PROPERTY VALUE VS. CRIME RATES

San Francisco

- 3rd highest property value in the country.
- Notorious for its ever-increasing prices.
- Upsurge in larceny and burglary during the pandemic.
- Considered more dangerous than 98% of US cities.
- Could crime rate be a factor that impacts the desirability of a region?

Questions

-How has the housing market changed within the last 20 years?

-What types of incidents are most reported in San Francisco, and have they changed over the past 20 years?

-What kind of impact did the Covid-19 pandemic have on the housing market and crime rate in San Francisco?

-Does crime rate have an impact on the prices of homes in San Francisco?

Objectives

- Analyze the housing market within the past 20 years.
- Determine common reported incidents in San Francisco over the past 20 years.
- Visualize impact of Covid-19 pandemic on the housing market and crime rate in San Francisco.
- Utilize data to find correlation between crime rates and housing prices.

Analysis Tools

DATA COLLECTION

San Francisco Crime Data:

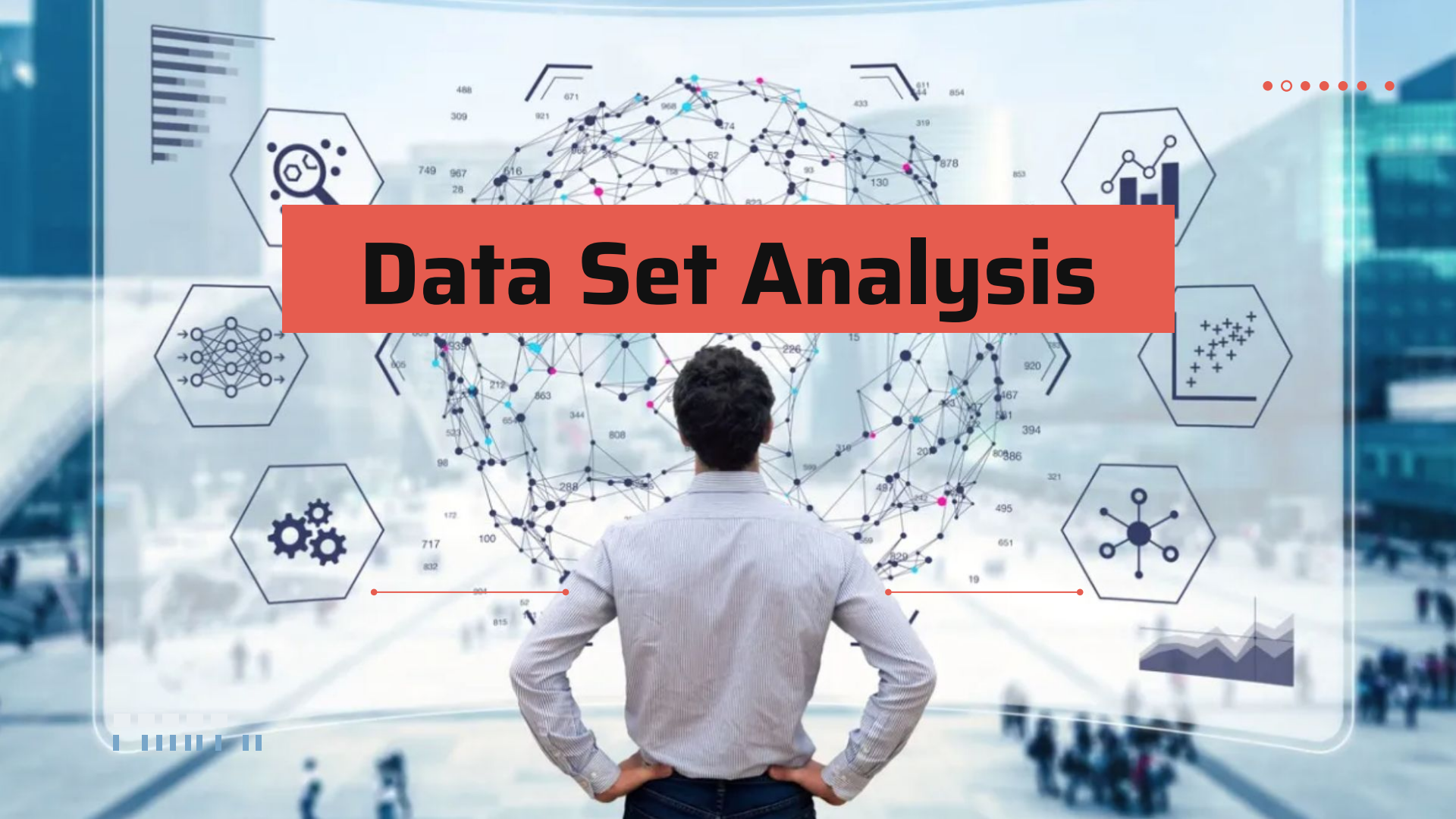
- Police Department Incident Reports: Historical 2003 to May 2018
- Police Department Incident Reports: 2018 to Present

