

Stock Price Predictions

Team: print("Hello Pythonians!")

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Agenda

Problem Statement

Solution

Dataset

Methodology

Web Application

Results

Conclusion

Stock Market Problem

This project revolves around predicting the accuracy of stock prices & comparing different company stocks using Historical daily prices & volumes of the more popular U.S. stocks.

We are focusing our view to stocks prior to Covid-19 (Dec 2019), during Covid-19 (Jan 2020 - Dec 2020), & after Vaccinations were made available for people (Jan 2021 - current).

Our goal is to be able to predict what the stock prices will look in the future, be it 30 days, 60 days, 90 days, etc. We are aiming to use these predictions to help investors choose whether to sell or buy stocks.

Back-End Approach

- Transition from Kaggle datasets -> API
- Preprocess data
- Predict stock data on different 'Deep learning' models
- Evaluate model performance using MAE or MSE

Front-End Approach

- User interface dash framework
- Prophet method is used to forecast the future stock data

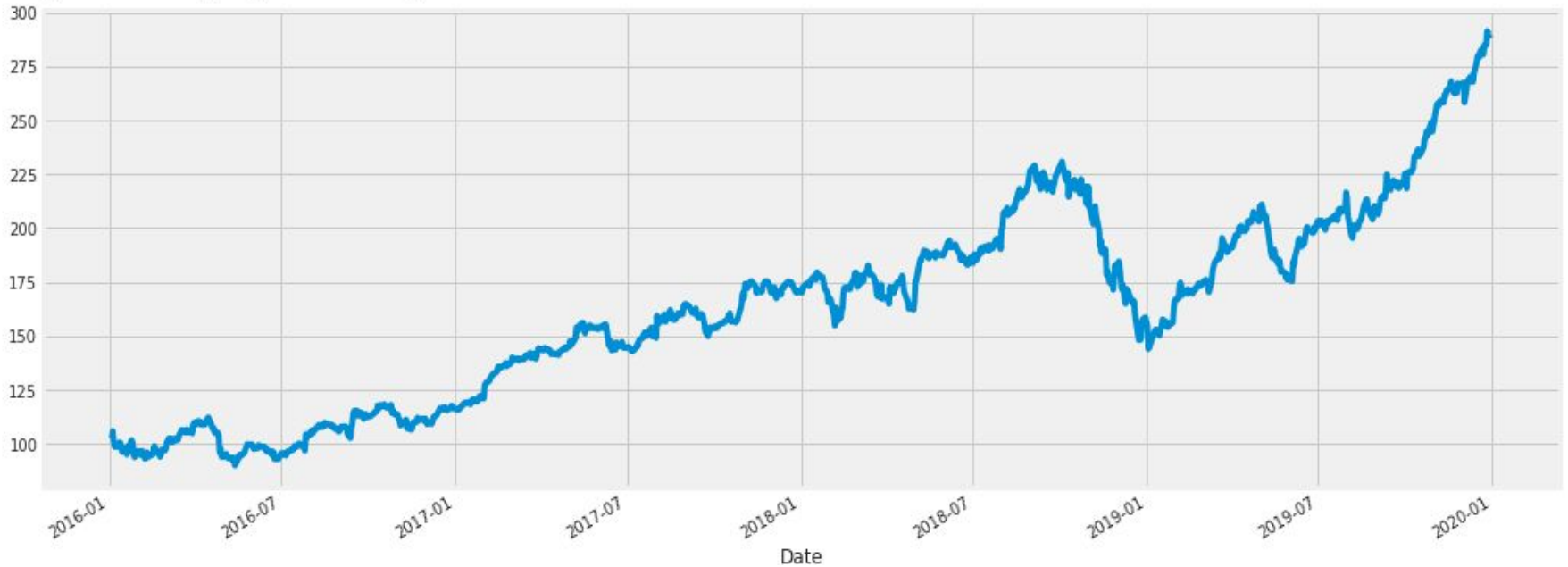
SOLUTION

- Tried using different deep learning such as LSTM, combination of CNN-LSTM and GRU to predict the stock price.
- Implemented web based user interface to see the future prediction of different company stocks

