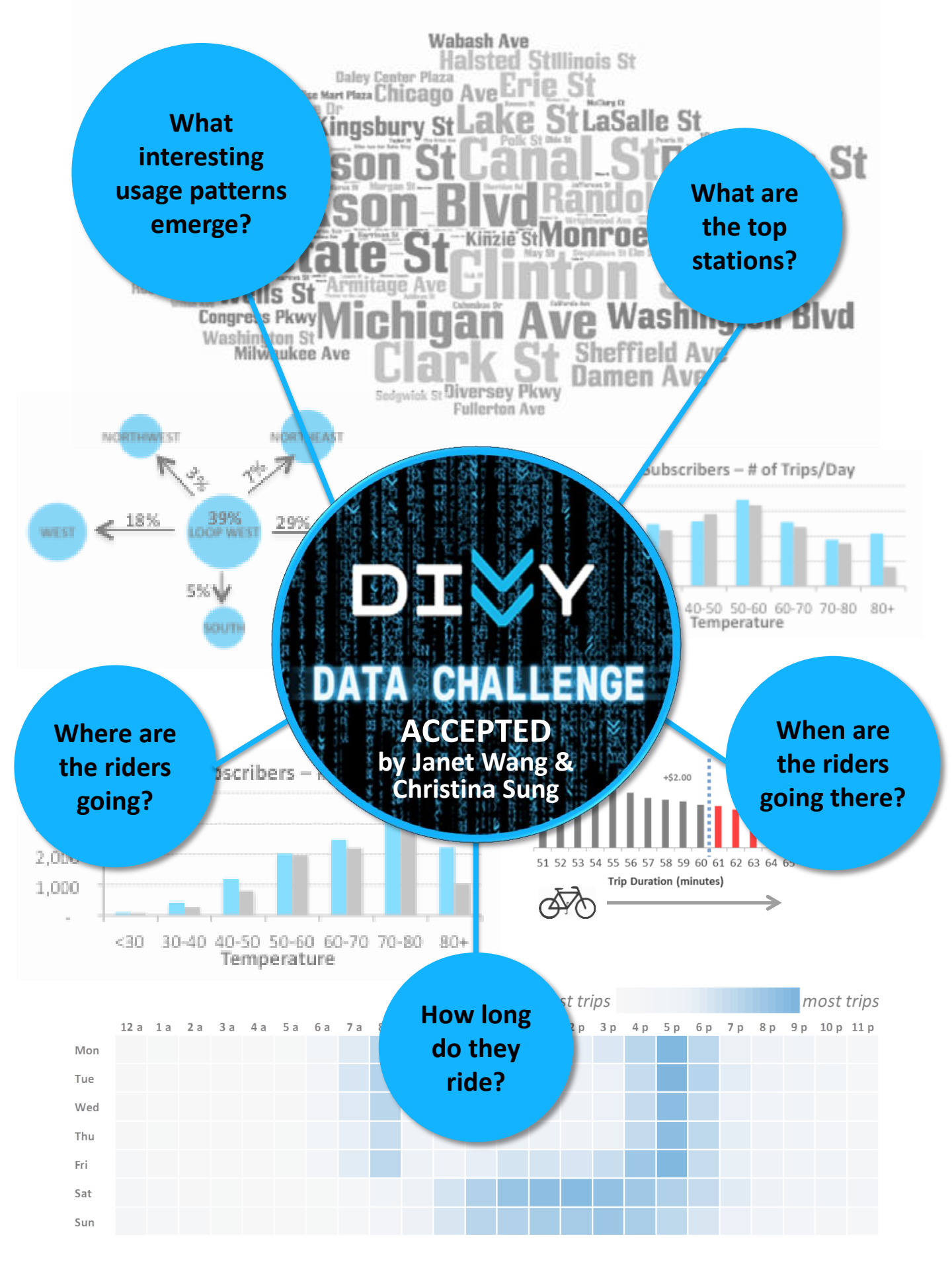

What interesting usage patterns emerge?
What are the top stations?
Where are the riders going?
When are the riders going there?
How long do they ride?
DIVVY
DATA CHALLENGE
ACCEPTED
by Janet Wang & Christina Sung
Wabash Ave
Halsted St
Illinois St
Daley Center Plaza
Chicago Ave
Erie St
Kingsbury St
Lake St
LaSalle St
Canal St
Kinzie St
Monroe
Clinton
Armitage Ave
Michigan Ave
Clark St
Sheffield Ave
Damen Ave
Diversey Pkwy
Fullerton Ave
Sedgwick St
Congress Pkwy
Milwaukee Ave
NORTHWEST ST
NORTHEAST
WEST
39%
LOOP WEST
18%
29%
5%
SOUTH
Subscribers – # of Trips/Day
40-50 50-60 60-70 70-80 80+
Temperature
+$2.00
51 52 53 54 55 56 57 58 59 60 61 62 63 64 65
Trip Duration (minutes)
2,000
1,000
<30 30-40 40-50 50-60 60-70 70-80 80+
Temperature
most trips
12 a 1 a 2 a 3 a 4 a 5 a 6 a 7 a
3 p 4 p 5 p 6 p 7 p 8 p 9 p 10 p 11 p
Mon
Tue
Wed
Thu
Fri
Sat
Sun

Data Snapshot

**Based on data from partial year (6/27/2013 – 12/31/2013)*

Subscribers		Non Subscribers
403,036 (100%)	**Number of Total Trips**	356,752 (100%)
7,624 (2%)	**Number of Round Trips[1]**	34,201 (10%)
