

A2: Seattle Police Department Crime Dataset

Data Source

The dataset used in this visualization report is the crime dataset¹ provided by the Seattle Police Department (SPD). This data set contains finalized crime records of the Seattle area from 2008 till now and it's updated on a daily basis. The data is collected using the National Incident-Based Reporting System (NIBRS) under the Uniform Crime Reporting (UCR) Program, which allows us to standardize and categorize the type of offenses in the records easily.

The data has 898,179 records as of 4/26/2021 and has 17 variables, which includes offense parent group, offense code, micro community policing plans (MCP), beat, blurred address, and geographical data such as longitude and latitudes. The data only needs a minimal amount of cleaning and processing, and it's also preprocessed before releasing to protect privacy of people involved.

The richness of the data both in the number of records and the number of variables allows us to do multiple analysis based on different types of crime, time of crime, and most importantly, the location of crime.

Below is some sample rows from the dataset loaded using Tableau.

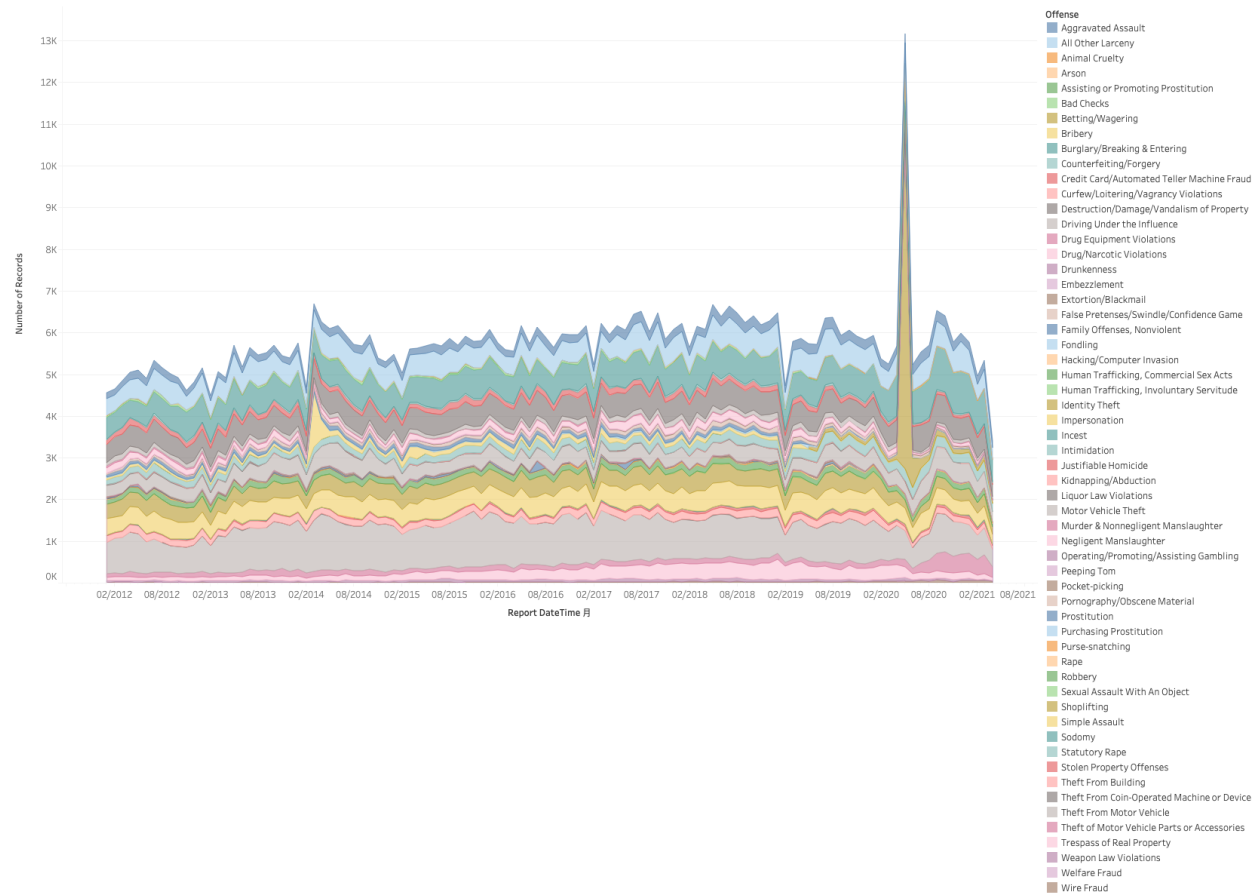
Sort fields <div>Data source order</div>														<input type="checkbox"/> Show aliases <input type="checkbox"/> Show hidden fields <div>1,000</div>		rows
Alt	#	SPD Crime Data_2008-Present	SPD Crime Data_2008-Present	SPD Crime Data_2008-Present	Alt	Alt	Alt	Alt	Alt	Alt	Alt	Alt	Alt	Alt	Alt	Alt
SPD Crime Data_2008-Present	SPD Crime Data_2008-Present	SPD Crime Data_2008-Present	SPD Crime Data_2008-Present	SPD Crime Data_2008-Present	SPD Crime Data_2008-Present	SPD Crime Data_2008-Present	SPD Crime Data_2008-Present	SPD Crime Data_2008-Present	SPD Crime Data_2008-Present	SPD Crime Data_2008-Present	SPD Crime Data_2008-Present	SPD Crime Data_2008-Present	SPD Crime Data_2008-Present	SPD Crime Data_2008-Present	SPD Crime Data_2008-Present	SPD Crime Data_2008-Present
Report No...	Offense ID	Offense Start Date...	Offense End Date/Time	Report Date/Time	Group A B	Crime Against Cat...	Offense Parent Gr...	Offense	Offense Code	Precinct	Sector	Beat	Mcp			
