



Stock Prediction Flask API

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Why interested in stocks?

▶ Market size:

- ▶ The NYSE and Nasdaq exchanges are worth a collective \$32 trillion in market capitalization, making up a sizable portion of the global equities market.
- ▶ For May 30, 2019, the total dollar volume from all trading venues on which Nasdaq® Issues are traded is >\$85 billions.
- ▶ Due to its enormous market size, it might affect your employer as well as your work environment.

▶ Investment potential:

- ▶ US stocks have consistently earned more than investment-grade bonds over the long term, despite regular ups and downs in the market, returned an average of 10.01% annually (from 1926 to now).
- ▶ Great option for retirement, since long-term stock ownership you can withstand the riskier investments and ride the ups and downs that are inevitable.

What methods are used?

- ▶ Composed of a tight-knit community of researchers, engineers, and business professionals, Alpha Vantage Inc. is a leading provider of free APIs for realtime and historical data on stocks, forex (FX), and digital/crypto currencies
- ▶ Data was collected in JSON format from Alpha Vantage API through Python
- ▶ The prediction model uses `auto.arima` method in Python's `pmdarima` package to fit a ARIMA model with the best (lowest) AIC score on the univariate time series stock data.

How is the result presented?

- ▶ The model is written in Python, and it is wrapped in a docker container for reproduction purpose. Finally, it is hosted on an EC2 instance through Flask API that everyone can access it.
- ▶ The detail direction on how to access the API and reproduce the model is posted on https://github.com/JustinFightOn/stat418_final_project.
- ▶ Here is a sample of result for stock AMZN:

```
{  
  "Forecasted Stock Price": {  
    "2019-06-03": 1799.46,  
    "2019-06-04": 1806.91,  
    "2019-06-05": 1806.2,  
    "2019-06-06": 1802.54,  
    "2019-06-07": 1805.27,  
    "2019-06-10": 1810.43,  
    "2019-06-11": 1810.59  
  },  
  "Last Refreshed": "2019-05-31",  
  "Previous Stock Price": {  
    "2019-05-22": 1871.48,  
    "2019-05-23": 1844.0,  
    "2019-05-24": 1841.76,  
    "2019-05-28": 1849.27,  
    "2019-05-29": 1830.0,  
    "2019-05-30": 1829.47,  
    "2019-05-31": 1795.59  
  },  
  "Stock": "AMZN"  
}
```

What is the purpose of the API?

- ▶ User can use the tool to guide him/her when to invest/sell the stock
- ▶ Finding potential stocks to invest:
 - ▶ Potential users can run the prediction API on all available stocks, and sort those stocks by % increase against last refreshed date, and invest in those stocks with high potential

Future Improvements

- Build user interface on an app to show plots of observed and predicted to improve user experience
- Build long term prediction tool that utilize all historical stock data (>20 years) to predict stock price, which can be used for planning.

