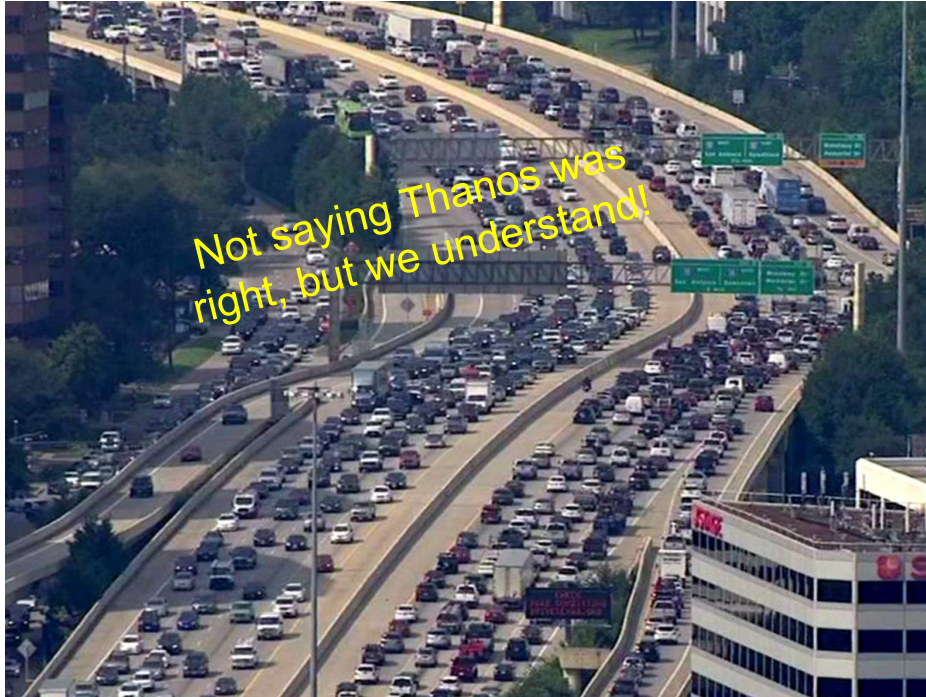


DOTS TRAFFIC PREDICTION

TEAM: DC20018

THE PURPOSE OF OUR PROJECT



We don't want this in our campus!!



To avoid potential traffic jams on campus, we need to take action in advance!

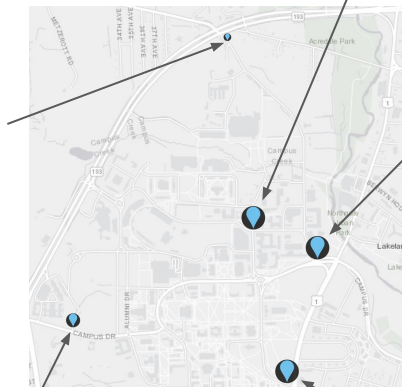
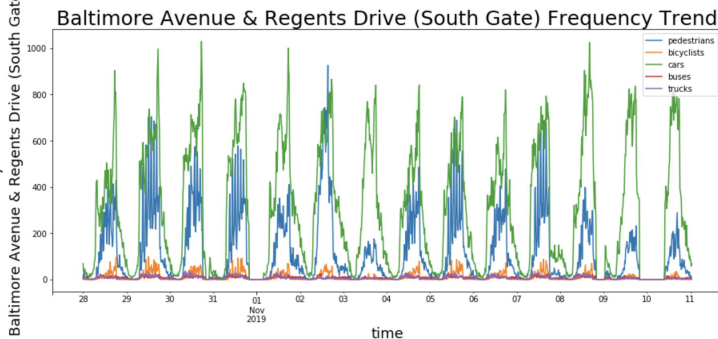
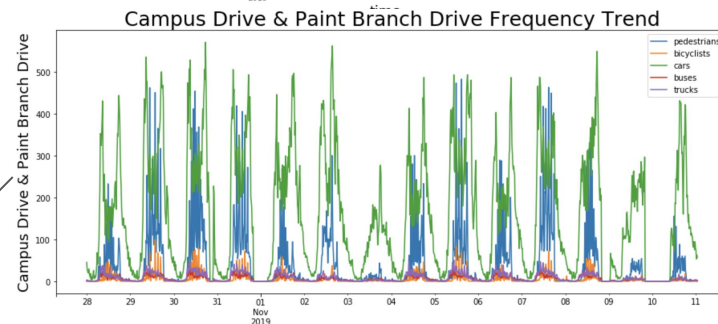
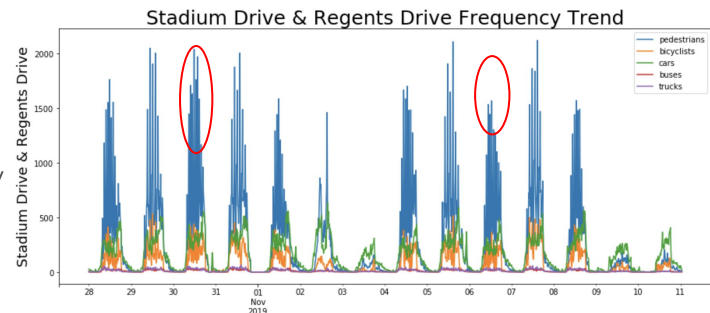
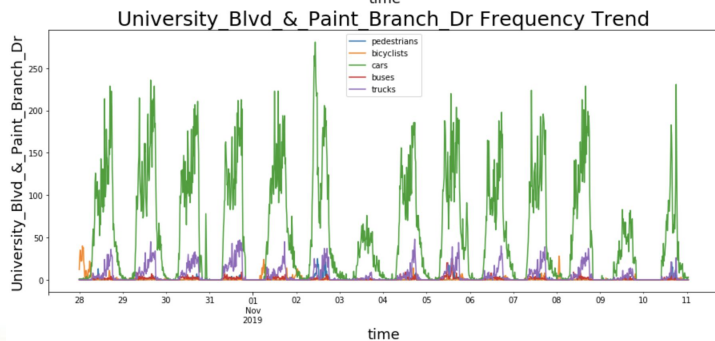
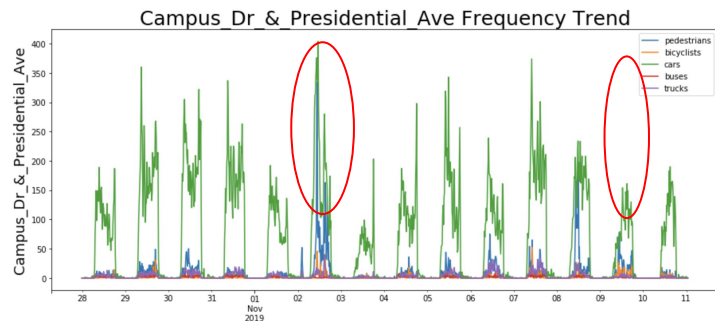
We built a **predictive model**

1. Features we found and put into the model
2. Model performance
3. Model application

OVERALL TIME TREND

Weekly periodic
Temporary dynamics matter!

Dataset:
count number
5 transportation mode
5 locations
2 weeks



GAME DAY

Football game date: 2019-11-02 Sat

Compare date: 2019-11-09 Sat

Game time: 12:00-15:00 pm

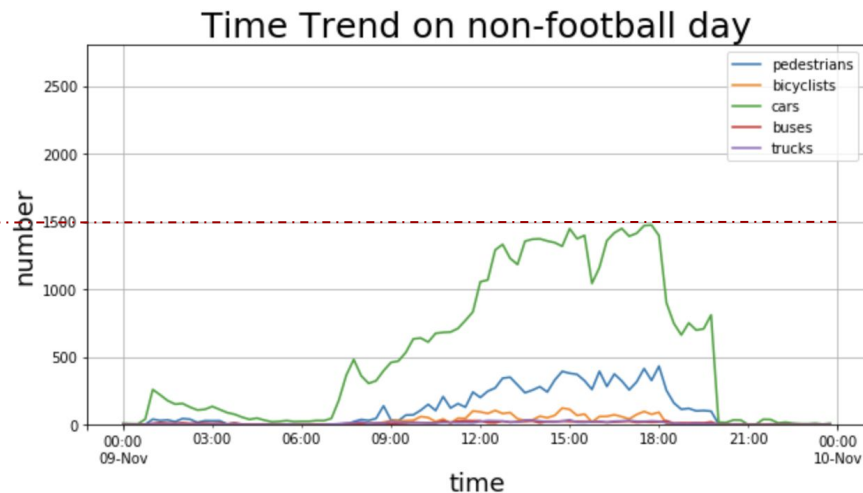
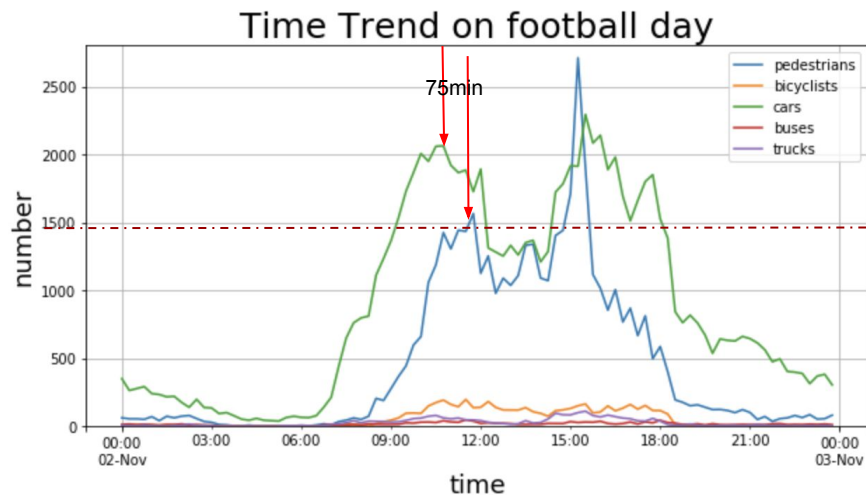
Method: Take number difference, Foreign vehicles

