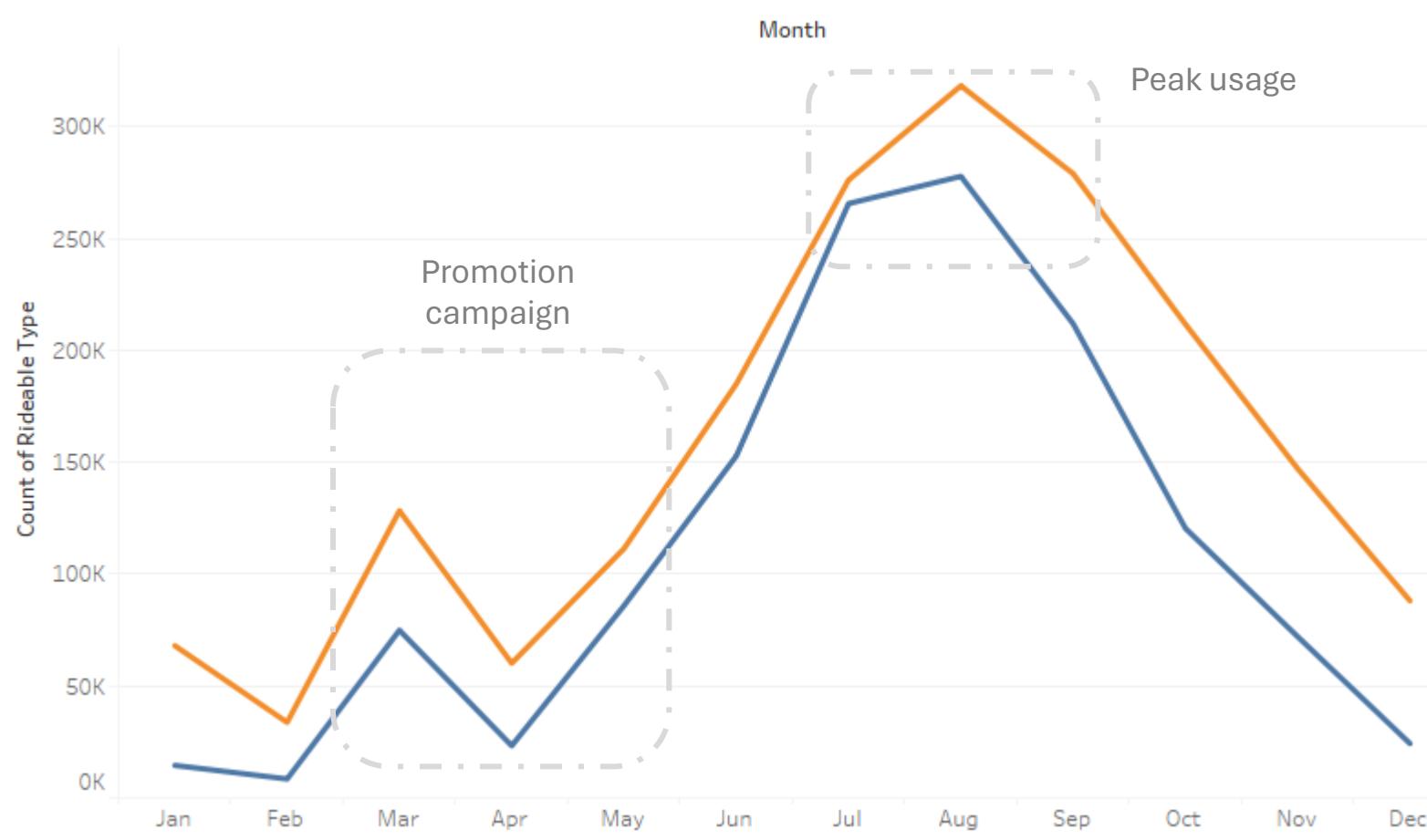


- Peak usage hour: 4,5 & 6 PM
- People prefer using bikes while returning to home than while starting



