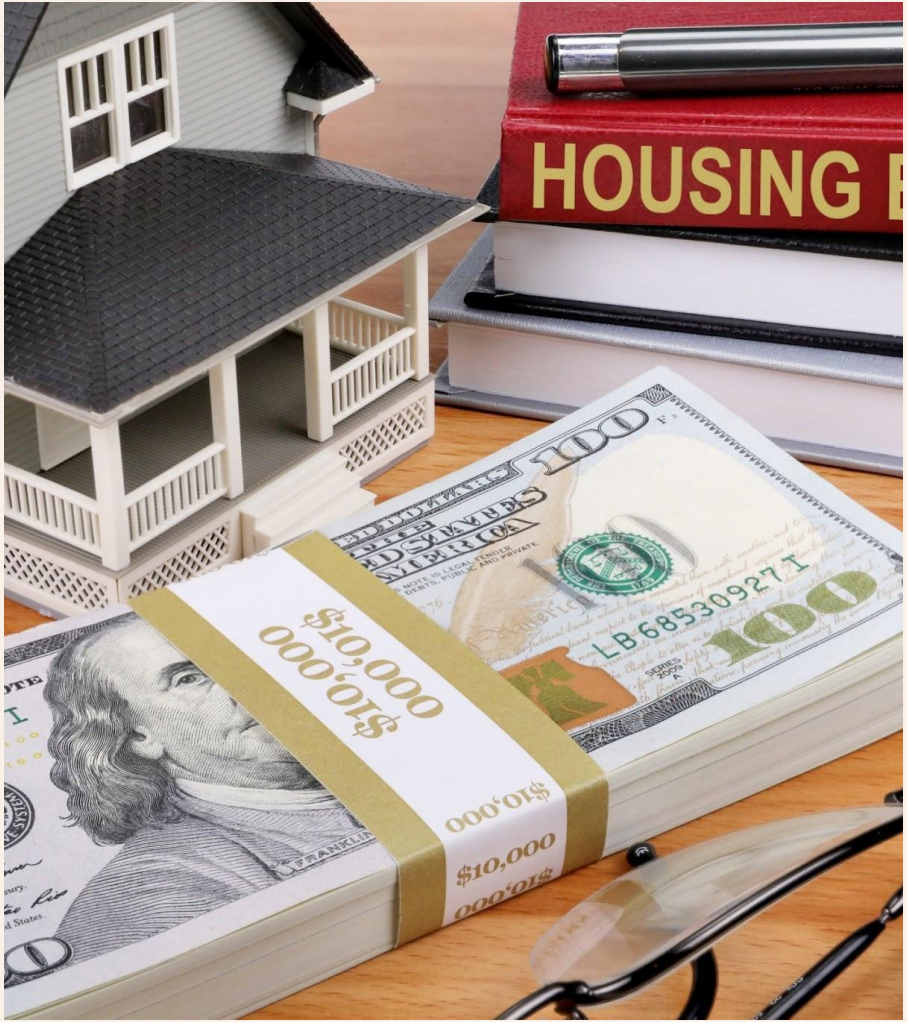

Navigating the Hawkish Fed:

Data Driven Insights on Trends, Challenges, & Housing Valuations

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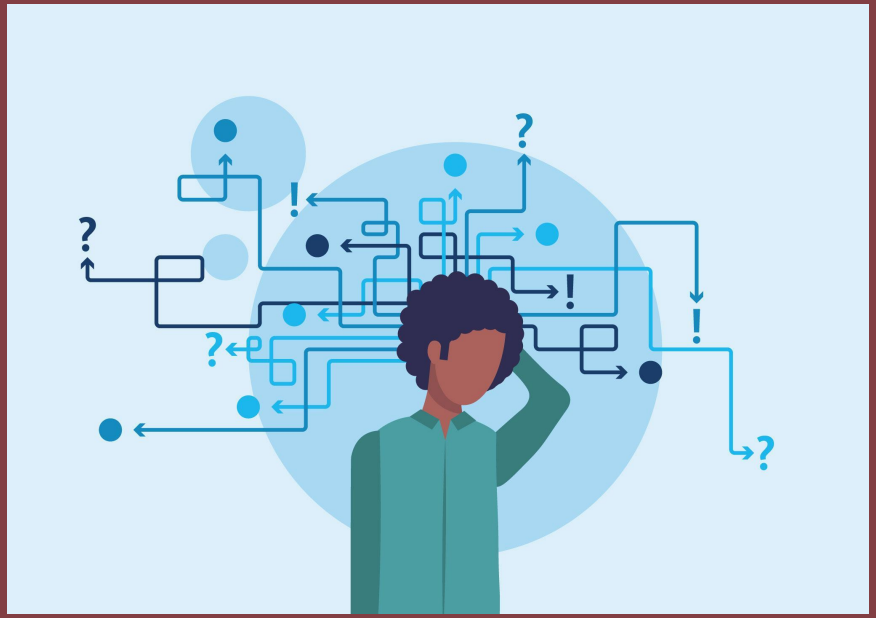
Problem Statement



