Scope

Cyclistic (a fictional company) offers two types of payment plans- an annual membership that requires a fee by members paid once a year and payment on a per-ride basis. The objective of this study is to understand the differences in use for the patrons on each of these payment plans. A review of ride durations and departure-return locations will offer an understanding of the differences between the rider types.

Data Information

The data is publicly available at https://divvy-tripdata.s3.amazonaws.com/index.html by Motivate International inc. and is used here in place of a fictional company's- Cyclistic- data. Because the data lacks identifying customer information, customer regularity cannot be analysed.It remains reliable for the purposes of this case study, however, since it is representative of real data collected in the real transactions of a real company. The data is made available for use under this license: https://ride.divvybikes.com/data-license-agreement

Process

SQL allows for a convenient review of the distinct items in a dataset and the range of data in a field. Using SQL, NULL values in the start_station_name and end_station_name fields were filled with string-value "None"; records without end_lat, end_lng values were updated with values from other records of the same station; records with stations at 0,0 were updated to have latitude, longitude coordinates correlating with those stations in other records; and records with ended_at times occurring before started_at times were updated with switched started_at and ended_at times. The twelve months of data were aggregated in a single dataframe with R to add a weekday column with the day of the week the bike was borrowed and a column with the duration of the loan in minutes.

Location Data

There were three general cases of records with missing end-location data: (1) NULL in the end_station_name, end_lat, and end_lng fields; (2) NULL in the end_station_name field; and (3) NULL ending coordinates. For the first and second conditions, the NULL values were replaced with "None" and 999 for the end_station_name and end_lat/end_lng fields respectively. With no

information (case 1) provided, this was the best solution to maintain the records to keep starting location and bike-type data to compare against member and casual users. However, for the missing end_station_names with end_lat, end_lng data, a more ideal solution would have been to programmatically create a table of coordinates for each of the stations and input the station names into the data records. This goes beyond the scope of the given project.

There were few records affected by missing end_lat, end_lng fields and they were adjusted by looking up the coordinates of the stations at those records and updating the NULL values to the values found in the lookup.
During a review of the range of values for ending location coordinates, several records of journeys in November 2022 and June 2023 were found to be at 0 latitude, 0 longitude. The affected stations were Green St & Madison Ave station in November 2022 and OH Charging Sx - Test station in June 2023. The end_lat and end_lng fields were updated in these records based on coordinates found in other records.

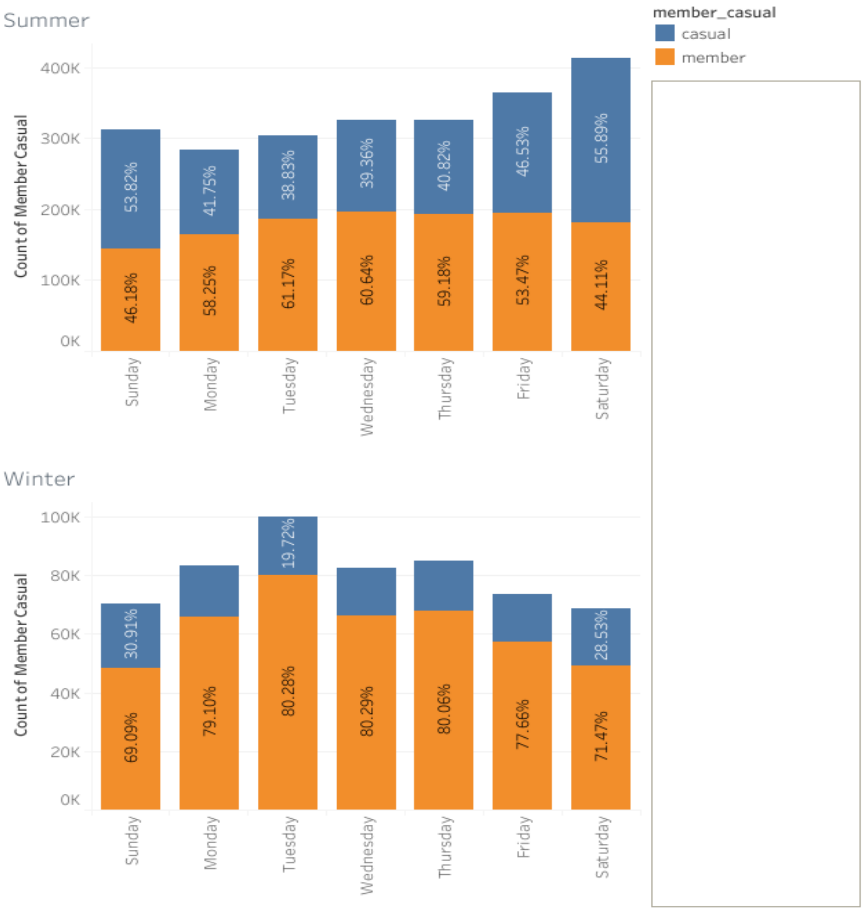
Analysis

Causal users use bikes differently from members in several ways:

1. Casual riders use bikes for longer durations
2. Casual riders ride mostly on weekends
3. Casual riders are less frequent customers in winter months
4. Casual riders use electric bikes more often than members do

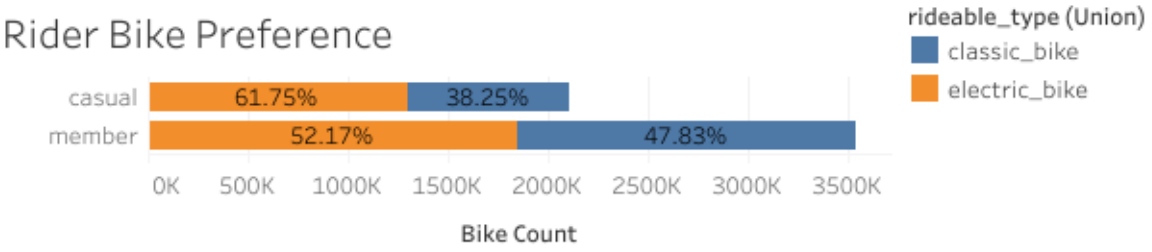
Across a year's worth of data, casual members ride for 28 minutes on average as compared to the members' average ride of only 12 minutes- less than half the amount of time spent riding.

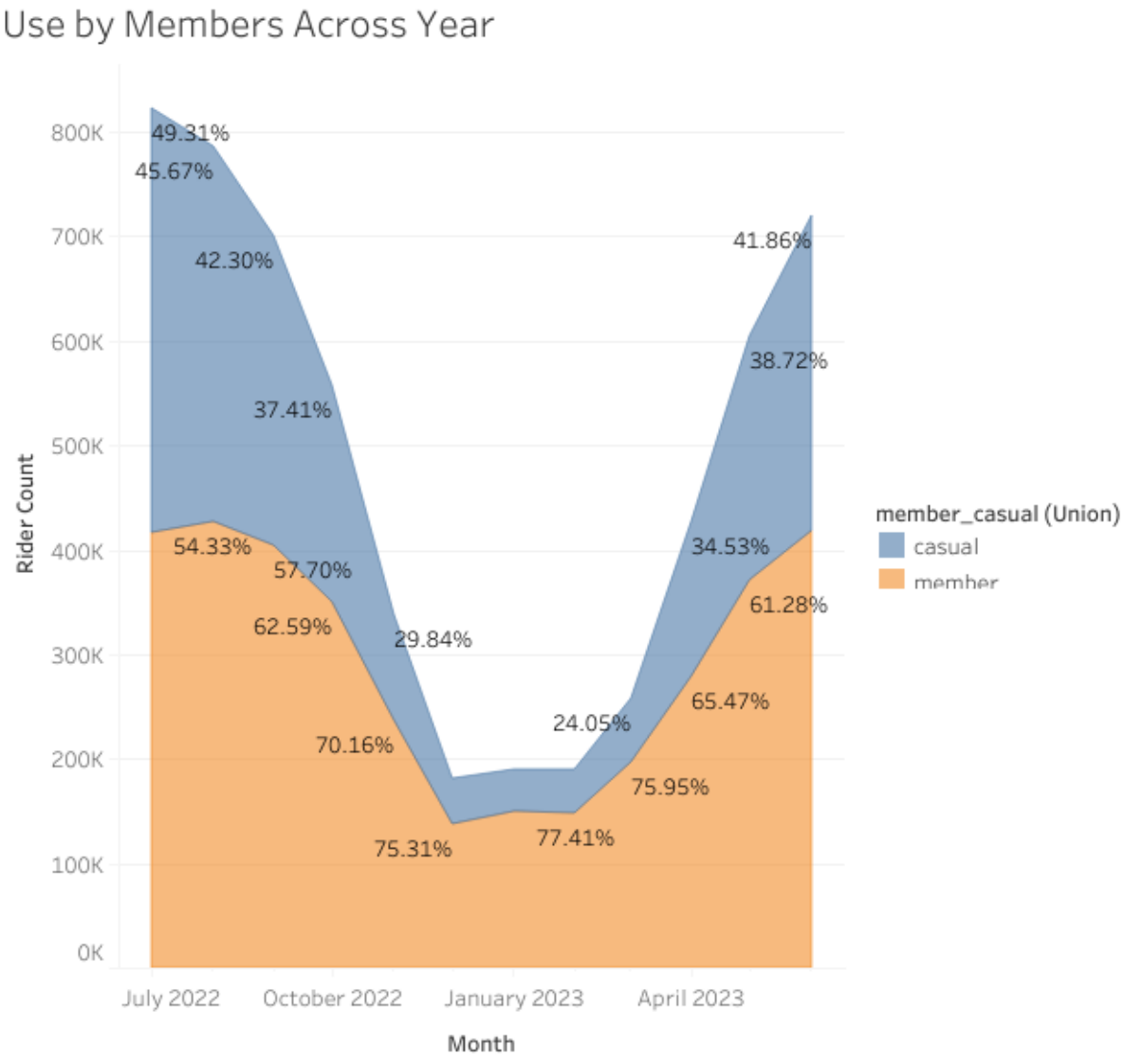
When broken down into weekdays, proportionally, members ride more during the workweek, while casual ridership is up on weekdays. This is seen across the seasons as casual use rises from about 40% on Wednesdays in the summer to 55% on Saturdays. This is seen less dramatically in winter where casual bike use increases from 20% on Wednesdays to 28% on Saturdays.