Targeted marketing on those frequent casual riders during the peak hours

# Month-wise trip analysis – Member type

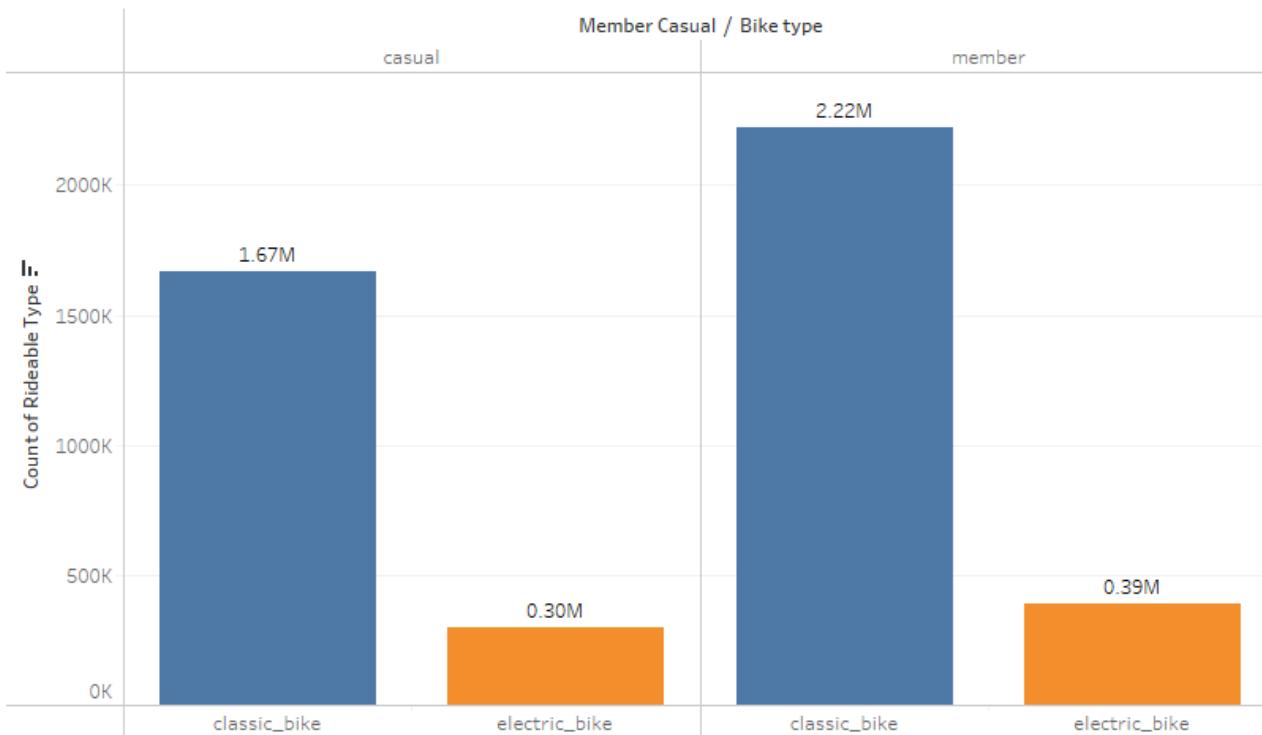


- Bike ride usage is season dependent
- Peak usage during Summer months: Jul & Aug



