

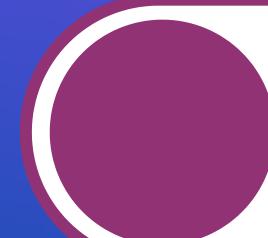
The background features a vibrant, abstract design with three glowing, translucent rings. One ring is positioned in the top left corner, another in the bottom left corner, and a larger one on the right side. These rings exhibit a rainbow-like color gradient and soft shadows, set against a dark blue-to-purple gradient background.

**Forecasting Apex
Assets Investment
opportunities.**

Team



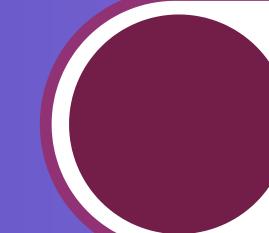
Miriam Ongare



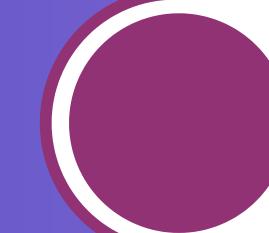
Caroline Njoroge



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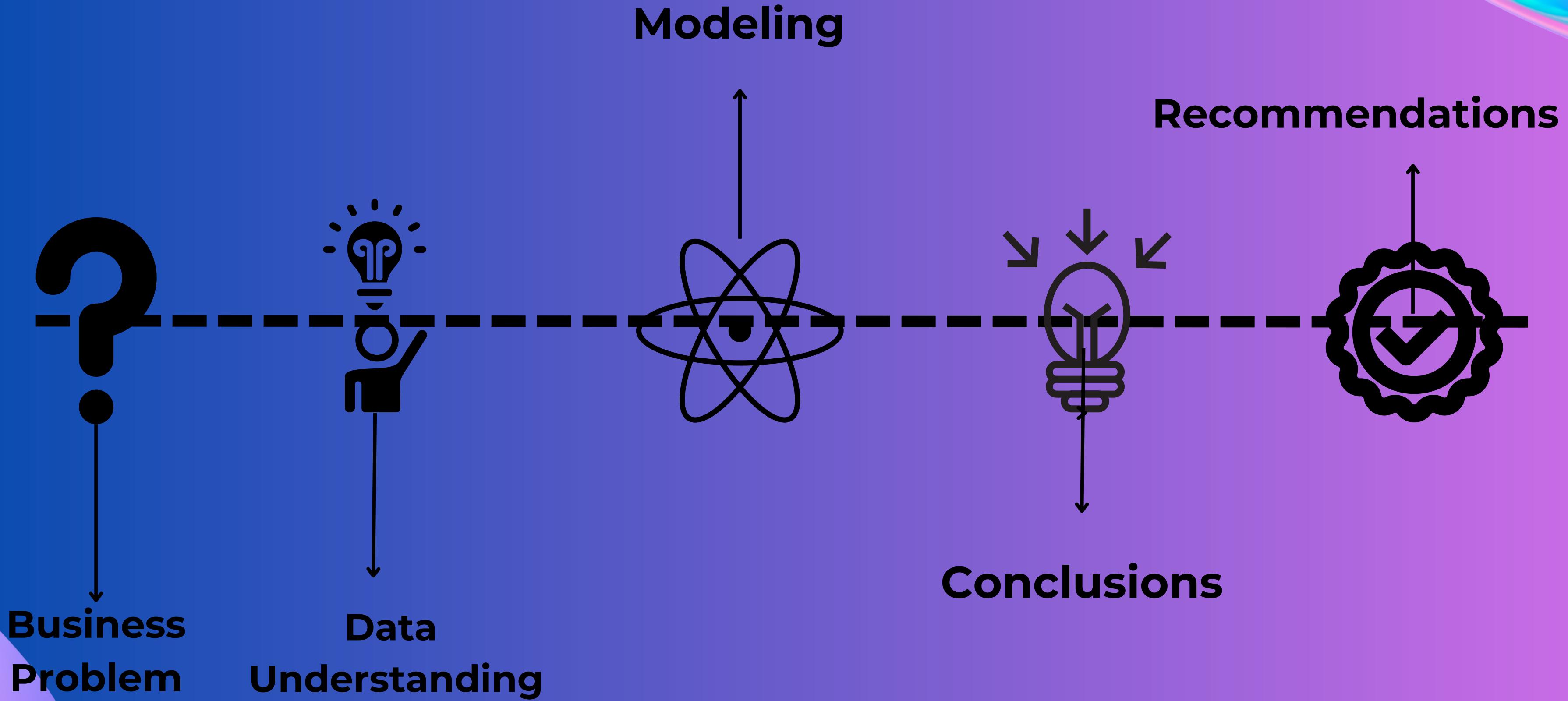


Philip Mweri



Mercy Ronoh

Roadmap



Overview

Apex Assets Investments is a real estate firm which provides state of art opportunities in the real estate scope such as housing.