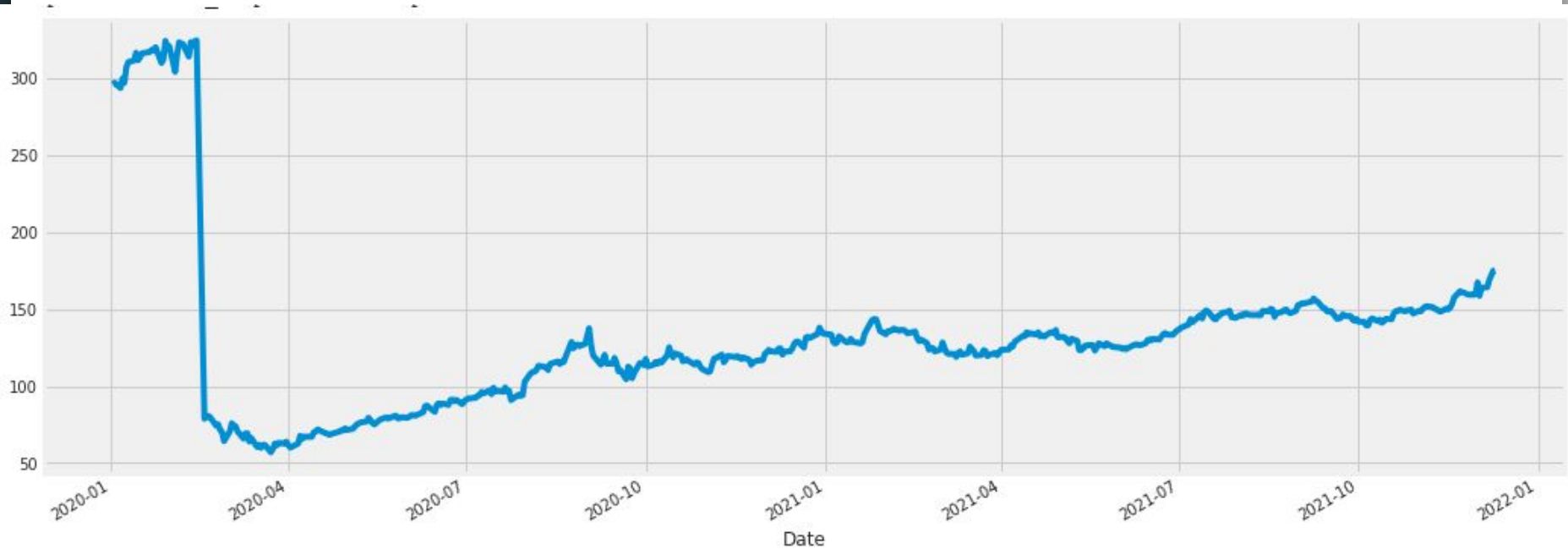
DATASET

- We are using yahoo finance data api to get the different company historical data.
- Link: <https://finance.yahoo.com/quote/AAPL/>

Data Visualization



Data Visualization





Training Phase

LSTM

- Long Short Term Memory
- Widely used in time series forecasting of data
- Used 3 layers of LSTM followed by dropout layer to avoid overfitting
- Total 1,430,337 parameters were trained

Model: "sequential_11"

Layer (type)	Output Shape	Param #
lstm_33 (LSTM)	(None, 100, 512)	1052672
dropout_33 (Dropout)	(None, 100, 512)	0
lstm_34 (LSTM)	(None, 100, 128)	328192
dropout_34 (Dropout)	(None, 100, 128)	0
lstm_35 (LSTM)	(None, 64)	49408
dropout_35 (Dropout)	(None, 64)	0
dense_11 (Dense)	(None, 1)	65

