

# Learning regression model to predict house price

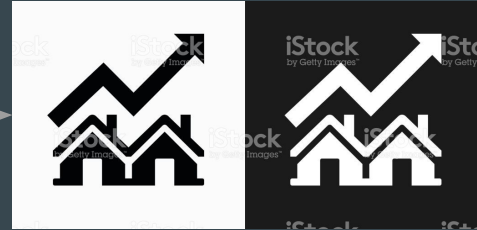
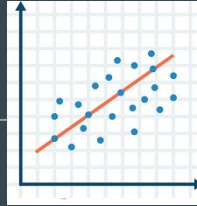
...

Capstone CS503

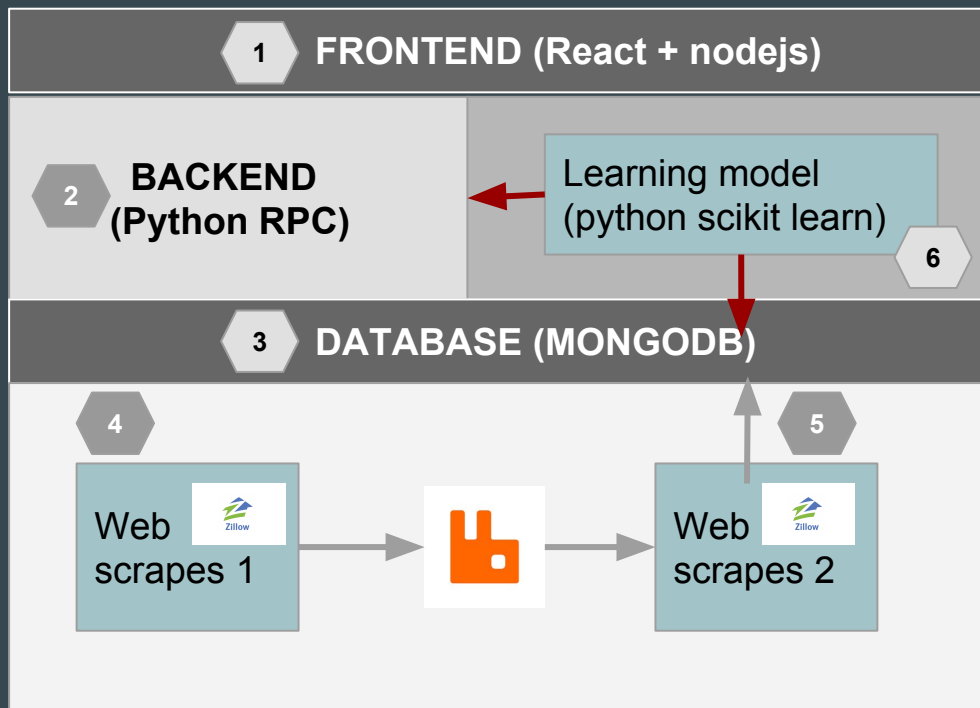
Larissa Liu

2017-11

# Overview



# Architecture



1. Use react and nodejs to host a simple web form and house market metrics. It will use auth0 as Identity provider to enable social login
2. Provide a backend with rpc apis for storing data into DB and return predicated sale price.
3. Use mongoDB to store historical house-level features and sale price
4. Scrape zillow.com listing page to get list of urls based on zip code.
5. Scrape zillow.com detail page to get house features and sale price.
6. Do linear regression using numpy, scipy, stats model and scikit learn

