

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



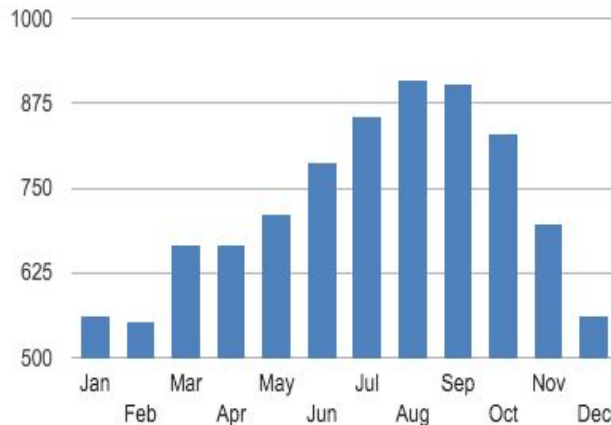
Exploring the SF data

- 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

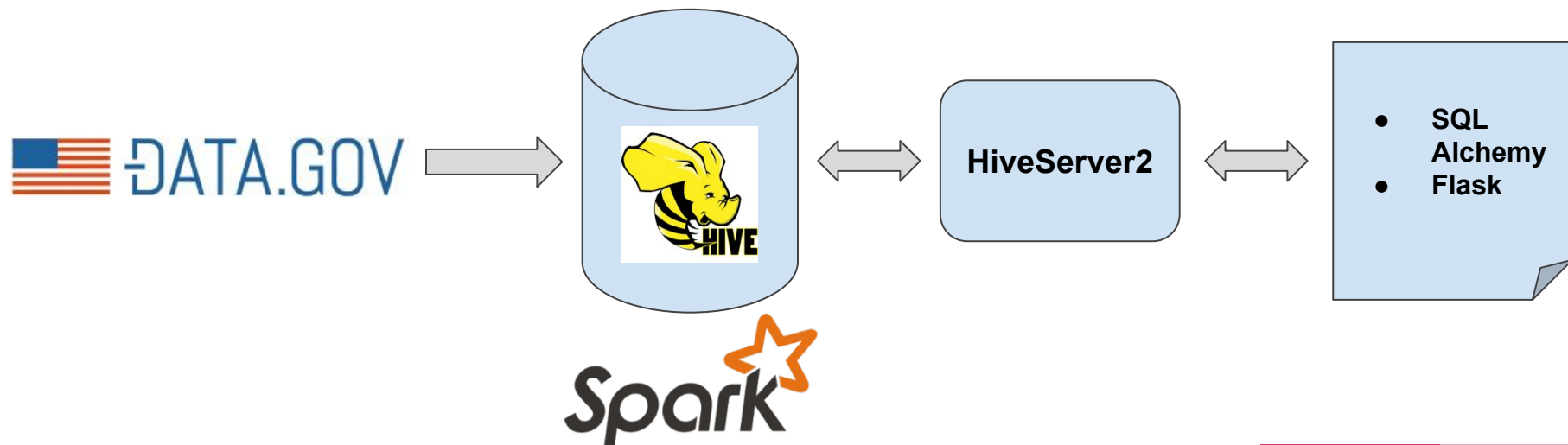
Bike Thefts by Police District



Bike Theft by Month



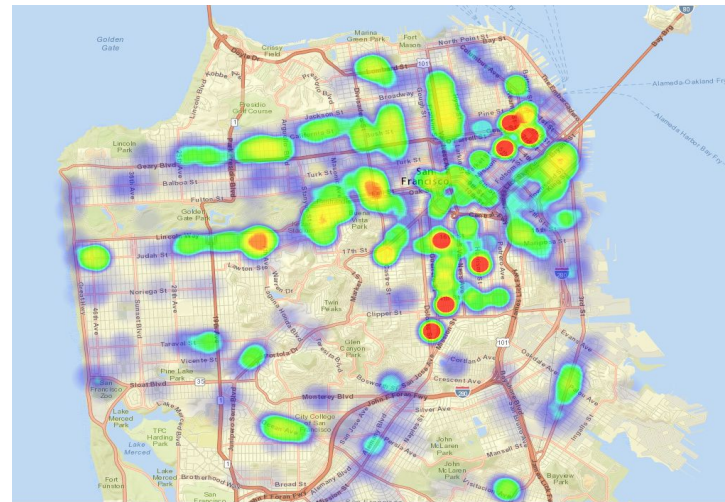
Architecture



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 $\frac{1}{4}$ 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,
    ],
    ...
  ]
}
```

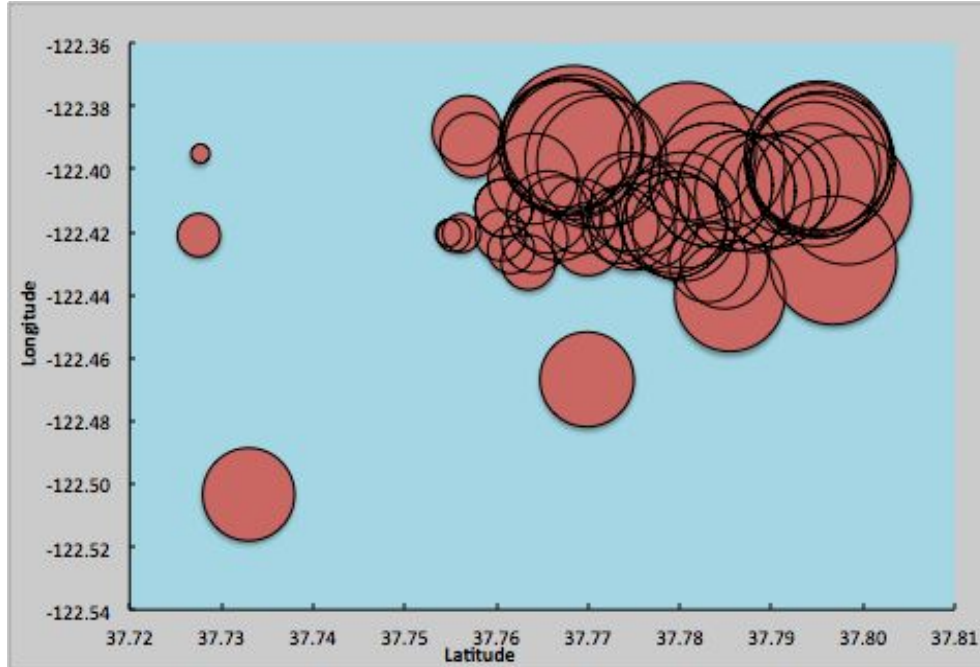

Challenges

- 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
Citizen Chain Cyclery	8.5
Starbucks	8.5
Urban Farmer Store, The	8.5
Avalon at Ocean	8.5
West Portal Elementary School	8.6
Ocean Beach	8.6
Ingleside Branch Library	8.6
Box Dog Bikes / Thieve's Tavern	8.6
Thieve's Tavern	8.6
California Pacific Medical Center	8.6
SFPD Bayview Station	8.6
Levi's	8.7
Academy of Art University	8.7
YMCA	8.8
A.P. Giannini MS	9.0
Laurel Village Shopping Center	9.1
Super Duper Burger	9.2
UCSF Mission Bay / Owens St Garage	9.3
Philz Coffee	10.0

- The scores for each location are calculated based on the crimes which have occurred near the location
- Higher scores represent bike parking locations which are safest 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.