Cars: 1.5 times Pedestrians: 3 times than usual;

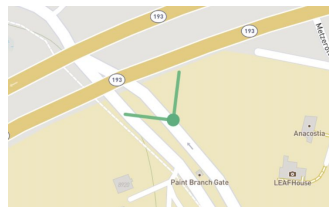
A concave

Reach peak earlier(10am) and faster;

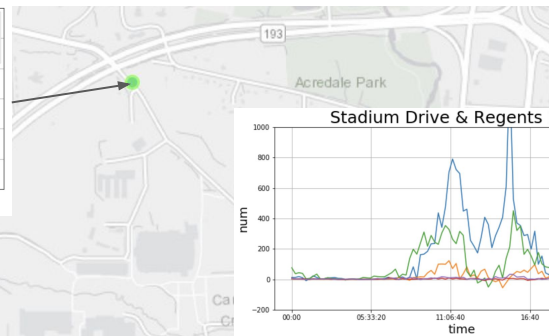
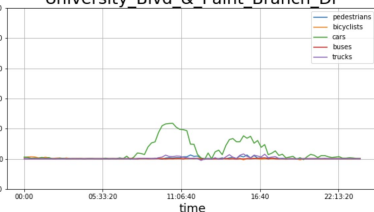
Cars reached peak 75 mins earlier;



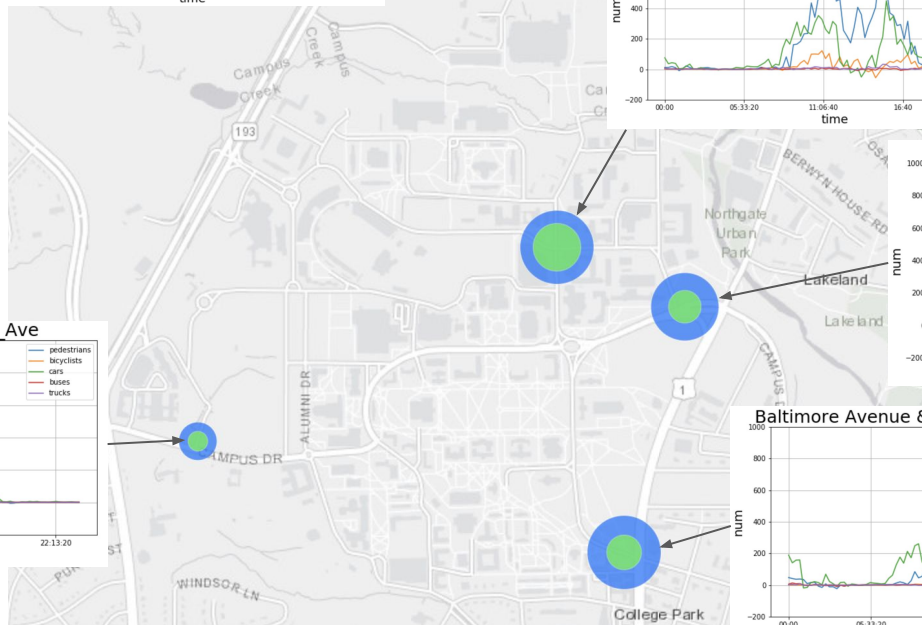
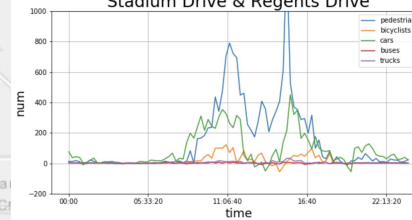
GAME DAY



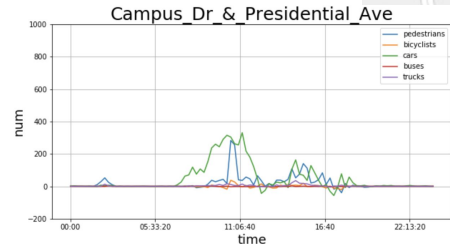
University Blvd & Paint Branch Dr



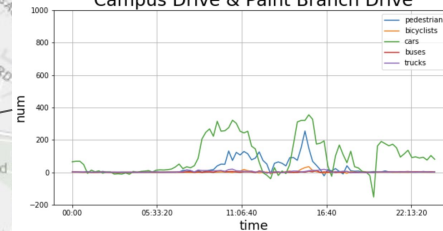
Stadium Drive & Regents Drive



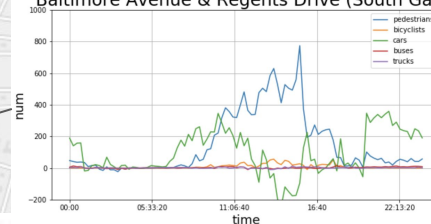
Campus Dr & Presidential Ave



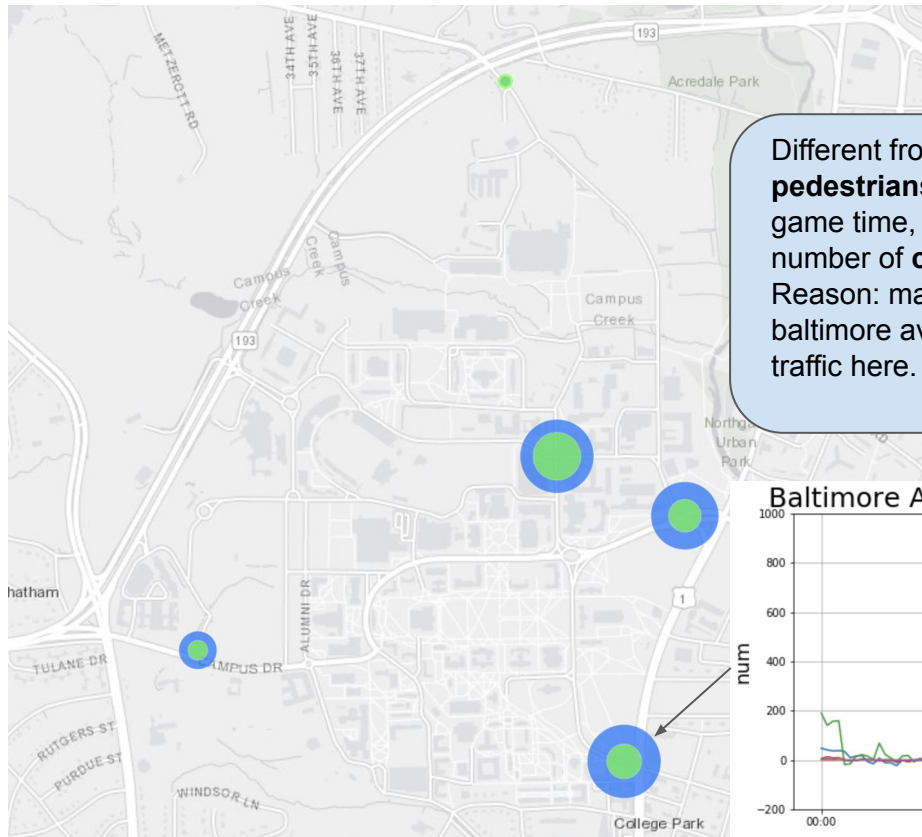
Campus Drive & Paint Branch Drive



Baltimore Avenue & Regents Drive (South Gate)

