Using Algo

July 8, 2020

1 Examples of how to use the build_algo.py script

[44]:
```
import sys
sys.path.insert(1, '../scripts/')

from build_algo import DataAnlysis, Modelling
import pandas as pd
from sklearn.metrics import confusion_matrix
from sklearn.metrics import f1_score
```

[6]:
```
STOCK_NAME = "BTC-USD"
```

1.1 Data Analysis

[8]:
```
da = DataAnlysis(STOCK_NAME)
```

[9]:
```
da.create_laggedFeatures('Close', 1)
```

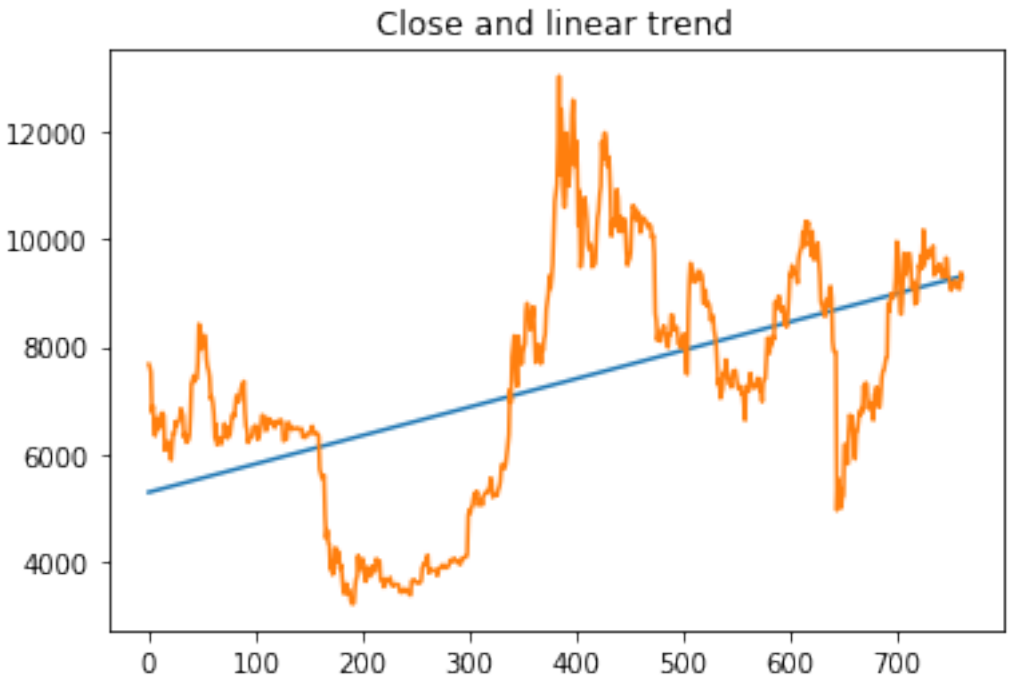
[9]:

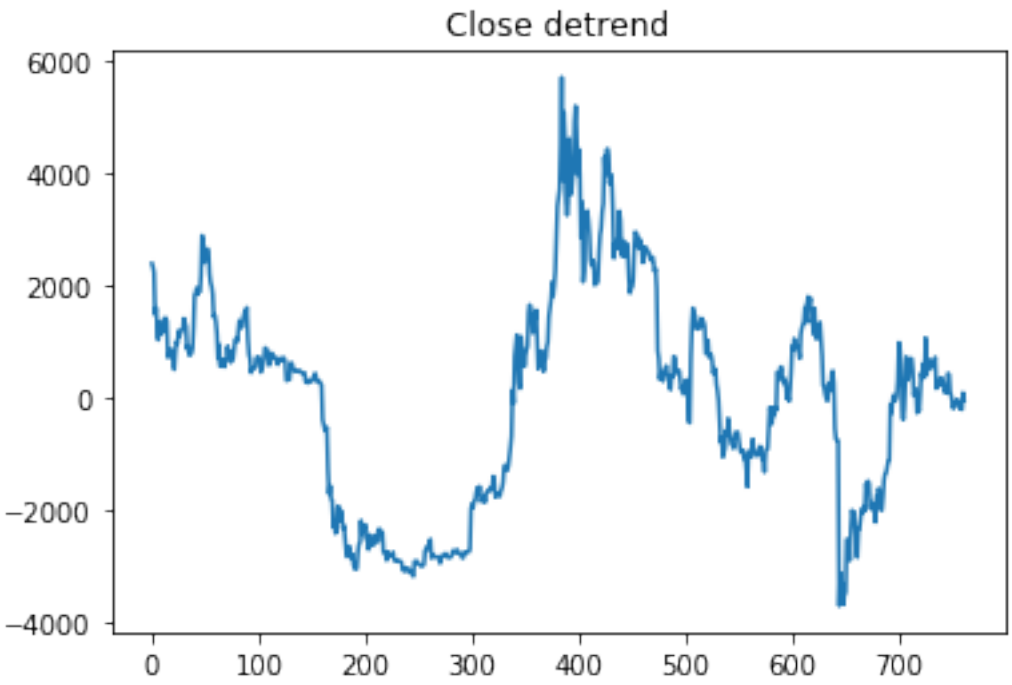
	Date	Open	High	Low	Close	Volume	Dividends	Stock Splits	Close_lagged
0	2018-06-07	7650.82	7741.27	7650.82	7678.24	4485799936	0	0	NaN
1	2018-06-08	7685.14	7698.19	7558.40	7624.92	4227579904	0	0	7678.24
2	2018-06-09	7632.52	7683.58	7531.98	7531.98	3845220096	0	0	7624.92
3	2018-06-10	7499.55	7499.55	6709.07	6786.02	5804839936	0	0	7531.98
4	2018-06-11	6799.29	6910.18	6706.63	6906.92	4745269760	0	0	6786.02
..	...	...	...	...	...	...	...	...	...
757	2020-07-03	9124.84	9202.34	9058.79	9087.30	13078970999	0	0	
758	2020-07-04	9084.23	9183.30	9053.63	9132.49	12290528515	0	0	
759	2020-07-05	9126.09	9162.18	8977.02	9073.94	12903406143	0	0	
760	2020-07-06	9072.85	9375.47	9058.66	9375.47	17889263252	0	0	
761	2020-07-07	9323.49	9359.54	9216.21	9249.49	14392401920	0	0	

..	...	...
757	0	9123.41
758	0	9087.30
759	0	9132.49
760	0	9073.94
761	0	9375.47

[762 rows x 9 columns]