DataSF

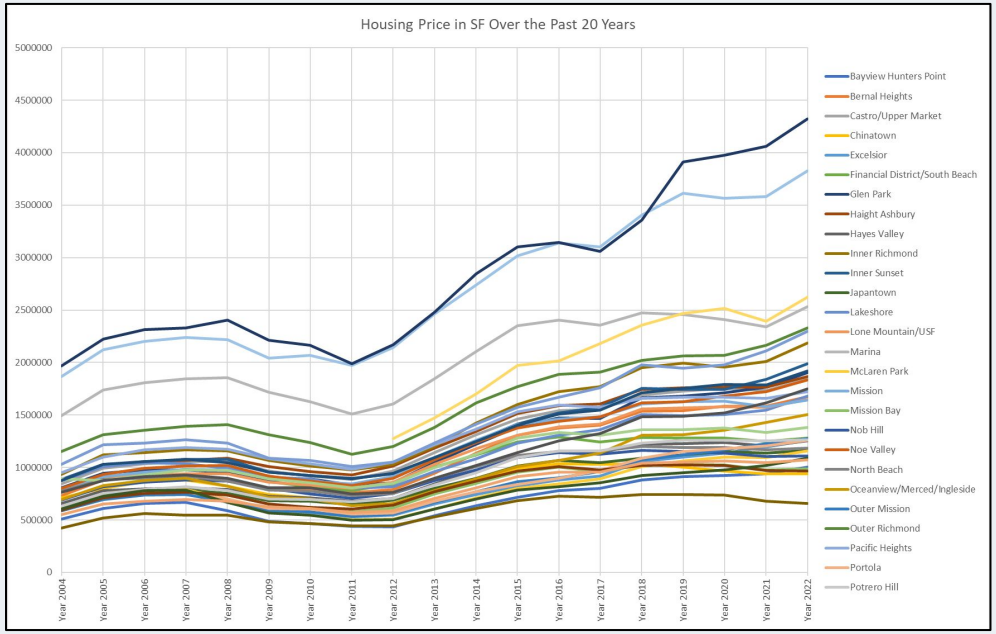
San Francisco Housing Data:

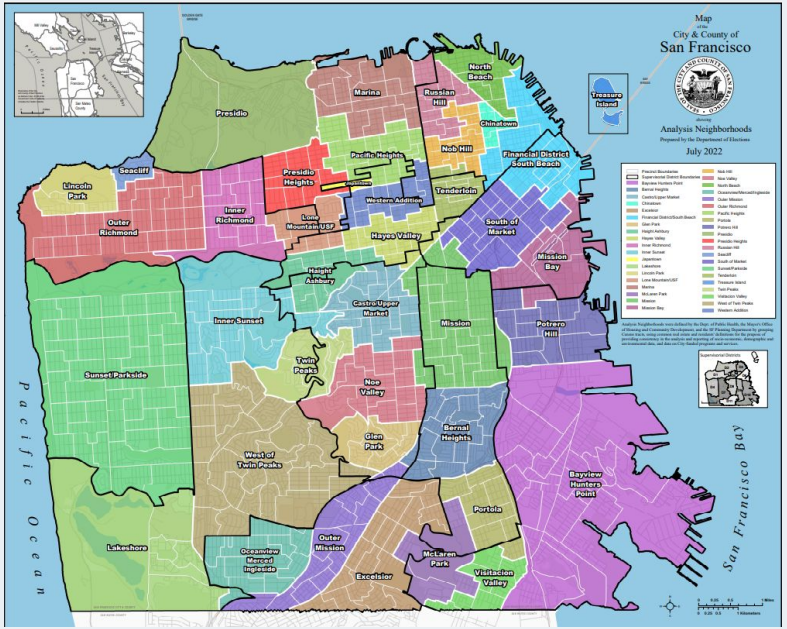
- Zillow Home Value Index

Zillow

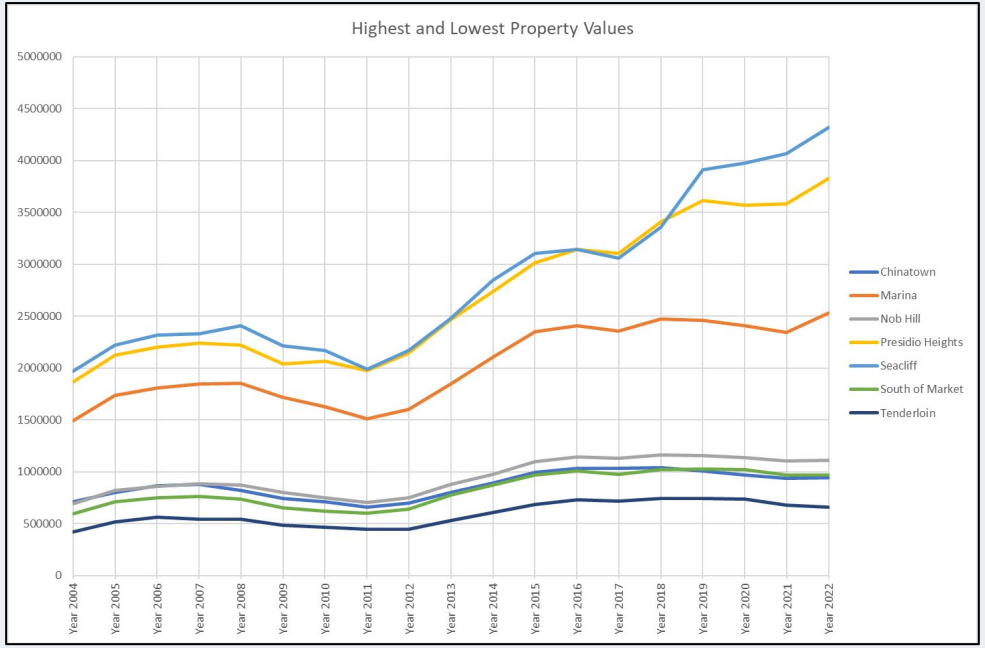

Data Set Analysis

Zillow data over the past 20 years





Neighborhoods with Highest and Lowest Property Values

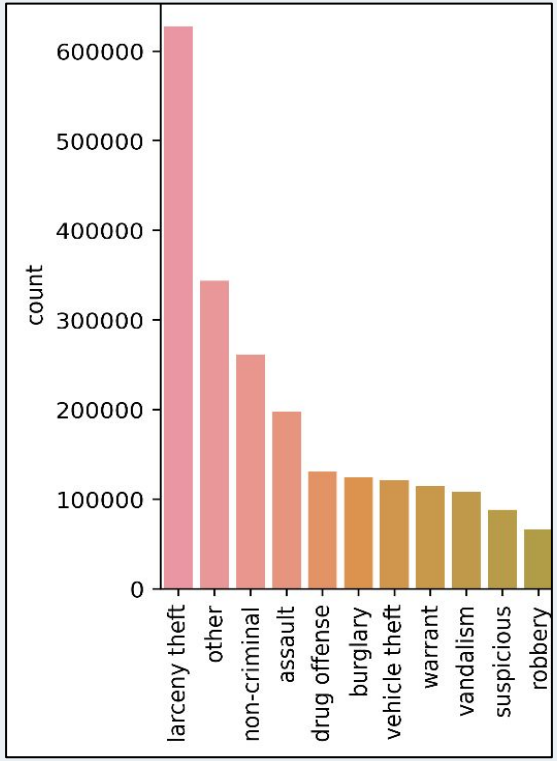


Neighborhood	2003	2022
Tenderloin	380,037.58	657,051.08
Bayview Hunters Point	442,917.67	1,001,195.56
Visitacion Valley	535,254.42	1,088,911.75
McLaren Park	540,224.42	1,156,625.08
Western Addition	496,976.00	1,073,314.96
Excelsior	512,035.54	1,261,654.29
South of Market	534,530.08	966,973.75
Outer Mission	505,098.89	1,277,161.58
Portola	545,865.42	1,261,620.92
Inner Sunset	786,172.73	1,991,108.72
Haight Ashbury	774,857.43	1,867,271.52