By analyzing housing trends across US regions - specifically, Charlotte, New York, and Miami through **descriptive, comparative, and predictive analytics, this project aims to uncover actionable insights that can guide housing policy, investment strategies, and affordability initiatives.** The integration of data pipelines and advanced analytics will streamline the process of extracting meaningful patterns from datasets.


```
import requests
import json
import pandas as pd
import time
from keys import x_rapidapi_key, x_rapidapi_host
```

API call

```
def fetch_data(query):

    url = "https://zillow56.p.rapidapi.com/search"

    # query header parameters
    headers = {
        "x-rapidapi-key": x_rapidapi_key,
        "x-rapidapi-host": x_rapidapi_host
}
    response = requests.get(url, headers=headers, params=query).json()
    time.sleep(1)

    return pd.json_normalize(response['results'])
```

```
import numpy as np
import pandas as pd
import matplotlib.pyplot as plt
import seaborn as sns
from sklearn.neighbors import NearestNeighbors
from matplotlib.colors import Normalize
from matplotlib.cm import ScalarMappable

# Load data
df = pd.read_csv('USRealEstateTrends.csv')
```

```
import numpy as np
import pandas as pd
import matplotlib.pyplot as plt
import seaborn as sns
```

```
df = pd.read_csv('city_market_tracker.tsv000', delimiter='\t')
```

```
import pandas as pd
import numpy as np
```

```
df = pd.read_excel('historicalweeklydata.xlsx', header=6)
```

```
import pandas as pd
import numpy as np
import seaborn as sns
import matplotlib.pyplot as plt
```

```
df = pd.read_csv('API.csv', index_col=False)
```

OUR APPROACH TO DESCRIPTIVE Analysis

"What is the average price of a home in a given year? What are the highs and lows?"

- Identify trends over time
- Single Family Homes
- Calculate summary statistics (mean, median, mode) to understand the central tendency of the data.

Focus on single family homes

```
family_df = cleaned_df[cleaned_df['property_type']== 'Single Family Residential']
```

```
family_df.isna().sum()
```

```
period_begin              0
period_end                0
city                      0
state                     0
property_type             0
median_list_price    303490
dtype: int64
```

```
family_df.dropna(inplace=True)
```

Group the 15 & 30 yr FRM by year

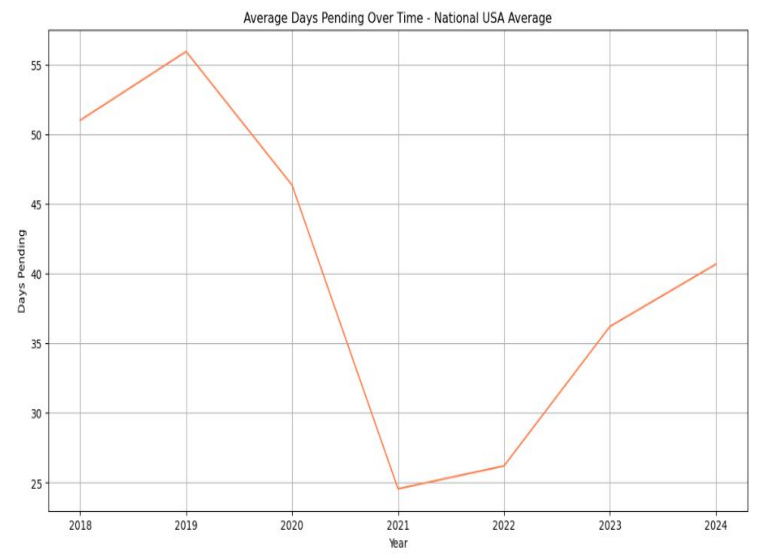
```
[20]: avg_mortgage = df.groupby(df['Week'].dt.year)[['30 yr FRM', '15yr FRM']].mean()
```

