Cyclistic Bike Share: Analytics

Abdur Rehman, Data Analyst

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Case study: How does a bike-share navigate speedy success?

Pre context

In 2016, Cyclistic launched a successful bike-share offering. Since then, the program has grown to a fleet of 5,824 bicycles that are geo-tracked and locked into a network of 692 stations across Chicago.

Until now, Cyclistic's marketing strategy relied on building general awareness and appealing to broad consumer segments. One approach that helped make these things possible was the flexibility of its pricing plans: single-ride passes, full-day passes, and annual memberships. Customers who purchase single-ride or full-day passes are referred to as casual riders. Customers who purchase annual memberships are Cyclistic members.

Case study

However, there arose a question by the stakeholders: 'what is the most effective marketing strategy to converting Cyclistic's casual riders to annul memberships?'

To answer this question, the goal can be broken down into 3 main questions.

1. How do annual members and casual riders use Cyclistic bikes differently?
2. Why would casual riders buy Cyclistic annual memberships?
3. How can Cyclistic use digital media to influence casual riders to become members?

This report aims to achieve the following objectives:

How do annual members and casual riders use Cyclistic bikes differently?

Stakeholders

This report also seeks to identify the important stakeholders that are involved in the overall analysis. This includes:

- Cyclistic marketing team
- Director of marketing team
- Cyclistic executive team

Data sources

User data of the Whole Year 2023 has been made available. Each data set is in csv format. This data has been made publicly available via license by Motivate International Inc.and the city of Chicago available here (https://shorturl.at/p2Reb). Same data can also be found on **Kaggle**

Documentation, cleaning and preparation of data for analysis

Tools for analysis

R is being used due to the data size and visualizations needed to complete this analysis.

