Week 11 Rubriks

1) How does the Profit Algorithm differ from an LSTM?
– Prophet is specifically designed for business time series collection. It requires less hyperparameter tuning as it is specifically designed to detect patterns in business time series. Prophet FB is an additive model consisting of four components:

$$Yt = g(t) + s(t) + h(t) + εt$$

   g(t) represents the general trend of the series, s(t) represents the season trends, h(t) represents the holiday components, and εt represents the error term that cannot be explained by the model.

   LSTM is used in recurrent neural network that learn to predict the future from sequences of variable lengths. LSTM works with any kind of sequential data, unlike Prophet FB, which is restricted to time series.

2) Why does an LSTM have poor performance against ARIMA and Profit for Time Series?
– LSTM performs the worst against ARIAMA and PROPHET due to the need of more adjustment of the change in trend. LSTM model is too advanced for small datasets and is prone to overfitting.

3) What is exponential smoothing and why is it used in Time Series Forecasting?
– Exponential smoothing is a time series forecasting method for univariate data that can be extended to support data with a systematic trend or seasonal component. Exponential smoothing forecasting prediction is a weighted sum of past observations, but the model explicitly uses an exponentially decreasing weight for past observations. By adjusting parameter values, analysts can change how quickly older observations lose their importance in the calculations.

4) What is stationarity? What is seasonality? Why Is Stationarity Important in Time Series Forecasting?
– Stationarity means that the statistical properties of a process generating a time series do not change over time. Seasonality is seasonal characteristics of the time series data. It is the predictable pattern that repeats at a certain frequency within one year, such as weekly, monthly, quarterly, etc. Stationarity is important in Time Series because the processes are easier to analyze. It is easier to model and investigate.

5) How is seasonality different from cyclicality? Fill in the blanks: ___ is predictable, whereas ___ is not.
– The difference between seasonality and cyclicality has to do with how regular

the period of change is. A seasonal behavior is very strictly regular, meaning there is a precise amount of time between the peaks and troughs of the data. Cyclical behavior on the other hand can drift over time because the time between periods isn't precise. Seasonality is predictable, whereas cyclicality is not.

Screenshots of the output

Request body ^{required}

application/json ⌄

```
{
  "ticker": "AAPL",
  "days": 7
}
```

Execute	Clear

Responses

Curl

```
curl -X 'POST' \
  'http://52.53.152.160:8000/predict' \
  -H 'accept: application/json' \
  -H 'Content-Type: application/json' \
  -d '{
  "ticker": "AAPL",
  "days": 7
}'
```

Request URL

```
http://52.53.152.160:8000/predict
```

Server response

Code	Details
200	

Response body

```
{
  "ticker": "AAPL",
  "days": 7,
  "forecast": {
    "07/30/2022": 148.78272840607212,
    "07/31/2022": 148.69009133497735,
    "08/01/2022": 148.59745426388255,
    "08/02/2022": 148.50481719278775,
    "08/03/2022": 148.41218012169293,
    "08/04/2022": 148.31954305059816,
    "08/05/2022": 148.22690597950333
  }
}
```

Download

Response headers

```
content-length: 263
content-type: application/json
date: Fri,29 Jul 2022 13:33:46 GMT
server: uvicorn
```

FastAPI 0.1.0 OAS3

/openapi.json

default ^

| GET | **/ping** Pong | ∨ |

| POST | **/predict** Get Prediction | ^ |

Parameters   Cancel   Reset

No parameters

Request body required   application/json ∨

```
{
  "ticker": "NVDA",
  "days": 14
}
```

| Execute | Clear |

Responses

Curl

```
curl -X 'POST' \
  'http://3.101.14.254:8000/predict' \
  -H 'accept: application/json' \
  -H 'Content-Type: application/json' \
  -d '{
  "ticker": "NVDA",
  "days": 14
}'
```

Request URL

```
http://3.101.14.254:8000/predict
```

Server response