ROC

September 29, 2021

1 Rate of Change (ROC)

https://stockcharts.com/school/doku.php?id=chart_school:technical_indicators:rate_of_change_roc_and_mon

[1]:
```
import numpy as np
import pandas as pd
import matplotlib.pyplot as plt

import warnings
warnings.filterwarnings("ignore")

# fix_yahoo_finance is used to fetch data
import fix_yahoo_finance as yf
yf.pdr_override()
```

[2]:
```
# input
symbol = 'AAPL'
start = '2016-01-01'
end = '2019-01-01'

# Read data
df = yf.download(symbol,start,end)

# View Columns
df.head()
```

```
[**********************100%**********************]  1 of 1 downloaded
```

[2]:

Date	Open	High	Low	Close	Adj Close	Volume
2016-01-04	102.610001	105.370003	102.000000	105.349998	99.499107	
2016-01-05	105.750000	105.849998	102.410004	102.709999	97.005730	
2016-01-06	100.559998	102.370003	99.870003	100.699997	95.107361	
2016-01-07	98.680000	100.129997	96.430000	96.449997	91.093399	
2016-01-08	98.550003	99.110001	96.760002	96.959999	91.575073	

```
2016-01-04  67649400
2016-01-05  55791000
2016-01-06  68457400
2016-01-07  81094400
2016-01-08  70798000
```

[3]:
```
n = 12
df['ROC'] = ((df['Adj Close'] - df['Adj Close'].shift(n))/df['Adj Close'].
 ↪shift(n)) * 100
```

[4]:
```
df.head()
```

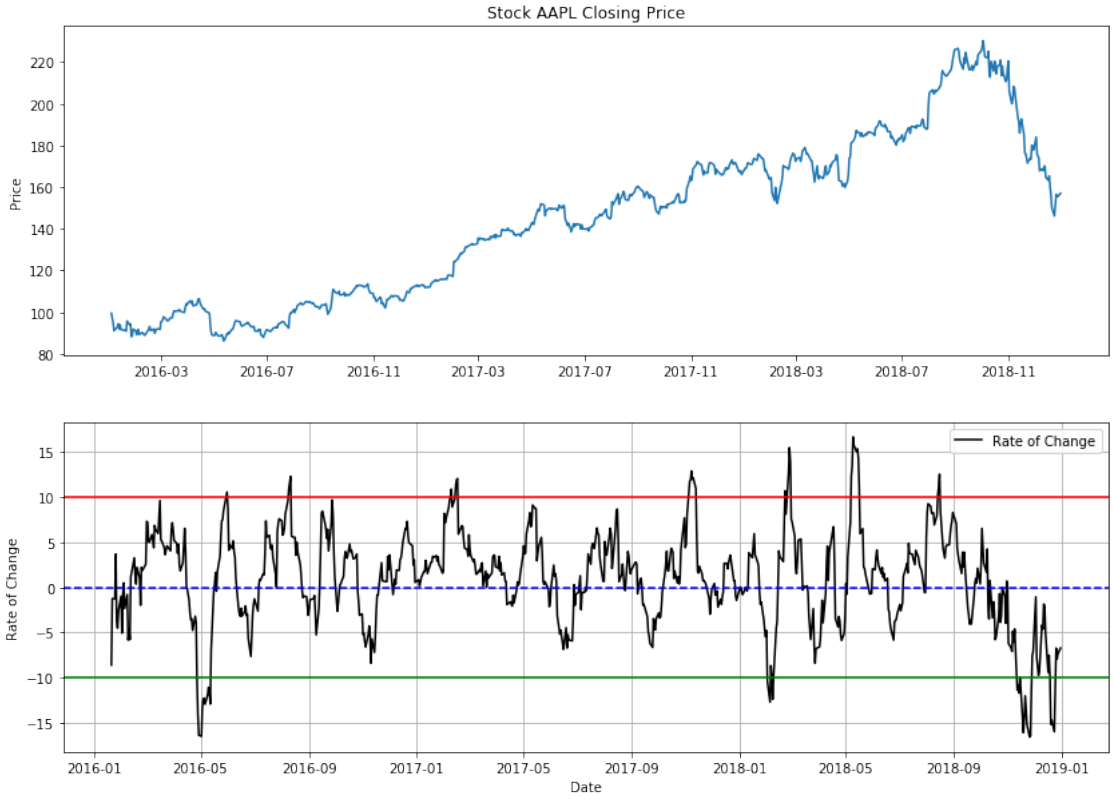
[4]:
```
                  Open        High         Low       Close  Adj Close  \
Date
2016-01-04  102.610001  105.370003  102.000000  105.349998  99.499107
2016-01-05  105.750000  105.849998  102.410004  102.709999  97.005730
2016-01-06  100.559998  102.370003   99.870003  100.699997  95.107361
2016-01-07   98.680000  100.129997   96.430000   96.449997  91.093399
2016-01-08   98.550003   99.110001   96.760002   96.959999  91.575073

               Volume  ROC
Date
2016-01-04  67649400  NaN
2016-01-05  55791000  NaN
2016-01-06  68457400  NaN
2016-01-07  81094400  NaN
2016-01-08  70798000  NaN
```

