ИССЛЕДОВАНИЕ ВРЕМЕННЫХ РЯДОВ С ПОМОЩЬЮ НЕЙРОННЫХ СЕТЕЙ

ОПИСАНИЕ ЗАДАЧИ

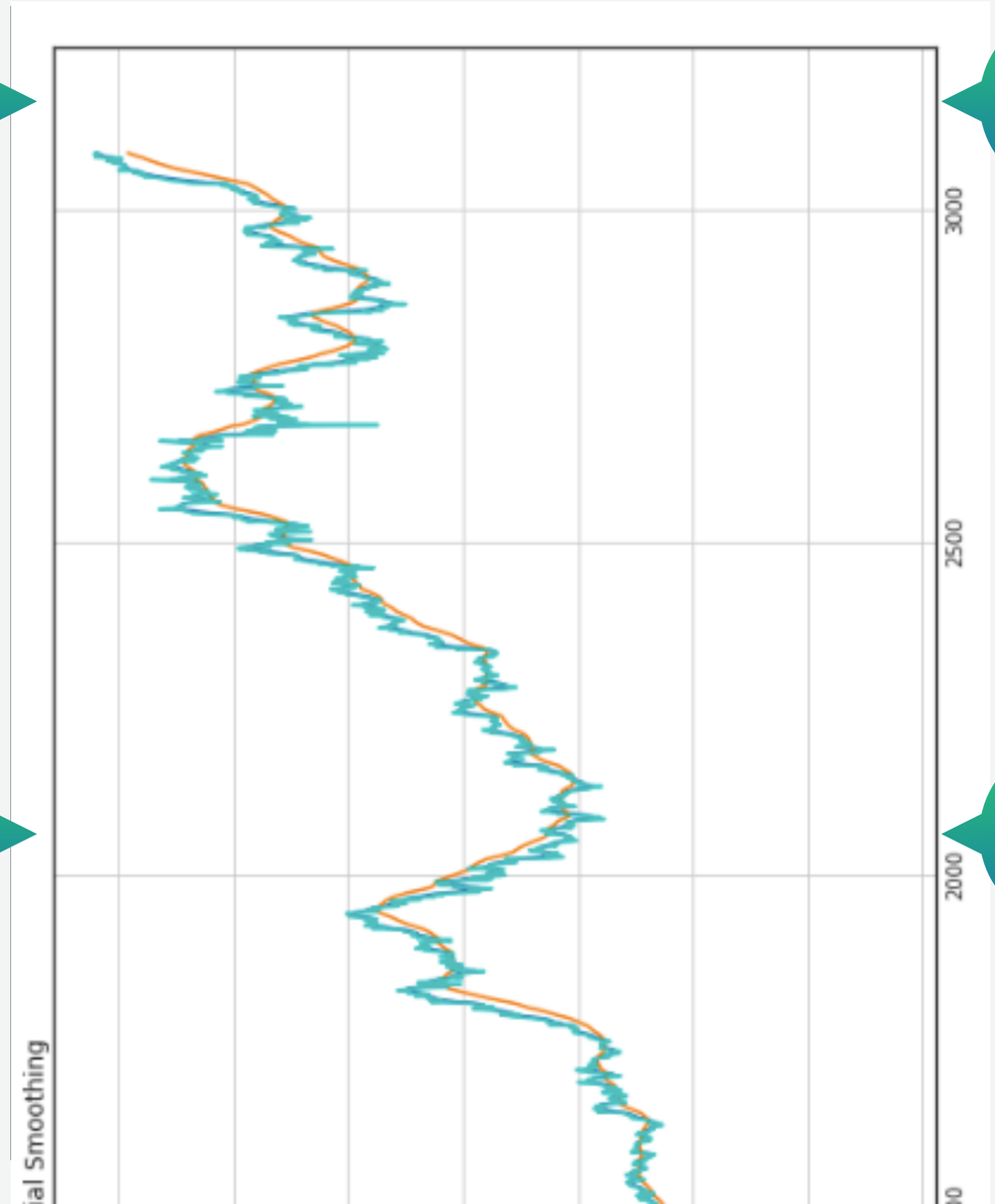
Есть временной ряд, происхождение его неважно. Нужно угадывать будущее, а именно бежать скользящим окном и угадывать показатель тренда - возрастание/убывание наблюдаемого показателя со временем.

