

## **Objective:**

Can we accurately estimate financial property losses due to a disaster within a given zip code?



# Disaster History

The Property Claim Services (PCS) division of Verisk Analytics defines a catastrophe as an event that causes \$25 million or more in insured property losses. The data below is for insured losses for 2018.

Catastrophes

55

Includes property losses of at least \$25 million.

**Estimated Damage** 

\$47.5B

Insured property value losses.

**Hurricane Katrina** 

\$51.9B

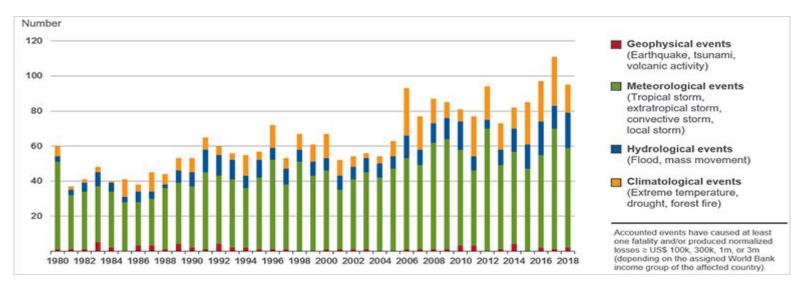
More than double the cost of hurricane Irma and Maria combined.

## Trend analysis

The chart below shows Loss Events for 2018.

These are estimated insured natural disaster losses in the United States.

The estimated losses for 2018 totaled at \$52 billion.



https://www.iii.org/fact-statistic/facts-statistics-us-catastrophes

### **Process**



We used Amazon Web Services to create a linux server. The server would be used to put our application into production.

#### Mapping

Using Bokeh to access Google maps API we can visualize the zip code boundaries with the affected properties displayed as points.

### Limitations

The Zillow API only allows individual addresses to be queried and limits queries to 1000 per day.

Because we can only get limited individual address data from Zillow, we have to sample addresses in the provided zip code, and this is computationally intensive and requires imputation of the remaining properties.

- We only have access to public address lists which do not provide 100% coverage for all zip codes (private lists may significantly improved coverage). Some areas have no address coverage at all.
- We rely on census data to estimate the remaining number of residential units. This data is also an estimate and is not timely.

#### Conclusions:

Our sampling method, with only 100 samples, matches Zillow's home value index with an R2 score of 92%. We can effectively estimate in real time the financial losses of a zip code given an upcoming disaster.

## **How Would We Improve This Product?**

- If we had unlimited access to Zillow's home estimates and ability to iterate through each estimate in a zip code we could provide much richer and more accurate estimates and our app would execute much faster
- This would remove the necessity of sampling addresses and imputing prices based on census building counts
- We would also have much broader coverage of zip codes across the US.