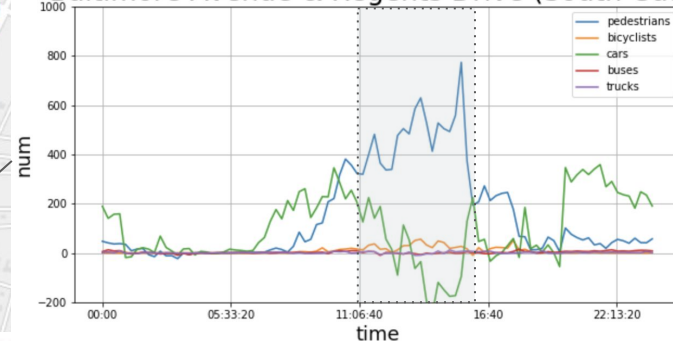


GAME DAY

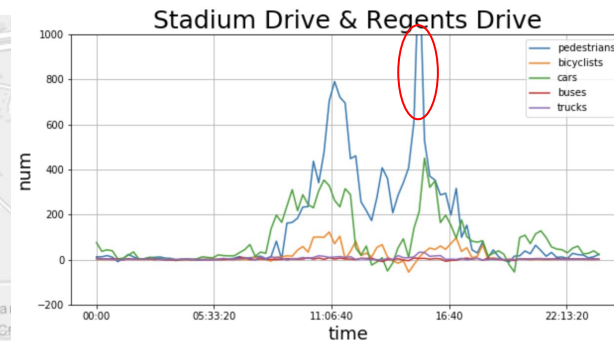
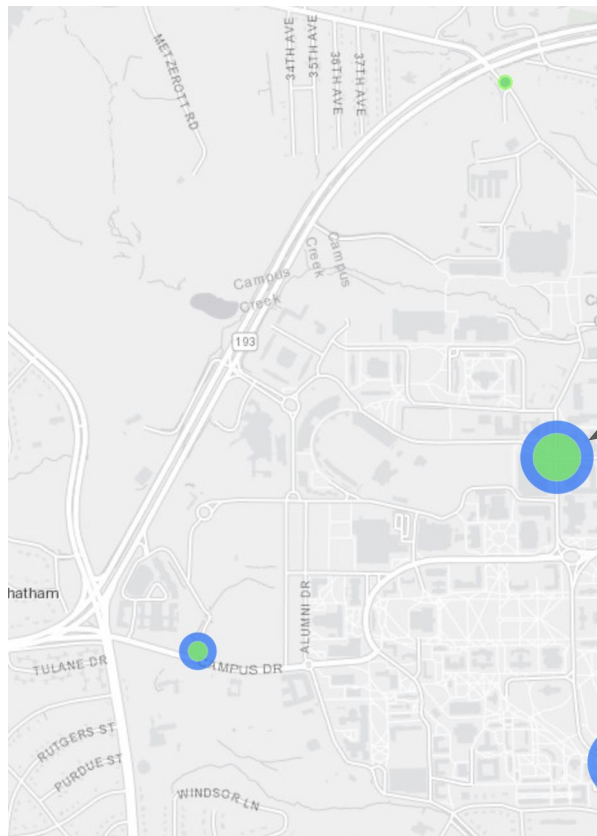


Different from others, the number of **pedestrians** here **increases a lot** during game time, till the end of the game. And number of **cars** is much **less** than usual. Reason: many people watch game at bars at baltimore avenue, and cars avoid potential traffic here.

Baltimore Avenue & Regents Drive (South Gate)



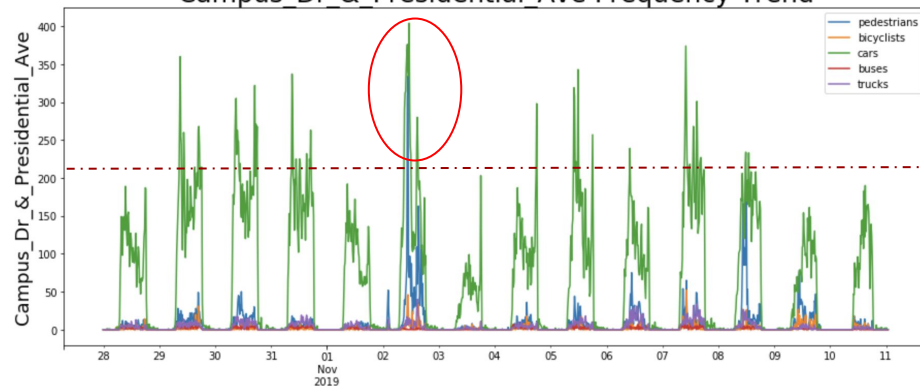
GAME DAY



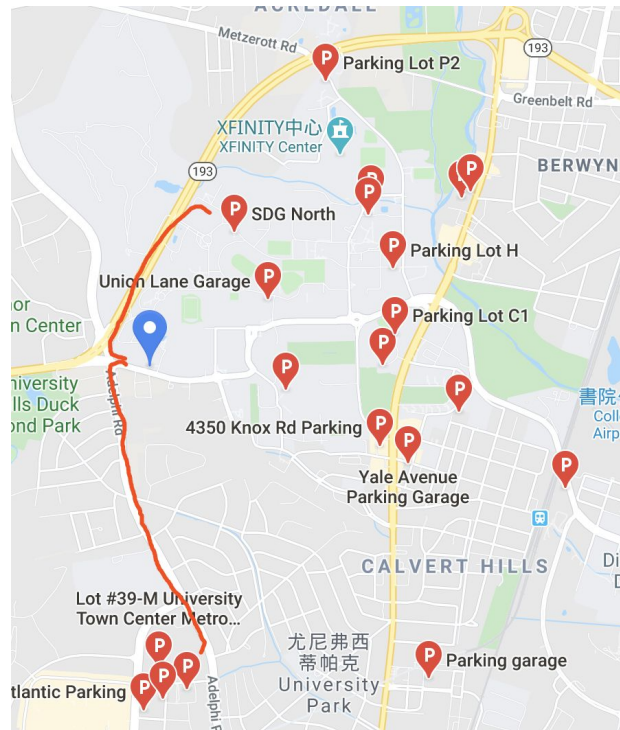
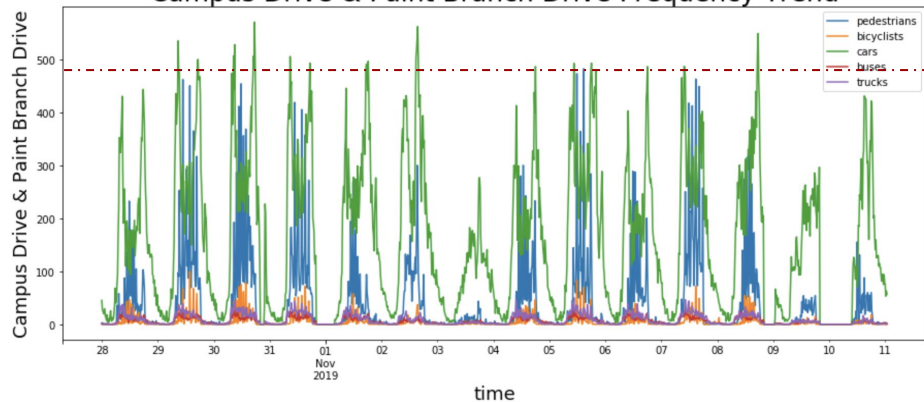
Here, pedestrian traffic reaches its peak at 3pm (1200 more than usual). Reason: There are many game day parking lots around here and there is a major bus stop near here.

GAME DAY

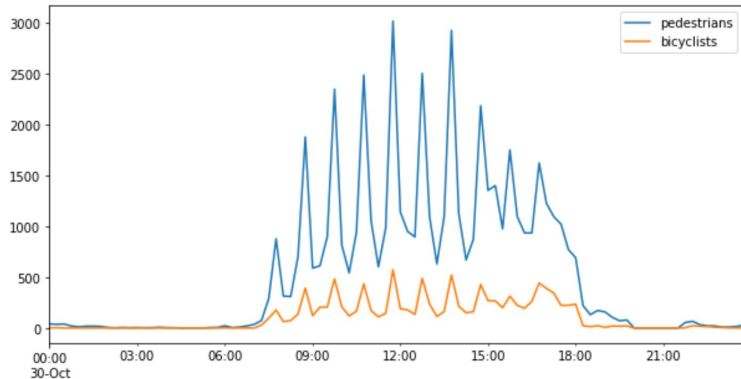
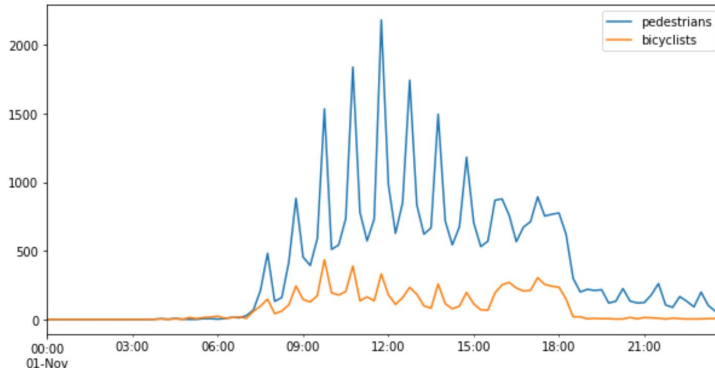
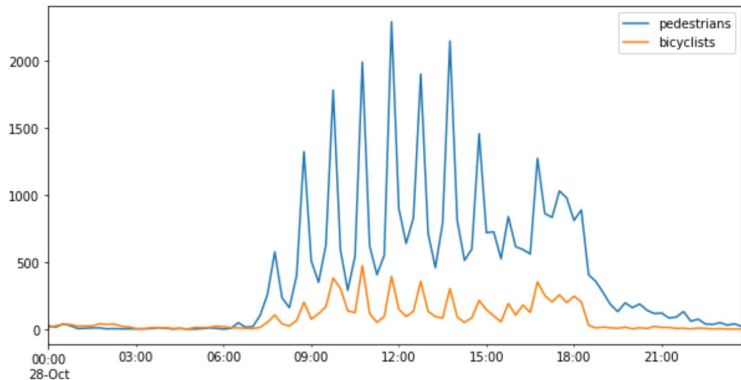
Campus Dr & Presidential Ave Frequency Trend



Campus Drive & Paint Branch Drive Frequency Trend



CLASS SCHEDULE (MON, WED, FRI)



