



UMD ***DATA*** ***CHALLENGE***

DC21018 - UMD Dots E-Scooter

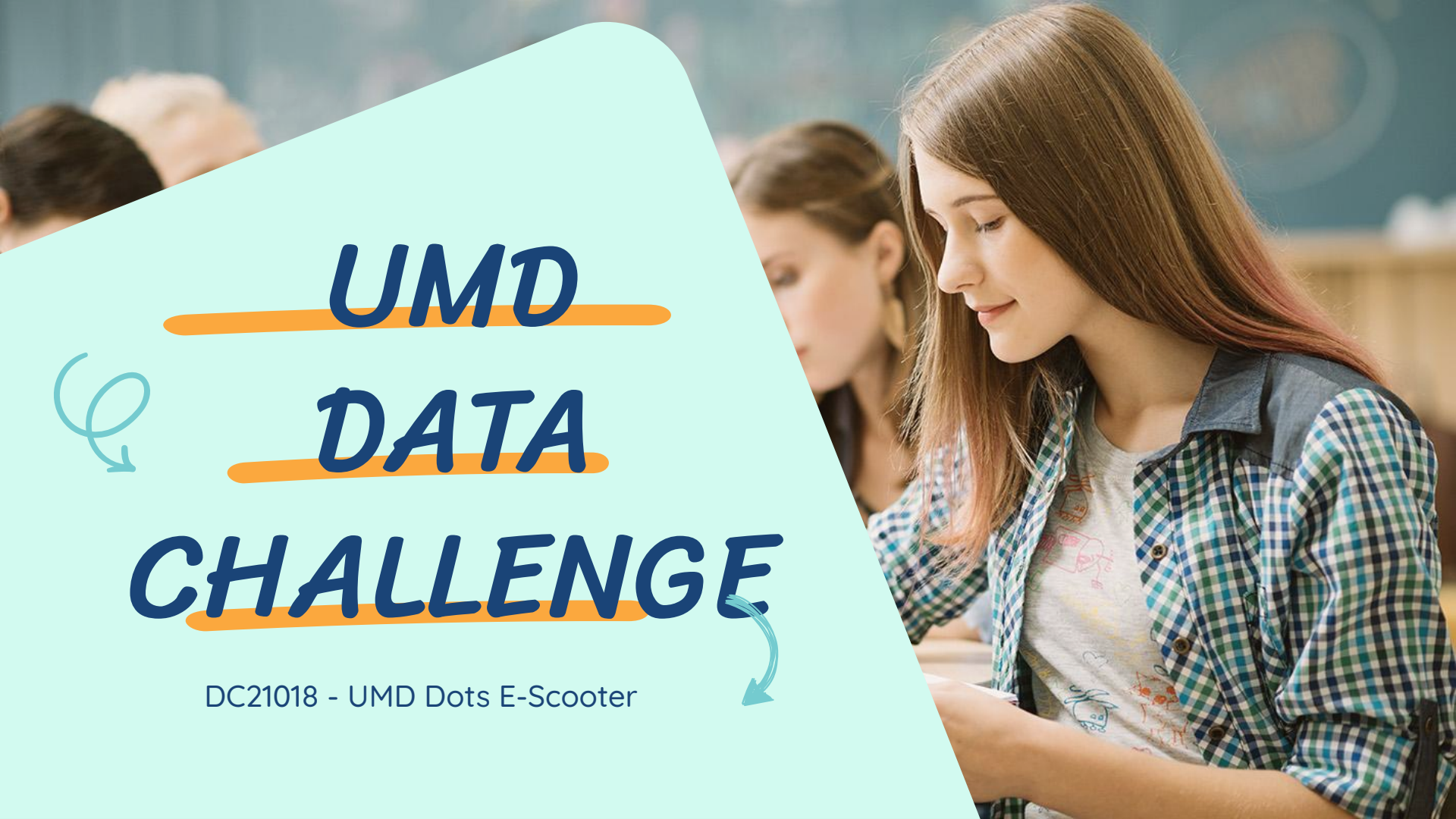


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About the Project

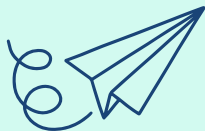
Brief Description

Our Set of Ideas



Distance

The haversine formula determines the great-circle distance between two points on a sphere given their longitudes and latitudes.



Boundary & Mapping Techniques

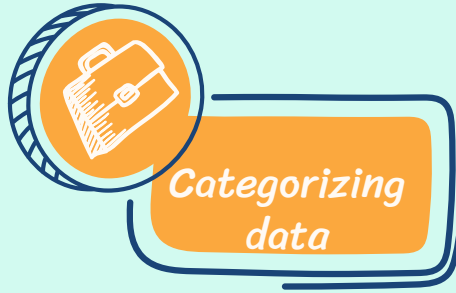
We collected locations of the campus boundary and created a spatial polygon to define ride locations as On-Campus and Off-Campus



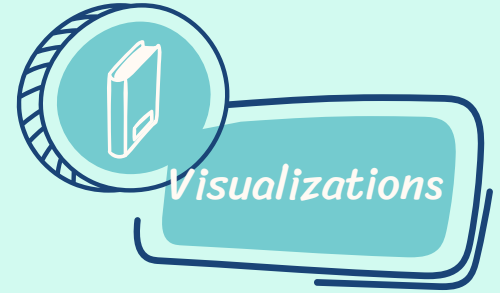
Major Requirements



We had to clean the dataset provided to be able to answer the questions



We defined certain things to help understand data better like defining the campus boundary and exits.

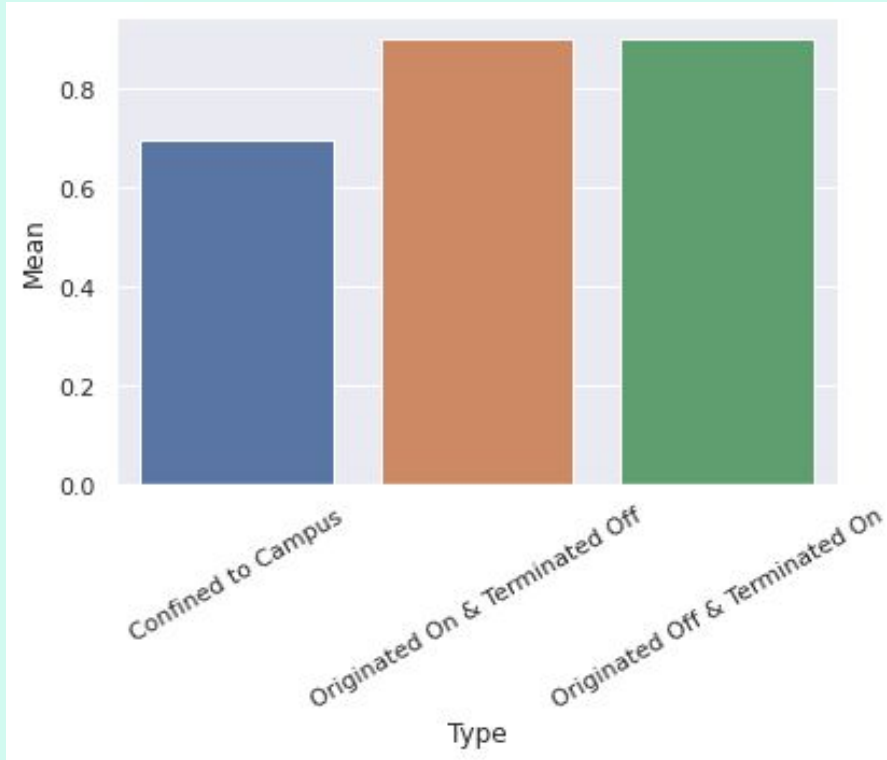


We made maps and graphs to visualize the findings

Methodology

- Started with cleaning the data like filtering for only E-Scooter rides and removing outliers in distance data.
- Then, we defined what is “On Campus” and what is not.
- We defined the designated Veo Ride Stations.
- Also defined Campus Exits.
- Wrote algorithms to find if the ride used any designated station, campus exit or entrance.
- Next, we found out the possible category of the destination based on Veo Ride Stations.
- Then we combined all the data to make visualizations

