



# HOUSING PRICES HAS THE MARKET IMPROVED?

Courtesy of Happy Housing

# OUR OBJECTIVES

## MAIN INTEREST

We wanted to give consumers accurate information about the current state of the housing market.



Our data scientist team at Happy Housing used current data to help inform future home owners in 2023 where to move. We used current housing data to decide which states are the best to move to based on the information we collected.



# QUESTIONS GUIDING OUR ANALYSIS

- What does the current housing market look like?
- What states have the highest cost of living ?
- What states are the most affordable?
- How do current housing prices compare to historical prices?

## OUR APPROACH:

To get an idea of the market, we scraped housing prices from Zillow get an estimate of the current housing prices in each state. We then compared this information to the historical housing costs.

# WHAT WE FOUND



## HIGHEST HOUSING PRICES

We found that the states with the highest median housing prices were:

A green square with the letters 'HI' in white, representing Hawaii.

**2023:** Hawaii  
Median price: \$1,350,000

A red square with the letters 'HI' in white, representing Hawaii.

**Historical:** Hawaii  
Median price: \$432,550

## LOWEST HOUSING PRICES

We found that the states with the lowest median housing prices were:

A green square with the letters 'IL' in white, representing Illinois.

**2023:** Illinois  
Median price: \$112,450

A red square with the letters 'MI' in white, representing Michigan.

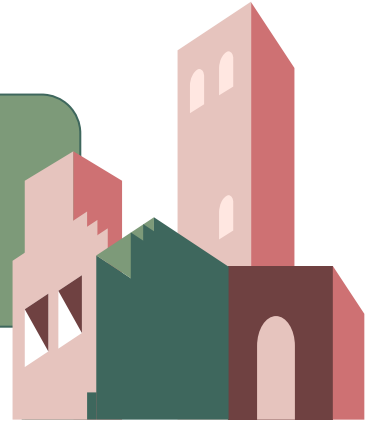
**Historical:** Michigan  
Median price: \$95,600

# OUR RECOMMENDATION



We recommend families looking for housing in the current housing market consider living in the Midwest or Southern region. Based on the data we collected from 2023, we found that **ILLINOIS** had the lowest median housing prices according to our current data.

MEDIAN HOUSING PRICE IN 2023: \$112,450



# HOW WE GATHERED OUR CURRENT DATA



## ZILLOW

- Web scraped Zillow to get price, address, square feet, number of beds, and baths
- Chose a popular city from each state to collect information from
- Compared our created dataset to an existing dataset of historical Zillow data



## LIMITS

- We were limited to getting information on 9 homes for each city
- Unable to collect a lot of information from Zillow in a short period of time
- We chose one to two cities in each state to sample current prices from
- This limited the accuracy of our data

# CONSTRUCTING THE DATA SET

LINK

["https://www.zillow.com/homes/{city}-{state}.rb/"](https://www.zillow.com/homes/{city}-{state}.rb/)

**Tag :** price = data.find\_all('div', class\_ = "srp\_sc-16e8gqd-0 gKmVGs")

- We got each price by iterating through the results from this tag
- We then formatted the results so we could convert them to integers and use them in future calculations

01

## PRICE

We wrote a function to access each price

**Tag :** info = data.find\_all('div', class\_ =

"StyledPropertyCardDataWrapper-c11n-8-85-1\_sc-1omp4c3-0 jVBMSP  
property-card-data")

- We then used item.find('address') to get the addresses for each home
- Finally we stripped them and appended them to our results

02

## ADDRESS

We also wrote a function to access each price

**Tag :** info= data.find\_all('b')

- Since all of our remaining results were in a b tag, we stored these in a dictionary
- Since the results were in the same pattern each time, we collected bed, bath, and sqft by storing them based on this

03

## BED, BATH, SQFT

We wrote a function to find and format this information

# FUNCTION FLOW

## access\_link inputs:

City: city name

State: state abbreviation (all caps)

header\_in: user agent

```
def access_link (city, state, header_in):  
    city = city.replace(" ", "-")  
    url =  
    f"https://www.zillow.com/homes/{city}-{state}_rb/"  
    time.sleep(random.randint(5,16))  
    response =  
    requests.get(url, headers=header_in)  
    return response
```

