

# Nvidia Stock Prediction with Time Series Models

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# Business Problem & Overview

## Business problem

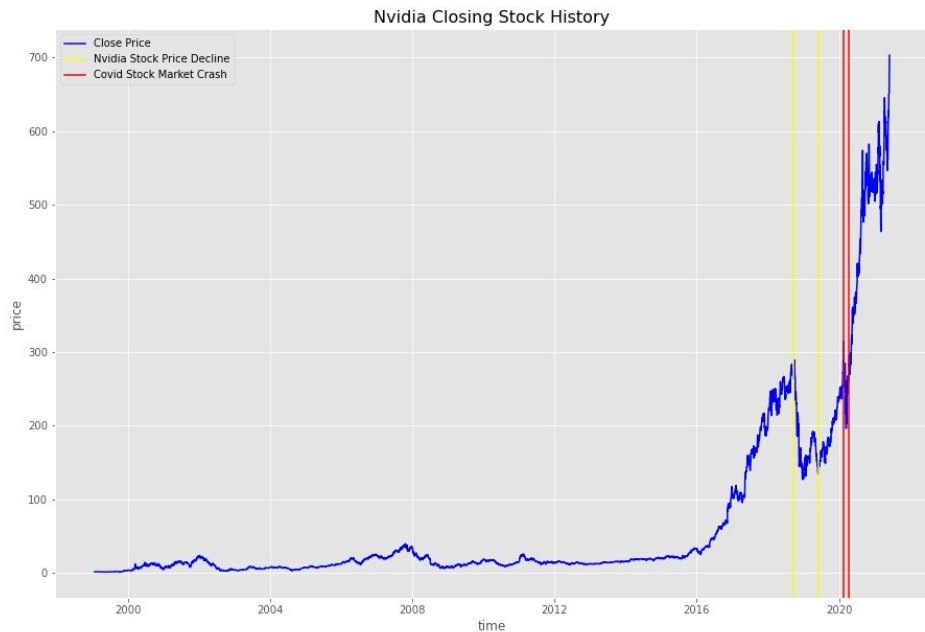
Predict Nvidia future stock price by using time series models.

## 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

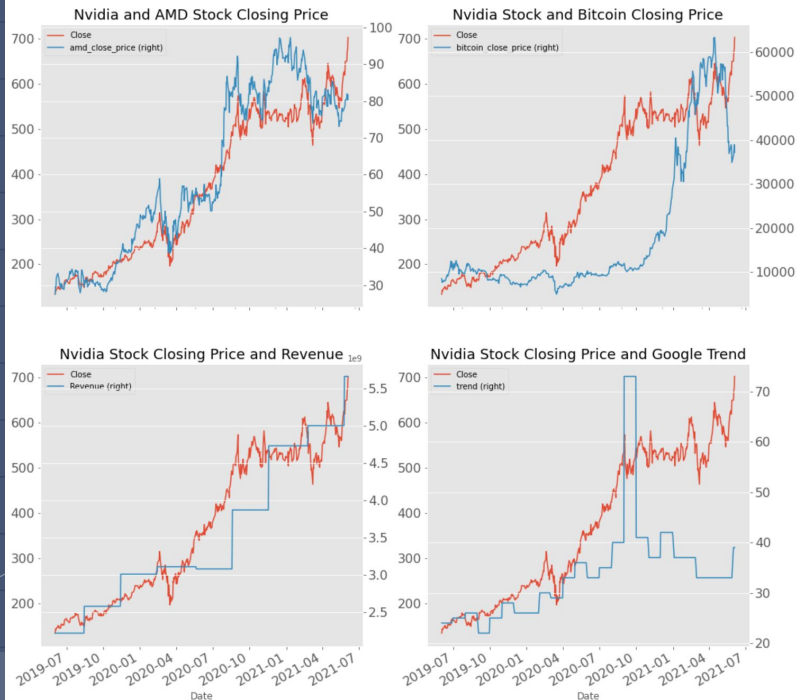
- Slowing global economy
- Trade war
- Poor future expectation

- 02/20/2020 ~ 04/07/2020

- 2020 stock market crash

# Data - Exogenous Variables

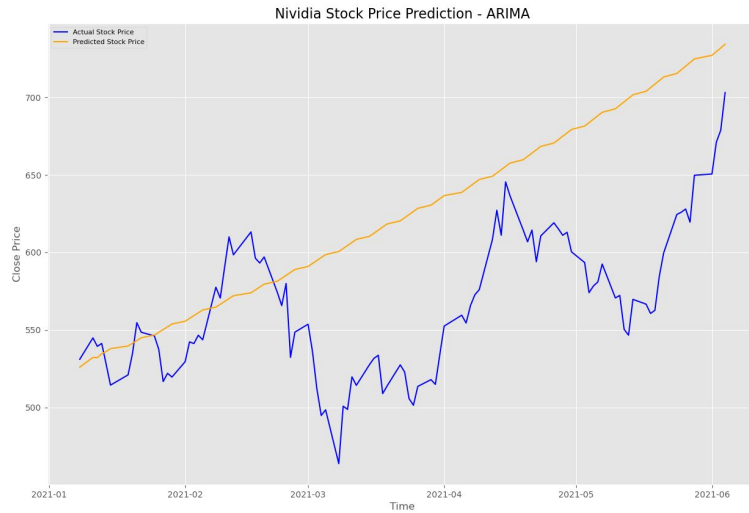
Relationship Between Close and Exogenous Variables