Findings : Mean Distances for 2020



0.69 Mi

Mean
Distance
for Rides
confined
to
Campus

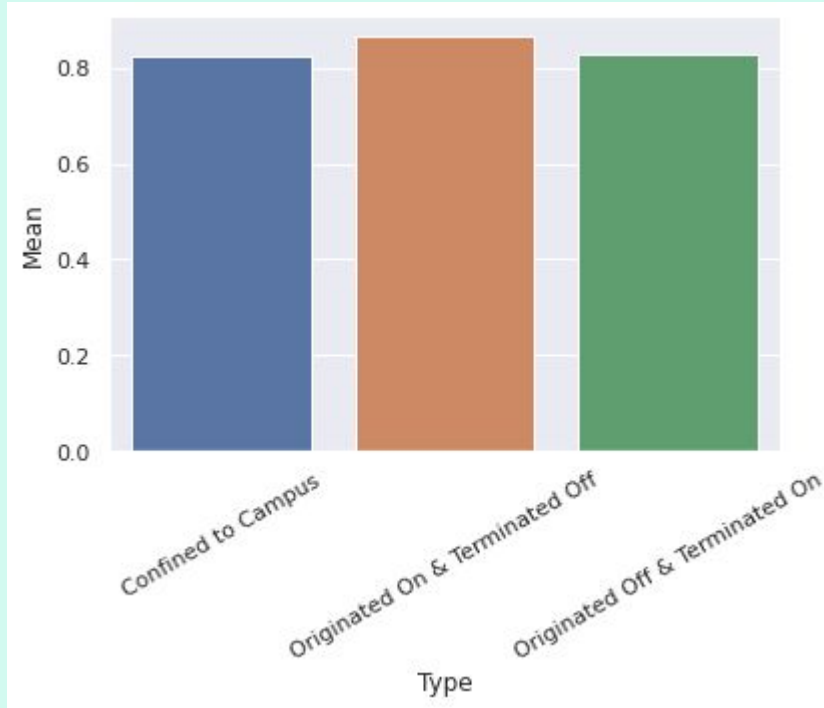
0.90 Mi

Mean
Distance
for Rides
which
Originated
on campus
and
Terminated
Off
Campus

0.90 Mi

Mean
Distance
for Rides
which
Originated
Off campus
and
Terminated
On Campus

Findings : Mean Distances for 2019



0.82 Mi

Mean
Distance
for Rides
confined
to
Campus

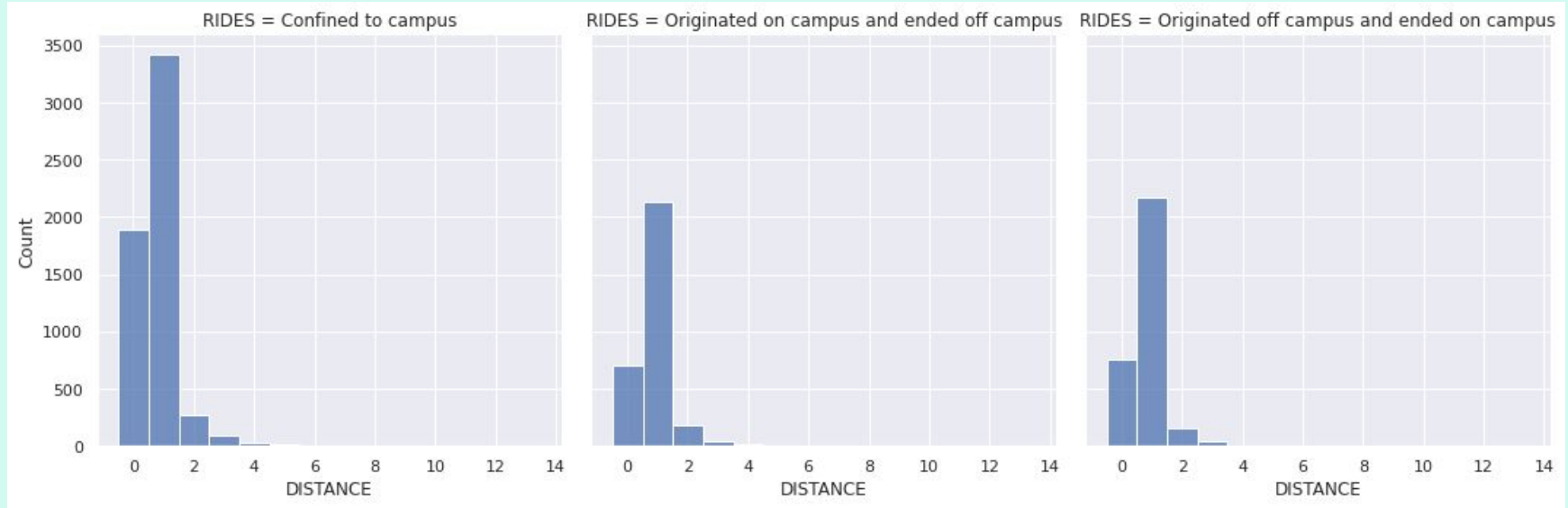
0.87 Mi

Mean
Distance
for Rides
which
Originated
on campus
and
Terminated
Off
Campus

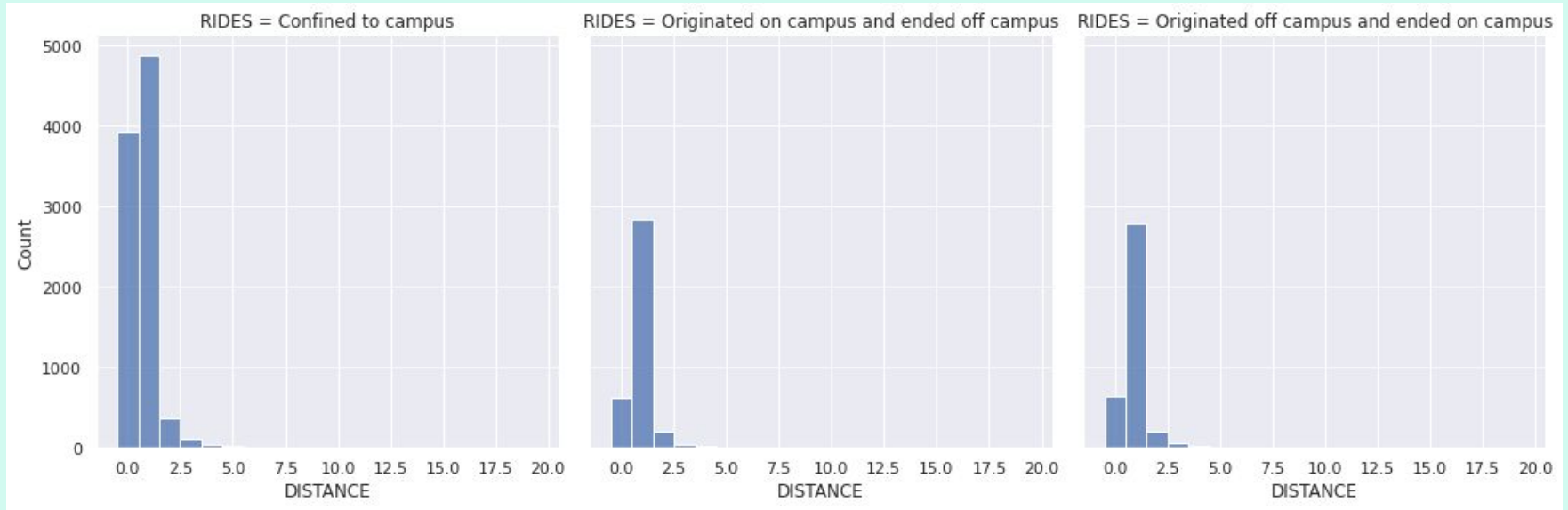
0.83 Mi

Mean
Distance
for Rides
which
Originated
Off campus
and
Terminated
On Campus

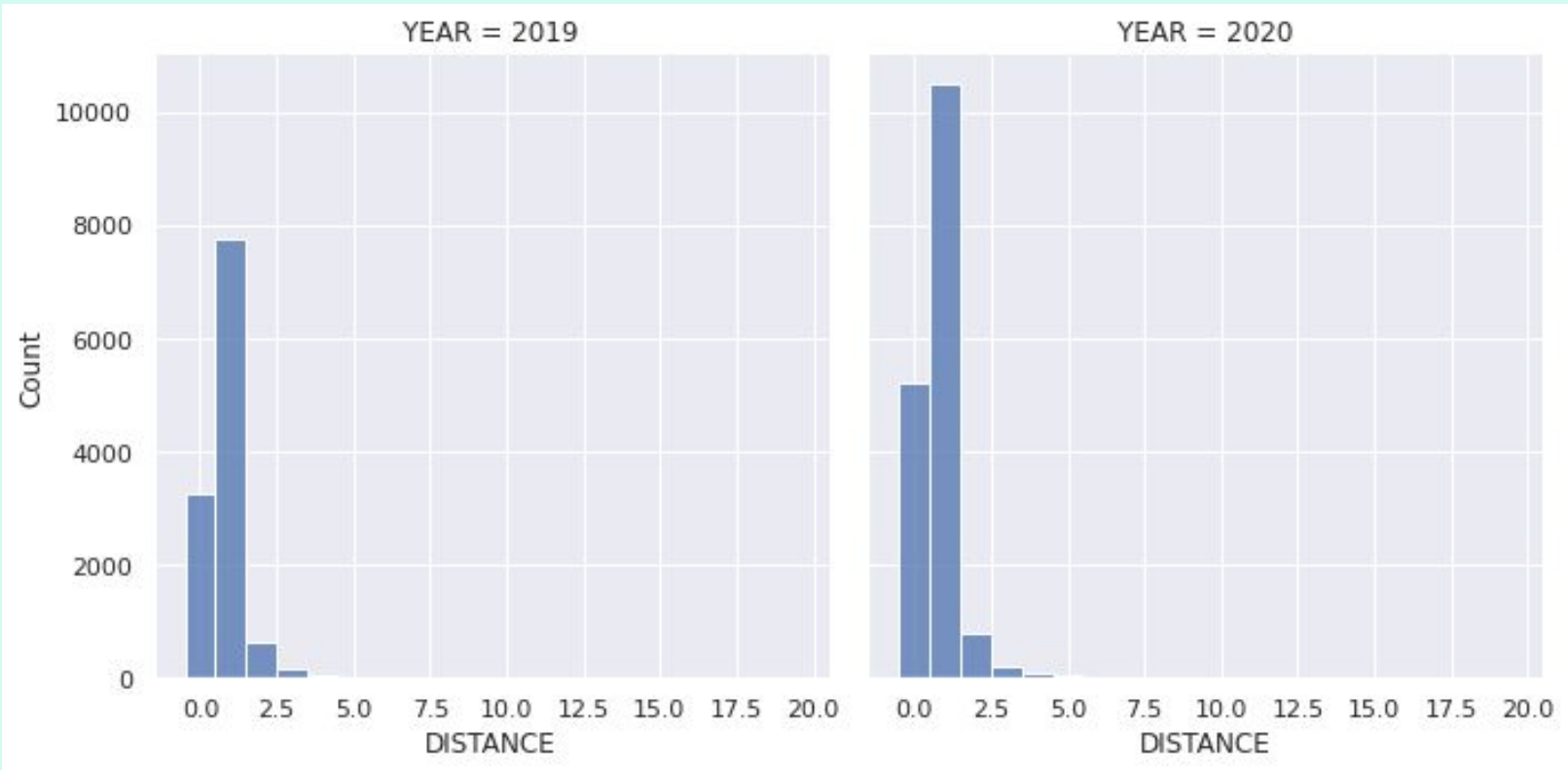
Findings : Distributions of Rides in 2019