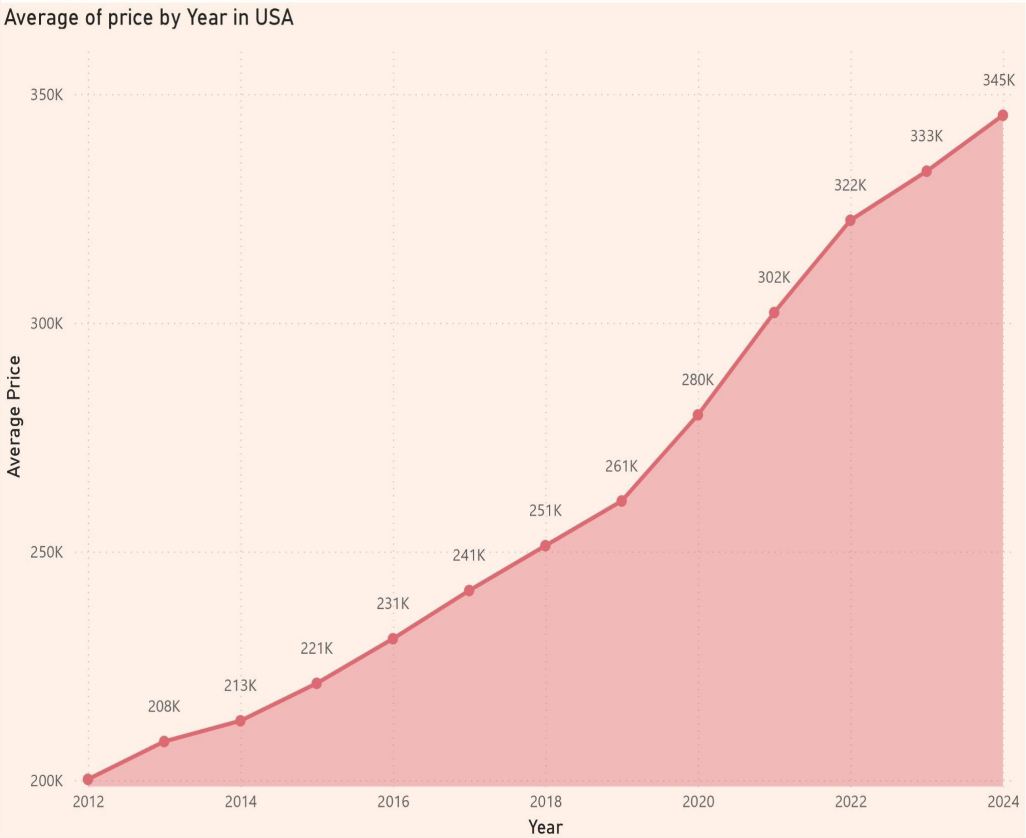
```
[21]: # reset the grouped index
avg_mortgage.reset_index(inplace=True)
```

```
[22]: # rename headers
avg_mortgage.rename(str.lower, axis='columns', inplace=True)
avg_mortgage.rename(columns={'week': 'year', '15yr frm': '15 yr frm'}, inplace=True)
```

```
[23]: # filter out anything before 2012
avg_mortgage = avg_mortgage.loc[avg_mortgage['year']>=2012].reset_index(drop=True)
```

