

Project Report
on
Chicago Divvy Bike Sharing Data Analysis Using Tableau
Bachelors of Technology
in
Department of Information Technology
2021-22

Submitted by
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**CHICAGO DIVVY BIKE SHARING
DATA ANALYSIS USING TABLEAU**

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Acknowledgement

I wish to express my heartfelt gratitude to all the people who have played a crucial role in the research for this project, without their active cooperation the preparation of this project could not have been completed within the specified time limit.

I am thankful to our respected professor Mr. Abhinav Pratap Singh for motivating me to complete this project with complete focus and attention.

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Nuzhat Fatima

B.Tech (IT) III Year

BBDITM, Lucknow

Certificate

This is to certify that this project report on 'Chicago Divvy Bike Sharing Data Analysis Using Tableau' has been successfully completed by Ms. Nuzhat Fatima, B.Tech (IT) III year as a part of the curriculum requirement under the guidance of Mr. Abhinav Pratap Singh.

The report embodies results of original work and studies carried out by the student herself. All help received by the student from various sources to complete this assignment has been duly acknowledged.

.....

Mr. Abhinav Pratap Singh
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Objective

Divvy is Chicagoland's bike share system with 6,000 bikes available at 570+ stations across Chicago and Evanston. Divvy provides residents and visitors with a convenient, fun and affordable transportation option to explore Chicago, commute to work or school and many more. Divvy is available 24*7 and riders have access to all bikes and stations across the system.

We are helping Divvy to understand the bike sharing market and help them strategize a plan to minimise the gap between supply and demand of the bikes at popular stations. We also want to come up with an analysis of the past data of customers to make Divvy understand the customer behaviour and the important factors which have some major influences such as geographical conditions, customer demographics, etc.

In a nutshell - our objective for this project is to understand and identify key product and revenue opportunities for Divvy, a micro mobility provider in Chicago. We want to provide recommendations to the company to help increase their business profit.

Software Used: For the purpose of this project, we plan to use **Tableau** as a Business Intelligence software. We have also used **MS Excel** for data preparation and cleaning before inputting into Tableau.

Theory

Divvy Historical trip data is available to the public through their website <https://ride.divvybikes.com/system-data>. This data is available to use for anyone who is a policy maker, transportation professional, web developer, designer, techie or just plain curious. Each trip is anonymized and includes:

- Trip start day and time
- Trip end day and time
- Trip start station
- Trip end station
- Rider type (Member, Single Ride, and Day Pass)

The data has been processed to remove trips that are taken by staff as they service and inspect the system; and any trips that were below 60 seconds in length (potentially false starts or users trying to re-dock a bike to ensure it was secure).

A snapshot of the dataset appears as follows:

	A	B	C	D	E	F	G	H	I	J	K	L	M	
1	ride_id	rideable_type	started_at	ended_at	start_station_name	start_station	end_station	end_station	start_lat	start_lng	end_lat	end_lng	member_casual	
2	B9F73448D	classic_bike	1/24/21 19:15	1/24/21 19:22	California Ave & Cortez St	17660	Wood St & Au	657	41.900363	-87.696704	41.899181	-87.6722	member	
3	457C7F4B5D	electric_bike	1/23/21 12:57	1/23/21 13:02	California Ave & Cortez St	17660	California Ave	13258	41.9004062	-87.696733	41.9104355	-87.696891	member	
4	57C750326F9	electric_bike	1/9/21 15:28	1/9/21 15:37	California Ave & Cortez St	17660	Wood St & Au	657	41.9003735	-87.696688	41.8991797	-87.672178	casual	
5	4D518C65E3	electric_bike	1/9/21 15:28	1/9/21 15:37	California Ave & Cortez St	17660	Wood St & Au	657	41.9003785	-87.696716	41.8991487	-87.672177	casual	
6	9D08A3AFF4	classic_bike	1/24/21 15:56	1/24/21 16:07	California Ave & Cortez St	17660	Wood St & Au	657	41.900363	-87.696704	41.899181	-87.6722	casual	
7	49FCE1F8598	electric_bike	1/22/21 15:15	1/22/21 15:36	California Ave & Cortez St	17660	Wells St & Elr	KA150400013	41.9003725	-87.696797	41.9032717	-87.634458	member	
8	0FEED5C2C8	classic_bike	1/5/21 10:33	1/5/21 10:39	California Ave & Cortez St	17660	Sacramento	KA150400011	41.900363	-87.696704	41.8904688	-87.702608	member	
9	E276FD43BD	classic_bike	1/30/21 11:59	1/30/21 12:03	California Ave & Cortez St	17660	Western Ave	KA150400010	41.900363	-87.696704	41.8984177	-87.686596	member	
10	888FCF66C2	electric_bike	1/27/21 7:27	1/27/21 7:45	California Ave & Cortez St	17660	Damen Ave	8	13271	41.9003133	-87.696792	41.9318415	-87.677814	member
11	8BD6F6510F	electric_bike	1/15/21 8:54	1/15/21 9:11	California Ave & Cortez St	17660	Damen Ave	8	13271	41.9003558	-87.696627	41.9319215	-87.677856	member
12	84F11CC620F	electric_bike	1/10/21 8:05	1/10/21 8:13	California Ave & Cortez St	17660	Leavitt St & N	TA130800000	41.9003958	-87.696708	41.910124	-87.682397	casual	
13	C84E5DD4D7	electric_bike	1/18/21 13:30	1/18/21 13:37	California Ave & Cortez St	17660	Leavitt St & N	TA130800000	41.90041	-87.69671	41.9101535	-87.682459	casual	
14	00AEF8EE462	electric_bike	1/7/21 9:45	1/7/21 9:52	California Ave & Cortez St	17660	Leavitt St & N	TA130800000	41.9004058	-87.69685	41.91013	-87.68244	casual	
15	55DAB9E709	classic_bike	1/11/21 11:20	1/11/21 11:29	California Ave & Cortez St	17660	Leavitt St & N	TA130800000	41.900363	-87.696704	41.9105094	-87.682389	casual	
16	3E41D6E4EF	classic_bike	1/22/21 21:54	1/22/21 22:04	California Ave & Cortez St	17660	Honore St & I	TA130500000	41.900363	-87.696704	41.903119	-87.673935	casual	
17	FCED029EB2	electric_bike	1/16/21 1:05	1/16/21 1:19	California Ave & Cortez St	17660	Ogden Ave & I	TA130500000	41.9003065	-87.696832	41.8963553	-87.654214	casual	
18	77E53236C1F	classic_bike	1/28/21 20:35	1/28/21 21:06	Halsted St & North Branc	KA150400011	Southport Av	TA130800000	41.8993684	-87.64848	41.957081	-87.664199	member	
19	72335684BF7	electric_bike	1/9/21 0:35	1/9/21 0:43	Halsted St & North Branc	KA150400011	Bissell St & Ar	13059	41.8993585	-87.648494	41.9179933	-87.652502	member	
20	625DDA8DC	classic_bike	1/17/21 15:07	1/17/21 15:20	Glenwood Ave & Touhy A	525	Broadway & i	15571	42.012701	-87.666058	41.9947797	-87.660285	member	
21	61C6977EA3	electric_bike	1/25/21 15:39	1/25/21 15:52	Halsted St & North Branc	KA150400011	Clark St & Lin	13179	41.8993252	-87.648468	41.9157573	-87.634802	member	
22	07F1F6A27AE	classic_bike	1/11/21 15:32	1/11/21 15:35	California Ave & Cortez St	17660	California Ave	13256	41.900363	-87.696704	41.903029	-87.697474	member	
23	09BD39967C	classic_bike	1/14/21 13:39	1/14/21 13:40	California Ave & Cortez St	17660	California Ave	13256	41.900363	-87.696704	41.903029	-87.697474	member	
24	D57B11E4C1	classic_bike	1/7/21 13:31	1/7/21 13:41	California Ave & Cortez St	17660	California Ave	13084	41.900363	-87.696704	41.922695	-87.697153	member	
25	85F441B67B	classic_bike	1/6/21 7:51	1/6/21 7:56	Michigan Ave & 8th St	623	LaSalle St & J	TA130900000	41.872773	-87.623981	41.878166	-87.631929	member	
26	144A7A47CA	classic_bike	1/6/21 16:00	1/6/21 16:17	Glenwood Ave & Touhy A	525	Clark St & Eln	KA150400014	42.012701	-87.666058	41.9908605	-87.669724	casual	
27	7EE4DF07C	electric_bike	1/6/21 17:26	1/6/21 17:31	California Ave & Cortez St	17660	California Ave	13258	41.9004013	-87.696737	41.9104242	-87.696912	member	
28	43EBF05C104	electric_bike	1/3/21 16:59	1/3/21 17:05	California Ave & Cortez St	17660	California Ave	13258	41.9002827	-87.696723	41.9104362	-87.696902	member	
29	AD289AEFCD	classic_bike	1/11/21 17:24	1/11/21 17:29	California Ave & Cortez St	17660	California Ave	13258	41.900363	-87.696704	41.91044	-87.6972	member	
30	80963048BE	classic_bike	1/10/21 15:01	1/10/21 15:07	California Ave & Cortez St	17660	Smith Park	643	41.900363	-87.696704	41.892048	-87.689397	member	