7,498 (2%)	**Number of Overtime Trips**	88,763 (25%) woa!
12 min.	**Average Trip Duration**	30 min.
Clinton St & Washington Blvd (#10)	**Top Outgoing Station**	Streeter Dr & Illinois St (#22)
Clinton St & Washington Blvd (#10)	**Top Incoming Station**	Streeter Dr & Illinois St (#22)
Clinton St & Washington Blvd (#10) to Michigan Ave & Lake St (#43)	**Top Route**	Lake Shore Dr & Monroe St (#300) to Streeter Dr & Illinois St (#22)

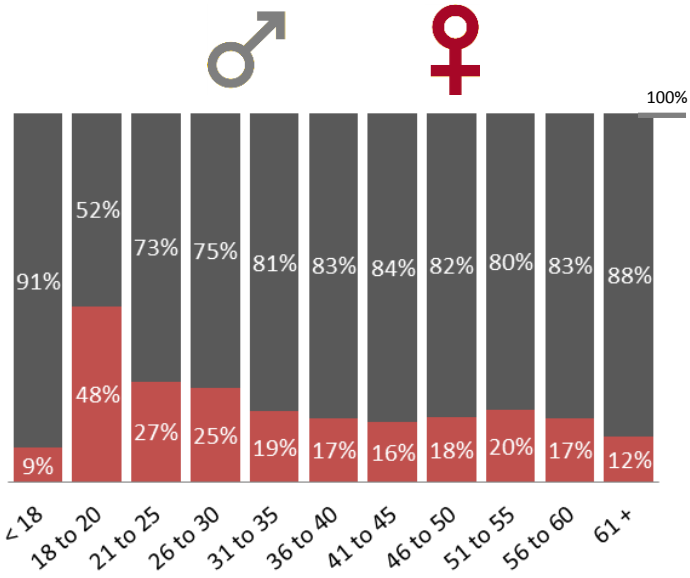
INDEX

[1] *Outgoing and incoming stations are the same*

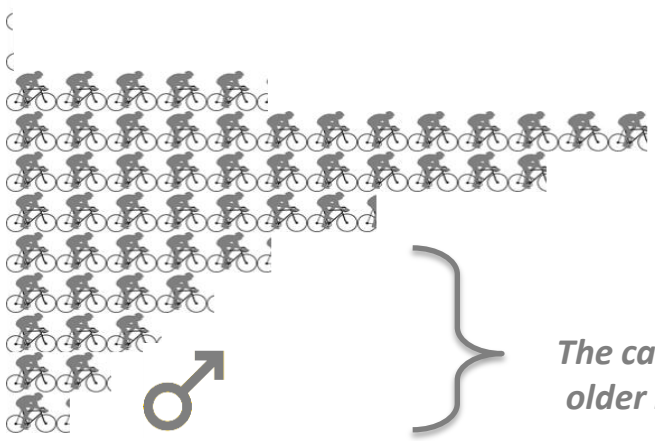
Subscriber Demographics

**Based on data from partial year (6/27/2013 – 12/31/2013) and assumed each subscriber is unique*

	Male	Female
# of Total Trips	318,571	84,448
# of Overtime Trips	2,344	5,152
% of Overtime Trips	1%	6%
Avg. Trip Duration	14 min.	12 min.
Min Age	16	16
Avg. Age	37	35
Max Age	107	101



Age Group	Trips
< 18	828
18 to 20	948
21 to 25	31,758
26 to 30	77,718
31 to 35	65,488
36 to 40	44,922
41 to 45	32,112
46 to 50	25,273
51 to 55	18,894
56 to 60	12,804
61 +	7,692



Total Trips by Gender and Age Group[1]

The case for older men.