[10]:
```
da.detrend('Close')
```





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       -1.45255530e+02, -2.93005599e+02, -9.20456686e+01,  2.65242621e+01,
       -6.98658072e+01, -5.99458766e+01,  2.52140541e+01,  2.85643985e+02,
        9.63143915e+02,  8.49033846e+02,  5.95003777e+02, -2.47726292e+02,
       -4.07616362e+02, -2.10196431e+02,  2.50053500e+02,  7.08523430e+02,
        2.97743361e+02,  3.41293292e+02,  6.29763222e+02,  6.80343153e+02,
        6.77543084e+02,  4.66223014e+02,  1.97429450e+01,  1.15302876e+02,
        1.36752806e+02, -2.87427263e+02, -1.76127332e+02, -2.53267402e+02,
        8.74425291e+01,  4.26912460e+02,  3.35022390e+02,  5.91052321e+02,
        3.46442252e+02,  1.04739218e+03,  4.04662113e+02,  5.26322044e+02,
        6.64981975e+02,  5.24611905e+02,  5.07501836e+02,  6.07411767e+02,
        6.14791697e+02,  6.33741628e+02,  7.02871559e+02,  1.49301489e+02,
        3.03101420e+02,  2.92281351e+02,  1.98531281e+02,  2.57181212e+02,
        3.39241143e+02,  2.76211073e+02,  2.02541004e+02,  7.34609347e+01,
        1.12520865e+02,  7.85507961e+01,  4.18380727e+02,  3.94060657e+02,
        7.27505882e+01,  1.86905188e+01, -8.84595505e+01, -2.11249620e+02,
       -1.18319689e+02, -7.63097584e+01, -1.34429828e+02, -4.93498971e+01,
       -1.59529966e+02, -2.00900036e+02, -1.60970105e+02, -2.24780174e+02,
        7.14897563e+01, -5.97503130e+01])
```

[11]:
```
