

SMART COMMUTE RETHINK YOUR RIDE

TEAM 25



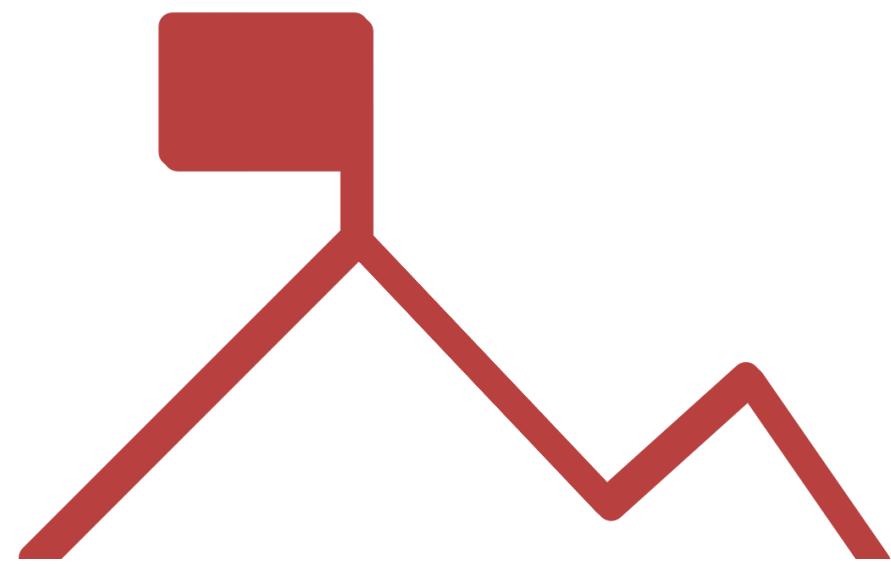
Data Challenge | Feb. 2020

50,000

C O M M U N I T Y

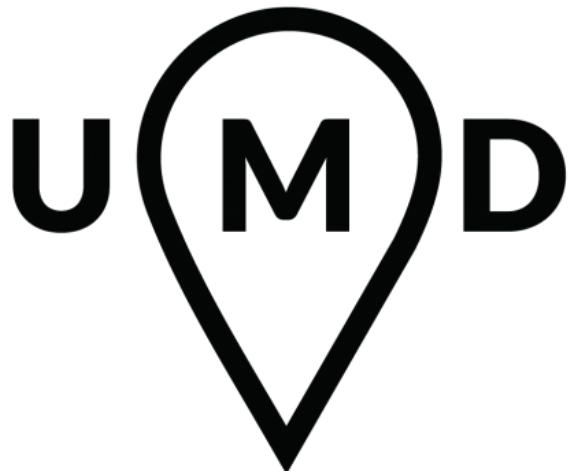


**The University of Maryland Department of
Transportation Services (DOTS)** provides a full range of parking and transportation services to a diverse community of students, faculty and staff in the City of College Park.



MISSION

"Strives to provide access to safe, cost-effective, sustainable and innovative services that anticipate the growing needs of our campus community"



