

Econometric Explorers

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Forecasting S&P 500 Index Using Prophet, ARIMA and Python

Project Team



Todd
Project Manager



Chris
Data Scientist



Sergio
Data Scientist



Reece
Data Scientist

About Us

- Adventurous researchers exploring data landscapes.
- Utilize statistical and economic tools.
- Navigate complex regression models to uncover hidden relationships.
- Employ econometric models for insights into economic phenomena.
- Focus on discovery and sharing findings to enrich global knowledge.
- Aim to guide future explorers.

“ Investors should temper expectations for 2024 as estimates for profit growth look lofty, volatility has been unusually high, and inflationary pressures could come under further pressure and economic growth is likely to slow.”

— J.P. Morgan

“ 2024 is likely to be a “tale of two halves,” with a cautious first half giving way to stronger performance in the second half of the year.”

— Morgan Stanley

2011	2010	
2007	2006	
2005	1999	
2004	1988	
2018	1993	1986
2015	1992	1983
1994	1987	1982
1990	1978	1979
1984	1970	1976
1981	1968	1972
1960	1965	1971
2022	1953	1959
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1973	1932	1926
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1966	1911	1916
1962	1910	1912
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Project Overview

Key Executive Points

- Project to forecast S&P 500 index.
- Used Prophet, Seaborn's Heatmap, and ARIMA libraries in Python.
- Analyzed five years of S&P 500, gold, and crude oil data.
- Aimed to develop accurate S&P 500 predictions by identifying correlations with gold and oil prices.
- Seeks to offer insights for informed investment decisions.

Data Collection Process

We developed a good strategy in this project in the form of more creative innovation.

01.

Proposals Draft, Data Collection and Preprocessing

02.

Familiarization with Prophet and Python Environment Setup

03.

Model Development and Initial Testing

04.

Model Tuning and Optimization

06.

Documentation, Report Writing, and Presentation Prep

05.

Validation and Fine-tuning

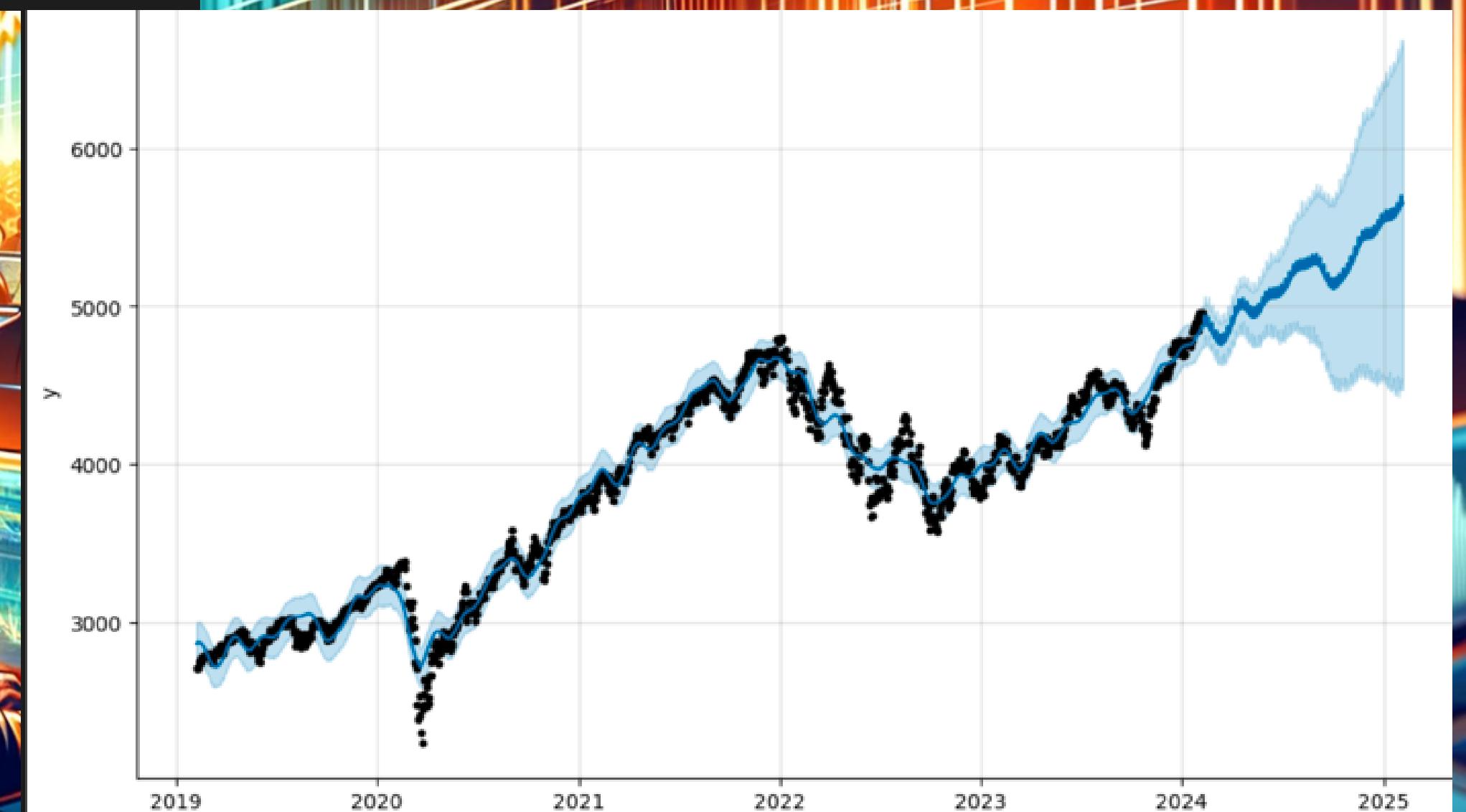
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Final Review

