

# HOUSE PRICE PREDICTION

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# Project Background



Collect real estate data from the internet, predict future housing price trends.



Build a website to display all property information and prices.



Visualize property locations and prices on a map.

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```
7 import re
8 import time
9 from lxml import etree
10 import pandas as pd
11 import requests
12 from retrying import retry
13
14 user_agent_pool = [ # User-Agent池
15     # Cent Browser 4.3.9.248, Chromium 86.0.4240.198
16     'Mozilla/5.0 (Windows NT 10.0; Win64; x64) AppleWebKit/537.36 (KHTML
17     'Mozilla/5.0 (Windows NT 10.0; Win64; x64) AppleWebKit/537.36 (KHTML
18     # 2021.01
19     # Cent Browser 5.0.1002.295, Chromium 102.0.5005.167
20     'Mozilla/5.0 (Windows NT 10.0; Win64; x64) AppleWebKit/537.36 (KHTML
21     # 2022.12
22
23     # Edge
24     'Mozilla/5.0 (Windows NT 10.0; Win64; x64) AppleWebKit/537.36 (KHTML
25     # 2021.09
26     'Mozilla/5.0 (Windows NT 10.0; Win64; x64) AppleWebKit/537.36 (KHTML
27     'Mozilla/5.0 (Windows NT 10.0; Win64; x64) AppleWebKit/537.36 (KHTML
28     'Mozilla/5.0 (Windows NT 10.0; Win64; x64) AppleWebKit/537.36 (KHTML
29     'Mozilla/5.0 (Windows NT 10.0; Win64; x64) AppleWebKit/537.36 (KHTML
30     'Mozilla/5.0 (Windows NT 10.0; Win64; x64) AppleWebKit/537.36 (KHTML
31     'Mozilla/5.0 (Windows NT 10.0; Win64; x64) AppleWebKit/537.36 (KHTML
32     'Mozilla/5.0 (Windows NT 10.0; Win64; x64) AppleWebKit/537.36 (KHTML
33     # 2021.10
34     'Mozilla/5.0 (Windows NT 10.0; Win64; x64) AppleWebKit/537.36 (KHTML
35     'Mozilla/5.0 (Windows NT 10.0; Win64; x64) AppleWebKit/537.36 (KHTML
36     'Mozilla/5.0 (Windows NT 10.0; Win64; x64) AppleWebKit/537.36 (KHTML
37     'Mozilla/5.0 (Windows NT 10.0; Win64; x64) AppleWebKit/537.36 (KHTML
```

# 01 Data Crawler

Provide all the data needed  
for the model from website

# Crawling Process: Timeline

## requirements analysis

Identify data fields needed for predictive modeling

## Obstacles

Analyzing website protection mechanisms and choosing effective crawling methods

## Test

Made my own target site to test crawler performance

## Finding a website

Find a website that meets the requirements

## Coding

Write code to crawl the data

# —Data sources

<https://www.redfin.com/city/16163/WA/Seattle>

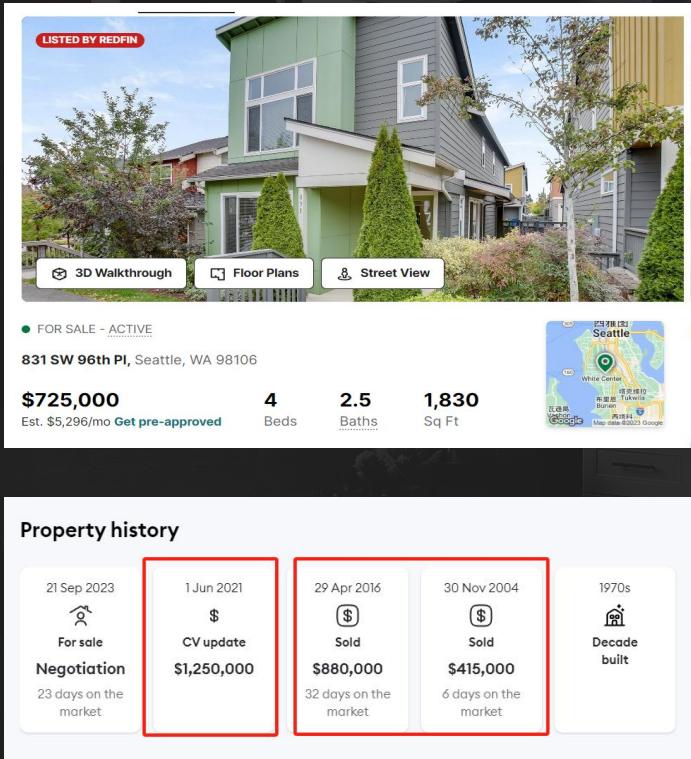
The screenshot shows a search results page for Seattle, WA homes for sale. At the top, there's a map of Seattle with various neighborhoods like Bellview, Greenwood, and Fremont highlighted. Below the map are several filters: 'For sale', 'Price', 'Home type', 'Beds / Baths', and 'All filters'. The main content area displays two properties: one a single-story house listed for \$995,000, and another a multi-story apartment building listed for \$349,950. Each listing includes a thumbnail image, price, bed/bath information, and a link to the full listing. A sidebar on the left provides options to 'Draw' or 'Options' over the map. At the bottom, there's an advertisement.

Outer layer

Get internal links, titles, image links, and the html file where they are located.

This screenshot shows the same Redfin page with developer tools (likely Chrome DevTools) open, focusing on the 'Elements' panel. The 'Outer layer' tab is selected, displaying the entire page structure as a single large block of code. The code is a long string of URLs, likely representing the full HTML document or a specific part of it, with several sections highlighted in red boxes. These red boxes highlight specific sections of the page, such as the header, footer, and various content blocks, illustrating how the developer tools can be used to identify and extract the outer structure of a web page.

—Data sources <https://www.redfin.com/city/16163/WA/Seattle>



Get basic information about a house property such as address, current price, historical sold price and date, type of house, number of bedrooms, number of bathrooms, land area, floor area, garage, open parking and more!

# Problem

Being warned by a website's anti-crawl measures

我们需要确认您是人类

在继续处理您的请求之前，您需要完成安全拼图。此身份认证活动可防止垃圾邮件并阻止可疑活动，从而保护您的账户。

开始 >

中文

```
22
23     # Edge
24     'Mozilla/5.0 (Windows NT 10.0; Win64; x64) AppleWebKit/537.36 (KHTML, like Gecko) Chrome/93.0.4577.63 Safari/537.36 Edg/93.0.9
25     # 2021.09
26     'Mozilla/5.0 (Windows NT 10.0; Win64; x64) AppleWebKit/537.36 (KHTML, like Gecko) Chrome/93.0.4577.63 Safari/537.36 Edg/93.0.9
27     'Mozilla/5.0 (Windows NT 10.0; Win64; x64) AppleWebKit/537.36 (KHTML, like Gecko) Chrome/93.0.4577.63 Safari/537.36 Edg/93.0.9
28     'Mozilla/5.0 (Windows NT 10.0; Win64; x64) AppleWebKit/537.36 (KHTML, like Gecko) Chrome/93.0.4577.82 Safari/537.36 Edg/93.0.9
29     'Mozilla/5.0 (Windows NT 10.0; Win64; x64) AppleWebKit/537.36 (KHTML, like Gecko) Chrome/94.0.4606.61 Safari/537.36 Edg/94.0.9
30     'Mozilla/5.0 (Windows NT 10.0; Win64; x64) AppleWebKit/537.36 (KHTML, like Gecko) Chrome/94.0.4606.61 Safari/537.36 Edg/94.0.9
31     'Mozilla/5.0 (Windows NT 10.0; Win64; x64) AppleWebKit/537.36 (KHTML, like Gecko) Chrome/94.0.4606.71 Safari/537.36 Edg/94.0.9
32     'Mozilla/5.0 (Windows NT 10.0; Win64; x64) AppleWebKit/537.36 (KHTML, like Gecko) Chrome/94.0.4606.81 Safari/537.36 Edg/94.0.9
33     # 2021.10
34     'Mozilla/5.0 (Windows NT 10.0; Win64; x64) AppleWebKit/537.36 (KHTML, like Gecko) Chrome/94.0.4606.81 Safari/537.36 Edg/94.0.9
35     'Mozilla/5.0 (Windows NT 10.0; Win64; x64) AppleWebKit/537.36 (KHTML, like Gecko) Chrome/95.0.4638.54 Safari/537.36 Edg/95.0.1
36     'Mozilla/5.0 (Windows NT 10.0; Win64; x64) AppleWebKit/537.36 (KHTML, like Gecko) Chrome/95.0.4638.54 Safari/537.36 Edg/95.0.1
37     'Mozilla/5.0 (Windows NT 10.0; Win64; x64) AppleWebKit/537.36 (KHTML, like Gecko) Chrome/95.0.4638.69 Safari/537.36 Edg/95.0.1
```

```
i usage
def req2(url):
    proxyip = {"http": "http://[REDACTED]", "https": "http://[REDACTED]"}
    headers['User-Agent'] = random.choice(user_agent_pool)
    html = requests.get(url, headers=headers, proxies=proxyip, verify=False).json()
    return html
```

# Solution

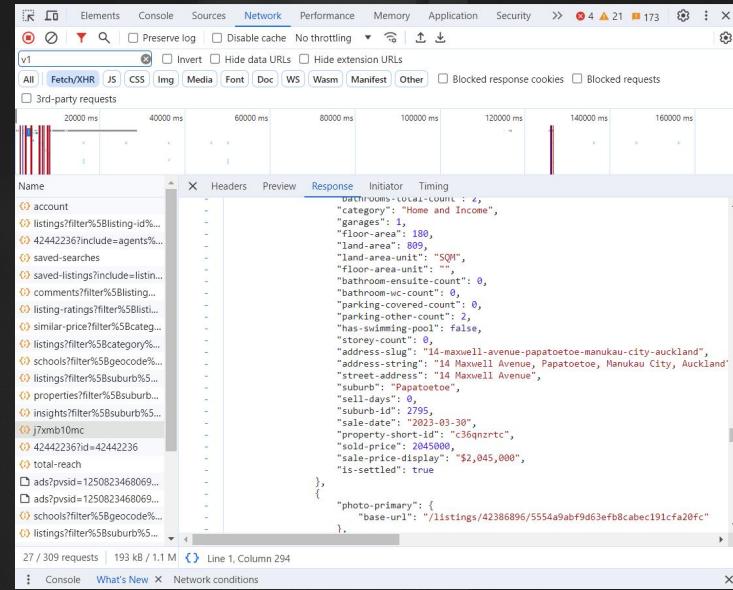
1. Creating a User Agent Pool
2. Renting a proxy pool server
3. Setting the access interval

# Problem

Tightly protected, the following information cannot be found in the source code of the web page

Property history

21 Sep 2023 For sale Negotiation 23 days on the market	1 Jun 2021 \$ CV update \$1,250,000	29 Apr 2016 \$ Sold <b>\$880,000</b> 32 days on the market	30 Nov 2004 \$ Sold <b>\$415,000</b> 6 days on the market	1970s Decade built
---	--	--	---	-----------------------



The screenshot shows the Network tab of a browser's developer tools. A specific request for a property listing is highlighted with a red box. The response body contains detailed JSON data about the property, including its address, price, and various features like bathrooms, bedrooms, and land area.