Period	Time	Monday	Wednesday	Friday
1	8:00 - 8:50			
2	9:00 - 9:50			
3	10:00 - 10:50			
4	11:00 - 11:50			
5	12:00 - 12:50			
6	1:00 - 1:50			
7	2:00 - 2:50			
8	3:00 - 3:50			
9	4:00 - 4:50			

Event List for Feb 24, 2020

9:00 am - 9:50 am
MATH 241 01111 XL 202001
 MWF 0900-0950
 BRB 1101

9:00 am - 9:50 am
MATH 241 01121 XL 202001
 MWF 0900-0950
 BRB 1101

9:00 am - 9:50 am
MATH 241 01211 XL 202001
 MWF 0900-0950
 BRB 1101

9:00 am - 9:50 am
MATH 241 01221 XL 202001
 MWF 0900-0950
 BRB 1101

9:00 am - 9:50 am
MATH 241 01311 XL 202001

Event List for Feb 26, 2020

8:00 am - 10:50 am
BSCI 201 01073 202001
 W 0800-1050
 BPS 0205

8:00 am - 10:50 am
BSCI 202 11053 202001
 W 0800-1050
 BPS 0201

8:30 am - 9:45 am
PSYC 319D 01011 202001
 MW 0830-0945
 BPS 1103

9:00 am - 9:50 am
MATH 241 01111 XL 202001
 MWF 0900-0950
 BRB 1101

Event List for Feb 28, 2020

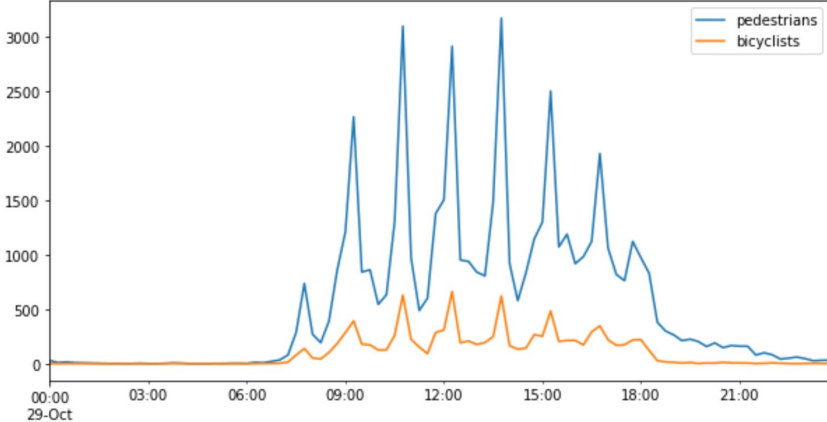
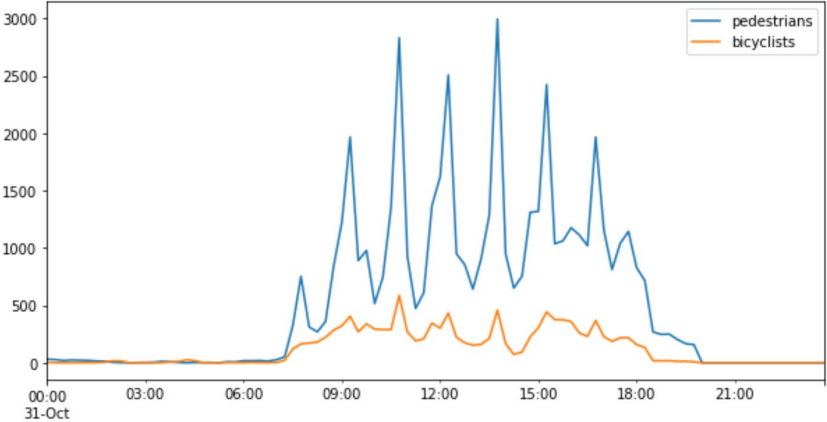
8:00 am - 9:50 am
PSYC 300 01035 202001
 F 0800-0950
 BPS 1228

8:00 am - 9:50 am
PSYC 300 02035 202001
 F 0800-0950
 BPS 1234

8:00 am - 9:50 am
PSYC 433 01073 202001
 F 0800-0950
 BPS 1232

9:00 am - 9:50 am
MATH 241 01111 XL 202001
 MWF 0900-0950
 BRB 1101

CLASS SCHEDULE (TUE, THURS)



Event List for Feb 25, 2020

- 8:00 am - 9:15 am
PSYC 200 01021 XL 202001
TR 0800-0915
BPS 1250
- 8:00 am - 9:15 am
PSYC 200 01031 XL 202001
TR 0800-0915
BPS 1250
- 8:00 am - 9:15 am
PSYC 200 01041 XL 202001
TR 0800-0915
BPS 1250
- 8:00 am - 9:15 am
PSYC 200 01051 XL 202001
TR 0800-0915
BPS 1250

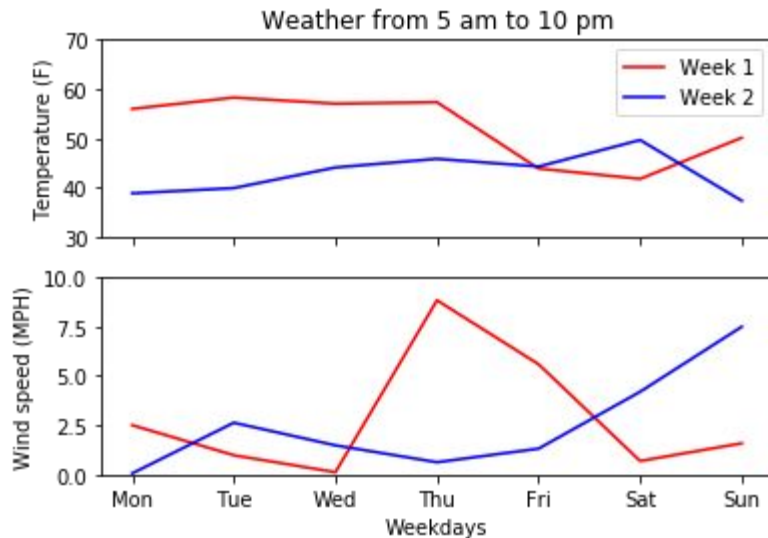
Event List for Feb 27, 2020

- 8:00 am - 9:15 am
PSYC 200 01011 XL 202001
TR 0800-0915
BPS 1250
- 8:00 am - 9:15 am
PSYC 200 01021 XL 202001
TR 0800-0915
BPS 1250
- 8:00 am - 9:15 am
PSYC 200 01031 XL 202001
TR 0800-0915
BPS 1250
- 8:00 am - 9:15 am
PSYC 200 01041 XL 202001
TR 0800-0915
BPS 1250

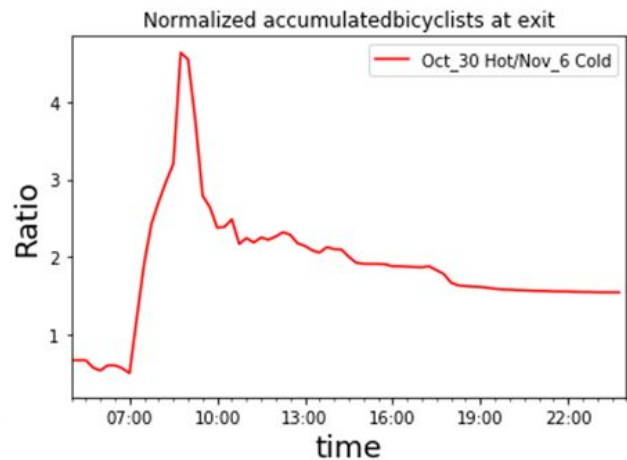
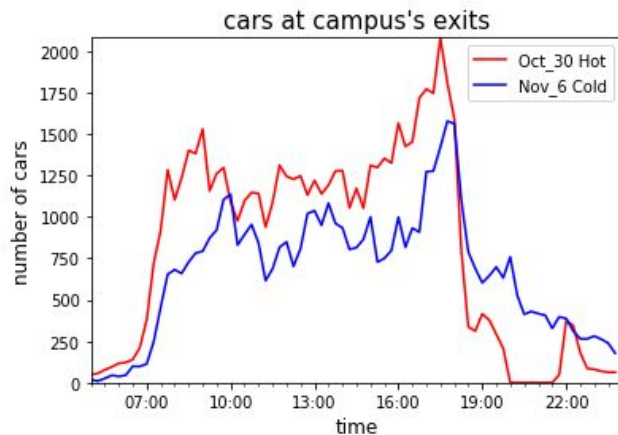
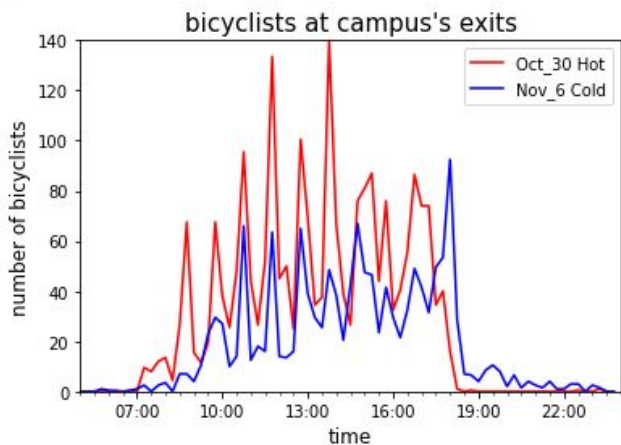
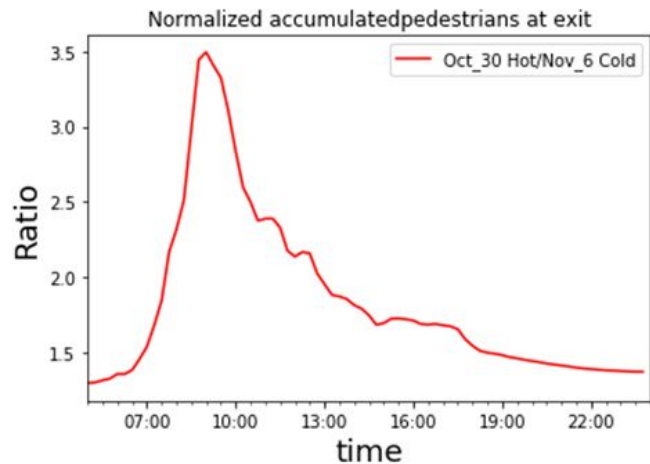
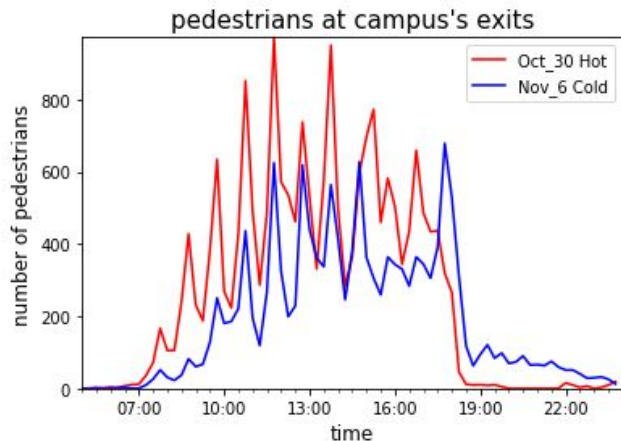
Period	Time	Tuesday	Thursday
16	8:00 - 9:15		
17	9:30 - 10:45		
18	11:00 - 12:15		
19	12:30 - 1:45		
20	2:00 - 3:15		
21	3:30 - 4:45		

