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Module 4 Project: Forecasting Forth Worth Housing Prices with Time Series Analysis

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Introduction

Project – Perform Time Series forecasting analysis on Zillow data

Dataset – https://www.zillow.com/research/data/

Goal – Provide five most profitable zip codes for 3yr return on investment (ROI) in Fort Worth.

23. Dallas-Fort Worth-Arlington, Texas *

- **2010-2018 pop. growth:** +16.9% (1.1 million)
- **2018 unemployment:** 3.6%
- **2010-2018 employment change:** +23.1% (+647,463)
- **Median household income:** $63,870

* Fastest Growing Cities - https://www.usatoday.com/story/money/2019/05/09/americas-fastest-growing-cities/39442201/

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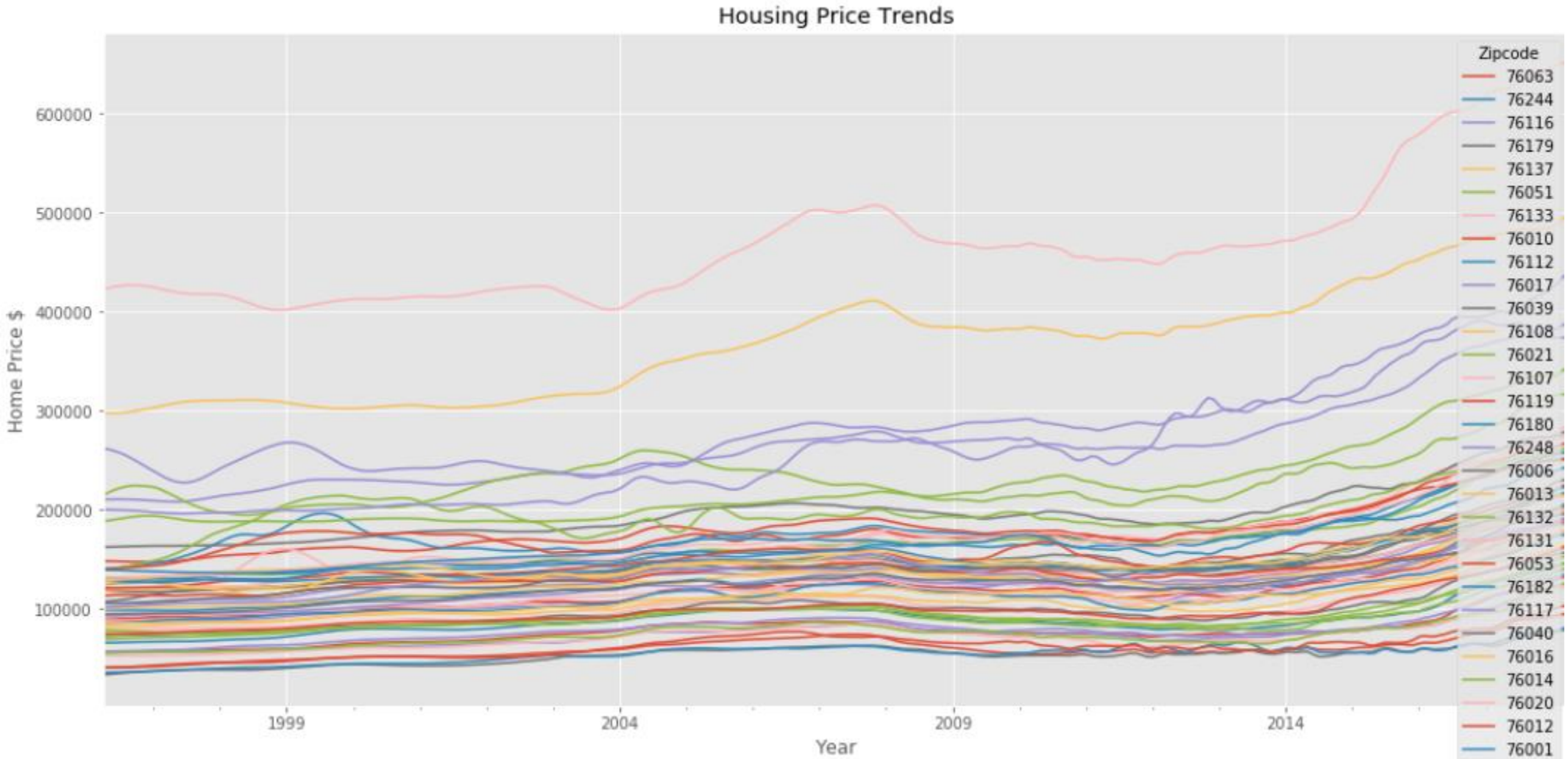
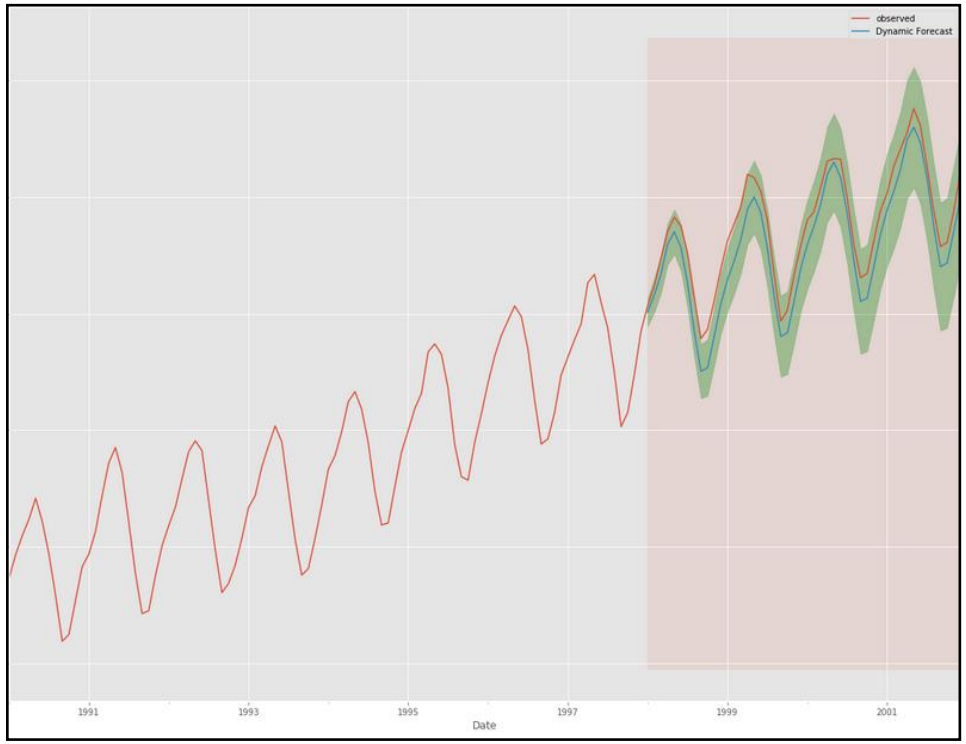
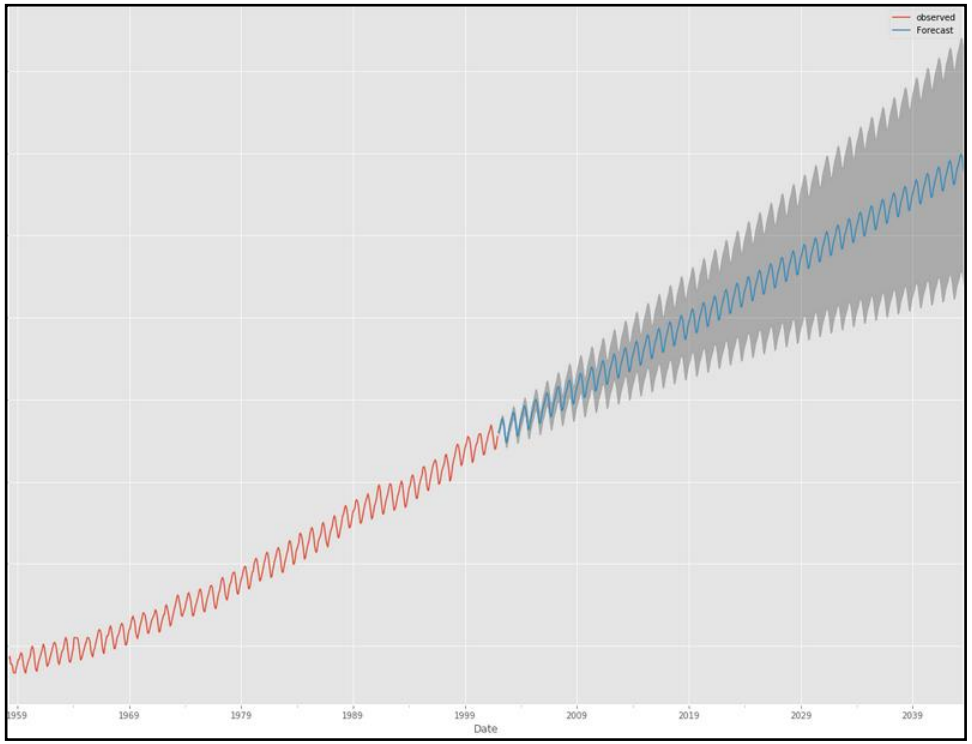
Fort Worth Housing Trends