**ACCESS\_LINK**

1

```
def scrape_housing (response, state):  
    prices = get_prices(response)  
    addresses = get_addresses(response)  
    dic_info = get_housing_info(response)  
    dic_info['prices'] = prices  
    dic_info['addresses'] = addresses  
    dic_info['cities'] = []  
    dic_info['state'] = []  
    for i in addresses:  
  
    dic_info['cities'].append(i.split(',')[1])  
    dic_info['state'].append(state)  
    df = pd.DataFrame.from_dict(dic_info)  
    return df
```

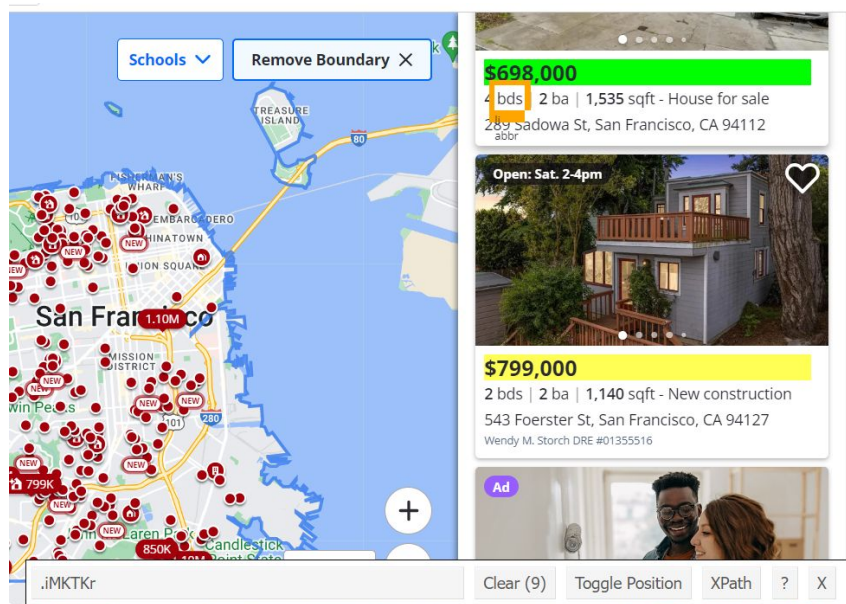
**SCRAPE\_HOUSING**

2



# DATA SCRAPING VIA R

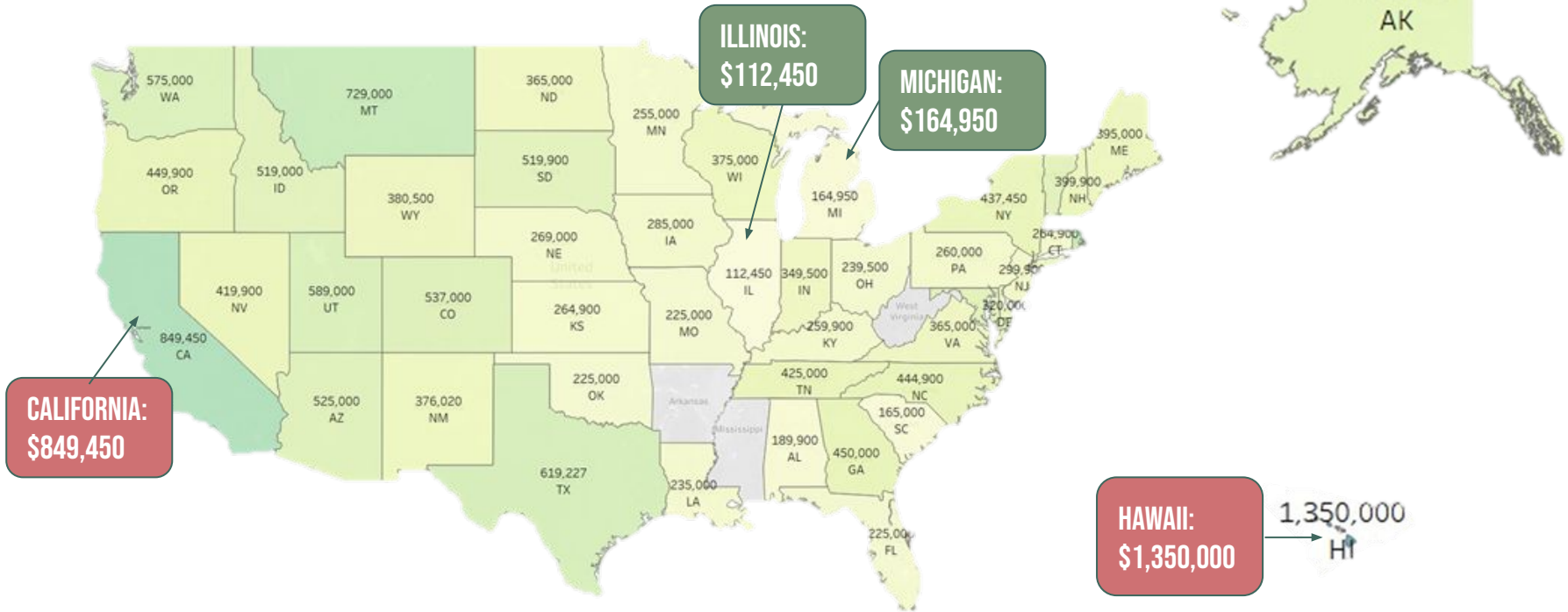
- rvest package
- Selector gadget
- No problems with blockers





