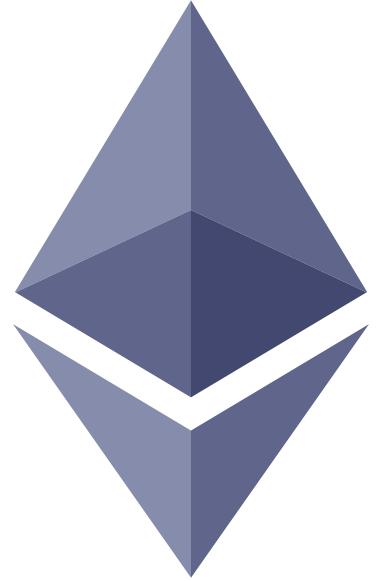




By Tanut Choksatchawathi



Round 3 - DesightsAI
Ocean Protocol

ETH Price Prediction



Introduction Ethereum (ETH)

Ethereum is a decentralized, open-source blockchain platform that allows for the creation of smart contracts and decentralized applications (DApps). As the second-largest cryptocurrency by market capitalization, Ethereum has experienced significant price fluctuations since its inception in 2015. **Predicting the future price of Ethereum is a complex and challenging task**, as it is influenced by various factors, including supply and demand, technological advancements, regulatory developments, and overall market sentiment. However, many analysts and experts use technical analysis, fundamental analysis, and market trends to make Ethereum price predictions. In this introduction, we will use the key factors that influence Ethereum's price and examine the power of deep learning model to predict its future movements.



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Data Source

ect ID: 01234



The 2 years historic price data from Binance in pair of ETH/USD and Fear and Greed Index as Market sentiment from Alternative.me

Data were split into 2 groups

1. Training Set including 1,129 days (Using the data since 2020-01-01 00:00:00 till end of Jan 2023)
2. Validation Set including 17 days (Data Since 1st Feb 2023 - 17th Feb 2023)



Our **Data Source**



Our Data Source

To analysis the behavior of ETH price data, We need to figure out some of factors that affect the price such as seasonality, trending and crypto market sentiments which is Fear and Greed index from alternative.me.

Data Features

Close Price position in hourly rate over 2 years acquired from Binance



Crypto which represent behavior over the period

The current price of Ethereum is a direct reflection of its value at the present moment. This price can be used as an input to forecast its future price. On the other hand, market sentiment reflects how investors and traders perceive the current price of Ethereum, and how they think it will affect the future price. Sentiment analysis can be used to extract and analyze the emotions and opinions of the market participants from various sources, such as news articles and social media. This information can provide additional insights into the market and be used to supplement price-based models in predicting the future price of Ethereum.

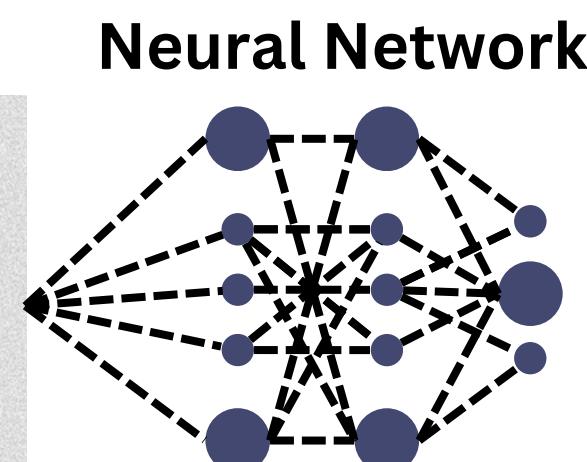
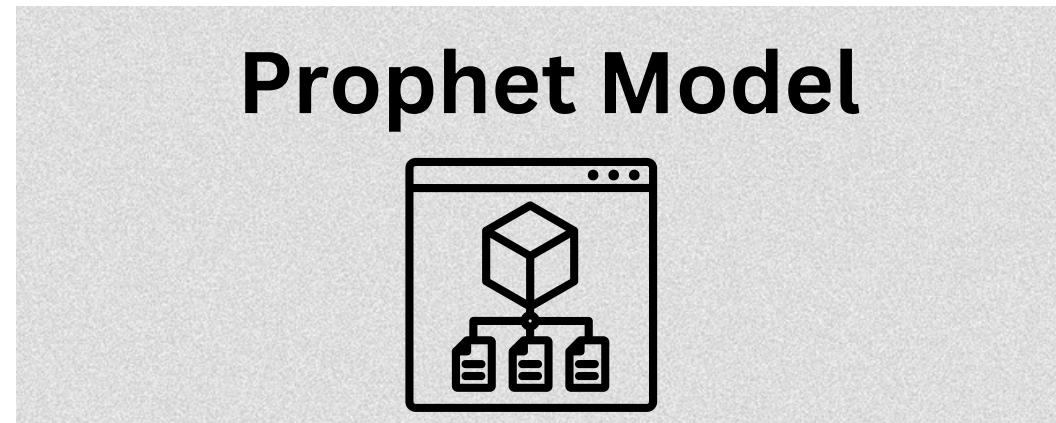
NeuralProphet Model

The NeuralProphet model is a time-series forecasting model that is designed to provide accurate and efficient predictions for a wide range of applications. It uses a neural network architecture that is based on the popular Prophet model developed by Facebook, but with several improvements and extensions, such as the ability to handle missing data and incorporate lagged covariates. The model is easy to use and can be applied to various types of time-series data, including hourly, daily, and weekly data, with the ability to generate forecasts for multiple steps ahead. It has been shown to outperform other state-of-the-art models in terms of accuracy and speed, making it a valuable tool for businesses and researchers who require reliable time-series predictions.