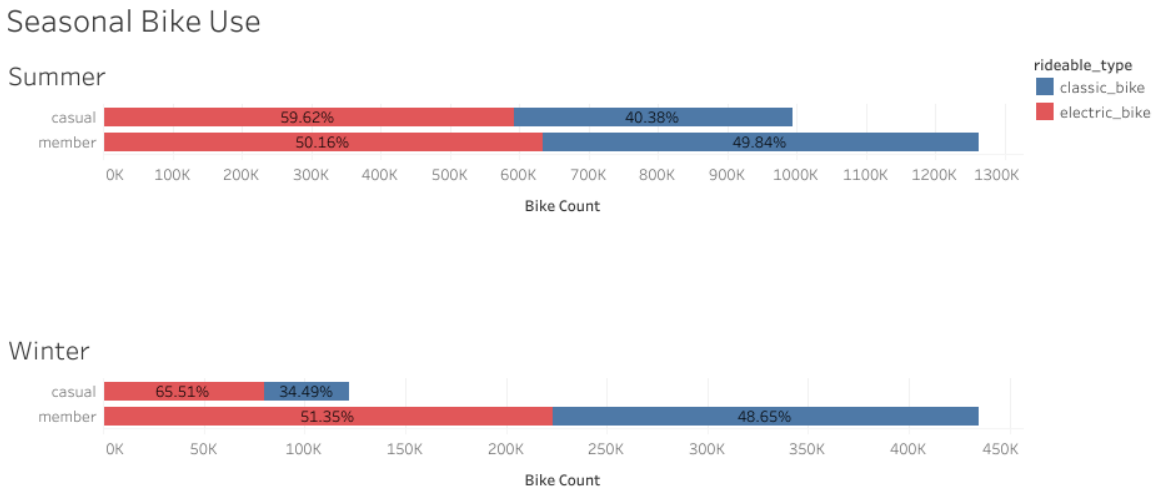
Across the year, there is a significant decline of total ridership- member and non-member- in the winter months from over 800,000 rides in a month at peak use in July down to under 200,000 rides in December. Membership use drops from around 400,000 rides a month to just under 150,000 rides in December- almost a third of use in winter compared to summer. Non-member use drops from around 400,000 rides per month to closer to 50,000 rides in winter- 12% the monthly usage of peak use during summer months.

All bike riders are less likely to use Cyclistic services in winter, but non-members are even less likely to ride.





The final noteworthy difference in behavior between members and non-member riders, is the increased tendency of non-members to use an electric bike.rather than a conventional one. Member use of electric bikes represents around fifty percent of their overall use, whereas casual riders opt for electric bikes two thirds of the time.



While casual riders are a little more likely to use an electric bike in winter than in summer, the group's use of electric bikes is essentially two thirds of bike use independent of seasons. This is in contrast to the bike-use of member riders who uniformly use electric bikes only fifty percent of rides in each season.

Suggested Action

Due to the disparity in bike use between seasons, a seasonal promotion on membership offered in winter would get membership up immediately in winter and then represent an increase in membership throughout the year. Winter subscribers on the promotional rate can be expected, at least in part, to maintain a membership and increase overall membership through the year.

The average duration of rides by non-members being twice the length of those by members and the increased use of bikes by non-members on weekends suggests use of the bikes as a hobby or for sightseeing. A membership plan may be offered for this group of users for weekend-only use to increase overall membership. The membership plan would be offered at a decreased price from a standard membership and allow unlimited bike-use on Saturdays and Sundays throughout the year.