Introduction

Sharing bicycles represents a healthier and environment-friendly lifestyle. There could be some interesting mechanism behind the sharing of bicycles.

The plan is to answer questions like:

1. When do they ride?

If you know when people are using the bikes then you would want to make more available then, and would also want to know where they are picking the bikes from.

2. How far do they go?

Long bike rides at a certain time might mean no bikes for others during that time and this would need to be addressed

3. Which stations are most popular?

Identifying the popular stations can allow for paying extra attention to them and also finding out what is so unique about them and maybe have those traits infused at the other stations or help identify similar locations in the city and open new stations

4. What days of the week and times of the day are most rides taken on?

If you know which days/hours are the busiest then you can adjust resources accordingly

Procedure

The data for 2013-2017 was downloaded from the Divvy website, and inputted into MS Excel. We filtered it to focus only on the year 2017, and also cleaned it to remove null values in certain records. The final dataset contains 83.5K records.

This was then inputted as a data source in **Tableau** Business Intelligence software to slice and dice it by different columns/dimensions and to perform our analysis using creative data visualisation techniques.

The insights from these visualisations would help us provide business recommendations to the company.

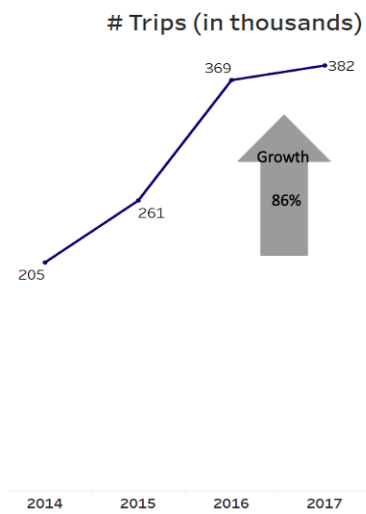
Observations

As per the initial BI analysis that we conducted, we can summarise our findings as follows:

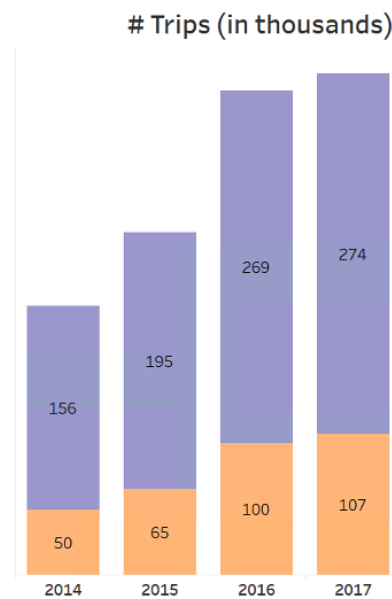
- The number of rides have been catching on in the city through the years. Number of trips has increased by 86% from 2013 to 2017
- Male customers are more likely to take a bike ride than females based on our dataset
- Most of the trips are taken when people are getting to work/school (8 am and 5 pm) during Weekdays
- We also know that the best day to get a ride hassle free are Saturdays and Sundays, the rest of the week is fairly busy with Tuesdays being the busiest
- Summer is the busiest season for the bike renting business with the number of rides peaking in August
- 4-9 minutes is the most common trip duration, while the maximum duration is 38 minutes
- Canal St and Adams St is the busiest station – maximum no of trips start and end at this station

Below are the snapshots of the analysis:

BIKE-SHARE MARKET IS GROWING YoY

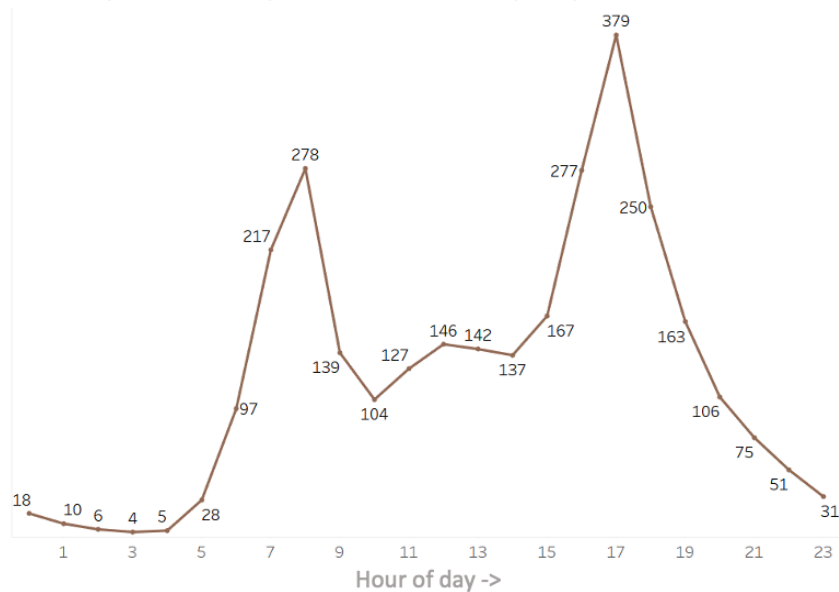


MALE CUSTOMERS ARE MORE LIKELY TO TAKE A BIKE RIDE THAN FEMALES IN CHICAGO



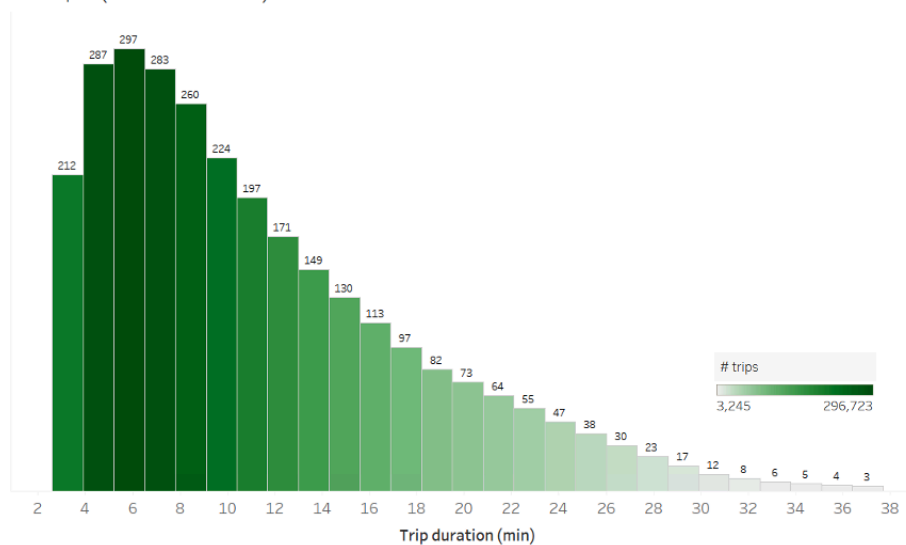
8 AM & 5 PM ARE THE BUSIEST HOURS

Trips (in thousands) by hour of the day (0-23)