WEATHER

- No precipitation
- Hard to separate from confounders with limited data
- Not enough data for wind uncorrelated with temperature
- Comparison of most distinct weather days

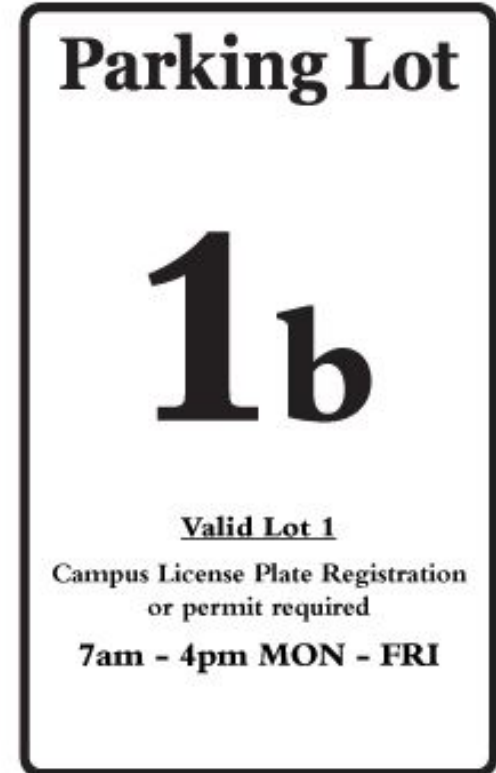
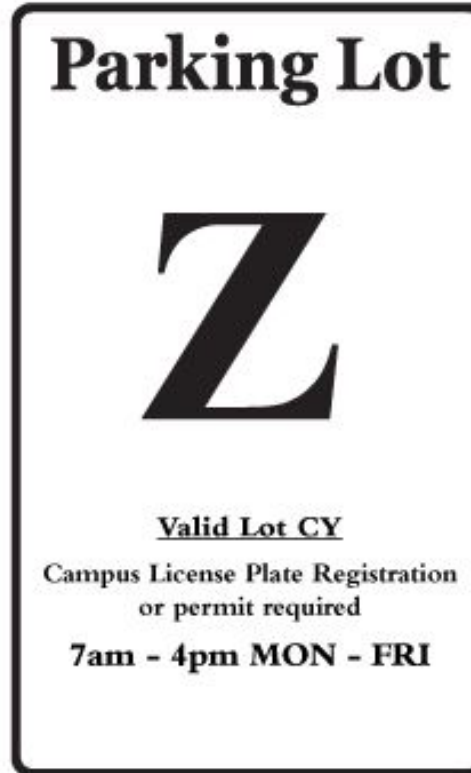


WEATHER



PARKING POLICY

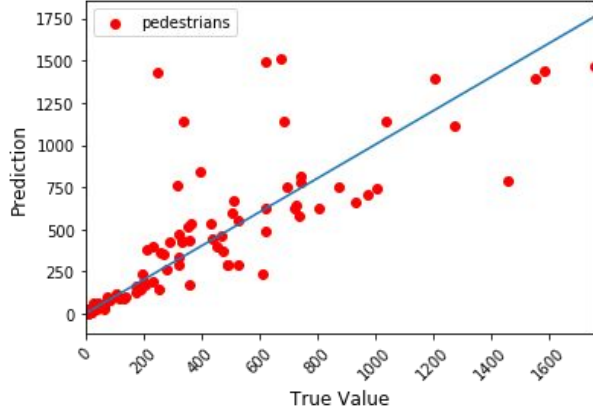
- Statistically insignificant difference for cars
- Difference for pedestrians, bikes, etc. essentially correlates to class schedule, which is not independent of parking hours.



PREDICTIVE MODEL (Performance)