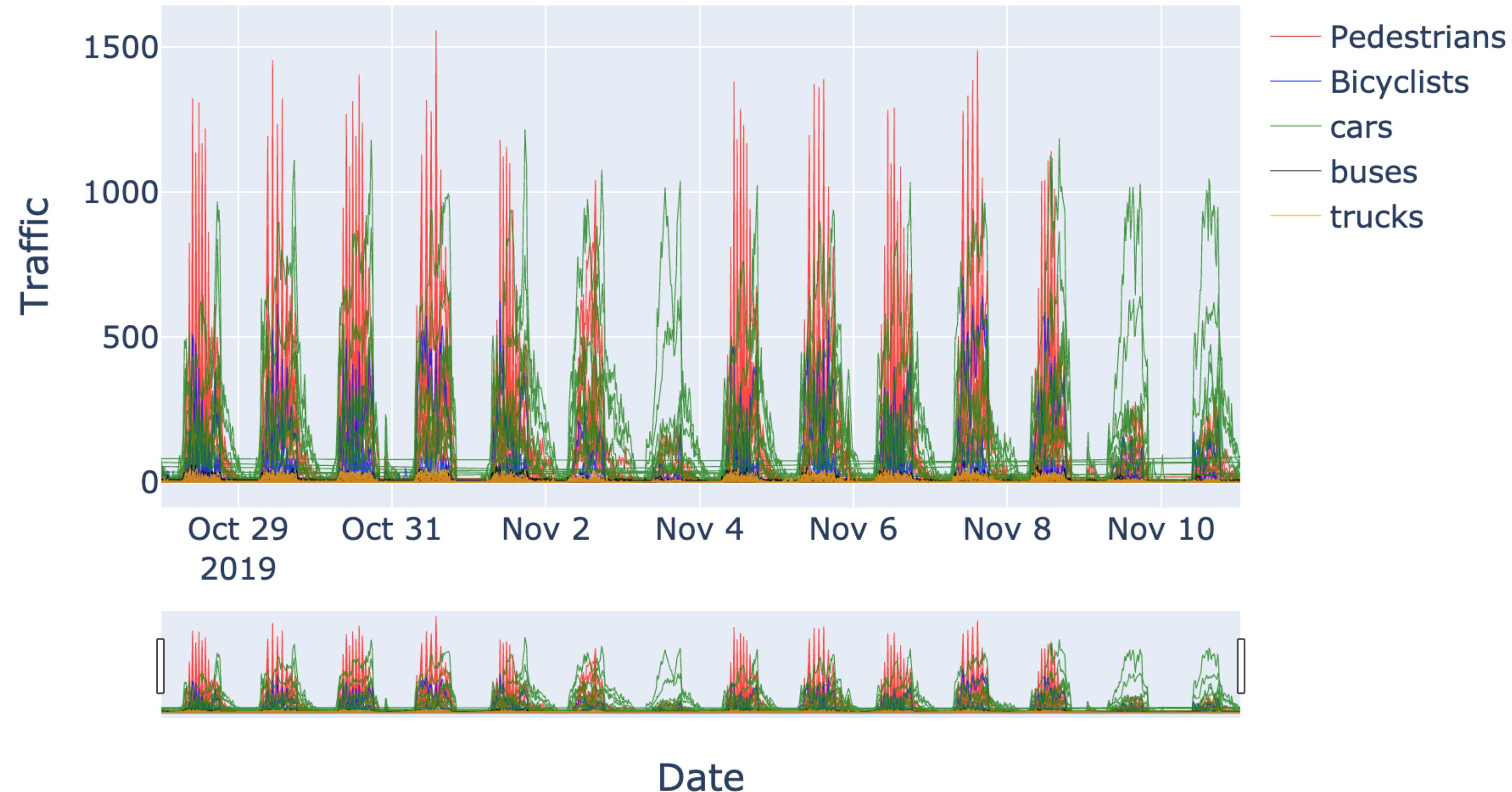
A B O U T P R O J E C T

Scope:

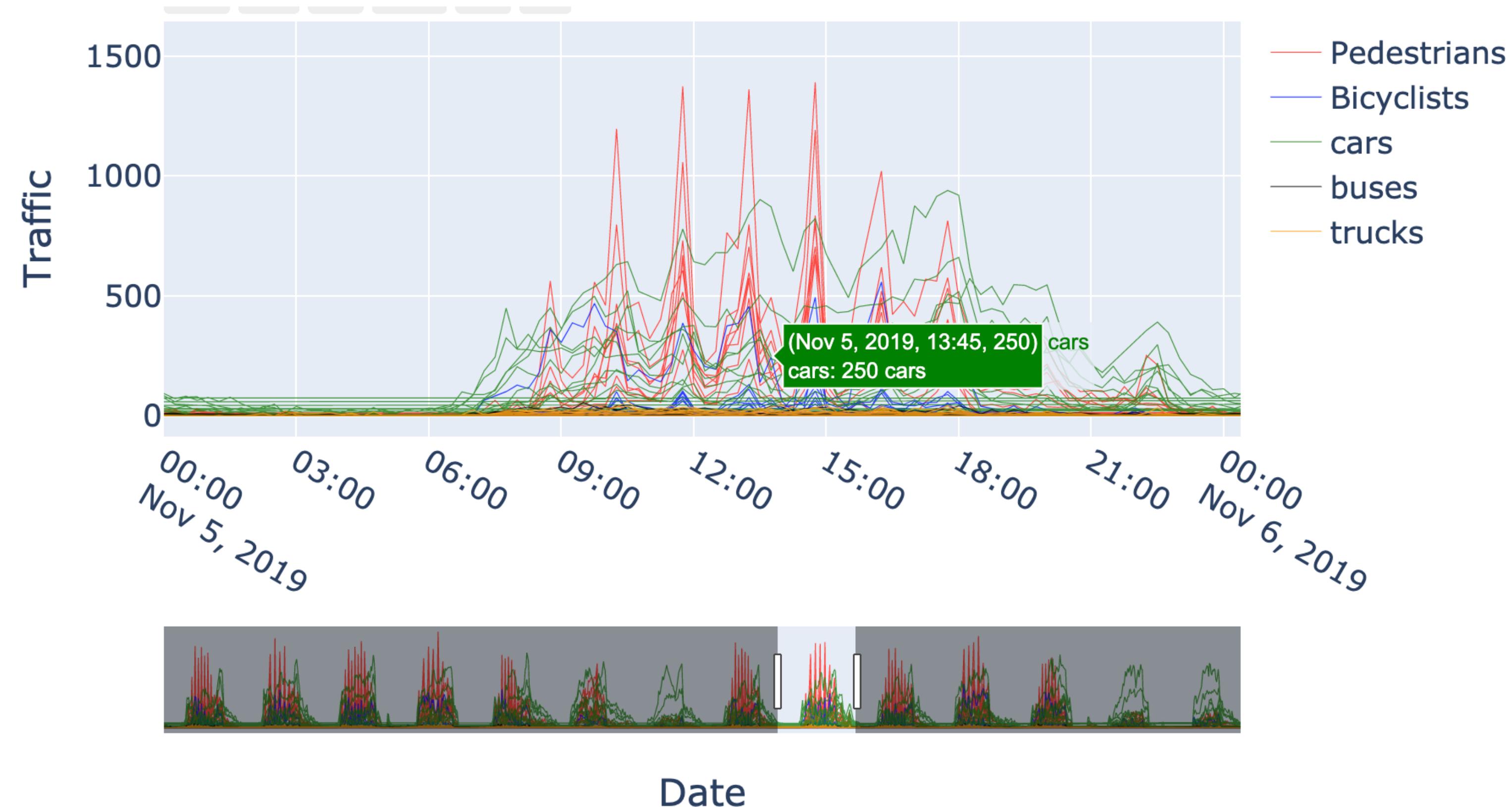
- Observe the time trend of traffic on campus by modes
- Identify and explore the influencing factors
- Give suggestions for future traffic

