INFSCI 2160 Final Project

Stockive: Stock prediction system

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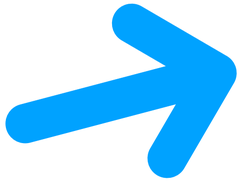
What we do?

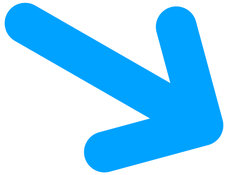
History data of stock

Algorithm



Future pattern

Development



Practical system

Data

Alpha Vantage APIs → **Feature extraction sampling** → **Structured Data**

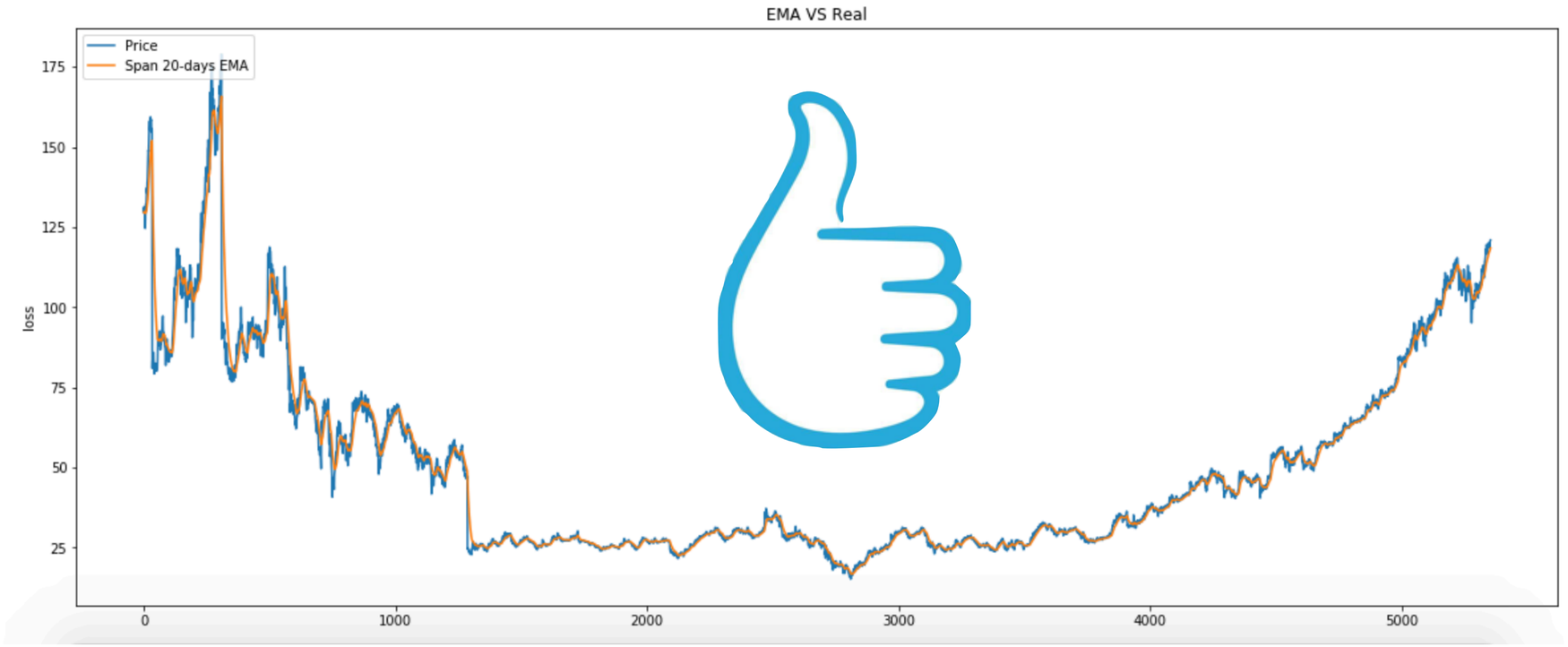

```
{
"Meta Data": {
"1. Information": "Intraday (5min) open, high, low, close prices and volume", "2. Symbol":
"MSFT",
"3. Last Refreshed": "2019-02-11 10:40:00",
"4. Interval": "5min",
"5. Output Size": "Compact", "6. Time Zone": "US/Eastern"
},

"Time Series (5min)": {
"2019-02-11 10:40:00": {
"1. open": "105.7400",
"2. high": "105.8200",
"3. low": "105.7100",
"4. close": "105.7300",
"5. volume": "161340"
},
"2019-02-11 10:35:00": {
"1. open": "105.5900",
"2. high": "105.7400",
"3. low": "105.4600",
"4. close": "105.7350",
"5. volume": "192407"
} }
}
```