Preparation of Data

Loading the data of the 12 months, from the year 2023.

```
## [1] "E:/DATA EVERYTHING/What I learned Yet/8th course, a case study"
```

```
## [1] TRUE
```

```
##            ride_id rideable_type          started_at            ended_at
## 1 F96D5A74A3E41399 electric_bike 2023-01-21 20:05:42 2023-01-21 20:16:33
## 2 13CB7EB698CEDB88  classic_bike 2023-01-10 15:37:36 2023-01-10 15:46:05
## 3 BD88A2E670661CE5 electric_bike 2023-01-02 07:51:57 2023-01-02 08:05:11
## 4 C90792D034FED968  classic_bike 2023-01-22 10:52:58 2023-01-22 11:01:44
## 5 3397017529188E8A  classic_bike 2023-01-12 13:58:01 2023-01-12 14:13:20
## 6 58E68156DAE3E311 electric_bike 2023-01-31 07:18:03 2023-01-31 07:21:16
##              start_station_name start_station_id              end_station_name
## 1   Lincoln Ave & Fullerton Ave     TA1309000058      Hampden Ct & Diversey Ave
## 2         Kimbark Ave & 53rd St     TA1309000037        Greenwood Ave & 47th St
## 3        Western Ave & Lunt Ave           RP-005 Valli Produce - Evanston Plaza
## 4         Kimbark Ave & 53rd St     TA1309000037        Greenwood Ave & 47th St
## 5         Kimbark Ave & 53rd St     TA1309000037        Greenwood Ave & 47th St
## 6 Lakeview Ave & Fullerton Pkwy     TA1309000019      Hampden Ct & Diversey Ave
##   end_station_id start_lat start_lng  end_lat   end_lng member_casual
## 1       202480.0  41.92407 -87.64628 41.93000 -87.64000        member
## 2   TA1308000002  41.79957 -87.59475 41.80983 -87.59938        member
## 3            599  42.00857 -87.69048 42.03974 -87.69941        casual
## 4   TA1308000002  41.79957 -87.59475 41.80983 -87.59938        member
## 5   TA1308000002  41.79957 -87.59475 41.80983 -87.59938        member
## 6       202480.0  41.92607 -87.63886 41.93000 -87.64000        member
```

```
## [1] TRUE
```

```
##            ride_id rideable_type          started_at            ended_at
## 1 CBCD0D7777F0E45F  classic_bike 2023-02-14 11:59:42 2023-02-14 12:13:38
## 2 F3EC5FCE5FF39DE9 electric_bike 2023-02-15 13:53:48 2023-02-15 13:59:08
## 3 E54C1F27FA9354FF  classic_bike 2023-02-19 11:10:57 2023-02-19 11:35:01
## 4 3D561E04F739CC45 electric_bike 2023-02-26 16:12:05 2023-02-26 16:39:55
## 5 0CB4B4D53B2DBE05 electric_bike 2023-02-20 11:55:23 2023-02-20 12:05:48
## 6 C67EB62172C472EB  classic_bike 2023-02-24 18:50:16 2023-02-24 18:56:40
##             start_station_name start_station_id              end_station_name
## 1 Southport Ave & Clybourn Ave     TA1309000030        Clark St & Schiller St
## 2   Clarendon Ave & Gordon Ter            13379    Sheridan Rd & Lawrence Ave
## 3 Southport Ave & Clybourn Ave     TA1309000030       Aberdeen St & Monroe St
## 4 Southport Ave & Clybourn Ave     TA1309000030 Franklin St & Adams St (Temp)
## 5  Prairie Ave & Garfield Blvd     TA1307000160   Cottage Grove Ave & 63rd St
## 6        Wells St & Concord Ln     TA1308000050    Clybourn Ave & Division St
##   end_station_id start_lat start_lng  end_lat   end_lng member_casual
## 1   TA1309000024  41.92077 -87.66371 41.90799 -87.63150        casual
## 2   TA1309000041  41.95788 -87.64958 41.96952 -87.65469        casual
## 3          13156  41.92077 -87.66371 41.88042 -87.65552        member
## 4   TA1309000008  41.92087 -87.66373 41.87943 -87.63550        member
## 5   KA1503000054  41.79483 -87.61879 41.78053 -87.60597        member
## 6   TA1307000115  41.91213 -87.63466 41.90461 -87.64055        member
```

```
## [1] TRUE
```

```
##            ride_id rideable_type          started_at            ended_at
## 1 6842AA605EE9FBB3 electric_bike 2023-03-16 08:20:34 2023-03-16 08:22:52
## 2 F984267A75B99A8C electric_bike 2023-03-04 14:07:06 2023-03-04 14:15:31
## 3 FF7CF57CFE026D02  classic_bike 2023-03-31 12:28:09 2023-03-31 12:38:47
## 4 6B61B916032CB6D6  classic_bike 2023-03-22 14:09:08 2023-03-22 14:24:51
## 5 E55E61A5F1260040 electric_bike 2023-03-09 07:15:00 2023-03-09 07:26:00
## 6 123AAD676850F53C  classic_bike 2023-03-22 17:47:02 2023-03-22 18:01:29
##                    start_station_name start_station_id
## 1              Clark St & Armitage Ave            13146
## 2 Public Rack - Kedzie Ave & Argyle St              491
## 3 Orleans St & Chestnut St (NEXT Apts)              620
## 4            Desplaines St & Kinzie St     TA1306000003
## 5                           Walsh Park            18067
## 6 Orleans St & Chestnut St (NEXT Apts)              620
##               end_station_name end_station_id start_lat start_lng  end_lat
## 1    Larrabee St & Webster Ave          13193  41.91841 -87.63645 41.92182
## 2                                              41.97000 -87.71000 41.95000
## 3       Clark St & Randolph St   TA1305000030  41.89820 -87.63754 41.88458
## 4 Sheffield Ave & Kingsbury St          13154  41.88872 -87.64445 41.91052
## 5        Sangamon St & Lake St   TA1306000015  41.91448 -87.66801 41.88578
## 6  Halsted St & Wrightwood Ave   TA1309000061  41.89820 -87.63754 41.92914
##     end_lng member_casual
## 1 -87.64414        member
## 2 -87.71000        member
## 3 -87.63189        member
## 4 -87.65311        member
## 5 -87.65102        member
## 6 -87.64908        member
```

```
## [1] TRUE
```

```
##            ride_id rideable_type          started_at            ended_at
## 1 8FE8F7D9C10E88C7 electric_bike 2023-04-02 08:37:28 2023-04-02 08:41:37
## 2 34E4ED3ADF1D821B electric_bike 2023-04-19 11:29:02 2023-04-19 11:52:12
## 3 5296BF07A2F77CB5 electric_bike 2023-04-19 08:41:22 2023-04-19 08:43:22
## 4 40759916B76D5D52 electric_bike 2023-04-19 13:31:30 2023-04-19 13:35:09
## 5 77A96F460101AC63 electric_bike 2023-04-19 12:05:36 2023-04-19 12:10:26
## 6 8D6A2328E19DC168 electric_bike 2023-04-19 12:17:34 2023-04-19 12:21:38
##   start_station_name start_station_id end_station_name end_station_id start_lat
## 1                                                                        41.80
## 2                                                                        41.87
## 3                                                                        41.93
## 4                                                                        41.92
## 5                                                                        41.91
## 6                                                                        41.91
##   start_lng end_lat end_lng member_casual
## 1    -87.60   41.79  -87.60        member
## 2    -87.65   41.93  -87.68        member
## 3    -87.66   41.93  -87.66        member
## 4    -87.65   41.91  -87.65        member
## 5    -87.65   41.91  -87.63        member
## 6    -87.63   41.92  -87.65        member
```