2020-044620	12605873663	2020/2/5 上午10:10:00	null	2020/2/5 上午11:2...	A	SOCIETY	DRUG/NARCOTIC OFF...	Drug/Narcotic Violat...	35A	W	Q	Q1	MAGNOLI...			
2020-044452	12605598696	2020/2/3 上午8:00:00	2020/2/4 上午8:00:00	2020/2/5 上午10:0...	A	PROPERTY	LARCENY-THEFT	Theft of Motor Vehicl...	23G	N	J	J3	ROOSEVE			
2020-044465	12605567653	2020/2/2 下午8:30:00	2020/2/2 下午9:30:00	2020/2/5 上午9:39...	A	PROPERTY	ROBBERY	Robbery	120	N	U	U3	ROOSEVE			
2020-044225	12605174036	2020/2/5 上午1:17:00	2020/2/5 上午2:21:00	2020/2/5 上午3:30...	A	PROPERTY	DESTRUCTION/DAM...	Destruction/Damage...	290	W	Q	Q1	MAGNOLI...			
2020-044076	12605081469	2020/2/5 上午12:51:21	null	2020/2/5 上午12:5...	B	SOCIETY	DRIVING UNDER THE...	Driving Under the In...	90D	N	B	B2	BALLARD			
2020-044142	12605077150	2020/2/4 下午10:59:00	null	2020/2/5 上午12:4...	A	PROPERTY	LARCENY-THEFT	Shoplifting	23C	W	M	M1	DOWNTOW			
2020-044104	12605029468	2020/2/4 下午8:30:00	2020/2/4 下午8:45:00	2020/2/4 下午11:3...	A	PROPERTY	DESTRUCTION/DAM...	Destruction/Damage...	290	N	J	J3	PHINNEY			
2020-043988	12604995759	2020/2/4 下午7:58:00	null	2020/2/4 下午10:4...	A	PROPERTY	LARCENY-THEFT	Shoplifting	23C	SW	F	F2	ROXHILL			
2020-043928	12604963106	2020/2/4 下午7:01:00	null	2020/2/4 下午9:59...	B	SOCIETY	DRIVING UNDER THE...	Driving Under the In...	90D	N	L	L2	NORTHGA			
2020-044065	12605008517	2020/2/4 下午9:00:00	2020/2/4 下午9:15:00	2020/2/4 下午9:47...	A	PROPERTY	LARCENY-THEFT	Theft From Motor Ve...	23F	E	E	E2	CAPITOL			
2020-044038	12604928711	2020/2/4 下午8:57:00	null	2020/2/4 下午9:20...	A	PROPERTY	LARCENY-THEFT	Shoplifting	23C	E	E	E2	CAPITOL			
2020-043971	12604927228	2019/2/4 上午12:00:00	2020/2/4 上午8:00:00	2020/2/4 下午9:18...	A	PROPERTY	FRAUD OFFENSES	Wire Fraud	26E	N	U	U2	UNIVERSI			
2020-043805	12604929082	2020/1/30 下午7:30:00	null	2020/2/4 下午9:14...	A	PROPERTY	LARCENY-THEFT	Theft From Building	23D	S	R	R3	COLUMBI			
2020-043805	12605193820	2020/1/30 下午7:30:00	null	2020/2/4 下午9:14...	A	PERSON	KIDNAPPING/ABDUC...	Kidnapping/Abduction	100	S	R	R3	COLUMBI			
2020-043518	12604909238	2020/2/4 上午7:30:00	2020/2/4 上午10:00:00	2020/2/4 下午8:59...	A	PROPERTY	LARCENY-THEFT	Theft From Motor Ve...	23F	S	R	R1	NORTH BE			
2020-044000	12604889529	2020/2/4 下午8:10:00	2020/2/4 下午8:39:00	2020/2/4 下午8:30...	A	PROPERTY	COUNTERFEITING/F...	Counterfeiting/Forge...	250	E	E	E1	CAPITOL			