Tools: Excel, Python, ArcGIS, and R

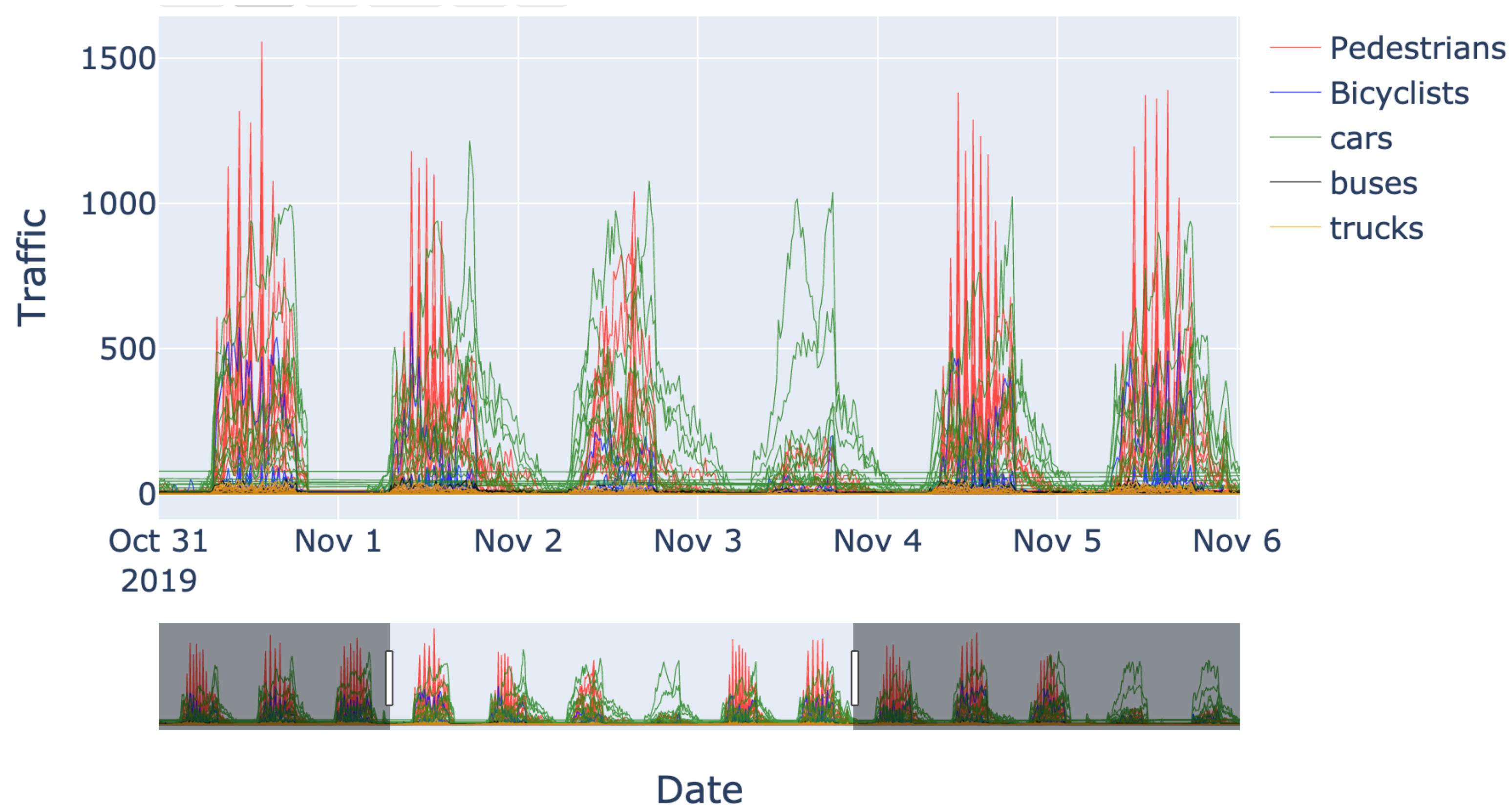
TIME TREND BY MODE (OVERALL)