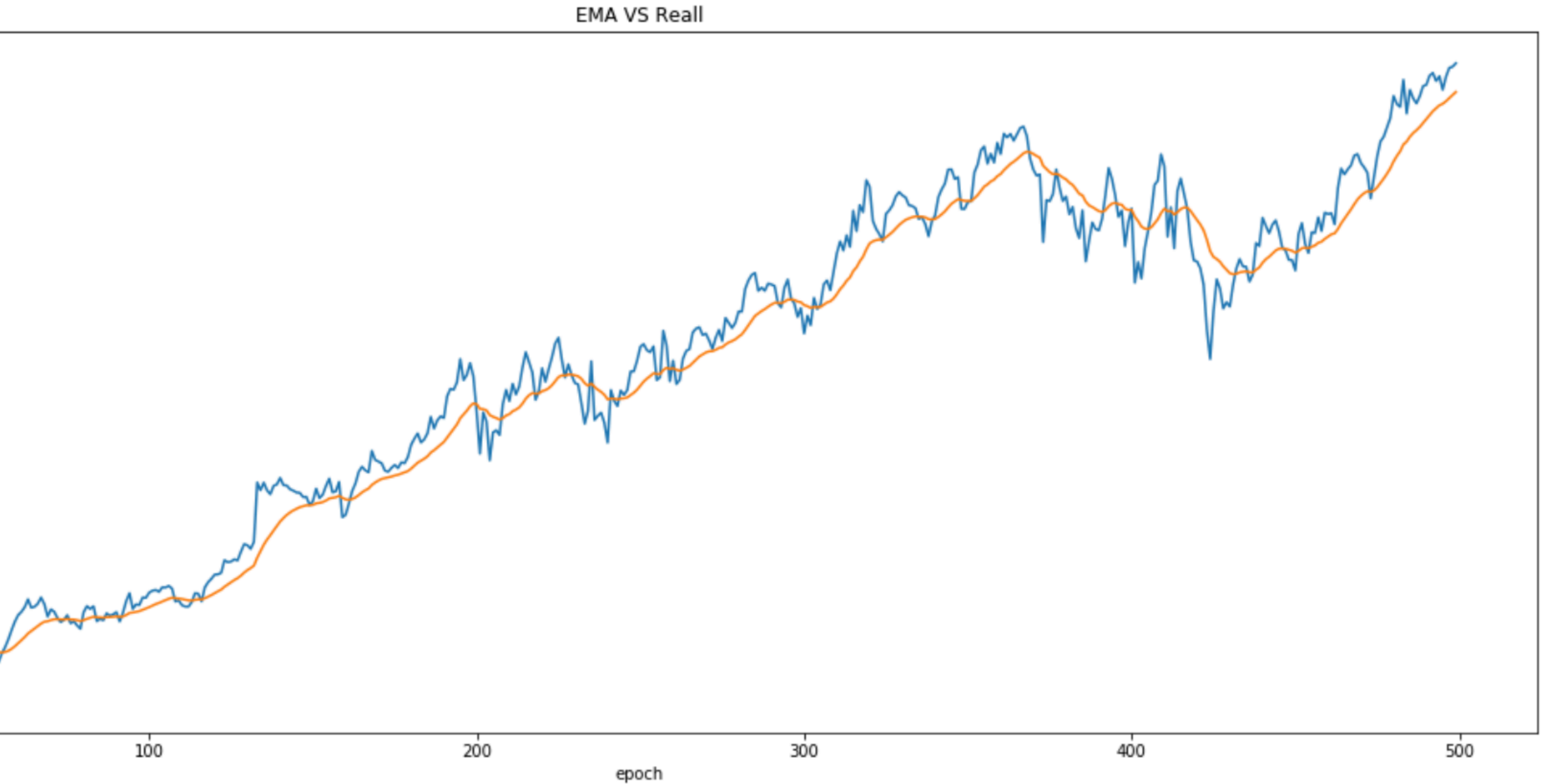

	open	high	low	close	volume
1998-01-02	129.6300	131.5000	129.5000	131.1300	4968500
1998-01-05	131.2500	133.6300	127.8700	130.3800	10047200
1998-01-06	129.7500	133.0000	129.2500	131.1300	8479300
1998-01-07	129.8800	131.1900	127.5000	129.5600	7686600
1998-01-08	128.6300	132.1300	127.5000	130.5000	9702400
1998-01-09	130.0600	131.5000	125.8700	127.0000	10941800
