Stock Market Analysis

# Forecasting Analysis of company Meta Using LSTM and RNN

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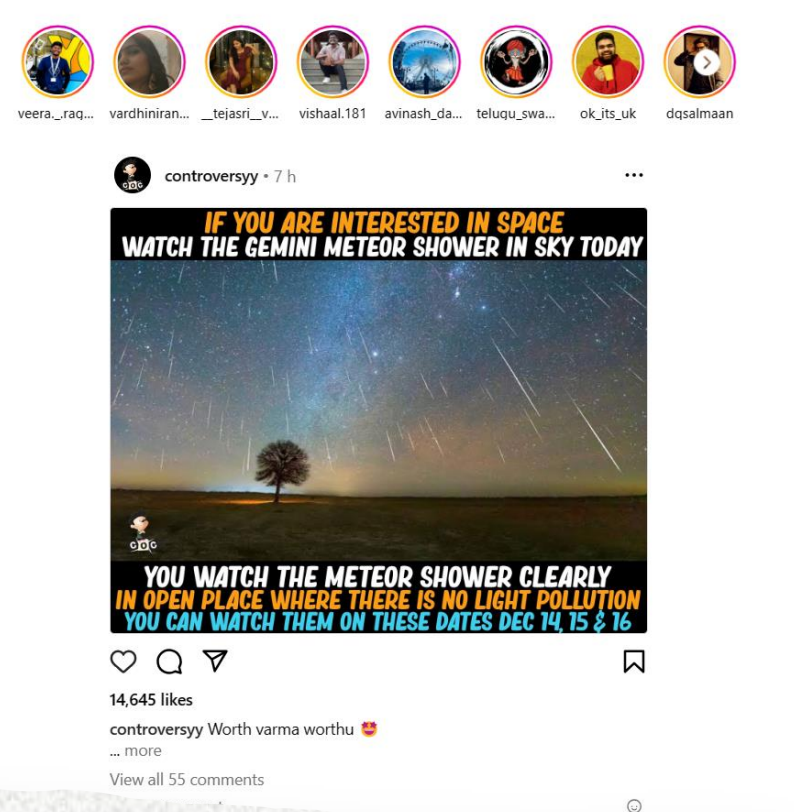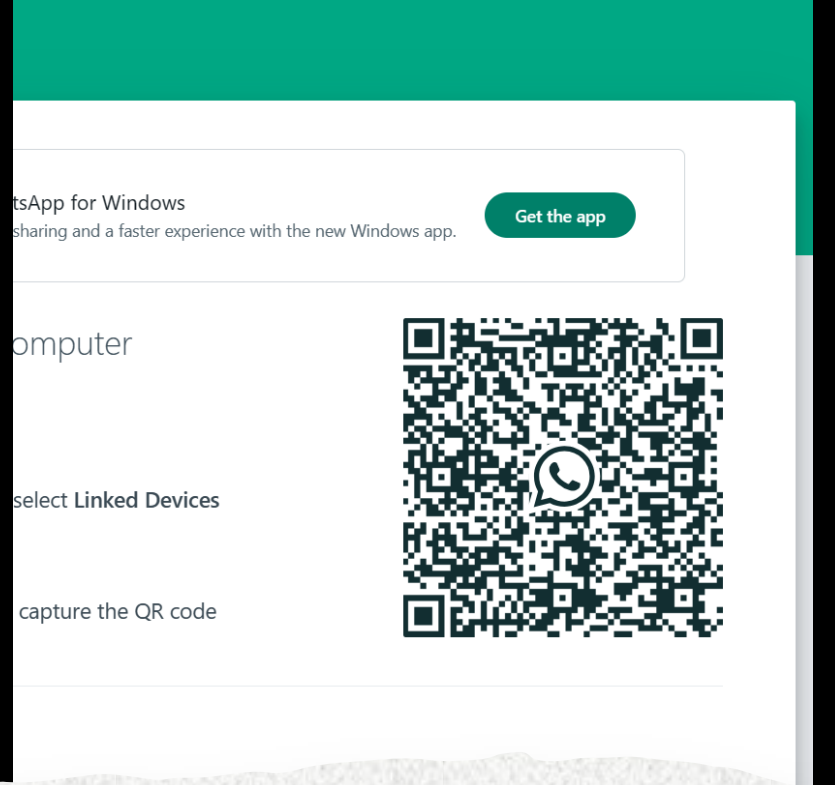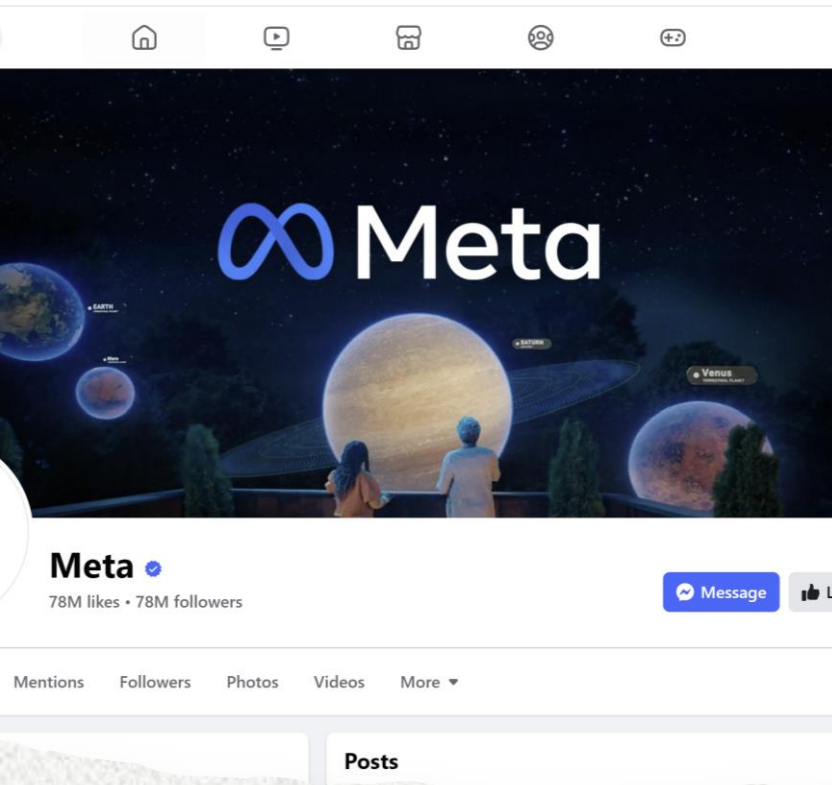4. Shivakumar Sundara Murthy - 22024927