[5]:
```
fig = plt.figure(figsize=(14,10))
ax1 = plt.subplot(2, 1, 1)
ax1.plot(df['Adj Close'])
ax1.set_title('Stock '+ symbol +' Closing Price')
ax1.set_ylabel('Price')

ax2 = plt.subplot(2, 1, 2)
ax2.plot(df['ROC'], label='Rate of Change', color='black')
ax2.axhline(y=0, color='blue', linestyle='--')
ax2.axhline(y=10, color='red')
ax2.axhline(y=-10, color='green')
ax2.grid()
ax2.set_ylabel('Rate of Change')
ax2.set_xlabel('Date')
ax2.legend(loc='best')
```

[5]:
```
<matplotlib.legend.Legend at 0x2c79a141e10>
```



1.1

1.2 Candlestick with (ROC)

[6]:
```
from matplotlib import dates as mdates
import datetime as dt

dfc = df.copy()
dfc['VolumePositive'] = dfc['Open'] < dfc['Adj Close']
#dfc = dfc.dropna()
dfc = dfc.reset_index()
dfc['Date'] = mdates.date2num(dfc['Date'].astype(dt.date))
dfc.head()
```

[6]:

	Date	Open	High	Low	Close	Adj Close	Volume	ROC	VolumePositive
0	735967.0	102.610001	105.370003	102.000000	105.349998	99.499107			
1	735968.0	105.750000	105.849998	102.410004	102.709999	97.005730			
2	735969.0	100.559998	102.370003	99.870003	100.699997	95.107361			
3	735970.0	98.680000	100.129997	96.430000	96.449997	91.093399			
4	735971.0	98.550003	99.110001	96.760002	96.959999	91.575073			