Age Group	Trips
< 18	85
18 to 20	861
21 to 25	11,836
26 to 30	26,529
31 to 35	15,528
36 to 40	9,417
41 to 45	6,285
46 to 50	5,484
51 to 55	4,661
56 to 60	2,677
61 +	1,085

Highlights

- 79% of subscriber trips are taken by dudes
- 26% of subscriber trips are taken by people in the 26 to 30 age group

- Linking in Census demographics data, the 25 to 35 age group has the highest trip rate per person at 0.35 trips per Chicago city resident and the rate falls to 0.10 for the 55 to 60 age group (still quite high!) [2]
- Over 1,000 trips were made by people over 70!

[1] *Biker clip art downloaded from https://openclipart.org*
[2] *From 2008-2012 American Community Survey 5-Year Estimates*

Non-Subscriber Overtime

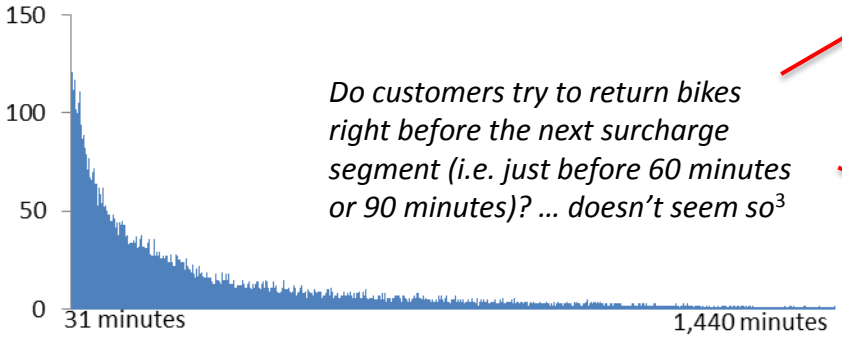
**Based on data from partial year (6/27/2013 – 12/31/2013)*

WOE ARE THE FEES!

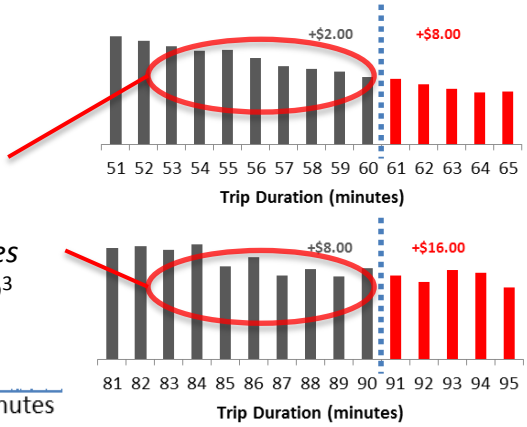
24-Hour Pass Overtime Fees[1]	
0-30 minutes of each trip	INCLUDED
30-60 minutes	$2.00
60-90 minutes	$6.00
Each additional 30 minutes	+$8.00

The longest non-subscriber trip

… was 86,399 seconds
… that's just under 1,440 minutes
… or 24 hours[2]
… $8 is charged for the first 90 minutes
… $8 x 45 late half hours = $360 is charged for the rest of the overtime



Do customers try to return bikes right before the next surcharge segment (i.e. just before 60 minutes or 90 minutes)? … doesn't seem so[3]



Unfortunately, with the data provided, there is no way to tell how many trips are taken by each customer. But as an estimate, let's assume each non-subscriber trip was bought with a separate 24-hour pass.

Then, a maximum of **$7 per trip x 356,752 trips = $2.5 million** is generated from non-subscribers purchasing 24-hour passes without accounting for overtime fees.

Under the current overtime fee structure, **$831K** would have been charged on non-subscribers for overtime only… that's **at least 33% of additional revenue!**

"WHAT IF" SCENARIOS

What if… $1 were added to one of the overtime fee breakouts?

- Change 30-60 minutes **$2** fee to **$3**… total overtime fees = **$920K**
- Change 60-90 minutes **$6** fee to **$7**… total overtime fees = **$857K**
- Change Each additional 30 min. **+$8** fee to **+$9**… total overtime fees = **$894K**

[1] Confirmed with Divvy hotline that the +$8 is not pro-rated… just wanted to mention that they have awesome waiting music
[2] Divvy might be capping the total duration to 24 hours
[3] Is it possible that customers aren't aware of or don't understand the overtime fees?

