Forecasting Real Estate Market with Time Series Modeling - Eric Wang

Data:

The dataset was pulled from the MLS (Multiple Listing Services). There are about 26,000 transactions that span from Jan 2016 to Sept 2019. In a timeframe of slightly less than 4 years, there has been $40~ bn in total transactions.

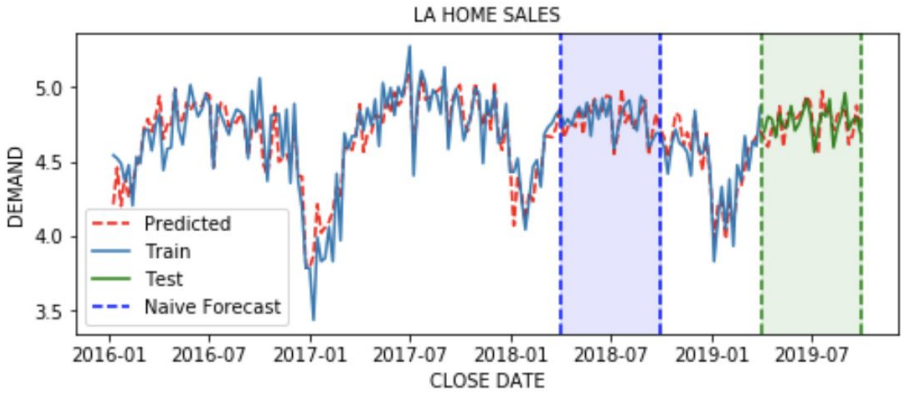
Premise:

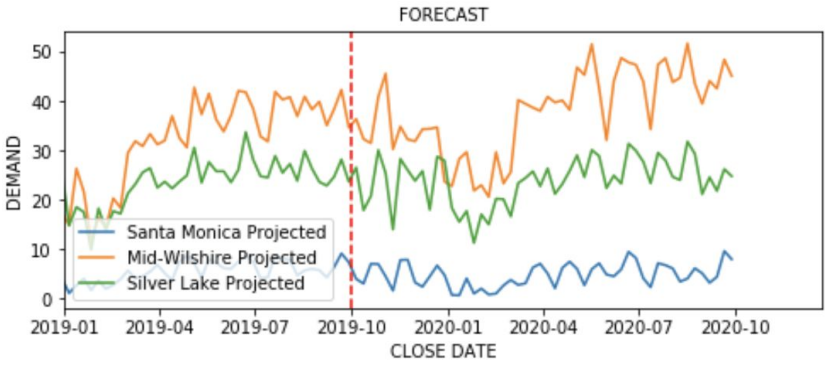
The housing market in greater LA and its make-up of unique neighborhoods has always been a topic of great discussion among brokers and lenders. The potential applications of predicting future outcomes will allow us to identify potential investment opportunities. My goal is to create forecast model to predict prices & demand in each of these unique markets. Real estate firms or lenders could potentially use this information to fill voids in the market.

Model:

- Generalized Additive Model - Facebook Prophet
- Decomposes Trend, Seasonality, & Holiday
- Naive Forecasting Baseline - simple but also hard to beat, don't use if it's not performing better
- Performance: RMSE & MAPE cross validated to measure accuracy

$$y(t) = g(t) + s(t) + h(t) + e(t)$$





Testing:

Santa Monica/Silverlake/Mid-Wilshire

Model Price MAPE's: 1.9%/0.6%/0.9%

Baseline Price MAPE's: 2.1%/1.0%/1.1%

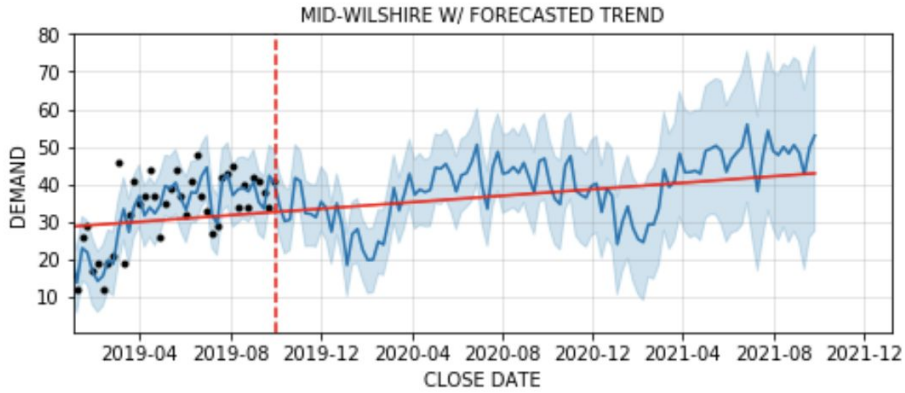
Model Demand MAPE's: 2.6%/5.3%/5.1%

Baseline Demand MAPE's: 4.7%/7.7%/6.7%

$$\left(\frac{1}{n}\sum\frac{|Actual - Forecast|}{|Actual|}\right) * 100$$

Conclusion:

Silverlake, Mid-Wilshire, and Santa Monica all have an upward trend in forecast regarding sale prices. However, Mid-Wilshire is the only neighborhood exhibiting an increasing trend in sales volume in prior and forecasted. As a lender or brokerage this could still be a viable opportunity for increased profitability in commision or margins but as a agent farming I would be hesitant to enter other markets.



Future:

I would love to see this forecasting tool deployed to actual real estate agents looking to farm specific neighborhoods. Although Zillow has a similar product, it doesn't allow the flexibility of looking at neighborhoods on a more granular level. Another application I would be interested in is to see the effect of marketing or sales campaigns of a brokerage or lending institution. One might forecast the existing trend and compare with the true values of after implementation.

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Summary

A data scientist and business professional focused on driving growth and fulfilling the organization's vision and mission via the implementation of practical data science applications that increase organizational learning and scalability

Skills

Statistics and Probability: Hypothesis Testing, KNN, Cross Validation, Linear Regression, Logistic Regression, Decision Trees, Random Forests, Gradient Boosting, NLP, K-means Clustering, Machine Learning

Software and Programming: Python (NumPy, SciPy, Pandas, Scikit-learn, Seaborn), PostgreSQL, Git, Spark, SQL, AWS (EC2), MongoDB, Docker, Web-scraping

Work experience

Data Science Fellow
08-2019 - Current

Galvanize Inc.

Capstone Project Overview:

- MLS Price Predictor – Built ML model to predict housing prices with 87% accuracy
- Epicurious web-scrape (BeautifulSoup) and hypothesis test - finding nutritional trends in recipe ingredients and tags
- Predicting Churn/Twitter Election Analysis/Auction Price Prediction

Branch Manager/Senior Loan Officer
01-2019 - Current

Lightspeed Mortgage

- Increased funding volumes by 25% through adopting new sales verticals
- Streamlined operations to reduce turn-time by 15% allowing for higher capacity of funding volume
- Implemented new investor products and oversaw conversion rate increases by 5% within first 3 months

Branch Manager/Senior Loan Officer
12-2016 - 01-2019

Titan Mutual Lending

- Recruited and trained sales team members, directly managed two sales teams of 7-10 loan officers each
- Analyzed KPI's for multiple teams to improve sales operations and consistently exceed funding goals
- Reduced lead acquisition costs by over 40% by implementing new marketing strategy

Sales Manager
02-2016 - 12-2016

Fortis Capital Lending

- Led a team responsible for funding an average monthly volume of $5-8 million
- Recognized as the top sales team based on funded volume from March 2016 - November 2016

Loan Officer
05-2015 - 01-2016

Network Capital Funding Corporation

- Consistently awarded top funding achievement for 6+ months
- Exceeded monthly target sales goals by an average $2+ million funded volume

Business Analyst-Investor Relations
05-2012 - 04-2015

Banc of California

- Restructured underwriting guidelines with quantitative risk analysis team to achieve additional 2% volume
- Built pricing models for streamlining rate delivery across multiple sales channels