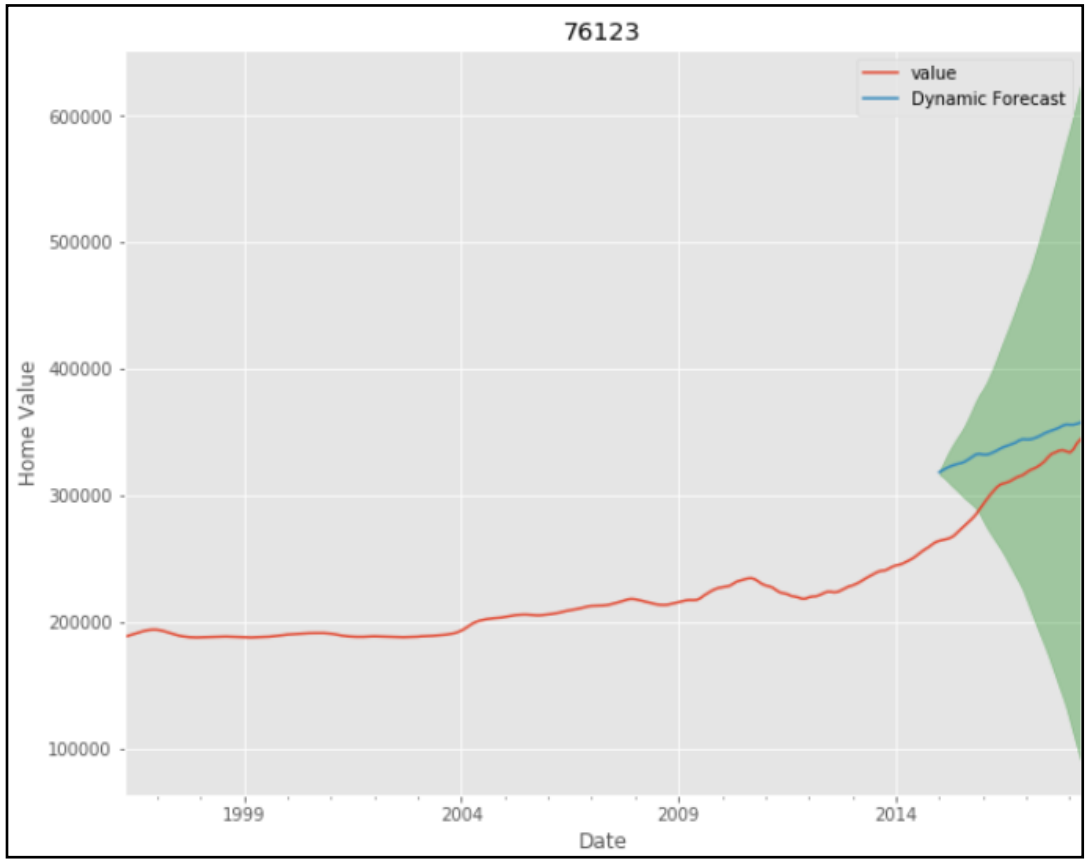
Time Series Forecasting Overview

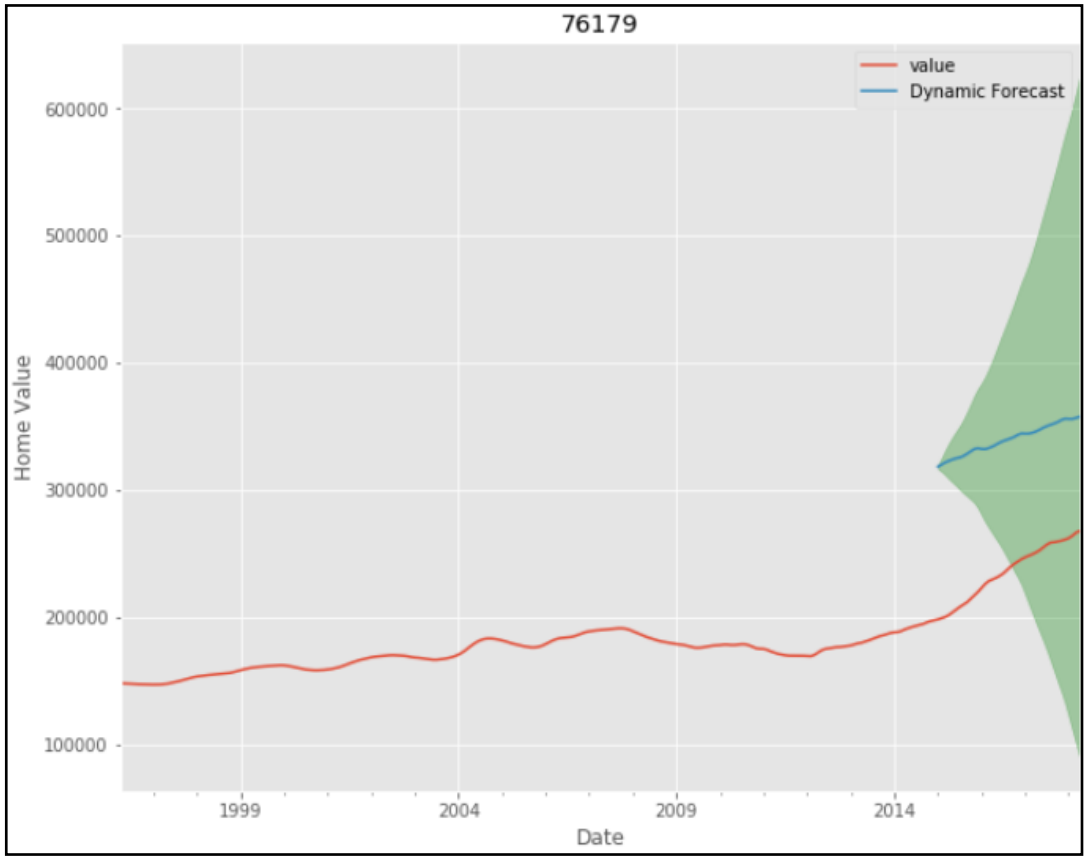
- Use historical home price data to train a model for each zip code of interest.
- Past prices and trends influence future valuations.
- Evaluate trained model against test data.
- Forecast future home prices.