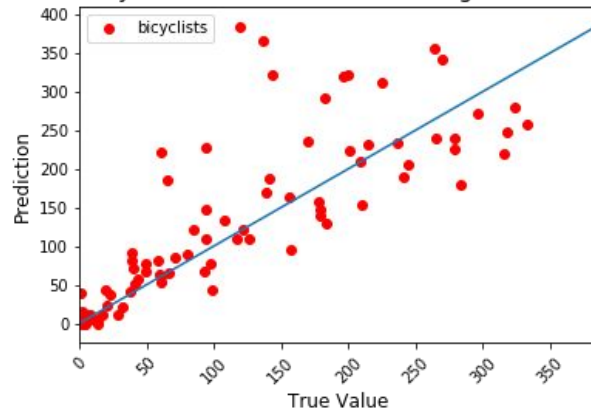
$R^2=0.701$

pedestrians at Stadium Drive & Regents Drive



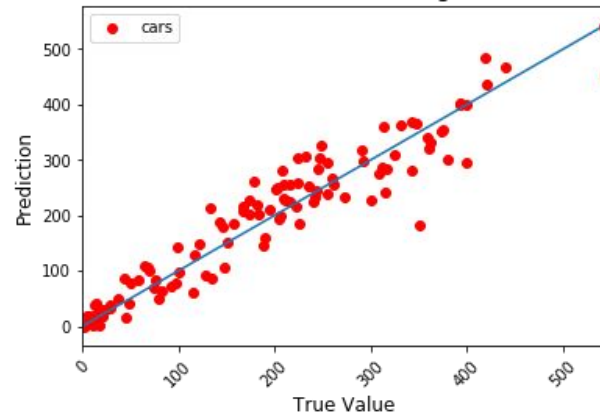
$R^2=0.706$

bicyclists at Stadium Drive & Regents Drive

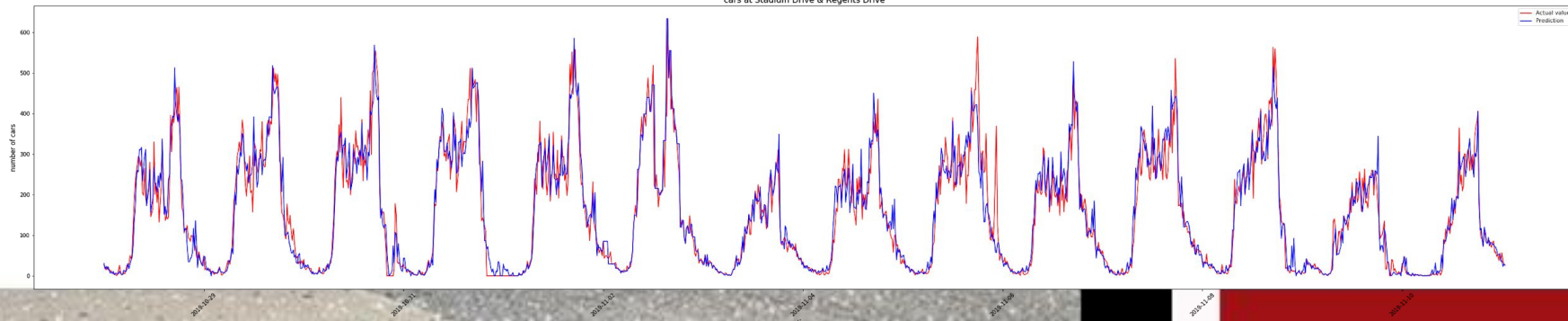


$R^2=0.928$

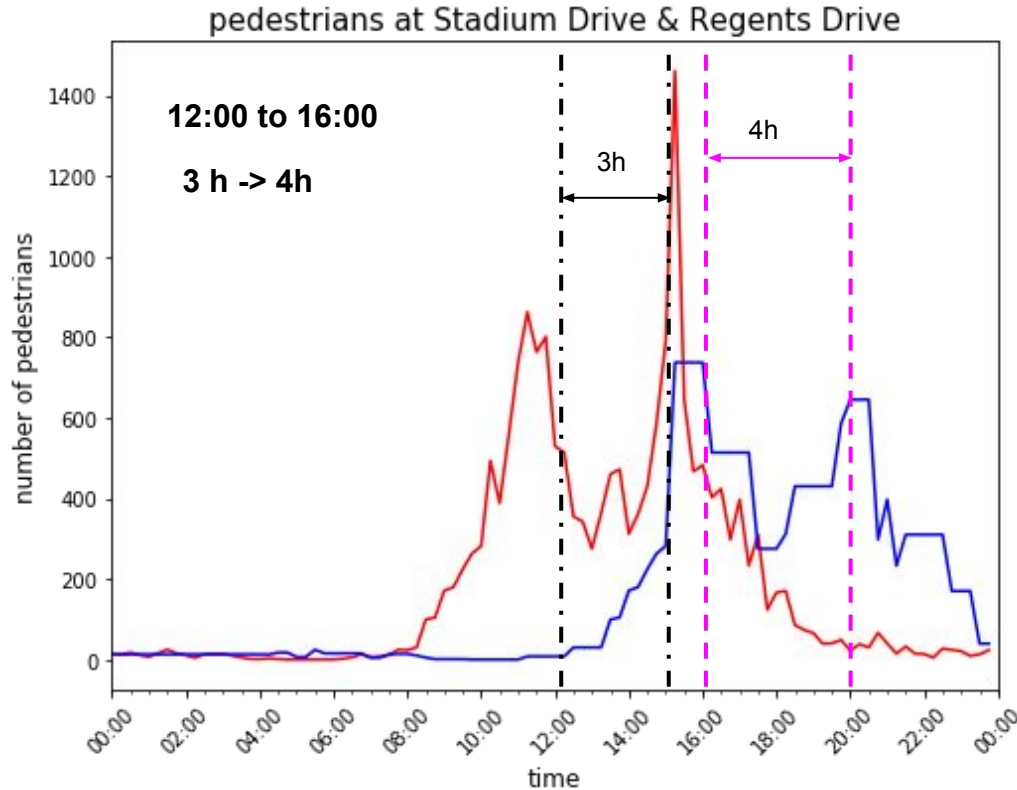
cars at Stadium Drive & Regents Drive



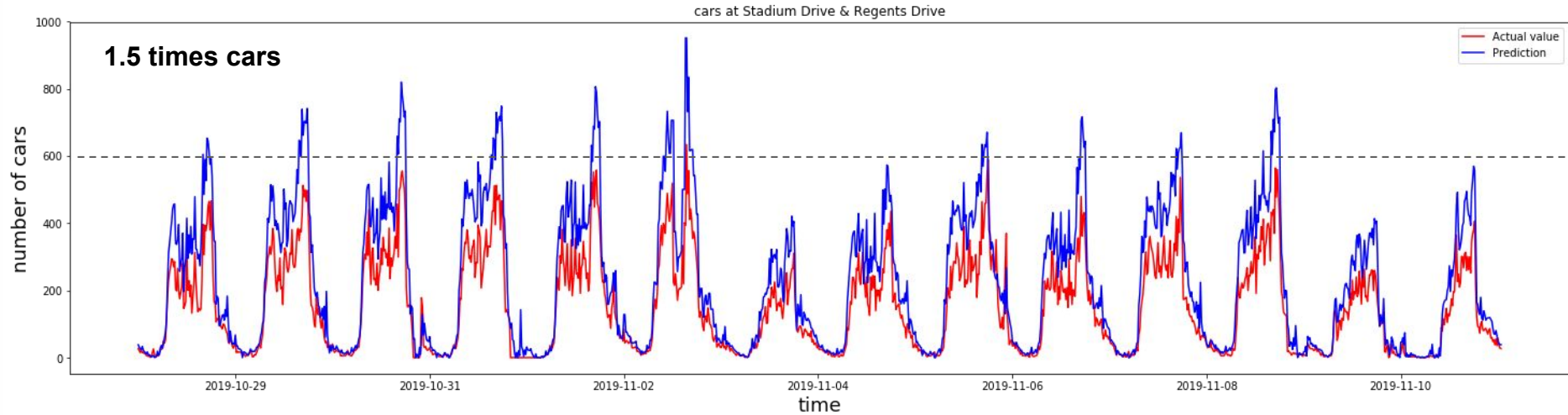
cars at Stadium Drive & Regents Drive



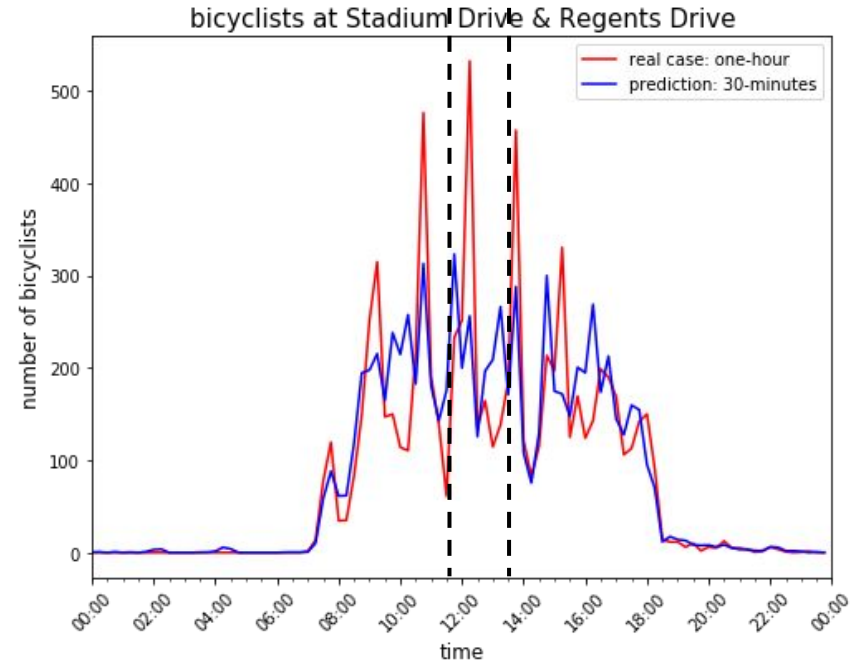
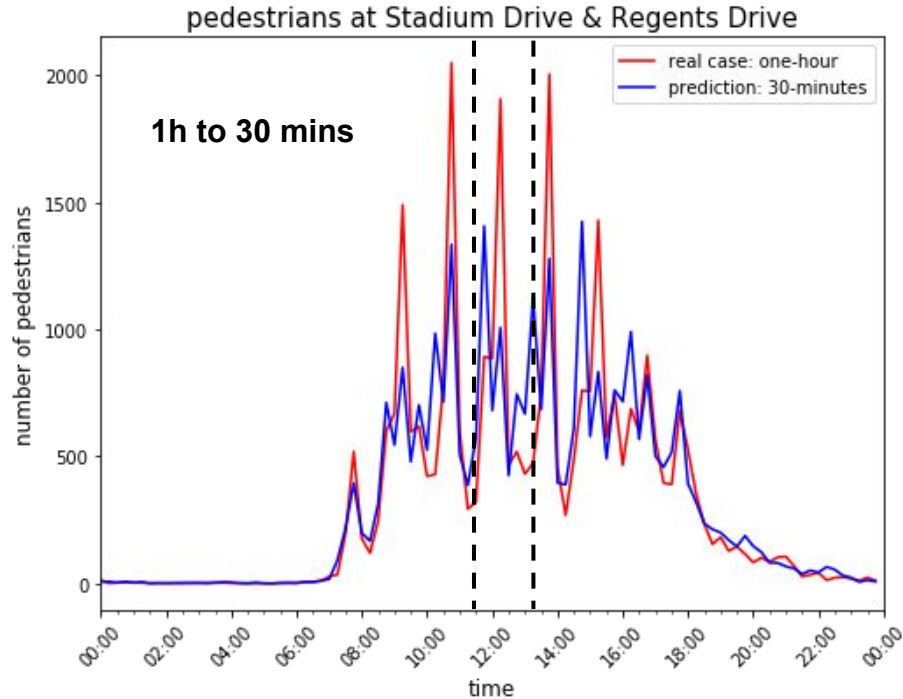
PREDICTIVE MODEL (What if the game is prolonged?)



PREDICTIVE MODEL (What if more student get enrolled?)



PREDICTIVE MODEL (Class Schedule)



Have the class timings be a mixture of 50 mins and 75 mins on the same day on different departments.

Future Works

1. Collect more data to support our suggestions, such as the reason for student's low attendance in cold weather. (Hospital data)
2. More data on football game days to make our model for game day more robust.
3. Collect student population and the number of car on the road over years.



THANK YOU!