```
## [1] TRUE
```

```
##            ride_id rideable_type          started_at            ended_at
## 1 0D9FA920C3062031 electric_bike 2023-05-07 19:53:48 2023-05-07 19:58:32
## 2 92485E5FB5888ACD electric_bike 2023-05-06 18:54:08 2023-05-06 19:03:35
## 3 FB144B3FC8300187 electric_bike 2023-05-21 00:40:21 2023-05-21 00:44:36
## 4 DDEB93BC2CE9AA77  classic_bike 2023-05-10 16:47:01 2023-05-10 16:59:52
## 5 C07B70172FC92F59  classic_bike 2023-05-09 18:30:34 2023-05-09 18:39:28
## 6 2BA66385DF8F815A  classic_bike 2023-05-30 15:01:21 2023-05-30 15:17:00
##            start_station_name start_station_id            end_station_name
## 1 Southport Ave & Belmont Ave            13229
## 2 Southport Ave & Belmont Ave            13229
## 3        Halsted St & 21st St            13162
## 4     Carpenter St & Huron St            13196     Damen Ave & Cortland St
## 5    Southport Ave & Clark St     TA1308000047 Southport Ave & Belmont Ave
## 6     Clinton St & Madison St     TA1305000032        McClurg Ct & Ohio St
##   end_station_id start_lat start_lng  end_lat   end_lng member_casual
## 1                41.93941 -87.66383 41.93000 -87.65000        member
## 2                41.93948 -87.66385 41.94000 -87.69000        member
## 3                41.85379 -87.64672 41.86000 -87.65000        member
## 4          13133  41.89456 -87.65345 41.91598 -87.67733        member
## 5          13229  41.95708 -87.66420 41.93948 -87.66375        member
## 6   TA1306000029  41.88275 -87.64119 41.89259 -87.61729        member
```

```
## [1] TRUE
```

```
##            ride_id rideable_type          started_at            ended_at
## 1 6F1682AC40EB6F71 electric_bike 2023-06-05 13:34:12 2023-06-05 14:31:56
## 2 622A1686D64948EB electric_bike 2023-06-05 01:30:22 2023-06-05 01:33:06
## 3 3C88859D926253B4 electric_bike 2023-06-20 18:15:49 2023-06-20 18:32:05
## 4 EAD8A5E0259DEC88 electric_bike 2023-06-19 14:56:00 2023-06-19 15:00:35
## 5 5A36F21930D6A55C electric_bike 2023-06-19 15:03:34 2023-06-19 15:07:16
## 6 CF682EA7D0F961DB electric_bike 2023-06-09 21:30:25 2023-06-09 21:49:52
##   start_station_name start_station_id end_station_name end_station_id start_lat
## 1                                                                        41.91
## 2                                                                        41.94
## 3                                                                        41.95
## 4                                                                        41.99
## 5                                                                        41.98
## 6                                                                        41.99
##   start_lng end_lat end_lng member_casual
## 1    -87.69   41.91  -87.70        member
## 2    -87.65   41.94  -87.65        member
## 3    -87.68   41.92  -87.63        member
## 4    -87.65   41.98  -87.66        member
## 5    -87.66   41.99  -87.65        member
## 6    -87.68   41.94  -87.65        member
```

```
## [1] TRUE
```

```
##            ride_id rideable_type          started_at            ended_at
## 1 9340B064F0AEE130 electric_bike 2023-07-23 20:06:14 2023-07-23 20:22:44
## 2 D1460EE3CE0D8AF8  classic_bike 2023-07-23 17:05:07 2023-07-23 17:18:37
## 3 DF41BE31B895A25E  classic_bike 2023-07-23 10:14:53 2023-07-23 10:24:29
## 4 9624A293749EF703 electric_bike 2023-07-21 08:27:44 2023-07-21 08:32:40
## 5 2F68A6A4CDB4C99A  classic_bike 2023-07-08 15:46:42 2023-07-08 15:58:08
## 6 9AEE973E6B941A9C  classic_bike 2023-07-10 08:44:47 2023-07-10 08:49:41
##         start_station_name start_station_id                  end_station_name
## 1    Kedzie Ave & 110th St            20204 Public Rack - Racine Ave & 109th Pl
## 2  Western Ave & Walton St     KA1504000103           Milwaukee Ave & Grand Ave
## 3  Western Ave & Walton St     KA1504000103              Damen Ave & Pierce Ave
## 4 Racine Ave & Randolph St            13155             Clinton St & Madison St
## 5    Clark St & Leland Ave     TA1309000014                     Montrose Harbor
## 6 Racine Ave & Randolph St            13155               Sangamon St & Lake St
##   end_station_id start_lat start_lng  end_lat   end_lng member_casual
## 1            877  41.69241 -87.70091 41.69483 -87.65304        member
## 2          13033  41.89842 -87.68660 41.89158 -87.64838        member
## 3   TA1305000041  41.89842 -87.68660 41.90940 -87.67769        member
## 4   TA1305000032  41.88411 -87.65694 41.88275 -87.64119        member
## 5   TA1308000012  41.96709 -87.66729 41.96398 -87.63818        member
## 6   TA1306000015  41.88407 -87.65685 41.88578 -87.65102        member
```

```
## [1] TRUE
```

```
##            ride_id rideable_type          started_at            ended_at
## 1 903C30C2D810A53B electric_bike 2023-08-19 15:41:53 2023-08-19 15:53:36
## 2 F2FB18A98E110A2B electric_bike 2023-08-18 15:30:18 2023-08-18 15:45:25
## 3 D0DEC7C94E4663DA electric_bike 2023-08-30 16:15:08 2023-08-30 16:27:37
## 4 E0DDDC5F84747ED9 electric_bike 2023-08-30 16:24:07 2023-08-30 16:33:34
## 5 7797A4874BA260CA electric_bike 2023-08-22 15:59:44 2023-08-22 16:20:38
## 6 DF4DE734EBC4DF66 electric_bike 2023-08-24 12:27:24 2023-08-24 12:54:59
##              start_station_name start_station_id  end_station_name
## 1      LaSalle St & Illinois St            13430 Clark St & Elm St
## 2        Clark St & Randolph St     TA1305000030
## 3        Clark St & Randolph St     TA1305000030
## 4             Wells St & Elm St     KA1504000135
## 5        Clark St & Randolph St     TA1305000030
## 6 Milwaukee Ave & Fullerton Ave              428
##   end_station_id start_lat start_lng  end_lat   end_lng member_casual
## 1   TA1307000039  41.89072 -87.63148 41.90297 -87.63128        member
## 2                 41.88451 -87.63155 41.93000 -87.64000        member
## 3                 41.88498 -87.63079 41.91000 -87.63000        member
## 4                 41.90310 -87.63467 41.90000 -87.62000        member
## 5                 41.88555 -87.63202 41.89000 -87.68000        member
## 6                 41.92467 -87.70060 41.91000 -87.72000        member
```

```
## [1] TRUE
```

```