However, it is grappling with a challenge on the best avenues to do the investing.

The primary goal of this project is to analyse the factors that will determine the best zipcodes to invest in and build time series model that will forecast the real estate prices of various zipcodes and provides insights and recommendations based on the built time series model in this project

Business Problem

- In dynamic real estate field, Apex Assets Investments needs to identify the most profitable zip codes for investment.
- They face a challenge: sifting through countless zip codes with fluctuating prices.
- Leverages time series modelling analysis to uncover hidden opportunities, aiming to pinpoint the zip codes with the highest return on investment while mitigating risk.

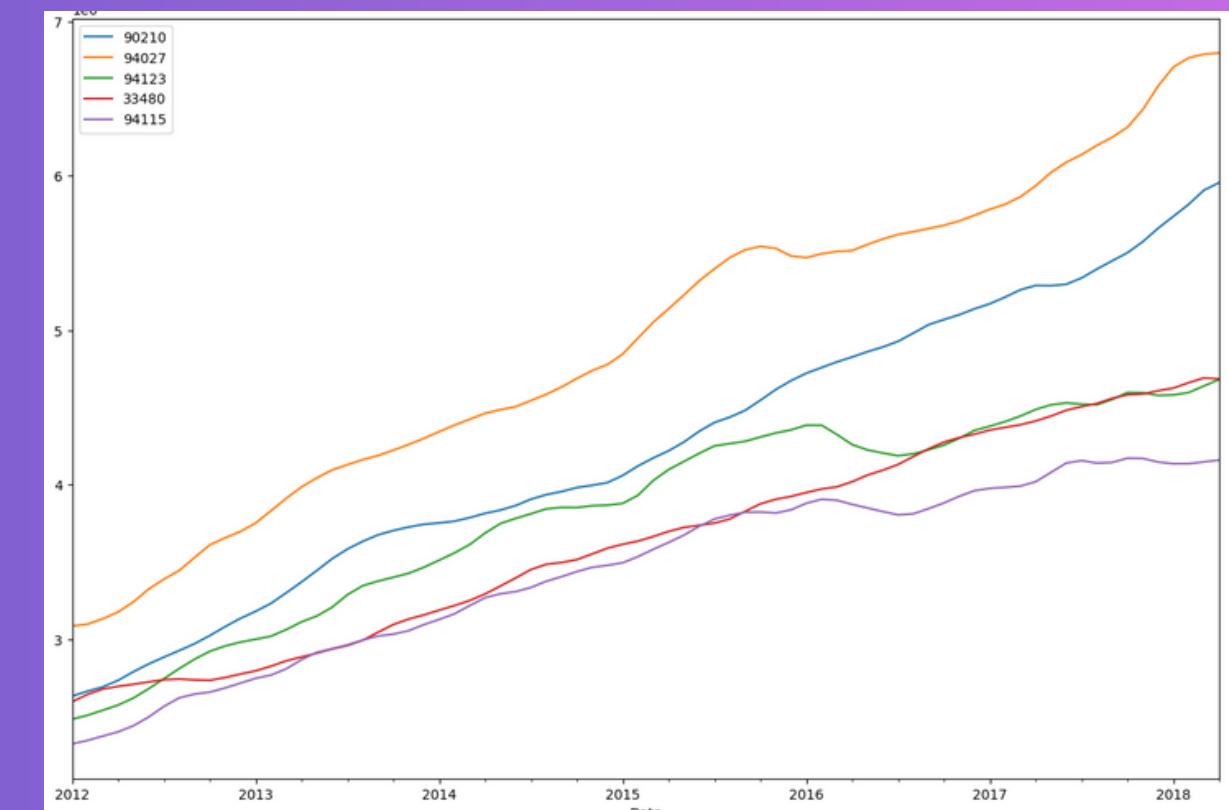
Project Objectives

- Evaluate which zipcodes(cities) exhibits the most promising highend real estate investment opportunities. Understand the trend for the 5 best Zipcodes to invest in based on Return On Investment(ROI). Forecast property values over the short and long term, aiming to identify the most favourable zip codes for investment across various counties.