1998-01-12	124.6200	130.0000	124.3700	129.5000	9799200
1998-01-13	129.5000	132.2500	128.1300	132.1300	8368200
1998-01-14	132.1300	132.5000	129.2500	131.1300	6846800
1998-01-15	130.3800	133.0000	129.8800	132.3100	6327800

Exponential Moving Average

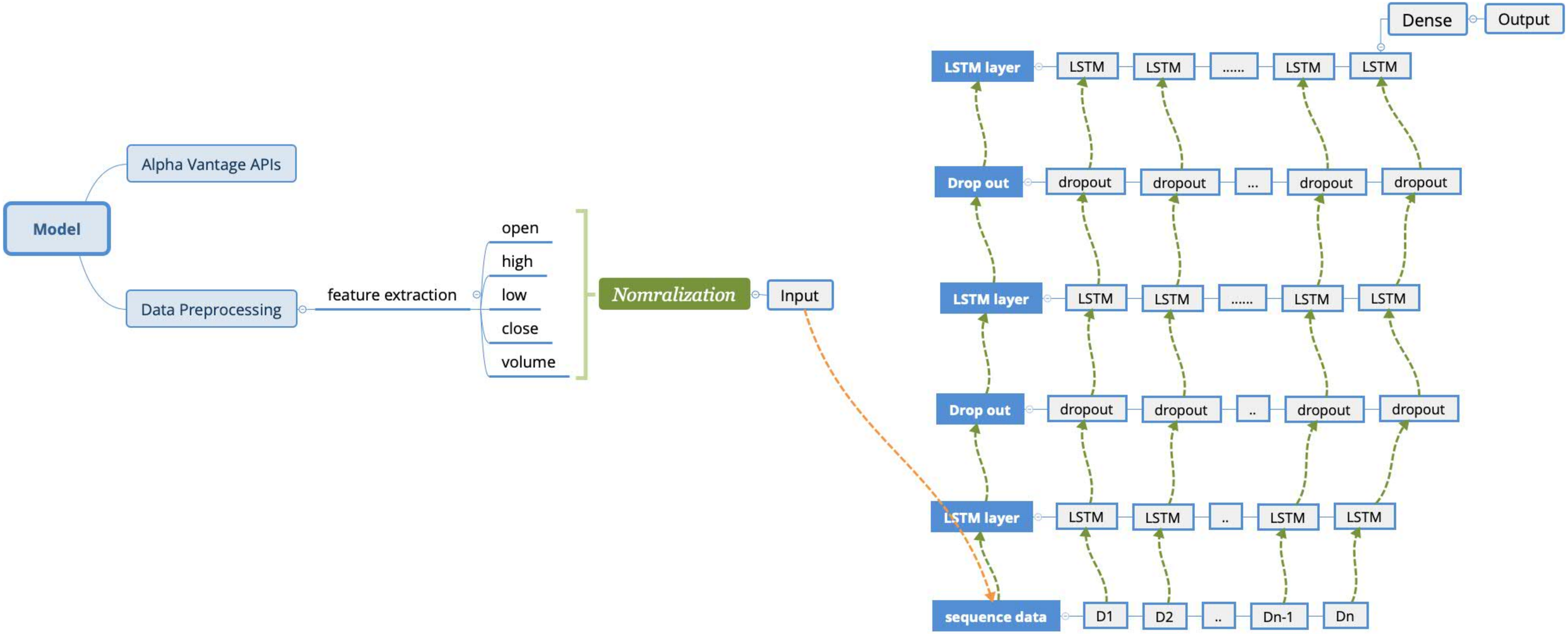
$$x_{t+1} = EMA_t = \gamma \times EMA_{t-1} + (1 - \gamma)x_t$$