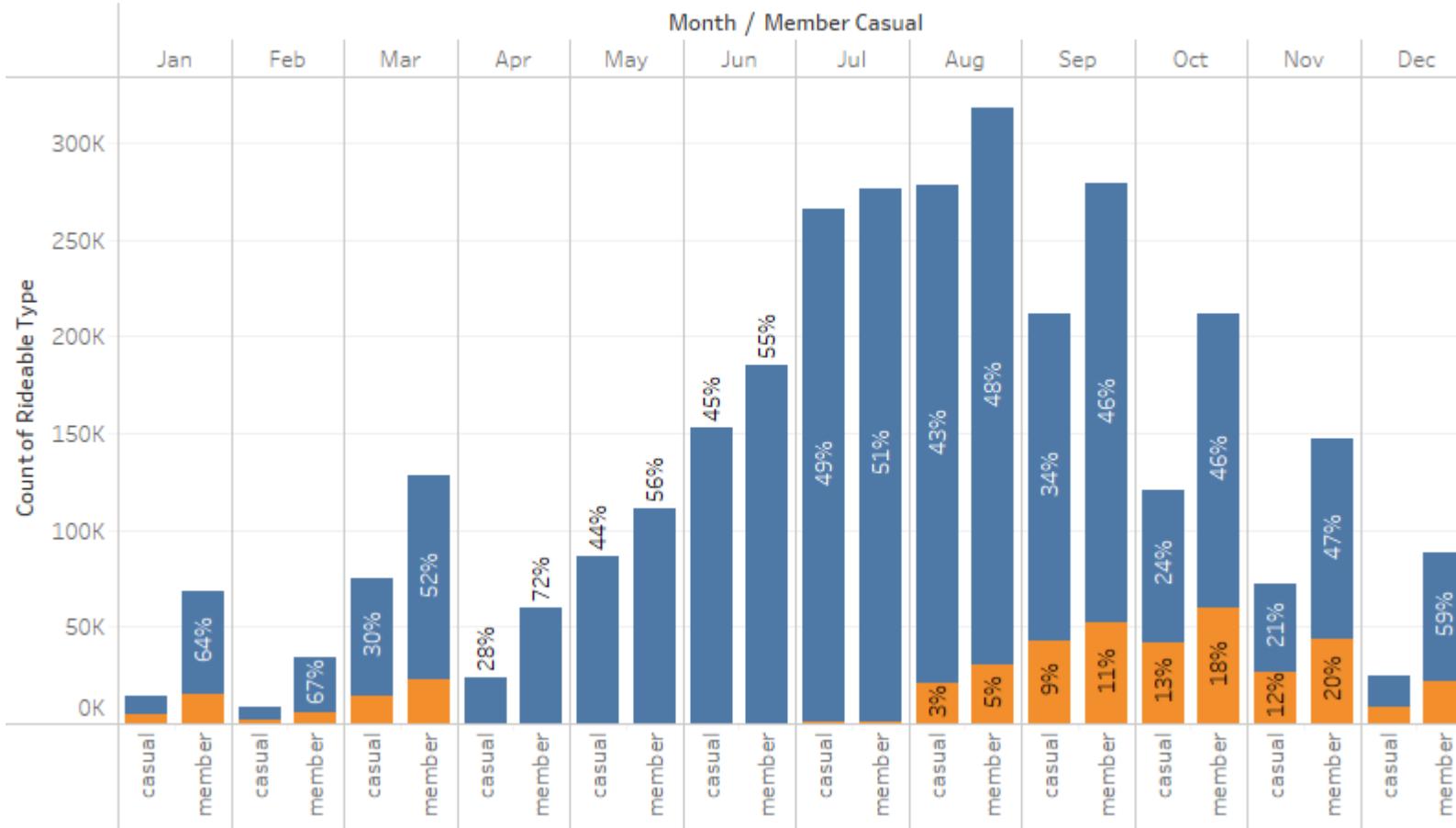
Optimal time for promotion campaign: Spring

# Bike Type and Popularity



- Classic bikes are more preferred by both types of users.
- About 15% of total rides by casual and member riders were via electric bikes.
- Electric bike usage is lesser during the weekend for all customer types

# Month-wise trip analysis – Bike type



- Electric bike usage seem to coincide with college/school dates
- Check the age distribution of electric bikes users
- Students have busy lives. Mostly likely to use electric bikes