¹ <https://data.seattle.gov/Public-Safety/SPD-Crime-Data-2008-Present/tazs-3rd5>

Analysis Questions:

- What does the trend of crime in Seattle look like over the past 10 years? Is there a particular type of crime that's surging?

Number of Cases Trend vs Offense Type

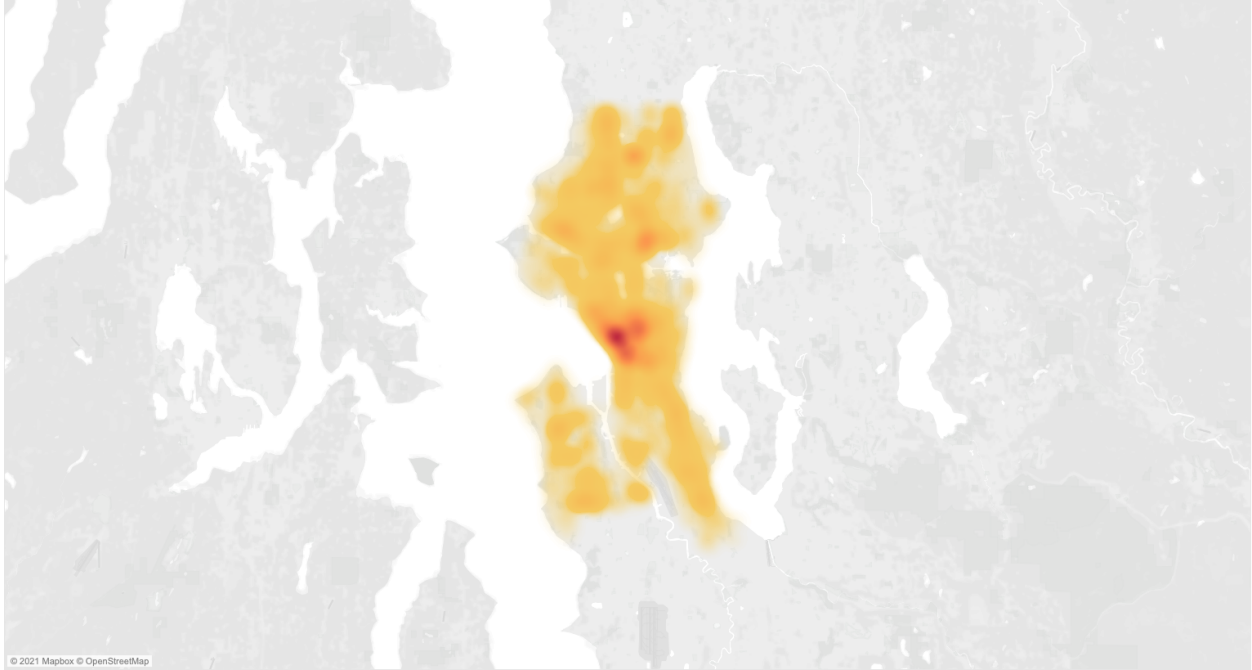


Here I used a stacked area chart with colors representing different types of crime. By using this graph, we can see the trend of the total number of crime cases changing over the years, and also identify the types of crime that have become more prevalent during the past 10 years. Here we can observe that in May 2020 there's a noticeable increase