EMA VS REAL

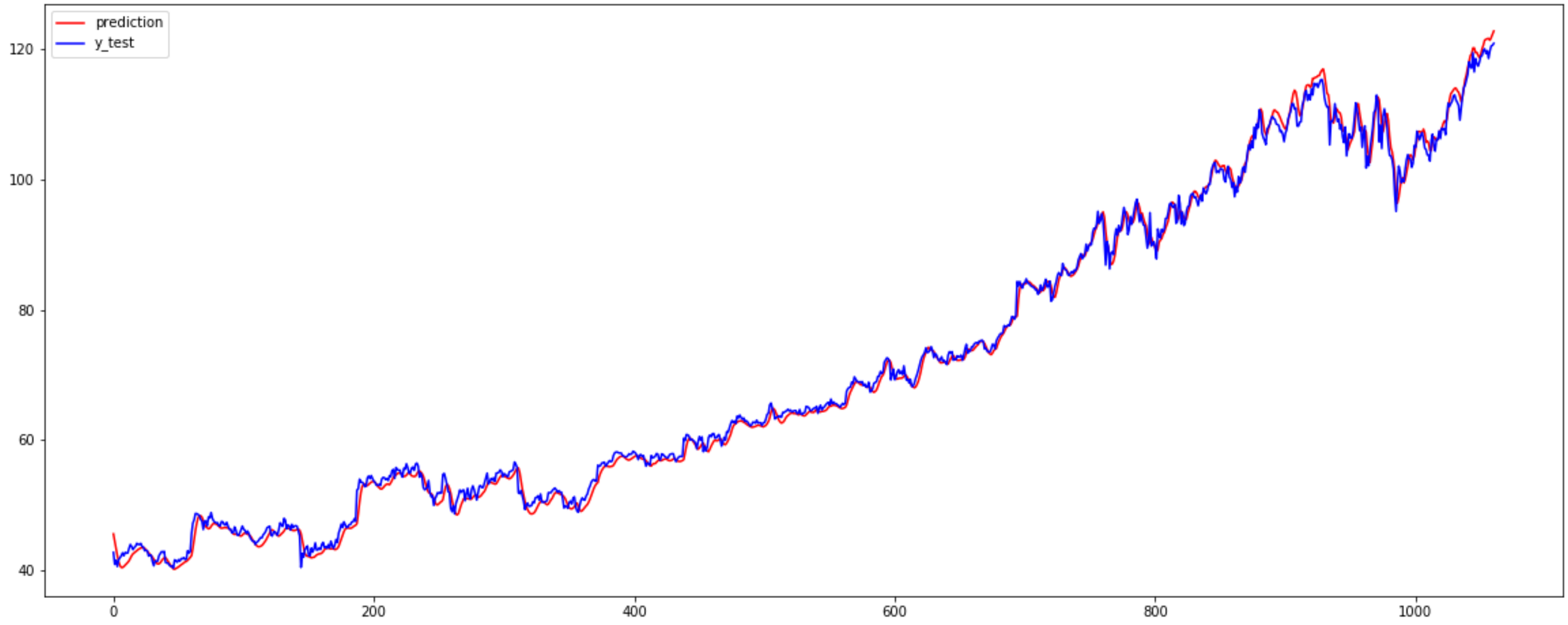


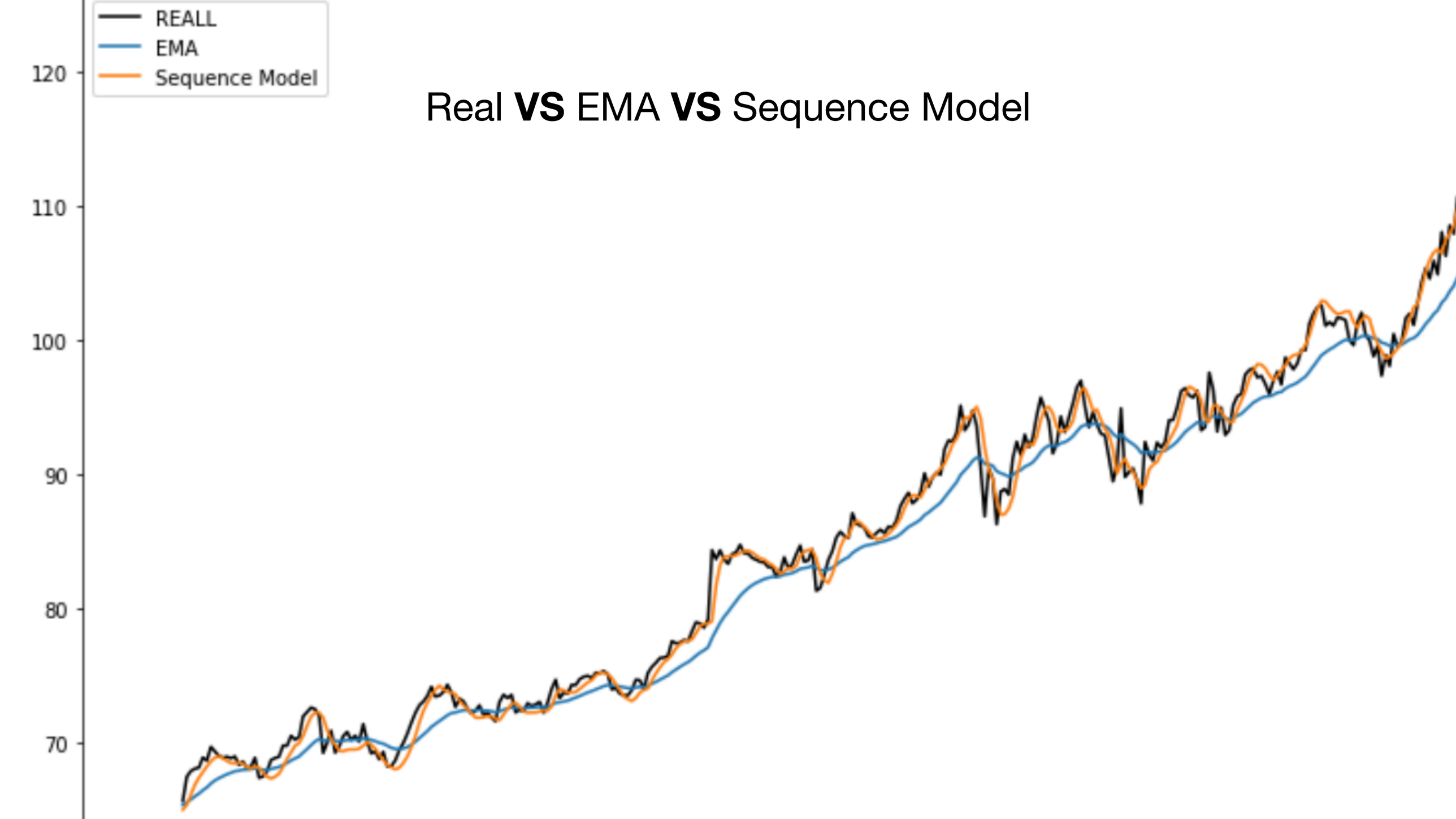
Sequence Model



```
Epoch 1/10
4236/4236 [==============================] - 10s 2ms/step - loss: 0.2427 - mean_squared_error: 0.2427 - val_loss: 0.1
909 - val_mean_squared_error: 0.1909
Epoch 2/10
4236/4236 [==============================] - 6s 1ms/step - loss: 0.1875 - mean_squared_error: 0.1875 - val_loss: 0.17
64 - val_mean_squared_error: 0.1764
Epoch 3/10
4236/4236 [==============================] - 6s 1ms/step - loss: 0.1536 - mean_squared_error: 0.1536 - val_loss: 0.20
60 - val_mean_squared_error: 0.2060
Epoch 4/10
4236/4236 [==============================] - 6s 1ms/step - loss: 0.1389 - mean_squared_error: 0.1389 - val_loss: 0.15
06 - val_mean_squared_error: 0.1506
Epoch 5/10
4236/4236 [==============================] - 6s 1ms/step - loss: 0.1999 - mean_squared_error: 0.1999 - val_loss: 0.20
11 - val_mean_squared_error: 0.2011
Epoch 6/10
4236/4236 [==============================] - 6s 1ms/step - loss: 0.1428 - mean_squared_error: 0.1428 - val_loss: 0.14
21 - val_mean_squared_error: 0.1421
Epoch 7/10
4236/4236 [==============================] - 6s 1ms/step - loss: 0.1174 - mean_squared_error: 0.1174 - val_loss: 0.14
38 - val_mean_squared_error: 0.1438
Epoch 8/10
4236/4236 [==============================] - 6s 1ms/step - loss: 0.1009 - mean_squared_error: 0.1009 - val_loss: 0.10
15 - val_mean_squared_error: 0.1015
Epoch 9/10
4236/4236 [==============================] - 6s 1ms/step - loss: 0.0768 - mean_squared_error: 0.0768 - val_loss: 0.08
41 - val_mean_squared_error: 0.0841
Epoch 10/10
4236/4236 [==============================] - 6s 1ms/step - loss: 0.0694 - mean_squared_error: 0.0694 - val_loss: 0.08
37 - val_mean_squared_error: 0.0837
```