Identify the stations nearby those school/college and dock more electric bikes

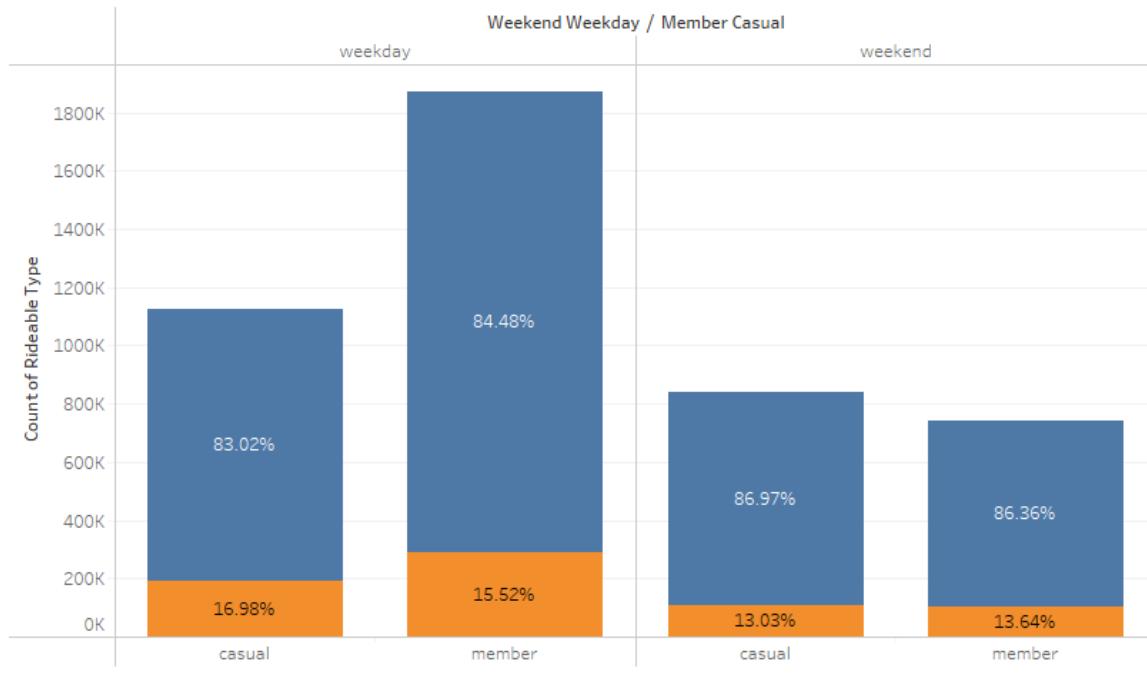
# Top stations handling Casual users

Start Station Name	Count of Member Casual
Streeter Dr & Grand Ave	47,106
Lake Shore Dr & Monroe St	32,854
Millennium Park	29,735
Michigan Ave & Oak St	22,868
Lake Shore Dr & North Blvd	22,332
Theater on the Lake	21,470
Indiana Ave & Roosevelt Rd	18,728
Clark St & Elm St	16,487
Wells St & Concord Ln	15,427
Wells St & Elm St	13,541

End Station Name	Count of Member Casual
Streeter Dr & Grand Ave	50,619
Lake Shore Dr & Monroe St	31,596
Millennium Park	31,145
Lake Shore Dr & North Blvd	24,945
Theater on the Lake	24,133
Michigan Ave & Oak St	23,927
Clark St & Elm St	15,799
Wells St & Concord Ln	15,724
Dearborn St & Erie St	12,157
Broadway & Barry Ave	12,127