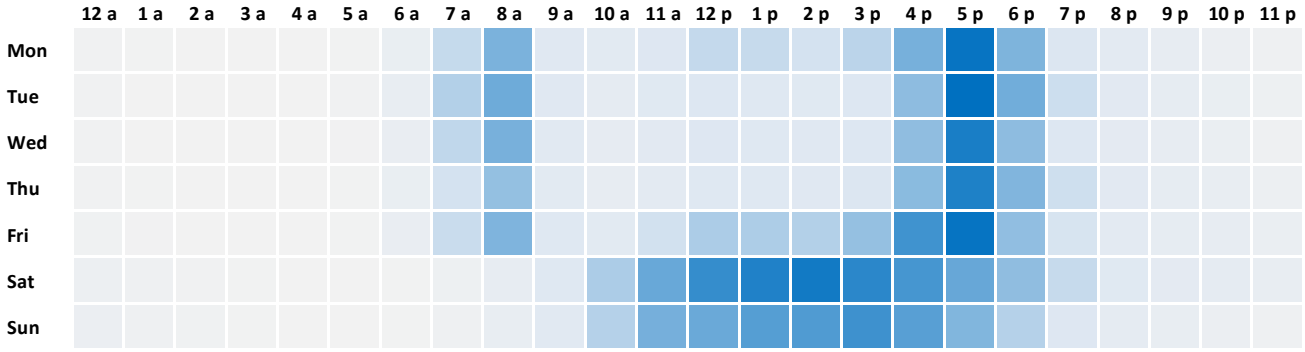
Day and Time Usage

**Based on data from partial year (6/27/2013 – 12/31/2013)*

least trips *most trips*

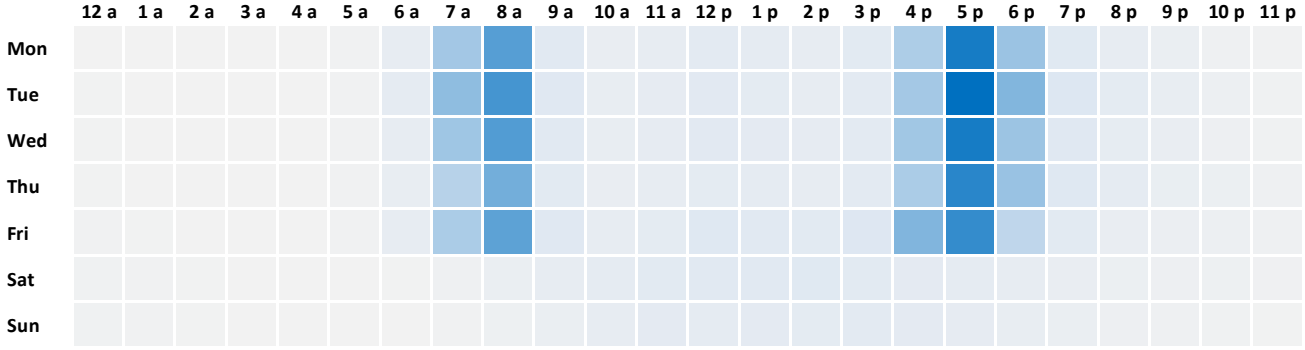
All Customers

- Heaviest traffic occurs during mornings and evenings on weekdays and daytime on weekends
- Mondays and Fridays receive slightly more traffic than other weekdays



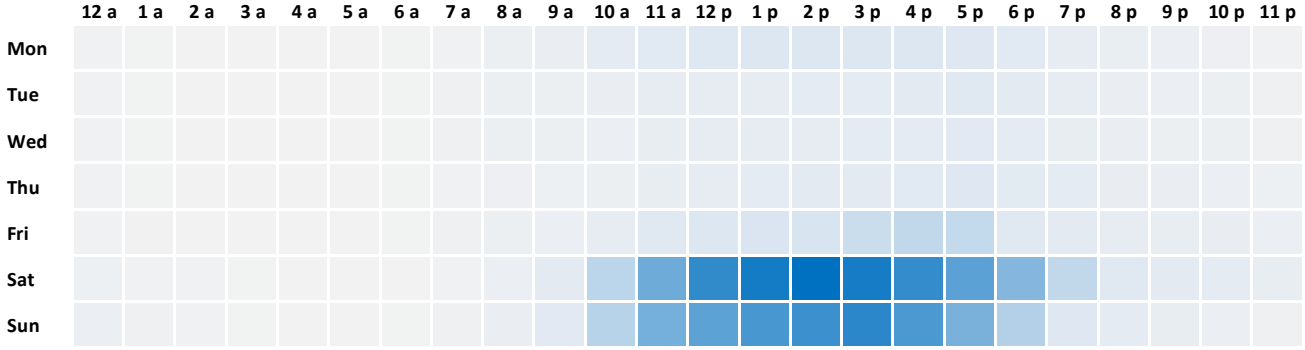
Subscribers

- … are probably commuters
- They ride into work a little more often on Tuesdays and leave a little earlier on Fridays