Neural Prophet

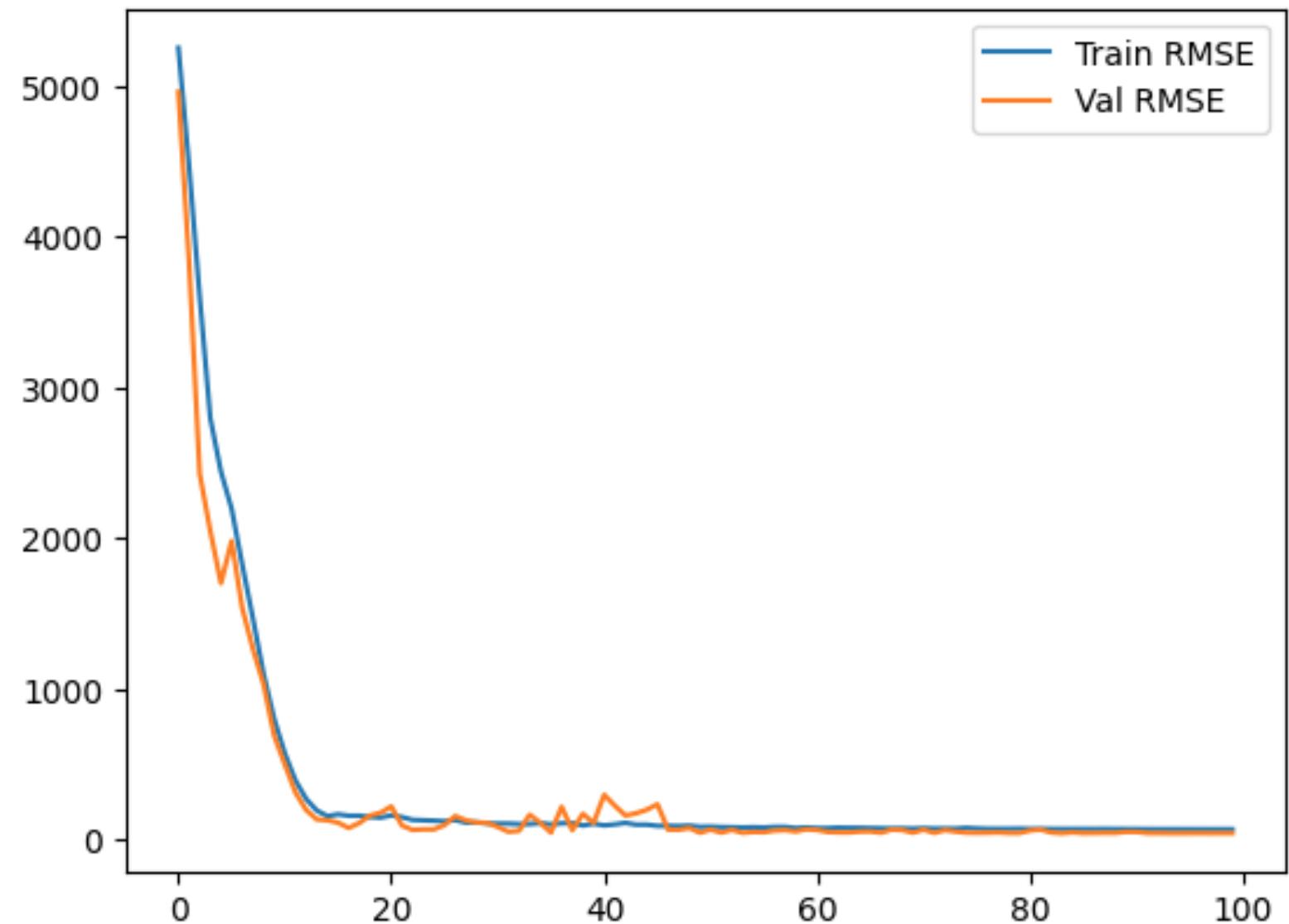
Our **Parameters**

- Last Week Lagged Data Input (24x7 Data points)
- Forecast Next 24 Data Points (24 Hours)
 - Select only 12 Data Points in target time for submission
- Using Seasonality
 - Yearly
 - Weekly
 - Daily
- 1 Hidden Layers for Neural Network Model
- Added Fear and Greed Index as Lag Regressor



Next 24 Points

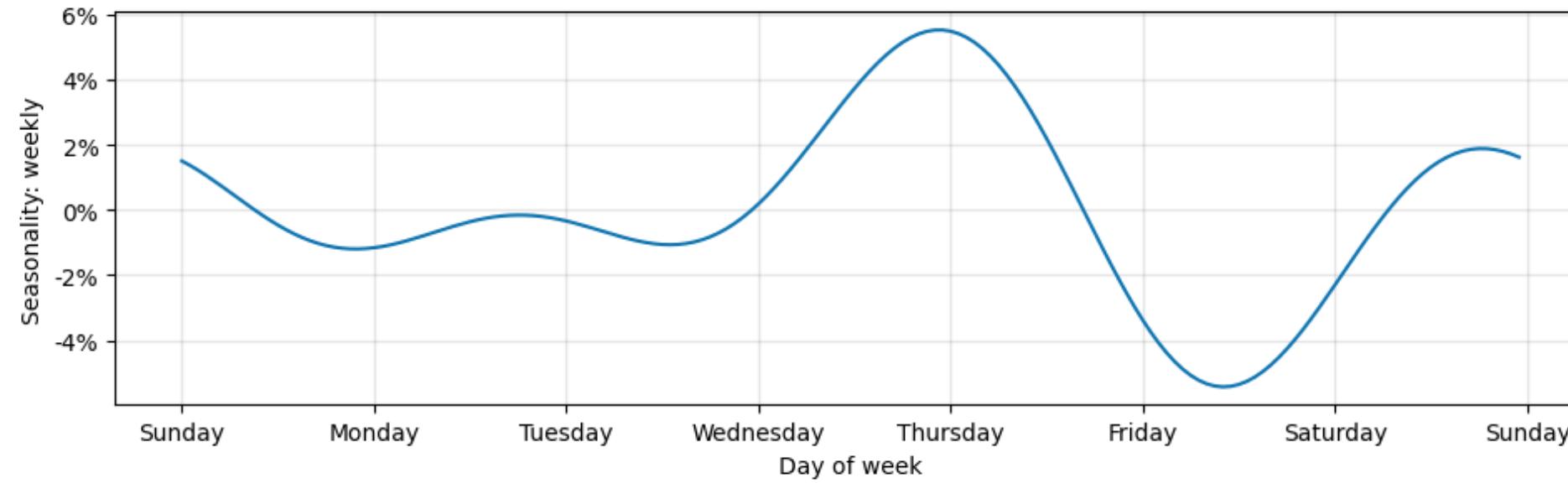
Result



The model nicely converge to optimum points without Sentiment feature, the model can only reach 175 RMSE on Training set and 92.77 RMSE on Validation set

with Sentiment feature, The model reach 72 RMSE on Training set and 46.35 RMSE on Validation set