##            ride_id rideable_type          started_at            ended_at
## 1 011C1903BF4E2E28  classic_bike 2023-09-23 00:27:50 2023-09-23 00:33:27
## 2 87DB80E048A1BF9F  classic_bike 2023-09-02 09:26:43 2023-09-02 09:38:19
## 3 7C2EB7AF669066E3 electric_bike 2023-09-25 18:30:11 2023-09-25 18:41:39
## 4 57D197B010269CE3  classic_bike 2023-09-13 15:30:49 2023-09-13 15:39:18
## 5 8A2CEA7C8C8074D8  classic_bike 2023-09-18 15:58:58 2023-09-18 16:05:04
## 6 03F7044D1304CD58 electric_bike 2023-09-15 20:19:25 2023-09-15 20:30:27
##              start_station_name start_station_id
## 1    Halsted St & Wrightwood Ave     TA1309000061
## 2         Clark St & Drummond Pl     TA1307000142
## 3  Financial Pl & Ida B Wells Dr           SL-010
## 4         Clark St & Drummond Pl     TA1307000142
## 5    Halsted St & Wrightwood Ave     TA1309000061
## 6 Southport Ave & Wrightwood Ave     TA1307000113
##                end_station_name end_station_id start_lat start_lng  end_lat
## 1 Sheffield Ave & Wellington Ave   TA1307000052  41.92914 -87.64908 41.93625
## 2     Racine Ave & Fullerton Ave   TA1306000026  41.93125 -87.64434 41.92557
## 3           Racine Ave & 15th St          13304  41.87506 -87.63314 41.86127
## 4       Racine Ave & Belmont Ave   TA1308000019  41.93125 -87.64434 41.93974
## 5     Racine Ave & Fullerton Ave   TA1306000026  41.92914 -87.64908 41.92557
## 6                                                41.92884 -87.66387 41.90000
##     end_lng member_casual
## 1 -87.65266        member
## 2 -87.65842        member
## 3 -87.65663        member
## 4 -87.65887        member
## 5 -87.65842        member
## 6 -87.64000        member
```

```
## [1] TRUE
```

```
##            ride_id rideable_type          started_at            ended_at
## 1 4449097279F8BBE7  classic_bike 2023-10-08 10:36:26 2023-10-08 10:49:19
## 2 9CF060543CA7B439 electric_bike 2023-10-11 17:23:59 2023-10-11 17:36:08
## 3 667F21F4D6BDE69C electric_bike 2023-10-12 07:02:33 2023-10-12 07:06:53
## 4 F92714CC6B019B96  classic_bike 2023-10-24 19:13:03 2023-10-24 19:18:29
## 5 5E34BA5DE945A9CC  classic_bike 2023-10-09 18:19:26 2023-10-09 18:30:56
## 6 F7D7420AFAC53CD9 electric_bike 2023-10-04 17:10:59 2023-10-04 17:25:21
##                     start_station_name start_station_id
## 1 Orleans St & Chestnut St (NEXT Apts)              620
## 2            Desplaines St & Kinzie St     TA1306000003
## 3 Orleans St & Chestnut St (NEXT Apts)              620
## 4            Desplaines St & Kinzie St     TA1306000003
## 5            Desplaines St & Kinzie St     TA1306000003
## 6 Orleans St & Chestnut St (NEXT Apts)              620
##              end_station_name end_station_id start_lat start_lng  end_lat
## 1 Sheffield Ave & Webster Ave   TA1309000033  41.89820 -87.63754 41.92154
## 2 Sheffield Ave & Webster Ave   TA1309000033  41.88864 -87.64441 41.92154
## 3       Franklin St & Lake St   TA1307000111  41.89807 -87.63751 41.88584
## 4       Franklin St & Lake St   TA1307000111  41.88872 -87.64445 41.88584
## 5       Franklin St & Lake St   TA1307000111  41.88872 -87.64445 41.88584
## 6 Sheffield Ave & Webster Ave   TA1309000033  41.89812 -87.63753 41.92154
##     end_lng member_casual
## 1 -87.65382        member
## 2 -87.65382        member
## 3 -87.63550        member
## 4 -87.63550        member
## 5 -87.63550        member
## 6 -87.65382        member
```

```
## [1] TRUE
```

```
##            ride_id rideable_type          started_at            ended_at
## 1 4EAD8F1AD547356B electric_bike 2023-11-30 21:50:05 2023-11-30 22:13:27
## 2 6322270563BF5470 electric_bike 2023-11-03 09:44:02 2023-11-03 10:17:15
## 3 B37BDE091ECA38E0 electric_bike 2023-11-30 11:39:44 2023-11-30 11:40:08
## 4 CF0CA5DD26E4F90E  classic_bike 2023-11-08 10:01:45 2023-11-08 10:27:05
## 5 EB8381AA641348DB  classic_bike 2023-11-03 16:20:25 2023-11-03 16:54:25
## 6 B8CF14EA423D6886 electric_bike 2023-11-30 16:15:53 2023-11-30 16:39:52
##              start_station_name start_station_id              end_station_name
## 1               Millennium Park            13008 Pine Grove Ave & Waveland Ave
## 2        Broadway & Sheridan Rd            13323        Broadway & Sheridan Rd
## 3         State St & Pearson St     TA1307000061         State St & Pearson St
## 4           Theater on the Lake     TA1308000001           Theater on the Lake
## 5           Theater on the Lake     TA1308000001           Theater on the Lake
## 6 Pine Grove Ave & Waveland Ave     TA1307000150               Millennium Park
##   end_station_id start_lat start_lng  end_lat   end_lng member_casual
## 1   TA1307000150  41.88110 -87.62408 41.94947 -87.64645        member
## 2          13323  41.95287 -87.65003 41.95283 -87.64999        member
## 3   TA1307000061  41.89753 -87.62869 41.89745 -87.62872        member
## 4   TA1308000001  41.92628 -87.63083 41.92628 -87.63083        member
## 5   TA1308000001  41.92628 -87.63083 41.92628 -87.63083        member
## 6          13008  41.94942 -87.64638 41.88103 -87.62408        member
```

```
## [1] TRUE
```

```
##            ride_id rideable_type          started_at            ended_at
## 1 65DBD2F447EC51C2 electric_bike 2022-12-05 10:47:18 2022-12-05 10:56:34
## 2 0C201AA7EA0EA1AD  classic_bike 2022-12-18 06:42:33 2022-12-18 07:08:44
## 3 E0B148CCB358A49D electric_bike 2022-12-13 08:47:45 2022-12-13 08:59:51
## 4 54C5775D2B7C9188  classic_bike 2022-12-13 18:50:47 2022-12-13 19:19:48
## 5 A4891F78776D35DF  classic_bike 2022-12-14 16:13:39 2022-12-14 16:27:50
## 6 DB91D9B8DFACA07A electric_bike 2022-12-02 15:24:47 2022-12-02 15:34:14
##           start_station_name start_station_id          end_station_name
## 1 Clifton Ave & Armitage Ave     TA1307000163 Sedgwick St & Webster Ave
## 2     Broadway & Belmont Ave            13277 Sedgwick St & Webster Ave
## 3      Sangamon St & Lake St     TA1306000015    St. Clair St & Erie St
## 4      Shields Ave & 31st St     KA1503000038    Damen Ave & Madison St
## 5  Ashland Ave & Chicago Ave            13247 Damen Ave & Charleston St
## 6        Wabash Ave & 9th St     TA1309000010 Wacker Dr & Washington St
##   end_station_id start_lat start_lng  end_lat   end_lng member_casual
## 1          13191  41.91824 -87.65711 41.92217 -87.63889        member
## 2          13191  41.94011 -87.64545 41.92217 -87.63889        casual
## 3          13016  41.88592 -87.65113 41.89435 -87.62280        member
## 4          13134  41.83846 -87.63541 41.88137 -87.67493        member
## 5          13288  41.89595 -87.66773 41.92008 -87.67785        casual
## 6   KA1503000072  41.87068 -87.62571 41.88314 -87.63724        member
```