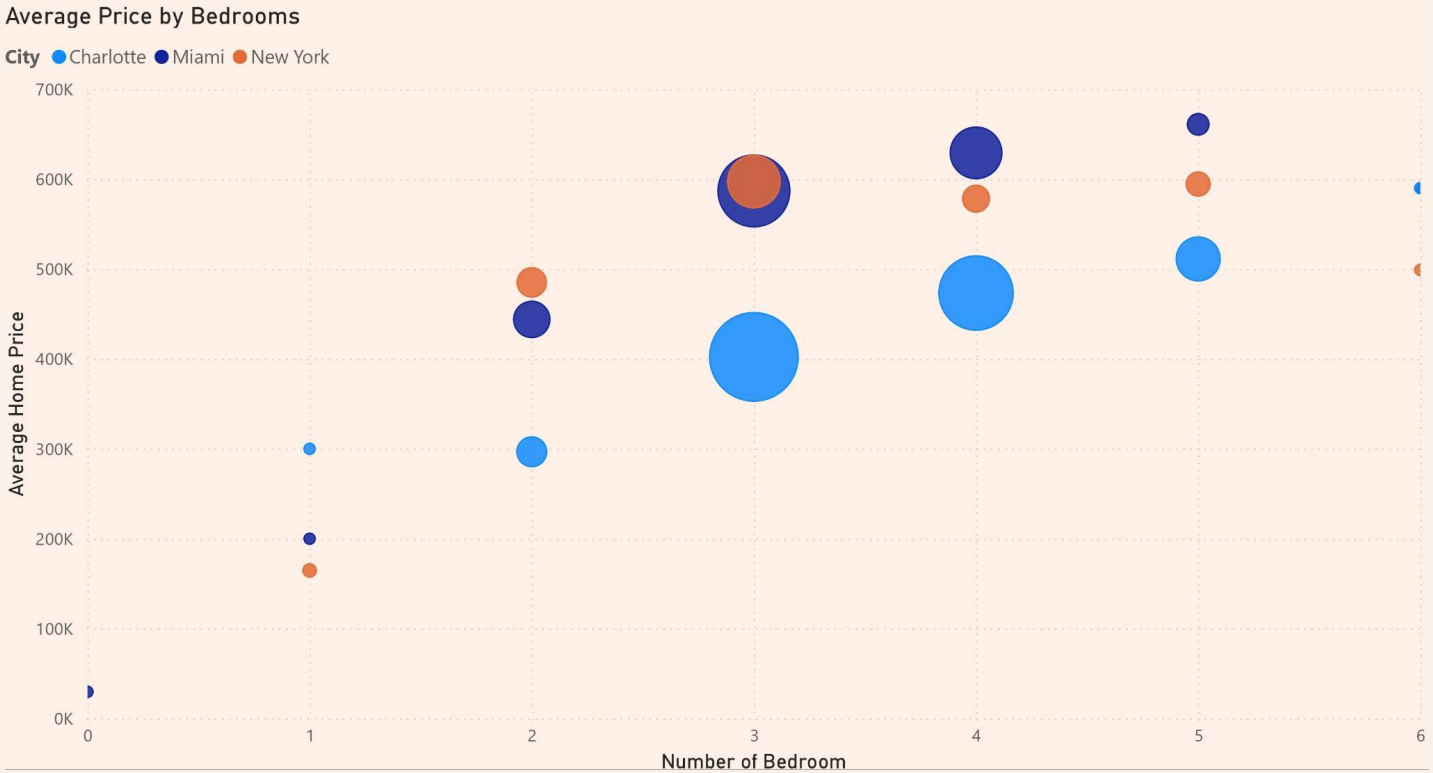
year	Average Housing Price	30 yr frm	15 yr frm
2012	200,189.15	3.66	2.93
2013	208,456.49	3.98	3.10
2014	212,985.50	4.17	3.29
2015	221,170.90	3.85	3.09
2016	230,922.72	3.65	2.93
2017	241,462.48	3.99	3.27
2018	251,267.83	4.54	4.00
2019	261,027.66	3.94	3.39
2020	279,855.12	3.11	2.60
2021	302,227.49	2.96	2.27
2022	322,399.63	5.34	4.58
2023	333,121.56	6.81	6.11
2024	345,347.68	6.72	5.96