Non-Subscribers

- … probably ride for pleasure (maybe tourists?)
- They generally ride between the hours of 11 am and 6 pm with 3 pm having the highest traffic



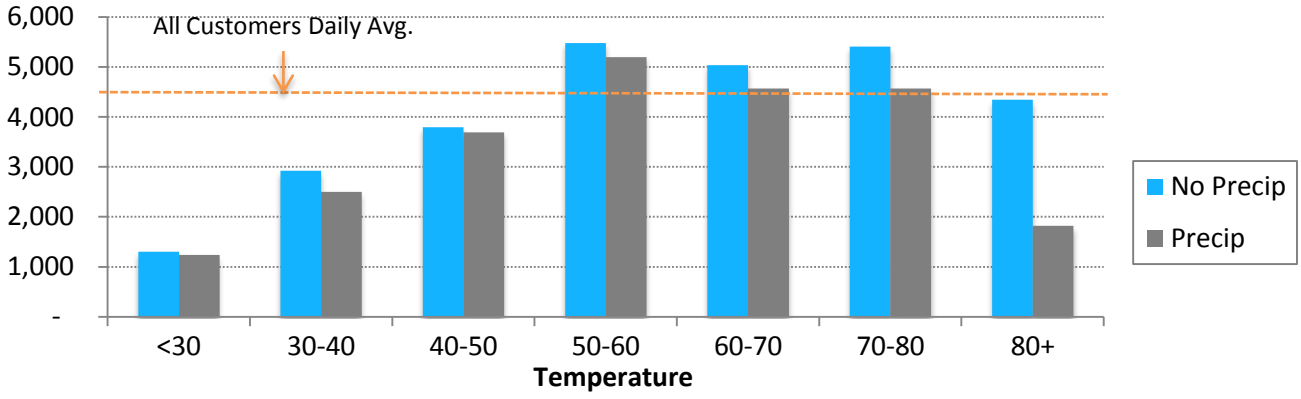
… sincere apologies to the color blind folks out there

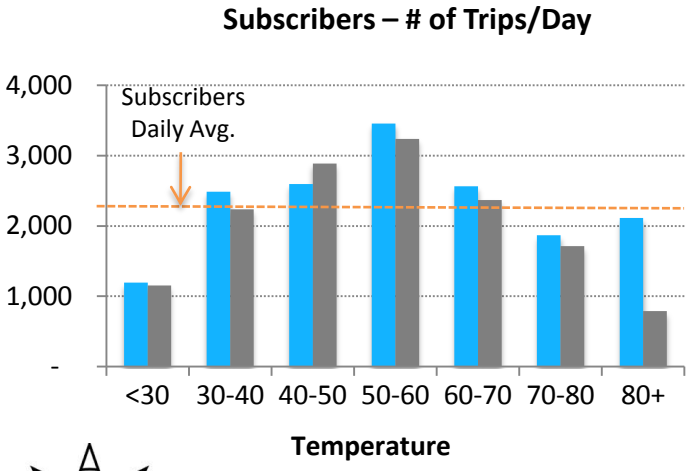
Weather Impact

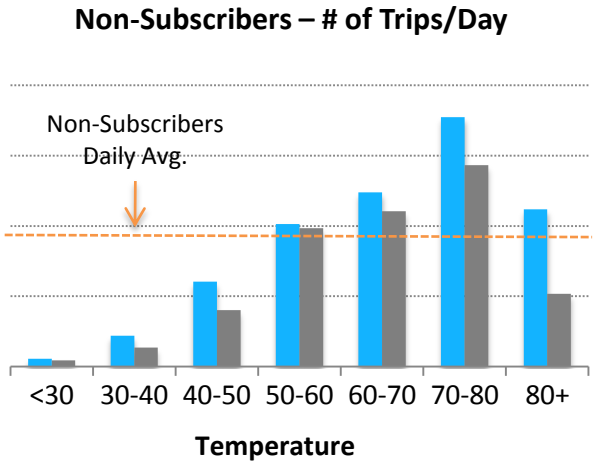
**Based on data from partial year (6/27/2013 – 12/31/2013)*

Wet weather deters bikers, but not the loyal subscribers…

- Daily trips for all customers drop about **15%** when it rains/snows
- However, subscribers' trips drop **8%** compared to a whopping **25%** for non-subscribers!
- Would a little shelter at the bike stations help?