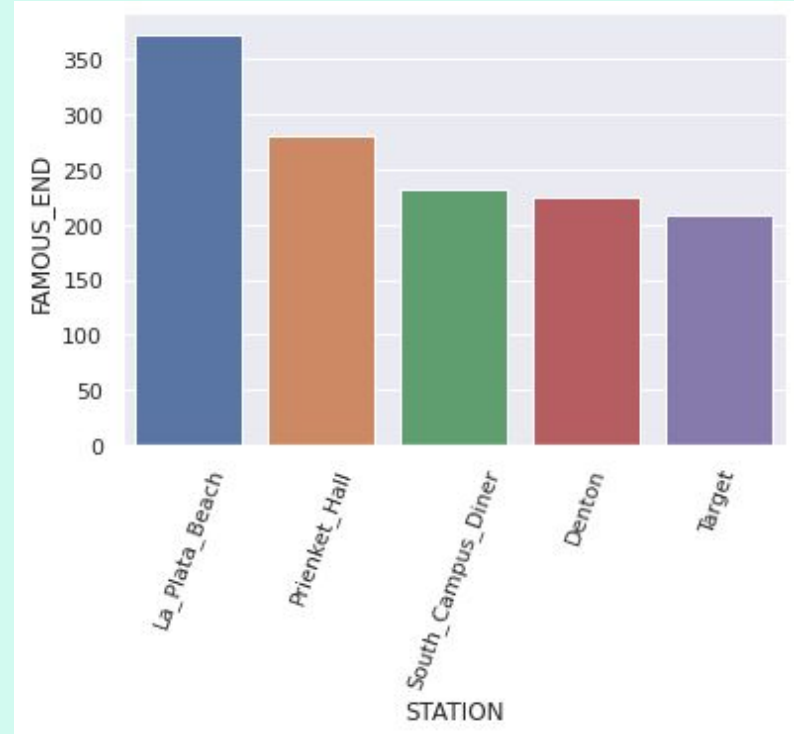
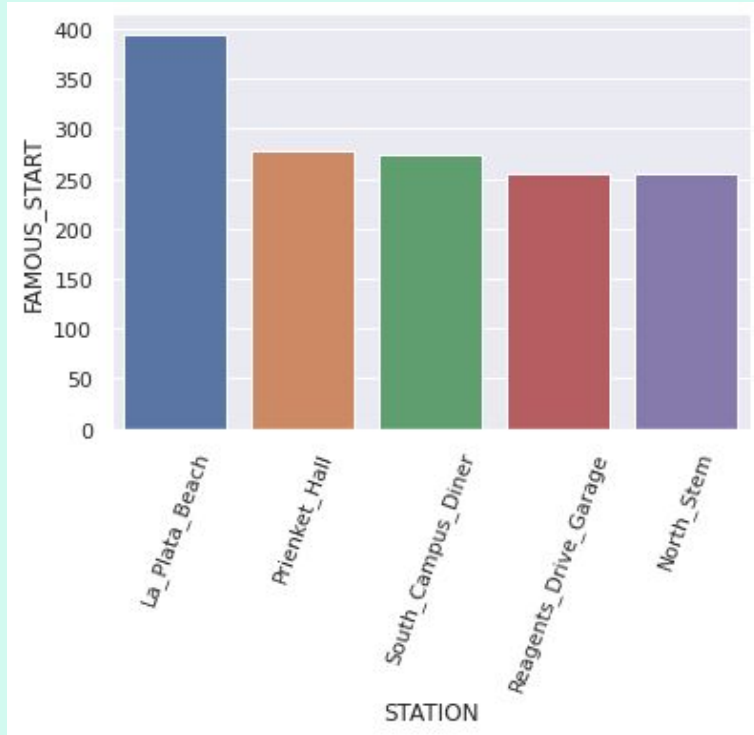
Findings : Distributions of Rides in 2020



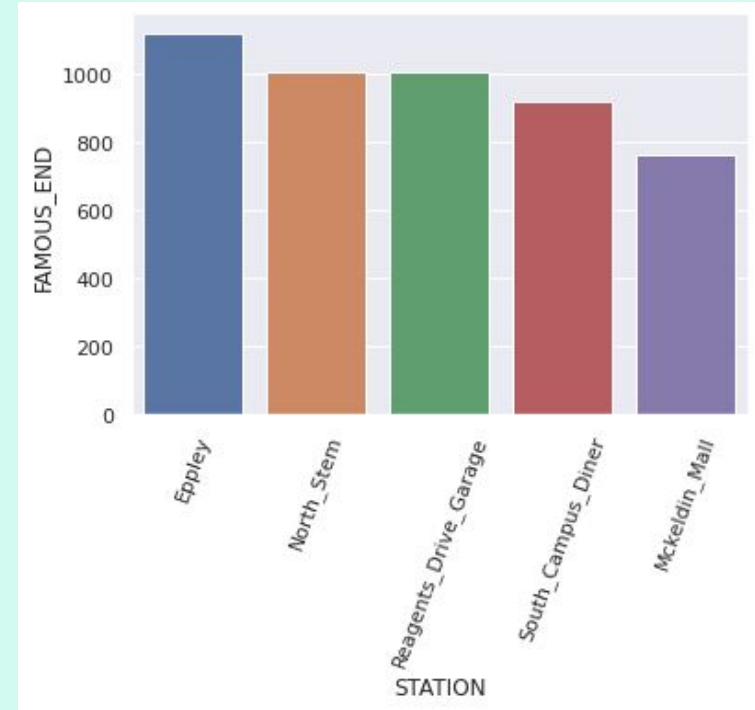
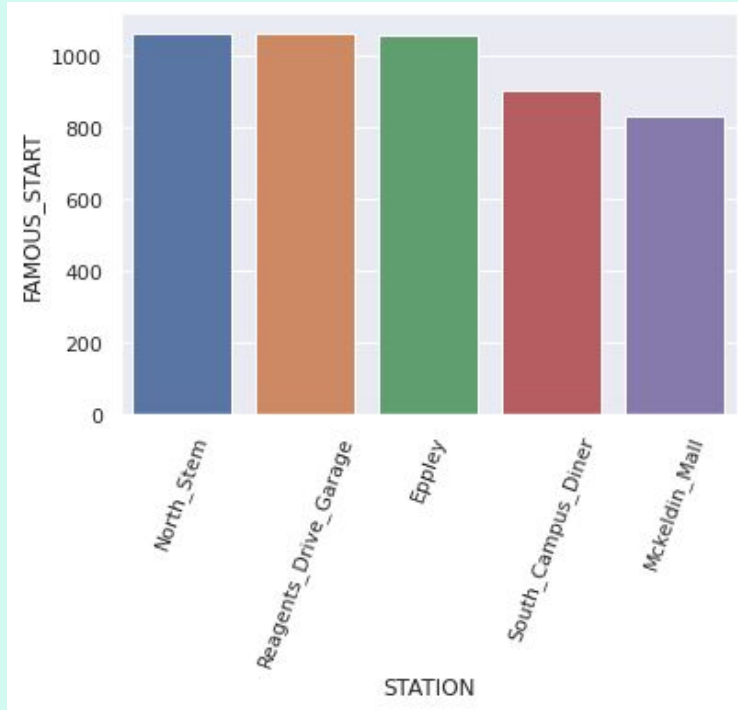
Findings : Distribution of Rides 2019 v 2020