in the number of identify theft cases in Seattle, where victims' identities were used to file false unemployment claims due to COVID-19².

² <https://spdblotter.seattle.gov/2020/05/08/criminals-exploiting-covid-19-to-commit-unemployment-fraud/>

- Where did these crime take place?

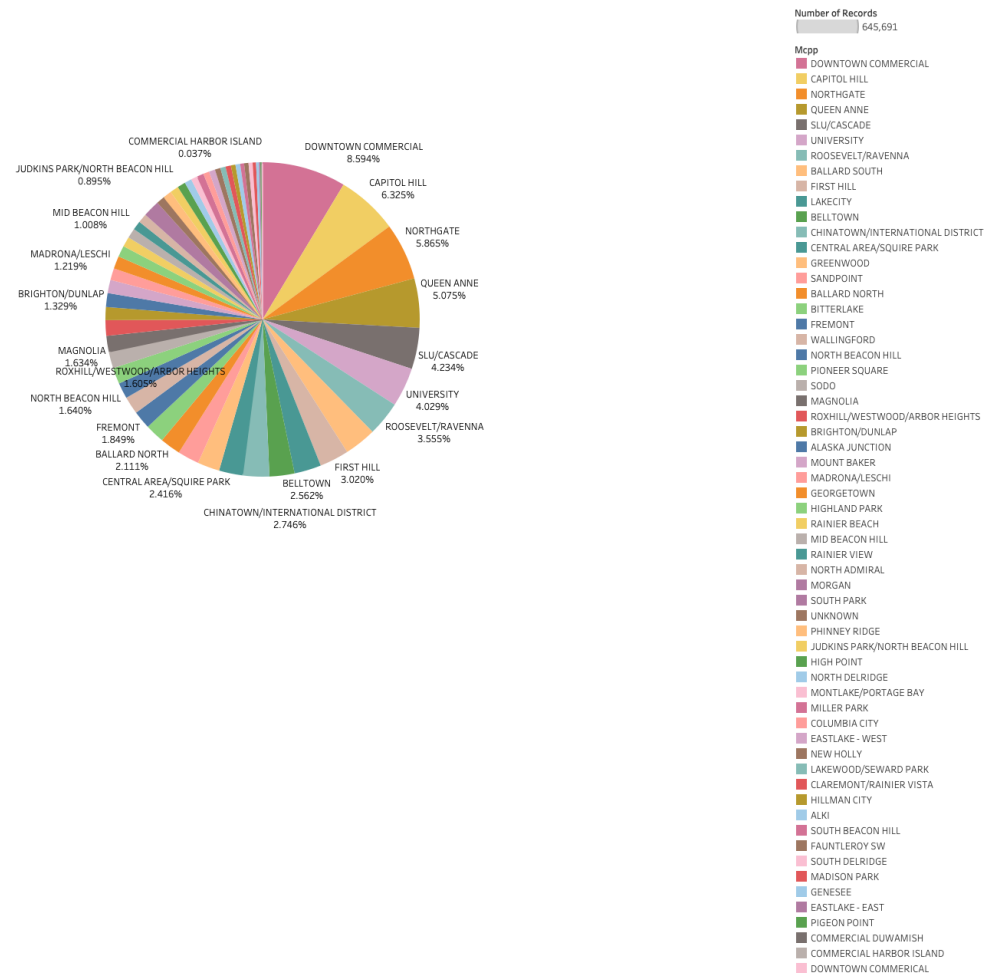
Seattle Crime Map



To see where did crime take place, I use a heat map to visualize the data. Instead of just using coordinates as points, a heat map provides a more high level view of the density of crime. Here in this case, we can see that the majority of the crime happened in downtown Seattle around the Pike's Place Market.

