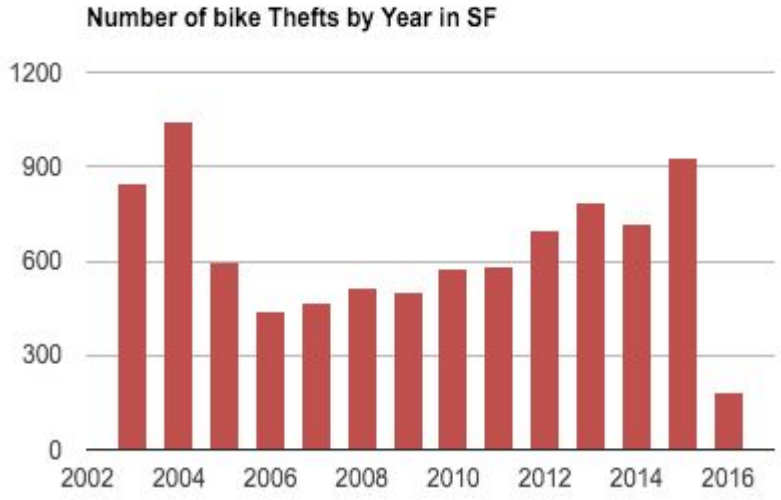
Park My Bike

App by Annie Lee and Roiana Reid

What is the Problem?

- Over 100 million people rode a bike in the last year and 18 million bikes were sold
- Many people use their bicycles for transportation or exercise
- However, it is estimated that approximately 1.5 million bicycles are stolen every year
    - The worst cities for bike theft are Philadelphia, Chicago, New York, and San Francisco



Why is it Important?

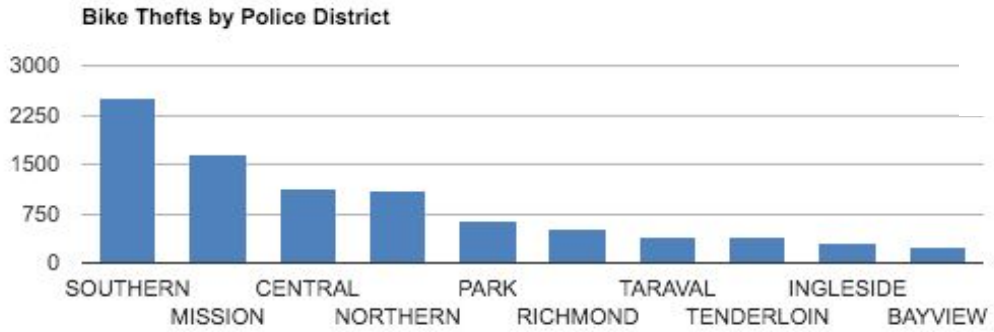
- Cycling is a healthier and more environmentally friendly mode of transportation, but bicycle theft discourages people from riding their bikes
- Bicycle thefts are often reported to the police -- time spent by police officers trying to recover stolen bikes takes away resources from fighting more serious/violent crimes

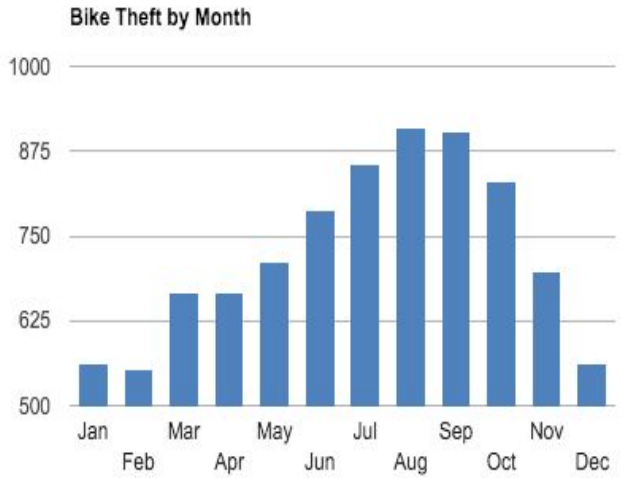
What are the Data Sources?