Non-subscribers are mainly fair-weather bikers…

- 60-80 degree weather is perfect for non-subscribers
- While subscribers tend to bike during cooler weather – perhaps they don't want to perspire on their way to work?

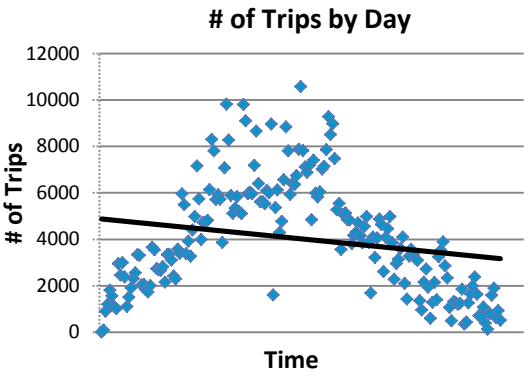
Trip Factors

**Based on data from partial year (6/27/2013 – 12/31/2013)*

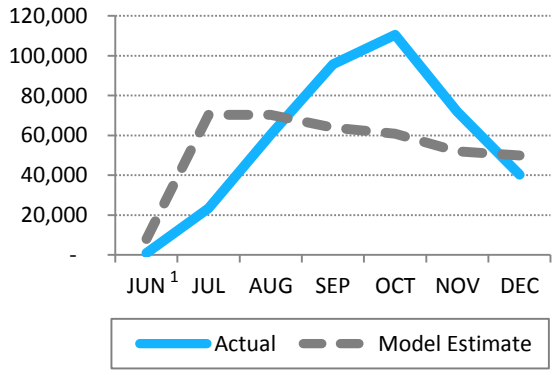
Regression analysis was used to better understand the influence of weather and dates on the # of trips made by subscribers and non-subscribers.

Factors considered:

- Avg. temperature
- Precipitation – Y/N
- Amt. of precipitation
- Holiday – Y/N
- Weekend – Y/N

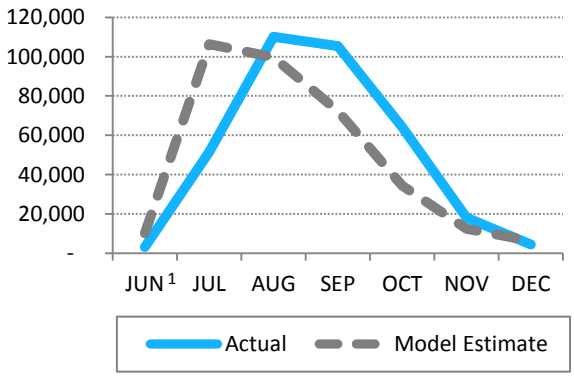


Subscriber Model Highlights



- Significant factors include: weekend indicator, holiday indicator, and avg. temperature
- Holding all other factors constant, the # of trips would…
  - **decrease by 50%** during the weekend
  - **decrease by 60%** during a holiday
  - **increase by 0.6%** for every 1 degree increase