Combining all of the data from both months to consolidate analysis:

Now View the Newly created dataset:

```
##            ride_id rideable_type          started_at            ended_at
## 1 F96D5A74A3E41399 electric_bike 2023-01-21 20:05:42 2023-01-21 20:16:33
## 2 13CB7EB698CEDB88  classic_bike 2023-01-10 15:37:36 2023-01-10 15:46:05
## 3 BD88A2E670661CE5 electric_bike 2023-01-02 07:51:57 2023-01-02 08:05:11
## 4 C90792D034FED968  classic_bike 2023-01-22 10:52:58 2023-01-22 11:01:44
## 5 3397017529188E8A  classic_bike 2023-01-12 13:58:01 2023-01-12 14:13:20
## 6 58E68156DAE3E311 electric_bike 2023-01-31 07:18:03 2023-01-31 07:21:16
##              start_station_name start_station_id              end_station_name
## 1   Lincoln Ave & Fullerton Ave     TA1309000058      Hampden Ct & Diversey Ave
## 2         Kimbark Ave & 53rd St     TA1309000037        Greenwood Ave & 47th St
## 3        Western Ave & Lunt Ave           RP-005 Valli Produce - Evanston Plaza
## 4         Kimbark Ave & 53rd St     TA1309000037        Greenwood Ave & 47th St
## 5         Kimbark Ave & 53rd St     TA1309000037        Greenwood Ave & 47th St
## 6 Lakeview Ave & Fullerton Pkwy     TA1309000019      Hampden Ct & Diversey Ave
##   end_station_id start_lat start_lng  end_lat   end_lng member_casual
## 1       202480.0  41.92407 -87.64628 41.93000 -87.64000        member
## 2   TA1308000002  41.79957 -87.59475 41.80983 -87.59938        member
## 3            599  42.00857 -87.69048 42.03974 -87.69941        casual
## 4   TA1308000002  41.79957 -87.59475 41.80983 -87.59938        member
## 5   TA1308000002  41.79957 -87.59475 41.80983 -87.59938        member
## 6       202480.0  41.92607 -87.63886 41.93000 -87.64000        member
```

Firstly remove all the irrelevant columns that won't be used for analysis

Review of the data and its parameters and it would be better if we write the code for each of them in different code console:

```
## [1] "ride_id"            "rideable_type"      "started_at"
## [4] "ended_at"           "start_station_name" "member_casual"
```

```
## [1] 5858322
```

```
## [1] 5858322       6
```

```
##             ride_id rideable_type          started_at            ended_at
## 1  F96D5A74A3E41399 electric_bike 2023-01-21 20:05:42 2023-01-21 20:16:33
## 2  13CB7EB698CEDB88  classic_bike 2023-01-10 15:37:36 2023-01-10 15:46:05
## 3  BD88A2E670661CE5 electric_bike 2023-01-02 07:51:57 2023-01-02 08:05:11
## 4  C90792D034FED968  classic_bike 2023-01-22 10:52:58 2023-01-22 11:01:44
## 5  3397017529188E8A  classic_bike 2023-01-12 13:58:01 2023-01-12 14:13:20
## 6  58E68156DAE3E311 electric_bike 2023-01-31 07:18:03 2023-01-31 07:21:16
## 7  2F7194B6012A98D4 electric_bike 2023-01-15 21:18:36 2023-01-15 21:32:36
## 8  DB1CF84154D6A049  classic_bike 2023-01-25 10:49:01 2023-01-25 10:58:22
## 9  34EAB943F88C4C5D electric_bike 2023-01-25 20:49:47 2023-01-25 21:02:14
## 10 BC8AB1AA51DA9115  classic_bike 2023-01-06 16:37:19 2023-01-06 16:49:52
##               start_station_name member_casual
## 1    Lincoln Ave & Fullerton Ave        member
## 2          Kimbark Ave & 53rd St        member
## 3         Western Ave & Lunt Ave        casual
## 4          Kimbark Ave & 53rd St        member
## 5          Kimbark Ave & 53rd St        member
## 6  Lakeview Ave & Fullerton Pkwy        member
## 7          Kimbark Ave & 53rd St        member
## 8          Kimbark Ave & 53rd St        member
## 9          Kimbark Ave & 53rd St        member
## 10         Kimbark Ave & 53rd St        member
```

```
## 'data.frame':    5858322 obs. of  6 variables:
##  $ ride_id           : chr  "F96D5A74A3E41399" "13CB7EB698CEDB88" "BD88A2E670661CE5" "C90792D034FED968" ...
##  $ rideable_type     : chr  "electric_bike" "classic_bike" "electric_bike" "classic_bike" ...
##  $ started_at        : chr  "2023-01-21 20:05:42" "2023-01-10 15:37:36" "2023-01-02 07:51:57" "2023-01-22 10:5
2:58" ...
##  $ ended_at          : chr  "2023-01-21 20:16:33" "2023-01-10 15:46:05" "2023-01-02 08:05:11" "2023-01-22 11:0
1:44" ...
##  $ start_station_name: chr  "Lincoln Ave & Fullerton Ave" "Kimbark Ave & 53rd St" "Western Ave & Lunt Ave" "Ki
mbark Ave & 53rd St" ...
##  $ member_casual     : chr  "member" "member" "casual" "member" ...
```

```
##    ride_id          rideable_type       started_at          ended_at
##  Length:5858322     Length:5858322     Length:5858322     Length:5858322
##  Class :character   Class :character   Class :character   Class :character
##  Mode  :character   Mode  :character   Mode  :character   Mode  :character
##  start_station_name member_casual
##  Length:5858322     Length:5858322
##  Class :character   Class :character
##  Mode  :character   Mode  :character
```

Additional columns must be created for date and time.