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Colab File: https://colab.research.google.com/drive/1Bw-58_I9woGdhPGY136aeZE59GQIL4VX?usp=sharing

- The Facebook, Instagram, Whatsapp are the biggest Social media platforms which belongs to Meta
- There are total 7 billion active users in all the three platforms
- The biggest revenues for this company is User's data. Company collects user data and displays the adds according to the user's data. So, its main revenue source is from Advertisements and next comes the virtual reality and E-commerce

# INTRODUCTION

- We have Fetched the Dataset from Yahoo finance, which is a popular financial website and provides all kind of financial information and quotes real time stock prices. And in Python we can use this by library called yfinance

- They are many different libraries for fetching the stock prices such as alpha_vantage , quandl. But use of yfinance is easier to use, So we chose yfinance as our library

- We have taken data from the period '2020-01-12' - '2023-12-11'

- We have used TimeseriesGenerator from Keras librarary for data preprocessing, This module is mainly used in time series data and we mainly used it for RNN Model
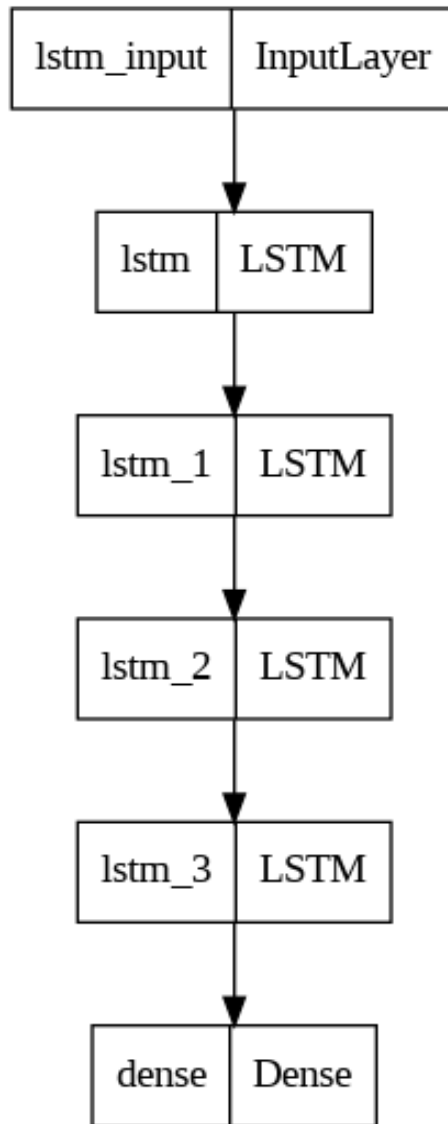
# Meta – Real time stock price