Seasonality and Trending Analysis with NeuralProphet over 2 Years Data

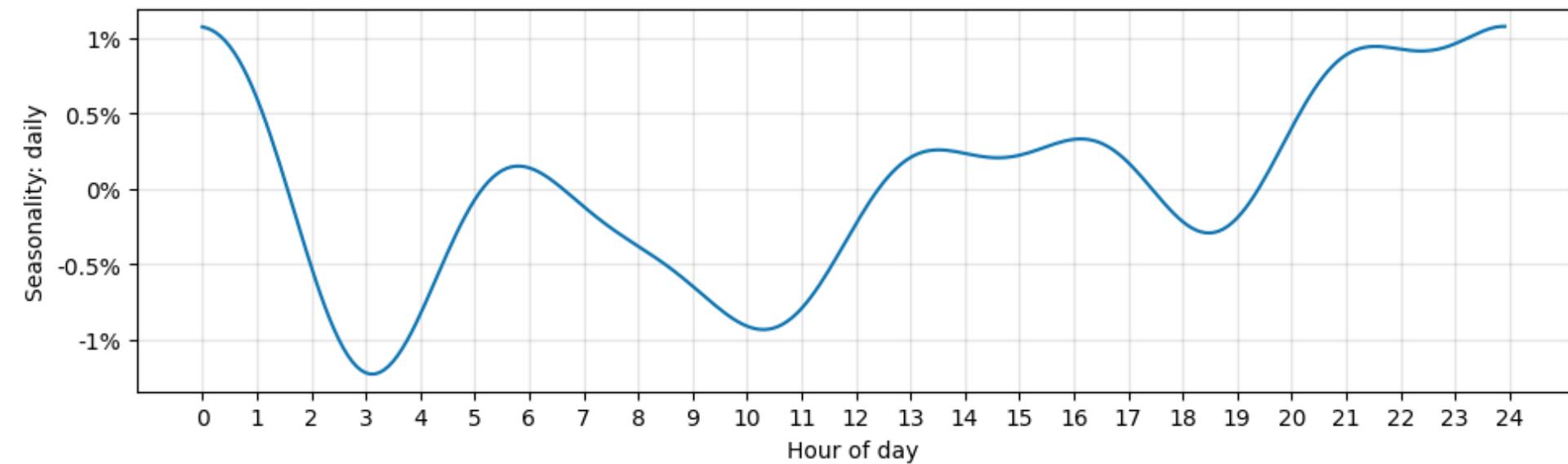


Day of Week Impact

Usually Thursday have positive impact of ETH price while Monday and Saturday have negative impact

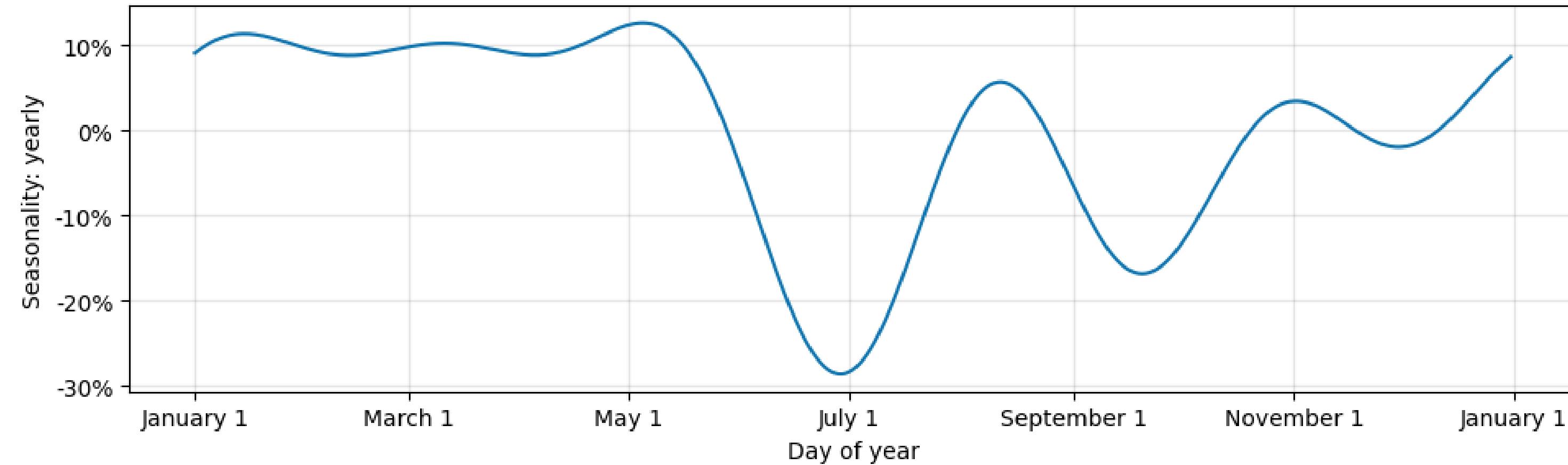
Hour of Day Impact

Usually 3:00:00 and 10:00:00 have negative impact of price while over 10:00:00 gradually increased till 00:00:00



Day of Week and Hour of Day seem have an effect on the ETH price

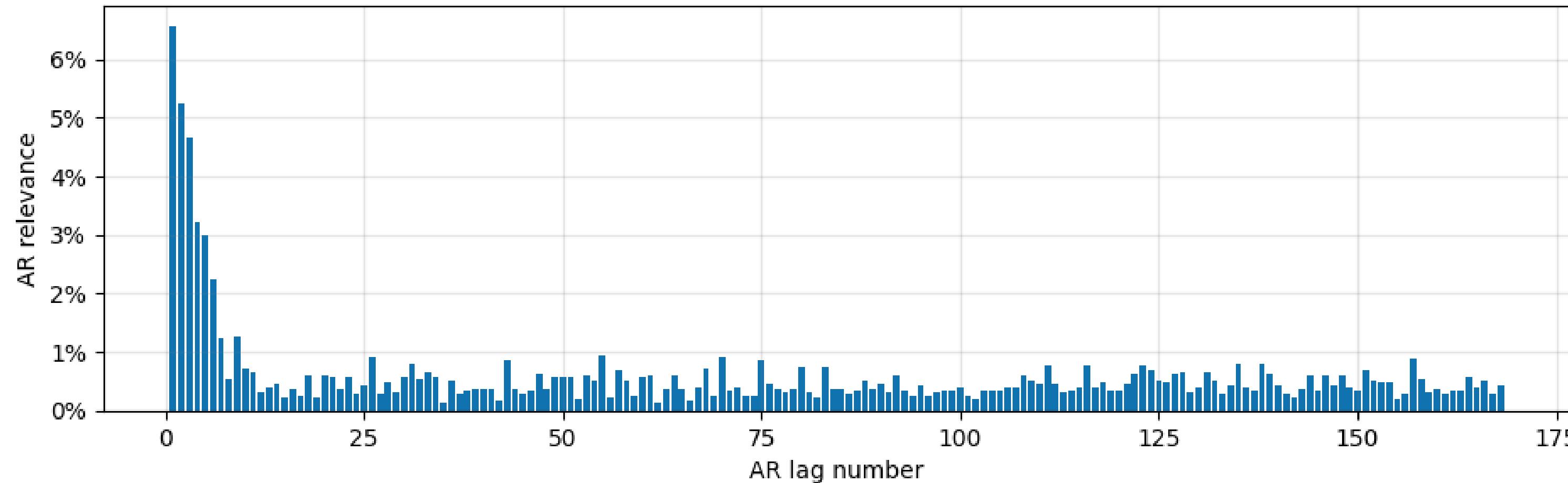
Seasonality and Trending Analysis with NeuralProphet over 2 Years Data



Day of Year Impact

Seems day of year also have significant impact especially on July while January to May slightly increased