# THE US HOUSING MARKET NOW

## MEDIAN US HOUSING PRICES



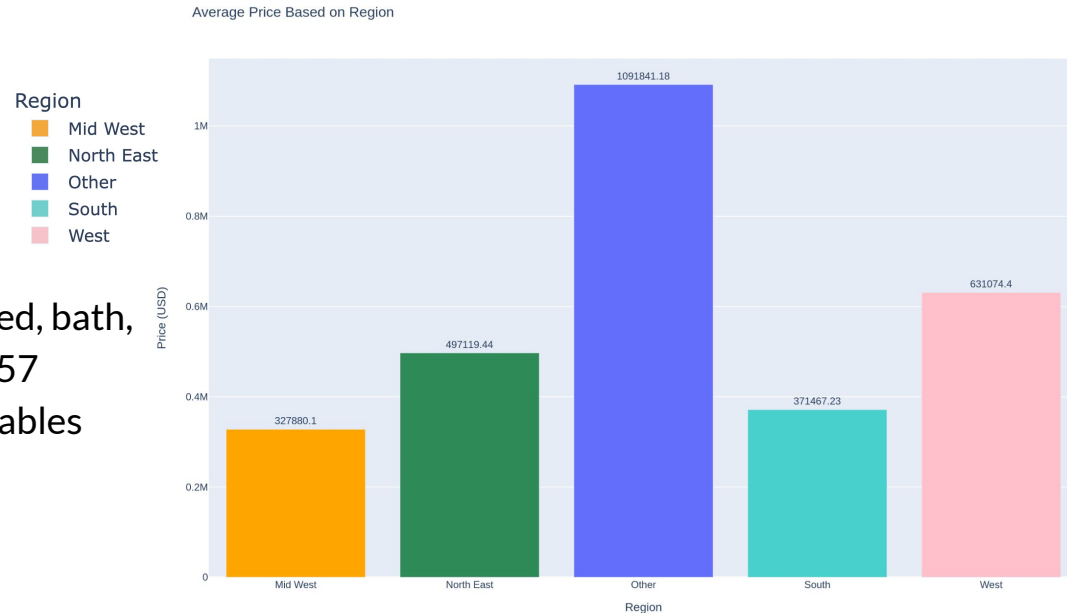
Prices) 112,450

1,350,000

# EXPLORATORY DATA ANALYSIS

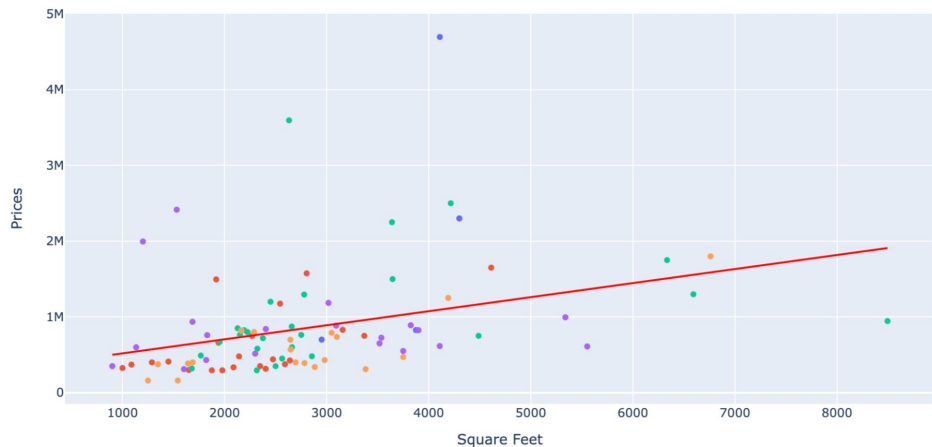


- Looked at average prices in states
- Grouped by regions
  - South
  - Mid West
  - West
  - North East
  - Other: Alaska and Hawaii
- Unexpected: Correlations between bed, bath, square feet, and prices all less than 0.57
  - Weak correlation between variables
- Grouped by state
  - 46 states
    - Missing: Arkansas, Massachusetts, Mississippi, West Virginia

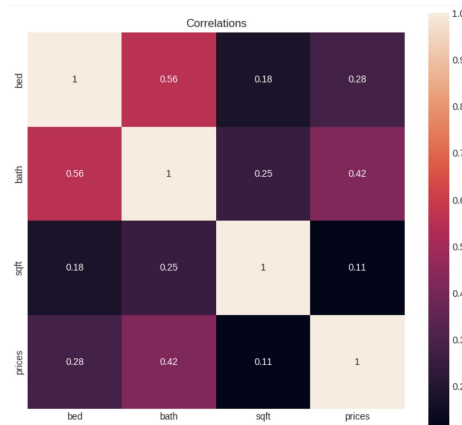


# ADDITIONAL VISUALIZATIONS

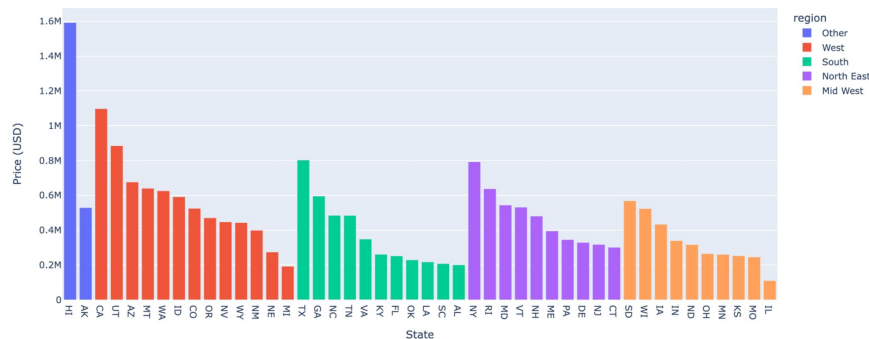
Square Feet vs Prices



region  
 • Other  
 • South  
 • West  
 • North East  
 • Mid West  
 — Trendline



Average Price by State and Region



- Linear Regression results:
  - Independent variables: bed, bath, square feet
  - Dependent variable: price
  - Root Mean Squared Error: 399169.88239
  - R-squared error: 0.181262077381