Pacific Heights	866,974.67	1,724,982.92
Inner Richmond	842,302.67	2,187,840.08
West of Twin Peaks	919,539.94	2,296,286.81
Outer Richmond	1,016,321.33	2,327,397.10
Marina	1,364,148.33	2,531,734.78
Presidio Heights	1,692,475.92	3,826,068.29
Seacliff	1,780,035.50	4,320,431.83

Incident Data

Top 10 crimes from 2003 to 2022:

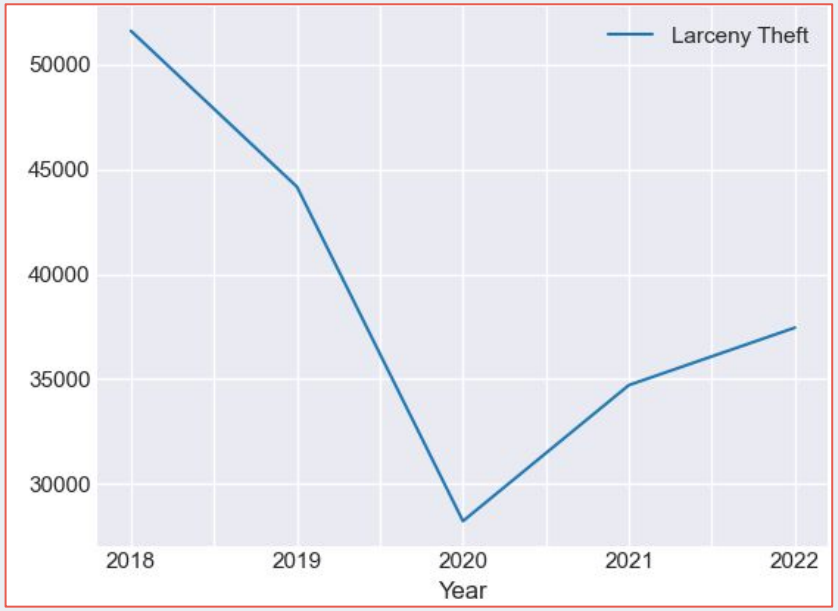
1. larceny theft %23.7
2. Other (Trespassing) %13.0
3. non-criminal %9.88
4. assault %7.48
5. drug offense %4.94
6. burglary %4.69
7. vehicle theft % 4.57
8. warrant %4.34
9. vandalism %4.08
10. suspicious % 3.33



- 2 Datasets were combined.
- 2.7 Million rows of data.
- Data cleaning happened from dropping columns to replace values.