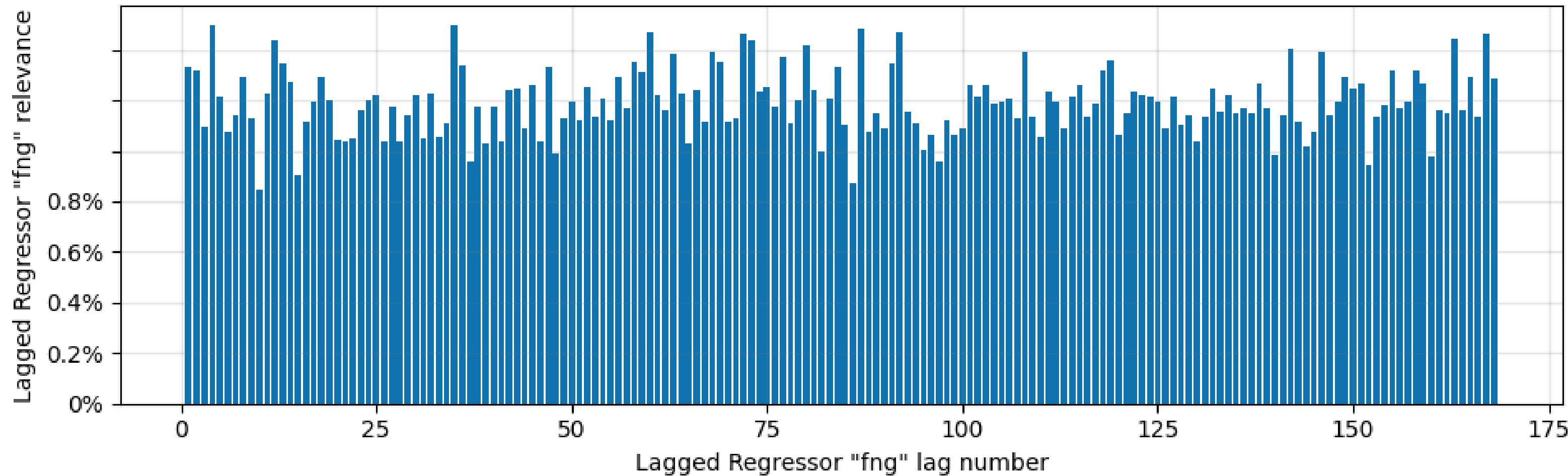
Seasonality and Trending Analysis with NeuralProphet over 2 Years Data



Lag Number

AR relevance shown around 10 data points (10 hours)
before shown significantly impact on the price

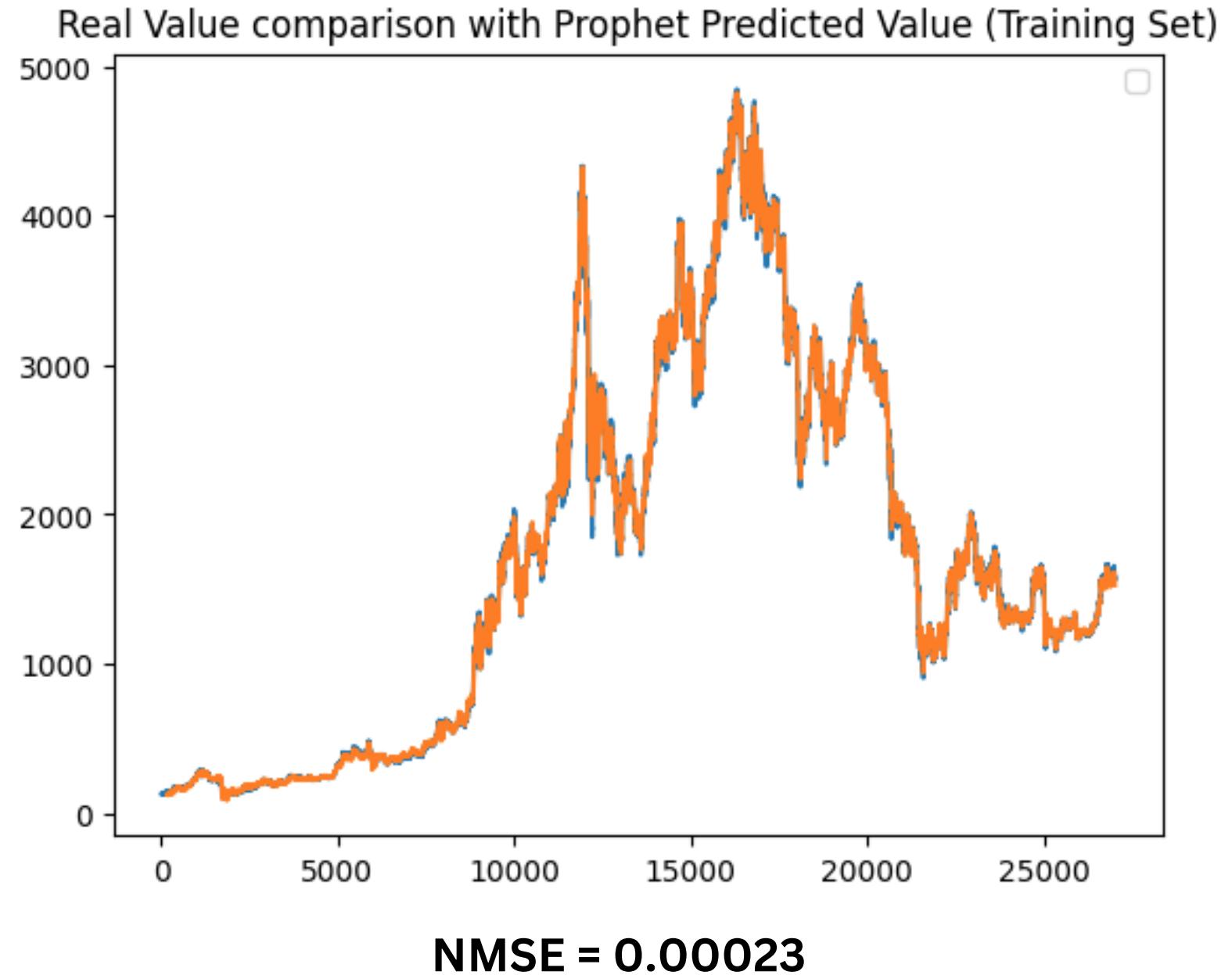
Seasonality and Trending Analysis with NeuralProphet over 2 Years Data