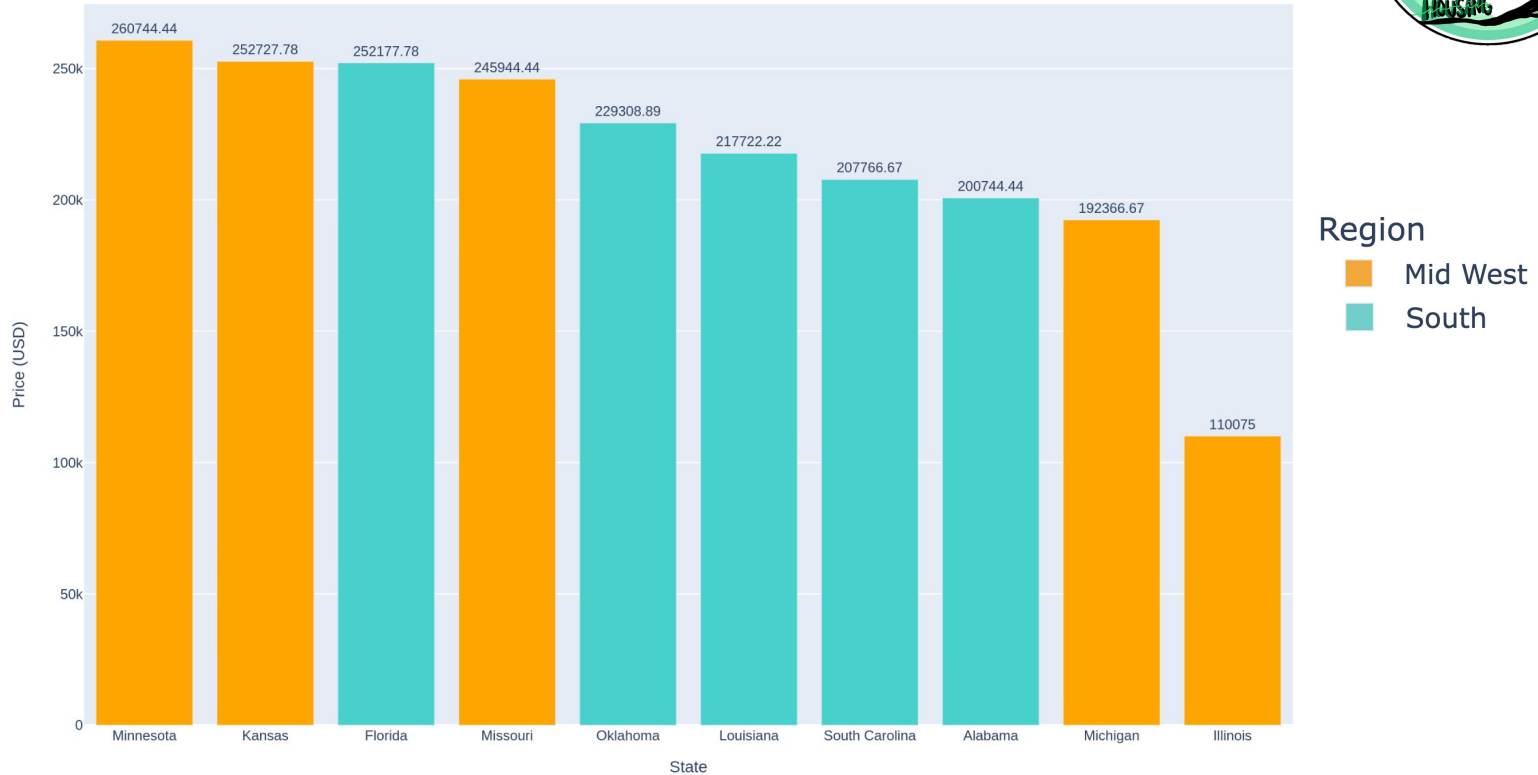
# CURRENT MOST EXPENSIVE STATES

Top 10 States Based On Average Price



# CURRENT LEAST EXPENSIVE STATES

Bottom 10 States Based on Average Price





# THE US HOUSING MARKET IN THE PAST

States with highest median selling prices since 1996:

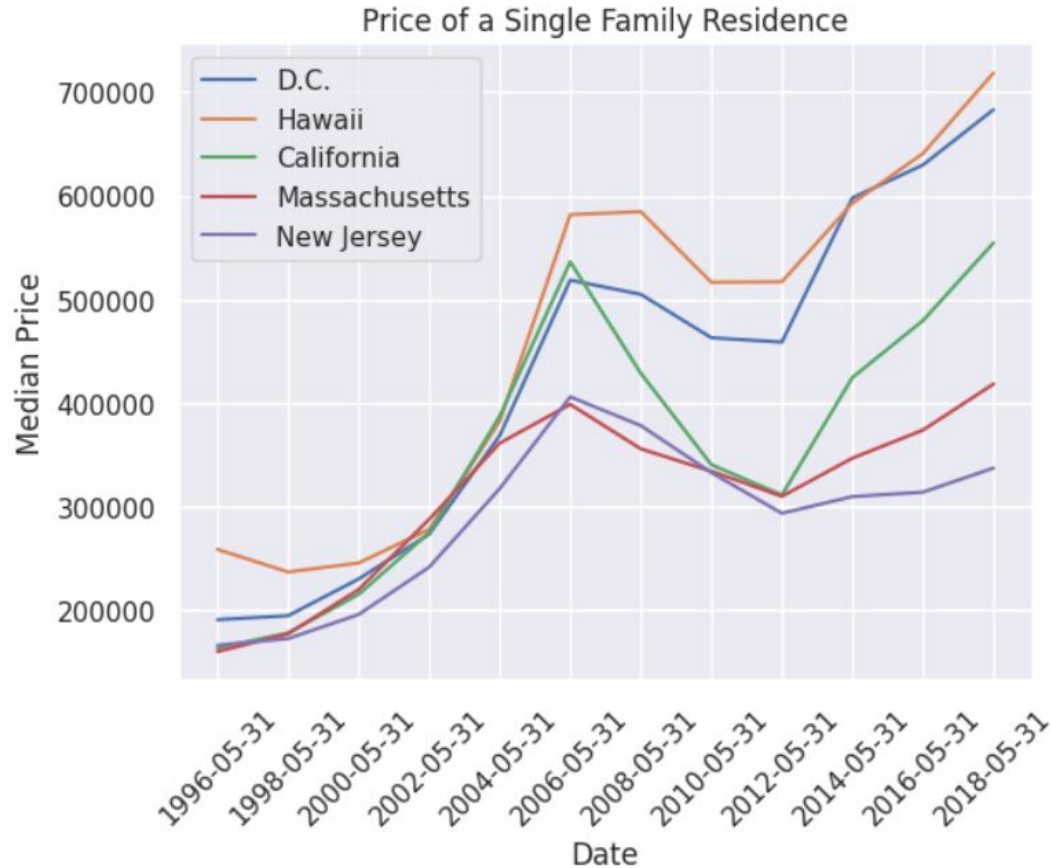
STATE	PRICE
DISTRICT OF COLUMBIA	\$459,100
HAWAII	\$432,550
CALIFORNIA	\$362,000
MASSACHUSETTS	\$208,900
NEW JERSEY	\$271,750

States with lowest median selling prices since 1996:

STATE	PRICE
MICHIGAN	\$95,600
WEST VIRGINIA	\$109,250
OHIO	\$109,450
INDIANA	\$110,800
KENTUCKY	\$116,800



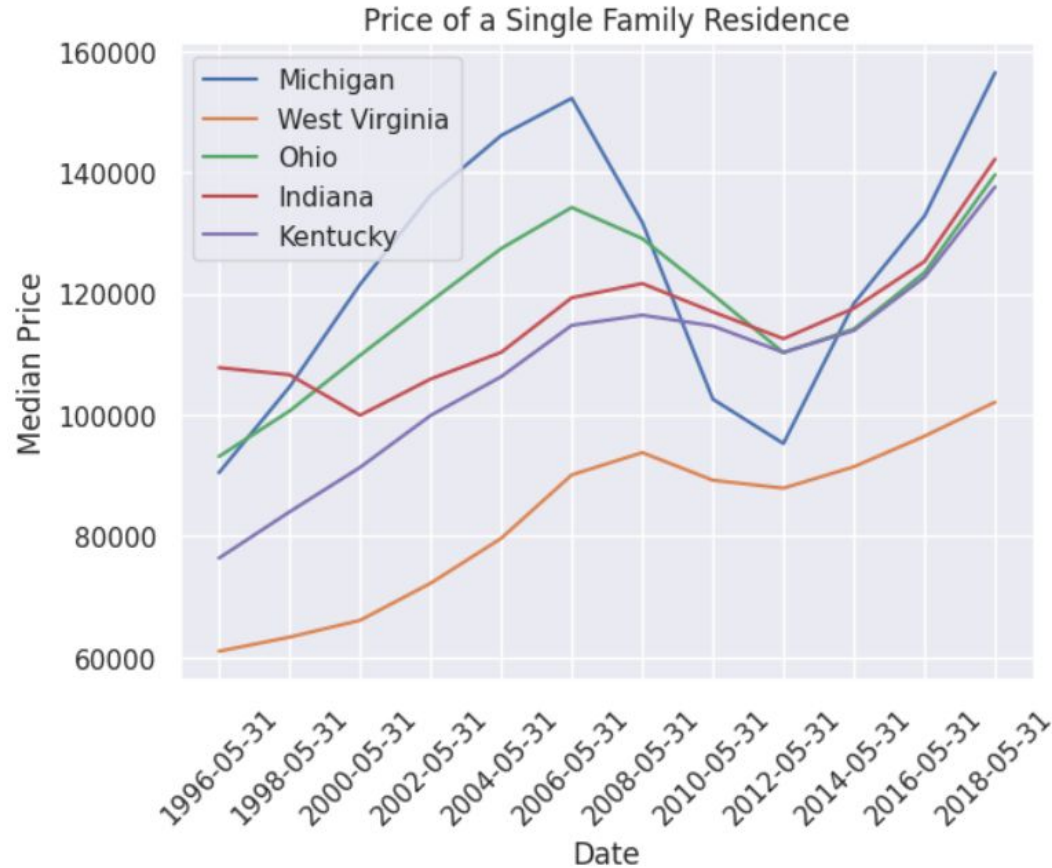
# HOW HAVE PRICES CHANGED OVER TIME?





