

Team 15

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### **OUR DATASET**

Includes ride counts, times, distances and routes of Veo e-scooters from October 2019 and October 2020

This data is collected by the riders' mobile device, with an accuracy of ~ ±1 meter.

VeoRide Inc. is the sole e-scooter provider with the University of Maryland.





#### **OUR PROCESS**

Remove rides with low or high distance, time, or speed

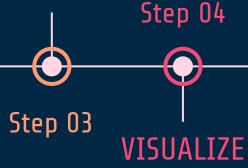
Find numerical values (averages, SDs) and create plots & histograms

DESCRIBE

Draw real-world conclusions and applications of the results



Separate by year, and on-campus, off-campus, or "hybrid"



Use Tableau and Python to plot and visualize the data



Step 05

## Cleaning & Classifying

# All Rides were Removed that Satisfied:

- Non-scooter (E-bike)
- DISTANCE < 0.06 miles
- DISTANCE > 43 miles
- DURATION < 2 mins
- DURATION > 4 hours
- Avg Speed > 20 mph

40,325 Rides pre-clean 34,538 Rides post-clean

#### Rides then classified by:

**Year:** 2019 or 2020

#### Location:

- Start & end on-campus
- Start & end off-campus
- Start on, end off
- Start off, end on

8 datasets total

## Raw Numbers: 2019



	Number of Rides	Mean Distance (mi)	Standard Deviation of Distance (mi)	Mean Duration (min)	Standard Deviation of Duration (min)
On-Campus	11,854	0.84	0.67	9.83	12.22
Off-Campus	597	1.16	1.38	13.71	21.93
On to Off	972	1.13	0.98	12.08	15.27
Off to On	950	1.08	0.71	11.15	10.36
All Rides	14,373	0.89	0.75	10.23	12.95

## Raw Numbers: 2020

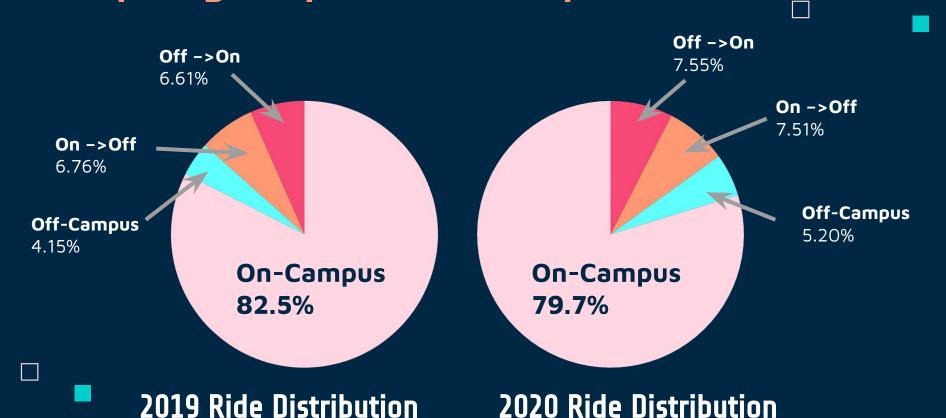
	Number of Rides	Mean Distance (mi)	Standard Deviation of Distance (mi)	Mean Duration (min)	Standard Deviation of Duration (min)
On-Campus	16,079	0.81	0.70	8.20	9.86
Off-Campus	1,049	1.17	1.65	13.24	19.84
On to Off	1,514	1.05	0.95	10.11	11.98
Off to On	1,523	1.07	0.81	10.37	11.39
All Rides	20,165	0.87	0.81	8.77	10.96

## Comparing 2019 & 2020

	Change in Number of Rides	% Change in Number of Rides	% Change in Avg. Distance	% Change in Avg. Duration
On Campus	+4,225	+35.64%	-2.75%	-16.59%
Off Campus	+452	+75.71%	+0.48%	-3.41%
On to Off	+542	+55.76%	-6.84%	-16.36%
Off to On	+573	+60.32%	-1.08%	-6.92%
All Rides	+5,792	+40.30%	-1.89%	-14.28%

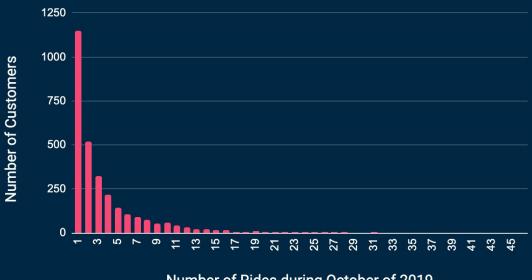
- Use caution when interpreting data: it **appears** that from 2019 to 2020 more scooters were used for shorter distances and durations
- There is plenty of variance in scooter usage

#### Comparing Campus & Non-Campus Rides



## Repeat Riders: 2019

#### Number of On-Campus Rides by Riders per Month



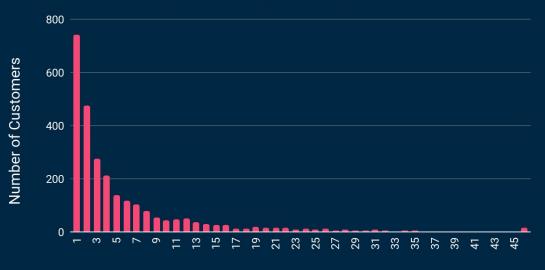
Number of Rides during October of 2019

Assuming 7 or more rides per month is regular usage

- About 39% are one time users
- About 18% of riders are regulars

## Repeat Riders: 2020

#### **Number of On-Campus Rides by Riders per Month**



Number of Rides during October of 2020

 About 28% are one time users

- About 27% of riders are regulars
- About 10% fewer 1
   one time riders and
   10% more regulars