# Add/update house features

Address  
9909 SEAN DR

City  
FRISCO

State  
Texas

Zip Code  
75035

sqft  
2000

beds  
3

baths  
2

✓ Fencing

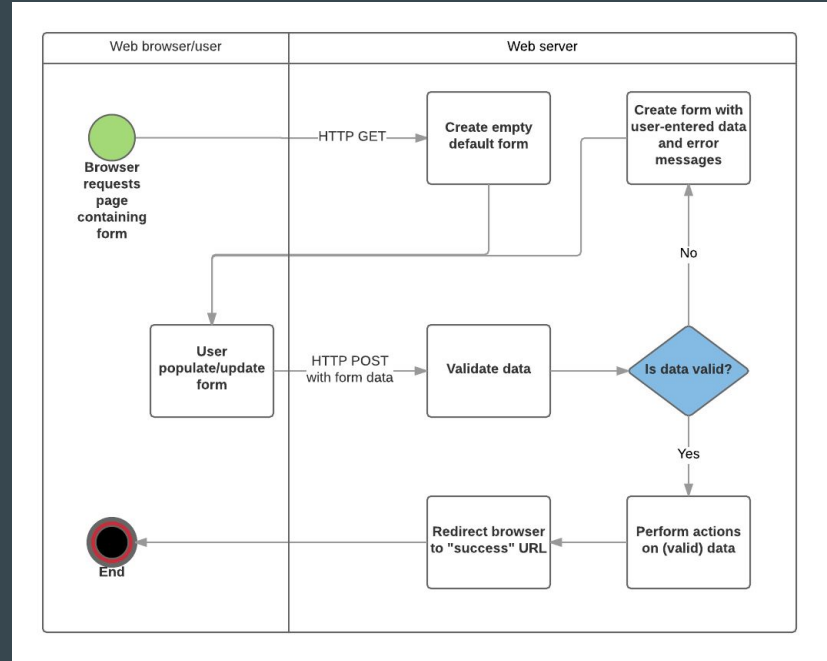
✓ Gutters

☐ None ☐ Tile ☐ Carpet  
☐ Laminate ☒ HardWood

Year of build

\$344266

SUBMIT



# Scrape zillow listing page

- Using python requests to make requests and download the HTML content of the page
- Using python LXML, for parsing the HTML Tree Structure using Xpaths
- Populate house basic feature and urls into Rabbitmq

Home Design

More

Advertise Sign in or Join

0+ Beds

Home Type

More

Save Search

Saved Homes (0)

More Map

Real Estate Provider

02126 Real Estate

59 homes for sale. 1 unmapped.

Homes for You

Newest

Cheapest

2 photos

APARTMENT FOR SALE

\$539,000

5 bds • 2 ba • 2,112 sq ft

1 day on Zillow

60 Rockdale St, Boston, MA

Crystal Realty Assoc., Inc.