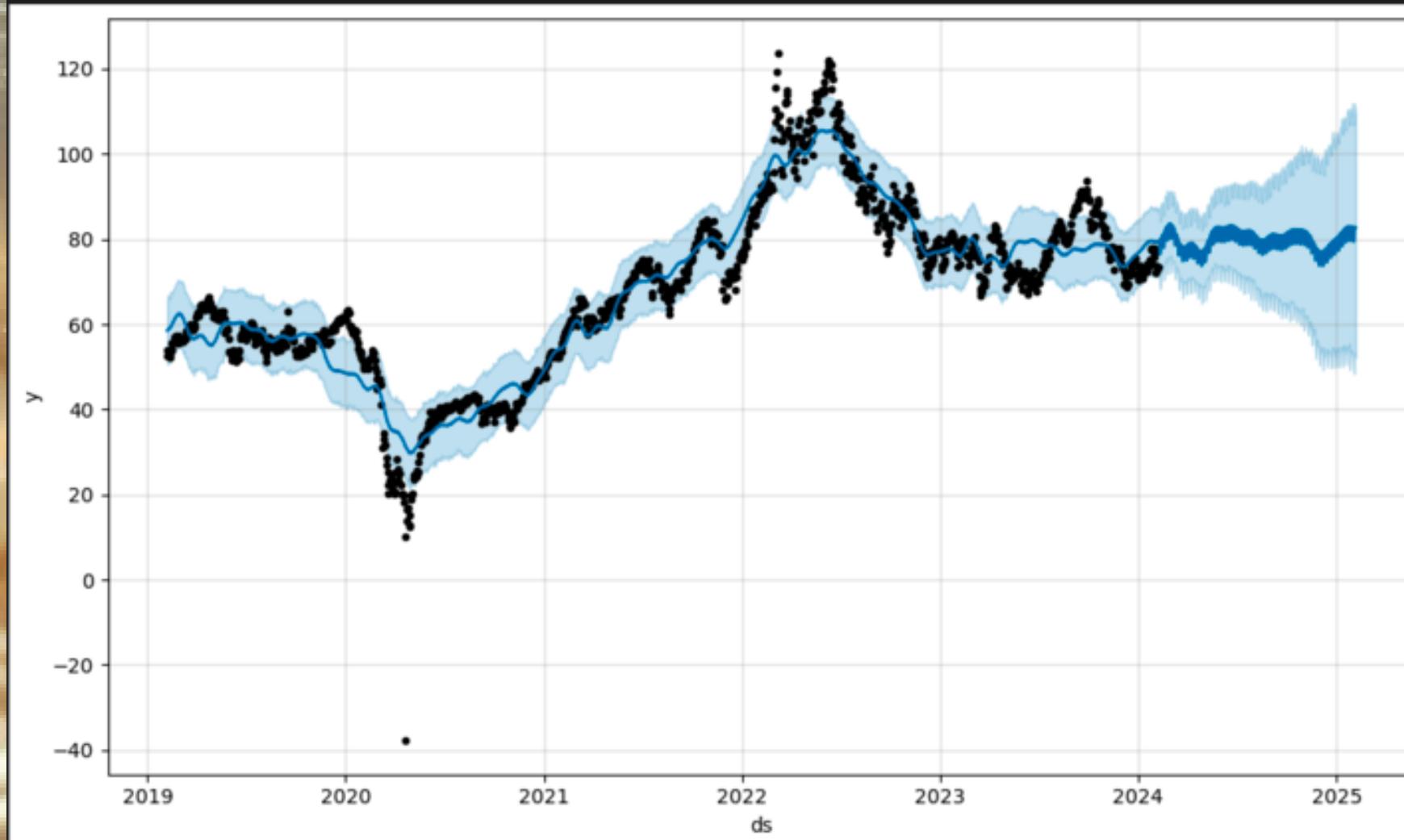