Secondary Marketing Analyst
05-2010 - 04-2012

CS Financial

- Improved pipeline pull through ratio by 4% through loan restructuring and refitting products
- Developed new pipeline reports for c-level executives and internal operations for ensuring loan delivery

Education

B.A., Business Economics
2005 - 2009

University of California, Riverside

Licenses

CA Real Estate Sales Person, BRE #02021075

Mortgage Loan Originator, NMLS #1372119

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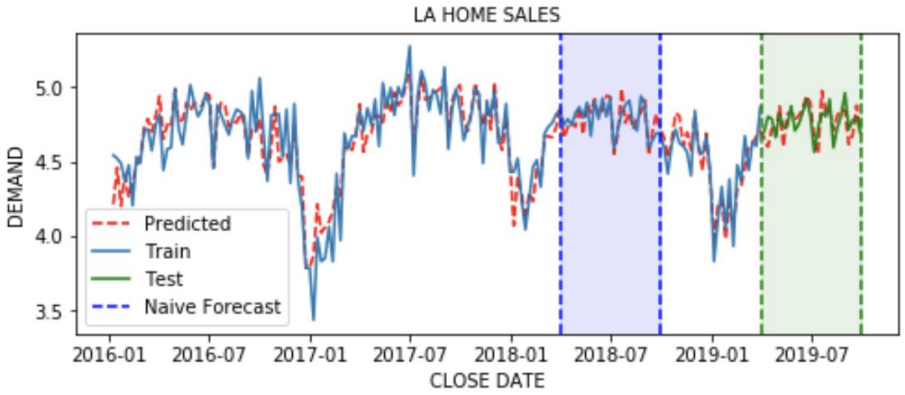

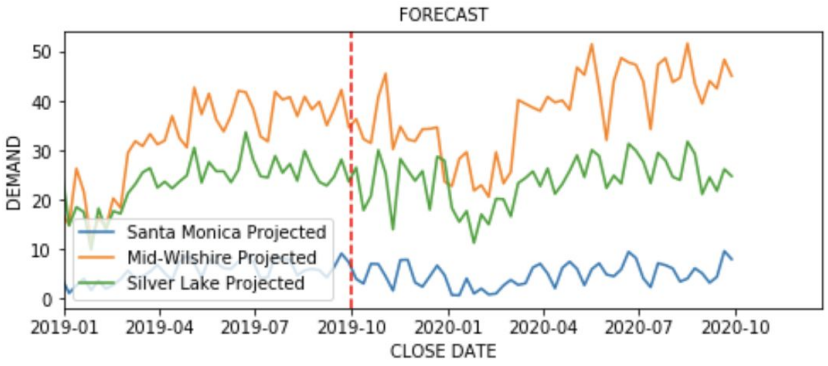

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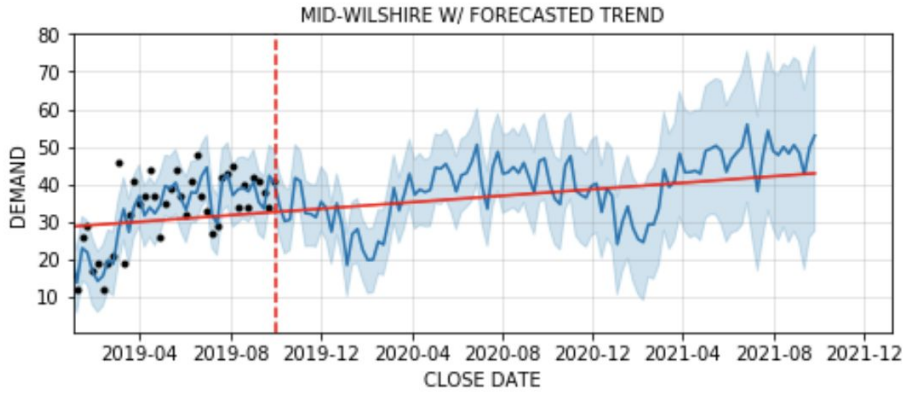

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