Findings : Popular Start and End Stations in 2019



Findings : Popular Start and End Stations in 2020



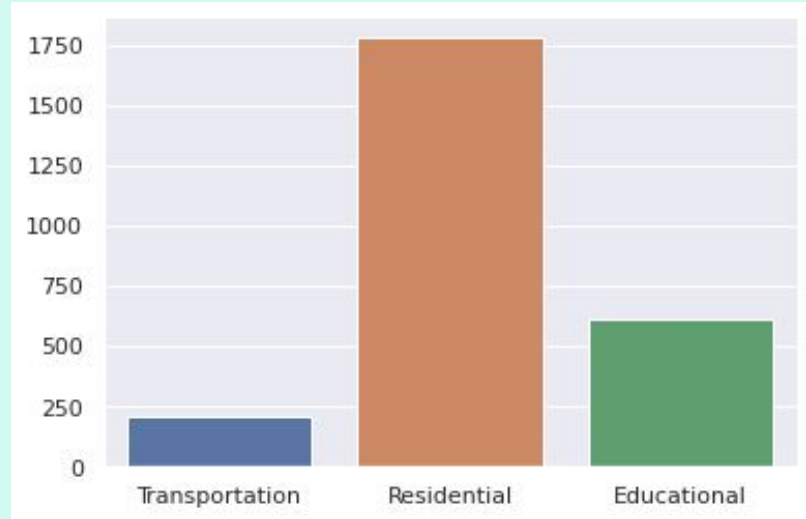
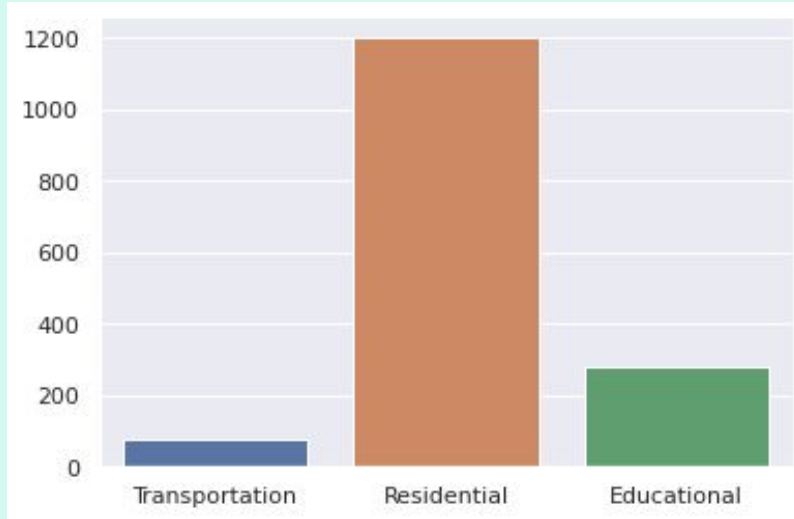
Findings : Most Common Routes in 2019

| Route | | Count |
|---------------------------|---------------------------|--------------|
| Reagent's Drive Garage to | Eppley | 308 |
| Eppley | to Reagent's Drive Garage | 282 |
| Mckeldin Mall | to Eppley | 248 |
| Eppley | to South Campus Diner | 212 |
| Eppley | to Mckeldin Mall | 206 |

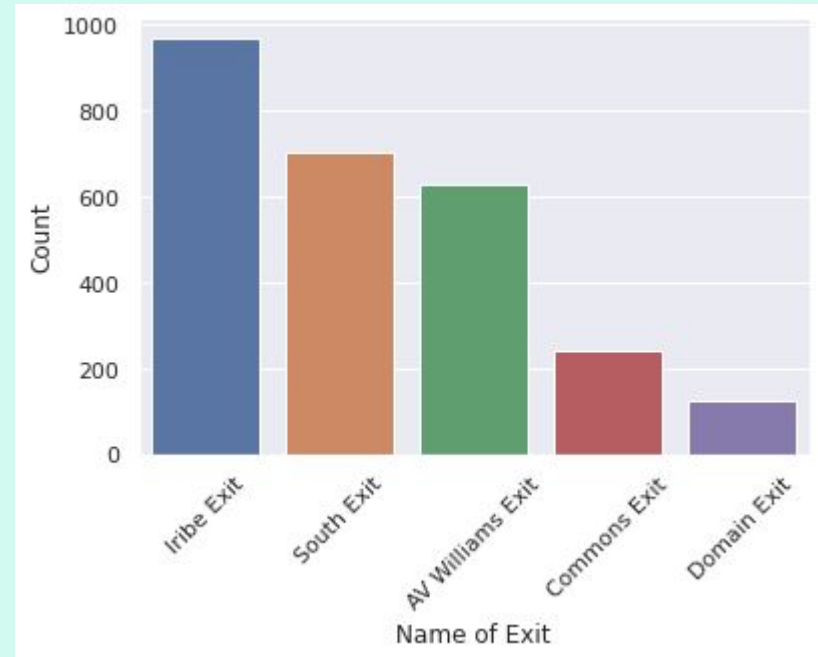
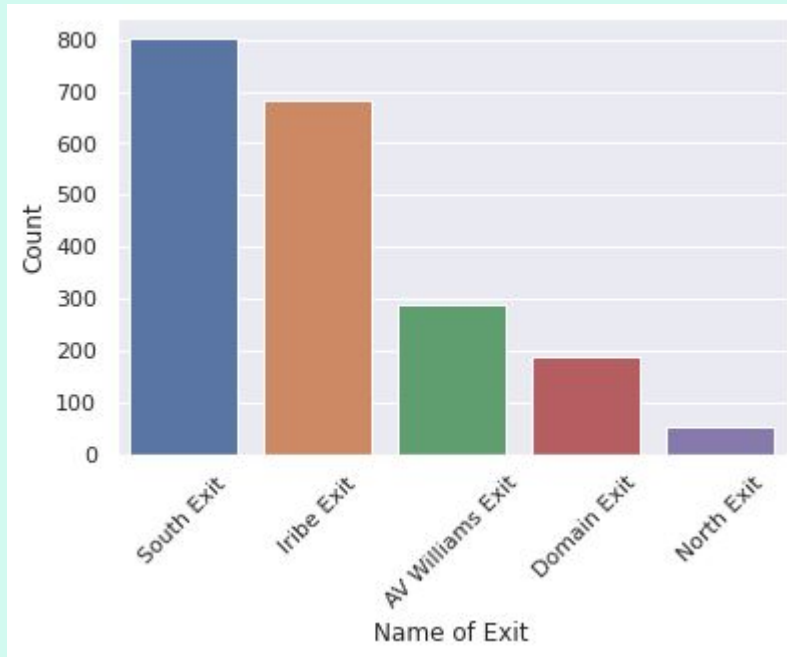
Findings : Most Common Routes in 2020

| Route | | | Count |
|--------------|----|---------------|--------------|
| Unknown | to | Unknown | 2845 |
| Denton | to | Unknown | 629 |
| Unknown | to | Denton | 569 |
| La Plata | to | Unknown | 260 |
| Unknown | to | La Plata | 236 |
| Denton | to | Denton | 207 |
| Unknown | to | Target | 154 |
| Unknown | to | Prienket Hall | 141 |
| Target | to | Unknown | 129 |