- Where exactly did these crime take place?

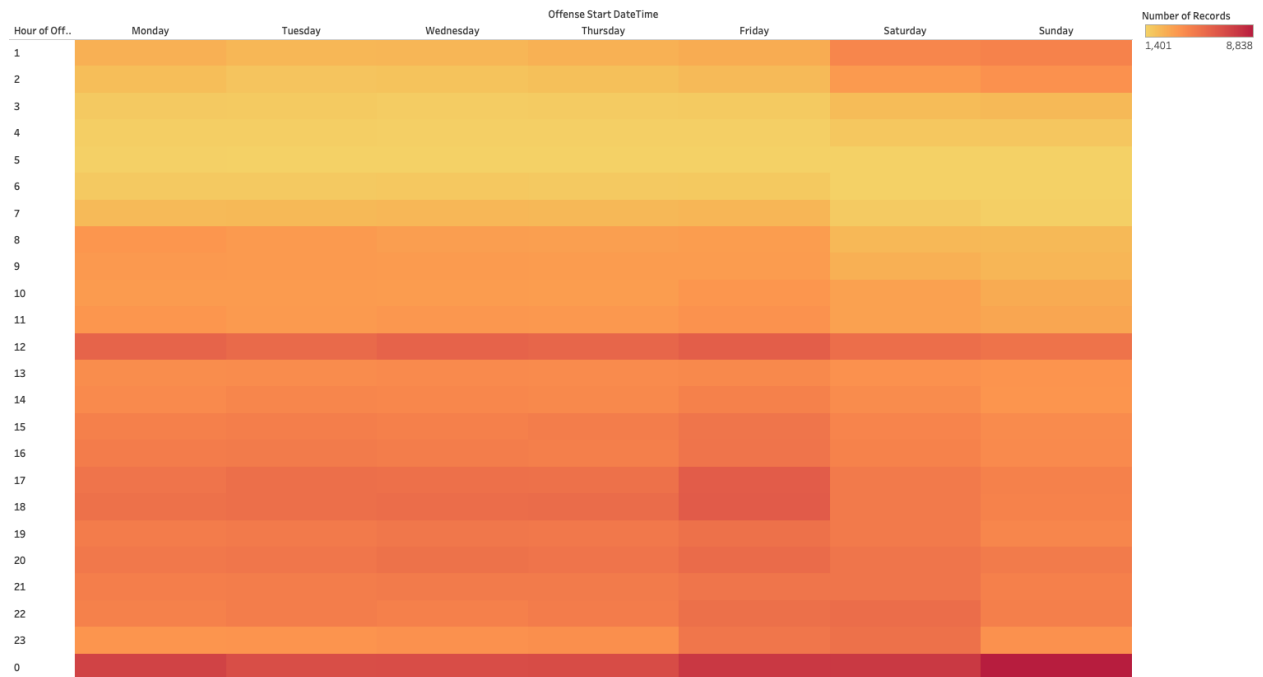
Offense Place Breakdown



The previous visualization provides a high overview of the city. However it fails to provide an accurate number-to-number comparison between areas. For example, if we want to see if the UDistict has more cases than downtown Seattle, it's hard to draw a boundary on the previous heat map and compare the colors. Here I used the Micro Community Policing Plan (MCP) to make a pie chart so that we can easily see which communities have more crime than the other. We can see that our previous observation that downtown Seattle is among the most dangerous areas is still valid- it takes about 9% of the total number of crime in Seattle following by Capitol Hill and Northgate.

- When did crime take place?