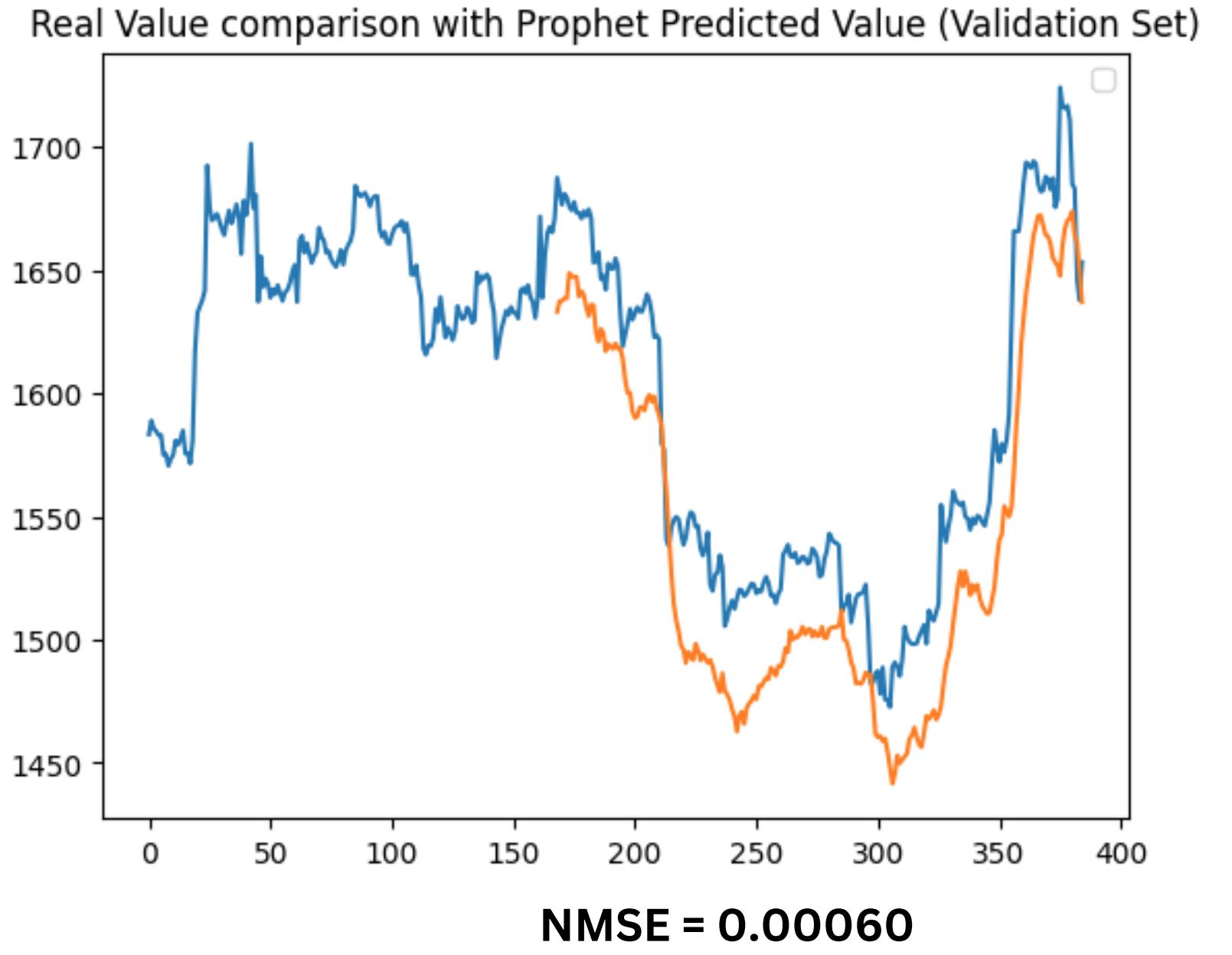
Fear and Greed Index

Data shown Fear and Greed index relevance with the ETH price especially in prediction.
The data so tough to do so but still significant imapct on low and high index.

Result



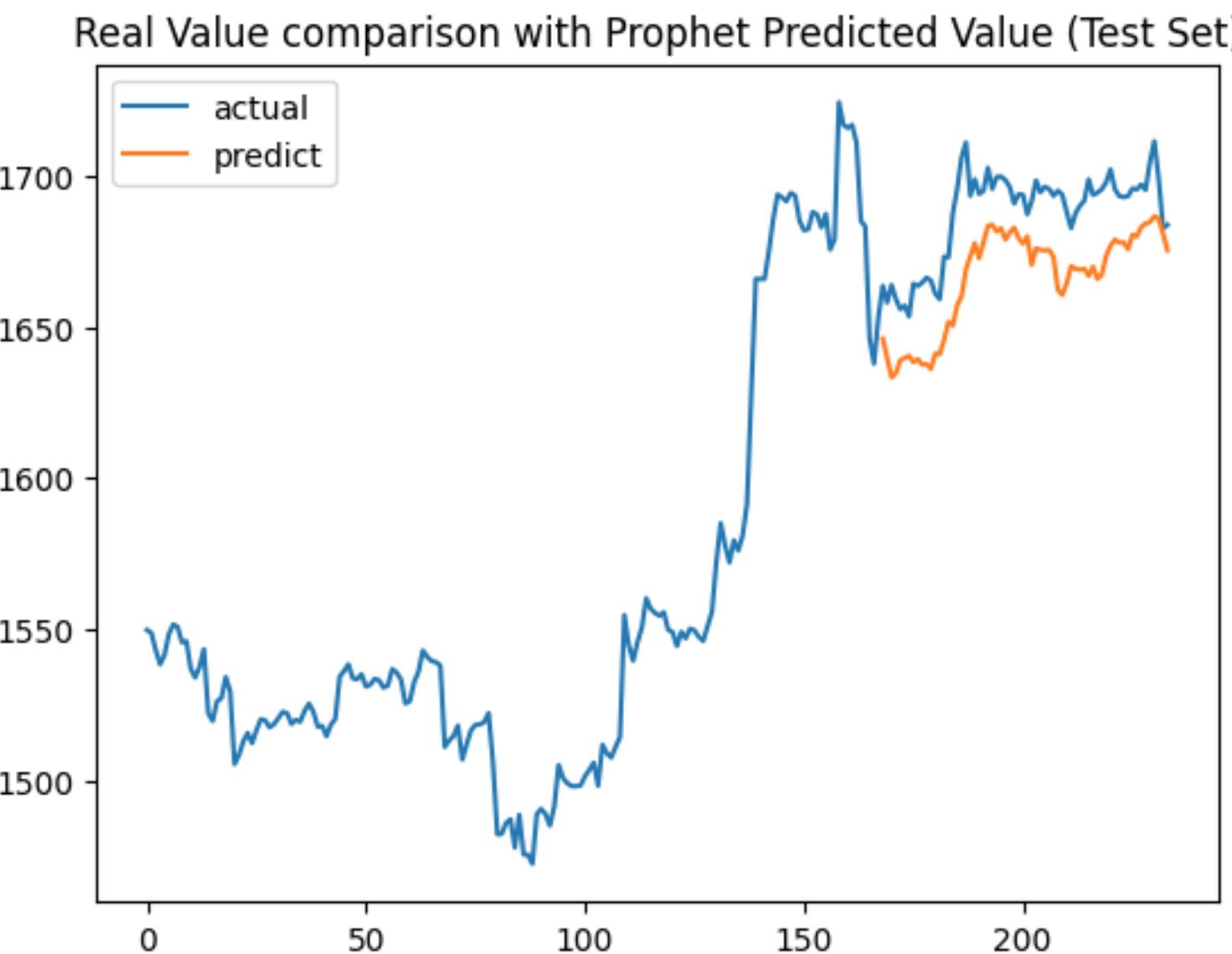
The prediction on training data shown highly correlation



When using Trained Prophet model to predict next
24 hours on validation set
shown trending are likely correct

On Testing Set

Run on 19 Feb 2023: 19:28 UTC Time



for Prediction next 24 hours shown NMSE = 0.00018

Conclusion

The NeuralProphet model with past price of ETH and daily crypto sentiment (fear and greed index) shown potential in price forecasting.