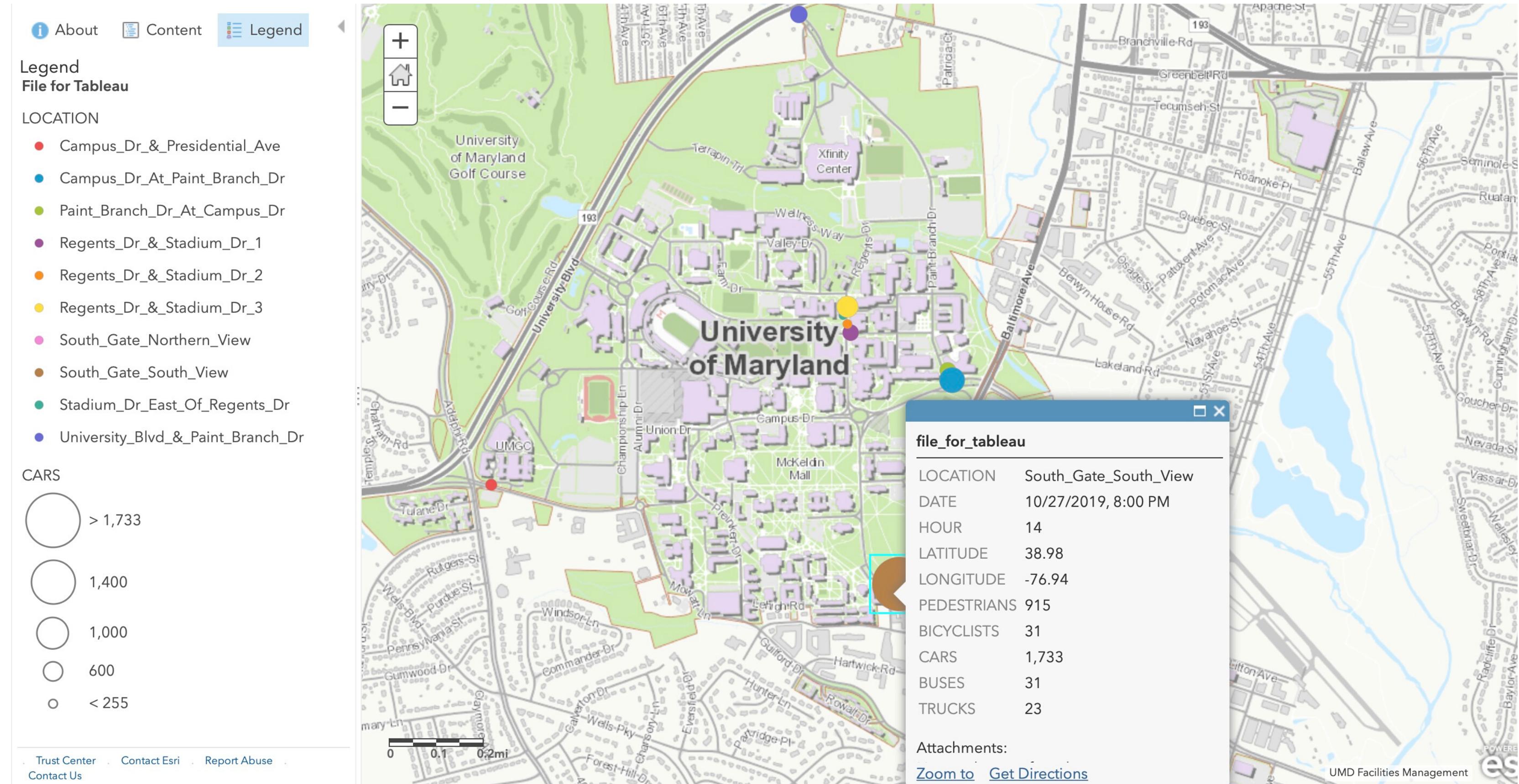
TIME TREND BY MODE (DAILY)