- Here is a screenshot from TradingView.com displaying the real-time chart of our selected company – META
- The above chart is candle chart graph which is most used indicator for investors and traders
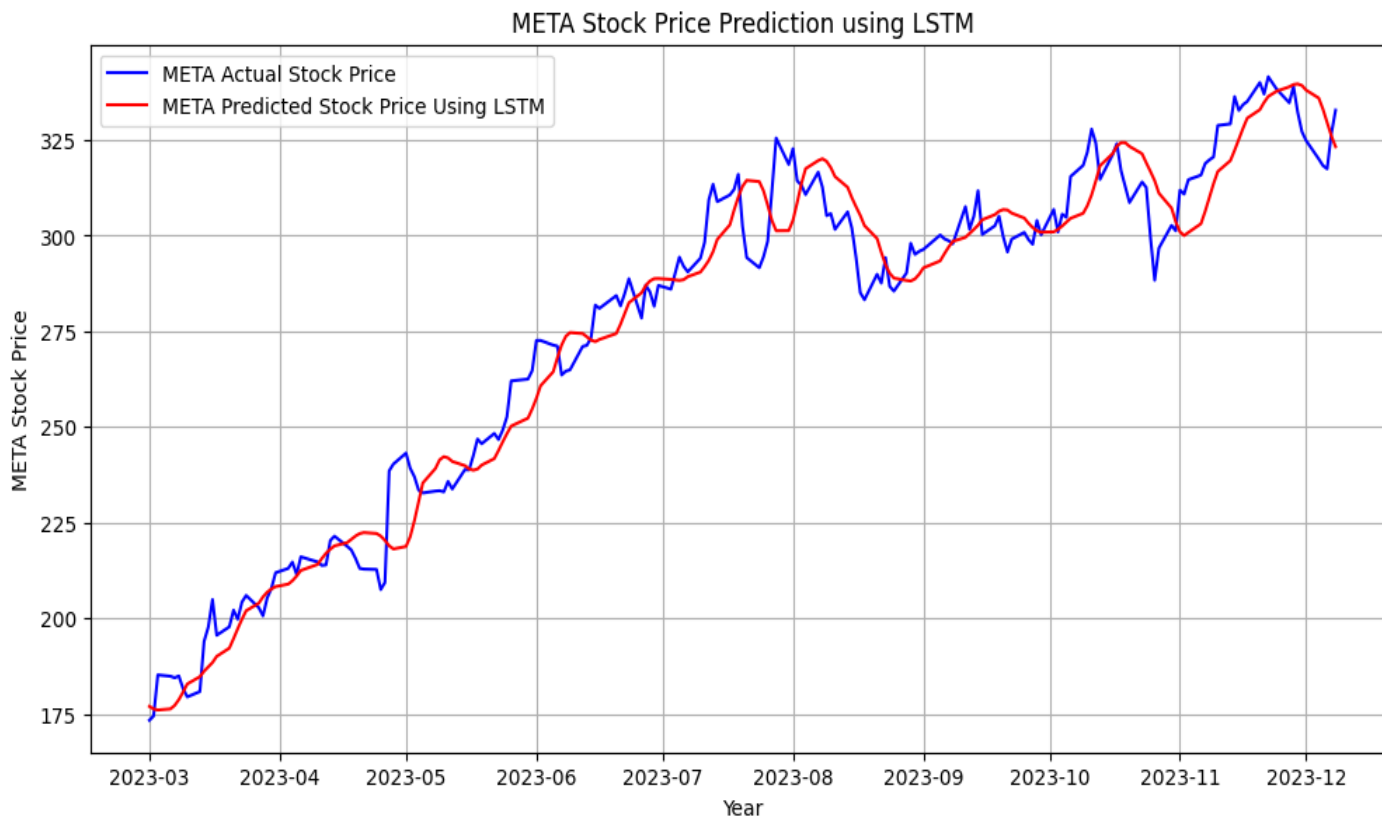
# Methodologies Used in this Analysis

## Method 1 - LSTM

- To try and check the predictions of different models, we have considered to try LSTM and RNN models.