Total params: 1,430,337

Trainable params: 1,430,337

Non-trainable params: 0

CNN-LSTM

- The CNN-LSTM can deliver a realistic stock price forecasting with the maximum prediction accuracy
- We used combination of CNN and LSTM layers with 128 and 256 units
- Total 358,465 parameters were trained

... Model: "sequential_1"

Layer (type)	Output Shape	Param #
=====		
conv1d_2 (Conv1D)	(None, 100, 128)	768
conv1d_3 (Conv1D)	(None, 100, 128)	82048
lstm_2 (LSTM)	(None, 100, 128)	131584
lstm_3 (LSTM)	(None, 128)	131584
dense_3 (Dense)	(None, 64)	8256
dense_4 (Dense)	(None, 64)	4160
dense_5 (Dense)	(None, 1)	65

=====

Total params: 358,465

Trainable params: 358,465

Non-trainable params: 0

GRU

- GRU helps in back propagate via immediate historic values as well as current prices and be more accurate in detecting a developing trend.
- Used 3 layers GRU followed by dropout layer to avoid overfitting
- Total 1,074,881 parameters were trained.

Model: "sequential_12"

Layer (type)	Output Shape	Param #
=====		
gru (GRU)	(None, 100, 512)	791040
dropout_36 (Dropout)	(None, 100, 512)	0
gru_1 (GRU)	(None, 100, 128)	246528
dropout_37 (Dropout)	(None, 100, 128)	0
gru_2 (GRU)	(None, 64)	37248
dropout_38 (Dropout)	(None, 64)	0
dense_12 (Dense)	(None, 1)	65
=====		
Total params: 1,074,881		
Trainable params: 1,074,881		
Non-trainable params: 0		