However, The another features should be use to improve the performance such as volume, dominan level and fundflow. These informations would highly correlated with price. Even on-chain activities could be help in improvement.





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Thank You

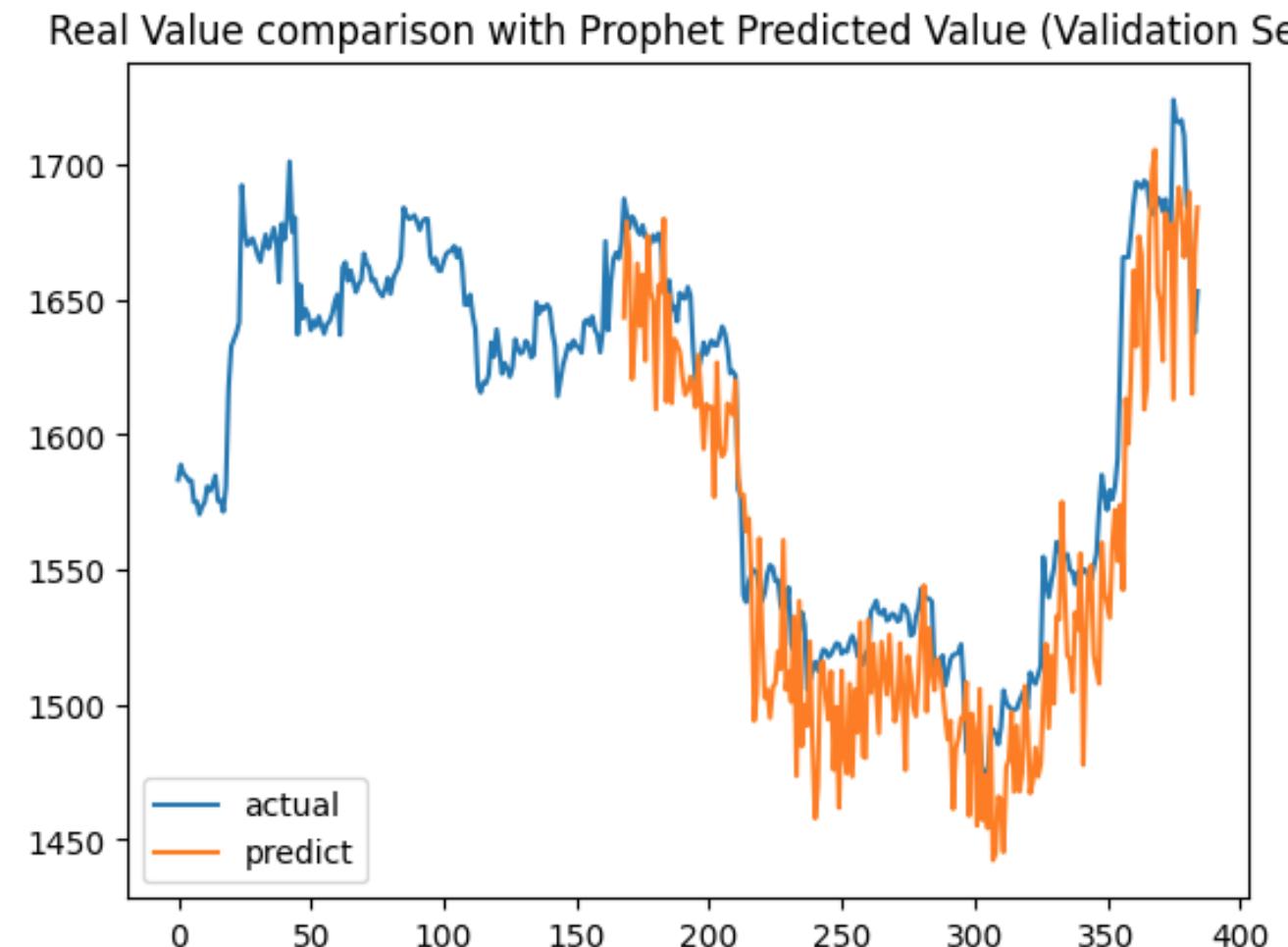