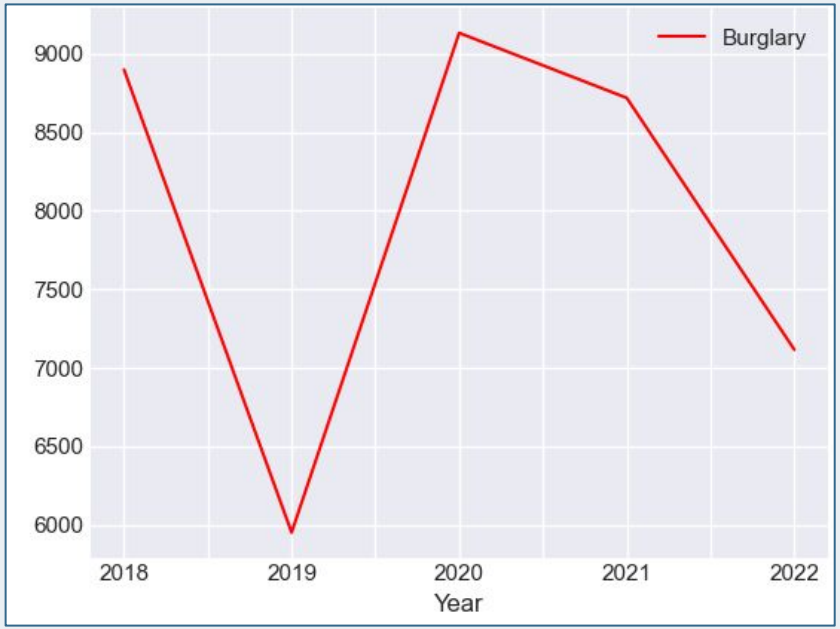
LARCENY THEFT

- Larceny likely fell because fewer tourists and workers went into the city during the day, reducing opportunities for such thefts. (-36%)



	Year	Larceny Theft
0	2018	51615
1	2019	44173
2	2020	28217
3	2021	34708
4	2022	37450

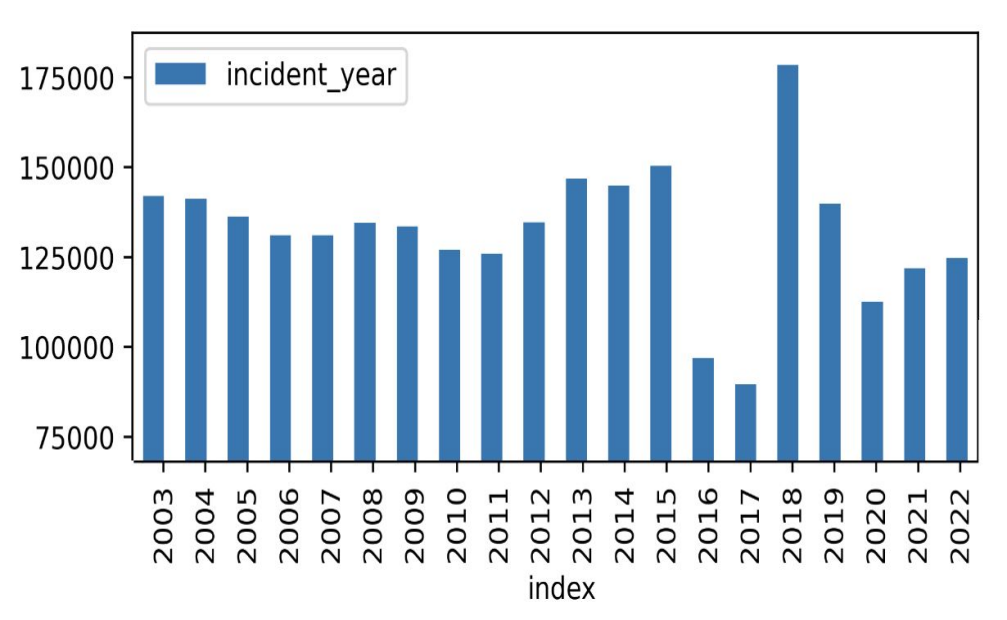
BURGLARY (last 5 years)



- Citywide changes in routine activities have been linked to changes in criminal activity, including and especially burglary (+53%)

	Year	Burglary
0	2018	8900
1	2019	5951
2	2020	9134
3	2021	8720
4	2022	7116

Incidents per Year



- 2019 reported a total number of 139897 incident.
- 2020 ended with a %20.63 decline in number of incidents due to lock down caused by Covid-19.
- The regional stay-at-home order is lifted statewide in 2021 and increased the incident numbers by %7.01 from 2020.