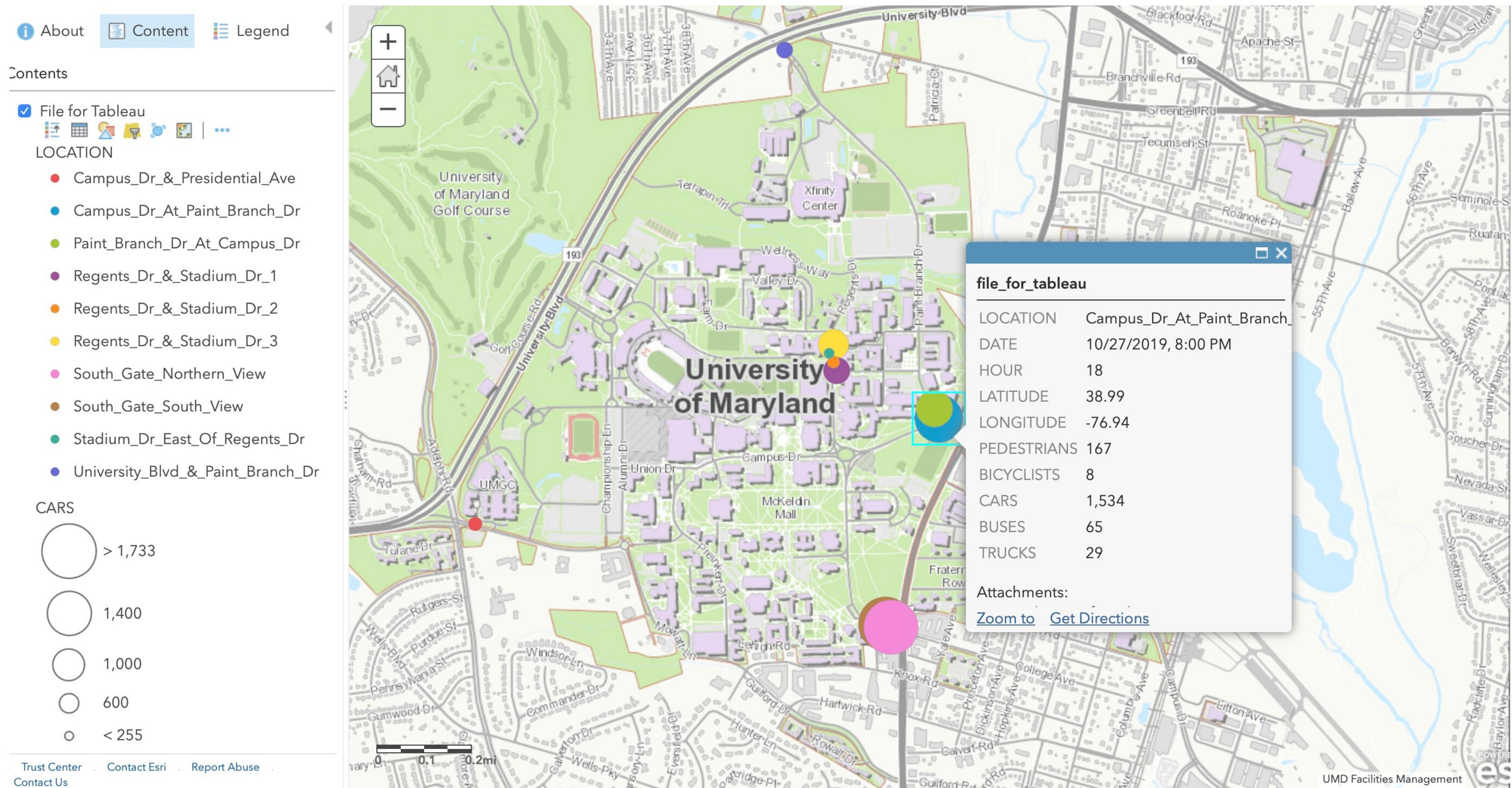
TIME TREND BY MODE (WEEKLY)