For Your Attention



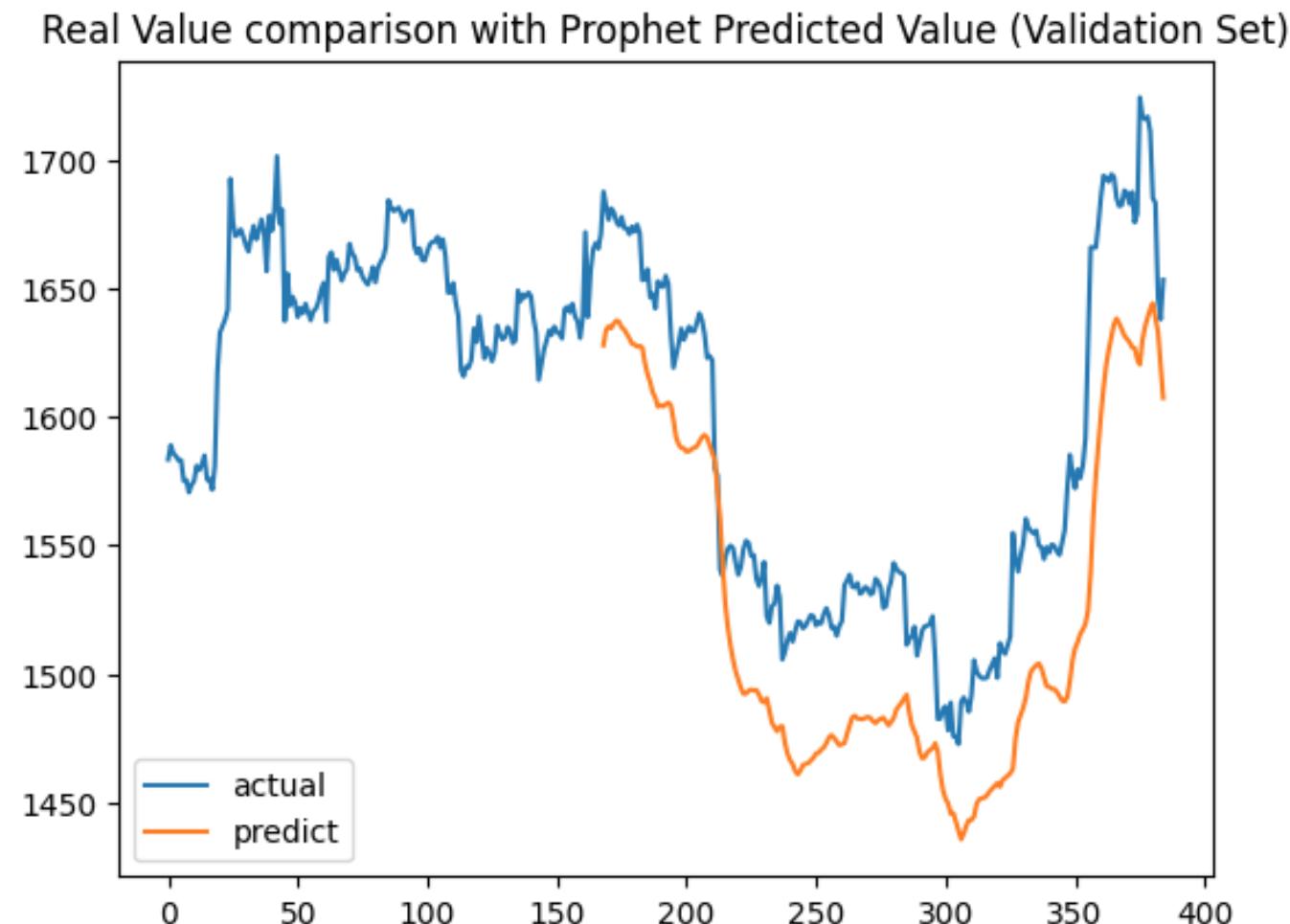
Supplementary

Neural Network Hidden Layer Tuning

0 Layer NN

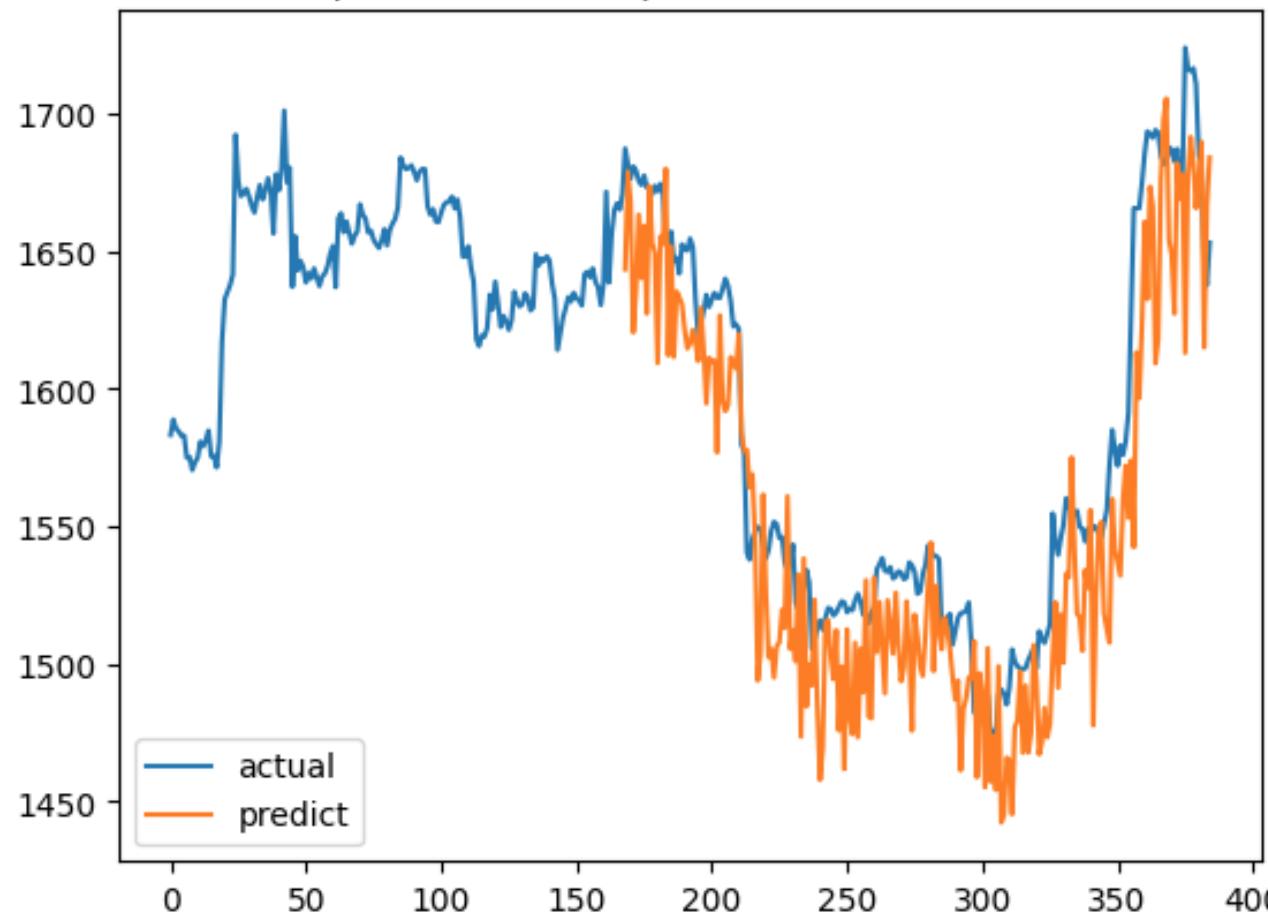


2 Layer NN



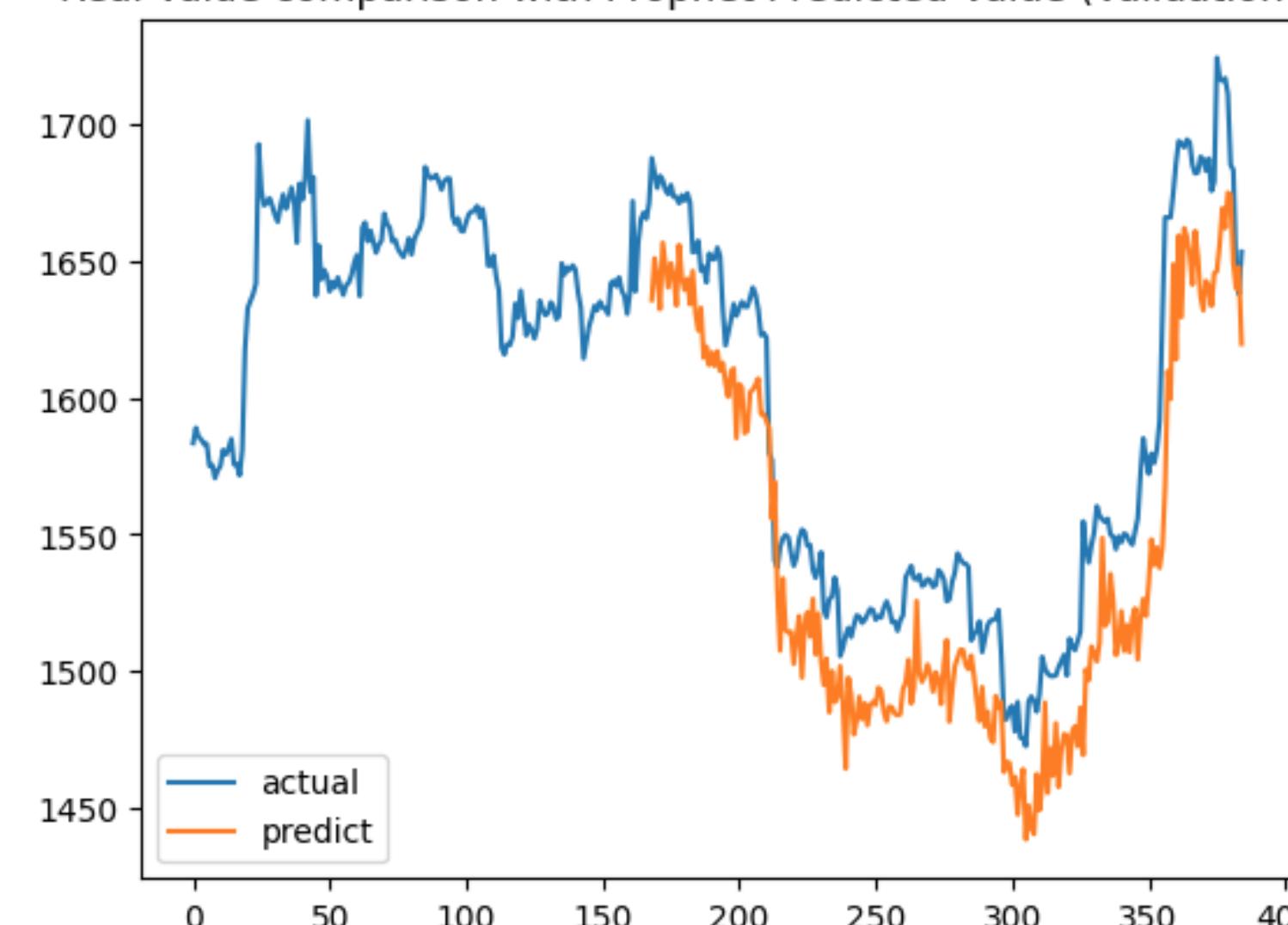
5 - Change point

Real Value comparison with Prophet Predicted Value (Validation Set)