Non-Subscriber Model Highlights



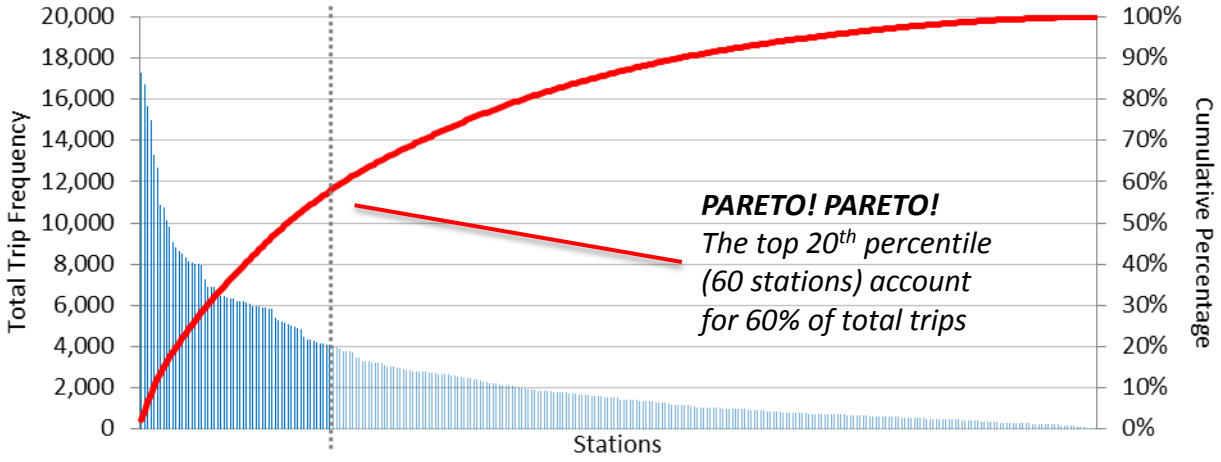
- Significant factors include: holiday indicator, avg. temperature, and precipitation indicator
- Holding all other factors constant, the # of trips would…
  - **decrease by 41%** during a holiday
  - **increase by 6.2%** for every 1 degree increase
  - **decrease by 18%** during a rainy/snowy day

[1] There were only four days of data for June

Geolocation Highlights

**Based on data from partial year (6/27/2013 – 12/31/2013)*

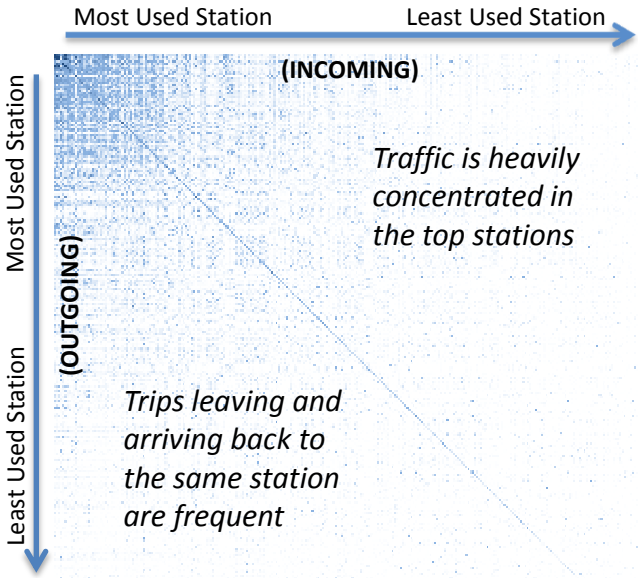
Pareto Chart: Trip Frequency by From Station



- The top 60 stations drive 60% of total traffic. But! This 60% includes trips going to other stations.
- Trips made only between the top 60 stations account for 41% of total traffic.

Quintiles (incoming station) →

← Quintiles (outgoing station)	1st	2nd	3rd	4th	5th
1st	**40.8%**	10.4%	4.5%	1.6%	0.5%
2nd	10.4%	6.6%	3.0%	1.5%	0.5%
3rd	4.4%	3.1%	2.5%	1.1%	0.5%
4th	1.7%	1.5%	1.1%	1.3%	0.6%
5th	0.5%	0.5%	0.5%	0.6%	0.4%



[1] *Chicago skyline downloaded from https://openclipart.org*

Geolocation Highlights

**Based on data from partial year (6/27/2013 – 12/31/2013)*

Subscribers

- *Clinton*
- *Jackson*
- *Canal*

Most Popular Station Streets by User Type

Non-Subscribers

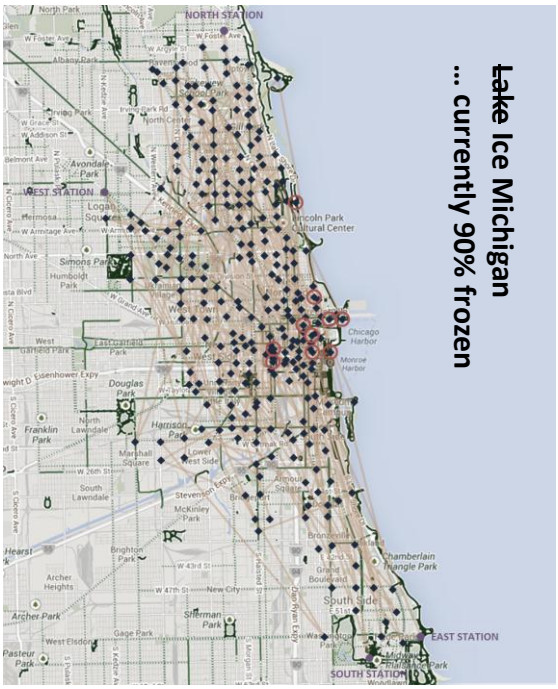
- *Michigan*
- *Lake Shore*
- *Illinois*