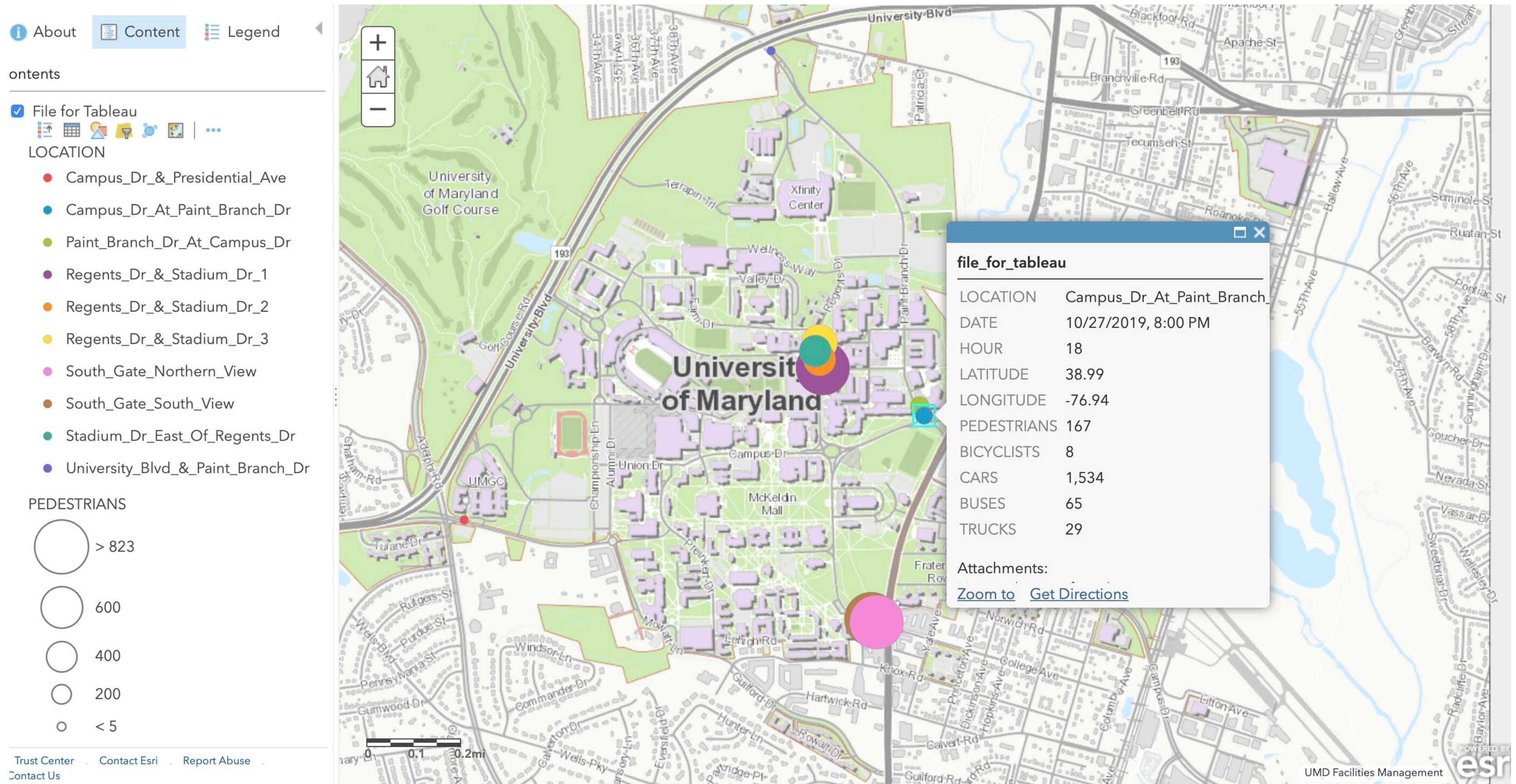
TIME TREND BY LOCATION



TIME TREND BY LOCATION



TIME TREND BY LOCATION



REGRESSION MODEL (BICYCLISTS)

Call:

```
lm(formula = BICYCLISTS ~ Temperature.F + Humidity + Wind.Speed.mph +
  Condition + IsGameTime + Prime.Time, data = dotTrain)
```

Residuals:

Min	1Q	Median	3Q	Max
-57.66	-17.32	-8.67	0.05	688.19

Coefficients:

	Estimate	Std. Error	t value	Pr(> t)
(Intercept)	4.85742	4.77356	1.018	0.308907
Temperature.F	0.94895	0.06320	15.015	< 2e-16 ***
Humidity	-0.48362	0.03719	-13.005	< 2e-16 ***
Wind.Speed.mph	-0.34372	0.16902	-2.034	0.042020 *
ConditionCloudy / Windy	-38.98493	9.61995	-4.053	5.10e-05 ***
ConditionFair	-13.37522	1.68495	-7.938	2.26e-15 ***
ConditionFair / Windy	-0.52670	5.58545	-0.094	0.924874
ConditionHeavy T-Storm	-30.72693	9.46854	-3.245	0.001177 **
ConditionLight Rain	-2.59825	2.34191	-1.109	0.267257
ConditionLight Rain / Windy	-39.53541	9.94050	-3.977	7.02e-05 ***
ConditionMostly Cloudy	-4.59616	1.71030	-2.687	0.007214 **
ConditionPartly Cloudy	-7.55186	1.97036	-3.833	0.000127 ***
ConditionPartly Cloudy / Windy	-28.38566	9.04320	-3.139	0.001700 **
ConditionT-Storm	-16.47433	8.53054	-1.931	0.053482 .
IsGameTime	-2.91765	2.08464	-1.400	0.161664
Prime.Time	18.86898	2.60980	7.230	5.16e-13 ***

Signif. codes:	0 ‘***’	0.001 ‘**’	0.01 ‘*’	0.05 ‘.’
	0.1 ‘ ’	1		

Residual standard error: 51.94 on 10736 degrees of freedom

Multiple R-squared: 0.06056, Adjusted R-squared: 0.05925

F-statistic: 46.14 on 15 and 10736 DF, p-value: < 2.2e-16

REGRESSION MODEL (PEDESTRIANS)

Call:

```
lm(formula = PEDESTRIANS ~ Temperature.F + Humidity + Wind.Speed.mph +  
  Condition + IsGameTime + Prime.Time, data = dotTrain)
```

Residuals:

Min	1Q	Median	3Q	Max
-253.10	-67.30	-27.24	20.89	1349.57

Coefficients:

	Estimate	Std. Error	t value	Pr(> t)
(Intercept)	-12.5070	12.9840	-0.963	0.335436
Temperature.F	5.1014	0.1719	29.676	< 2e-16 ***
Humidity	-2.3366	0.1011	-23.100	< 2e-16 ***
Wind.Speed.mph	-1.8453	0.4597	-4.014	6.02e-05 ***
ConditionCloudy / Windy	-165.4741	26.1661	-6.324	2.65e-10 ***
ConditionFair	-40.7282	4.5830	-8.887	< 2e-16 ***
ConditionFair / Windy	-22.3692	15.1923	-1.472	0.140942
ConditionHeavy T-Storm	-150.5271	25.7542	-5.845	5.22e-09 ***
ConditionLight Rain	-24.1105	6.3699	-3.785	0.000155 ***
ConditionLight Rain / Windy	-193.9329	27.0379	-7.173	7.84e-13 ***
ConditionMostly Cloudy	-15.6906	4.6520	-3.373	0.000746 ***
ConditionPartly Cloudy	-27.9366	5.3593	-5.213	1.90e-07 ***
ConditionPartly Cloudy / Windy	-127.1476	24.5973	-5.169	2.39e-07 ***
ConditionT-Storm	-74.4340	23.2029	-3.208	0.001341 **
IsGameTime	8.5896	5.6702	1.515	0.129832
Prime.Time	68.1044	7.0986	9.594	< 2e-16 ***

Signif. codes: 0 ‘***’ 0.001 ‘**’ 0.01 ‘*’ 0.05 ‘.’ 0.1 ‘ ’ 1

Residual standard error: 141.3 on 10736 degrees of freedom

Multiple R-squared: 0.1621, Adjusted R-squared: 0.1609

F-statistic: 138.4 on 15 and 10736 DF, p-value: < 2.2e-16

REGRESSION MODEL (TRUCKS)