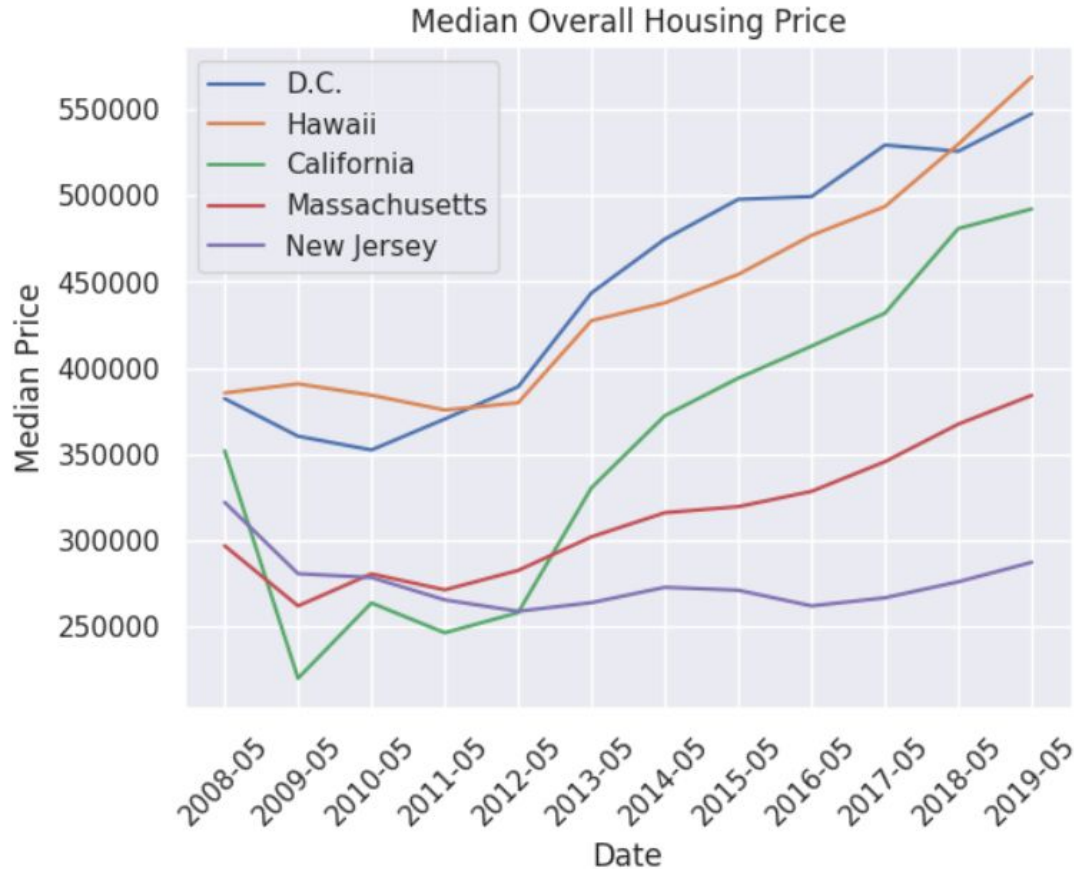


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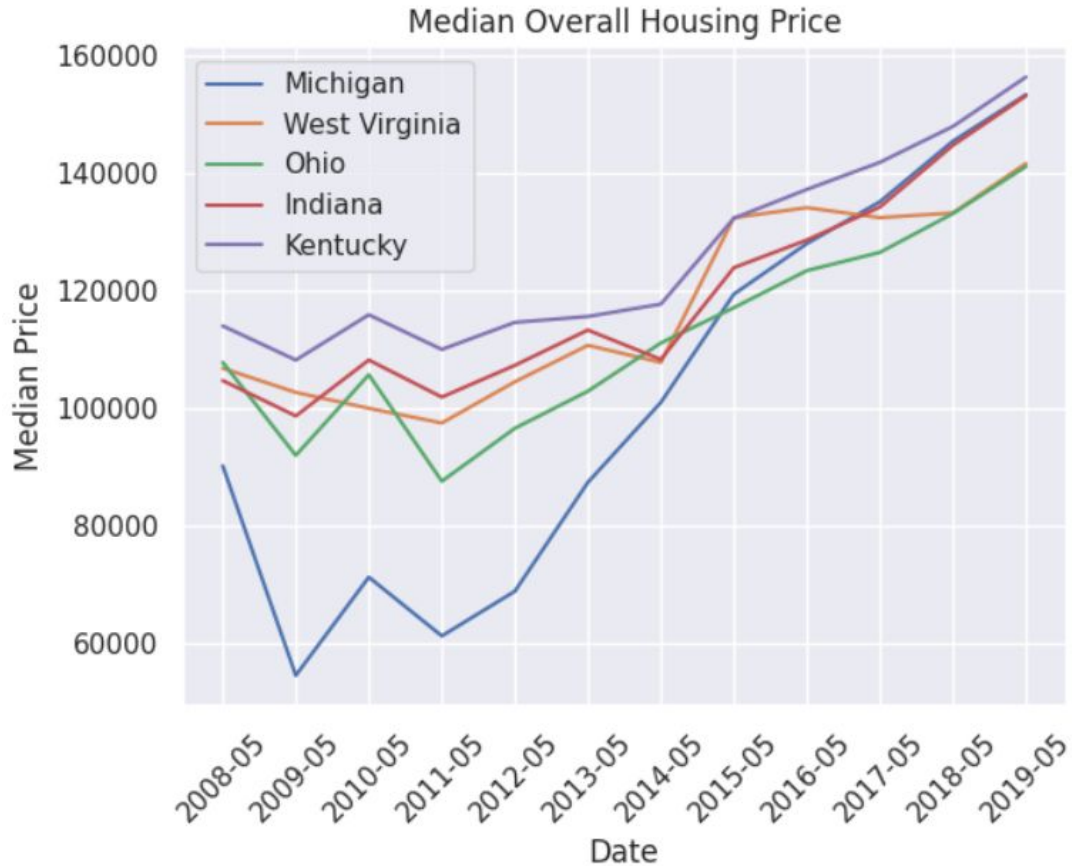


# HOW HAVE PRICES CHANGED OVER TIME?





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# KEY TAKEAWAYS

1

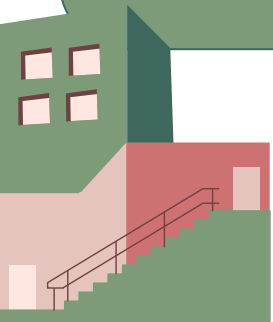
Housing is getting more expensive. Prices continue to increase faster than the rate of inflation.

2

Even in the cheapest states to live in, housing prices are rising

3

New home owners should consider moving to states in the south or midwest, since every state with the lowest median housing prices in 2023 came from those regions



# FUTURE WORK

- Look at all 50 states
- Web scrape more than one city per state
- Web scrape more than 9 entries per city
- Include multiple cities per state
- Consider cities that have:
  - Highest population
  - Highest household income
  - Lowest household income
- Machine learning
  - Random Forest





**THANK YOU!**

**QUESTIONS?**