
What's the Damage? Using Real Estate Data to Predict the Costs of Natural Disasters



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DSI Client Project



Roadmap

Overview

Problem Statement

Project Objective

Research Process

Obtaining / Cleaning
Data

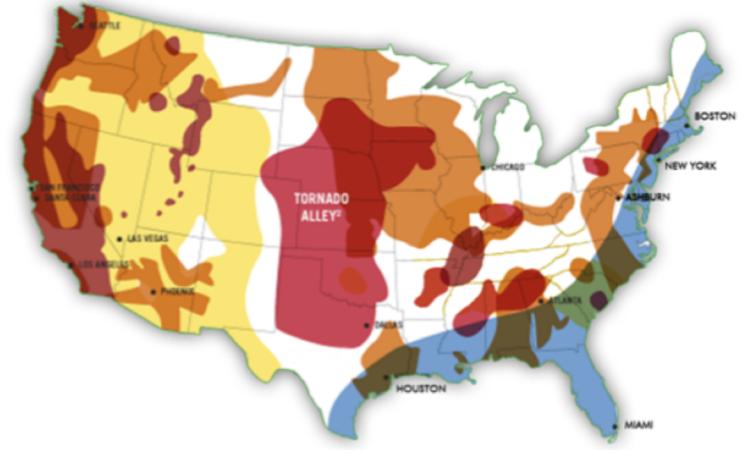
Mapping the Data

Developing Interactive
Tool

Next Steps

Overview

- The U.S. experiences ~100+ natural disasters annually (hurricanes / flooding, wildfires, earthquakes, and tornadoes)
- Natural disasters cost an estimated **\$306 billion** in **2017**, including \$102 billion in property losses.
- **Housing stock** in the U.S. valued at **\$31.8 trillion** (20% in NY, LA, SF Metro areas)
- Capacity to **estimate the potential financial losses** that result from damage to affected buildings and property is crucial



Redcross.org



Problem Statement

- During a disaster, it is important to model / estimate the projected/ forecasted damage.
- Existing indicators of forecasted damage include:
 - # People
 - # Households
 - #Structures
 - # Demographics of the impacted population
- This project will estimate **value of the properties in the affected area** – using market prices published in real estate websites, according to zip codes

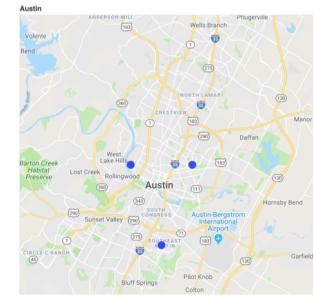
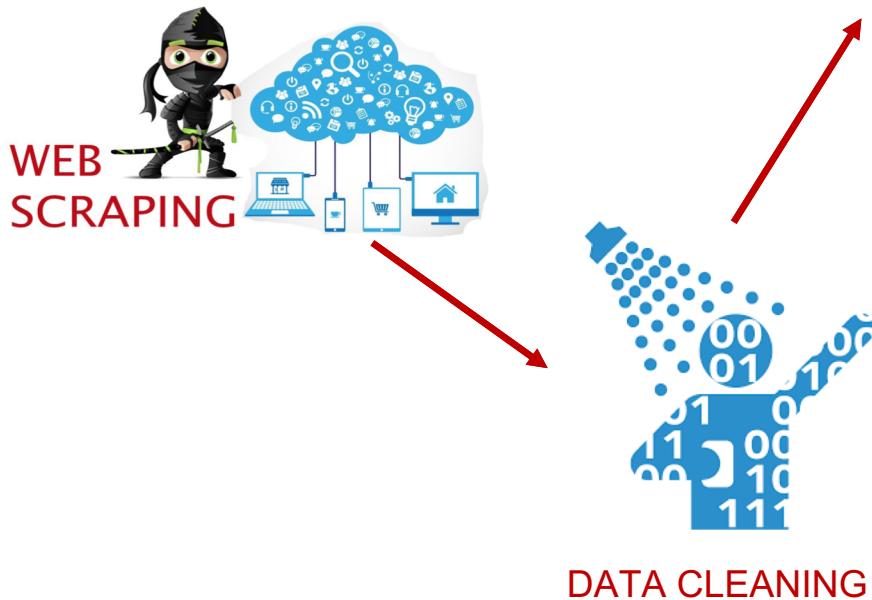


Project Objective

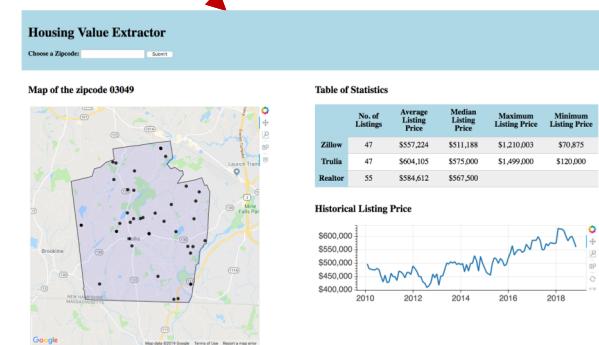
Create an interactive tool to allow residents/ policymakers in areas affected by natural disasters to estimate costs of property losses / damages

The tool will automatically search for the mean, median, min, and max value of properties in each zip code area.