- incident rate per year = 132194.75
- 2016 Elections
- 2020 Covid-19

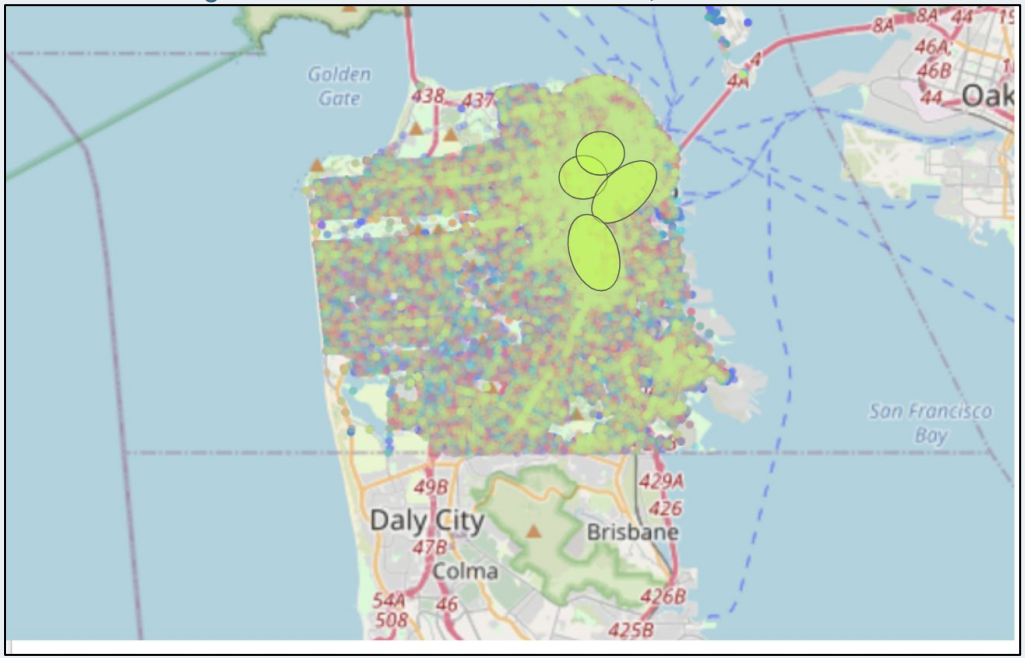
Incident by Latitude & Longitude

spots with the most crime-ridden statistically:

- Civic center
- South of Market
- Tenderloin
- Nob hill
- Mission District

San Francisco, CA, USA

Latitude and longitude coordinates are: **37.773972, -122.431297**.



San Francisco map based on crimes from 2003 to 2022

Statistical Analysis

Housing Prices vs. Crime Rates

Correlation Analysis: Housing Prices vs. Number of Incidents

year	Incidents	Housing Price
2003	142803	7.731558e+05
2004	142054	8.559378e+05
2005	137048	9.861348e+05
2006	131856	1.022826e+06
2007	131771	1.043747e+06
2008	135242	1.014031e+06
2009	134309	9.162063e+05
2010	127758	8.892231e+05
2011	126713	8.416086e+05
2012	135464	8.761517e+05
2013	147664	1.031252e+06
2014	144844	1.180278e+06
2015	151459	1.320998e+06
2016	145994	1.391771e+06
2017	149487	1.414432e+06
2018	189745	1.540198e+06
2019	139897	1.559623e+06
2020	112609	1.573787e+06
2021	121880	1.595301e+06
2022	124661	1.691018e+06