ПОДХОД К РЕШЕНИЮ

1 ВЫГРУЗКА ДАННЫХ

2 ПРИМЕНЕНИЕ КЛАССИЧЕСКИХ АЛГОРИТМОВ

3 ПРИМЕНЕНИЕ АЛГОРИТМОВ МАШИННОГО ОБУЧЕНИЯ

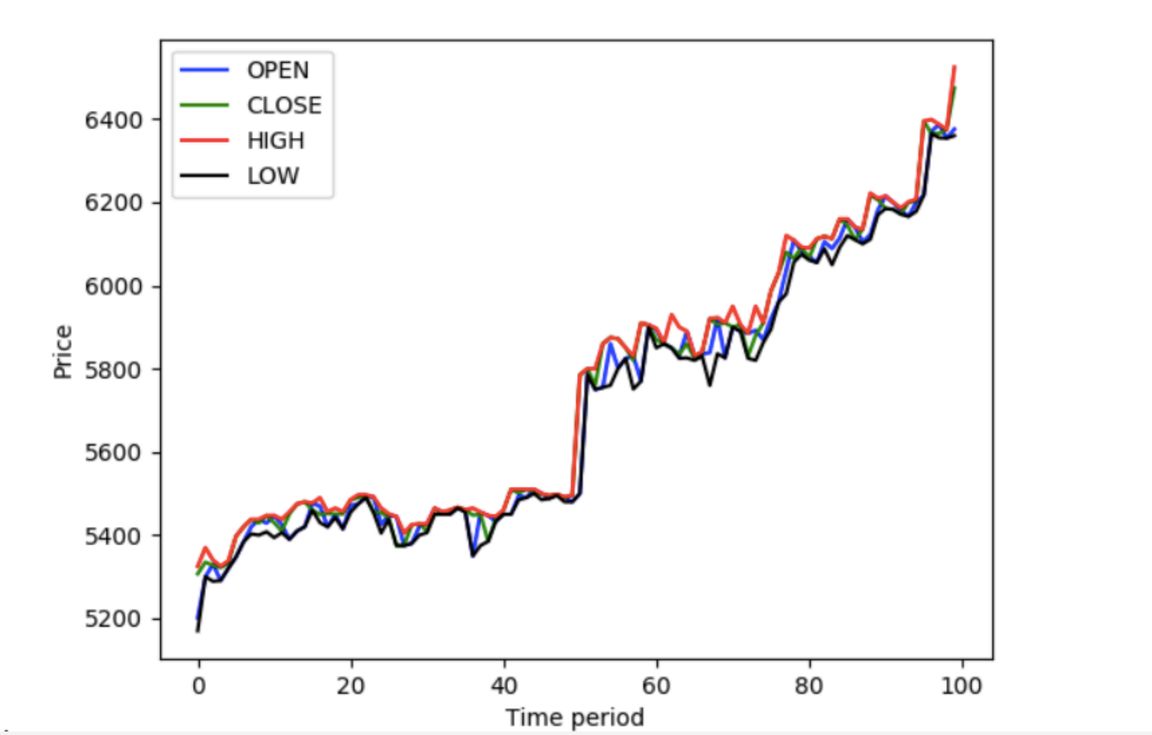


4 ПРИМЕНЕНИЕ НЕЙРОСЕТЕЙ

5 ПОЛУЧЕНИЕ РЕЗУЛЬТАТОВ

6 АНАЛИЗ РЕЗУЛЬТАТОВ

ВЫГРУЗКА ДАННЫХ



securities

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12441	ABRD	АбрауДюрсо	1-02-12500-A	Абрау-Дюрсо ПАО ао	RU000A0JS5T7	1	2556	Публичное акционерное общество "Абрау – Дюрсо"	7727620673	81521198	1-02-12500-A	common_share
131568	ACKO	АСКО ао	1-01-52065-Z	СК ЮЖУРАЛ-АСКО ПАО ао	RU000A0JXS91	1	1098705	Публичное акционерное общество "Страховая компания ЮЖУРАЛ-АСКО"	7453297458	null	1-01-52065-Z	common_share
85909	acru	ОАО АК "Рубин"	1-03-01692-A	Открытое акционерное общество "Авиационная корпорация "Рубин"	RU000A0JRM20	1	486957	Открытое акционерное общество "Авиационная корпорация "Рубин"	5001000034	null	1-03-01692-A	common_share
134438	AFH8	AFLT-3.18	null	Фьючерсный контракт AFLT-3.18	null	1	null	null	null	null	null	futures
								Публичное акционерное				

