Nvidia Stock Prediction with Time Series Models

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Business Problem & Overview

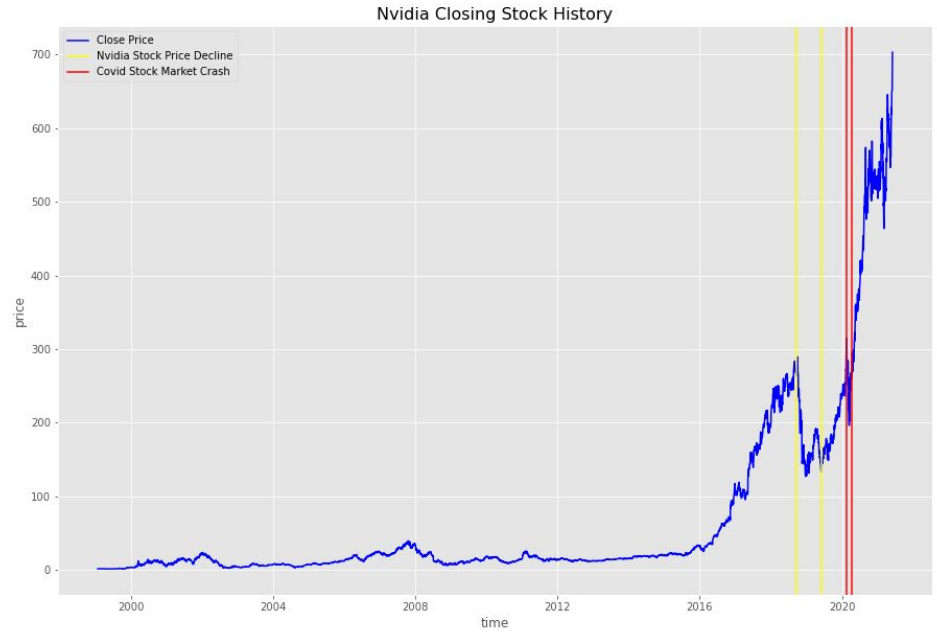
Business problem

Predict Nvidia future stock price by using time series models.

Overview

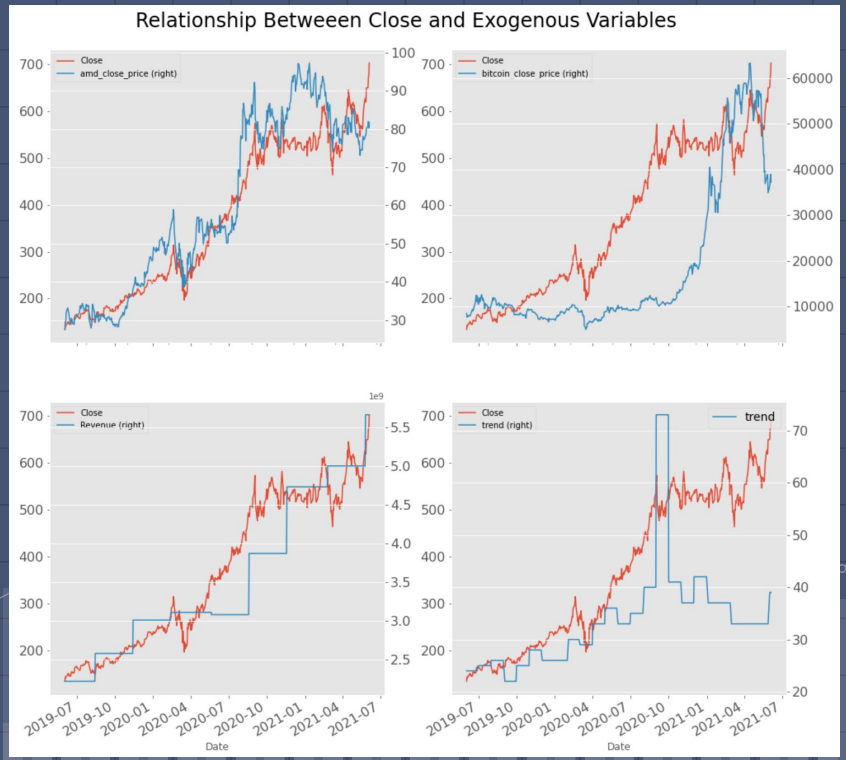
Nvidia closing stock price will be predicted with Nvidia's stock historical data, AMD stock price, Google trend, Nvidia revenue and bitcoin price by using ARIMA, LSTM, and Prophet.