[1] *Chicago skyline downloaded from https://openclipart.org*

[2] *Thankfully the Divvy station street names are nicely organized with first street name being N/S and second being E/W*

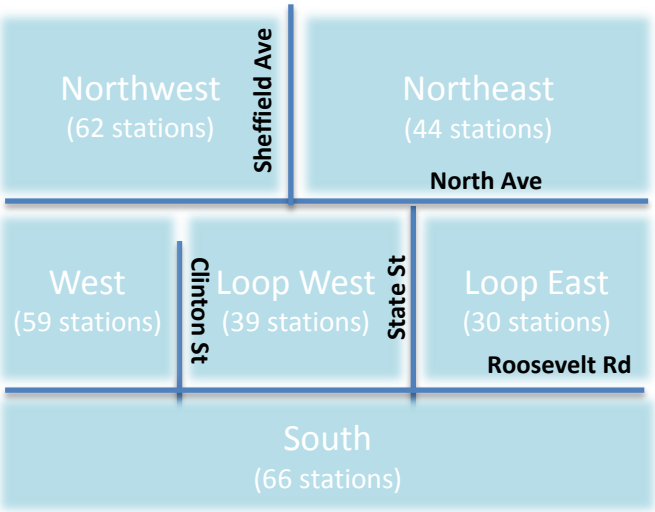
Geolocation Highlights

**Based on data from partial year (6/27/2013 – 12/31/2013)*



* *Map is from Google*

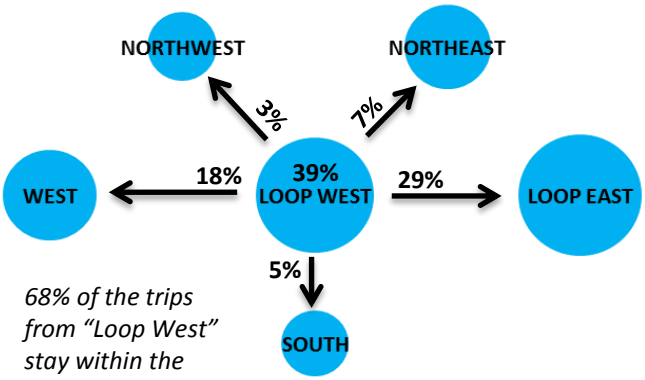
Divvy-ing it up into geographical locations!



Trip Frequency by Station Location Clusters

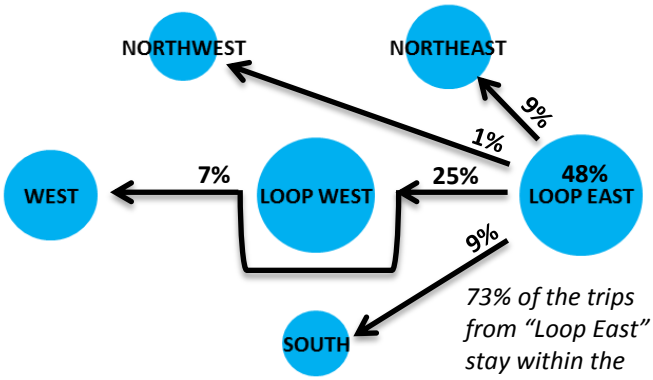
Outgoing Stations \ Incoming Stations	Loop East	Loop West	Northeast	Northwest	South	West
Loop East	101,361	52,634	18,083	3,071	19,696	15,180
Loop West	56,206	76,072	13,997	5,133	9,336	34,427
Northeast	16,201	11,597	47,028	19,310	1,235	7,178
Northwest	2,967	4,148	18,646	32,227	484	9,031
South	20,088	8,208	1,444	469	27,897	5,282
West	15,765	33,175	7,414	8,954	5,361	50,483

Distribution of Trips from Loop West

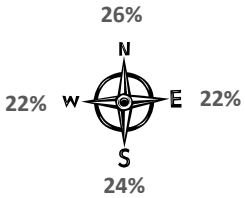


68% of the trips from "Loop West" stay within the downtown area

Distribution of Trips from Loop East



73% of the trips from "Loop East" stay within the downtown area



6% of all trips return back to the same station

More trips head north than any other direction