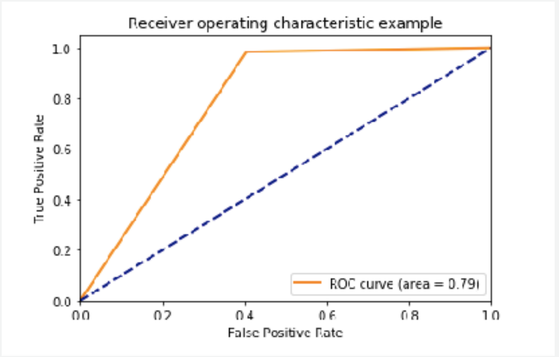
ПРИМЕНЁННЫЕ МОДЕЛИ

- Autoregressive integrated moving ave
- Random Forest
- LSTM

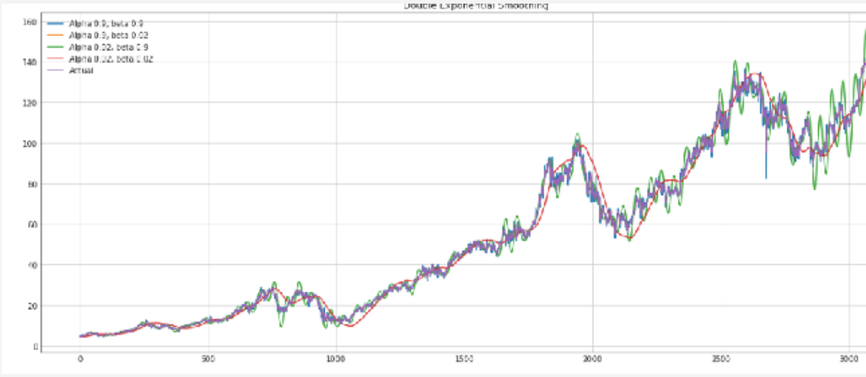
1

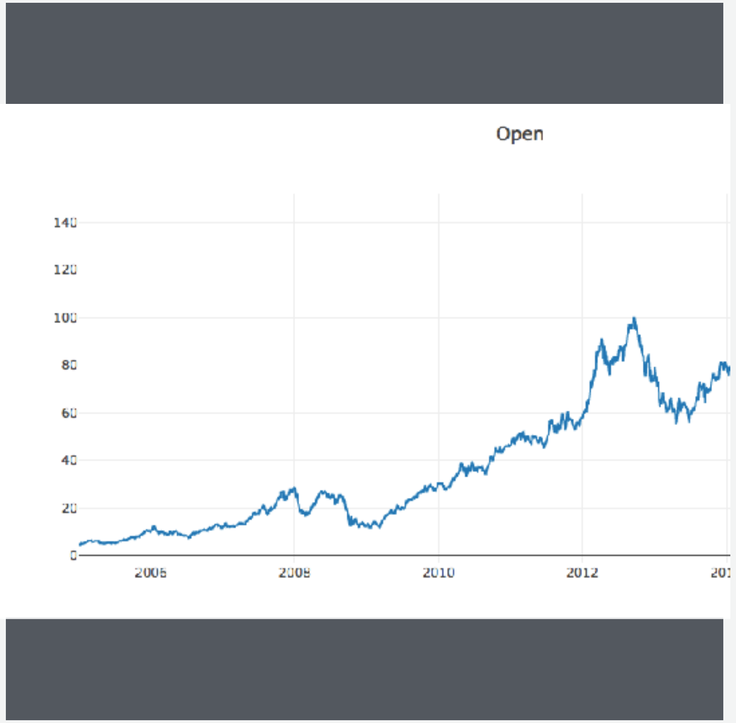

Exponential Smoothing
500
1000
1500
2000
2500
3000

2


Receiver operating characteristic example
True Positive Rate
False Positive Rate
0.0
0.2
0.4
0.6
0.8
1.0
ROC curve (area = 0.79)