Data - Nvidia Closing Stock History



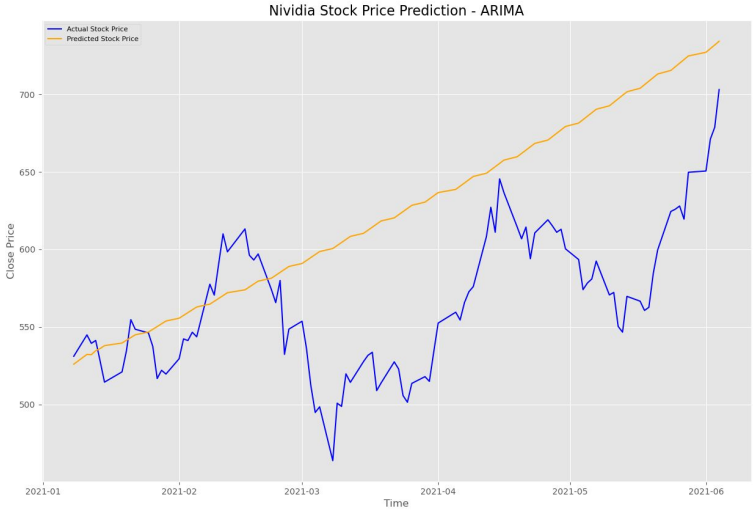
- 09/16/2018 ~ 06/01/2019
  - Slowing global economy
  - Trade war
  - Poor future expectation
- 02/20/2020 ~ 04/07/2020
  - 2020 stock market crash

Data - Exogenous Variables



- Exogenous Variables
  - A variable that is determined outside the model and is imposed on the model
    - Previous day AMD stock close
    - Previous day Bitcoin close
    - Revenue
    - Google trend

Model 1 - ARIMA



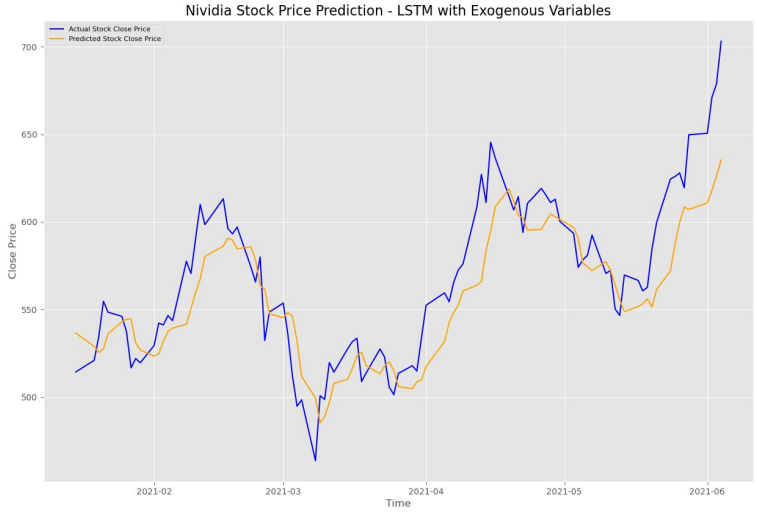
- Used Auto Arima
  - Order: (2, 1, 0)
- Result
  - RMSE: 77.55
  - %RMSE: 0.14