```
    "bathrooms-total-count": 2,
    "category": "Home and Income",
    "garage": 1,
    "floor-area": 180,
    "land-area": 800,
    "land-area-unit": "SQM",
    "floor-area-unit": "",
    "bathroom-ensuite-count": 0,
    "bedroom-count": 0,
    "parking-covered-count": 0,
    "parking-other-count": 2,
    "has-swimming-pool": false,
    "storey-count": 0,
    "address-slug": "14-maxwell-avenue-papatoetoe-manukau-city-auckland",
    "address-string": "14 Maxwell Avenue, Papatoetoe, Manukau City, Auckland",
    "street-address": "14 Maxwell Avenue",
    "suburb": "Papatoetoe",
    "suburb-id": 2795,
    "sale-date": "2023-03-30",
    "property-short-id": "c36gnzr7c",
    "sold-price": 2045000,
    "sale-price-display": "$2,045,000",
    "is-settled": true
  },
  {
    "photo-primary": {
      "base-url": "/listings/42386896/5554a9abf9d63efb8cabec191cfa20fc"
    }
  }
```

27 / 309 requests | 193 kB / 1.1 M Line 1, Column 294

# Solution

Finding out the interface of the request one by one in the network and get the html of the interface from it

## Data acquisition

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Each transaction record or current price is one piece of data, a total of 27,000 pieces of data, covering about 9,000 units of real estate information

# Sample Data Presentation

	A	B	C	D	E	F	G
1	Date	Address	Price	PriceType	attr	Href	Pic
2	2014-04-1151 N 79th St,Seattle, WA 98103	255000	history		{"Apartment": "Apartment", "Bedroom": "1", "Bathroom": "1", "Floor area": "41m", "Title type": "Freehold", "Land area": "647m", "Garage": "2"}	<a href="https://www.realestate.com/property/1151-n-79th-st-seattle-wa-98103">https://www.realestate.com/property/1151-n-79th-st-seattle-wa-98103</a>	
3	2023-10-0152 N 79th St,Seattle, WA 98103	379000	current		{"Apartment": "Apartment", "Bedroom": "1", "Bathroom": "1", "Floor area": "41m", "Title type": "Freehold", "Land area": "647m", "Garage": "2"}	<a href="https://www.realestate.com/property/0152-n-79th-st-seattle-wa-98103">https://www.realestate.com/property/0152-n-79th-st-seattle-wa-98103</a>	
4	2017-07-1133 Queen Anne Ave N #302,Seattle, WA 98109	850000	history		{"House": "House", "Bedroom": "3", "Bathroom": "2", "Land area": "647m", "Garage": "2"}	<a href="https://www.realestate.com/property/1133-queen-anne-ave-n-302-seattle-wa-98109">https://www.realestate.com/property/1133-queen-anne-ave-n-302-seattle-wa-98109</a>	
5	2015-02-2134 Queen Anne Ave N #302,Seattle, WA 98109	632000	history		{"House": "House", "Bedroom": "3", "Bathroom": "2", "Land area": "647m", "Garage": "2"}	<a href="https://www.realestate.com/property/2134-queen-anne-ave-n-302-seattle-wa-98109">https://www.realestate.com/property/2134-queen-anne-ave-n-302-seattle-wa-98109</a>	
6	2004-06-3135 Queen Anne Ave N #302,Seattle, WA 98109	462000	history		{"House": "House", "Bedroom": "3", "Bathroom": "2", "Land area": "647m", "Garage": "2"}	<a href="https://www.realestate.com/property/3135-queen-anne-ave-n-302-seattle-wa-98109">https://www.realestate.com/property/3135-queen-anne-ave-n-302-seattle-wa-98109</a>	
7	2003-01-3136 Queen Anne Ave N #302,Seattle, WA 98109	155000	history		{"House": "House", "Bedroom": "3", "Bathroom": "2", "Land area": "647m", "Garage": "2"}	<a href="https://www.realestate.com/property/3136-queen-anne-ave-n-302-seattle-wa-98109">https://www.realestate.com/property/3136-queen-anne-ave-n-302-seattle-wa-98109</a>	
8	2001-05-3137 Queen Anne Ave N #302,Seattle, WA 98109	140000	history		{"House": "House", "Bedroom": "3", "Bathroom": "2", "Land area": "647m", "Garage": "2"}	<a href="https://www.realestate.com/property/3137-queen-anne-ave-n-302-seattle-wa-98109">https://www.realestate.com/property/3137-queen-anne-ave-n-302-seattle-wa-98109</a>	
9	2021-06-C138 Queen Anne Ave N #302,Seattle, WA 98109	1150000	cv		{"House": "House", "Bedroom": "3", "Bathroom": "2", "Land area": "647m", "Garage": "2"}	<a href="https://www.realestate.com/property/c138-queen-anne-ave-n-302-seattle-wa-98109">https://www.realestate.com/property/c138-queen-anne-ave-n-302-seattle-wa-98109</a>	
10	2023-10-1139 Queen Anne Ave N #302,Seattle, WA 98109	1250000	current		{"House": "House", "Bedroom": "3", "Bathroom": "2", "Land area": "647m", "Garage": "2"}	<a href="https://www.realestate.com/property/1139-queen-anne-ave-n-302-seattle-wa-98109">https://www.realestate.com/property/1139-queen-anne-ave-n-302-seattle-wa-98109</a>	
11	819 Virginia St #2309,Seattle, WA 98101				{"House": "House", "Bedroom": "2", "Bathroom": "1"}	<a href="https://www.realestate.com/property/819-virginia-st-2309-seattle-wa-98101">https://www.realestate.com/property/819-virginia-st-2309-seattle-wa-98101</a>	
12	820 Virginia St #2309,Seattle, WA 98101				{"Section": "Lifestyle section", "Land area": "2045m", "Title type": "Unit Title"}	<a href="https://www.realestate.com/property/820-virginia-st-2309-seattle-wa-98101">https://www.realestate.com/property/820-virginia-st-2309-seattle-wa-98101</a>	
13	2006-05-C6414 High Point Dr SW,Seattle, WA 9812	706500	history		{"House": "House", "Bedroom": "3", "Bathroom": "2", "Floor area": "206m", "Land area": "471m", "Garage": "1"}	<a href="https://www.realestate.com/property/c6414-high-point-dr-sw-seattle-wa-9812">https://www.realestate.com/property/c6414-high-point-dr-sw-seattle-wa-9812</a>	
14	2005-04-26415 High Point Dr SW,Seattle, WA 9812	495000	history		{"House": "House", "Bedroom": "3", "Bathroom": "2", "Floor area": "206m", "Land area": "471m", "Garage": "1"}	<a href="https://www.realestate.com/property/26415-high-point-dr-sw-seattle-wa-9812">https://www.realestate.com/property/26415-high-point-dr-sw-seattle-wa-9812</a>	
15	2021-06-C6416 High Point Dr SW,Seattle, WA 9812	1325000	cv		{"House": "House", "Bedroom": "3", "Bathroom": "2", "Floor area": "206m", "Land area": "471m", "Garage": "1"}	<a href="https://www.realestate.com/property/c6416-high-point-dr-sw-seattle-wa-9812">https://www.realestate.com/property/c6416-high-point-dr-sw-seattle-wa-9812</a>	
16	2023-03-C6417 High Point Dr SW,Seattle, WA 9812	1249000	current		{"House": "House", "Bedroom": "3", "Bathroom": "2", "Floor area": "206m", "Land area": "471m", "Garage": "1"}	<a href="https://www.realestate.com/property/c6417-high-point-dr-sw-seattle-wa-9812">https://www.realestate.com/property/c6417-high-point-dr-sw-seattle-wa-9812</a>	
17	11068 Occidental Ave S,Seattle, WA 98168				{"House": "House", "Bedroom": "3", "Bathroom": "2", "Title type": "Freehold", "Garage": "1"}	<a href="https://www.realestate.com/property/11068-occidental-ave-s-seattle-wa-98168">https://www.realestate.com/property/11068-occidental-ave-s-seattle-wa-98168</a>	
18	2018-08-3831 SW 96th Pl,Seattle, WA 98106	1700000	history		{"Apartment": "Apartment", "Bedroom": "3", "Bathroom": "3", "Title type": "Freehold"}	<a href="https://www.realestate.com/property/3831-sw-96th-pl-seattle-wa-98106">https://www.realestate.com/property/3831-sw-96th-pl-seattle-wa-98106</a>	