3

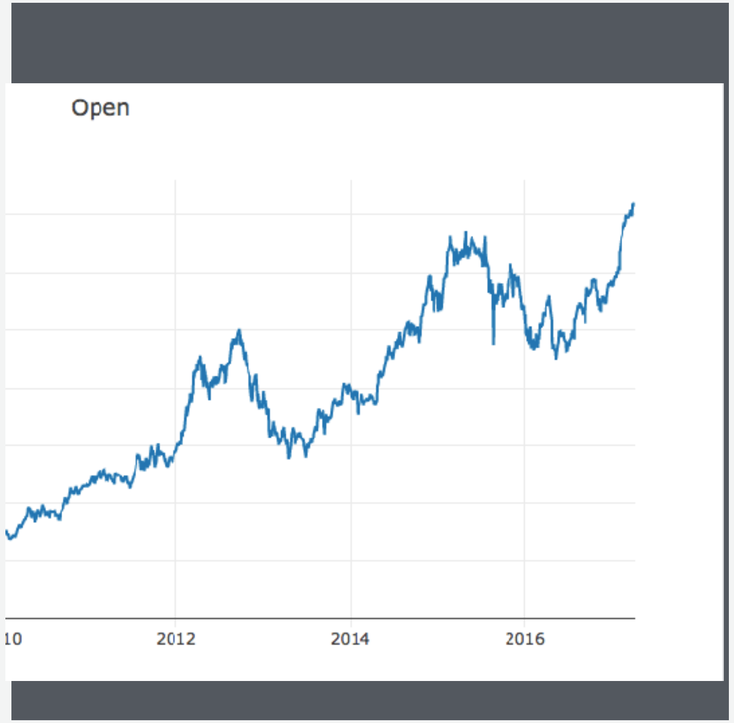

Double Exponential Smoothing
Actual
0
500
1000
1500
2000
2500
3000

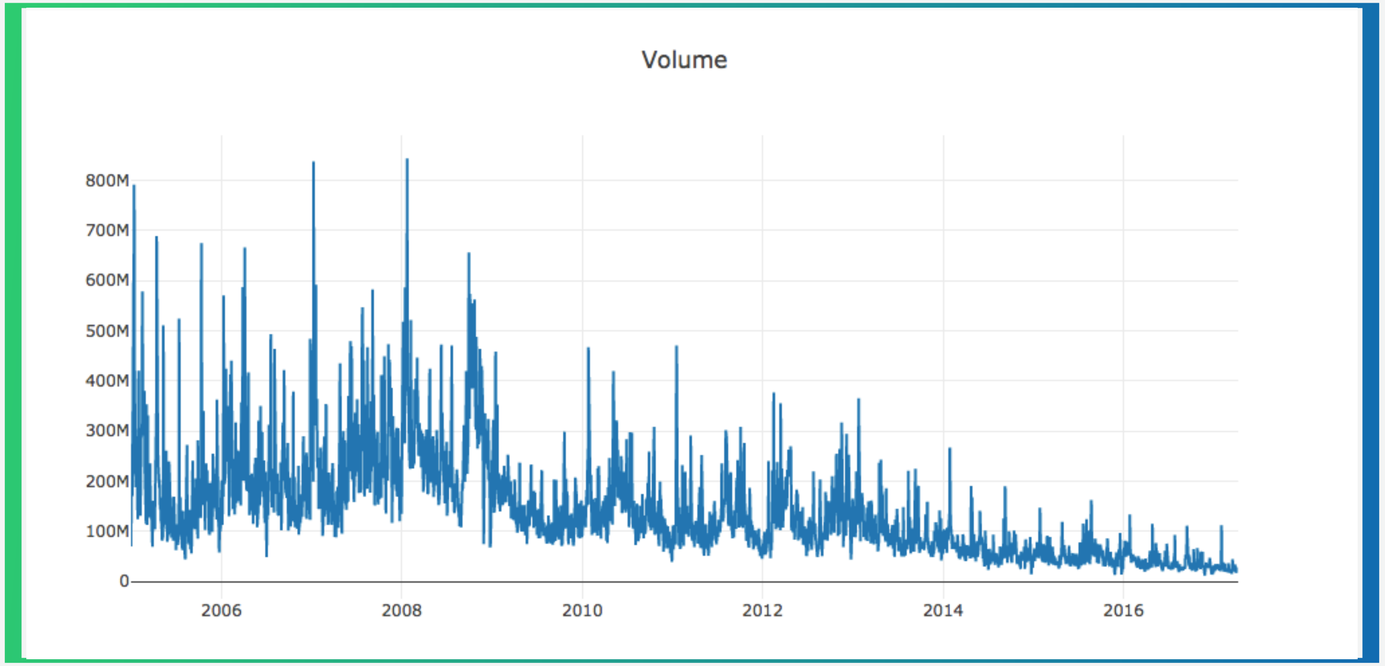