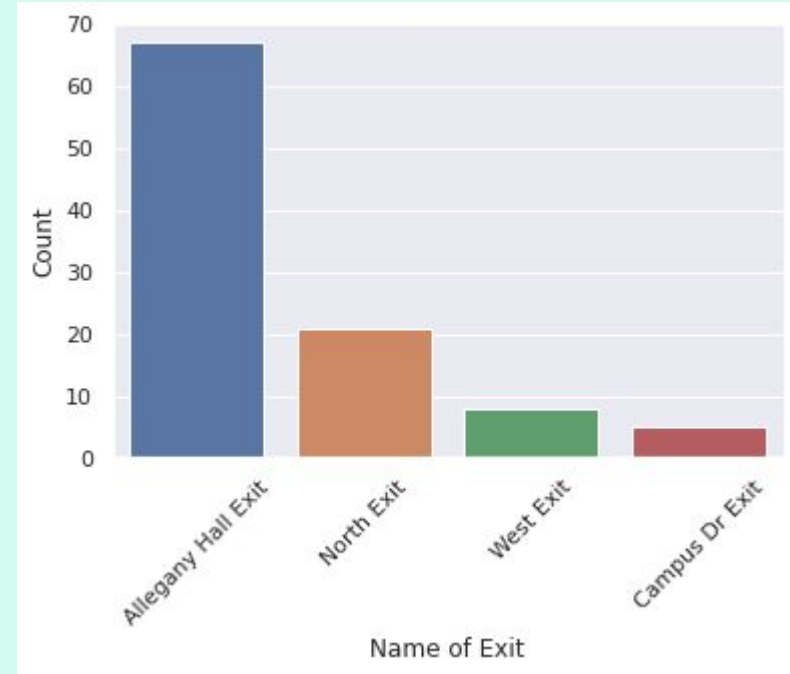
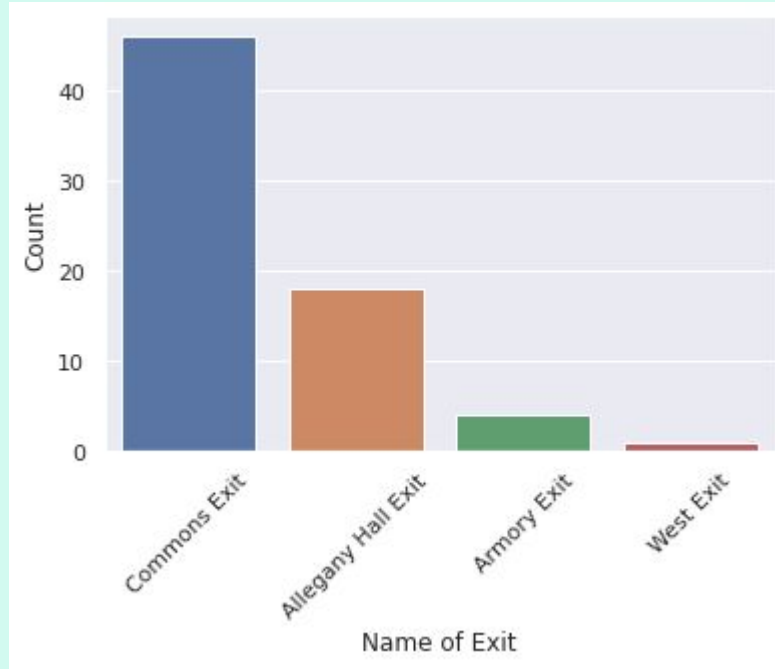
Findings : Categories of Destinations 2020 v 2019



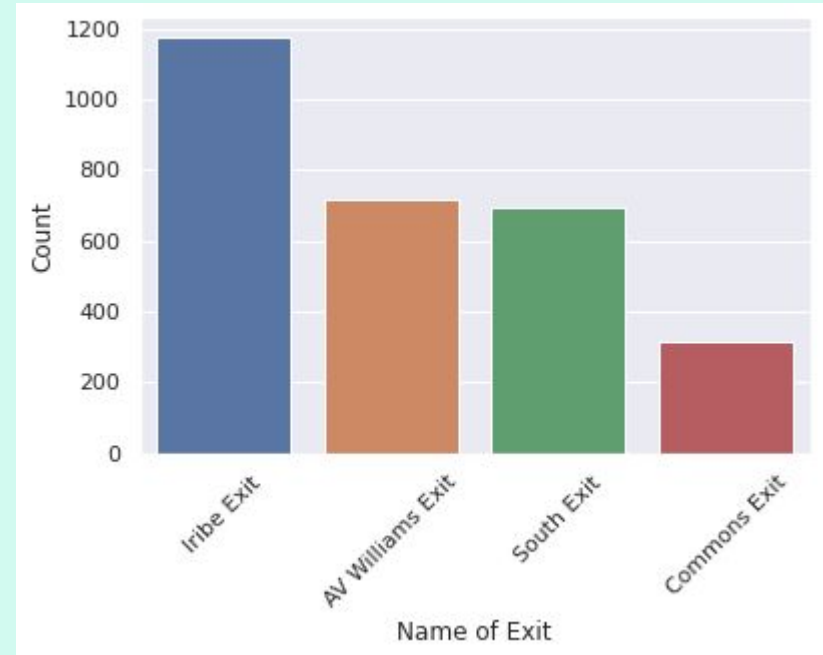
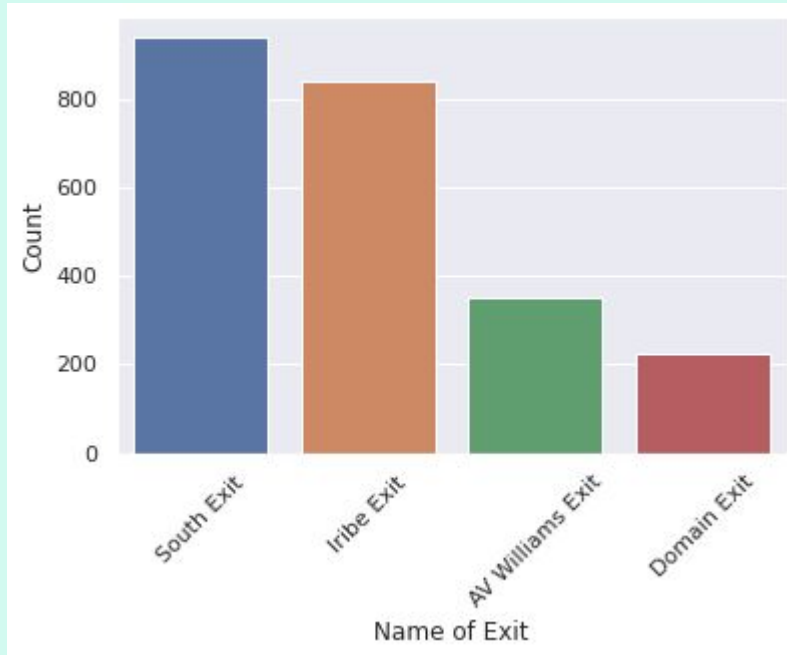
Findings : Most Used Campus Exits Used 2019 v 2020



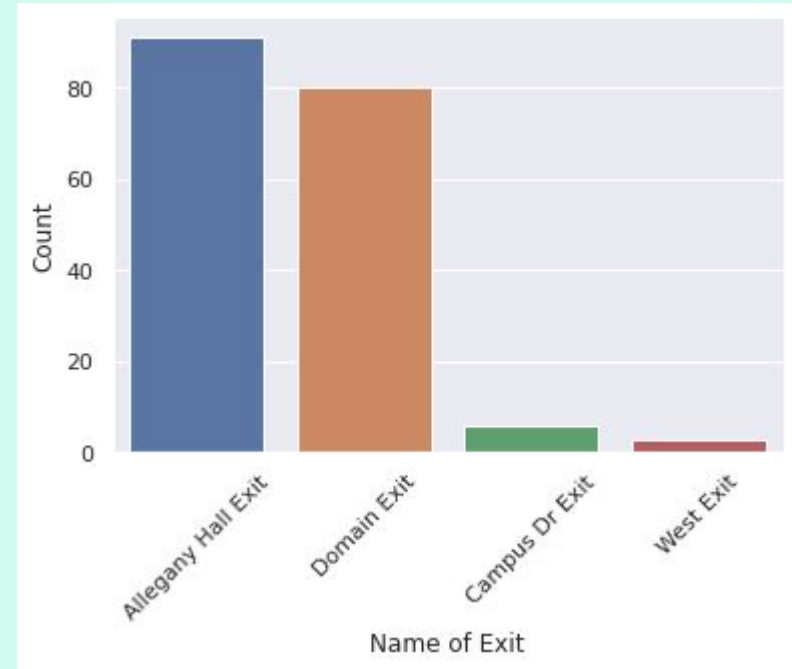
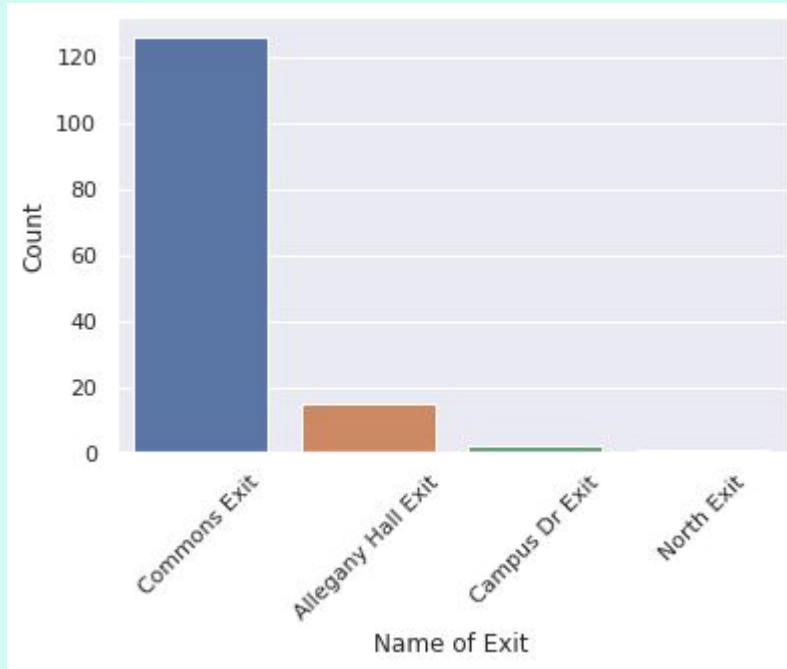
Findings : Least Used Campus Exits Used 2019 v 2020