Model 2 - ARIMA with Exogenous Variables

- Used Auto Arima
  - Order: (2, 1, 0)
- Result

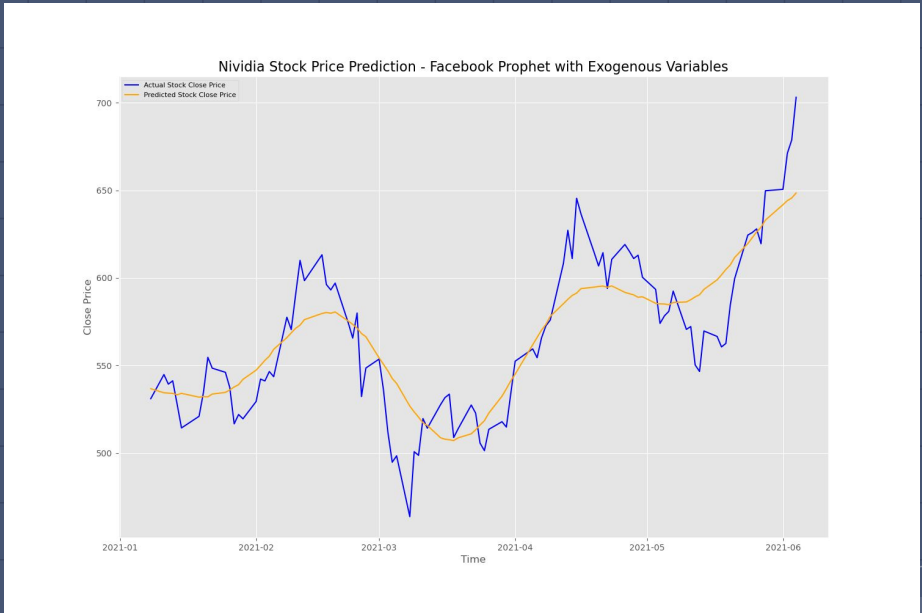
	With All Exogenous Variables	Without Bitcoin Close	**Without Bitcoin Close and Trend**
RMSE	70.83	69.64	**26.49**
%RMSE	0.125	0.123	**0.046**

Model 3 – LSTM



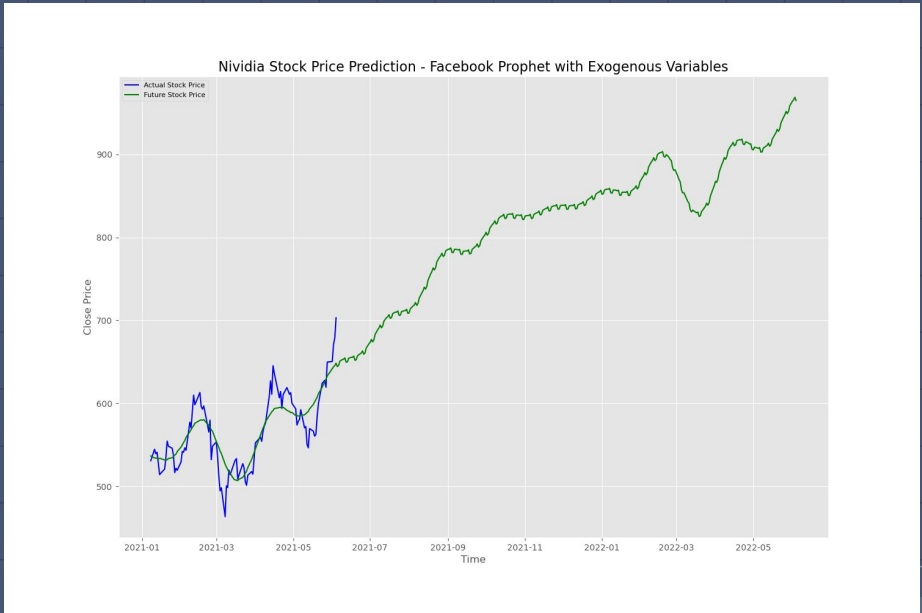
- Create data in 5 timesteps
- Result
  - RMSE: 25.56
  - %RMSE: 0.040

Model 4 - Facebook Prophet



- Yearly, Daily seasonality
- Result
  - RMSE: 22.05
  - %RMSE: 0.039
- Profit from trading at the change points
  - 58%

Model 4 - Facebook Prophet



- Predicted Nvidia stock price on 6/4/22
  - $965 per share

Conclusion

- I chose Prophet model because its RMSE is lowest.
- During test dataset period, expected profit from trading at the change points is 58% and expected stock price on 6/4/2022 is $965.
- Yearly, daily seasonality feature can cause overfitting.

Next Step

- Find the way to overcome overfitting which is caused by seasonality
- Find other exogenous variables

THANKS!

Any questions?

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