## 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

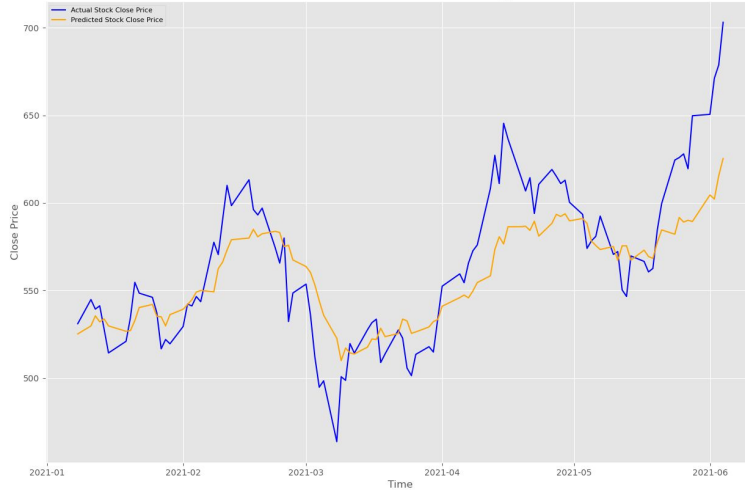
# Model 1 - ARIMA



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

# Model 2 - ARIMA with Exogenous Variables

Nvidia Stock Price Prediction - 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	<b>26.49</b>
%RMSE	0.125	0.123	<b>0.046</b>

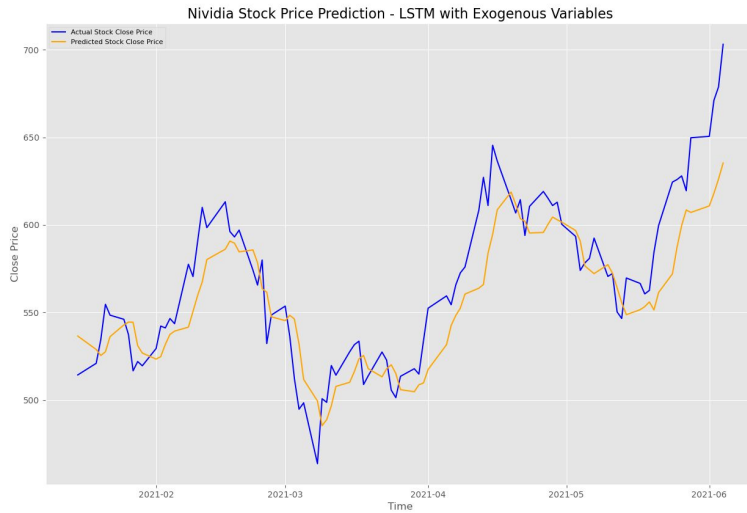
# Model 3 - LSTM

- Create data in 5 timesteps

- Result

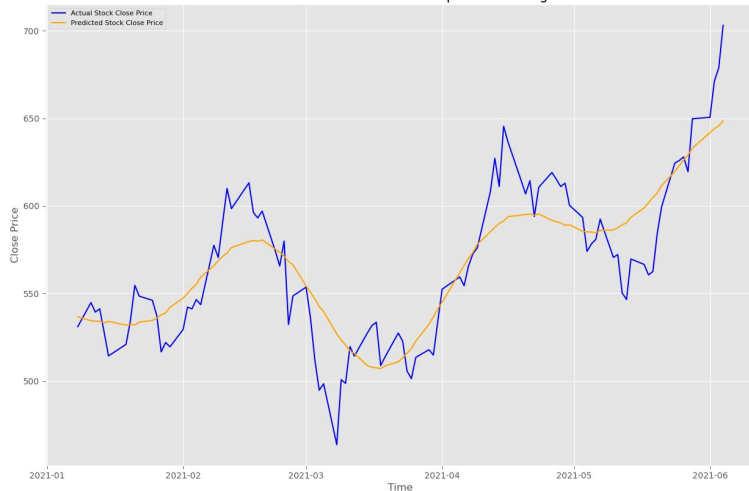
- RMSE: 25.56

- %RMSE: 0.040



# Model 4 - Facebook Prophet

Nvidia Stock Price Prediction - Facebook Prophet with Exogenous Variables

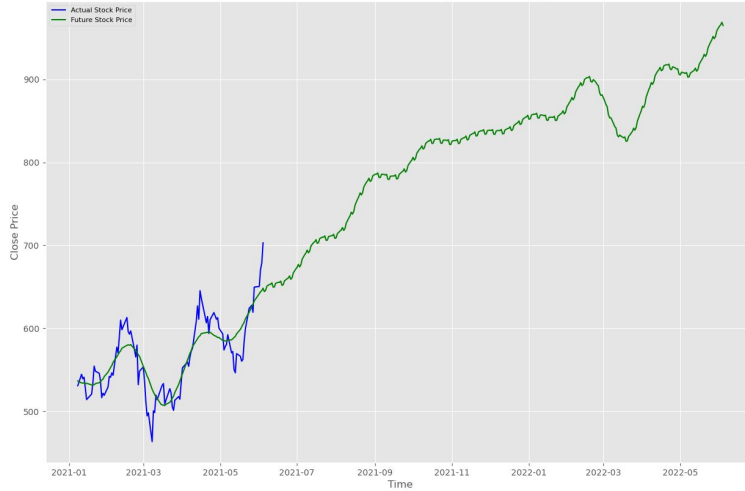


- Yearly, Daily seasonality
- Result
  - RMSE: 22.05
  - %RMSE: 0.039
- Profit from trading at the change points
  - 58%



# Model 4 - Facebook Prophet

Nvidia Stock Price Prediction - Facebook Prophet with Exogenous Variables



- 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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