19	2008-01-2832 SW 96th Pl,Seattle, WA 98106	689000	history		{"Apartment": "Apartment", "Bedroom": "3", "Bathroom": "3", "Title type": "Freehold"}	<a href="https://www.realestate.com/property/2832-sw-96th-pl-seattle-wa-98106">https://www.realestate.com/property/2832-sw-96th-pl-seattle-wa-98106</a>	
20	2005-02-2833 SW 96th Pl,Seattle, WA 98106	532000	history		{"Apartment": "Apartment", "Bedroom": "3", "Bathroom": "3", "Title type": "Freehold"}	<a href="https://www.realestate.com/property/2833-sw-96th-pl-seattle-wa-98106">https://www.realestate.com/property/2833-sw-96th-pl-seattle-wa-98106</a>	
21	2021-06-0834 SW 96th Pl,Seattle, WA 98106	2175000	cv		{"Apartment": "Apartment", "Bedroom": "3", "Bathroom": "3", "Title type": "Freehold"}	<a href="https://www.realestate.com/property/0834-sw-96th-pl-seattle-wa-98106">https://www.realestate.com/property/0834-sw-96th-pl-seattle-wa-98106</a>	
22	2023-02-2835 SW 96th Pl,Seattle, WA 98106	1600000	current		{"Apartment": "Apartment", "Bedroom": "3", "Bathroom": "3", "Title type": "Freehold"}	<a href="https://www.realestate.com/property/2835-sw-96th-pl-seattle-wa-98106">https://www.realestate.com/property/2835-sw-96th-pl-seattle-wa-98106</a>	
23	2021-02-210457 Des Moines Memorial Dr S Unit 402-W,Burien, WA	502000	history		{"Apartment": "Apartment", "Bedroom": "2", "Bathroom": "1", "Title type": "Leasehold"}	<a href="https://www.realestate.com/property/210457-des-moines-memorial-dr-s-unit-402-w-burien-wa">https://www.realestate.com/property/210457-des-moines-memorial-dr-s-unit-402-w-burien-wa</a>	
24	2016-09-110458 Des Moines Memorial Dr S Unit 402-W,Burien, WA	446000	history		{"Apartment": "Apartment", "Bedroom": "2", "Bathroom": "1", "Title type": "Leasehold"}	<a href="https://www.realestate.com/property/110458-des-moines-memorial-dr-s-unit-402-w-burien-wa">https://www.realestate.com/property/110458-des-moines-memorial-dr-s-unit-402-w-burien-wa</a>	
25	2011-08-C10459 Des Moines Memorial Dr S Unit 402-W,Burien, WA	242000	history		{"Apartment": "Apartment", "Bedroom": "2", "Bathroom": "1", "Title type": "Leasehold"}	<a href="https://www.realestate.com/property/c10459-des-moines-memorial-dr-s-unit-402-w-burien-wa">https://www.realestate.com/property/c10459-des-moines-memorial-dr-s-unit-402-w-burien-wa</a>	
26	2021-06-C10460 Des Moines Memorial Dr S Unit 402-W,Burien, WA	520000	cv		{"Apartment": "Apartment", "Bedroom": "2", "Bathroom": "1", "Title type": "Leasehold"}	<a href="https://www.realestate.com/property/c10460-des-moines-memorial-dr-s-unit-402-w-burien-wa">https://www.realestate.com/property/c10460-des-moines-memorial-dr-s-unit-402-w-burien-wa</a>	
27	2023-09-C10461 Des Moines Memorial Dr S Unit 402-W,Burien, WA	539000	current		{"Apartment": "Apartment", "Bedroom": "2", "Bathroom": "1", "Title type": "Leasehold"}	<a href="https://www.realestate.com/property/c10461-des-moines-memorial-dr-s-unit-402-w-burien-wa">https://www.realestate.com/property/c10461-des-moines-memorial-dr-s-unit-402-w-burien-wa</a>	
28	2021-06-C5177 42nd Ave S,Seattle, WA 98118	1725000	cv		{"Section": "Lifestyle property", "Bedroom": "5", "Bathroom": "2", "Land area": "6.36ha", "Title type": "Freehold"}	<a href="https://www.realestate.com/property/c5177-42nd-ave-s-seattle-wa-98118">https://www.realestate.com/property/c5177-42nd-ave-s-seattle-wa-98118</a>	

# Sample Data Presentation

A	B	C	D	E	F
27485	2006-05-11424 Belmont Ave Unit F-361, Seattle, WA 98122	3000000	history	{"Apartment": "Apartment", "Bedroom": "1", "Bathroom": "1", "Floor area": "41m"}	<a href="https://www.re.com">https://www.re.com</a>
27486	2021-06-01425 Belmont Ave Unit F-361, Seattle, WA 98122	340000	cv	{"Apartment": "Apartment", "Bedroom": "1", "Bathroom": "1", "Floor area": "41m"}	<a href="https://www.re.com">https://www.re.com</a>
27487	2023-08-11426 Belmont Ave Unit F-361, Seattle, WA 98122	339000	current	{"Apartment": "Apartment", "Bedroom": "1", "Bathroom": "1", "Floor area": "41m"}	<a href="https://www.re.com">https://www.re.com</a>
27488	2021-06-012319 1st Ave #702, Seattle, WA 98121	1025000	cv	{"Townhouse": "Townhouse", "Bedroom": "3", "Bathroom": "2", "Land area": "216m", "Title type": "Freehold"}	<a href="https://www.re.com">https://www.re.com</a>
27489	2023-08-12320 1st Ave #702, Seattle, WA 98121	900000	current	{"Townhouse": "Townhouse", "Bedroom": "3", "Bathroom": "2", "Land area": "216m", "Title type": "Freehold"}	<a href="https://www.re.com">https://www.re.com</a>
27490	2021-02-213717 Linden Ave N #323, Seattle, WA 98133	1460000	history	{"House": "House", "Bedroom": "5", "Bathroom": "3", "Floor area": "275m", "Land area": "568m", "Cover type": "Covered"}	<a href="https://www.re.com">https://www.re.com</a>
27491	2020-08-313718 Linden Ave N #323, Seattle, WA 98133	1210000	history	{"House": "House", "Bedroom": "5", "Bathroom": "3", "Floor area": "275m", "Land area": "568m", "Cover type": "Covered"}	<a href="https://www.re.com">https://www.re.com</a>
27492	2021-06-013719 Linden Ave N #323, Seattle, WA 98133	1600000	cv	{"House": "House", "Bedroom": "5", "Bathroom": "3", "Floor area": "275m", "Land area": "568m", "Cover type": "Covered"}	<a href="https://www.re.com">https://www.re.com</a>
27493	2023-08-113720 Linden Ave N #323, Seattle, WA 98133	1600000	current	{"House": "House", "Bedroom": "5", "Bathroom": "3", "Floor area": "275m", "Land area": "568m", "Cover type": "Covered"}	<a href="https://www.re.com">https://www.re.com</a>
27494	2010-03-33813 Gilman Ave W, Seattle, WA 98199	270000	history	{"House": "House", "Bedroom": "5", "Bathroom": "3", "Land area": "539m", "Title type": "Freehold", "G": "G"}	<a href="https://www.re.com">https://www.re.com</a>
27495	2009-07-03814 Gilman Ave W, Seattle, WA 98199	240000	history	{"House": "House", "Bedroom": "5", "Bathroom": "3", "Land area": "539m", "Title type": "Freehold", "G": "G"}	<a href="https://www.re.com">https://www.re.com</a>
27496	2021-06-03815 Gilman Ave W, Seattle, WA 98199	1525000	cv	{"House": "House", "Bedroom": "5", "Bathroom": "3", "Land area": "539m", "Title type": "Freehold", "G": "G"}	<a href="https://www.re.com">https://www.re.com</a>
27497	2023-08-13816 Gilman Ave W, Seattle, WA 98199	1359000	current	{"House": "House", "Bedroom": "5", "Bathroom": "3", "Land area": "539m", "Title type": "Freehold", "G": "G"}	<a href="https://www.re.com">https://www.re.com</a>
27498	2016-01-21974 Perkins Ln W, Seattle, WA 98199	1370000	history	{"House": "House", "Bedroom": "3", "Bathroom": "1", "Land area": "814m", "Title type": "Freehold", "G": "G"}	<a href="https://www.re.com">https://www.re.com</a>
27499	2021-06-01975 Perkins Ln W, Seattle, WA 98199	2275000	cv	{"House": "House", "Bedroom": "3", "Bathroom": "1", "Land area": "814m", "Title type": "Freehold", "G": "G"}	<a href="https://www.re.com">https://www.re.com</a>