Calculate the time spent by the customer for each unique ride

```
##             ride_id rideable_type          started_at            ended_at
## 1 F96D5A74A3E41399 electric_bike 2023-01-21 20:05:42 2023-01-21 20:16:33
## 2 13CB7EB698CEDB88  classic_bike 2023-01-10 15:37:36 2023-01-10 15:46:05
## 3 BD88A2E670661CE5 electric_bike 2023-01-02 07:51:57 2023-01-02 08:05:11
## 4 C90792D034FED968  classic_bike 2023-01-22 10:52:58 2023-01-22 11:01:44
## 5 3397017529188E8A  classic_bike 2023-01-12 13:58:01 2023-01-12 14:13:20
## 6 58E68156DAE3E311 electric_bike 2023-01-31 07:18:03 2023-01-31 07:21:16
##               start_station_name member_casual       date month day year
## 1   Lincoln Ave & Fullerton Ave        member 2023-01-21    01  21 2023
## 2         Kimbark Ave & 53rd St        member 2023-01-10    01  10 2023
## 3        Western Ave & Lunt Ave        casual 2023-01-02    01  02 2023
## 4         Kimbark Ave & 53rd St        member 2023-01-22    01  22 2023
## 5         Kimbark Ave & 53rd St        member 2023-01-12    01  12 2023
## 6 Lakeview Ave & Fullerton Pkwy        member 2023-01-31    01  31 2023
##   day_of_week time ride_length
## 1    Saturday <NA>   10.850000
## 2     Tuesday <NA>    8.483333
## 3      Monday <NA>   13.233333
## 4      Sunday <NA>    8.766667
## 5    Thursday <NA>   15.316667
## 6     Tuesday <NA>    3.216667
```

Check data structure. Confirm data types for time/date

```
## 'data.frame':    5858322 obs. of  13 variables:
##  $ ride_id           : chr  "F96D5A74A3E41399" "13CB7EB698CEDB88" "BD88A2E670661CE5" "C90792D034FED968" ...
##  $ rideable_type     : chr  "electric_bike" "classic_bike" "electric_bike" "classic_bike" ...
##  $ started_at        : chr  "2023-01-21 20:05:42" "2023-01-10 15:37:36" "2023-01-02 07:51:57" "2023-01-22 10:5
2:58" ...
##  $ ended_at          : chr  "2023-01-21 20:16:33" "2023-01-10 15:46:05" "2023-01-02 08:05:11" "2023-01-22 11:0
1:44" ...
##  $ start_station_name: chr  "Lincoln Ave & Fullerton Ave" "Kimbark Ave & 53rd St" "Western Ave & Lunt Ave" "Ki
mbark Ave & 53rd St" ...
##  $ member_casual     : chr  "member" "member" "casual" "member" ...
##  $ date              : Date, format: "2023-01-21" "2023-01-10" ...
##  $ month             : chr  "01" "01" "01" "01" ...
##  $ day               : chr  "21" "10" "02" "22" ...
##  $ year              : chr  "2023" "2023" "2023" "2023" ...
##  $ day_of_week       : chr  "Saturday" "Tuesday" "Monday" "Sunday" ...
##  $ time              : POSIXct, format: NA NA ...
##  $ ride_length       : num  10.85 8.48 13.23 8.77 15.32 ...
```

Alter data type for time

Remove all blank entries from the dataset

Observe the newly created column(ride length) for the backup dataset

```
##            ride_id rideable_type          started_at            ended_at
## 1 F96D5A74A3E41399 electric_bike 2023-01-21 20:05:42 2023-01-21 20:16:33
## 2 13CB7EB698CEDB88  classic_bike 2023-01-10 15:37:36 2023-01-10 15:46:05
## 3 BD88A2E670661CE5 electric_bike 2023-01-02 07:51:57 2023-01-02 08:05:11
## 4 C90792D034FED968  classic_bike 2023-01-22 10:52:58 2023-01-22 11:01:44
## 5 3397017529188E8A  classic_bike 2023-01-12 13:58:01 2023-01-12 14:13:20
## 6 58E68156DAE3E311 electric_bike 2023-01-31 07:18:03 2023-01-31 07:21:16
##              start_station_name member_casual       date month day year
## 1   Lincoln Ave & Fullerton Ave        member 2023-01-21    01  21 2023
## 2         Kimbark Ave & 53rd St        member 2023-01-10    01  10 2023
## 3        Western Ave & Lunt Ave        casual 2023-01-02    01  02 2023
## 4         Kimbark Ave & 53rd St        member 2023-01-22    01  22 2023
## 5         Kimbark Ave & 53rd St        member 2023-01-12    01  12 2023
## 6 Lakeview Ave & Fullerton Pkwy        member 2023-01-31    01  31 2023
##   day_of_week time ride_length
## 1    Saturday <NA>   10.850000
## 2     Tuesday <NA>    8.483333
## 3      Monday <NA>   13.233333
## 4      Sunday <NA>    8.766667
## 5    Thursday <NA>   15.316667
## 6     Tuesday <NA>    3.216667
```

```
##     Min.  1st Qu.   Median     Mean  3rd Qu.     Max.
##     0.00     5.42     9.52    18.10    16.88 98489.07
```

Analyze Data

Calculating the mean, median, max, min - figures to determine statistical spread of membership type Now, we'll calculate the mean, median, maximum, and minimum **ride lengths** for each group in the **member_casual** column of the Comb_months data frame.

```
##   Comb_months$member_casual Comb_months$ride_length
## 1                    casual                28.06227
## 2                    member                12.50835
```

```
##   Comb_months$member_casual Comb_months$ride_length
## 1                    casual               11.816667
## 2                    member                8.516667
```

```
##   Comb_months$member_casual Comb_months$ride_length
## 1                    casual               98489.067
## 2                    member                1559.667
```

```
##   Comb_months$member_casual Comb_months$ride_length
## 1                    casual                       0
## 2                    member                       0
```

Order the days of the week from Sunday to Saturday within the new dataset for future use.