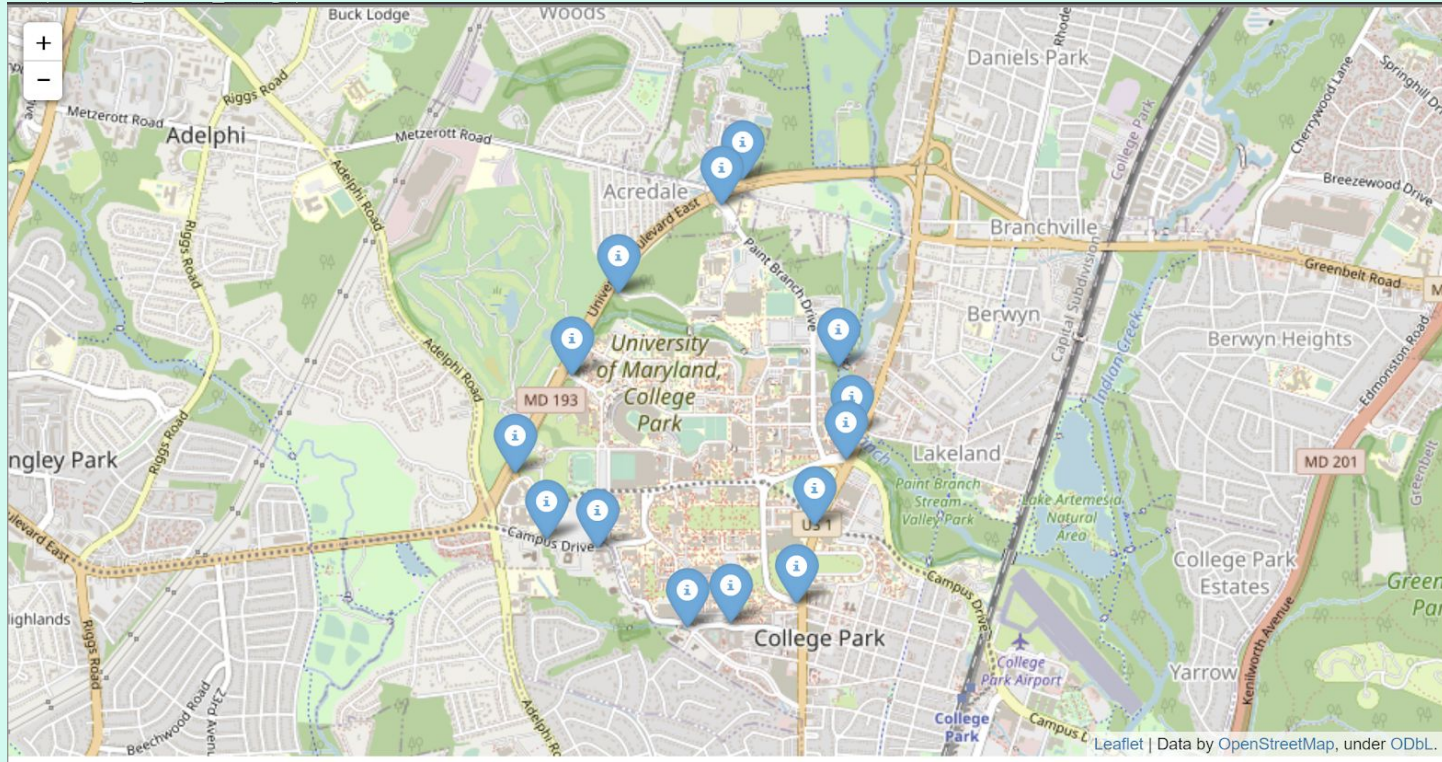
Findings : Most Used Campus Entrances Used 2019 v 2020



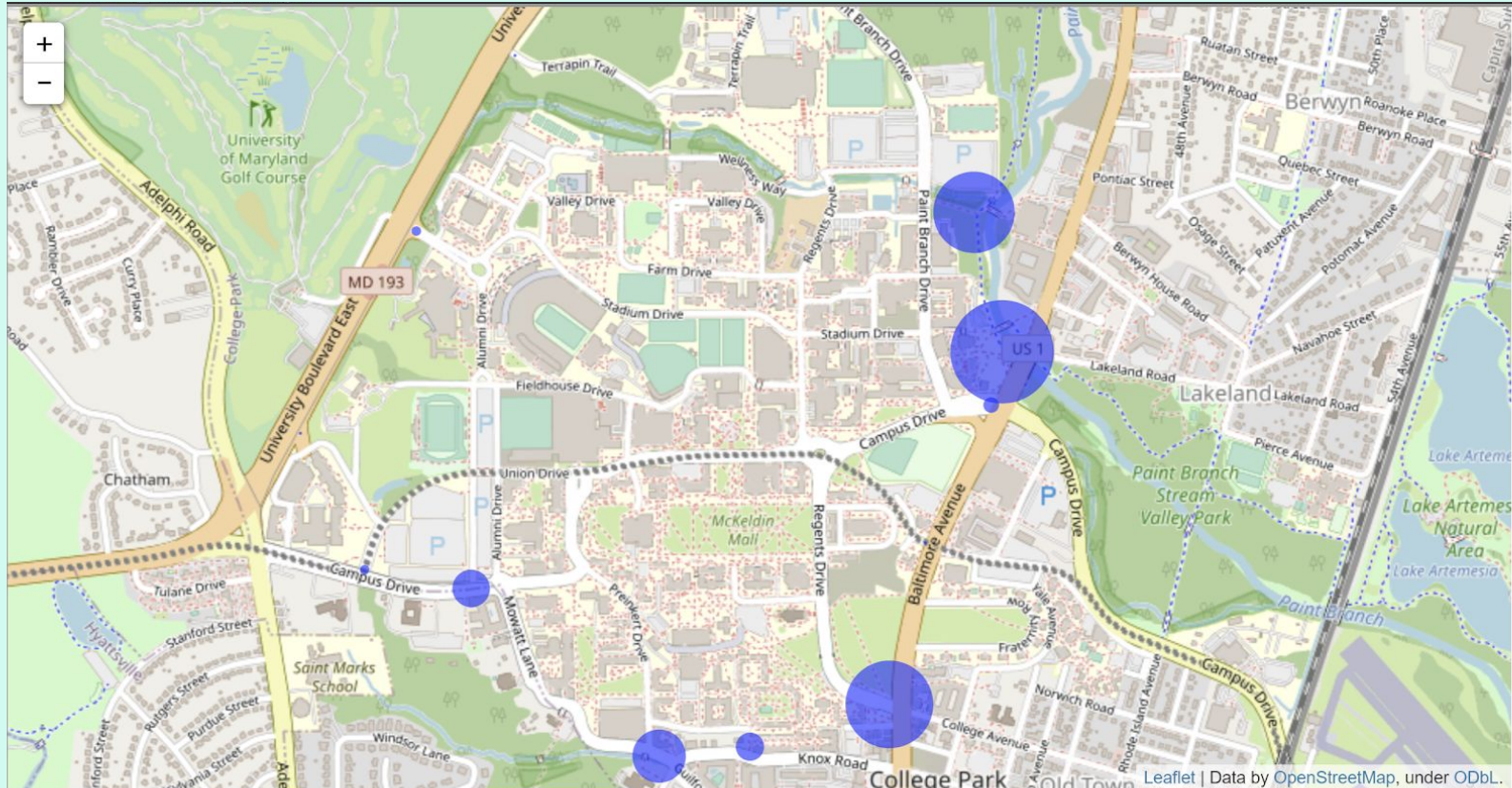
Findings : Least Used Campus Entrances Used 2019 v 2020