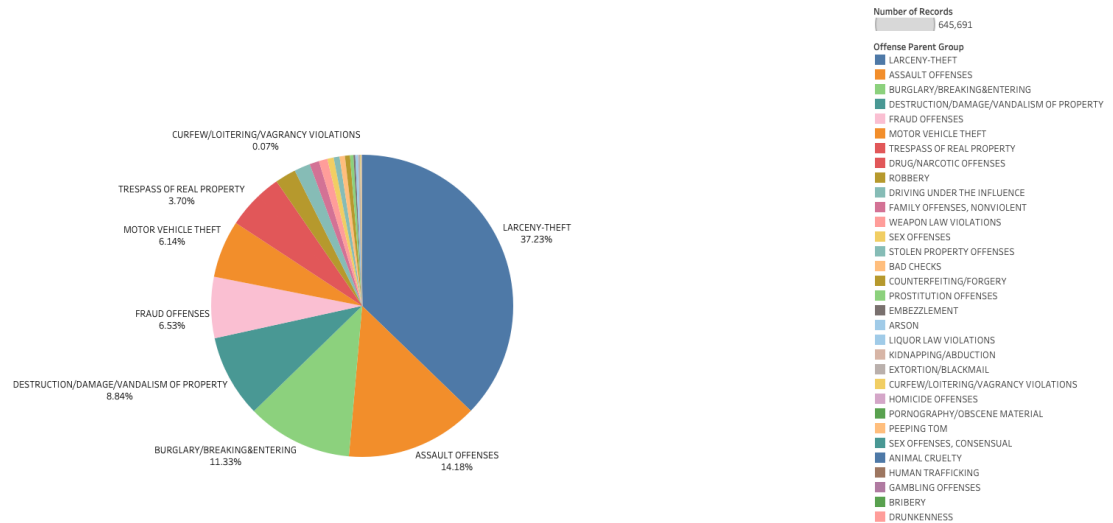
Hour of Day vs. Day of Week



I'm also interested in when did crime happen in Seattle. Here I also used a heat map in order to find any correlation between the hour of day and day of week of the reported time. With the same coloring we can see that there's a surge in the number of crime on the weekends (including Fridays), especially around midnight. The AM hours also seem to be safer than the PM hours in general.

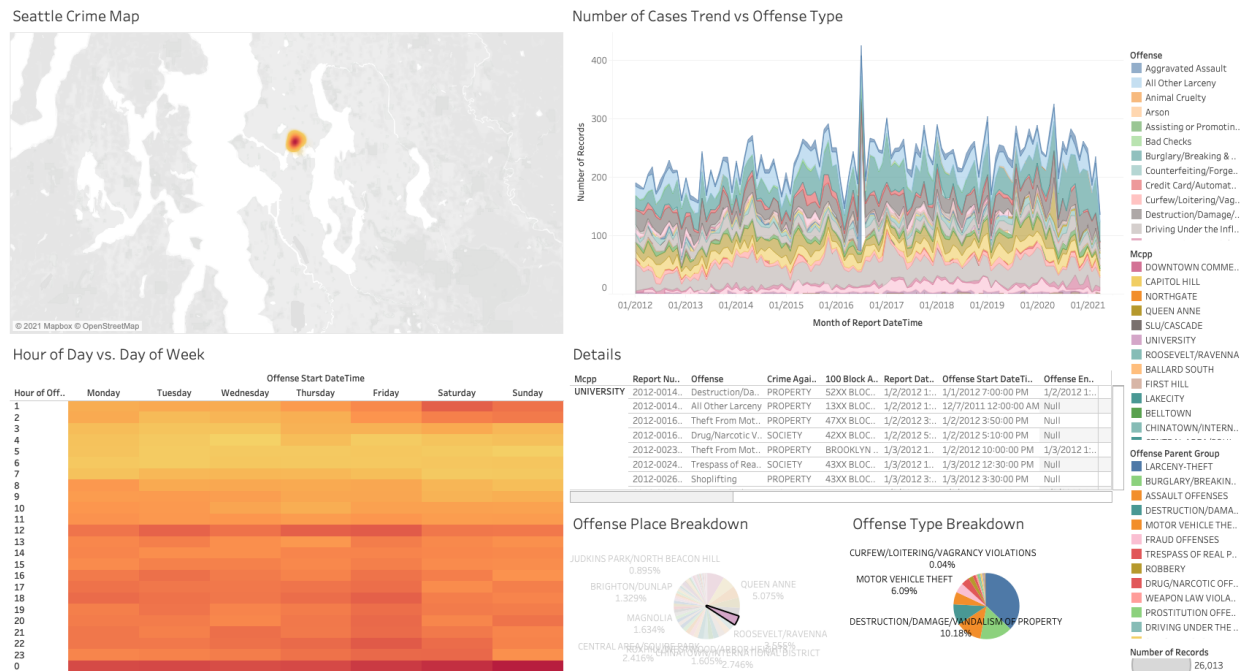
- What kind of crime is the most prevalent over the past 10 years?