ROI:Top 5 Zip Codes by EDA:

Identifying Top Investment Zipcodes

- 1.Examine Coefficient of Variance (CV): An analysis of the CV for each zip code to understand the volatility or variability of housing prices. A higher CV indicates greater volatility.
- 2.Set Upper Limit for CV: Using the 60th percentile of CV values as a threshold, we will set an upper limit for acceptable risk. This helps filter out zip codes with higher-than-acceptable risk levels.
- 3.Identify Promising Zip Codes: We will then identify top 5 zip codes that offer the best historical Return on Investment (ROI) while also fitting within the defined



Modeling

To find the five zipcode areas that are the most optimal for real estate investment ,
We ran an Auto Arima time series models on every all the zipcode areas of concern
individually by means of functions .

We used this model due to the nature of data and it various advantages such as the ability automatically selects the optimal values for the p, d, and q parameters, as well as seasonal parameters (P, D, Q, m) if applicable. This removes the need for manual parameter tuning, saving time and effort.

Model Evaluation and Prediction

The evaluation shows the the model's predictions are roughly off by 8.2% from the actual values from the test set.

| | Actual | Predicted | % Error |
|--------------|-----------|-----------|---------|
| Mc | 1,253,800 | 1,251,722 | 0.17 |
| Sea Is | 2,440,000 | 2,431,463 | 0.35 |
| Da | 1,388,100 | 1,383,292 | 0.35 |
| San Franc | 3,345,857 | 3,330,054 | 0.47 |
| Berk | 1,974,100 | 1,962,974 | 0.56 |
| ... | ... | ... | ... |
| Menlo | 2,561,200 | 1,925,987 | 24.80 |
| Brook | 2,000,850 | 1,499,232 | 25.07 |
| Glenb | 2,161,900 | 2,715,748 | 25.62 |
| Sullivans Is | 1,837,000 | 2,475,610 | 34.76 |
| Key Bisc | 2,871,700 | 3,880,653 | 35.13 |

82 rows × 3 columns

The aim of this project is to recommended 5 zipcodes to invest in highend properties.

| | City | Current Value | Predicted Value | Net Profit | ROI |
|----|----------------|---------------|-----------------|------------|-----|
| 1 | AI | 3,069,100 | 3,128,438 | 59,338 | 1% |
| 2 | Amagan | 3,141,100 | 3,369,837 | 228,737 | 7% |
| 3 | A | 4,766,600 | 5,442,671 | 676,071 | 14% |
| 4 | Athe | 6,796,500 | 6,898,057 | 101,557 | 1% |
| 5 | Av | 1,665,600 | 1,685,437 | 19,837 | 1% |
| 6 | Berk | 1,974,100 | 2,002,863 | 28,763 | 1% |
| 7 | Beverly H | 3,899,300 | 3,903,336 | 4,036 | 0% |
| 8 | Boca Gr | 1,989,100 | 2,077,214 | 88,114 | 4% |
| 9 | Bridgeham | 2,592,100 | 2,895,226 | 303,126 | 11% |
| 10 | Brook | 2,000,850 | 2,125,373 | 124,523 | 6% |
| 11 | Burlin | 2,964,000 | 2,978,624 | 14,624 | 0% |
| 12 | Cambr | 2,037,600 | 2,171,339 | 133,739 | 6% |
| 13 | Carmel-by-the | 1,603,550 | 1,624,524 | 20,974 | 1% |
| 14 | Chil | 1,526,200 | 1,546,644 | 20,444 | 1% |
| 15 | Cold Spring Ha | 1,128,900 | 1,135,776 | 6,876 | 0% |
| 16 | Coro | 1,997,600 | 2,024,888 | 27,288 | 1% |
| 17 | Cuper | 2,490,200 | 2,330,157 | -160,043 | -6% |

Conclusion

In our investigation to assess the effectiveness of our models, we uncovered compelling evidence suggesting their efficacy. By employing an exploratory data analysis (EDA) approach on our training dataset to identify five cities for investment and subsequently simulating investments in those selected cities on our test dataset, we realized a notable 21.39% return on investment.

Comparatively, when leveraging modeling techniques to predict the optimal five cities for investment within New York over the duration of our test dataset, we attained a respectable 17.27% return on investment. This represented the 8% error. This analysis underscores the value of our models' recommendations, indicating that even if their predictive accuracy is not exceptionally high, their insights remain valuable.

Recommendations

While time series forecasting poses challenges, our top ROI estimates may seem overly optimistic, surpassing historical ROIs spanning nearly a decade. Despite potential inaccuracies in dollar predictions, our models' performance compared to EDA-based methods in the validation set indicates their value in identifying the best short-term investment opportunities in five zipcode areas

These are the top 5 zipcodes by ROI one year out, as predicted by our models, and serve as our final recommendations.

1. Aspen
2. Bridgehampton
3. Amagansett
4. Brookline
5. Cambridge



Thank You