Create a weekday field as well as view column specifically:

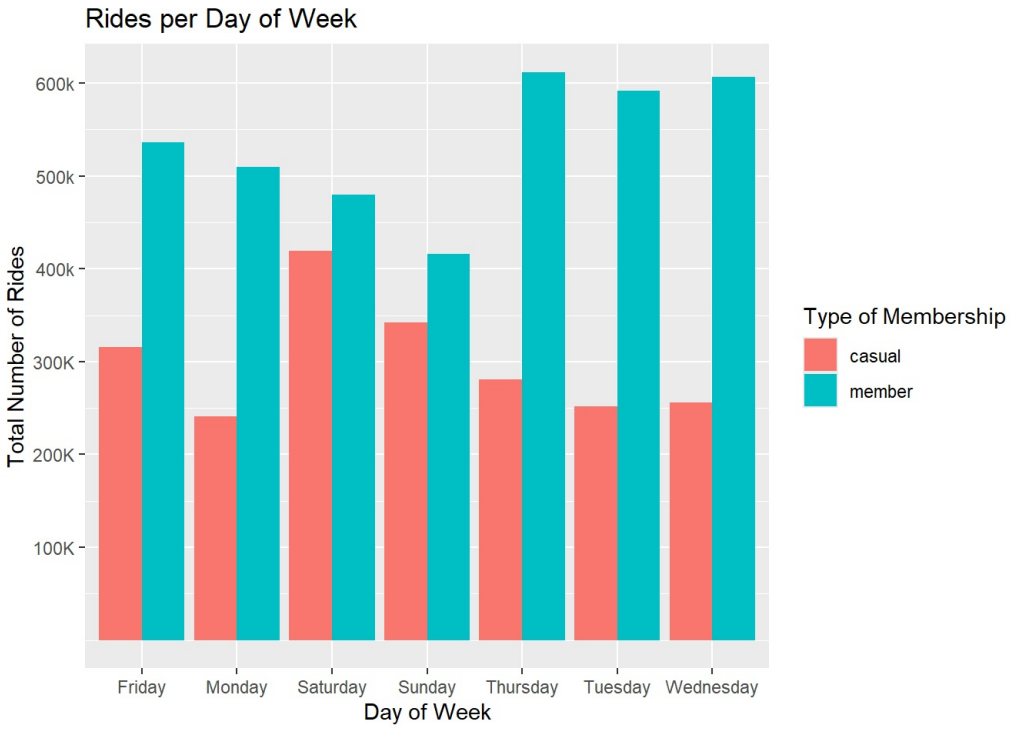
```
## # A tibble: 14 × 3
## # Groups:   member_casual [2]
##    member_casual day_of_week number_of_rides
##    <chr>         <ord>                <int>
##  1 casual        Sun                 341876
##  2 casual        Mon                 240811
##  3 casual        Tue                 251590
##  4 casual        Wed                 255950
##  5 casual        Thu                 280967
##  6 casual        Fri                 315215
##  7 casual        Sat                 419315
##  8 member        Sun                 415948
##  9 member        Mon                 509950
## 10 member        Tue                 591917
## 11 member        Wed                 606552
## 12 member        Thu                 612024
## 13 member        Fri                 535977
## 14 member        Sat                 479904
```

Now, at last, we'll do final three more things:

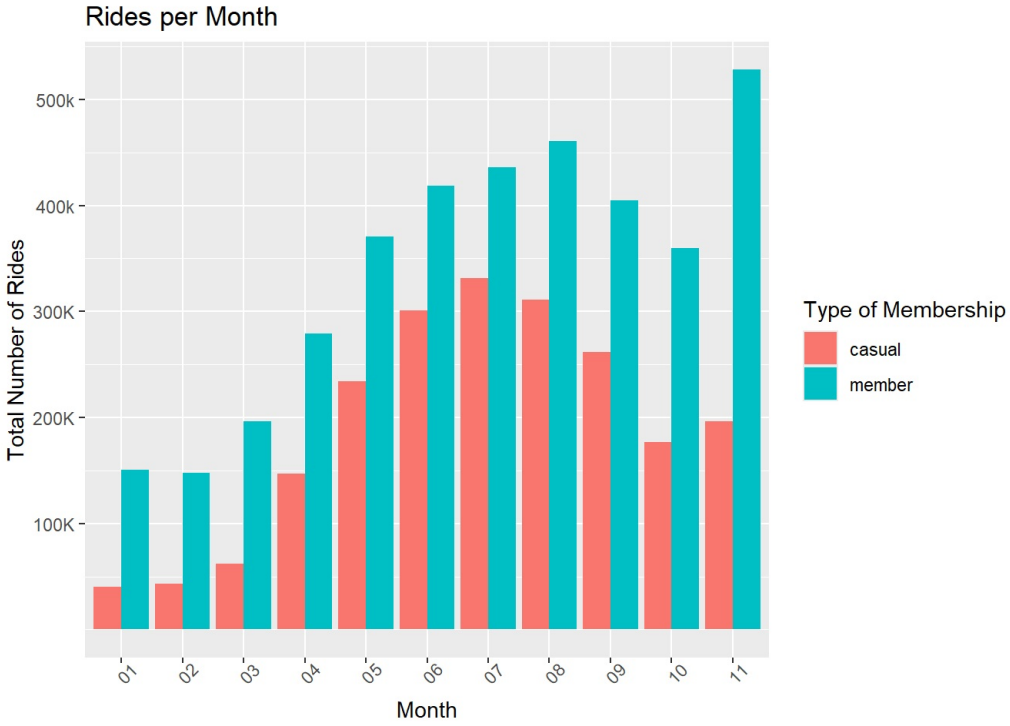
1. Adding average ride length
2. Adding total ride length
3. sorting the results

```
## # A tibble: 14 × 5
## # Groups:   member_casual [2]
##    member_casual day_of_week number_of_rides avg_ride_length total_ride_length
##    <chr>         <ord>                <int>           <dbl>             <dbl>
##  1 casual        Sun                 341876            32.6         11148630.
##  2 casual        Mon                 240811            27.5          6611600.
##  3 casual        Tue                 251590            24.9          6260599.
##  4 casual        Wed                 255950            24.1          6167974.
##  5 casual        Thu                 280967            24.7          6927493.
##  6 casual        Fri                 315215            27.2          8579884.
##  7 casual        Sat                 419315            31.9         13395205.
##  8 member        Sun                 415948            14.0          5824245.
##  9 member        Mon                 509950            11.9          6044827.
## 10 member        Tue                 591917            12.0          7092550.
## 11 member        Wed                 606552            12.0          7249452.
## 12 member        Thu                 612024            12.0          7340450.
## 13 member        Fri                 535977            12.4          6665643.
## 14 member        Sat                 479904            14.0          6717573.
```

