



# Zillow Analysis

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# Business Problem

- Identify the top 5 ZipCodes in the state of Tx
  - (based on ROI)
  - Mention that it is for the state of Tx
- Incorporate coefficients of variance to help filter most risk appropriate counties
- Forecast the next 10 year mean house value in the top 5 ZipCodes as well as ROI in 1 year, 3 years, 5 years, and 10 years

# Data

- 1,293 individual ZipCodes from 2000-01-31 to 2022-08-31
  - Include the amount of records
  - Mention that it is for the state of Tx
- Each row represents a unique ZipCode indexed with RegionID, and contains other location info as well as median housing sales price for each month.
- Contains location information of each ZipCode

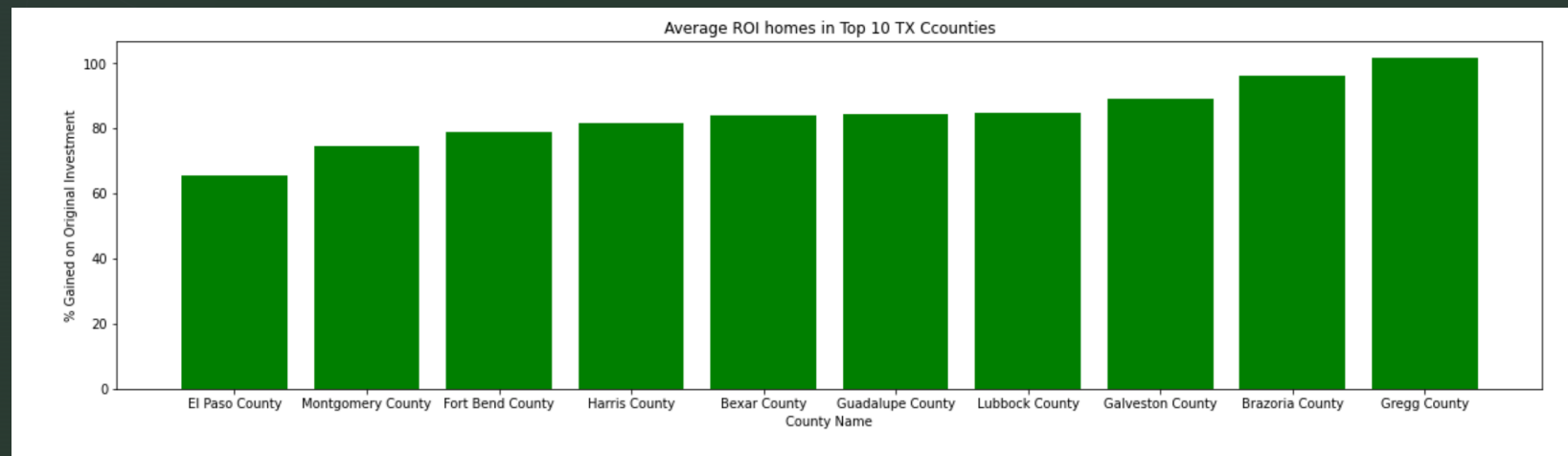
# Methods

- Using Coefficient of Variation using a  $\sim < 60\%$  risk profile
- Quartiles between 30% - 70%
- Steps as follows:
  - Select top 10 counties with highest ROI
  - Select ZipCodes with highest ROI from each selected county
  - Select ZipCodes with the highest expected ROI after time series analysis

# Modeling

- Model 1: Random Walk model
- Model 2: ARIMA model
- Model 3: SARIMA model with AUTO-ARIMA
  - Include how well models performed

# Results





# Results Cont.

County: Harris County, Average ROI: 81.53705671672635  
City: Crosby, ZipCode: 77532, Metro: Houston-The Woodlands-Sugar Land, TX

County: Bexar County, Average ROI: 83.93467554304374  
City: San Antonio, ZipCode: 78229, Metro: San Antonio-New Braunfels, TX

County: Fort Bend County, Average ROI: 78.8977328380016  
City: Rosenberg, ZipCode: 77471, Metro: Houston-The Woodlands-Sugar Land, TX

County: Brazoria County, Average ROI: 96.22419210416874  
City: West Columbia, ZipCode: 77486, Metro: Houston-The Woodlands-Sugar Land, TX

County: Montgomery County, Average ROI: 74.539561572528  
City: The Woodlands, ZipCode: 77380, Metro: Houston-The Woodlands-Sugar Land, TX

County: Gregg County, Average ROI: 101.74313673018614  
City: Longview, ZipCode: 75605, Metro: Longview, TX

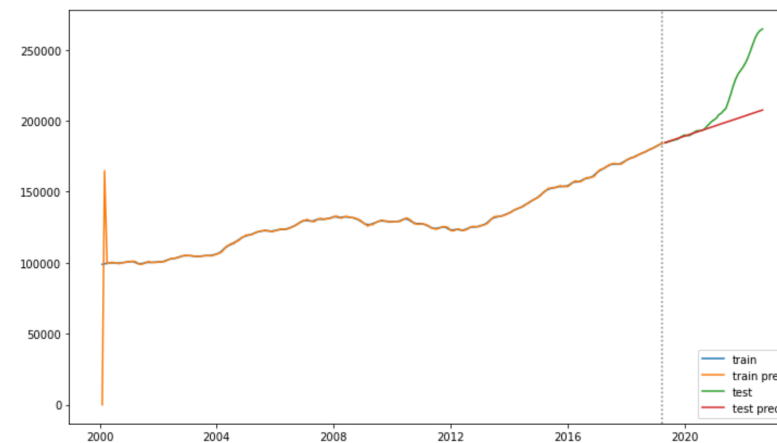
County: Lubbock County, Average ROI: 84.97603401477758  
City: Wolfforth, ZipCode: 79382, Metro: Lubbock, TX

County: El Paso County, Average ROI: 65.55005487866306  
City: El Paso, ZipCode: 79902, Metro: El Paso, TX

County: Galveston County, Average ROI: 89.14312986685249  
City: Friendswood, ZipCode: 77546, Metro: Houston-The Woodlands-Sugar Land, TX

County: Guadalupe County, Average ROI: 84.36173099073108  
City: Schertz, ZipCode: 78154, Metro: San Antonio-New Braunfels, TX

# Results, RMSE and plot for SARIMA model



```
] : sarimax_modelnp.sqrt(mean_squared_error(test, test_pred))  
] : 24745.297753507075
```



# Recommendations

- **1) ZipCode 78229 Bexar County - San Antonio (10 years):**  
Total Expected ROI in 10 year: 26.8%
- **2) ZipCode 77471 Fort Bend County - Rosenberg (10 years):**  
Total Expected ROI in 10 year: 26.68%
- **3) ZipCode 79902 El Paso County - El Paso (5 years):**  
Total Expected ROI in 5 year: 12.77%
- **4) ZipCode 77546 Galveston County - Friendswood (10 years):**  
Total Expected ROI in 10 year: 25.96%
- **5) ZipCode 77532 Harris County - Crosby (10 years):**  
Total Expected ROI in 10 year: 21.73%

## Next Steps

- This project focused solely on past home values to make predictions for the next 10 years. We can make the analysis more meaningful by incorporating factors such as population, school rankings, crime rate, and property size.
- We can remove coefficients of variance to have counties such as Dallas and Tarrant county included in analysis.



# Thanks

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