Research Process



MAPPING



INTERACTIVE TOOL

Scraping data

- Properties for sale (Zillow / Trulia) - Average
- Estimates for additional properties (Zillow)
- Historical data (Zillow)

Download existing data (Realtor)

Aggregate data by zip code:

- Range, mean, median prices





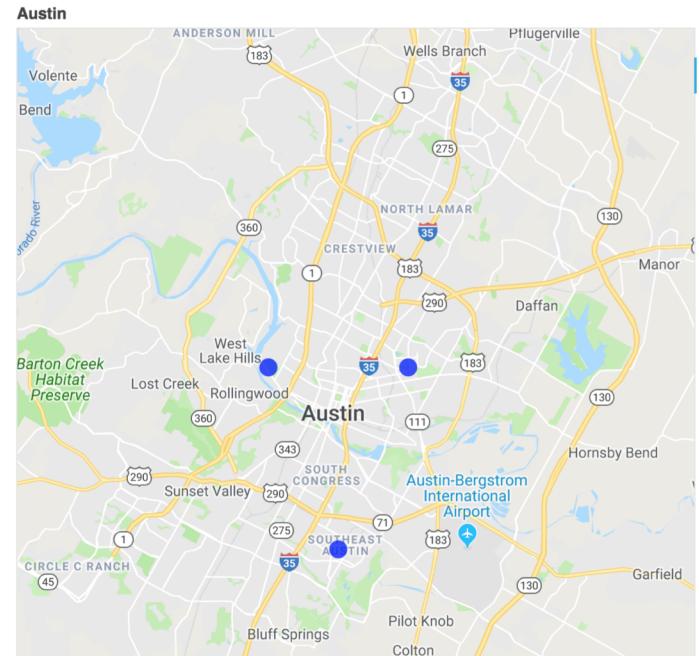
Data Summary

	Properties	Zip Codes	Mean Price	Median Price
Realtor	1,302,600	15,029	\$330,197	\$255,500
Zillow	~80 mil.	10,218	\$334,308	\$259,950
Total US	128 mil. (5.51 mil Sold 2017)	42,000	\$222,800	\$199,200

Mapping Affected Areas

Using Bokeh, Gmaps,

- Create maps in real-time with current data
- Plot all houses currently available / with value estimates online
- Display zip code-level data on key indicators





Interactive Tool

Using Flask, Python, Bokeh, and Gmaps

We developed an interactive tool that allows users to enter a zip code and obtain information about property values aggregated within each zip code, maps price information about specific addresses, and provides historical trends in values



Zip codes affected by large natural disasters

1. Hurricane Katrina 70112
2. Hurricane Sandy 06249
3. California Wildfires 90265



Housing Value Extractor

Choose a Zipcode:

Map of the zipcode 03049

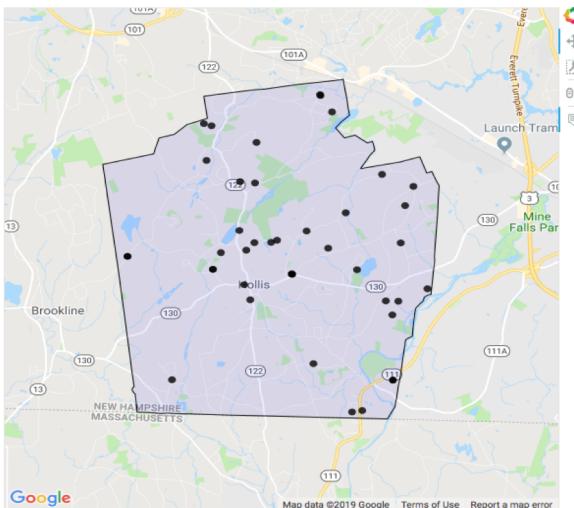
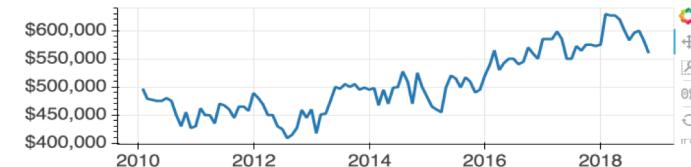


Table of Statistics

	No. of Listings	Average Listing Price	Median Listing Price	Maximum Listing Price	Minimum Listing Price
Zillow	47	\$557,224	\$511,188	\$1,210,003	\$70,875
Trulia	47	\$604,105	\$575,000	\$1,499,000	\$120,000
Realtor	55	\$584,612	\$567,500		

Historical Listing Price





Next Steps

- Add demographic information by zip codes to interactive tool (in information box hovering from csv)
- Add mapping feature that includes risk levels for different types of natural disasters
- Add ability to choose which real estate site's data to present in tool (Realtor, Trulia, and Zillow)
- Live links to external websites on disaster areas and local weather reports by zip code



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Thank you!