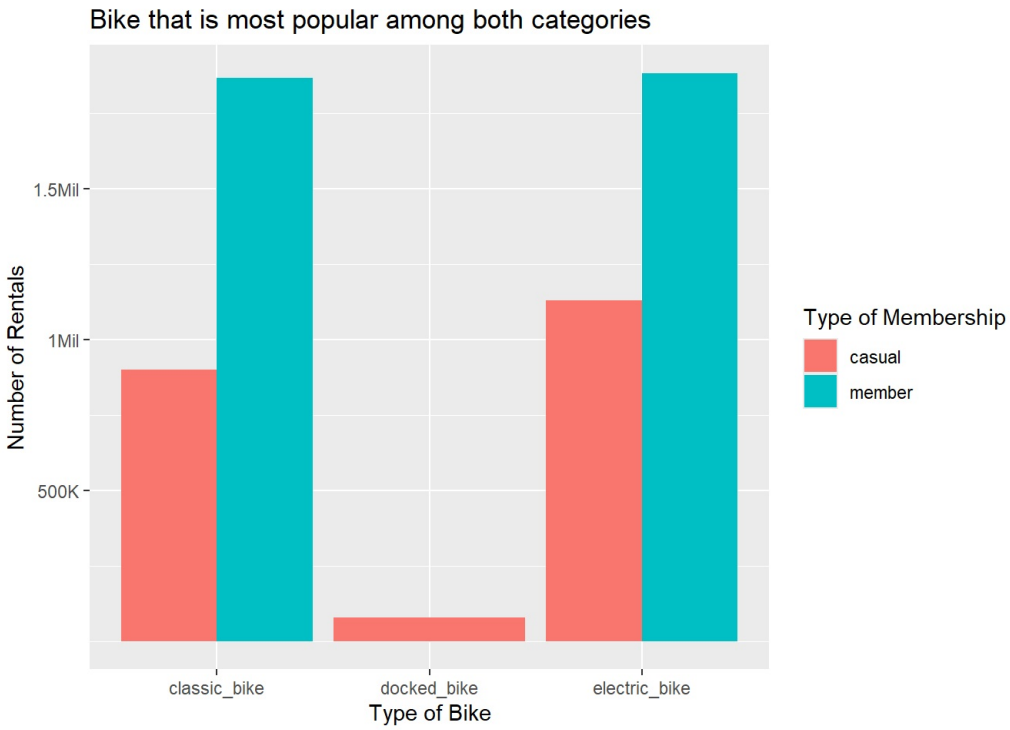
Data Visualiation's



The rides per day of the week show the members peak from Monday to Friday, indicating they mainly use the bikes for their commutes and not leisure, while casual riders peak on Saturday and Sunday. For the casual riders, it is clear that they use rides most for their leisure and enjoyment. And they tend to spend time using rides, more on holidays rather than other days of the week.



From the above graph, we can see that the rides per month show that casual riders were a lot more active during the summer months than the long-term. Furthermore, the winter months show very little activity on the part of the casual users. The long-term users are more active in the winter and spring months Moreover, it is also clear from the graph that the members are more active in the working months of the year than casual riders. That's mainly because they use for their commutes and not for leisure and from the previous plot.



Above visualization is the breakdown of which type of bike is the most popular among either type of user. Seeing results, we conclude that among the three types of bikes classic, docked and electric, both types of memberships prefer using the electric bike more so than the classic and docked bike.

We see the huge difference of average ride time between the casual riders and members. It shows the casual riders spend overall more time using the rides and the service and enjoying rides while the members spend less indicating that they use bike mostly for their commutes.

Now, what story does this data and the charts hold?

key takeaways

- Casual riders tended to use the service more on the weekends than the weekdays and moreover, their average ride time was way more higher than the members and in that scenario, it surpassed the long term members.
- To further that the long term members used bikes mostly for their work commute and they were more active on the weekdays(Monday to Friday) rather than the weekends.
- Casual users tended to ride more so in the warmer months, namely June, July, and August. Their participation in these months exceeded that of the long term members.
- Story that the data is telling also entails that the casual rides love to ride in their free time and in the holidays. It implies anonymously that casual riders love to ride in the summer months to enjoy summer holidays as well.

Recommendations

Following recommendations can be given seeing the behaviors of the casual riders and active long term members:

- Develop and promote summer plans appealing to casual riders, with marketing efforts conducted during the winter months in preparation.
- Consider offering a membership option with a per-use balance card for casual users, or adjust the existing payment structure to make single-use more costly and lower the long-term membership rate.
- Offering membership rates specifically for the warmer months and weekends would help target casual riders more effectively.

Considerations

Additional unexamined points and limitations to consider

This report provides the analysis of the provided 12 months of the year 2023 comprehensively. It would be more accurate and comprehensive unveiling more patterns and trends if analyze it including some more factors.

For example, more data points can be added to see more aspects for the improvement of the business model and to answer the asked questions more precisely and concisely. For instance, following data points could enhance the report to its optimum:

- Age and gender, Pricing structure, Household income of the riders type.

And that concludes the report. Thank you for taking the time to read it.