- So used both the models in predicting our data and what to prove which one is best suited model for the selected stock

- The first model we used in our prediction is Long Short Term Memory(LSTM)

- While training this model, on first we have given two hidden layers and the model turns out to be overfitted

- And then we have added two more layers by including units/neuron to 100 and training with 30 epochs made the model to be good fit
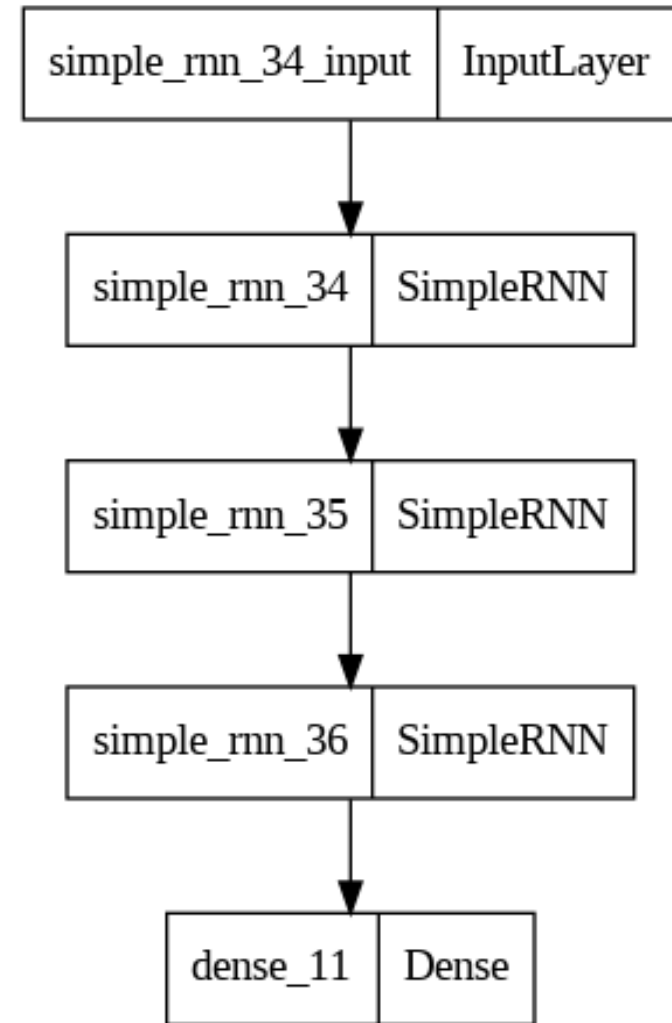
| lstm_input | InputLayer |
|---|---|

| lstm | LSTM |
|---|---|

| lstm_1 | LSTM |
|---|---|

| lstm_2 | LSTM |
|---|---|

| lstm_3 | LSTM |
|---|---|

| dense | Dense |
|---|---|

# Result of LSTM Model



META Stock Price Prediction using LSTM

- Previously, When we tested the models with large dataset, I.e., from 2010 to 2023. This model lost its efficiency and most of the loss is in exponentials and it got overfitted.
- Initially, identifying the mistake posed a challenge, and we encountered difficulties in pinpointing its source.
- And once we shrunk the dataset to few years. The model turned out and stopped getting overfitted and exponential loss was reduced.
- After training both the models, we have got to see the results, we are getting a RMSE value of 5-10, as the value gets changed when we run our model again

# Method 2 - RNN

- The Second model is Recurrent Neural Network(RNN)

- These are specialized neural networks designed for sequential data processing, utilizing a hidden state to capture information from previous inputs.

- The observations we have made while training these models are:

- Upon increasing the number of neurons from 50 to 120 and adding additional layers to the model, the resulting graph exhibited a linear trend.