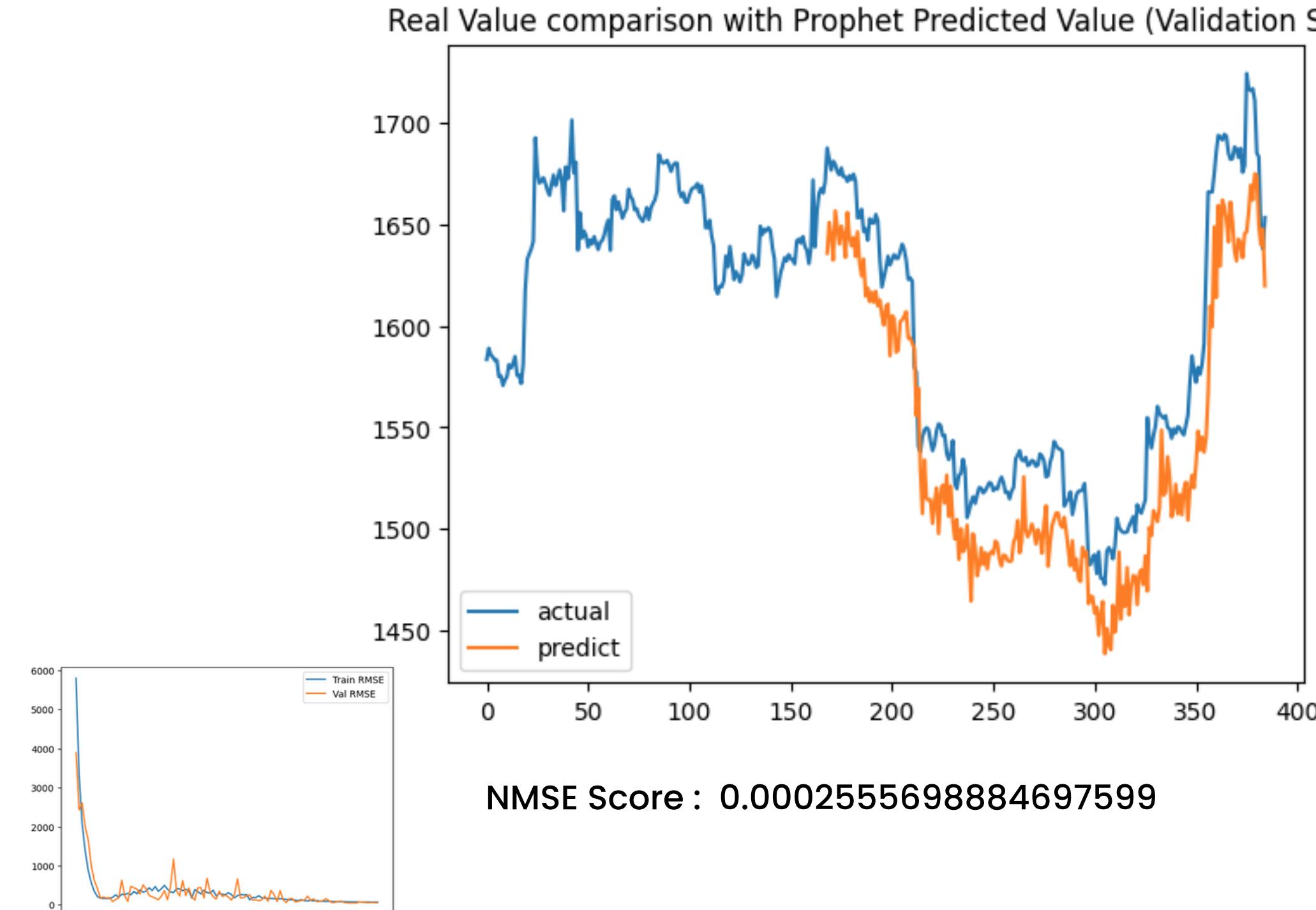
**Increase Trend Flexibility
20 Change point
(w/ Trend Regulizer)**

Real Value comparison with Prophet Predicted Value (Validation Set)



NMSE Score : 0.0002555698884697599

Increase Trend Flexibility 20 Change point (w/ Trend Regulizer)



Trend Regulizer with 1 Hidden Layer