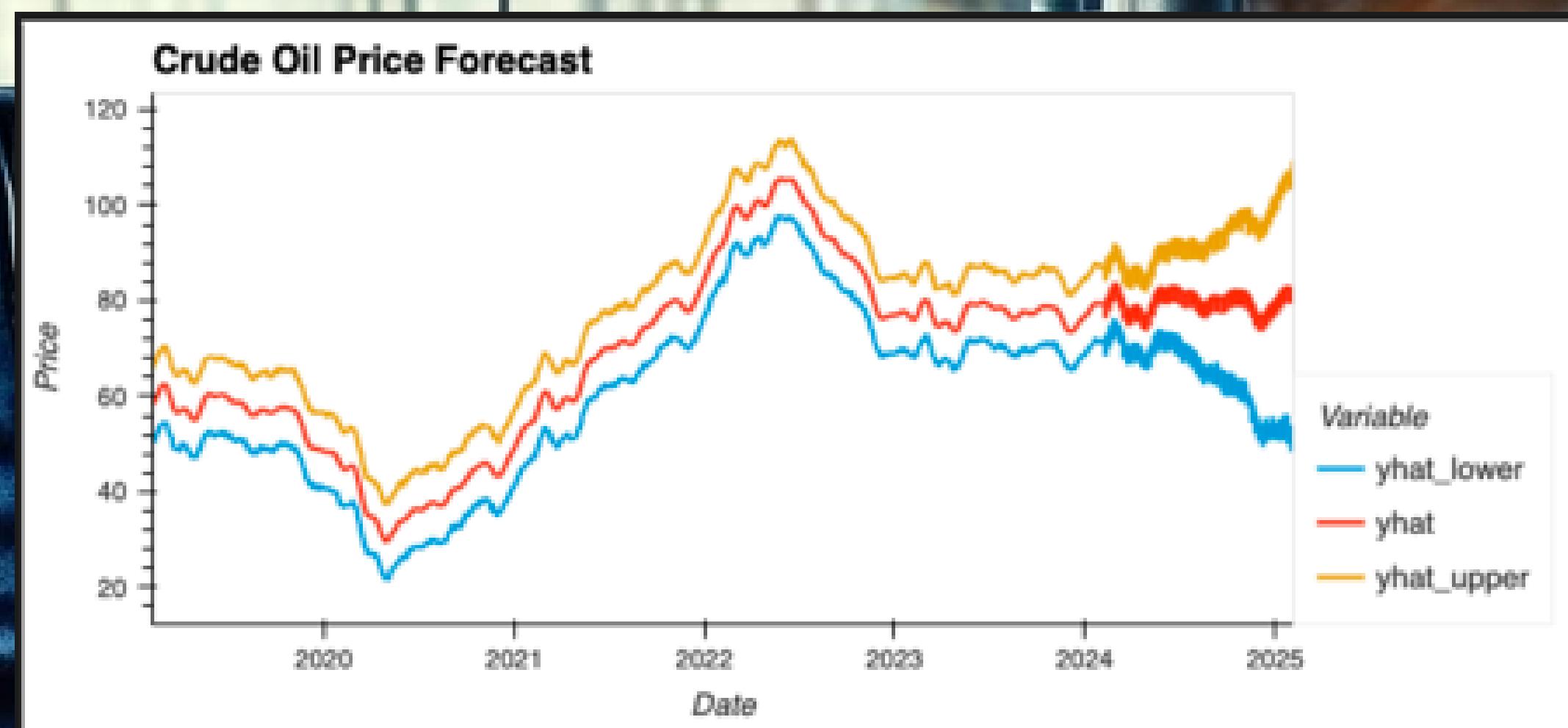