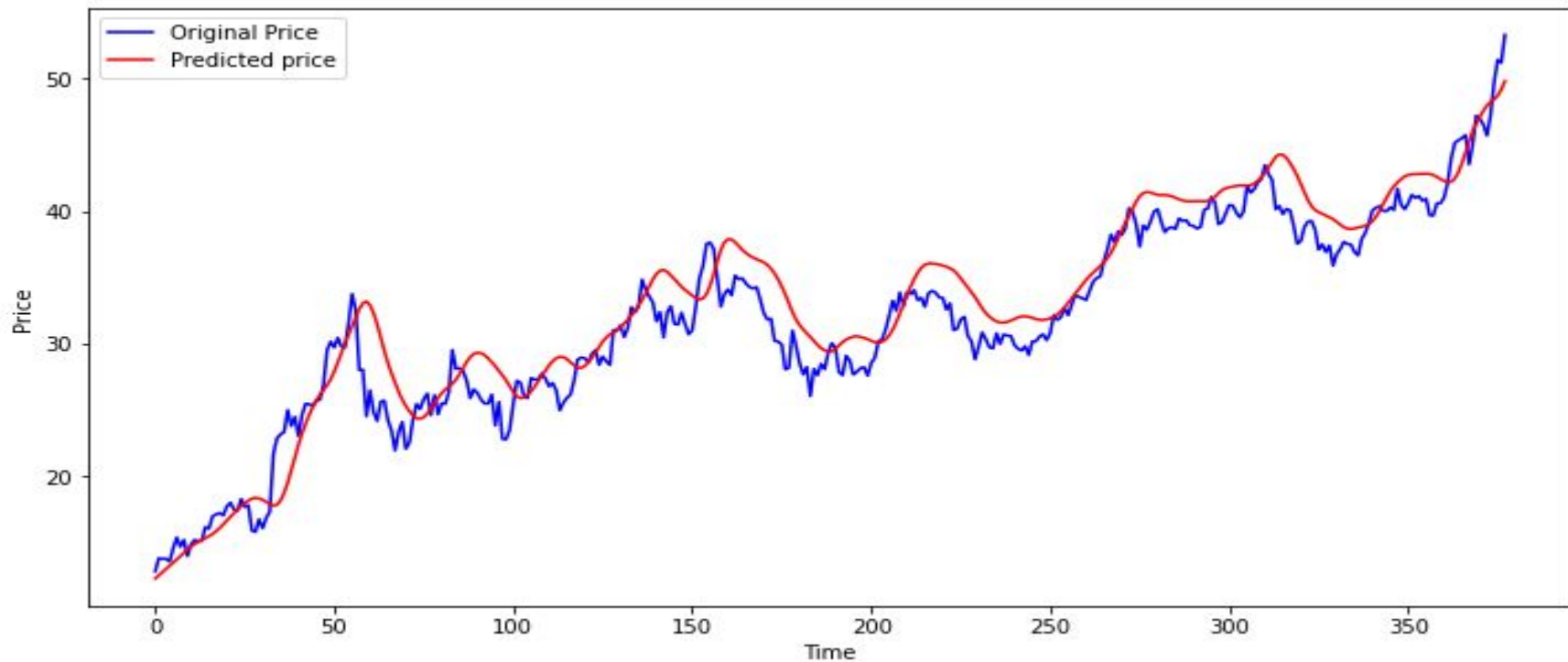


RESULTS

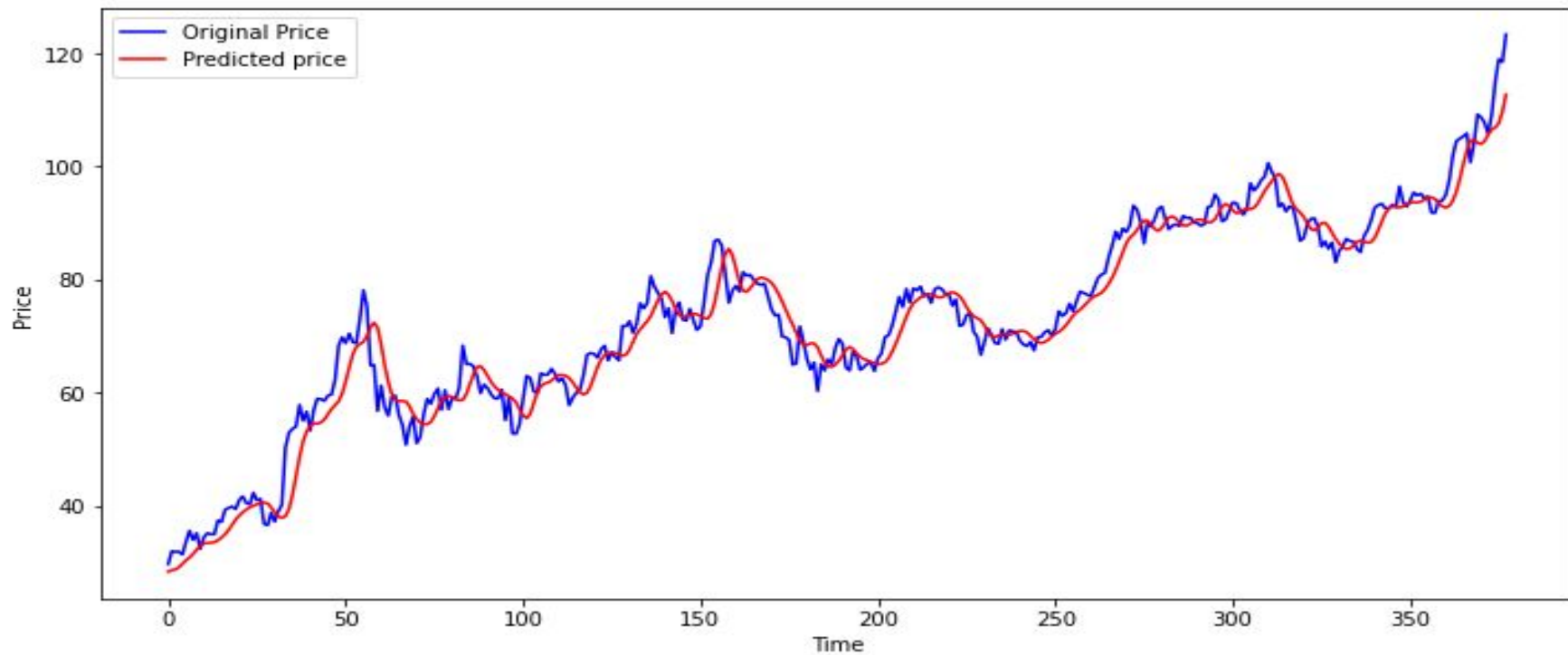
MODEL PERFORMANCE

Model	LSTM	CNN-LSTM	GRU
MAE	4.15	3.34	7.40
MSE	20.59	18.12	65.014
RMSE	4.53	4.25	8.063
R-squared	0.0036	0.0028	0.0031