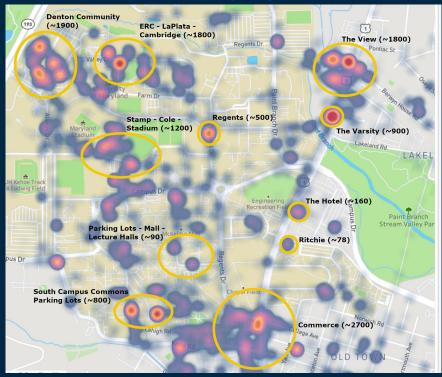
## On-Campus Ride Destinations

OLD TOWN

2019 Parking - Sporting ERC -Diner -[LAX, Tennis] (428) . University 1 LaPlata - Cambridge (2,343) View (1,055) The Varsity -Commerce (927) of Maryland |Regents (1,613) Stadium Lakeland P JH Kehoe Track & Ludwig Field Campus Dr The Hotel (150) Parking - Mall -Lecture Halls (1,298) Keldin Mall The Domain (904) Ritchie Collisseum (678) Chapel Field **South Campus** Commons (1,387)

|Commerce (1,764)

2020



### Off-Campus Destinations

2019 Hollywood Shopping Center (71) COLLEGE PARK WOODS Station (61) DANIELS PARK Monument Village Apartments (105) Courtyards (315) ACREDALE BRANCHVILLE Greenbelt Rd Holy Redeemer School Berwyn and Church (145) LAKELAND PARK ESTATES UMD Metro Station/ HEIGHT Graduate Gardens Calvert Post Office (615) ESTATE Apartments (164) CALVERT Residential (42) HILLS Police Station/ Residential (44) University Park Restaurants (100) yland RIVERDALI GARDENS

Location Breakdown:

Residential: 670 (40.3%)
Commercial: 171 (10.3%)
Transport:

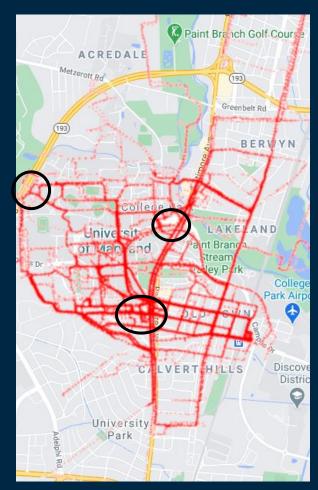
676 (40.7%) Other:

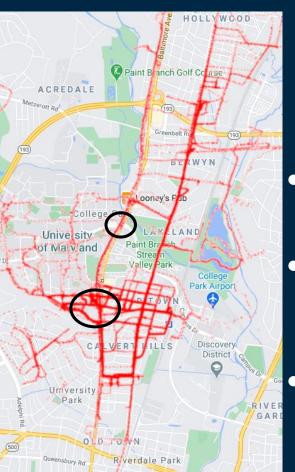
145 (8.7%)

2020 495 Capital Beltway ak Manor HILL HOLLYWOOD COLLEGE PARK WOODS DANIELS PARK BRANCHVIII Greenbelt R Berw Heigh Golf Course HATHAM COLLEGE PARK ESTATE HEIGHTS ESTATES University University Pa of Maryland RIVERDALE Research Park OpenStreetMap (500)

2019

2020





# On and Off Campus

- Most hybrid rides traveled in Oldtown and Calvert Hills areas
- Most used entrances/exits: Knox Rd/College Ave., Campus Dr. East and West (2019)
- 400 rides on each map

#### Possible Impacts of the Pandemic

**Maximum number of rides: 334,800 rides per month** at max capacity

- October 2020 only had 20,165 rides (6.0% utilization)
- October 2019 could sustain 156,240 rides per month at max, with 14,373 (9.2% utilization)

The pandemic lowered campus population density to less than half

With half the people and double the scooters, we expect one quarter the utilization in 2020; we get more than half (6.0 vs 9.2)

### Recommendations & Conclusions

- More research is needed after the pandemic ends:
  - Find utilization rate after pandemic
  - Match new hotspot destinations against 2019
- The pandemic has not had major impacts on the scooter market
  - If anything, it's likely that scooters are on the rise on campus (utilization, repeat riders, etc.)
  - The network helps to fill a short-distance and widely convenient niche in transportation on campus

#### **CONTRIBUTORS**

#### Data Analysis Software

- Python,
  - Pandas & Geopandas libraries
- Tableau
- Excel

#### **External Dataset Providers**

Office of Institutional Research, Planning & Assessment (2020)
 <a href="https://irpa.umd.edu/CampusCounts/Enrollments/stuprofile\_allug.pdf">https://irpa.umd.edu/CampusCounts/Enrollments/stuprofile\_allug.pdf</a>

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CREDITS: This presentation template was created by Slidesgo, including icons by Flaticon, and infographics & images by Freepik