27500	2023-08-21976 Perkins Ln W, Seattle, WA 98199	1800000	current	{"House": "House", "Bedroom": "3", "Bathroom": "1", "Land area": "814m", "Title type": "Freehold", "G": "G"}	<a href="https://www.re.com">https://www.re.com</a>
27501	2016-06-31623 14th Ave Unit A, Seattle, WA 98122	769000	history	{"House": "House", "Bedroom": "3", "Bathroom": "2", "Land area": "732m", "Title type": "Freehold", "G": "G"}	<a href="https://www.re.com">https://www.re.com</a>
27502	2014-05-31624 14th Ave Unit A, Seattle, WA 98122	560000	history	{"House": "House", "Bedroom": "3", "Bathroom": "2", "Land area": "732m", "Title type": "Freehold", "G": "G"}	<a href="https://www.re.com">https://www.re.com</a>
27503	2012-05-21625 14th Ave Unit A, Seattle, WA 98122	502500	history	{"House": "House", "Bedroom": "3", "Bathroom": "2", "Land area": "732m", "Title type": "Freehold", "G": "G"}	<a href="https://www.re.com">https://www.re.com</a>
27504	2004-02-11626 14th Ave Unit A, Seattle, WA 98122	345000	history	{"House": "House", "Bedroom": "3", "Bathroom": "2", "Land area": "732m", "Title type": "Freehold", "G": "G"}	<a href="https://www.re.com">https://www.re.com</a>
27505	1999-02-21627 14th Ave Unit A, Seattle, WA 98122	235000	history	{"House": "House", "Bedroom": "3", "Bathroom": "2", "Land area": "732m", "Title type": "Freehold", "G": "G"}	<a href="https://www.re.com">https://www.re.com</a>
27506	2021-06-01628 14th Ave Unit A, Seattle, WA 98122	1150000	cv	{"House": "House", "Bedroom": "3", "Bathroom": "2", "Land area": "732m", "Title type": "Freehold", "G": "G"}	<a href="https://www.re.com">https://www.re.com</a>
27507	2023-03-01629 14th Ave Unit A, Seattle, WA 98122	1150000	current	{"House": "House", "Bedroom": "3", "Bathroom": "2", "Land area": "732m", "Title type": "Freehold", "G": "G"}	<a href="https://www.re.com">https://www.re.com</a>
27508	112 21st Ave Unit A, Seattle, WA 98122			{"Apartment": "Apartment", "Bedroom": "2", "Bathroom": "2", "Floor area": "90m", "Title type": "Unit"}	<a href="https://www.re.com">https://www.re.com</a>
27509					
27510					
27511					
27512					

# Data samples-outer layer

0,https://www.redfin.com/WA/Seattle/151-N-79th-St-98103/home/496732,"151 N 79th St,Seattle, WA 98103","https://ssl.cdn-redfin.com/system\_files/863697.JPG/item\_49.jpg",1.html  
1,https://www.redfin.com/WA/Seattle/133-Queen-Anne-Ave-N-98109/unit-302/home/67105,"133 Queen Anne Ave N #302,Seattle, WA 98109","https://ssl.cdn-redfin.com/system\_files/862821.JPG/item\_1.jpg",1.html  
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3,https://www.redfin.com/WA/Seattle/6414-High-Point-Dr-SW-98126/home/18661846,"6414 High Point Dr SW,Seattle, WA 98126","https://ssl.cdn-redfin.com/system\_files/863790.JPG/item\_51.jpg",1.html  
4,https://www.redfin.com/WA/Seattle/11068-Occidental-Ave-S-98168/home/189514,"11068 Occidental Ave S,Seattle, WA 98168","https://ssl.cdn-redfin.com/system\_files/863404.JPG/item\_3.jpg",1.html  
5,https://www.redfin.com/WA/Seattle/831-SW-96th-Pl-98106/home/8187827,"831 SW 96th Pl,Seattle, WA 98106","https://ssl.cdn-redfin.com/system\_files/863697.JPG/item\_49.jpg",1.html  
6,https://www.redfin.com/WA/Seattle/7733-26th-Ave-SW-98106/home/472386,"7733 26th Ave SW,Seattle, WA 98106","https://ssl.cdn-redfin.com/system\_files/863697.JPG/item\_49.jpg",1.html  
7,https://www.redfin.com/WA/Burien/10457-Des-Moines-Memorial-Dr-S-98148/unit-402-W/home/187982499,"10457 Des Moines Memorial Dr S Unit 402-W,Burien, WA 98148","https://ssl.cdn-redfin.com/system\_files/863697.JPG/item\_49.jpg",1.html  
8,https://www.redfin.com/WA/Seattle/5177-42nd-Ave-S-98118/home/112863558,"5177 42nd Ave S,Seattle, WA 98118","https://ssl.cdn-redfin.com/system\_files/863697.JPG/item\_49.jpg",1.html  
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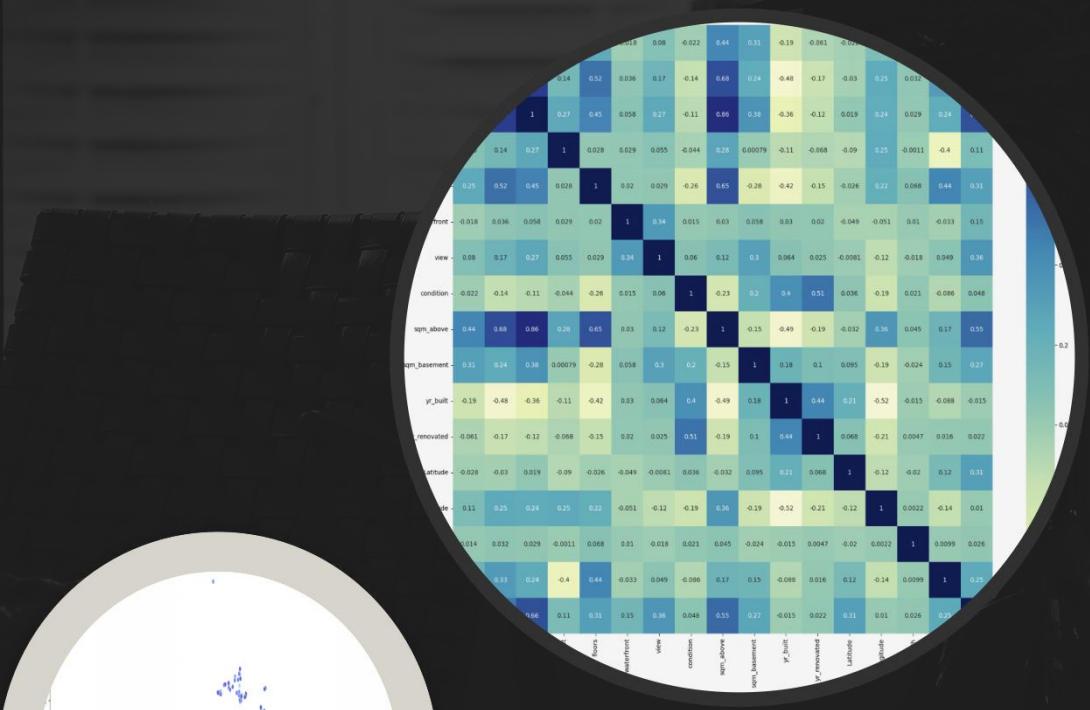
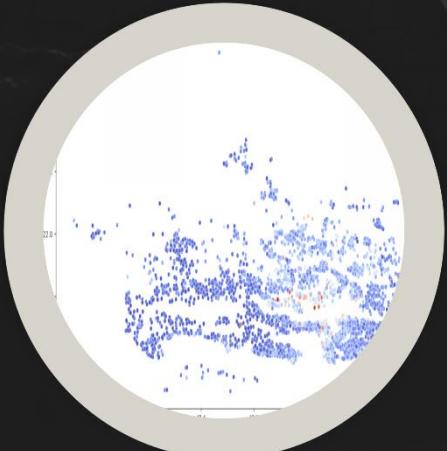
## Data samples-internal layer

Date	Address	Price	PriceType	attr	Href	Pic_url	130
2021-06-01	"151 N 79th St, Seattle, WA 98103",1175000,sv,"{""House"": ""House"", ""Bedroom"": ""3"", ""Bathroom"": ""1"", ""Land area"": ""3328m""}						
2023-10-15T00:13:09	"151 N 79th St, Seattle, WA 98103",1550000,current,"{""House"": ""House"", ""Bedroom"": ""3"", ""Bathroom"": ""1"", ""Land area"": ""9454 Olson Pl SW, Seattle, WA 98106""}, {"Apartment": ""Apartment"", ""Bedroom"": ""3"", ""Bathroom"": ""2"", ""Floor area"": ""212m""}, ""Title						
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2023-10-04T13:57:51	"133 Queen Anne Ave N #302, Seattle, WA 98109",1000000,current,"{\"House\": \"House\", \"Bedroom\": \"3\", \"Bathroom\": \"1\", \"Floor area\": \"6414 High Point Dr SW, Seattle, WA 98126\", \"Title						
2019-10-11	"6414 High Point Dr SW, Seattle, WA 98126",1865000,history,"{\"Townhouse\": \"Townhouse\", \"Bedroom\": \"3\", \"Bathroom\": \"2\", \"Title						
2018-07-23	"6414 High Point Dr SW, Seattle, WA 98126",1839000,history,"{\"Townhouse\": \"Townhouse\", \"Bedroom\": \"3\", \"Bathroom\": \"2\", \"Title						
2006-07-31	"6414 High Point Dr SW, Seattle, WA 98126",835000,history,"{\"Townhouse\": \"Townhouse\", \"Bedroom\": \"3\", \"Bathroom\": \"2\", \"Title						
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2023-10-11T16:37:08	"11068 Occidental Ave S, Seattle, WA 98168",2800000,current,"{\"Townhouse\": \"Townhouse\", \"Bedroom\": \"3\", \"Bathroom\": \"1\", \"Title						
2016-06-30	"831 SW 96th Pl, Seattle, WA 98106",550000,history,"{\"House\": \"House\", \"Bedroom\": \"3\", \"Bathroom\": \"1\", \"Title type\": \"Cross						
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2013-05-10	"10457 Des Moines Memorial Dr S Unit 402-W, Burien, WA 98168",1400000,history,"{\"House\": \"House\", \"Bedroom\": \"5\", \"Bathroom\": \"1\", \"Title						
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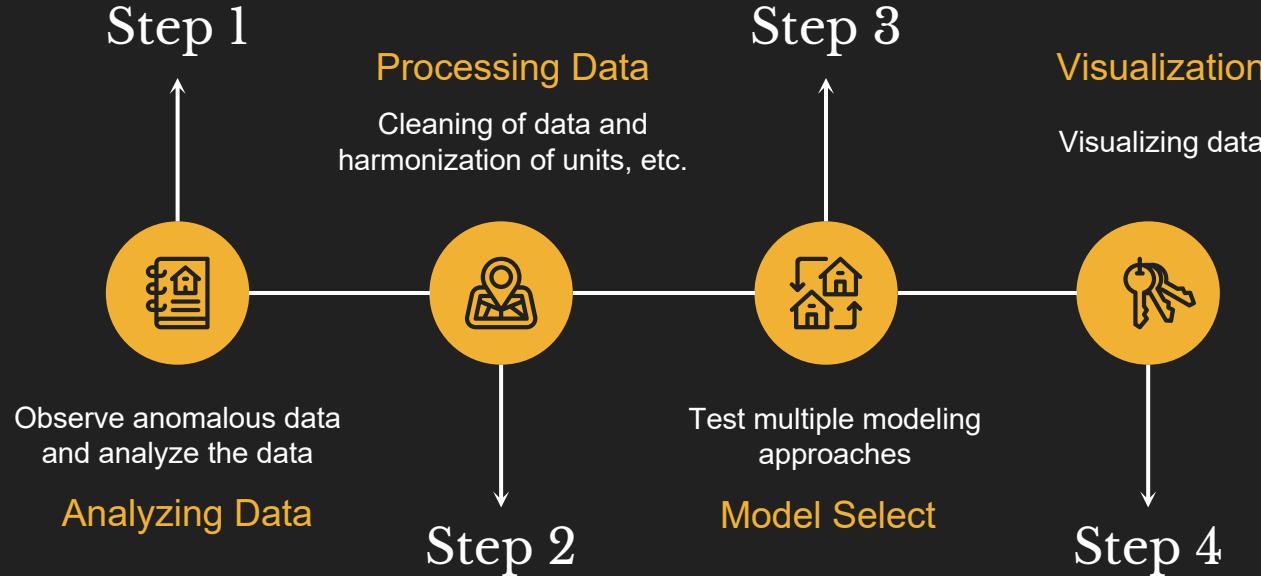
# 02

# Data Analysis

Build predictive models and visualize data

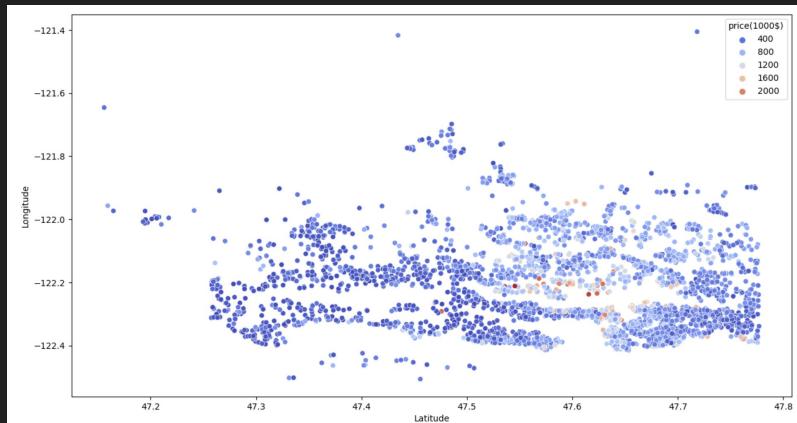


# Process Timeline

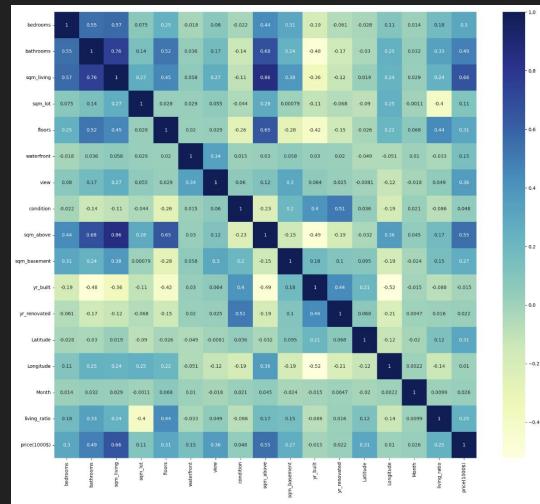


# Analyzing Data

Analyzing data characteristics (tables and plots), including data statistics (maximum and minimum values, etc.), correlation analysis, etc.



Indicates house prices at different latitudes and longitudes



Correlation of different features

# Processing Data

Data processing including Cleaning up missing or unusual data and remove less relevant features and so on.

	price(1000\$)	bedrooms	bathrooms
count	4600.000000	4600.000000	4600.000000
mean	551.962975	3.400870	2.160815
std	563.834706	0.908848	0.783781
min	0.000000	0.000000	0.000000
25%	322.875000	3.000000	1.750000
50%	460.943000	3.000000	2.250000
75%	654.962500	4.000000	2.500000
max	26590.000000	9.000000	8.000000

Clean up data with a price of 0