- Many large metropolitan cities supply public crime databases with details around individually reported crimes going back 10+ years (including date, type, and location)
    - Major cities found to date include San Francisco, Chicago, New York, Philadelphia, and Boston
- These cities also provide public data sets on every installed bike rack, the number of bike spaces and location

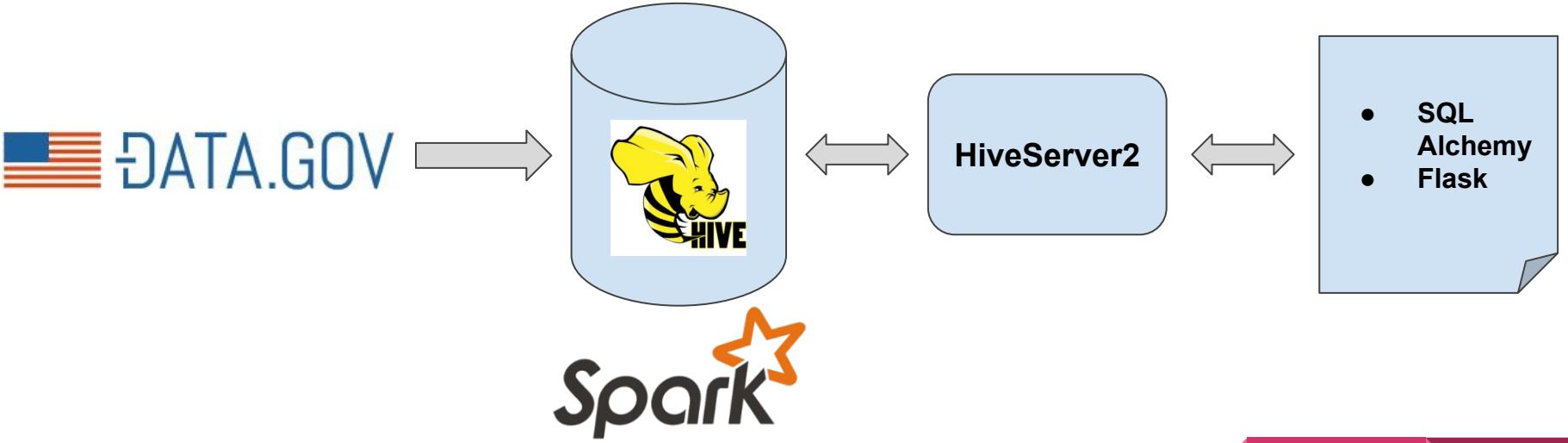
Exploring the SF data

- The number of bike thefts in the San Francisco has increased over the last several years
- The Southern and Mission Police Districts are most susceptible to theft
- Thefts increase during the summer months and the weekends, as expected





Architecture

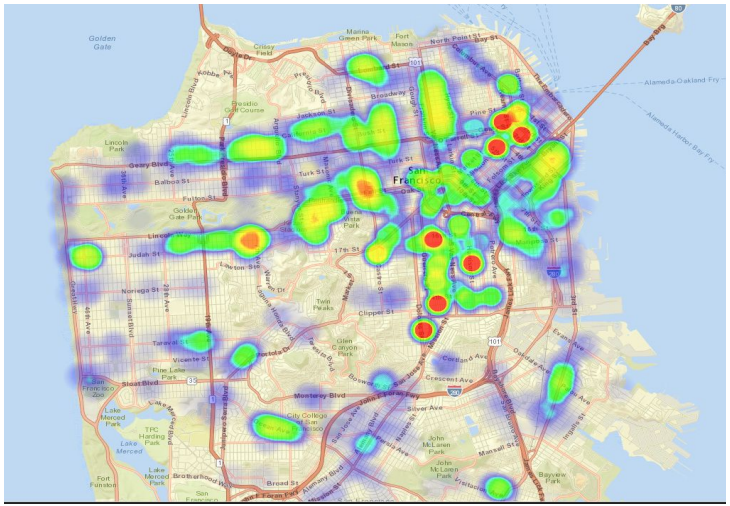


Data Processing

- Clean data
- Using the public crime data sets and bike parking data, we scored each bike parking location with the following steps:

    1. Compute ¼ mile radius area around each bike parking location.
    2. Filter for crimes that happened in area.
    3. Compute weighted score based off past crimes.