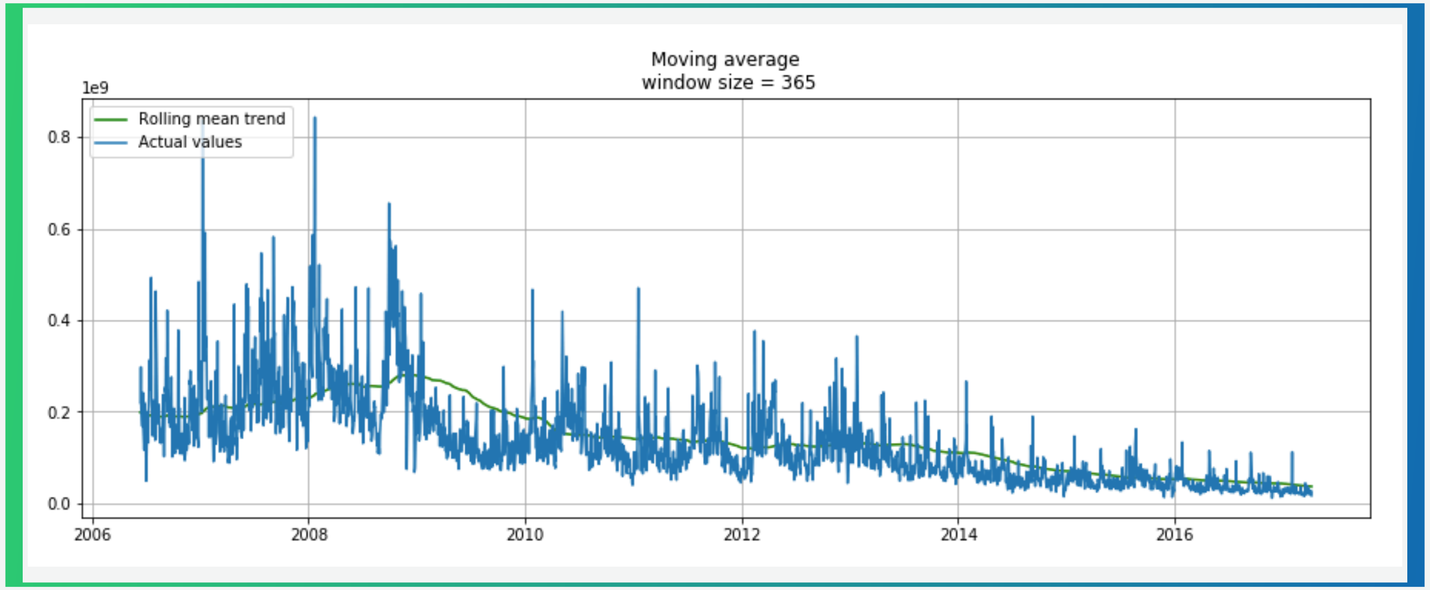
ARIMA

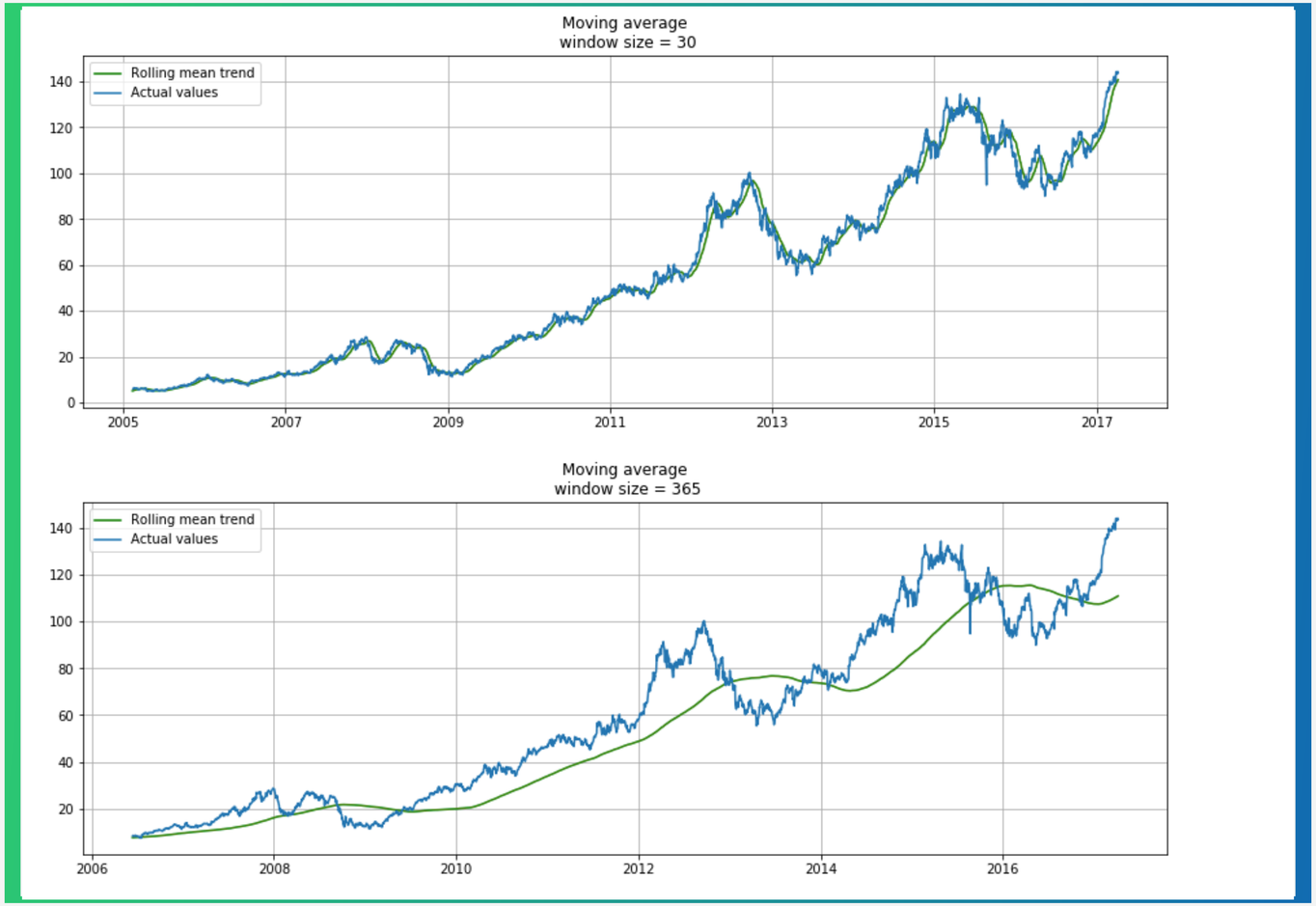
AUTOREGRESSIVE INTEGRATED MOVING AVERAGE

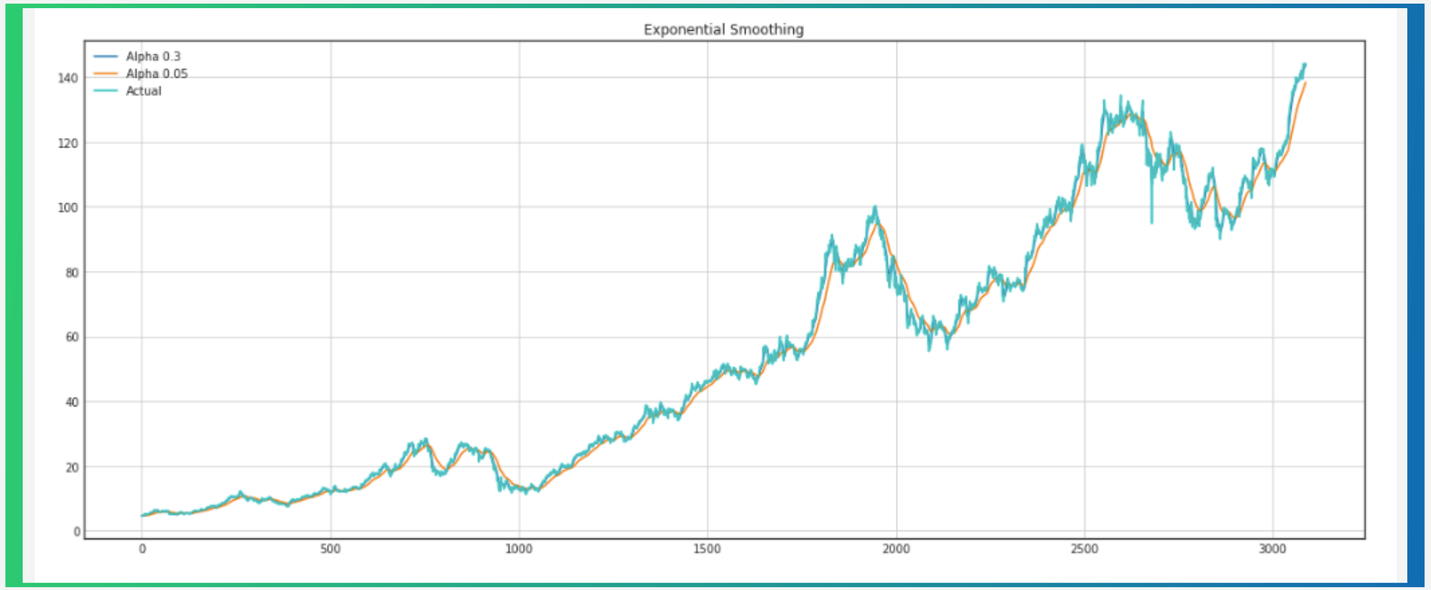
- Apple dataset 2006-2017
- Moving average
- Exponential smoothing
- Double Exponential smoothing
- Plot graphs
- Result analysis