Output of Sequence Model



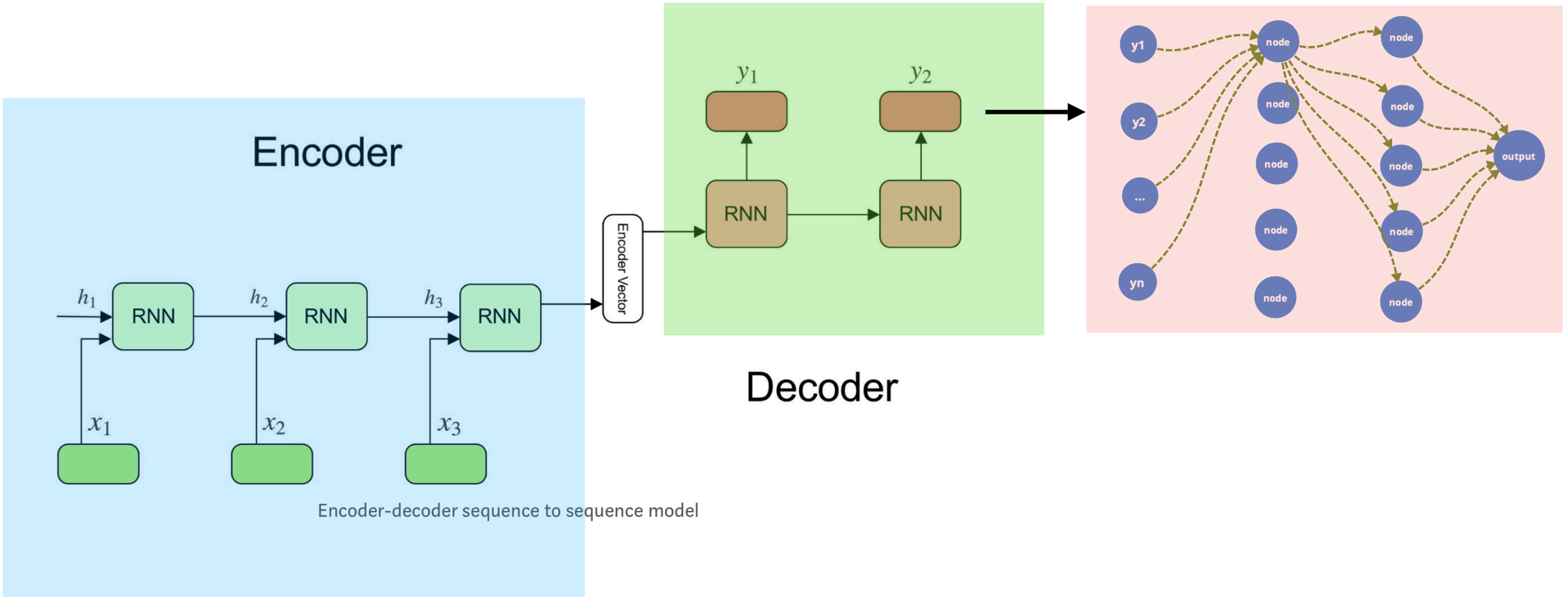


Real **VS** EMA **VS** Sequence Model

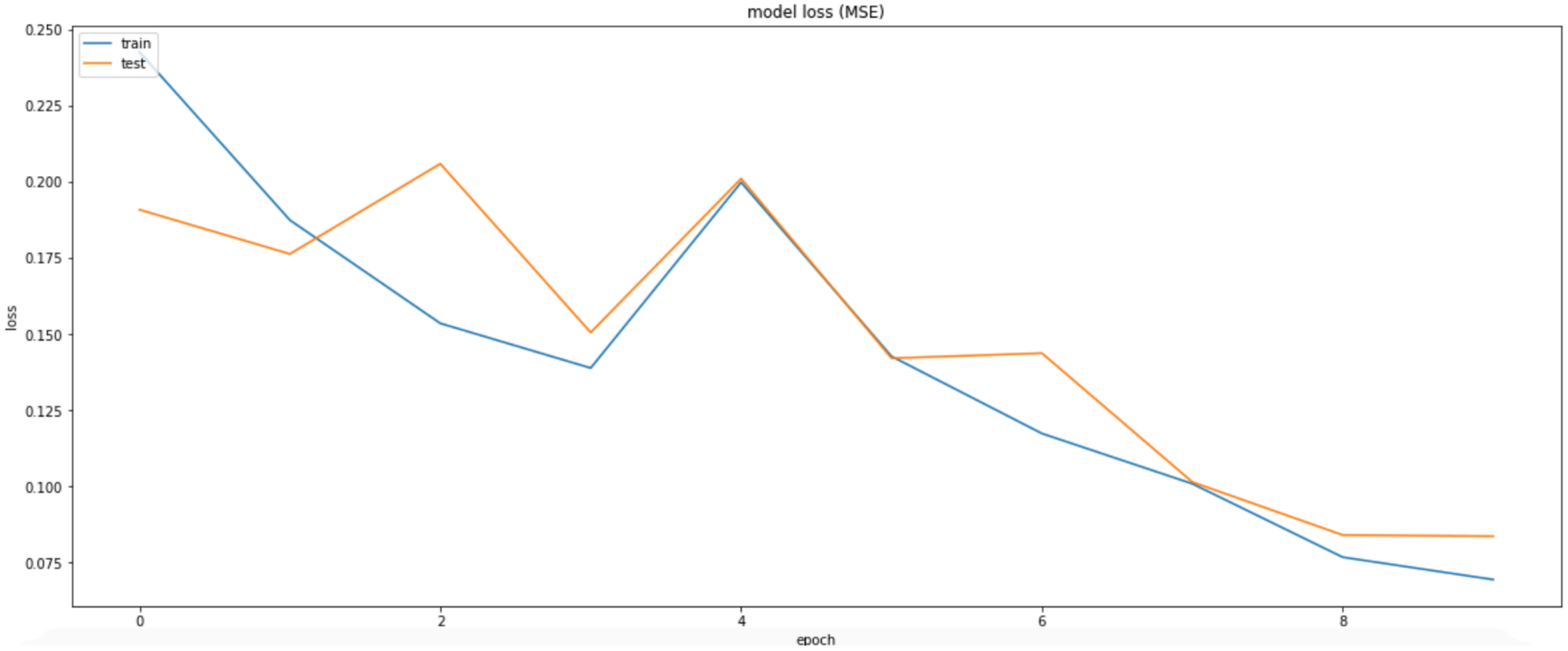
Stock Market Context

Predicted Market Context

Predicted Market Tendency



Encoder-decoder sequence to sequence model

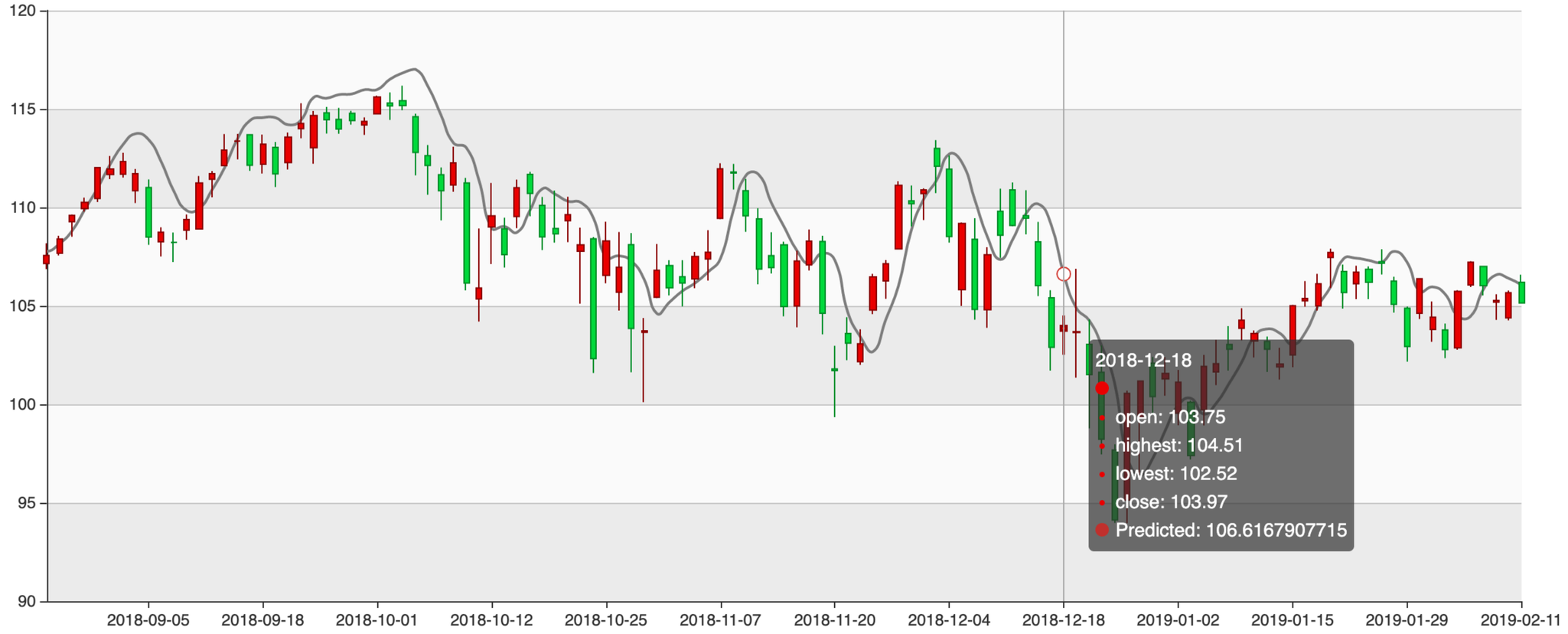

model loss (MSE)
train
test
loss
epoch
0.250
0.225
0.200
0.175
0.150
0.125
0.100
0.075
0
2
4
6
8

localhost:8002

localhost:8002

Apps

Next 10 days: +1.21



Reference

[1] O. H. Luca Di Persio, “Artificial neural networks approach to the forecast of stock market price movements,” International Journal of Economics and Management Systems, vol. 1, pp. 158–162, 2016.

[2] K. Chen, Y. Zhou, and F. Dai, “A lstm-based method for stock returns prediction: A case study of china stock market,” in Big Data (Big Data), 2015 IEEE International Conference on, Oct 2015, pp. 2823–2824.