28 photos

HOUSE FOR SALE

\$449,900

3 bds • 3 ba • 1,850 sq ft

4 days on Zillow

56 Hillsboro Rd, Boston, MA

Hillman Homes

Title	Address	City	State	Zip Code	Price	Facts and Features	Real Estate Provider	URL
House For Sale	45 Faunce Rd	Boston	MA	02126	\$349,000	3 bds, 2 ba, 956 sqft	Pondside Realty	https://www.zillow.com/homedetails/45-Faunce-Rd-Boston-MA-02126/59137709_zpid/
House For Sale	60 Temple St	Boston	MA	02126	\$540,000	4 bds, 2 ba, 1,696 sqft	Gibson Sotheby's International Realty	https://www.zillow.com/homedetails/60-Temple-St-Boston-MA-02126/59138896_zpid/
House For Sale	29 Violante St	Boston	MA	02126	\$259,000	3 bds, 2 ba, 1,632 sqft		https://www.zillow.com/homedetails/29-Violante-St-Boston-MA-02126/59139388_zpid/
Condo For Sale	53 River St	Boston	MA	02126	\$529,000	3 bds, 3 ba, 1,589 sqft	The Galvin Group, LLC	https://www.zillow.com/homedetails/53-River-St-Boston-MA-02126/2092600080_zpid/
Condo For Sale	6 Temple St	Boston	MA	02126	\$639,000	3 bds, 3 ba, 1,697 sqft	The Galvin Group, LLC	https://www.zillow.com/homedetails/6-Temple-St-Boston-MA-02126/2124803167_zpid/
Condo For Sale	15 Groveland St #3	Boston	MA	02126	\$349,900	3 bds, 1 ba, 830 sqft	Newbury Street Real Estate	https://www.zillow.com/homedetails/15-Groveland-St-3-Boston-MA-02126/2092921175_zpid/
House For Sale	20 Almont St	Boston	MA	02126	\$550,000	8 bds, 3 ba, 3,770 sqft		https://www.zillow.com/homedetails/20-Almont-St-Boston-MA-02126/59138113_zpid/
House For Sale	21 Kennebec St	Boston	MA	02126	\$420,000	2 bds, 2 ba, 908 sqft	Success1 Real Estate	https://www.zillow.com/homedetails/21-Kennebec-St-Boston-MA-02126/59138042_zpid/
Apartment For Sale	40 Tennis Rd	Boston	MA	02126	\$629,900	6 bds, 2 ba, 4,452 sqft	M7 Real Estate Group	https://www.zillow.com/homedetails/40-Tennis-Rd-Boston-MA-02126/59137978_zpid/
House For Sale	3 Duxbury Rd	Boston	MA	02126	\$475,000	4 bds, 1.5 ba, 1,296 sqft		https://www.zillow.com/homedetails/3-Duxbury-Rd-Boston-MA-02126/59137470_zpid/
Condo For Sale	51 River St	Mattapan	MA	02126	\$599,000	3 bds, 3 ba, 1,485 sqft	The Galvin Group, LLC	https://www.zillow.com/homedetails/51-River-St-Mattapan-MA-02126/2092719719_zpid/
Condo For Sale	51A River St	Boston	MA	02126	\$579,000	3 bds, 3 ba, 1,491 sqft	The Galvin Group, LLC	https://www.zillow.com/homedetails/51A-River-St-Boston-MA-02126/2092760832_zpid/
Apartment For Sale	4-6 Greendale Rd	Boston	MA	02126	\$599,900	6 bds, 3 ba, 2,496 sqft	WEICHERT, REALTORS® - Briarwood Real Estate	https://www.zillow.com/homedetails/4-6-Greendale-Rd-Boston-MA-02126/2092835887_zpid/
Condo For Sale	27 Hosmer St APT 1	Boston	MA	02126	\$199,000	2 bds, 1 ba, 896 sqft		https://www.zillow.com/homedetails/27-Hosmer-St-APT-1-Boston-MA-02126/81378796_zpid/
House For Sale	64 Tampa St	Boston	MA	02126	\$230,000	1 bd, 1 ba, 729 sqft	Rudy & Associates REALTORS®	https://www.zillow.com/homedetails/64-Tampa-St-Boston-MA-02126/2118499072_zpid/
House For Sale	151 Hebron St	Boston	MA	02126	\$299,900	2 bds, 1 ba, 960 sqft	Pondside Realty	https://www.zillow.com/homedetails/151-Hebron-St-Boston-MA-02126/59138658_zpid/
Condo For Sale	622 Morton St #1	Boston	MA	02126	\$325,000	3 bds, 1 ba, 1,200 sqft	Alpha Realty	https://www.zillow.com/homedetails/622-Morton-St-1-Boston-MA-02126/2093444356_zpid/

# Scrape zillow detail page

- Using python requests to make requests and download the HTML content of the page
- Using python LXML, for parsing the HTML Tree Structure using Xpaths
- Transform categorized data type into integer.

one is looking for tons of natural light pouring in. Large picturesque windows in living room with great views of the backyard. 4 bedroom, 3 living areas, 2 dining single story home over 2700 sq. ft. located in sought after Caelis Place Large kitchen features a great size island, lots of counter space for food prep, kitchen opens up to a large breakfast bar and dining area. Just a short distance to shopping, dining, and entertainment. Award-Winning Fricco ISD elementary, middle, and new Lebanon Trail High school all near by! Seller will consider all offers DONT MISS THIS ONE!

**Facts and Features**

Type: Single Family	Year Built: 1999	Heating: Forced air
Cooling: No Data	Parking: No Data	Lot: 8,732 sqft
Days on Zillow: 108 Days	Price/sqft: \$115	Saves: \$2

**INTERIOR FEATURES**

**Bedrooms:** Beds: 4

**Heating and Cooling:** Heating: Forced air  
Heating: Central Air-Elec

**Flooring:** Floor size: 2,744 sqft  
Flooring: Carpet, Tile

**Other Interior Features:** Fireplace  
[View Virtual Tour](#)

**Agents:**

- Claudia Rodriguez** (47) (408) 447-4470
- Stefanie Mock** (50) (408) 447-4470
- Joah DeShong** (145) (408) 201-0448
- Christie Carson** (11) (408) 203-4359