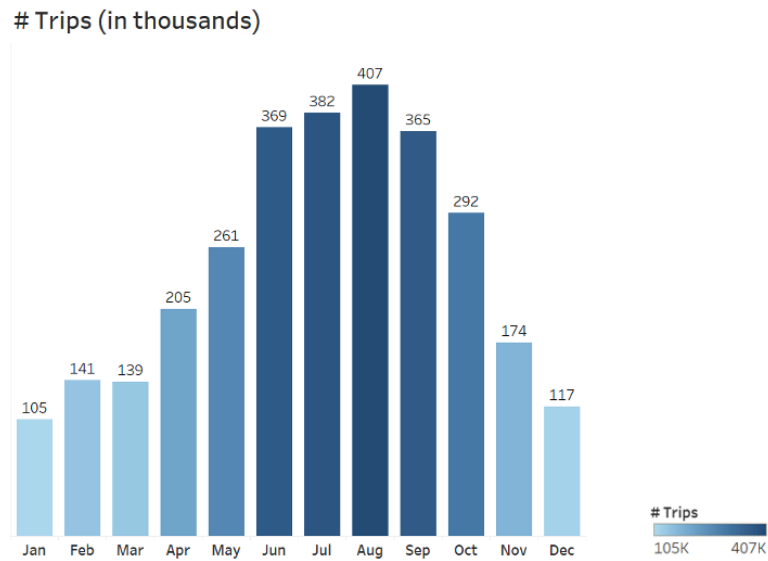


4-9 MINUTES IS THE MOST COMMON BIKE-RENTING DURATION FOR DIVVY RIDERS

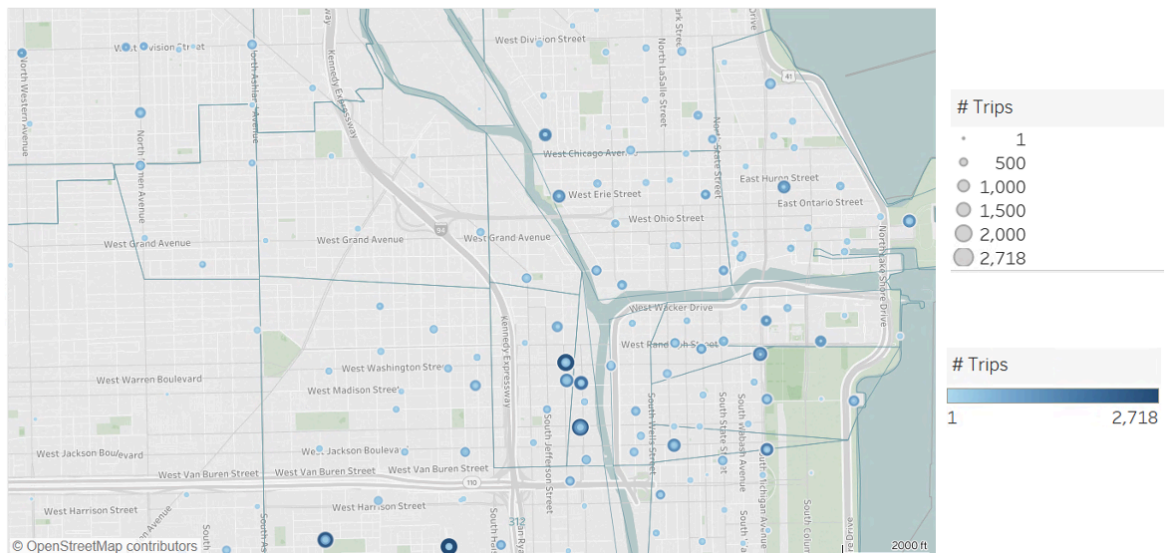
Trips (in thousands)