da.ma_smoothing(7)
```

[11]:

	Date	Open	High	Low	Close	Volume	Dividends	Stock Splits	Close_lagged	ma_7
0	2018-06-07	7650.82	7741.27	7650.82	7678.24	4485799936	0	0	NaN	NaN
1	2018-06-08	7685.14	7698.19	7558.40	7624.92	4227579904	0	0	7678.24	NaN
2	2018-06-09	7632.52	7683.58	7531.98	7531.98	3845220096	0	0	7624.92	NaN
3	2018-06-10	7499.55	7499.55	6709.07	6786.02	5804839936	0	0	7531.98	7065.762857
4	2018-06-11	6799.29	6910.18	6706.63	6906.92	4745269760	0	0	6786.02	6922.492857
..	...	...	...	...	...	...	...	...	...	...
757	2020-07-03	9124.84	9202.34	9058.79	9087.30	13078970999	0	0		
758	2020-07-04	9084.23	9183.30	9053.63	9132.49	12290528515	0	0		
759	2020-07-05	9126.09	9162.18	8977.02	9073.94	12903406143	0	0		
760	2020-07-06	9072.85	9375.47	9058.66	9375.47	17889263252	0	0		
761	2020-07-07	9323.49	9359.54	9216.21	9249.49	14392401920	0	0		

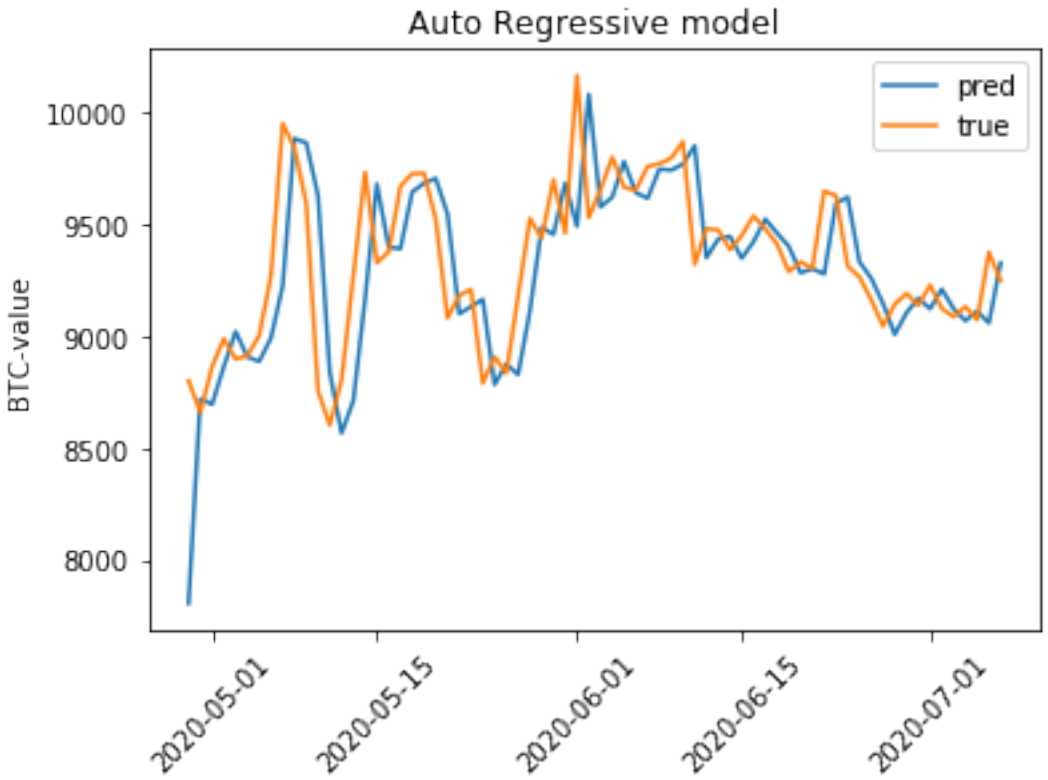
757	0	9123.41	9165.561429
758	0	9087.30	9181.490000
759	0	9132.49	NaN
760	0	9073.94	NaN
761	0	9375.47	NaN

[762 rows x 10 columns]

1.2 Modelling

[12]:
```
m = Modelling(da.df)
```

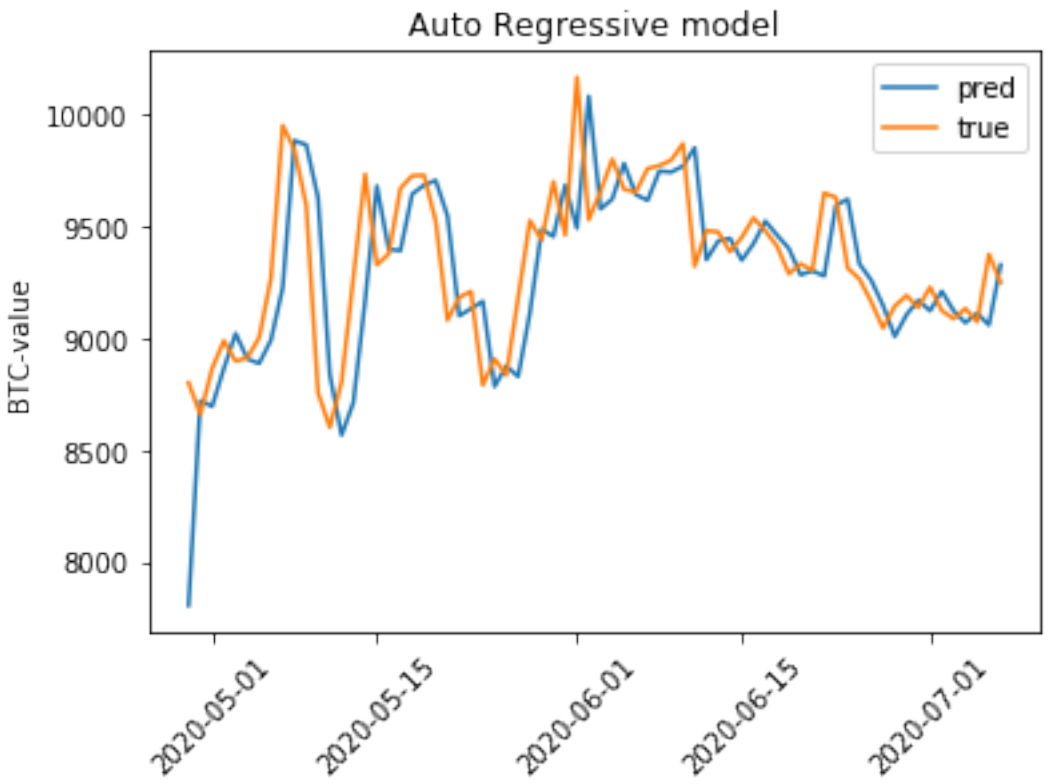
[13]:
```
m.AutoRegressive()
```



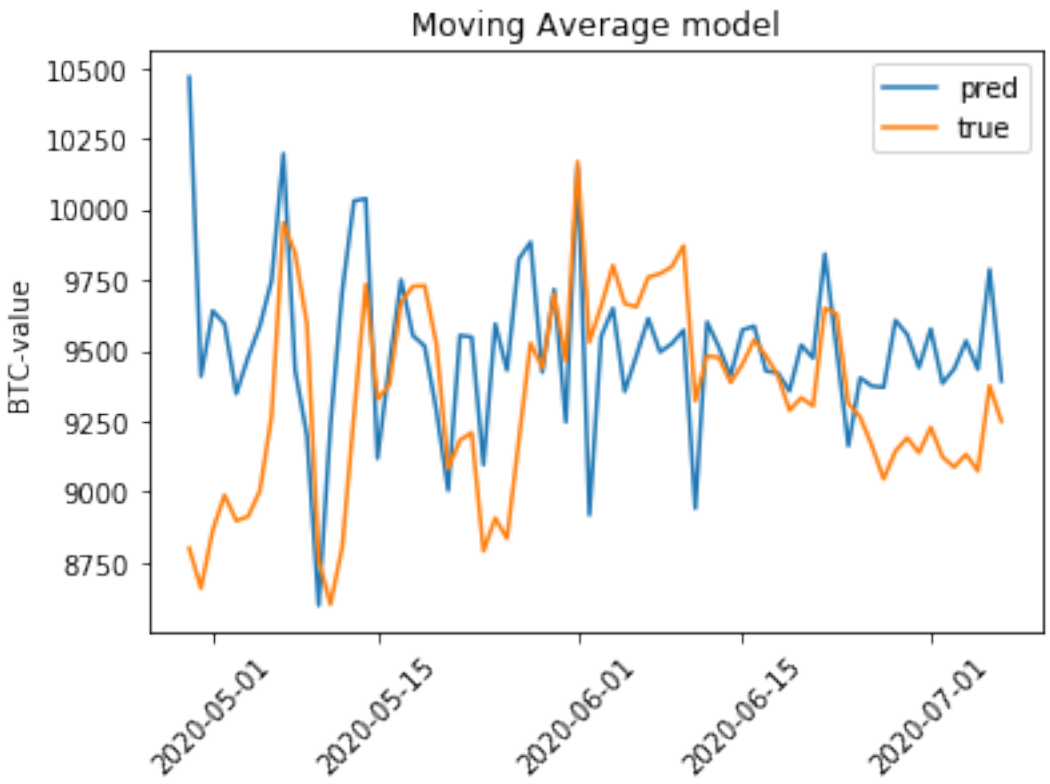
RMSE of Auto Regressive: 290.24

[13]: LinearRegression(copy_X=True, fit_intercept=True, n_jobs=None, normalize=False)

[14]:
```
m.MovingAverage()
```



RMSE of Auto Regressive: 290.24

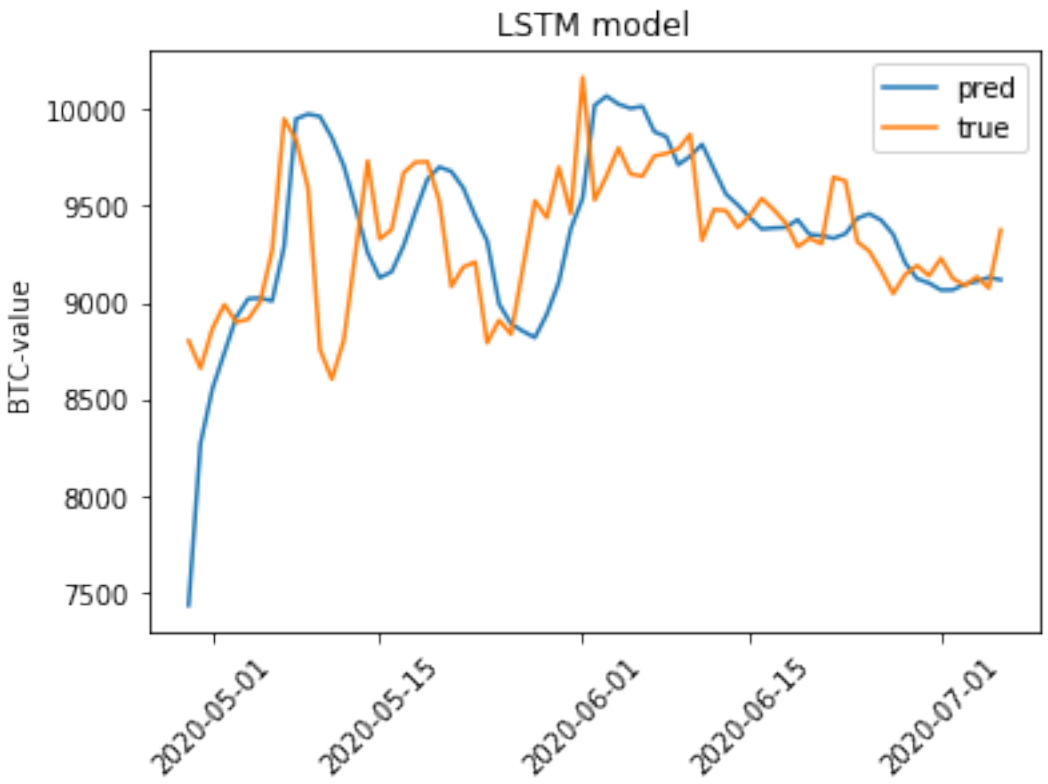


RMSE of Auto Regressive: 416.67