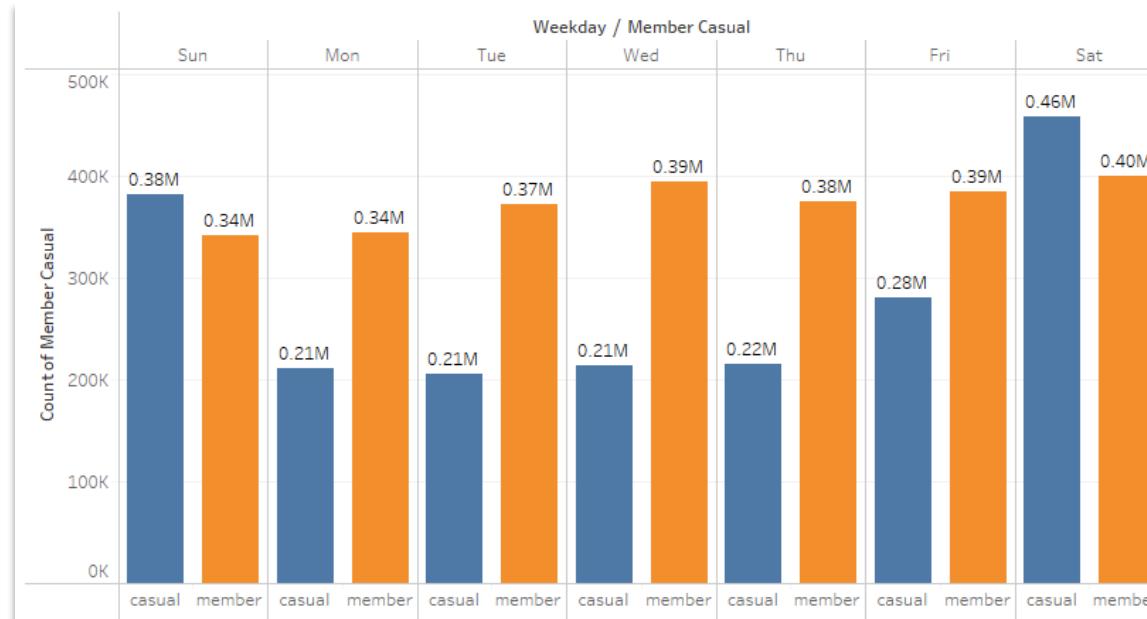


Attractive stations for marketing campaign

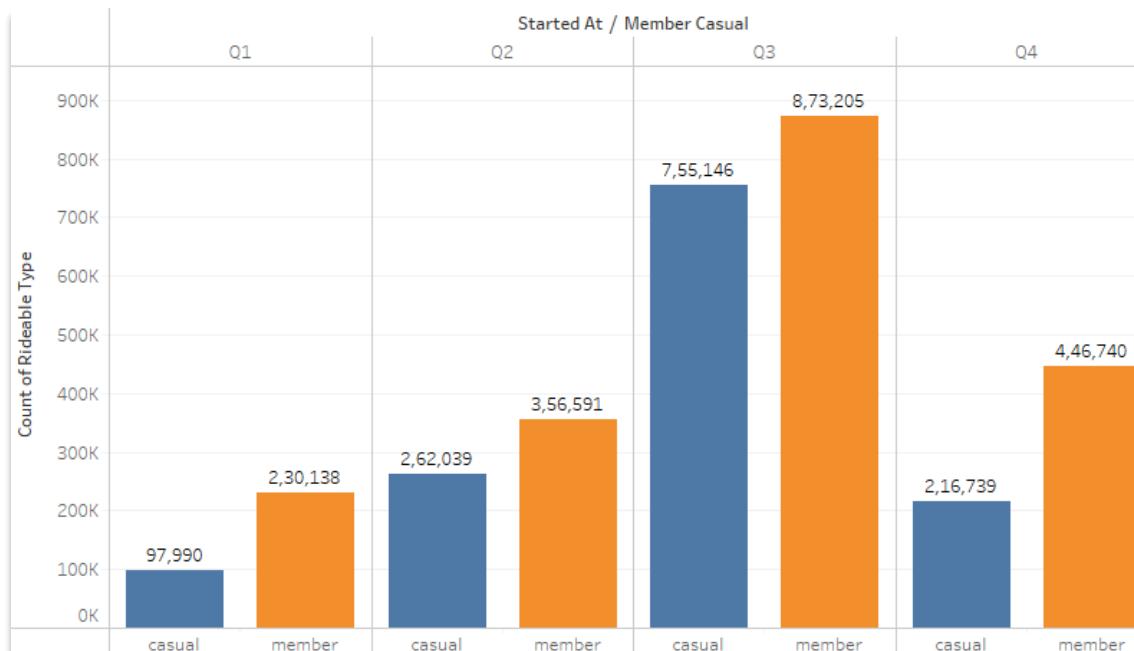
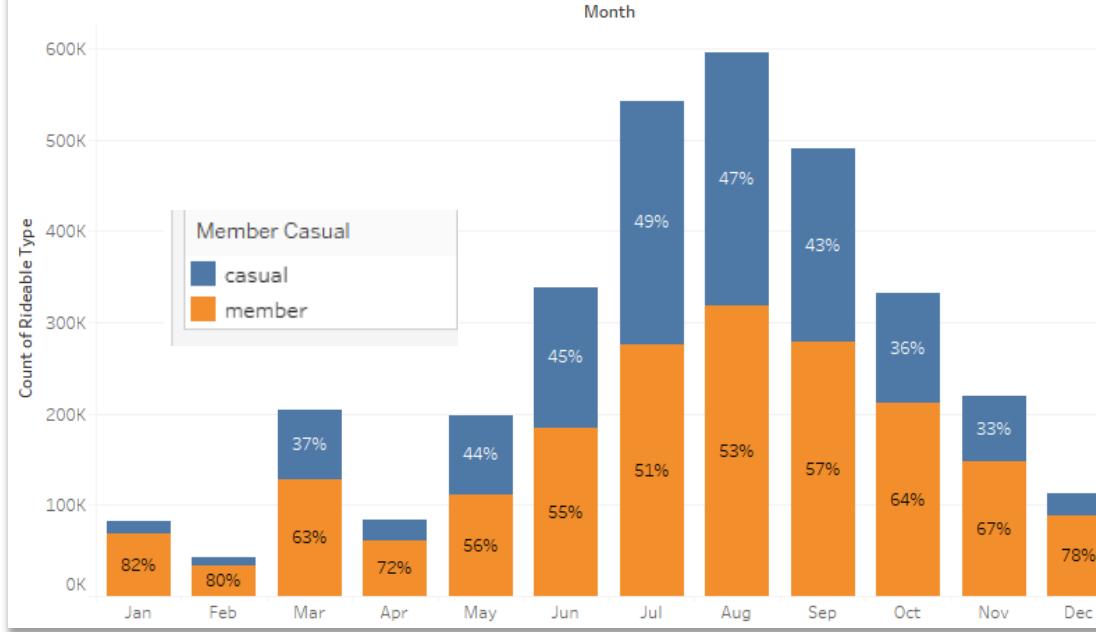