Offense Type Breakdown



Although we can partly answer this question by using the stacked area chart we created, it doesn't provide a cumulative view for us to examine what type of crime. Here I used a simple pie chart to answer this question. Through this pie chart, we can see that the majority of crime in Seattle are theft and assault cases. These two types of offenses take 51% of the total number of crime cases.

Interactive Analysis:

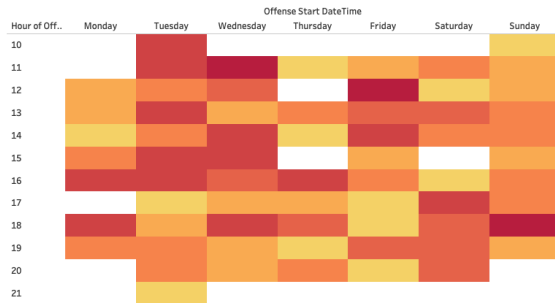


By combining all the visualizations together into one dashboard, we can explore all the trends and compositions at the same time. For example, here we can click on the UNIVERSITY MCPP and see that the types of crime happen around the UDistrict is slightly different than the other communities- theft and burglary cases take 52% while usually it's the assault offenses that run second.

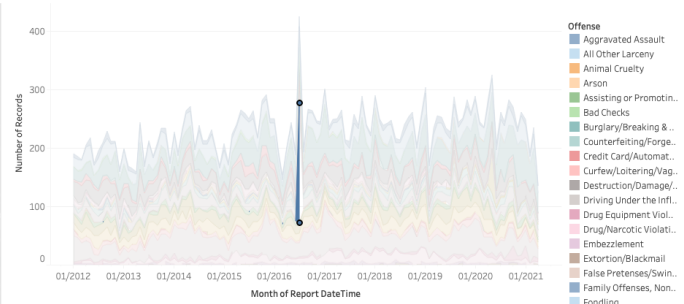
Seattle Crime Map



Hour of Day vs. Day of Week



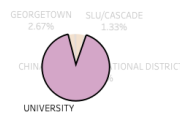
Number of Cases Trend vs Offense Type



Details

Mcp	Report Nu..	Offense	Crime Agal..	100 Block A..	Report Dat..	Offense Start DateTi..	Offense En..
UNIVERSITY	2016-2398..	Prostitution	SOCIETY	47XX BLOC..	7/5/2016 1..	7/5/2016 10:44:00 AM	Null
	2016-2398..	Prostitution	SOCIETY	47XX BLOC..	7/5/2016 2..	7/5/2016 2:04:00 PM	Null
	2016-2398..	Prostitution	SOCIETY	47XX BLOC..	7/5/2016 2..	7/5/2016 2:22:00 PM	Null
	2016-2399..	Prostitution	SOCIETY	47XX BLOC..	7/5/2016 3..	7/5/2016 3:00:00 PM	7/5/2016 3..
	2016-2399..	Prostitution	SOCIETY	47XX BLOC..	7/5/2016 3..	7/5/2016 3:15:00 PM	Null
	2016-2399..	Prostitution	SOCIETY	47XX BLOC..	7/5/2016 3..	7/5/2016 3:30:00 PM	7/5/2016 3..