```
for i in range(rows):
    geocode_result = gmaps.geocode(data['Address'][i])
    data['Latitude'][i] = geocode_result[0]['geometry']['location']['lat']
    data['Longitude'][i] = geocode_result[0]['geometry']['location']['lng']
```

Convert address to latitude and longitude using google api

# Model Select

Testing with different scalers, models, parameters

- Split the data into three groups two groups using Standard Scaler Min Max Scaler and one group without scaler

Why use them?

- Standard Scaler:

For data that is close to normally distributed.

- Min Max Scaler:

Min Max Scaler is not affected by non-normally distributed data.

```
std_scaler = StandardScaler()
mm_scaler = MinMaxScaler()

X_train_std = std_scaler.fit_transform(X_train)
X_train_mm = mm_scaler.fit_transform(X_train)
```

## ● Test different models and parameters

Use grid search to select the appropriate parameters.  
This is an example for Random Forest.

Algorithm	MSE	MAE	R2
LR(no)	38329.2211161543	130.1797061053948	0.6395529302592287
LR(std)	38332.965727995106	130.0425955754526	0.6395177160199086
LR(mm)	38329.22111615375	130.17970610539328	0.6395529302592338
RF(no)	19887.22761601966	85.35477214634146	0.8129809917676394
RF(std)	19542.43668532529	84.46573637804879	0.8162233973533244
RF(mm)	19761.803566429408	84.88996162195122	0.8141684765018448
dt(no)	30442.999900786588	109.50008658536585	0.7137147641194206
dt(std)	36284.294605987315	114.98183414634146	0.6595356878454557
dt(mm)	32065.055808715853	112.55667195121951	0.698468989533263
svr(no)	112015.22423795737	218.50184675572197	-0.0533884636103501
svr(std)	86174.22217725583	174.517065025916	0.18961969571851767
svr(mm)	87946.97438931635	180.26377930962778	0.17294877672754705
gbr(no)	20949.111999087225	90.09435943797037	0.802995056733601
gbr(std)	21396.661678657372	91.27546512012178	0.7987863102948305
gbr(mm)	21487.529194583916	91.22809354728194	0.7986841124375035
xgb(no)	16869.935831567524	82.0147752305938	0.8413555308422229
xgb(std)	17289.905465262655	83.74924624812428	0.8374061465490547
xgb(mm)	17330.933720192905	83.66839286499024	0.8370203178305067

```
param_grid = {
    'n_estimators': [10, 50, 100],
    'max_depth': [None, 10, 20, 30],
    'min_samples_split': [2, 5, 10],
    'min_samples_leaf': [1, 2, 4],
}

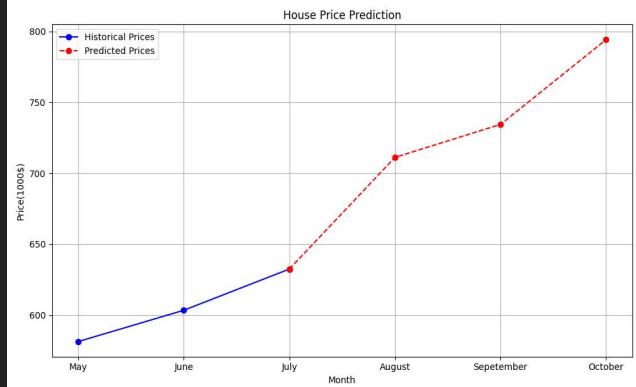
rf_std = RandomForestRegressor()