# Weekend vs Weekdays

- More rides are taken during the weekends than during the weekdays
- Casual riders spend 43% of their trips during weekends.
- Member riders use the bikes slightly more but very similar to other days of the week.
- This can be attributed to the fact that casual riders use the bikes for leisure, while members mostly use the service to commute to and from work or school.



## Temporal Analysis



# Quarterly Analysis

- In the **3rd quarter** of the year, **casual riders** took rides **8 times** more compared to the 1st quarter of the year.
- 50% of total rides for casual members** were taken in the 3rd quarter of the year.
- August as the most popular month for the casual user has over 33 times greater number of rides compared to February as the least popular month. In fact,
- Casual customer usage during winter months is very low and negligible. But annual members still use the service at a reasonable rate in those months.



# Key Findings

In this analysis, we found the patterns which indicate that:

- Casual riders are more leisure-oriented
- Average ride duration for casual riders =  $2 * \text{Average ride duration for member riders}$ , but member riders took the bikes 32% more by the number of rides compared to casual users.
- During the week, member users have a trend with small changes in the number of rides. However, Casual users have a trend with small changes in the number of rides during weekdays, but on the weekend, the number of riders increased drastically.
- Correlation between the seasons of the year and riders' behavior. Rides rose exponentially during the summer months and fell drastically during wintertime.
- In a 24-hour span, the number of rides for both, members and casual users significantly spike during afternoon rush hours (16, 17, and 18 hours) but for members, users are more intense. Around 28% of the rides took in rush hours.
- Data shows that classic bikes are more preferred by both types of users.

# Recommendations



# Thank you



# Annual temperature distribution of Chicago