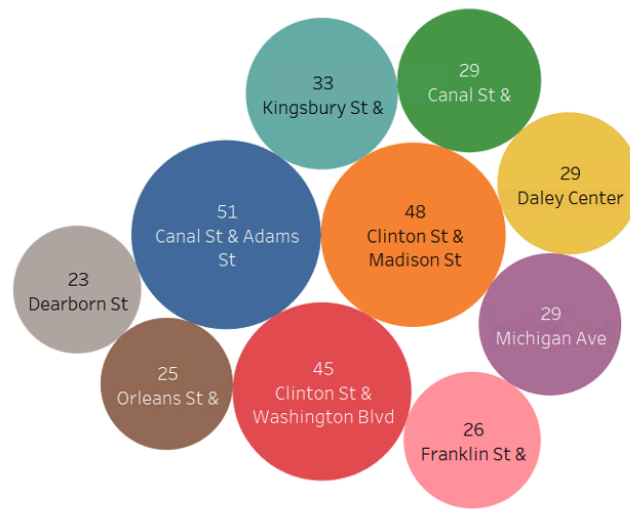
SUMMER IS THE MOST POPULAR SEASON FOR BIKE RIDES IN CHICAGO



BUSIEST STATIONS OF CHICAGO

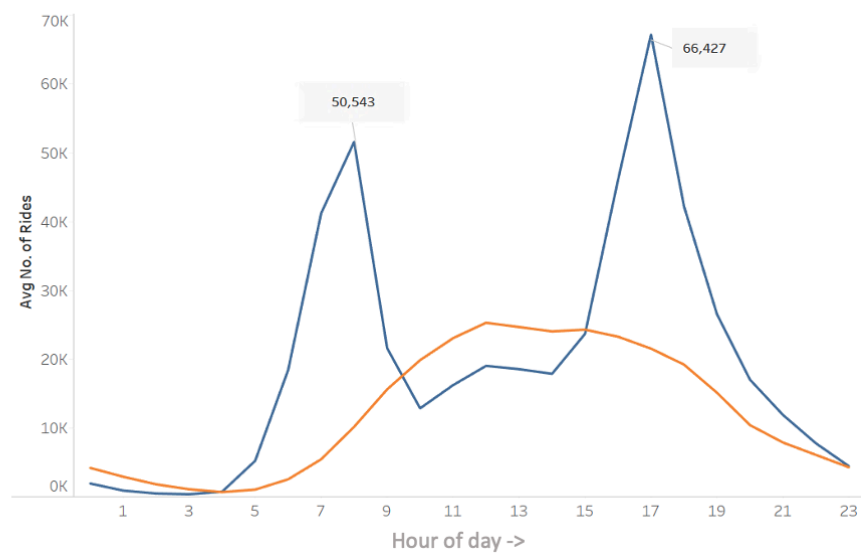


CANAL ST & ADAMS ST IS THE BUSIEST STATION



Trips (in thousands)

WEEKENDS WITNESS LOWER NUMBER OF RIDES THAN WEEKDAYS



Conclusion and Recommendations

Based on the above data analysis, we come up with several recommendations:

- Busy stations like 'Canal St & Adams St' need proper inventory so that high demand can be met. We can shuttle bikes from the stations that are the most frequent target stations from Canal Street to meet the demand.
- We should exploit the significant amount of difference between number of male and female customers. Incentives can be provided to females for onboarding them, such as an onboarding discount coupon.
- The number of rides on weekdays are significantly higher than weekends. Hence, we should try different pricing models to increase profits over weekends
- Since 4 to 9 minutes is the most common trip duration, we should update our pricing to take advantage of this insight. For example - We can make a higher pricing slab kick in once 5 minutes have passed into the trip duration.
- The number of rides are the highest during the hours of 8 am and 5 pm. We can consider surge pricing during these hours to take advantage of the increased demand.