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t =  15.290505013951142
p =  8.040970188886129e-18
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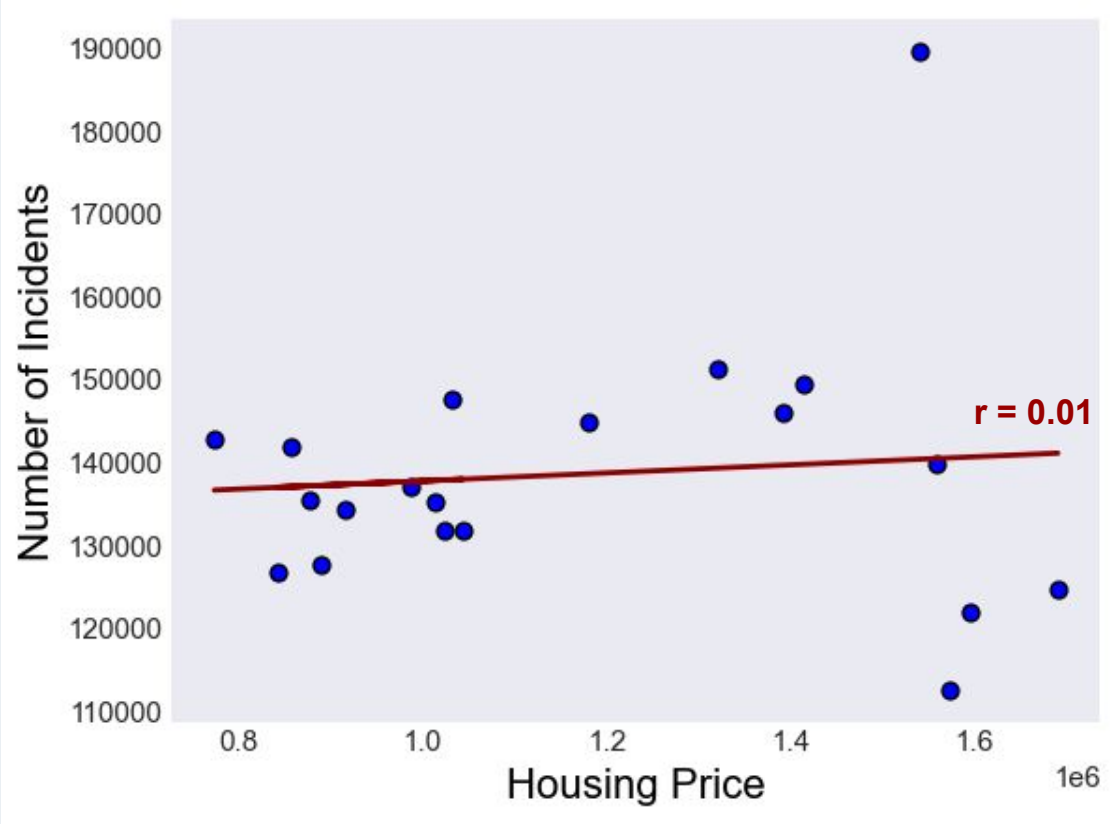
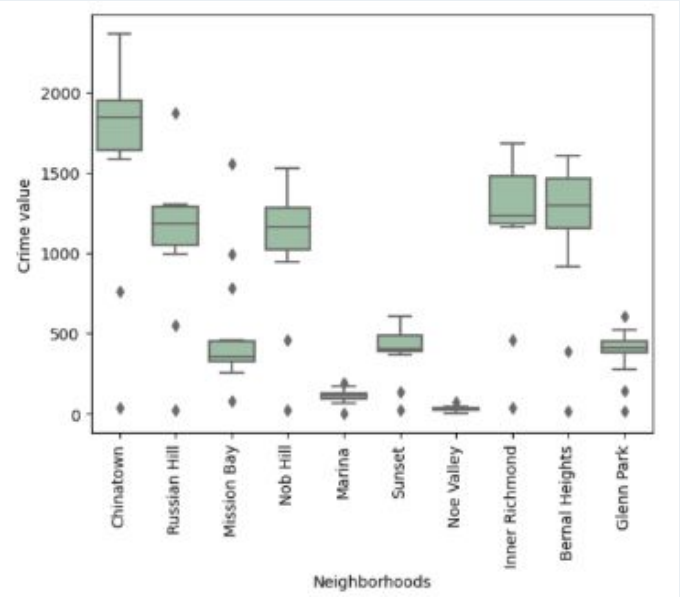


Note: figure utilizes total number of incidents and the average housing price for all regions of San Francisco

ANOVA and Correlation Analysis (2022)

- **ANOVA** analysis between the crime rates of 5 lowest and 5 highest valued neighborhoods show **f-value: 43.8**, and **p-val: 1.25e-37**

	Neighborhood	Crime Value	Home Value
0	Chinatown	1583.0	9.390608e+05
1	Russian Hill	1183.0	1.380222e+06
2	Mission Bay	992.0	9.876052e+05
3	Nob Hill	944.0	1.112175e+06
4	Marina	190.0	2.531735e+06
5	Sunset	404.0	1.746623e+06
6	Noe Valley	20.0	1.836052e+06
7	Inner Richmond	1288.0	2.187840e+06
8	Bernal Heights	1106.0	1.677147e+06
9	Glenn Park	424.0	1.904029e+06