Extra slides ahead

Suggestions

- 1- Hot Lanes
- 2- Build Connected pathways
- 3- Carpooling
- 4- Advocating walking and Biking

ACTIVITY

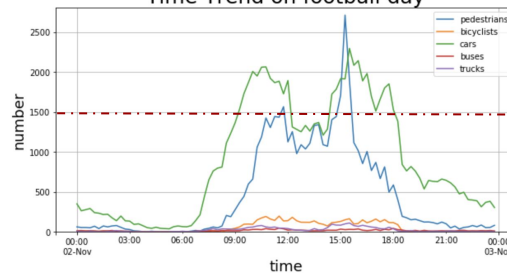
Football game date: 2019-11-02 Sat

Compare date: 2019-11-09 Sat

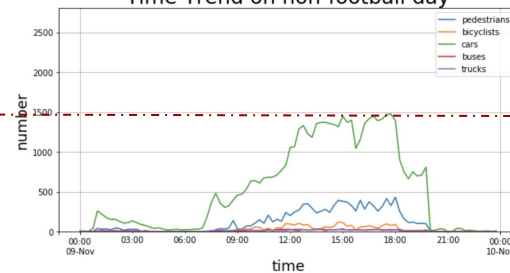
Game time: 12:00-15:00 pm

Method: Take number difference, Foreign vehicles

Time Trend on football day

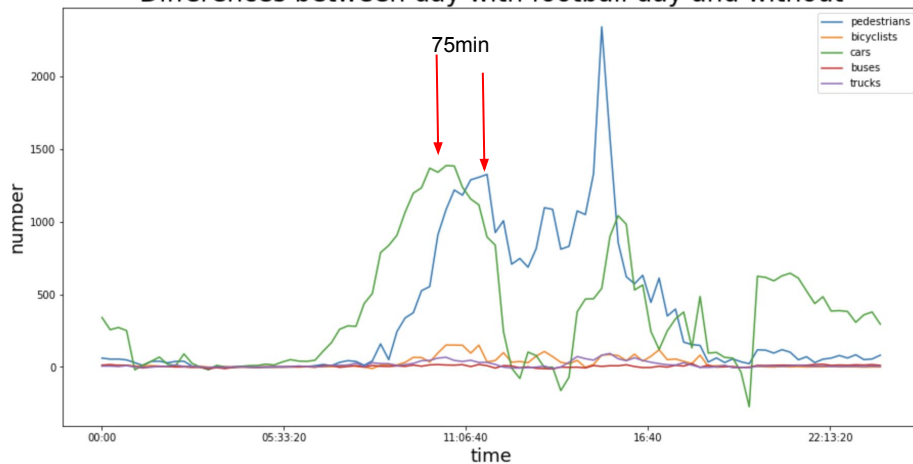


Time Trend on non-football day

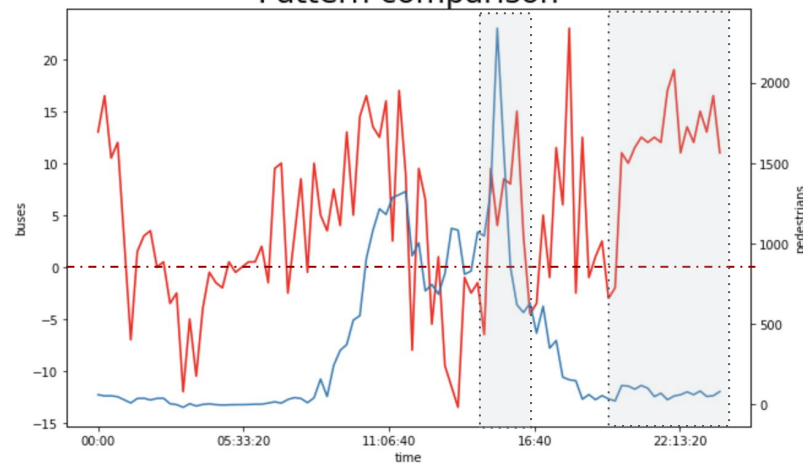


Cars: 1.5 times Pedestrians: 3 times than usual; Reach peak earlier(10am); A concave

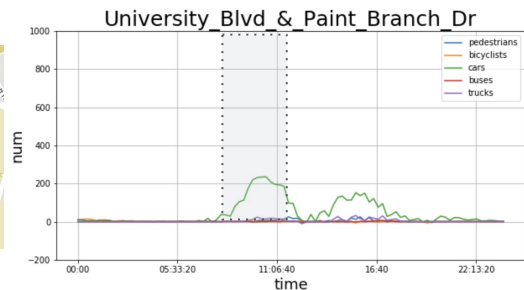
Differences between day with football day and without



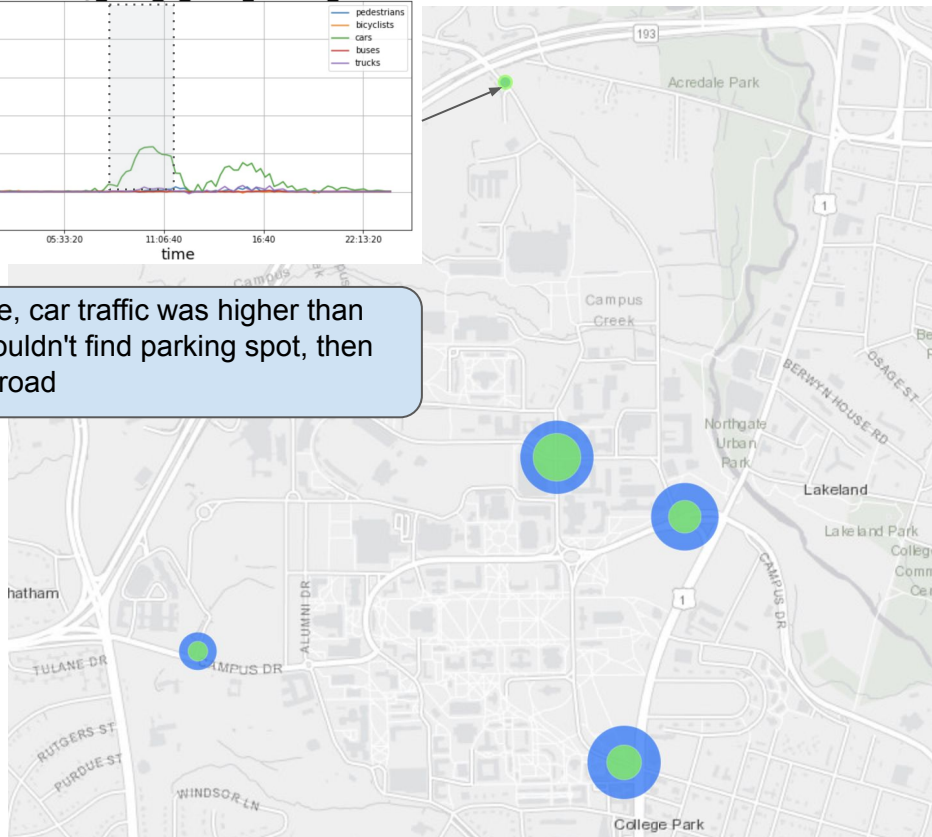
Pattern comparison



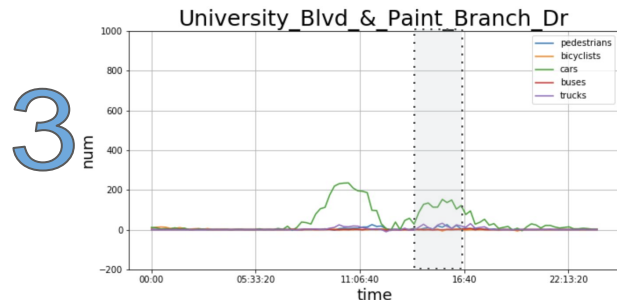
ACTIVITY



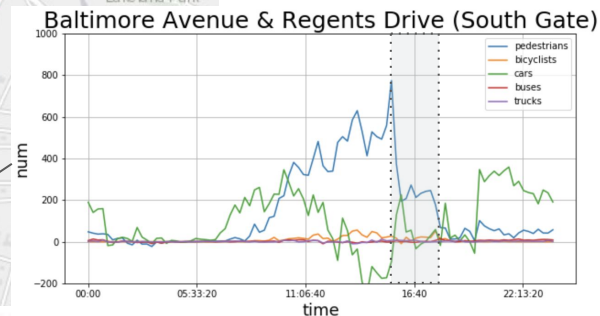
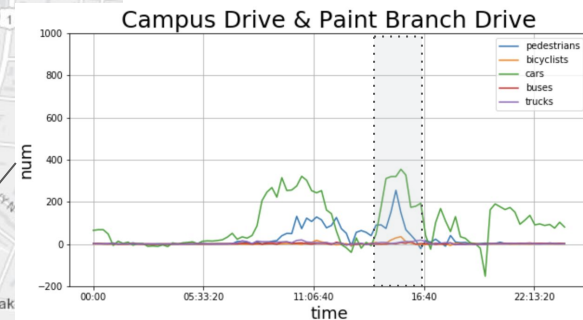
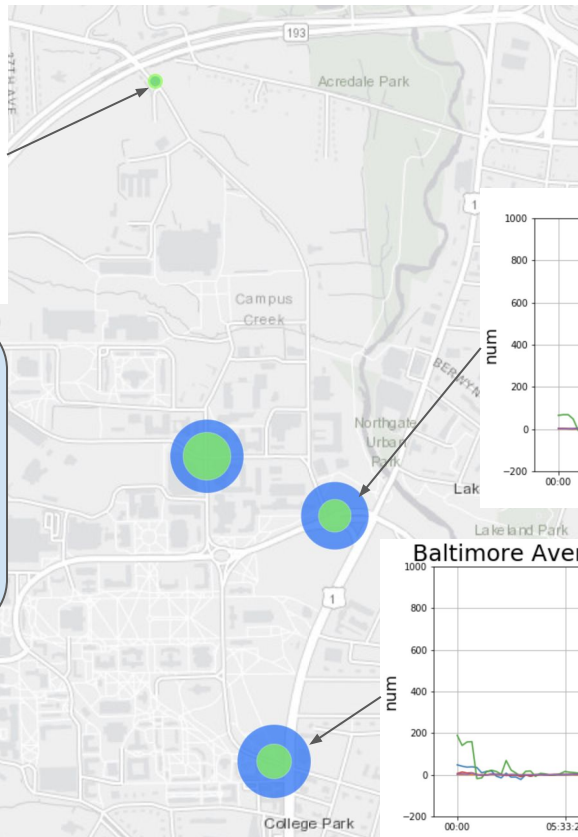
Before the beginning of game, car traffic was higher than usual, might because they couldn't find parking spot, then went out and park along the road