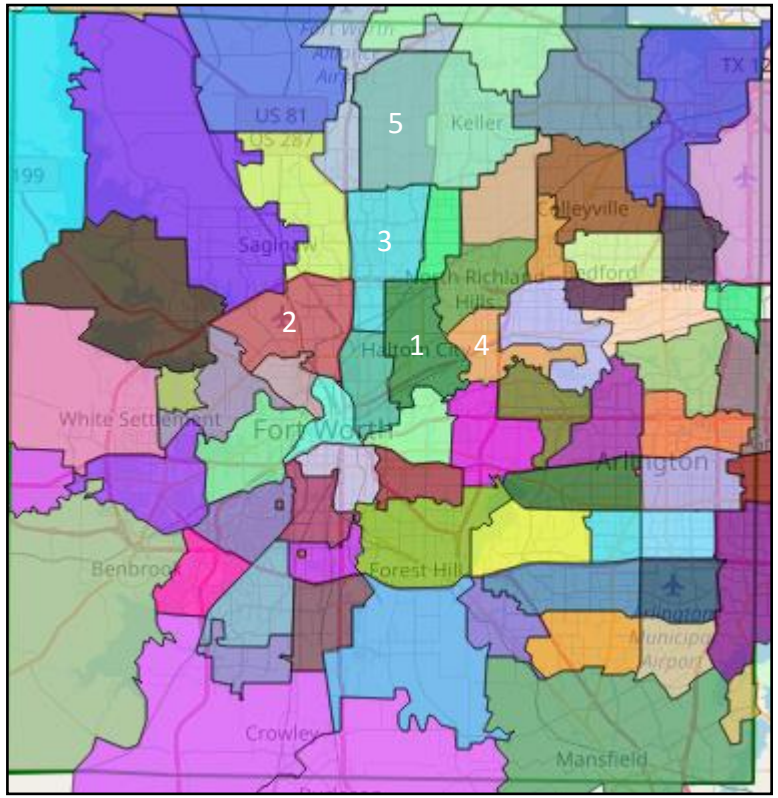
Prediction Examples





Forecasting Results

1. 76117 – Haltom City
2. 76107 – Westover Hills
3. 76137 – Watauga
4. 76118 – Richland Hills
5. 76244 - Keller



Zipcode	Current Value	3 Years Value	3Yr-ROI
76117	137000.0	345082.107690	1.518848
76107	439900.0	893324.540854	1.030745
76137	123700.0	199697.845640	0.614372
76118	208100.0	330819.328189	0.589713
76244	103600.0	163485.195164	0.578042
76012	164900.0	248664.897643	0.507974
76020	285500.0	427967.888639	0.499012
76179	216600.0	323346.508446	0.492828
76126	164400.0	244308.209263	0.486060
76021	95100.0	140440.709184	0.476769

Recommendations

Current Recommendations:

1. 76117 – Haltom City
2. 76107 – Westover Hills
3. 76137 – Watauga
4. 76118 – Richland Hills
5. 76244 - Keller

- Model results are flawed.
- Next Steps:
  - Refine investment criteria – Include only current zip codes with prices between $100-200K
  - Increase model parameter search for increased forecasting accuracy
  - Evaluate home values after the 2008 recession

Future Work

Once the model is accurate:

- Invest in markets with high confidence intervals
- Integrate more data including –
  - School ratings
  - Rent/own ratio
  - Job opportunities
  - Nearby amenities
  - Demographics
  - Income levels

- Reassess forecasts yearly to compare how predictions hold up with reality

Thank You