Data Exploration WALLS

In our data analysis, we utilized Python libraries like pandas, numpy, matplotlib, prophet, statsmodels, and yfinance to perform financial data analysis and forecasting.



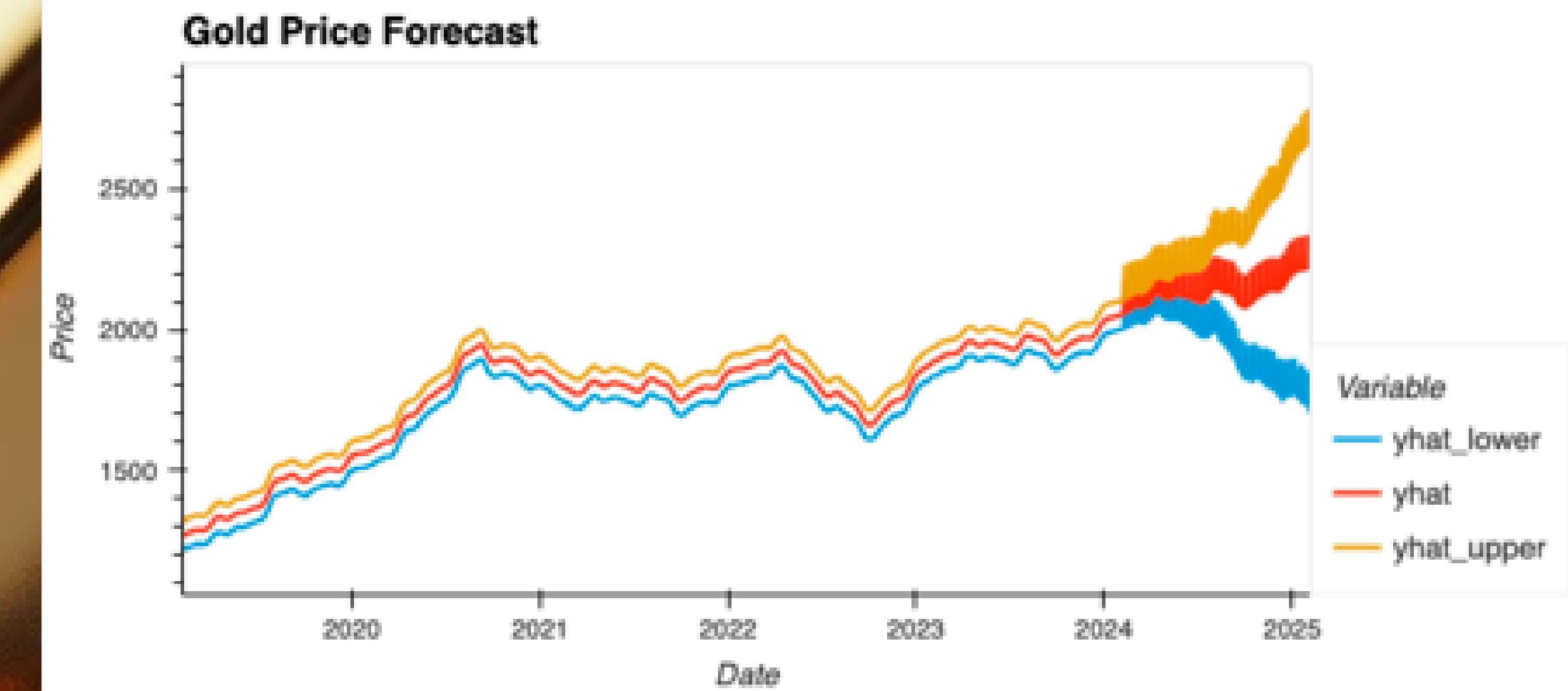
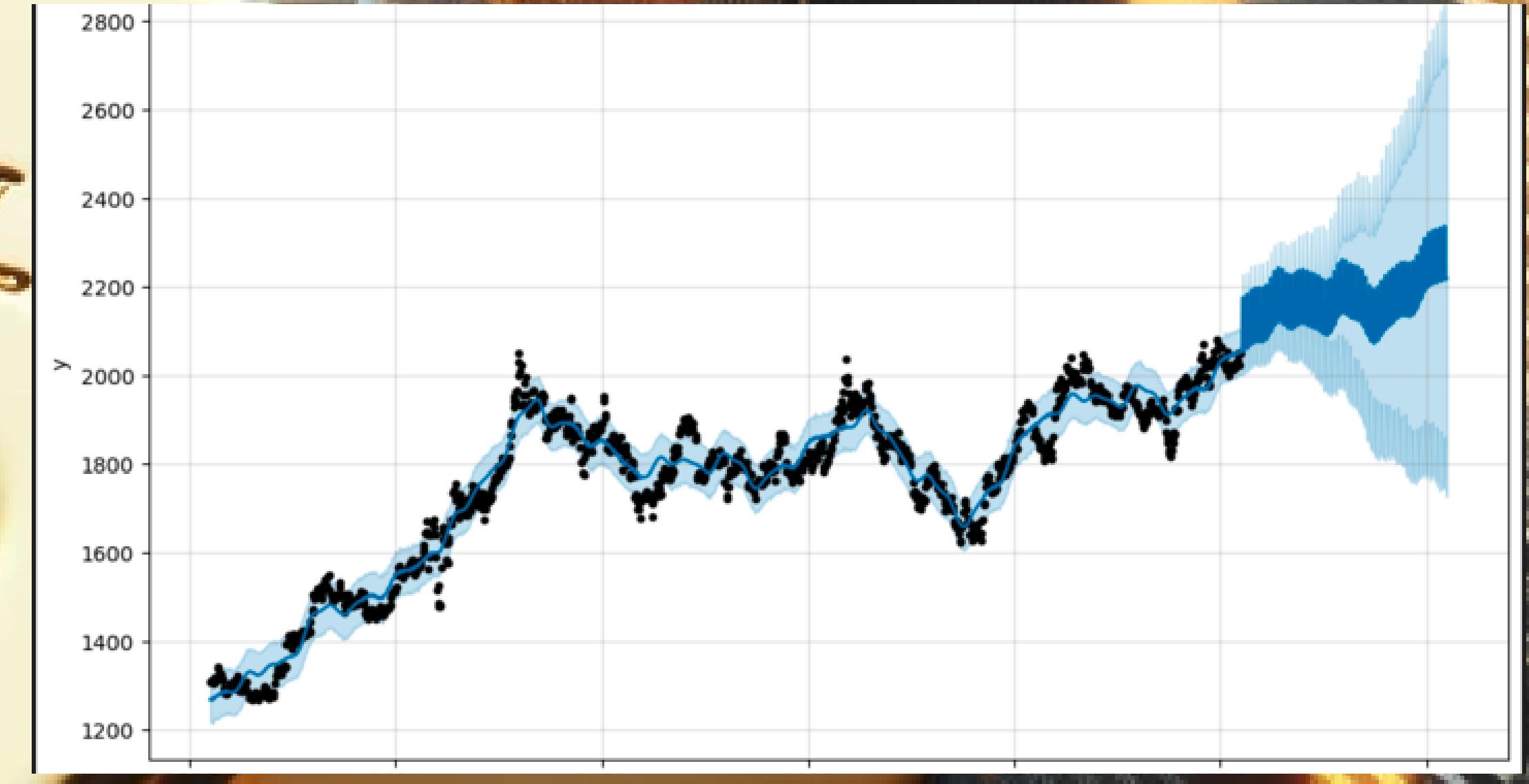
Crude Oil