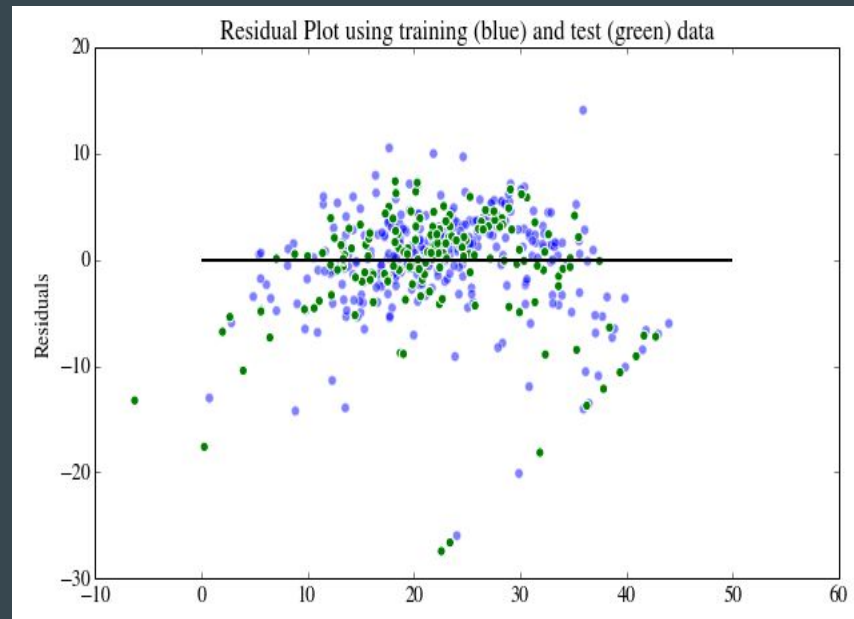
[Zestimate history & details](#)

## Price History

DATE	EVENT	PRICE	\$/SQFT	SOURCE
11/24/17	Price change	\$315,000 -4.5%	\$114	City Real Esta...
10/08/17	Price change	\$330,000 -5.7%	\$120	City Real Esta...
09/25/17	Price change	\$350,000 -2.8%	\$127	City Real Esta...

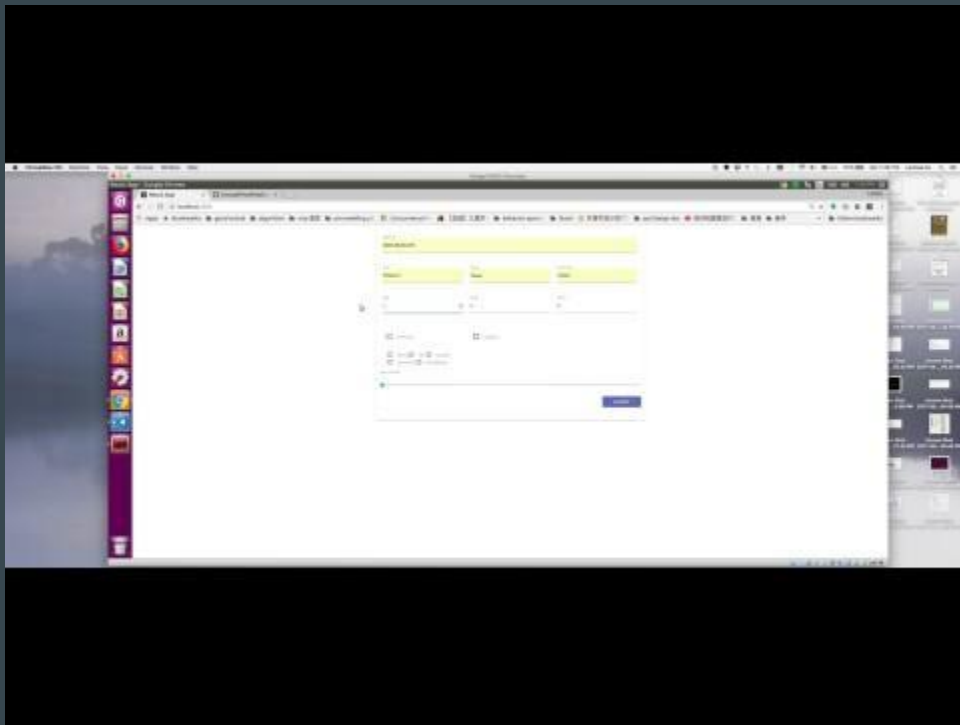
[More](#)

# RMS 90K



Learning linear regression and predict the price

# Demo..





# Improvement

- (1) Tuning the model to get a better prediction
- (2) Using different model, like Random forest.
- (3) Add house list to show similar house
- (4) Scale the scraping services
- (5) Deploy the application to remote server.

# Things I've learned....

Front end framework : Angular 2, ReactJs/Redux

Back end techniques : Nodejs, web socket

ML framework: tensorflow , pandas

Non-sql DB : mongo

Q & A