- And Increase in hidden layers increasing the complexity of the model

| simple_rnn_34_input | InputLayer |
|---|---|

↓

| simple_rnn_34 | SimpleRNN |
|---|---|

↓

| simple_rnn_35 | SimpleRNN |
|---|---|

↓

| simple_rnn_36 | SimpleRNN |
|---|---|

↓

| dense_11 | Dense |
|---|---|

# Result of RNN Model

- We can observe the fit of this RNN model while compared to the actual prices, the highs and lows are properly matching with the original.

- As RNN model is simple and efficient, and It is suitable for this kind of problems

- After training both the models, we have got to see the results, we are getting a RMSE value of 1-5, as the value changes when we run our model again

- In our stock price prediction analysis, the RNN outperformed the LSTM model, demonstrating superior effectiveness in terms of simplicity and efficiency.



META Stock Price Prediction using RNN
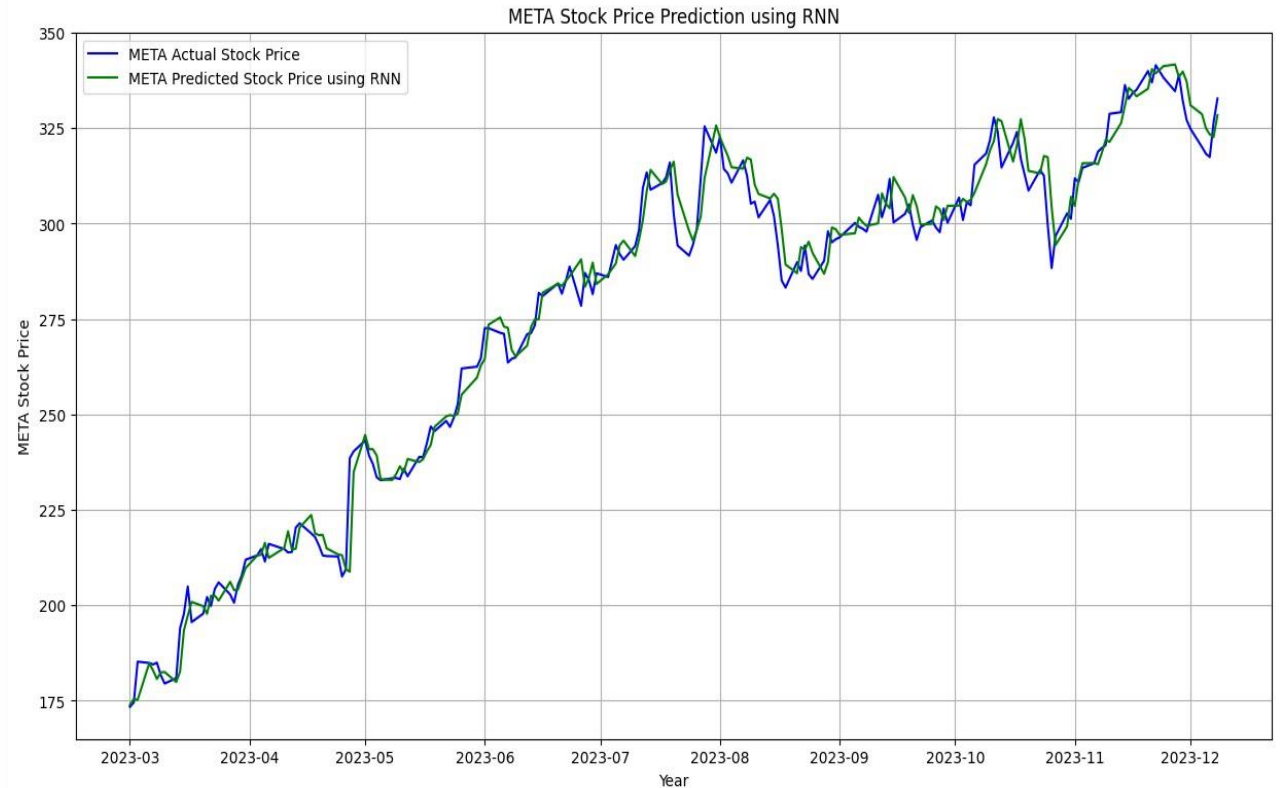
# Final Prediction with both the models with future predictions