Volume
800M
700M
600M
500M
400M
300M
200M
100M
0
2006
2008
2010
2012
2014
2016


Moving average
window size = 365
1e9
Rolling mean trend
Actual values
0.8
0.6
0.4
0.2
0.0
2006
2008
2010
2012
2014
2016


Moving average
window size = 30
Rolling mean trend
Actual values
0
20
40
60
80
100
120
140
2005
2007
2009
2011
2013
2015
2017
Moving average
window size = 365
Rolling mean trend
Actual values
20
40
60
80
100
120
140
2006
2008
2010
2012
2014
2016


Exponential Smoothing
Alpha 0.3
Alpha 0.05
Actual
0
20
40
60
80
100
120
140
0
500
1000
1500
2000
2500
3000


Double Exponential Smoothing
Alpha 0.9, beta 0.9
Alpha 0.9, beta 0.02
Alpha 0.02, beta 0.9
Alpha 0.02, beta 0.02
Actual
0
20
40
60
80
100
120
140
160
0
500
1000
1500
2000
2500
3000

RANDOM FOREST

FROM SKLEARN IMPORT *

Get data from moex

Feature engineering

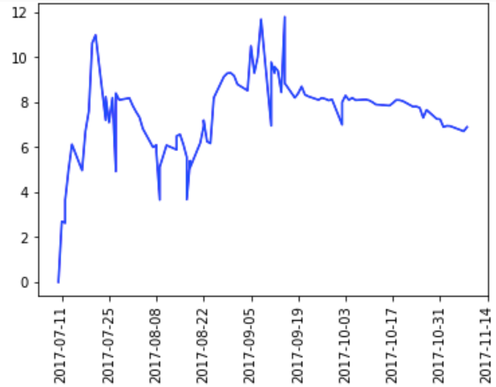
Tuning parameters of the model

Result analysis

https://github.com/DELTA37/TimeSeries/blob/master/experiments/Review_nnetwork_sphere_.pdf

https://arxiv.org/pdf/1605.00003.pdf

GETTING DATA

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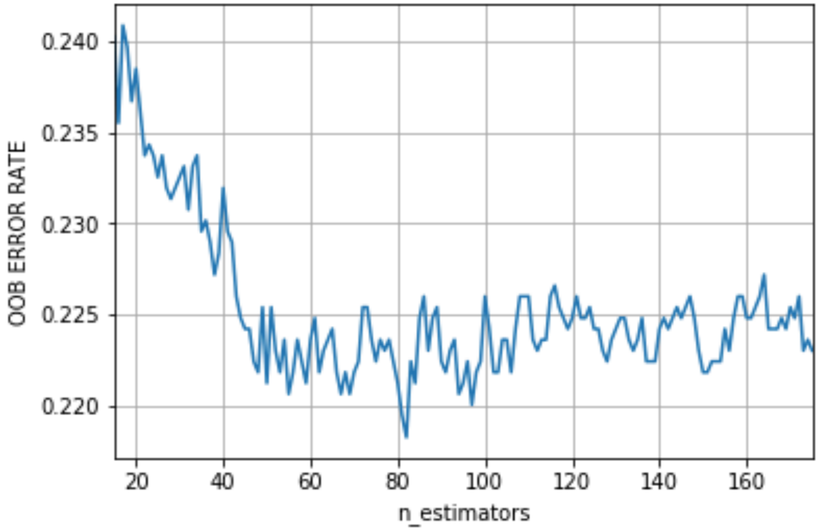
FEATURE ENGINEERING