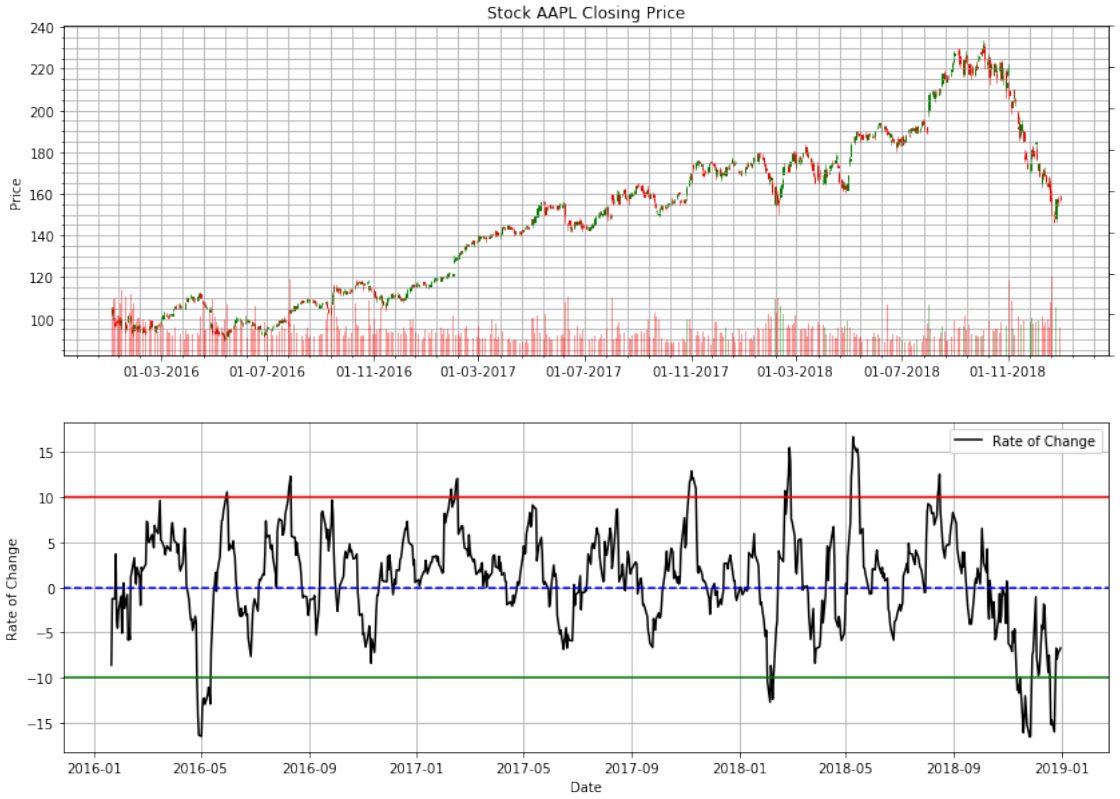
```
0  67649400  NaN          False
1  55791000  NaN          False
2  68457400  NaN          False
3  81094400  NaN          False
4  70798000  NaN          False
```

[7]:
```
from mpl_finance import candlestick_ohlc

fig = plt.figure(figsize=(14,10))
ax1 = plt.subplot(2, 1, 1)
candlestick_ohlc(ax1,dfc.values, width=0.5, colorup='g', colordown='r', alpha=1.
↪0)
ax1.xaxis_date()
ax1.xaxis.set_major_formatter(mdates.DateFormatter('%d-%m-%Y'))
ax1.grid(True, which='both')
ax1.minorticks_on()
ax1v = ax1.twinx()
colors = dfc.VolumePositive.map({True: 'g', False: 'r'})
ax1v.bar(dfc.Date, dfc['Volume'], color=colors, alpha=0.4)
ax1v.axes.yaxis.set_ticklabels([])
ax1v.set_ylim(0, 3*df.Volume.max())
ax1.set_title('Stock '+ symbol +' Closing Price')
ax1.set_ylabel('Price')

ax2 = plt.subplot(2, 1, 2)
ax2.plot(df['ROC'], label='Rate of Change', color='black')
ax2.axhline(y=0, color='blue', linestyle='--')
ax2.axhline(y=10, color='red')
ax2.axhline(y=-10, color='green')
ax2.grid()
ax2.set_ylabel('Rate of Change')
ax2.set_xlabel('Date')
ax2.legend(loc='best')
```

[7]:
```
<matplotlib.legend.Legend at 0x2c79c23cb38>
```


Stock AAPL Closing Price
Price
240
220
200
180
160
140
120
100
01-03-2016
01-07-2016
01-11-2016
01-03-2017
01-07-2017
01-11-2017
01-03-2018
01-07-2018
01-11-2018
Rate of Change
Rate of Change
15
10
5
0
−5
−10
−15
2016-01
2016-05
2016-09
2017-01
2017-05
2017-09
2018-01
2018-05
2018-09
2019-01
Date