grid_search = GridSearchCV(rf, param_grid, cv=5, scoring='accuracy', n_jobs=-1)
grid_search.fit(X_train, y_train)
```

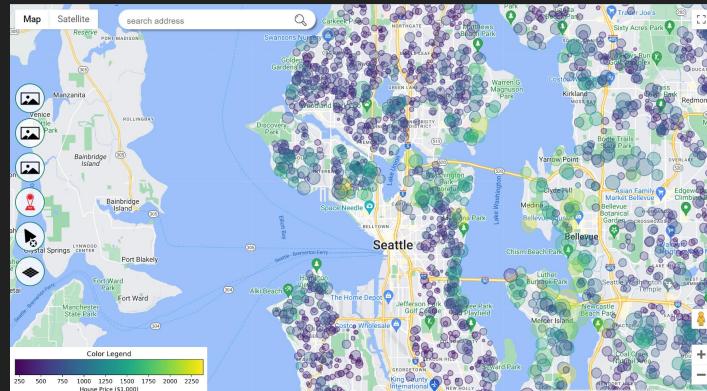
1. **MAE (Mean Absolute Error):** indicates the average amount of deviation in the model's predictions.
2. **MSE (Mean Square Error):** penalizes large errors more and is more suitable for optimization.
3. **R^2 (coefficient of determination):** describes the ability of the model to explain the variability of the target variable

# Visualization

## Prediction



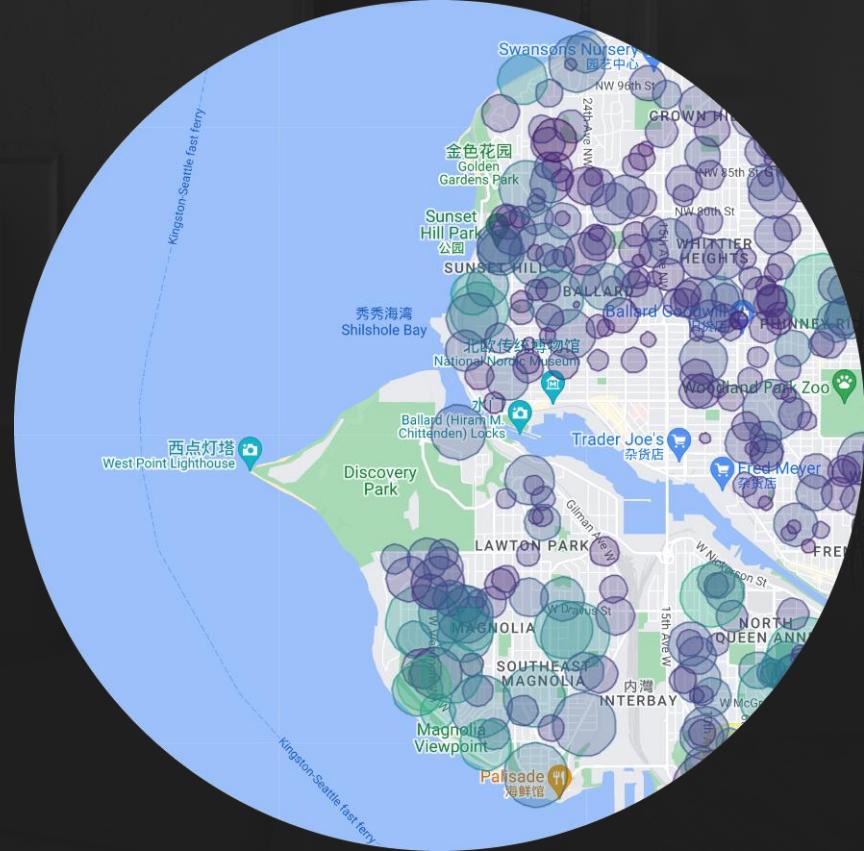
## Heat Map



# 03

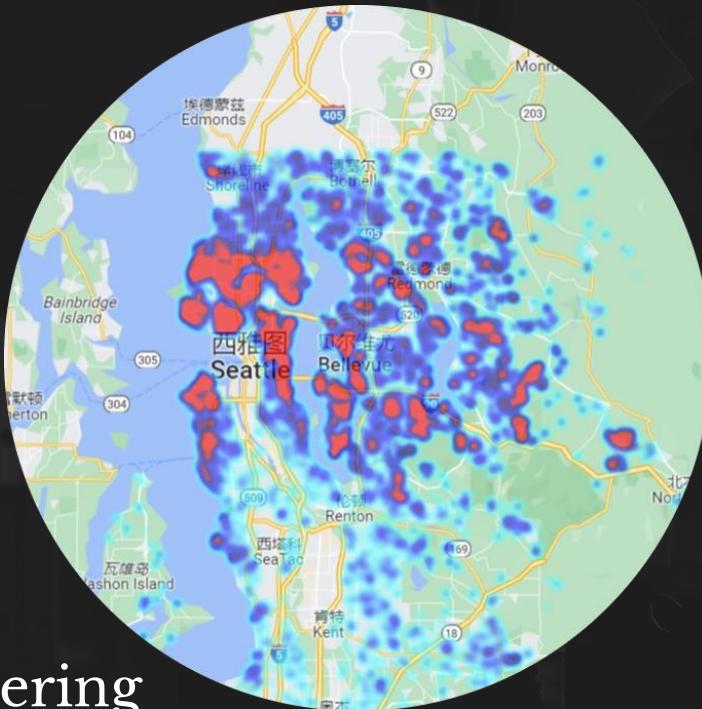
# Map Development

Provide users with an optimal  
and intuitive visual  
experience of the data



# Map Visualization

Solution



precise information  
predict price

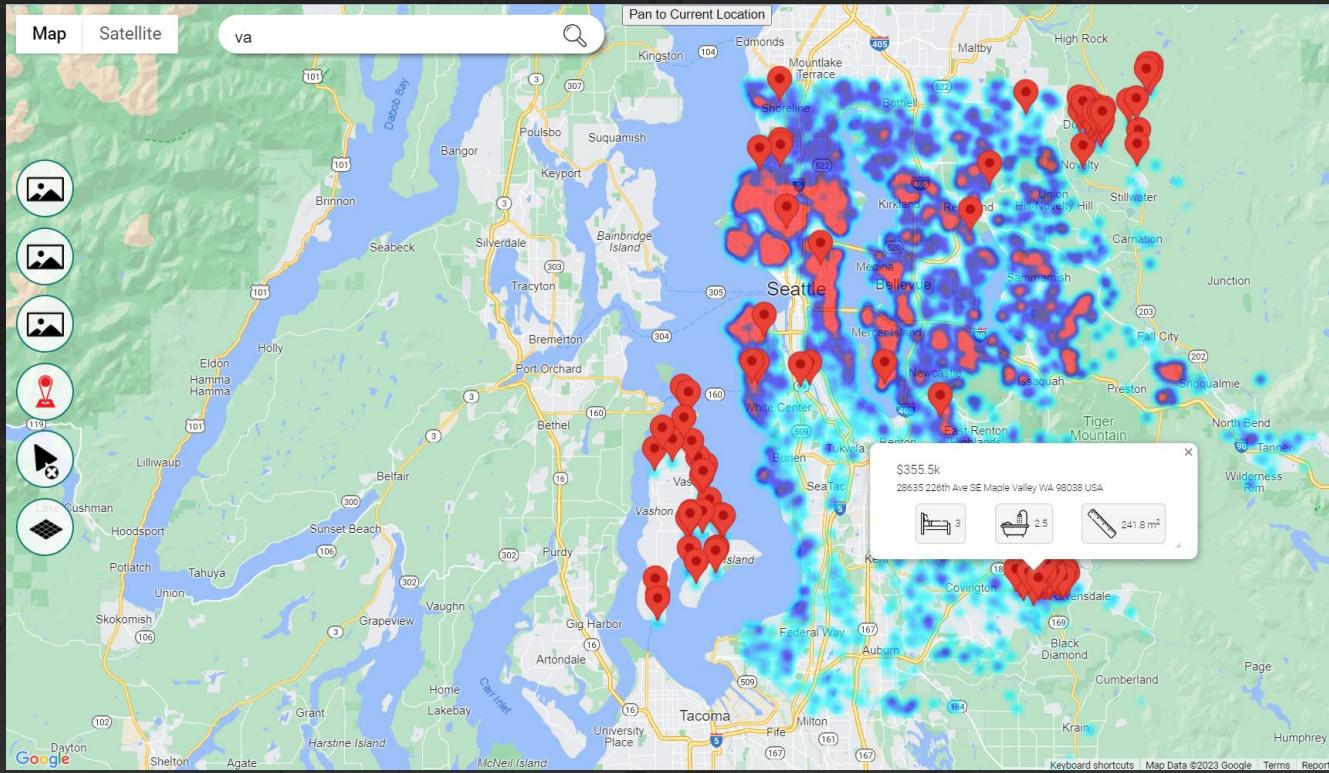
Requirements Gathering

# Map Overview

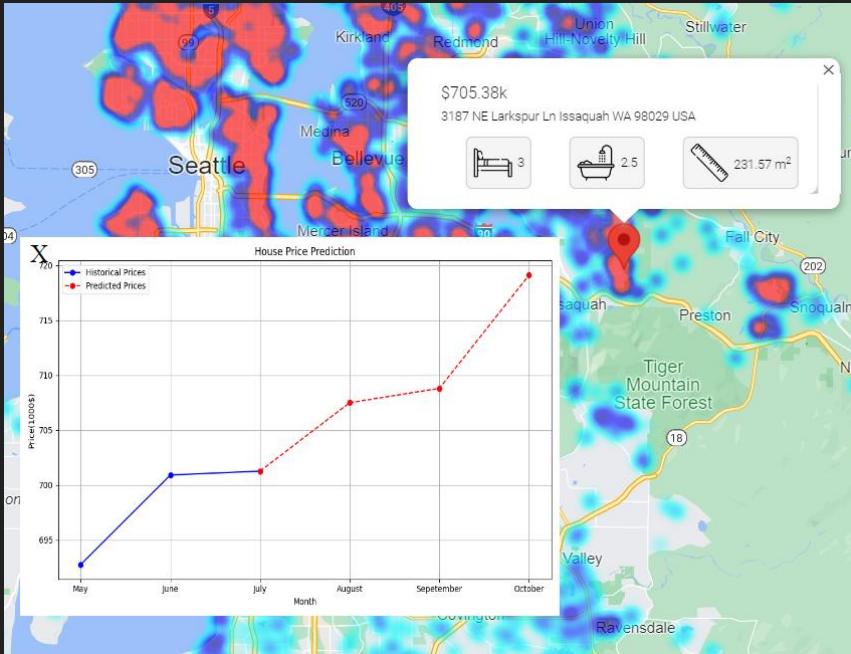


Heatmap

Multiple Controls



# Predicted Growth



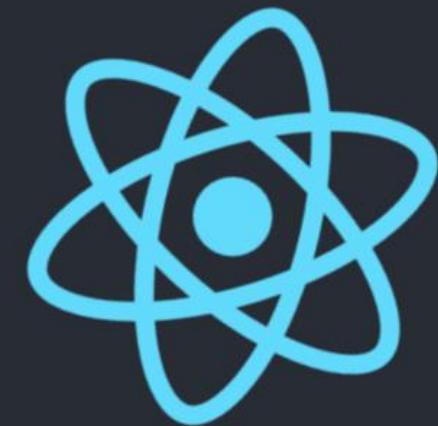
Useful  
Information

Prediction

04

# Web Design

React project and integrate  
algorithms



Edit `src/App.js` and save to reload

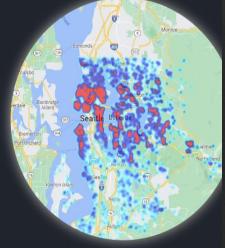
[Learn React](#)

- React project
- Simple
- Highly interactive
- High-end overall style

Map   Display   Search   Home

Hello, It's Me,  
**House Price Prediction**  
And I can price analyze!

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Downtown Penthouse  
Prices have been steadily increasing in recent years, promising substantial investment potential.

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Get started with House Price Prediction now  
Complete data | rich functions | convenient use

[usescheck.com](#)

- High-end overall style
- Advanced
- light black background
- various animation effects

# 05

# Server Construction

By using BT Linux server  
operations and  
maintenance

: 65.4 MiB	Upload Speed	Download Speed
et, US	76.59 Mbps	976.6 Mbps
A	95.48 Mbps	850.95 Mbps
NL	78.32 Mbps	657.26 Mbps
N	19.16 Mbps	939.90 Mbps
CN	311.02 Mbps	494.62 Mbps
CN	257.97 Mbps	752.09 Mbps
N	440.86 Mbps	582.93 Mbps
SG	18.82 Mbps	1.49 Mbps
N	443.65 Mbps	611.40 Mbps
SG	558.57 Mbps	561.23 Mbps
SG	208.80 Mbps	608.70 Mbps
SG	502.39 Mbps	745.12 Mbps
SG	462.59 Mbps	586.37 Mbps

: 7 min 29 sec

: 2023-10-16 08:53:57 UTC

# Details

## Area



sgr-07641a204f6b8b1e9	IPv4	MySQL/Aurora	TCP	3306	0.0.0.0/0
sgr-0e23d935611a528...	IPv4	自定义 TCP	TCP	8080	0.0.0.0/0
sgr-0bc3551a5ad9ba8...	IPv4	HTTPS	TCP	443	0.0.0.0/0
sgr-08062e5241e1f49eb	IPv4	自定义 TCP	TCP	5001	0.0.0.0/0
sgr-070b54a192a08fd93	IPv4	自定义 TCP	TCP	8084	0.0.0.0/0
sgr-0fb03ddff1f30652e	IPv4	HTTP	TCP	80	0.0.0.0/0
sgr-023f79ad43e3e55e0db	IPv4	SSH	TCP	22	0.0.0.0/0
sgr-0894a76fd40185b...	IPv4	自定义 TCP	TCP	21	0.0.0.0/0
sgr-0b535b95ec5689ba	IPv4	自定义 TCP	TCP	5000	0.0.0.0/0
sgr-0bd4335686bea2...	IPv4	自定义 TCP	TCP	3330	0.0.0.0/0
sgr-0acd7f517be9c47c4	IPv4	自定义 TCP	TCP	8888	0.0.0.0/0
sgr-00c1bc466c6090a51	IPv4	自定义 TCP	TCP	41069	0.0.0.0/0

**Server Provider:** Amazon Web Services

**Amazon Machine Image (AMI):** Ubuntu Server 20.04 LTS (HVM), SSD Volume Type

**Server Configuration:** Intel Xeon Processor, 1 Core 1G, 30GB SSD

**Database:** MySQL

**Web Server:** Nginx

**Domain name:** 13.239.117.249:3330

# Navicat Premium

## Database Development Tools

The screenshot shows the Navicat Premium application window. The title bar reads "clean\_data @13\_239\_117\_249 (13.239.117.249) - Table - Navicat Premium". The menu bar includes File, Edit, View, Table, Favorites, Tools, Window, and Help. The toolbar contains icons for Connection, New Query, Table, View, Function, User, Others, Query, Backup, Automation, Model, and Charts.

The left sidebar displays the database structure under "13.239.117\_249":

- Tables: all\_perth\_310121, clean\_data, data, processed\_data
- Views
- Functions
- Queries
- Backups
- information\_schema

The main area shows a table viewer for the "clean\_data" table:

price(1000\$)	bedrooms	bathrooms	sqm_living	sqm_lot	floors	waterfront	view	condition	sqm_above	sqm_basement	yr_built	yr_renc
313	3	1.5	124.62	735.816	1.5	0	0	3	124.62	0	59	
2384	5	2.5	339.45	841.65	2	0	4	5	313.41	26.04	93	
342	3	2	179.49	1111.071	1	0	0	4	179.49	0	48	
420	3	2.25	186	746.79	1	0	0	4	93	93	51	
550	4	2.5	180.42	976.5	1	0	0	4	106.02	74.4	38	
490	2	1	81.84	593.34	1	0	0	3	81.84	0	76	
335	2	2	125.55	238.08	1	0	0	3	125.55	0	38	
482	4	2.5	252.03	335.724	2	0	0	3	252.03	0	25	
452.5	3	2.5	225.99	8223.618	1	0	0	4	146.01	79.98	29	
640	4	2	141.36	576.6	1.5	0	0	3	141.36	0	69	
463	3	1.75	159.03	680.76	1	0	0	3	159.03	0	66	
1400	4	2.5	271.56	372	1.5	0	0	5	177.63	93.93	105	