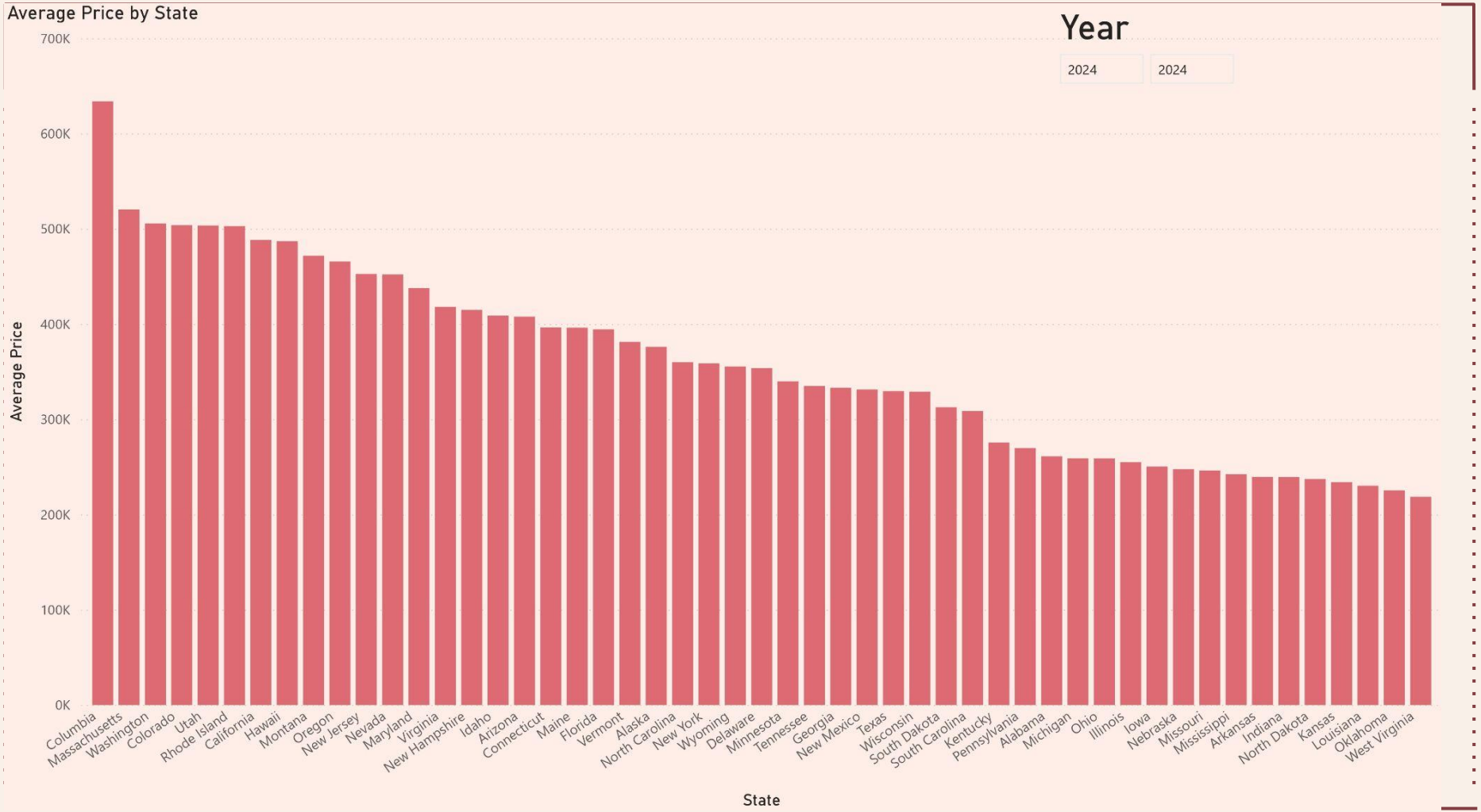




OUR APPROACH TO COMPARATIVE ANALYSIS

- Perform year-over-year comparisons to detect growth, decline, or stagnation in housing prices.
- "Which city saw the largest growth in prices last year?"
- Moderate and steady price growth, supported by relatively stable mortgage rates (~4.5% to 3.7%).


Average Price by Bedrooms
City Charlotte Miami New York
700K
600K
500K
400K
300K
200K
100K
0K
Average Home Price
0
1
2
3
4
5
6
Number of Bedroom


Average Price by State
Year
2024
2024
700K
600K
500K
400K
300K
200K
100K
0K
Average Price
Columbia
Massachusetts
Washington
Colorado
Utah
Rhode Island
California
Hawaii
Montana
Oregon
New Jersey
Nevada
Maryland
Virginia
New Hampshire
Idaho
Arizona
Connecticut
Maine
Florida
Vermont
Alaska
North Carolina
New York
Wyoming
Delaware
Minnesota
Tennessee
Georgia
New Mexico
Texas
Wisconsin
South Dakota
South Carolina
Kentucky
Pennsylvania
Alabama
Michigan
Ohio
Illinois
Iowa
Nebraska
Missouri
Mississippi
Arkansas
Indiana
North Dakota
Kansas
Louisiana
Oklahoma
West Virginia
State

CONCLUSION

- Many people and investors have to consider the economic downturn caused by the pandemic, thus paving the way for low interest rates. Ultimately, this would be directly correlated to the surge in home buying and rise in property values.
- Inflationary costs on goods which could be contributing to higher home values, especially in single family homes.
- Extend market research to include rental properties.
- Lower mortgage rates encouraged more buyers to enter the market, increasing demand and pushing prices upward. This trend was particularly visible in major cities where affordability was already strained.