Offense Place Breakdown

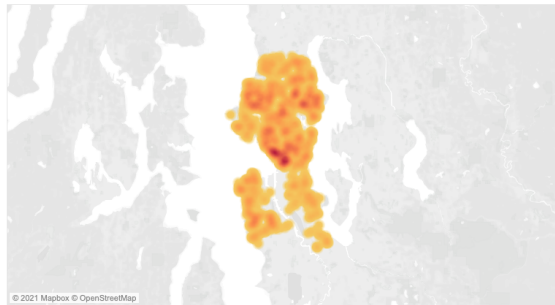


Offense Type Breakdown

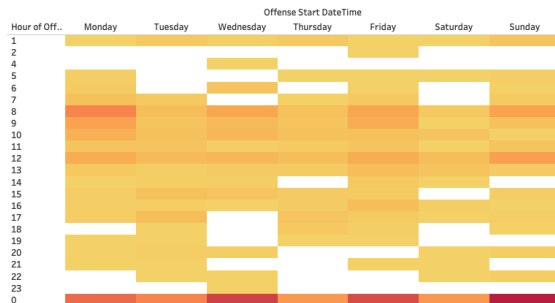


Another example is that we can dig into the trend of each area, take the UDistrict as an example again, we can see that there's a sudden increase in the number of prostitution in July 2016 (204 cases) and it seems they are all from the same block.

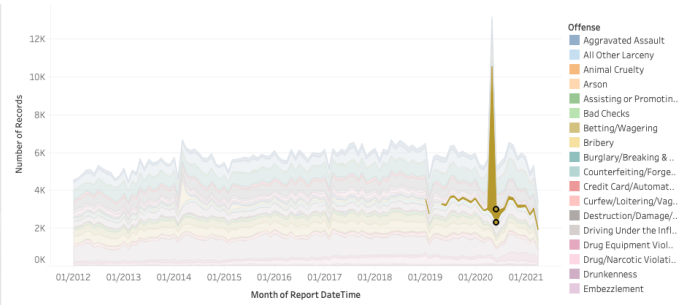
Seattle Crime Map



Hour of Day vs. Day of Week



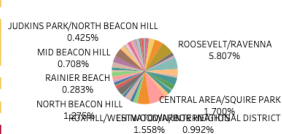
Number of Cases Trend vs Offense Type



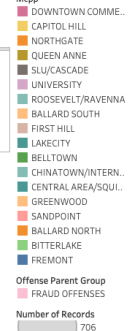
Details

Mcp	Report Nu..	Offense	Crime Agal..	100 Block A..	Report Dat..	Offense Start DateTi..	Offense En..
ALKI	2020-9148..	Identity Theft	PROPERTY	51XX BLOC..	6/3/2020 1..	5/27/2020 8:25:00 AM	5/27/2020 ..
	2020-9149..	Identity Theft	PROPERTY	40XX BLOC..	6/4/2020 1..	3/8/2020 12:00:00 PM	3/8/2020 1..
	2020-9153..	Identity Theft	PROPERTY	37XX BLOC..	6/12/2020 ..	6/8/2020 11:15:00 AM	6/8/2020 1..
	2020-9154..	Identity Theft	PROPERTY	41XX BLOC..	6/12/2020 ..	4/1/2020 12:00:00 AM	5/15/2020 ..
	2020-9156..	Identity Theft	PROPERTY	57XX BLOC..	6/19/2020 ..	5/20/2020 11:00:00 PM	5/20/2020 ..
	2020-9161..	Identity Theft	PROPERTY	40XX BLOC..	6/24/2020 ..	5/15/2020 12:00:00 PM	5/15/2020 ..
	2020-9163..	Identity Theft	PROPERTY	36XX BLOC..	6/25/2020 ..	5/10/2020 12:00:00 AM	5/10/2020 ..

Offense Place Breakdown



Offense Type Breakdown



Also, we can see that the identity theft cases we see in May 2020 happened all around Seattle and it seems that there were a few 'hotspots' that suffered more than other areas.