Stock Price Prediction for the Next 60 Days
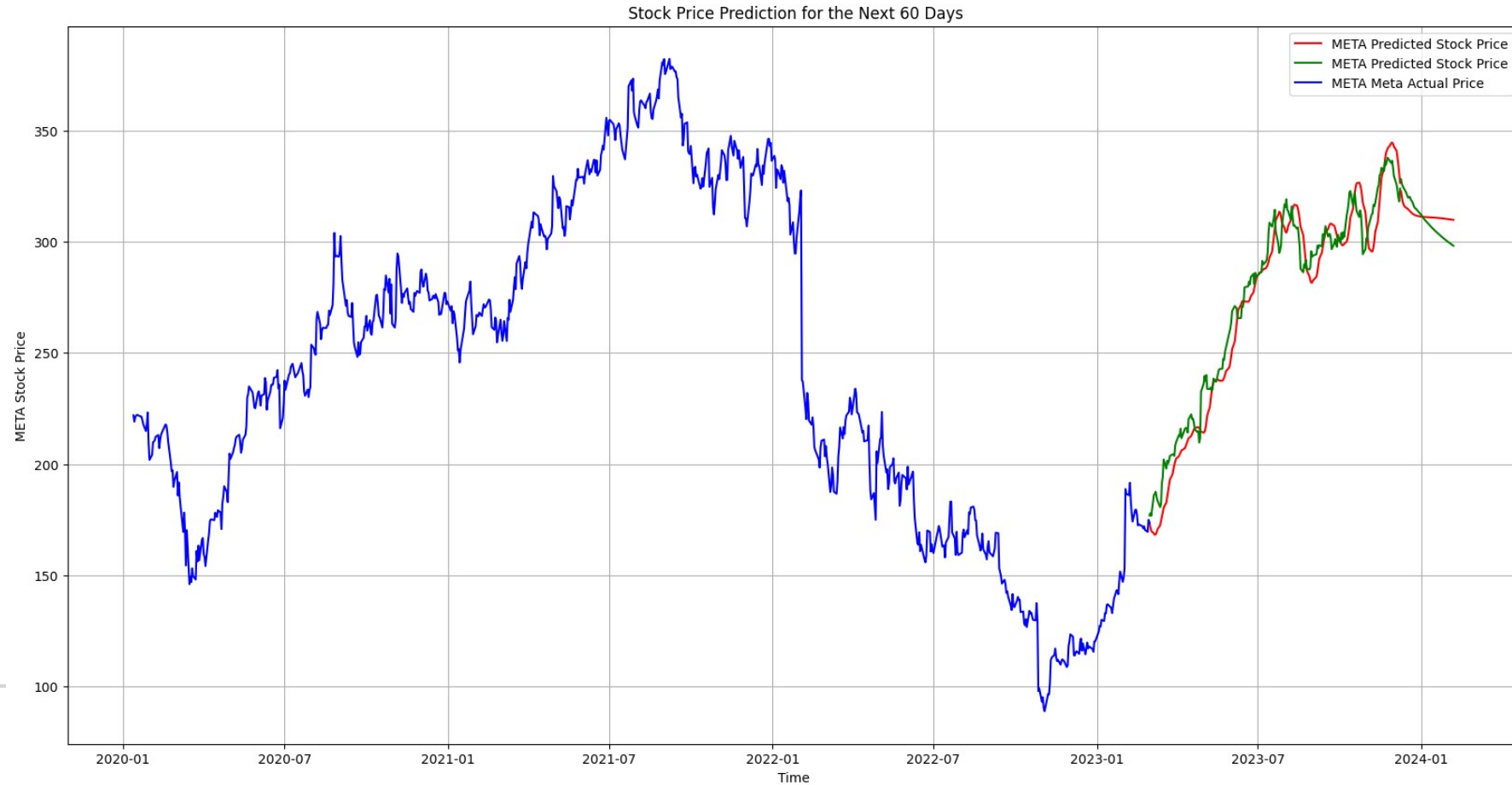
So, Upon training and researching on the model we have decided to go for the RNN model, And hence we choose our model for predicting stock prices is RNN model

# References

- [Difference between adding more layers vs making current layers bigger? : r/learnmachinelearning (reddit.com)](reddit.com)
- [Choose optimal number of epochs to train a neural network in Keras - GeeksforGeeks]