- The **correlation** between 2022 crime numbers and home values for the listed neighborhoods is **r = -0.57**

Summary of Statistical Analyses

- Weak correlation when comparing the average price of all SF regions to total number of reported incidents
- Moderate negative correlation when comparing specific regions against respective number of incidents
- Data shows statistical significance for both models ($p < 0.05$)

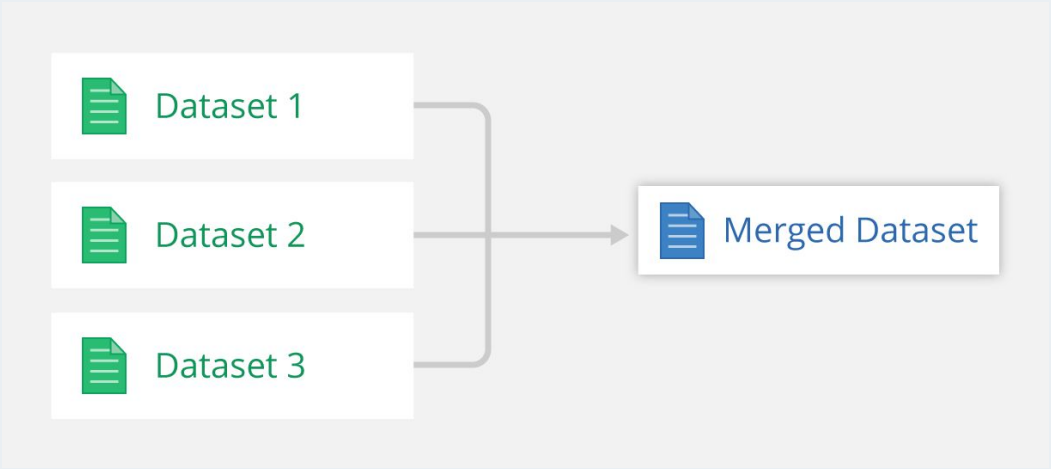
WHAT'S
NEXT?

Obstacles

- Merging/cleaning multiple datasets
- Region/location restrictions (e.g. zillow is nationwide whereas datasf is only San Francisco)
- Null/alternative hypothesis focus on all incident categories

DataSF

Zillow



Next Steps

- Specific crime categories may have higher correlation with real estate values
- In addition to crime levels, real estate values can be impacted by other factors
- Further data could be incorporated into analysis
- Use more datasets from the Bay Area, beyond just SF to increase the sample size and have more reliable conclusions

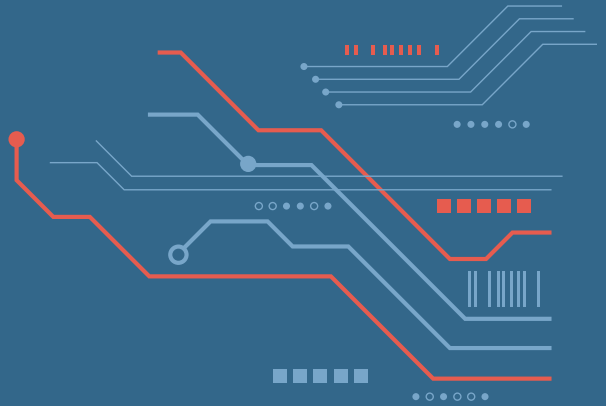
Conclusion

- How has the housing market changed within the last 20 years?
- What types of incidents are most reported in San Francisco, and have they changed over the past 20 years?
- What kind of impact did the Covid-19 pandemic have on the housing market and crime rate in San Francisco?

RESOURCES

- https://www.bizjournals.com/sanfrancisco/news/2018/08/29/value-sf-real-estate-homes.html
- https://www.hoover.org/research/why-san-francisco-nearly-most-crime-ridden-city-us
- https://data.sfgov.org/Public-Safety/Police-Department-Incident-Reports-Historical-2003/tmnf-yvry
- https://data.sfgov.org/Public-Safety/Police-Department-Incident-Reports-2018-to-Present/wg3w-h783
- https://www.zillow.com/research/data/

THANK YOU



Group 3

Ezgi Booth,
Madison Hanson,
Matthew Ng,
Michael Banning,
Rashed Alkanawi