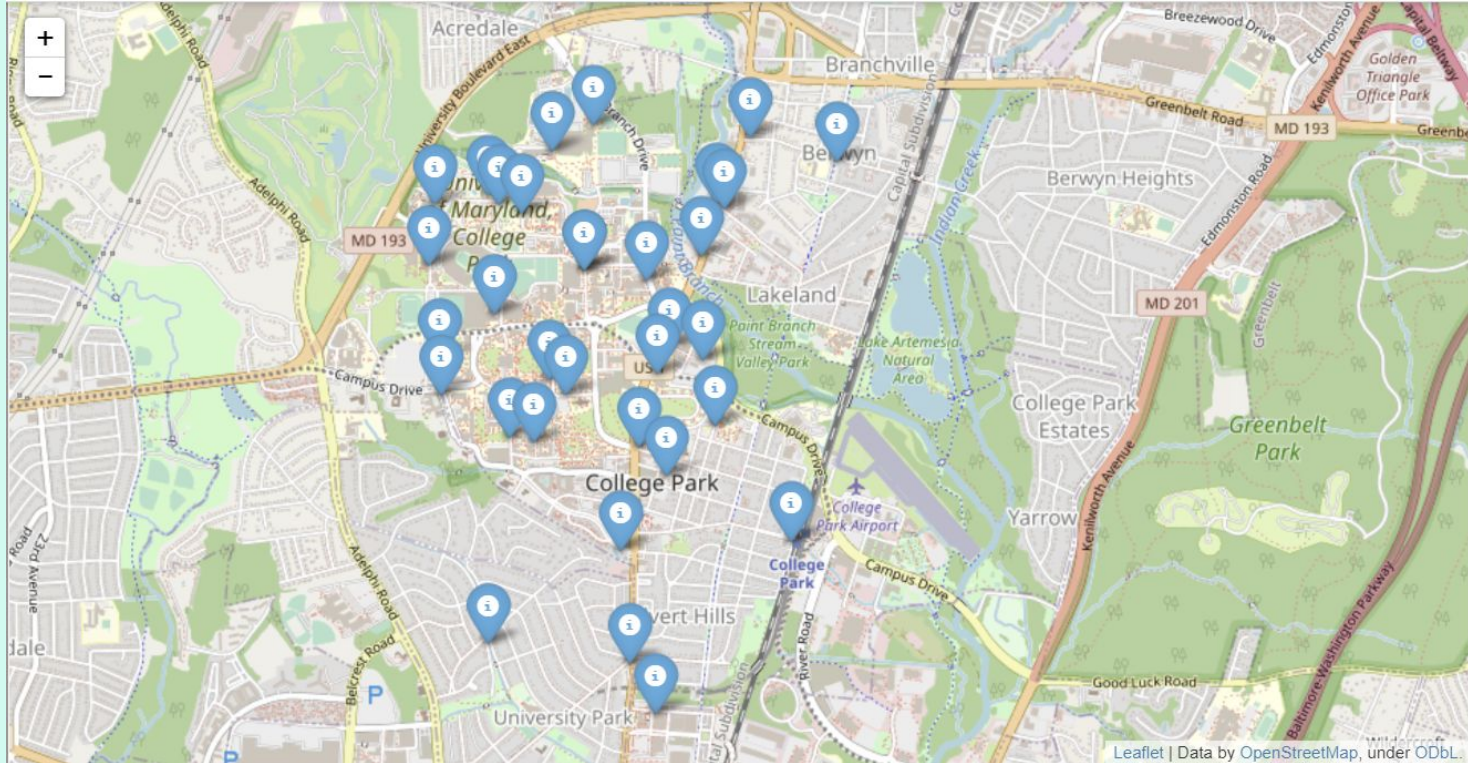
Findings : Interactive Map for Campus Exits



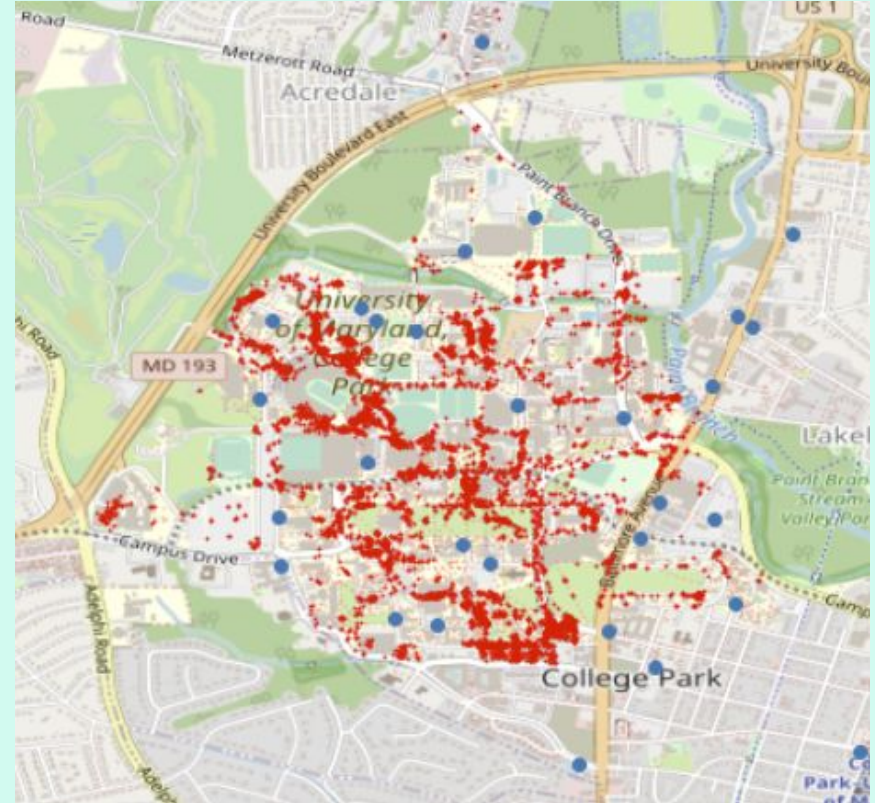
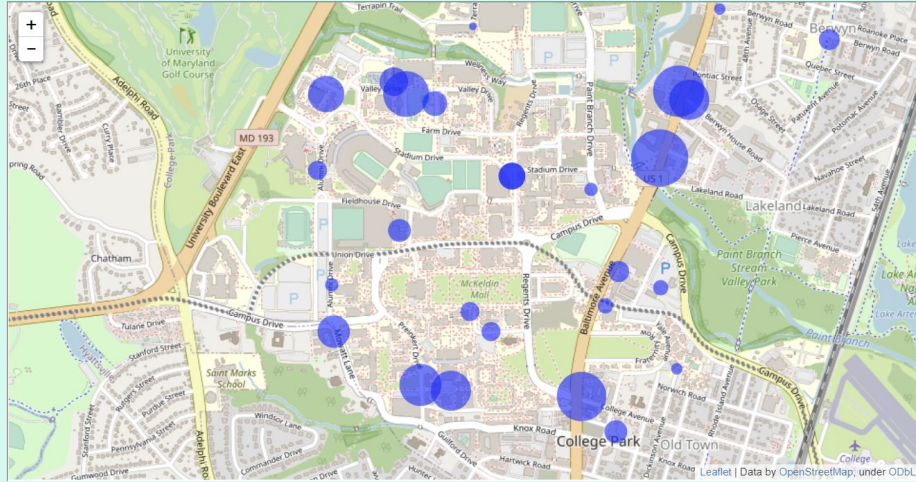
Findings : Interactive Map for Campus Exits



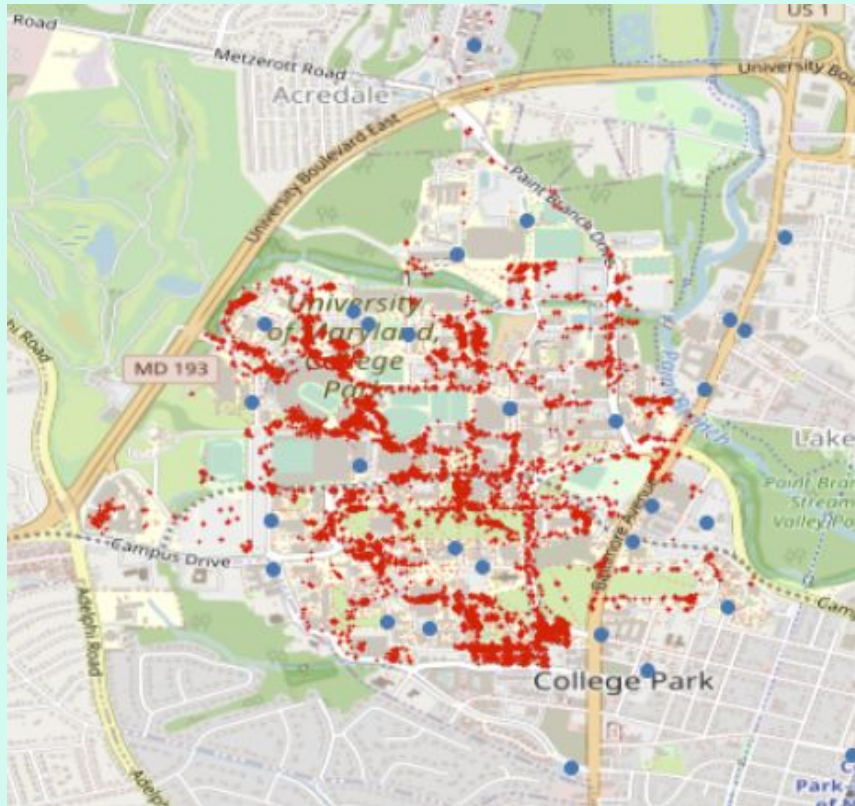
Findings : Interactive Map for VEO Ride Stations