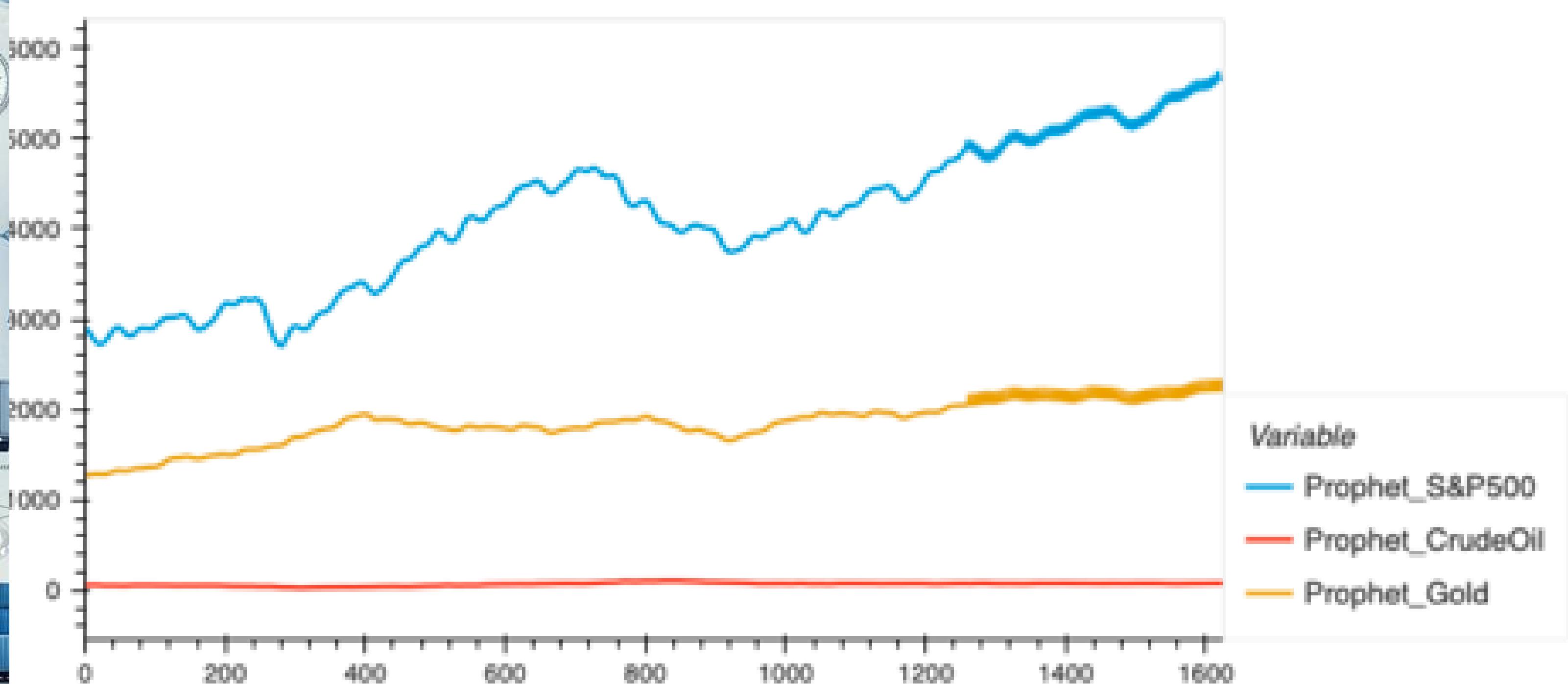
Plotted
Forecasts

Gold Plotted

Forecasts



Combined Forecast



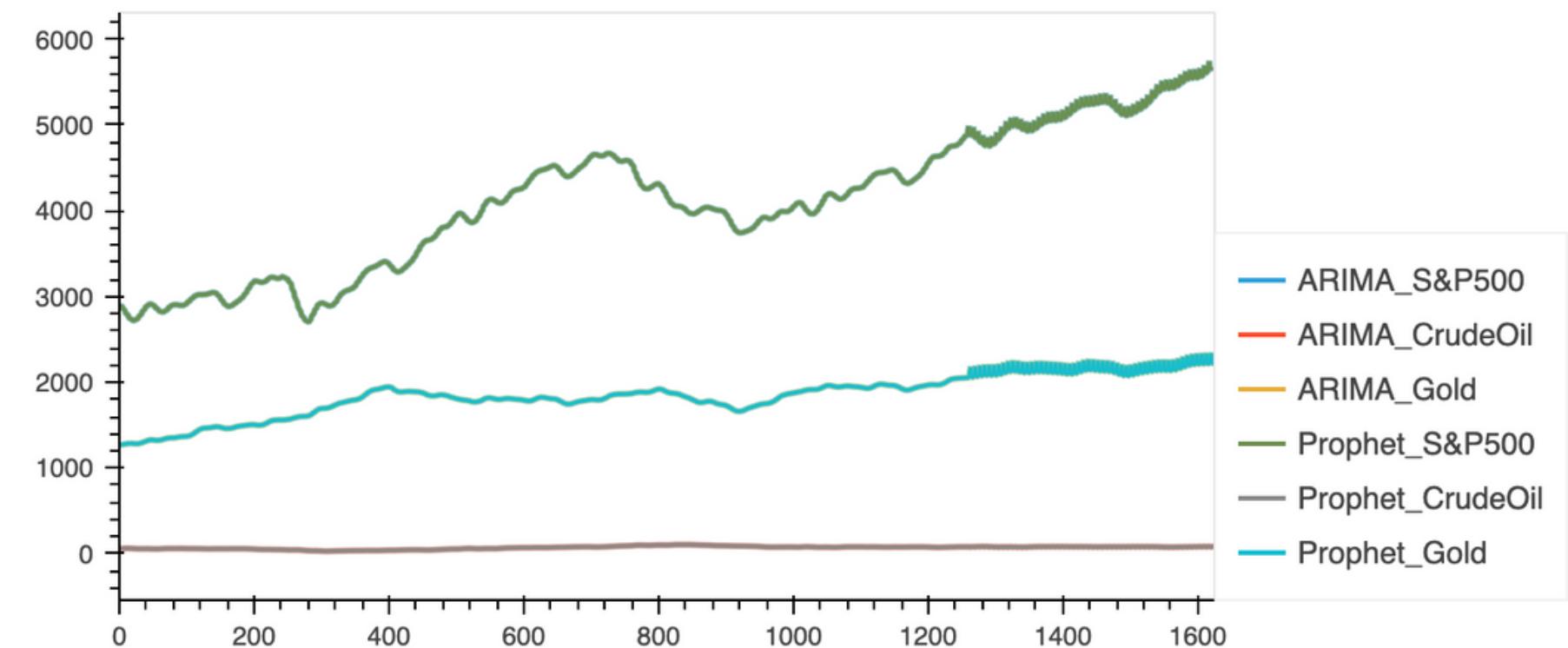
ARIMA



... Correlation between combined ARIMA and Prophet predictions:

```
ARIMA_CrudeOil      NaN
ARIMA_Gold           NaN
ARIMA_S&P500          NaN
Prophet_CrudeOil     NaN
Prophet_Gold          NaN
Prophet_S&P500         NaN
dtype: float64
```