Call:

```
lm(formula = TRUCKS ~ Temperature.F + Humidity + Wind.Speed.mph +
  Condition + IsGameTime + Prime.Time, data = dotTrain)
```

Residuals:

Min	1Q	Median	3Q	Max
-17.739	-4.321	-1.642	2.010	90.035

Coefficients:

	Estimate	Std. Error	t value	Pr(> t)
(Intercept)	-1.517355	0.673538	-2.253	0.024291 *
Temperature.F	0.314334	0.008917	35.249	< 2e-16 ***
Humidity	-0.114246	0.005247	-21.774	< 2e-16 ***
Wind.Speed.mph	-0.181606	0.023849	-7.615	2.86e-14 ***
ConditionCloudy / Windy	-12.202252	1.357351	-8.990	< 2e-16 ***
ConditionFair	-2.434642	0.237743	-10.241	< 2e-16 ***
ConditionFair / Windy	0.377103	0.788093	0.479	0.632304
ConditionHeavy T-Storm	-11.165335	1.335987	-8.357	< 2e-16 ***
ConditionLight Rain	-1.840499	0.330437	-5.570	2.61e-08 ***
ConditionLight Rain / Windy	-13.326092	1.402579	-9.501	< 2e-16 ***
ConditionMostly Cloudy	-0.925187	0.241319	-3.834	0.000127 ***
ConditionPartly Cloudy	-1.207632	0.278013	-4.344	1.41e-05 ***
ConditionPartly Cloudy / Windy	-8.438148	1.275972	-6.613	3.94e-11 ***
ConditionT-Storm	-6.536166	1.203638	-5.430	5.75e-08 ***
IsGameTime	-0.900013	0.294138	-3.060	0.002220 **
Prime.Time	7.463016	0.368236	20.267	< 2e-16 ***

Signif. codes: 0 ‘***’ 0.001 ‘**’ 0.01 ‘*’ 0.05 ‘.’ 0.1 ‘ ’ 1

Residual standard error: 7.328 on 10736 degrees of freedom

Multiple R-squared: 0.2325, Adjusted R-squared: 0.2314

F-statistic: 216.8 on 15 and 10736 DF, p-value: < 2.2e-16

REGRESSION MODEL (BUSES)

call:

```
lm(formula = BUSES ~ Temperature.F + Humidity + Wind.Speed.mph +
  Condition + IsGameTime + Prime.Time, data = dotTrain)
```

Residuals:

Min	1Q	Median	3Q	Max
-11.951	-3.558	-1.682	1.222	69.502

Coefficients:

	Estimate	Std. Error	t value	Pr(> t)
(Intercept)	-1.533314	0.598473	-2.562	0.010419 *
Temperature.F	0.215167	0.007924	27.155	< 2e-16 ***
Humidity	-0.069969	0.004662	-15.008	< 2e-16 ***
Wind.Speed.mph	-0.109160	0.021191	-5.151	2.63e-07 ***
ConditionCloudy / Windy	-6.005140	1.206076	-4.979	6.49e-07 ***
ConditionFair	-0.815384	0.211247	-3.860	0.000114 ***
ConditionFair / Windy	2.828095	0.700262	4.039	5.41e-05 ***
ConditionHeavy T-Storm	-7.912654	1.187093	-6.666	2.77e-11 ***
ConditionLight Rain	-1.139098	0.293610	-3.880	0.000105 ***
ConditionLight Rain / Windy	-9.283368	1.246264	-7.449	1.01e-13 ***
ConditionMostly Cloudy	0.215192	0.214425	1.004	0.315605
ConditionPartly Cloudy	0.172005	0.247029	0.696	0.486260
ConditionPartly Cloudy / Windy	-5.723402	1.133767	-5.048	4.53e-07 ***
ConditionT-Storm	-4.760380	1.069494	-4.451	8.63e-06 ***
IsGameTime	-0.357798	0.261357	-1.369	0.171027
Prime.Time	3.548771	0.327197	10.846	< 2e-16 ***

Signif. codes: 0 ‘***’ 0.001 ‘**’ 0.01 ‘*’ 0.05 ‘.’ 0.1 ‘ ’ 1

Residual standard error: 6.511 on 10736 degrees of freedom

Multiple R-squared: 0.1249, Adjusted R-squared: 0.1237

F-statistic: 102.2 on 15 and 10736 DF, p-value: < 2.2e-16

REGRESSION MODEL (CARS)

Call:

```
lm(formula = CARS ~ Temperature.F + Humidity + Wind.Speed.mph +  
Condition + IsGameTime + Prime.Time, data = dotTrain)
```

Residuals:

Min	1Q	Median	3Q	Max
-362.73	-96.20	-44.37	39.88	1049.89

Coefficients:

	Estimate	Std. Error	t value	Pr(> t)
(Intercept)	67.2186	15.0391	4.470	7.92e-06 ***
Temperature.F	5.9222	0.1991	29.743	< 2e-16 ***
Humidity	-3.3089	0.1172	-28.243	< 2e-16 ***
Wind.Speed.mph	-4.3540	0.5325	-8.176	3.25e-16 ***
ConditionCloudy / Windy	-169.2942	30.3075	-5.586	2.38e-08 ***
ConditionFair	-34.8216	5.3084	-6.560	5.64e-11 ***
ConditionFair / Windy	-44.3364	17.5969	-2.520	0.01176 *
ConditionHeavy T-Storm	-199.9976	29.8305	-6.704	2.12e-11 ***
ConditionLight Rain	-11.2320	7.3781	-1.522	0.12796
ConditionLight Rain / Windy	-257.1210	31.3174	-8.210	2.46e-16 ***
ConditionMostly Cloudy	1.7541	5.3883	0.326	0.74477
ConditionPartly Cloudy	-16.6465	6.2076	-2.682	0.00734 **
ConditionPartly Cloudy / Windy	-195.0974	28.4905	-6.848	7.91e-12 ***
ConditionT-Storm	-110.4696	26.8754	-4.110	3.98e-05 ***
IsGameTime	38.9598	6.5676	5.932	3.08e-09 ***
Prime.Time	33.0706	8.2222	4.022	5.81e-05 ***

Signif. codes: 0 ‘***’ 0.001 ‘**’ 0.01 ‘*’ 0.05 ‘.’ 0.1 ‘ ’ 1

Residual standard error: 163.6 on 10736 degrees of freedom

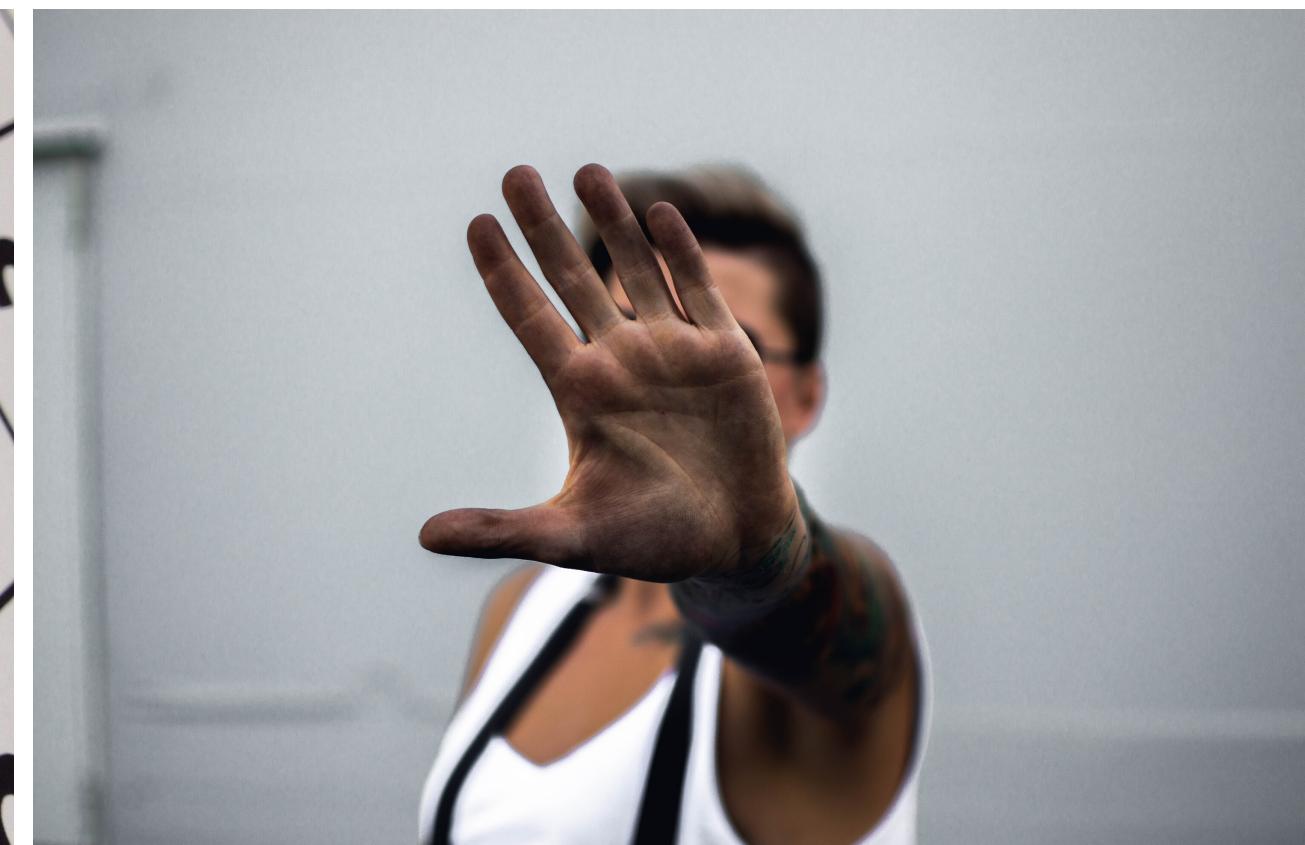
Multiple R-squared: 0.17, Adjusted R-squared: 0.1688

F-statistic: 146.6 on 15 and 10736 DF, p-value: < 2.2e-16

SUGGESTIONS



ADJUST CLASS
SCHEDULE



RESTRICT AUTOMOBILE
ACCESS IN RUSH HOUR



PROVIDE MORE
SHUTTLES



THANK YOU!

SMART COMMUTE IS OUR PRIORITY.