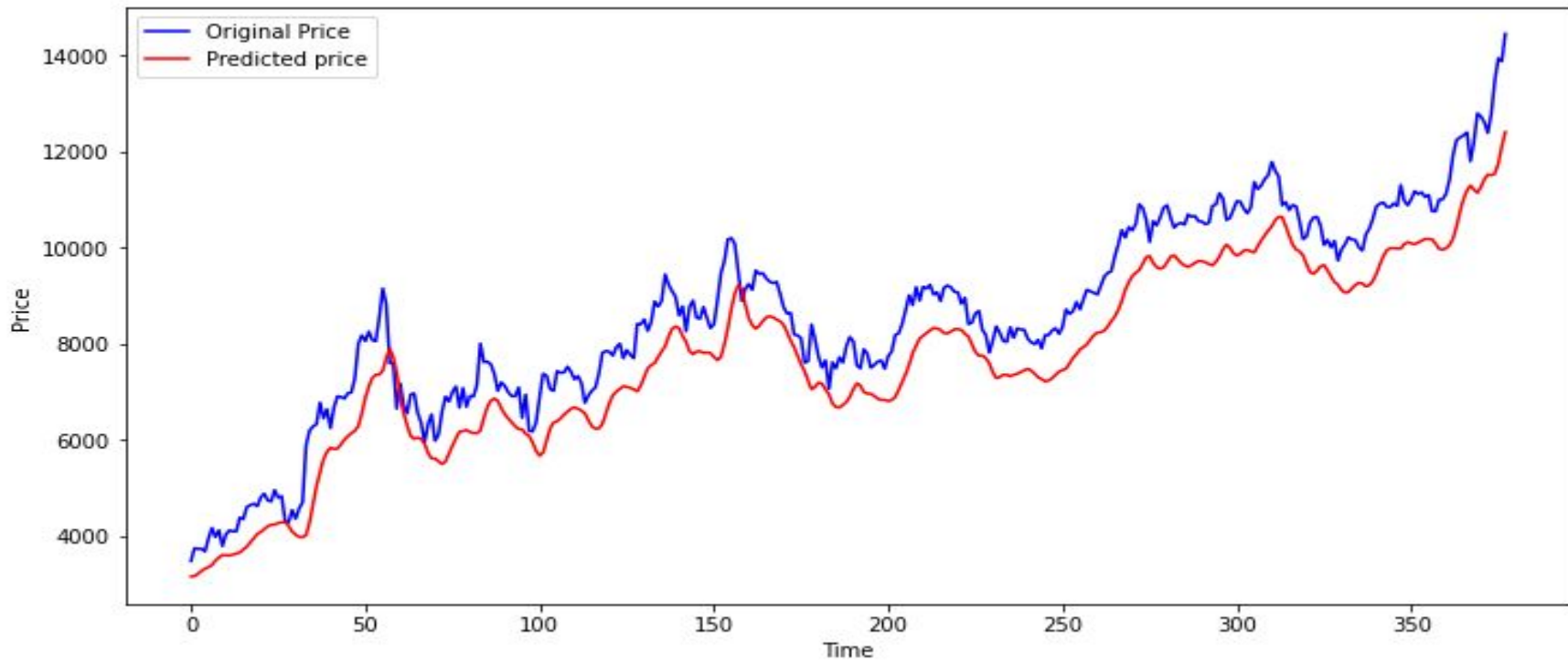
LSTM



CNN-LSTM



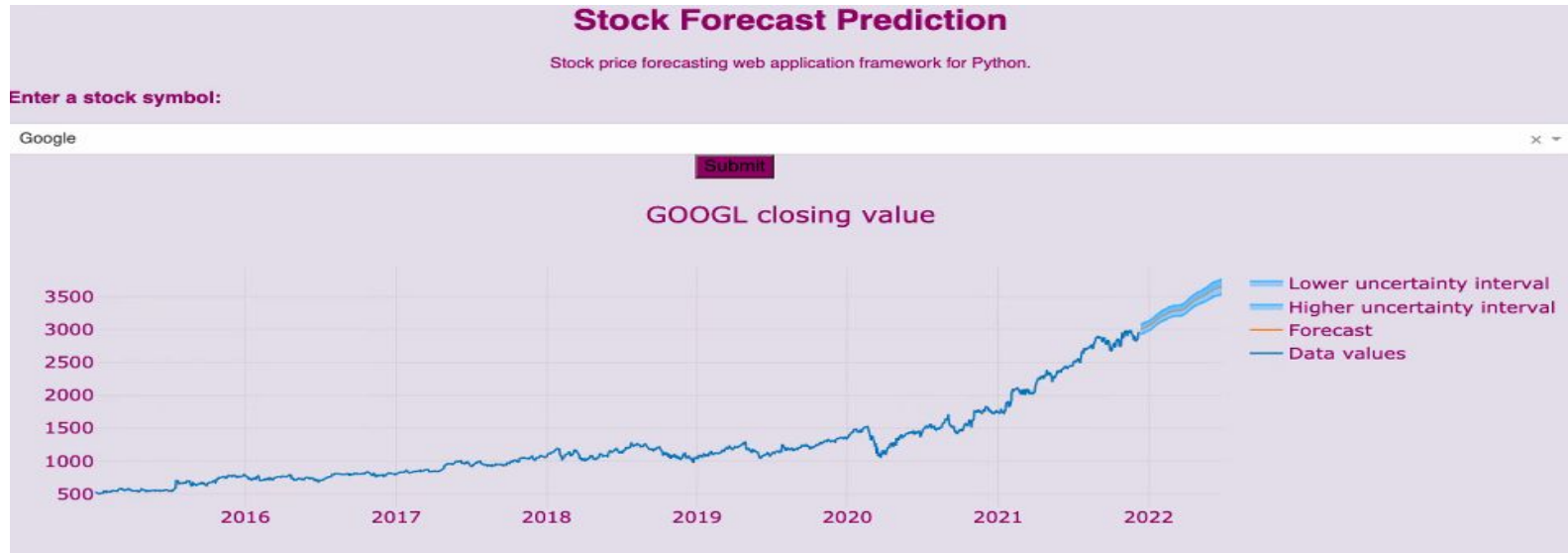
GRU



WEB APPLICATION

We have used User interface dash framework

Prophet method is used to forecast the future stock data.



APPLE STOCK PREDICTION

Stock Forecast Prediction

Stock price forecasting web application framework for Python.

Enter a stock symbol:

Apple

Submit

AAPL closing value



CONCLUSION

For business experts, determining stock market forecasts has always been a challenging task.

As a result, Project uses Deep Learning and Machine Learning models to estimate stock price forecasts and achieves a positive outcome.

We tried with different models to predict the stock price. Out of all predicted models we got best results for CNN-LSTM model.

References

- <https://www.kaggle.com/mattiuzc/stock-exchange-data>
- <https://www.hindawi.com/journals/complexity/2020/6622927/>
- [Ensemble Stock Market Prediction using SVM,LSTM, and Linear Regression](#)



ANY QUESTIONS?



Thank You