Combined ARIMA Predictions

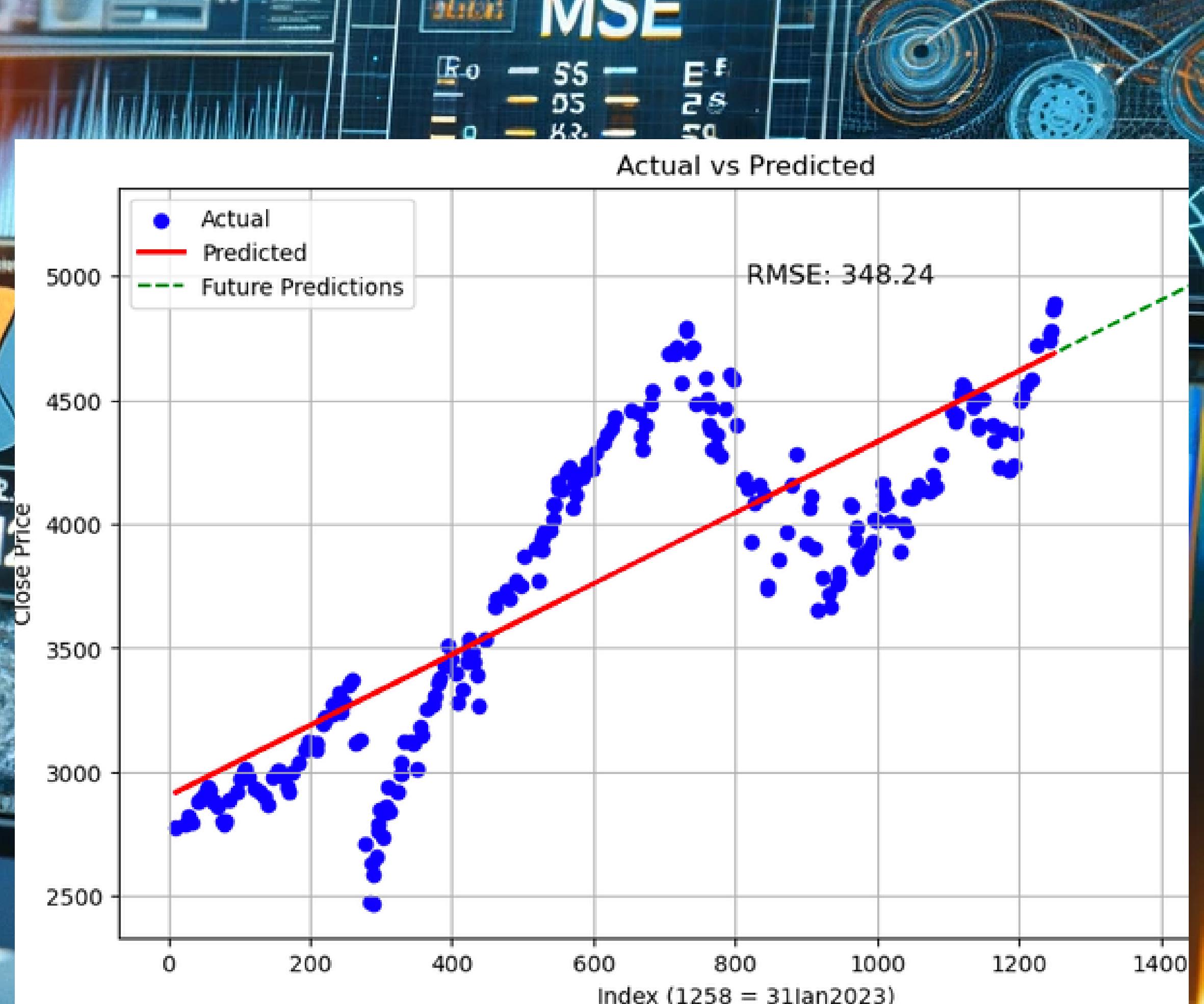


Prophet Predictions



RMSE

Imagine you're trying to predict something, like how much a package will weigh when you send it. Root Mean Squared Error (RMSE), is like measuring how close your guesses are to the actual weights. It gives you a single number to show how accurate your guesses are on average, with smaller numbers meaning you're doing a better job at guessing.



Conclusion

Analysis showed that the correlation between Prophet and ARIMA model predictions for the S&P 500 index, crude oil, and gold was NaN.

This indicates a lack of linear relationship between the forecasts.

Further investigation is needed to understand the discrepancy.

Assessing the reliability of forecasting methods in financial markets is crucial.



Thank You!

Well folks, congratulations, we've finally reached the end of our presentation marathon. Let's all take a moment to mourn the loss of those precious minutes we'll never get back.

Questions

Financial Analysis



Questations

Analisions



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Q & A

WE INVITE YOU TO
ASK US QUESTIONS