588.5	3	1.75	216.69	1384.956	1	0	0	3	183.21	33.48	34	
365	3	1	101.37	598.455	1	0	0	4	101.37	0	59	
1200	5	2.75	270.63	881.64	1.5	0	0	3	270.63	0	75	
242.5	3	1.5	111.6	903.96	1	0	0	4	111.6	0	49	
419	3	1.5	146.01	623.1	1	0	0	4	146.01	0	58	
367.5	4	3	289.23	672.483	2	0	0	3	289.23	0	17	
257.95	3	1.75	127.41	544.794	1	0	0	3	127.41	0	27	
275	3	1.5	109.74	955.761	1	0	0	3	109.74	0	31	
750	3	1.75	208.32	983.754	2	0	0	5	144.15	64.17	91	
435	4	1	134.85	818.4	1	0	0	4	134.85	0	60	
612.5	4	2.5	253.89	1140.273	2	0	0	3	253.89	0	23	
495	4	1.75	148.8	593.34	1	0	0	3	105.09	43.71	55	
285	3	2.5	194.37	1007.562	1	0	0	4	126.48	67.89	27	
615	3	1.75	219.48	678.063	1	0	0	4	126.48	93	66	
698	4	2.25	204.6	1046.25	1.5	0	0	5	120.9	83.7	94	
675	5	2.5	262.26	6279.174	2	0	0	3	262.26	0	35	
790	3	2.5	241.8	441.75	1	0	0	4	158.1	83.7	63	
382.5	4	1.75	145.08	809.1	1	0	0	4	145.08	0	47	
499.95	4	2.5	265.98	311.085	2	0	0	3	203.67	62.31	10	

The status bar at the bottom shows the query: "SELECT \* FROM '13\_239\_117\_249'.`clean\_data` LIMIT 0,1000" and "Record 1 of 1000 in page 1".

# Details

## Area



sgr-07641a204f6b8b1e9	IPv4	MySQL/Aurora	TCP	3306	0.0.0.0/0
sgr-0e23d935611a528...	IPv4	自定义 TCP	TCP	8080	0.0.0.0/0
sgr-0bc3551a5ad9ba8...	IPv4	HTTPS	TCP	443	0.0.0.0/0
sgr-08062e5241e1f49eb	IPv4	自定义 TCP	TCP	5001	0.0.0.0/0
sgr-070b54a192a08fd93	IPv4	自定义 TCP	TCP	8084	0.0.0.0/0
sgr-0fb03ddff1f30652e	IPv4	HTTP	TCP	80	0.0.0.0/0
sgr-023f79ad43e3e55e0db	IPv4	SSH	TCP	22	0.0.0.0/0
sgr-0894a76fd40185b...	IPv4	自定义 TCP	TCP	21	0.0.0.0/0
sgr-0b535b95ec5689ba	IPv4	自定义 TCP	TCP	5000	0.0.0.0/0
sgr-0bd4335686bea2...	IPv4	自定义 TCP	TCP	3330	0.0.0.0/0
sgr-0acd7f517be9c47c4	IPv4	自定义 TCP	TCP	8888	0.0.0.0/0
sgr-00c1bc466c6090a51	IPv4	自定义 TCP	TCP	41069	0.0.0.0/0

**Server Provider:** Amazon Web Services

**Amazon Machine Image (AMI):** Ubuntu Server 20.04 LTS (HVM), SSD Volume Type

**Server Configuration:** Intel Xeon Processor, 1 Core 1G, 30GB SSD

**Database:** MySQL

**Web Server:** Nginx

**Domain name:** 13.239.117.249:3330

# Web View

Not secure | 13.239.117.249:3330/#/index

Home Map Display Search

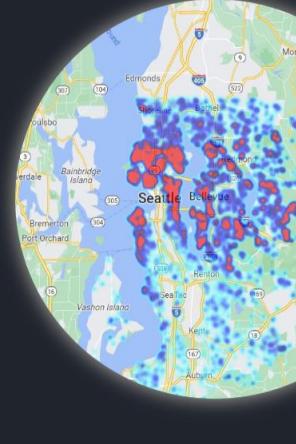
Hello, It's Me,

## House Price Prediction

And I can analyze price|



[Learn More](#)



# Details

## Area



sgr-07641a204f6b8b1e9	IPv4	MySQL/Aurora	TCP	3306	0.0.0.0/0
sgr-0e23d935611a528...	IPv4	自定义 TCP	TCP	8080	0.0.0.0/0
sgr-0bc3551a5ad9ba8...	IPv4	HTTPS	TCP	443	0.0.0.0/0
sgr-08062e5241e1f49eb	IPv4	自定义 TCP	TCP	5001	0.0.0.0/0
sgr-070b54a192a08fd93	IPv4	自定义 TCP	TCP	8084	0.0.0.0/0
sgr-0fb03ddff1f30652e	IPv4	HTTP	TCP	80	0.0.0.0/0
sgr-023f79ad43e3e55e0db	IPv4	SSH	TCP	22	0.0.0.0/0
sgr-0894a76fd40185b...	IPv4	自定义 TCP	TCP	21	0.0.0.0/0
sgr-0b535b95ec5689ba	IPv4	自定义 TCP	TCP	5000	0.0.0.0/0
sgr-0bd4335686bea2...	IPv4	自定义 TCP	TCP	3330	0.0.0.0/0
sgr-0acd7f517be9c47c4	IPv4	自定义 TCP	TCP	8888	0.0.0.0/0
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# Pagoda Panel

## Linux server operation and management panel

The screenshot shows the Pagoda Linux Panel interface. On the left is a dark sidebar with various management links: Home, site, FTP, database, Docker, monitor, safe, WAF, file (selected), log, terminal, Schedule tasks, Software Store, Panel settings, quit, and Customize the. Below the sidebar is a "menu" button.

The main area is a file manager window titled "root directory > www > wwwroot > 13.239.117.249". It displays a list of files and directories:

filename	Tamper-	Permission /	size	Modification time	remark
build	🛡️	755 / www	compute	2023/10/16 14:14:38	
static	🛡️	755 / root	compute	2023/10/16 14:14:18	
.htaccess	🛡️	755 / www	1 B	2023/09/05 18:31:23	PS: Apache user profile (pseu
.user.ini	🛡️	644 / root	47 B	2023/09/05 18:31:23	PS: PHP User Profile (Anti-Cr
asset-manifest.json	🛡️	755 / www	1.83 KB	2023/10/16 14:14:14	
homepage.ico	🛡️	755 / www	161.78 KB	2023/10/16 14:14:14	
homepage.png	🛡️	755 / www	1.95 KB	2023/10/16 14:14:15	
index.html	🛡️	755 / www	728 B	2023/10/16 14:14:15	
manifest.json	🛡️	755 / www	493 B	2023/10/16 14:14:15	
robots.txt	🛡️	755 / www	67 B	2023/09/05 18:31:54	

At the bottom of the file manager, there are buttons for "编辑 | 复制 | 剪切 | 重命名" (Edit | Copy | Cut | Rename). The footer of the page includes the text "Total 2 directories, 8 files, file size: calculated", navigation links "1 1/1 From 1-10 bars A total of 10 articles per page 500 strip", and a "客服" (Customer Service) icon with a blue bird logo.

At the very bottom of the page, there is a footer bar with links: "Pagoda Linux Panel ©2014-2023 Guangdong Baota Security Technology Co., Ltd. (bt.cn)" and "Forum Help | User manual | WeChat public account | Genuine query".

# Server Performance

## Configuration