[14]: LinearRegression(copy_X=True, fit_intercept=True, n_jobs=None, normalize=False)

[15]:
```
y_pred = m.LSTM_model()
```

Epoch 1 completed!
Epoch 2 completed!
Epoch 3 completed!
Epoch 4 completed!
Epoch 5 completed!



RMSE of LSTM: 407.16

[20]:
```
df = da.df.copy()
```

[25]:
```
TEST_SIZE = int(len(df)*(9/10))
df_test = df[TEST_SIZE:]
y_true = df_test[7:len(df_test)-1]['Close'].values
table = pd.DataFrame({'y_pred': y_pred, 'y_true': y_true})
table['y_true_lagged'] = table['y_true'].shift(1)
table = table[1:]
table['dif_true'] = table['y_true'] - table['y_true_lagged']
table['dif_pred'] = table['y_pred'] - table['y_true_lagged']
table['sign_true'] = table['dif_true'].apply(lambda x: 1 if x>=0 else 0)
table['sign_pred'] = table['dif_pred'].apply(lambda x: 1 if x>=0 else 0)
```

[48]:
```
table.head()
```

[48]:

	y_pred	y_true	y_true_lagged	dif_true	dif_pred	sign_true	\
1	8268.144531	8658.55	8801.04	-142.49	-532.895469	0	
2	8552.465820	8864.77	8658.55	206.22	-106.084180	1	
3	8738.349609	8988.60	8864.77	123.83	-126.420391	1	
4	8924.604492	8897.47	8988.60	-91.13	-63.995508	0	
5	9019.111328	8912.65	8897.47	15.18	121.641328	1	

	sign_pred
1	0
2	0
3	0
4	0
5	1

[40]:
```
confusion_matrix(table['sign_true'], table['sign_pred'])
```

[40]:
```
array([[18, 14],
       [14, 22]])
```

[47]:
```
print('F1-score: {}'.format(round(f1_score(table['sign_true'], table['sign_pred']),2 )))
```

F1-score: 0.61