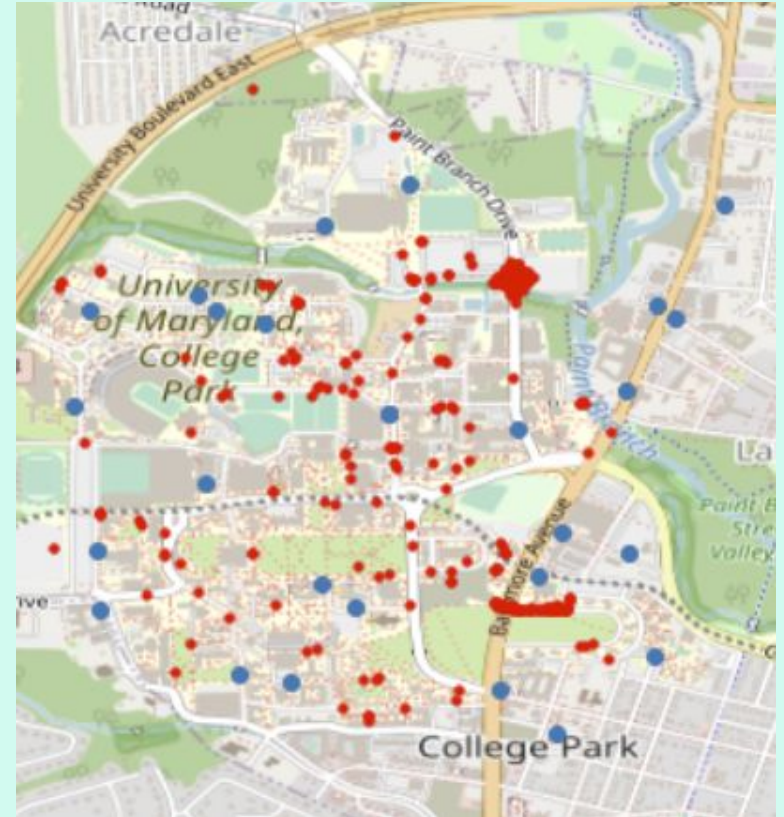
Findings : Interactive Map for Famous Veo Ride Stations



Findings : Insights About Veo Ride Stations

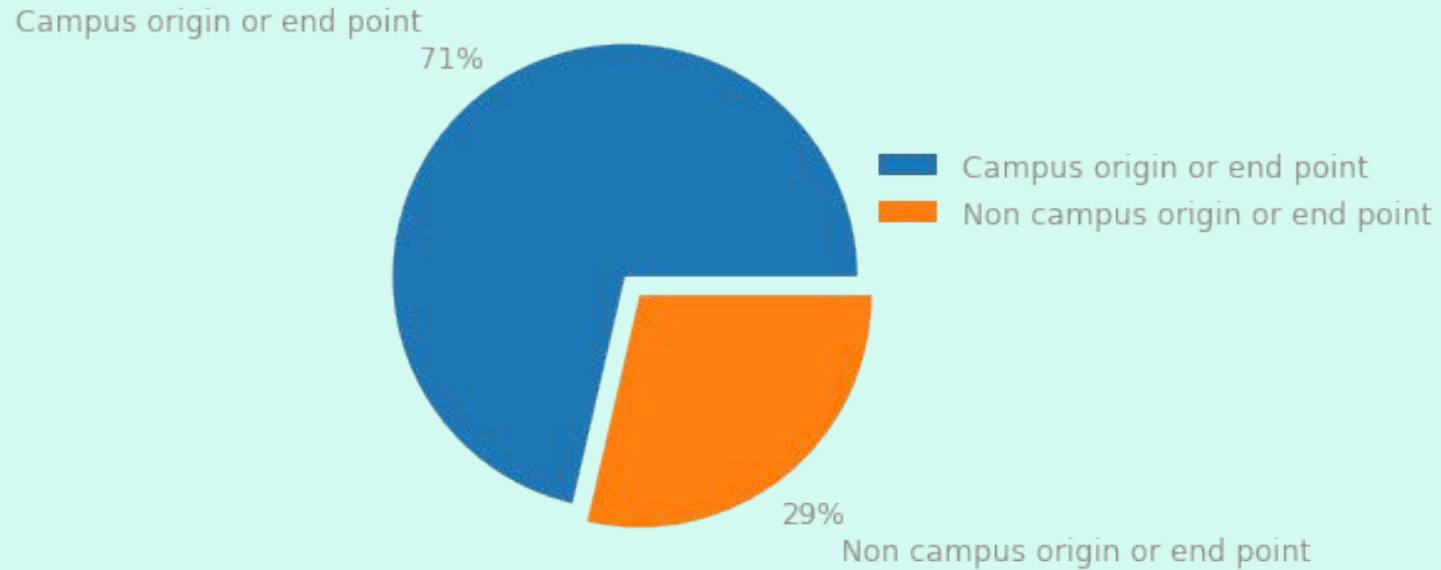


2020

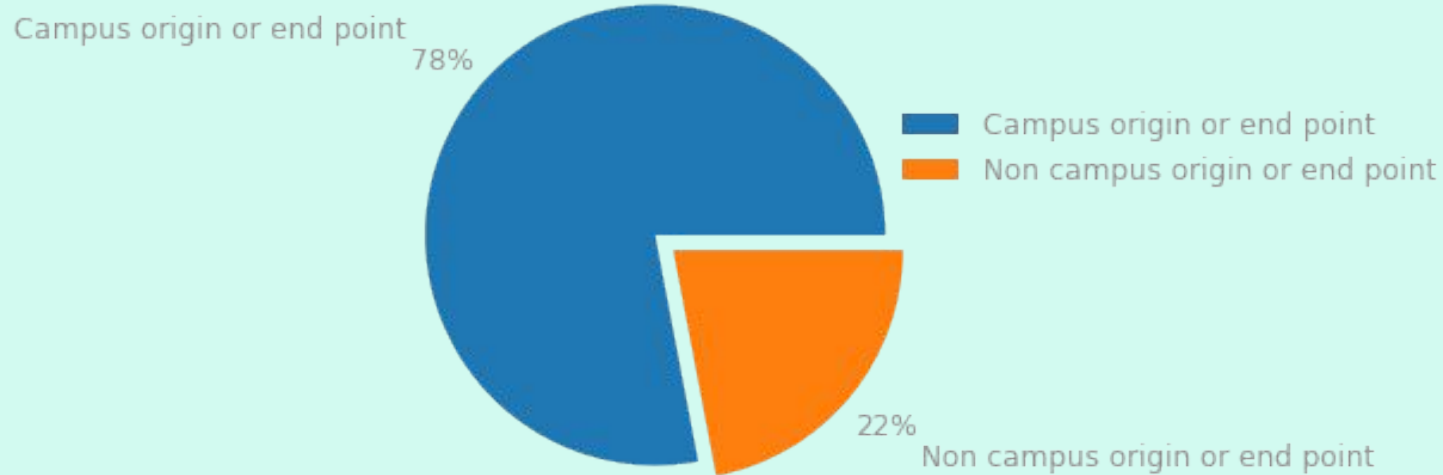


2019

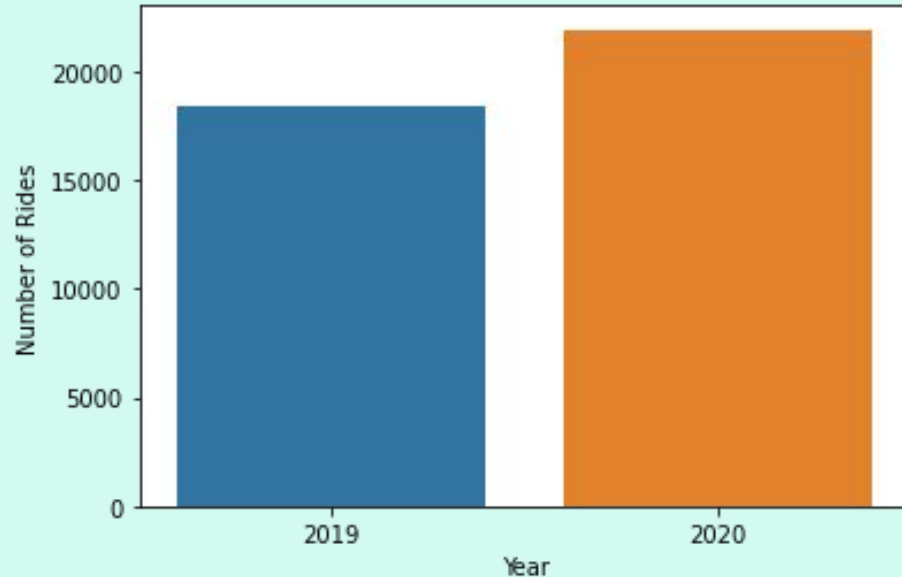
Findings : Percentage of Rides with Campus Origin in 2019



Findings : Percentage of Rides with Campus Origin in 2020



Findings : Number of Rides in 2019 v 2020



We see an increase in rides even though most of the courses in the University were online during 2020.

Findings : Impact of COVID-19

The increase in number of rides in 2020 could be due to:

- Lesser frequency of Campus Shuttles
- Social Distancing Rules in Campus Shuttles
- Students using private modes of transport to stay safe

We also notice an increase in the percent rides from campus and to campus in 2020 which could show students used E-Scooter to go from campus to places off campus since most of the classes were in online mode.

Further Improvements:

- We can analyse the data in depth by using more sophisticated mapping techniques and better maps.
- With the help of professional data analysing tools such as Power BI or Tableau.
- If we can properly map the veo rides to places on campus, we can use ML techniques to determine best placement of Veo Scooters and possible Veo Stations.
- With data regarding time, speed, and cost we can do cost benefit analysis to change/improve the business model.
- To increase accessibility for everyone on campus we can add more stations.
- Designated bike/e-scooter lanes is also a frontier to explore.

Our Team

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Thank You!