```
----- A Bench.sh Script By Teddysun -----
Version      : v2023-06-10
Usage        : wget -qO- bench.sh | bash

CPU Model   : Intel(R) Xeon(R) CPU E5-2676 v3 @ 2.40GHz
CPU Cores    : 1 @ 2400.005 MHz
CPU Cache    : 30720 KB
AES-NI       : Enabled
VM-x/AMD-V   : Disabled
Total Disk   : 29.0 GB (9.9 GB Used)
Total Mem    : 965.7 MB (322.5 MB Used)
Total Swap   : 1.0 GB (467.9 MB Used)
System uptime: 38 days, 22 hour 1 min
Load average: 0.68, 0.17, 0.05
OS           : Ubuntu 22.04.2 LTS
Arch         : x86_64 (64 Bit)
Kernel       : 5.19.0-1025-aws
TCP CC       : cubic
Virtualization: Xen-DomU
IPv4/IPv6    : Online / Offline
Organization  : AS16509 Amazon.com, Inc.
Location     : Sydney / AU
Region       : New South Wales
```

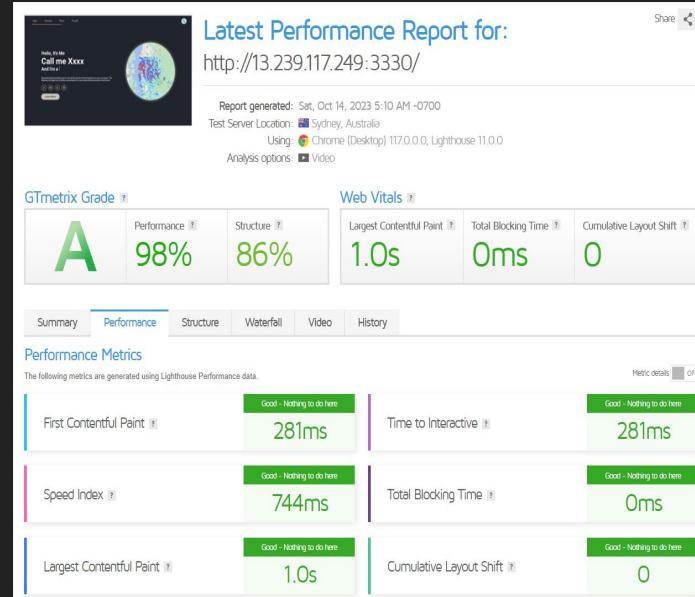
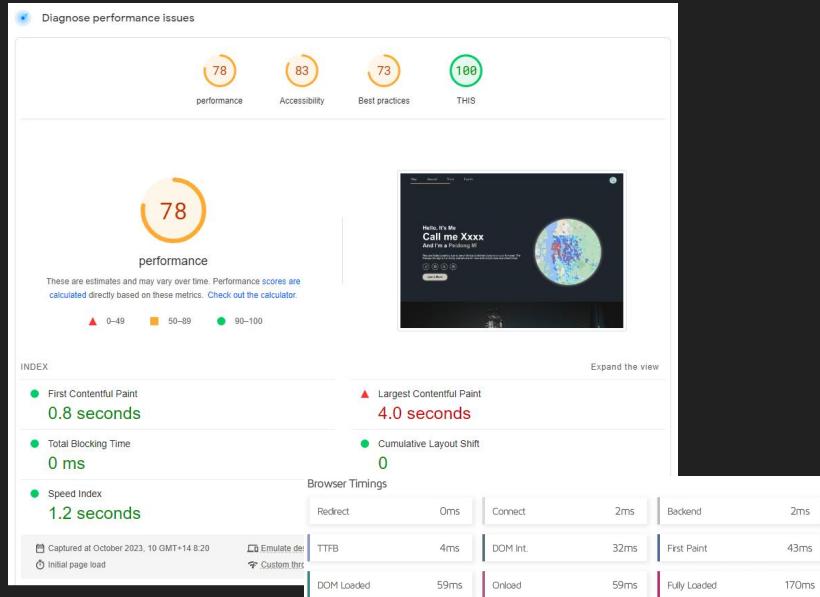
## Test

I/O Speed(1st run)	67.7 MB/s		
I/O Speed(2nd run)	64.2 MB/s		
I/O Speed(3rd run)	64.2 MB/s		
I/O Speed(average)	65.4 MB/s		
Node Name	Upload Speed	Download Speed	Latency
Speedtest.net	976.38 Mbps	976.67 Mbps	1.09 ms
Los Angeles, US	580.85 Mbps	723.98 Mbps	143.91 ms
Dallas, US	507.25 Mbps	804.42 Mbps	169.65 ms
Montreal, CA	245.79 Mbps	712.49 Mbps	203.23 ms
Paris, FR	337.77 Mbps	322.62 Mbps	265.37 ms
Amsterdam, NL	340.33 Mbps	624.11 Mbps	260.92 ms
Shanghai, CN	486.31 Mbps	469.49 Mbps	160.78 ms
Nanjing, CN	441.67 Mbps	498.13 Mbps	159.21 ms
Hongkong, CN	663.63 Mbps	653.19 Mbps	128.84 ms
Singapore, SG	590.57 Mbps	487.95 Mbps	93.61 ms
Tokyo, JP	488.45 Mbps	667.06 Mbps	130.22 ms

-----  
Finished in : 6 min 26 sec  
Timestamp : 2023-10-14 05:13:06 UTC

# Web Testing

## Metrics



# Web Testing

## Waterfall

The waterfall chart displays the loading behaviour of your site in your selected browser. It can be used to discover simple issues such as 404's or more complex issues such as external resources blocking page rendering.

React App



# Web Testing

## Accessibility

### PASSED AUDITS (11)

- [aria-hidden="true"] is not present on the document <body>
- Buttons have an accessible name
- Image elements have [alt] attributes
- [user-scalable="no"] is not used in the <meta name="viewport"> element and the [maximum-scale] attribute is not less than 5.
- Background and foreground colors have a sufficient contrast ratio
- Document has a <title> element
- [id] attributes on active, focusable elements are unique
- <html> element has a [lang] attribute
- <html> element has a valid value for its [lang] attribute
- Form elements have associated labels
- Image elements do not have [alt] attributes that are redundant text.

## Best Practices

### PASSED AUDITS (11)

- Avoids deprecated APIs
- Allows users to paste into input fields
- Avoids requesting the geolocation permission on page load
- Avoids requesting the notification permission on page load
- Serves images with appropriate resolution
- Page has the HTML doctype
- Properly defines charset
- Avoids unload event listeners
- No browser errors logged to the console
- No issues in the Issues panel in Chrome DevTools
- Page has valid source maps

## SEO

### PASSED AUDITS (11)

- Has a <meta name="viewport"> tag with width or initial-scale
- Document has a <title> element
- Document has a meta description
- Page has successful HTTP status code
- Links have descriptive text
- Links are crawlable
- Page isn't blocked from indexing
- robots.txt is valid
- Image elements have [alt] attributes
- Document has a valid hreflang
- Document avoids plugins

06

# Project Summary

About project testing, team introduction and experience

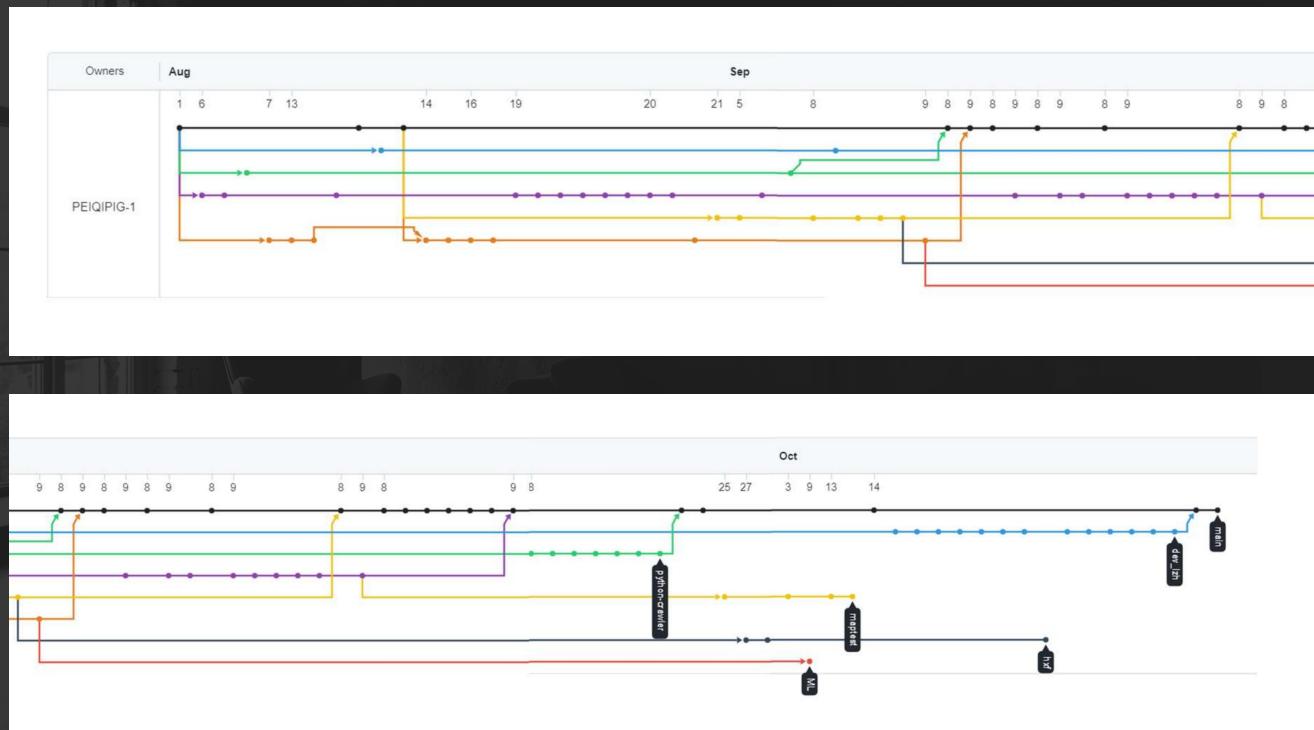
Hello, It's Me,  
**House Price Predic**  
And I can analyze price



Learn More

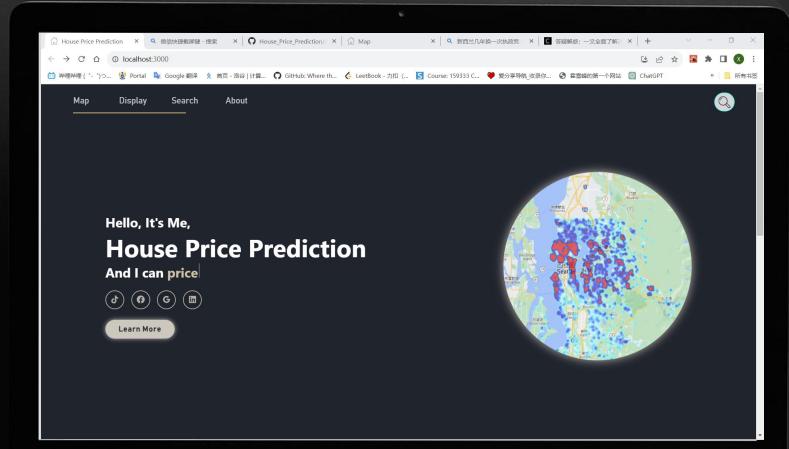
# Gantt Chart of Project Organisation

# Network Graph

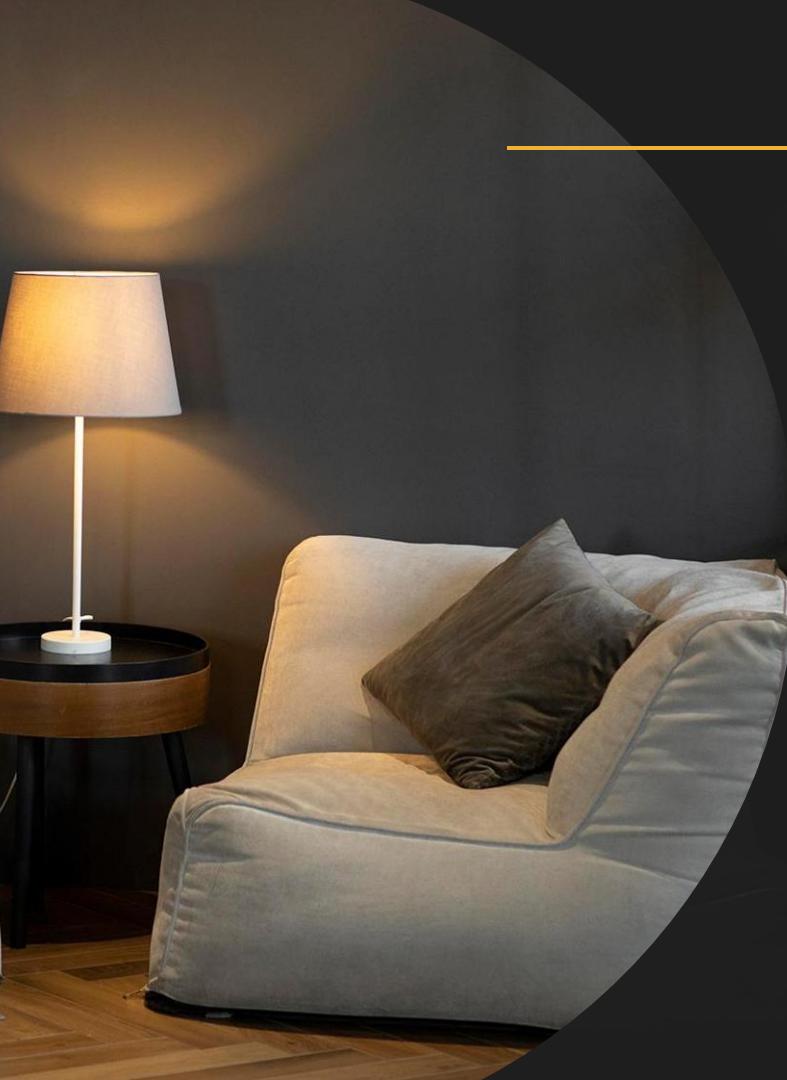


# Our Learning

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- Understand how to gather data from the internet, while overcoming anti-crawling mechanisms.
- Learn Data cleaning, feature engineering, and model selection.
- Configure cloud servers, deploy websites, and maintain databases.
- Use the Google Maps API to display heatmaps and markers on a map.
- Create interactive and visually appealing front-end interfaces.

A circular inset on the left side of the image shows a modern living room interior. It features a light-colored sofa with dark, textured pillows, a floor lamp with a white shade on a black stand, and a small round table with a dark base and a light-colored top. The background is a dark, solid color.

# Thank you!