Bike racks in SF



Serving Layer

- Enter your location!
- We'll find all the nearby bike racks.
- We will return the safest bike rack locations along with our proprietary risk score!

Sample Output

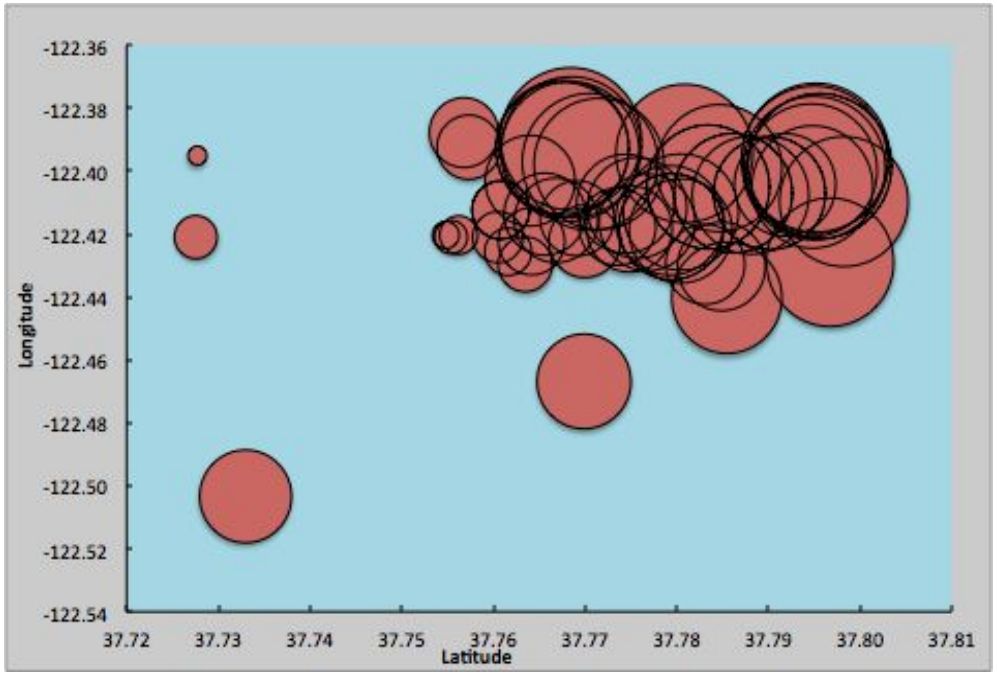
```
{
    "Address, distance, score": [
        [
            "22 OAK ST",
            0.06,
            0.2
      ],
      [
            "50 OAK ST",
            0.02,
            0.5,
      ],
      ...
    ]
}
```

Challenges

- Messy data!
- ...and lots of it!
- Joining the data

O(m*n)

Preliminary Results for San Francisco



- For our initial analysis, we created risk scores based on three major categories of crime - larceny/theft, robbery and vehicle theft
- Larger bubbles are indicative of a higher incidence of crimes near the respective bike rack locations

Risk Scores by Location in San Fran

LOCATION NAME	SCORE
UCSF Mission Bay / 3rd St Garage	0.915
California Academy of Sciences	0.406
Sutter - Stockton Garage	0.576
Mission Cliffs	0.152
UCSF Mission Bay / Owens St Garage	0.881
Golden Gateway Garage	0.949
UCSF Mission Bay / Genentech Hall	0.813
Japan Center Garage	0.355
San Francisco General Hospital	0.220
SF Main Library	0.542
Civic Center Plaza	0.508
Fifth & Mission Garage	0.694
UCSF Mount Zion	0.559
Union Square	0.627
St. Mary's Square Garage	0.474
Portsmouth Garage	0.677
UCSF Mission Bay / Genentech Hall	0.813
San Francisco Zoo	0.389

- The scores for each location are calculated based on the crimes which have occurred near the location
- Higher risk scores represent bike parking locations which are less safe based on our methodology

Goals for the Next Week and Beyond...

- Engineer a more efficient architecture for calculating the risk scores and include other variables in the risk score calculation such as time
- Use our methodology and architecture for San Francisco to extend the study to other states
- Allow users to enter reports of bike theft. We will update our risk scores to include these thefts.