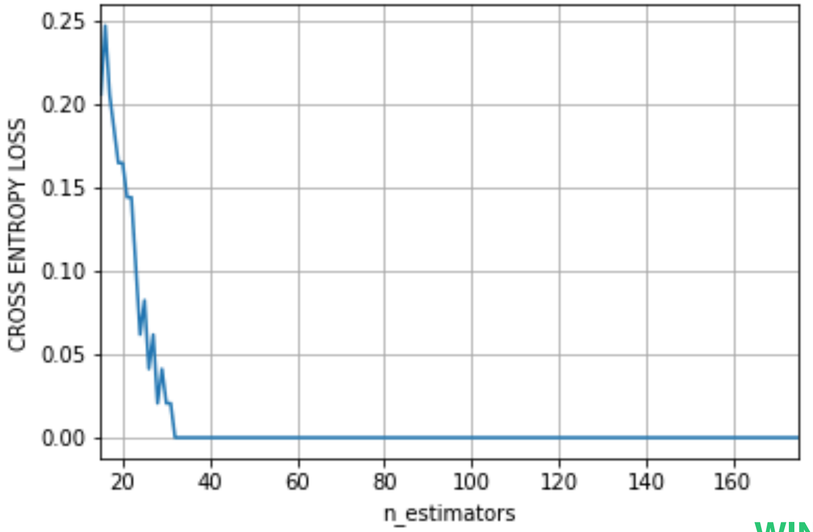
DIFFERENCE WINDOW

EXPONENTIAL SMOTHING WINDOW

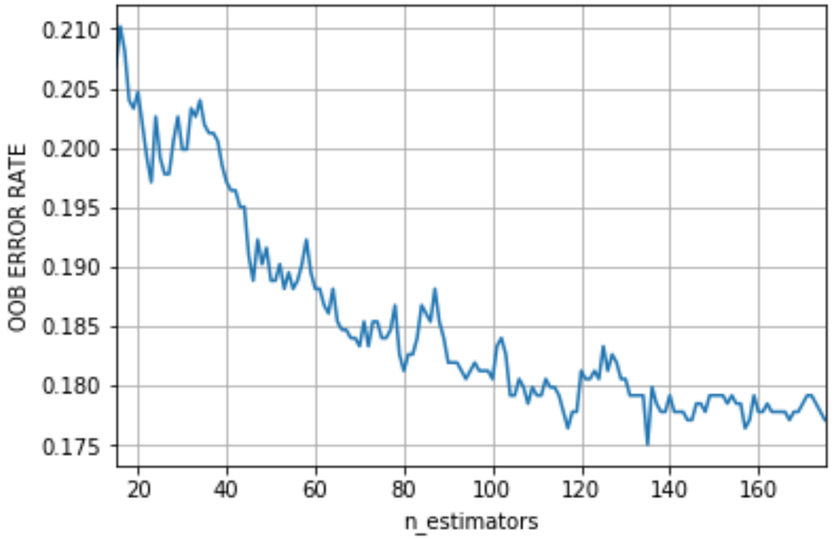
RSI

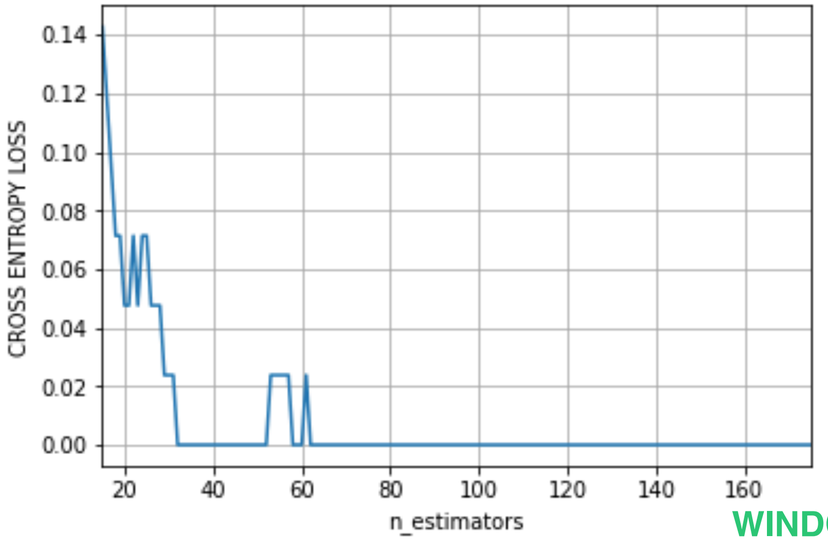
TUNING PARAMETERS





WINDOW = 7





WINDOW = 14

RESULTS

```
CROSS ENTROPY LOSS: 3.00, PRECISION: 0.92, RECALL: 0.98, F1_SCORE: 0.95
```