ACTIVITY

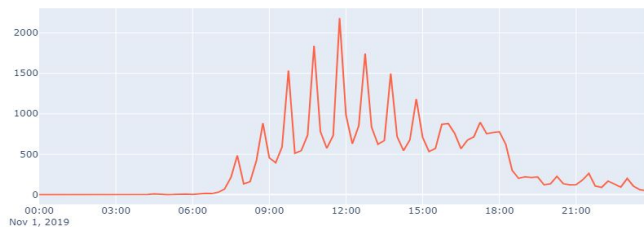
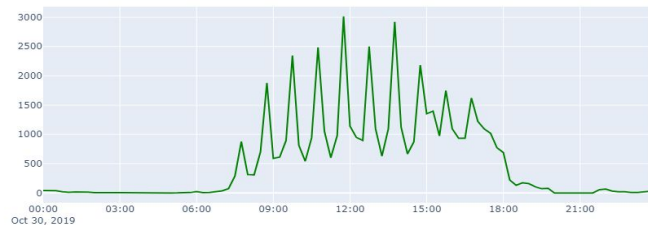
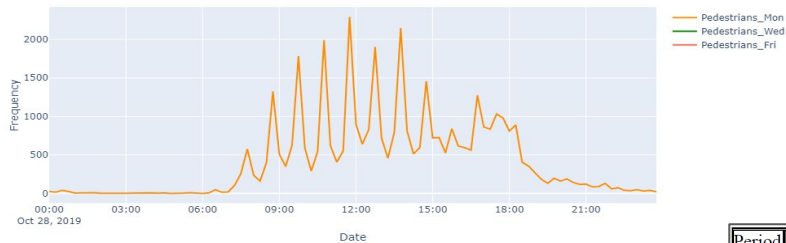


After the end of game(around 3pm), more cars exit campus from Campus Drive & Paint Branch Drive rather than south gate, the third is University_Bldv_&_Paint_Branch_Dr. Campus Drive & Paint Branch Drive has higher kurtosis than University_Bldv_&_Paint_Branch_Dr.



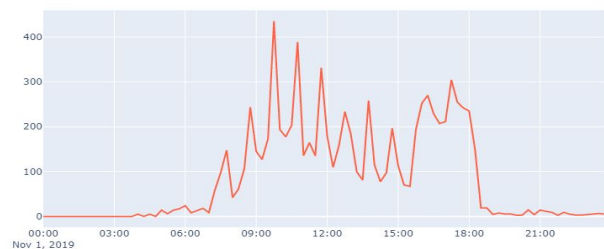
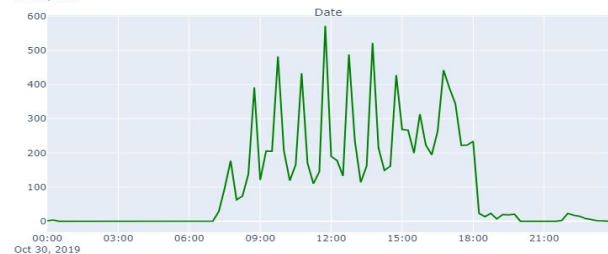
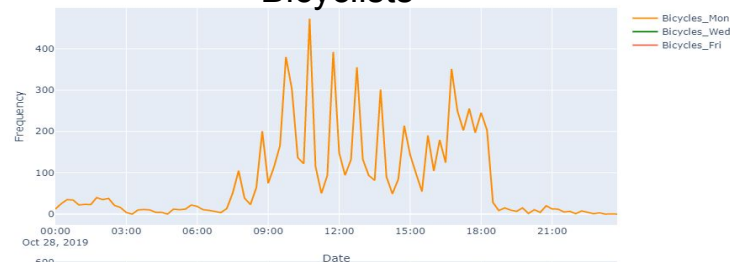
CLASS SCHEDULE (MON, WED, FRI)

Pedestrians



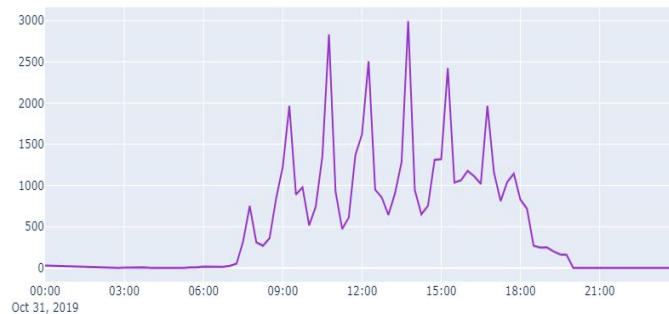
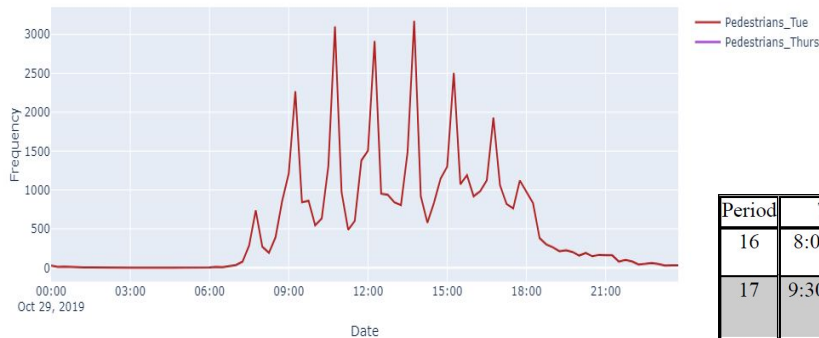
Period	Time	Monday	Wednesday	Friday
1	8:00 - 8:50			
2	9:00 - 9:50			
3	10:00 - 10:50			
4	11:00 - 11:50			
5	12:00 - 12:50			
6	1:00 - 1:50			
7	2:00 - 2:50			
8	3:00 - 3:50			
9	4:00 - 4:50			

Bicyclists



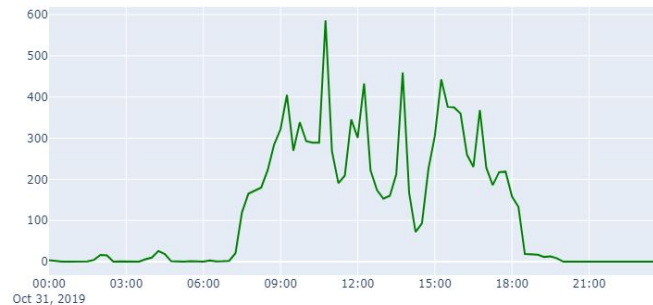
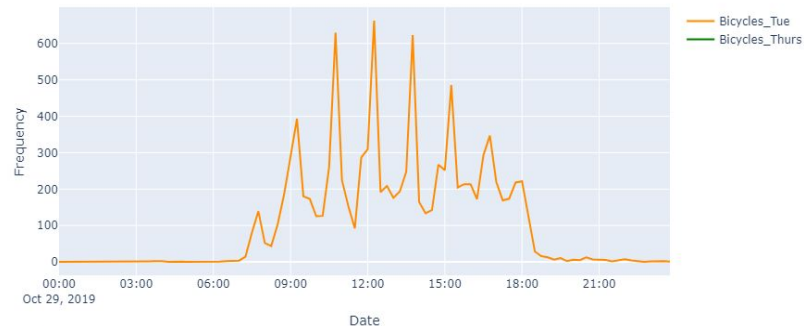
CLASS SCHEDULE (TUE, THURS)

Time Series for Pedestrians on a Tuesday and Thursday



Period	Time	Tuesday	Thursday
16	8:00 - 9:15		
17	9:30 - 10:45		
18	11:00 - 12:15		
19	12:30 - 1:45		
20	2:00 - 3:15		
21	3:30 - 4:45		

Time Series for Bicycles on a Tuesday and Thursday



PREDICTIVE MODEL (What if the game is prolonged?)

