ROCP

September 29, 2021

1 Rate of Change Percentage (ROCP)

https://www.tradingtechnologies.com/xtrader-help/x-study/technical-indicator-definitions/rate-of-change-rocp/

[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 yfinance as yf
yf.pdr_override()
```

[2]:
```
# input
symbol = 'AAPL'
start = '2018-01-01'
end = '2019-01-01'

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

# View Columns
df.head()
```

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

[2]:

Date	Adj Close	Close	High	Low	Open	Volume
2018-01-02	167.199890	172.259995	172.300003	169.259995	170.160004	
2018-01-03	167.170776	172.229996	174.550003	171.960007	172.529999	
2018-01-04	167.947266	173.029999	173.470001	172.080002	172.539993	
2018-01-05	169.859406	175.000000	175.369995	173.050003	173.440002	
2018-01-08	169.228500	174.350006	175.610001	173.929993	174.350006	

```
Date
2018-01-02  25555900
2018-01-03  29517900
2018-01-04  22434600
2018-01-05  23660000
2018-01-08  20567800
```

[3]:
```
n = 12
df['ROCP'] = (df['Adj Close']/df['Adj Close'].shift(n)) - 1.0
```

[4]:
```
df.head(20)
```

[4]:
```
             Adj Close       Close        High         Low        Open  \
Date
2018-01-02  167.199890  172.259995  172.300003  169.259995  170.160004
2018-01-03  167.170776  172.229996  174.550003  171.960007  172.529999
2018-01-04  167.947266  173.029999  173.470001  172.080002  172.539993
2018-01-05  169.859406  175.000000  175.369995  173.050003  173.440002
2018-01-08  169.228500  174.350006  175.610001  173.929993  174.350006
2018-01-09  169.209091  174.330002  175.059998  173.410004  174.550003
2018-01-10  169.170258  174.289993  174.300003  173.000000  173.160004
2018-01-11  170.131180  175.279999  175.490005  174.490005  174.589996
2018-01-12  171.888031  177.089996  177.360001  175.649994  176.179993
2018-01-16  171.014465  176.190002  179.389999  176.139999  177.899994
2018-01-17  173.839005  179.100006  179.250000  175.070007  176.149994
2018-01-18  173.994293  179.259995  180.100006  178.250000  179.369995
2018-01-19  173.217789  178.460007  179.580002  177.410004  178.610001
2018-01-22  171.800674  177.000000  177.779999  176.600006  177.300003
2018-01-23  171.839493  177.039993  179.440002  176.820007  177.300003
2018-01-24  169.102325  174.220001  177.300003  173.199997  177.250000
2018-01-25  166.083679  171.110001  174.949997  170.529999  174.509995
2018-01-26  166.471924  171.509995  172.000000  170.059998  172.000000
2018-01-29  163.026215  167.960007  170.160004  167.070007  170.160004
2018-01-30  162.065277  166.970001  167.369995  164.699997  165.529999

              Volume      ROCP
Date
2018-01-02  25555900       NaN
2018-01-03  29517900       NaN
2018-01-04  22434600       NaN
2018-01-05  23660000       NaN
2018-01-08  20567800       NaN
2018-01-09  21584000       NaN
2018-01-10  23959900       NaN
2018-01-11  18667700       NaN
2018-01-12  25418100       NaN
2018-01-16  29565900       NaN
```

```
2018-01-17  34386800       NaN
2018-01-18  31193400       NaN
2018-01-19  32425100  0.035992
2018-01-22  27108600  0.027696
2018-01-23  32689100  0.023175
2018-01-24  51105100 -0.004457
2018-01-25  41529000 -0.018583
2018-01-26  39143000 -0.016176
2018-01-29  50640400 -0.036319
2018-01-30  46048200 -0.047410
```

[5]:
```
df.tail()
```

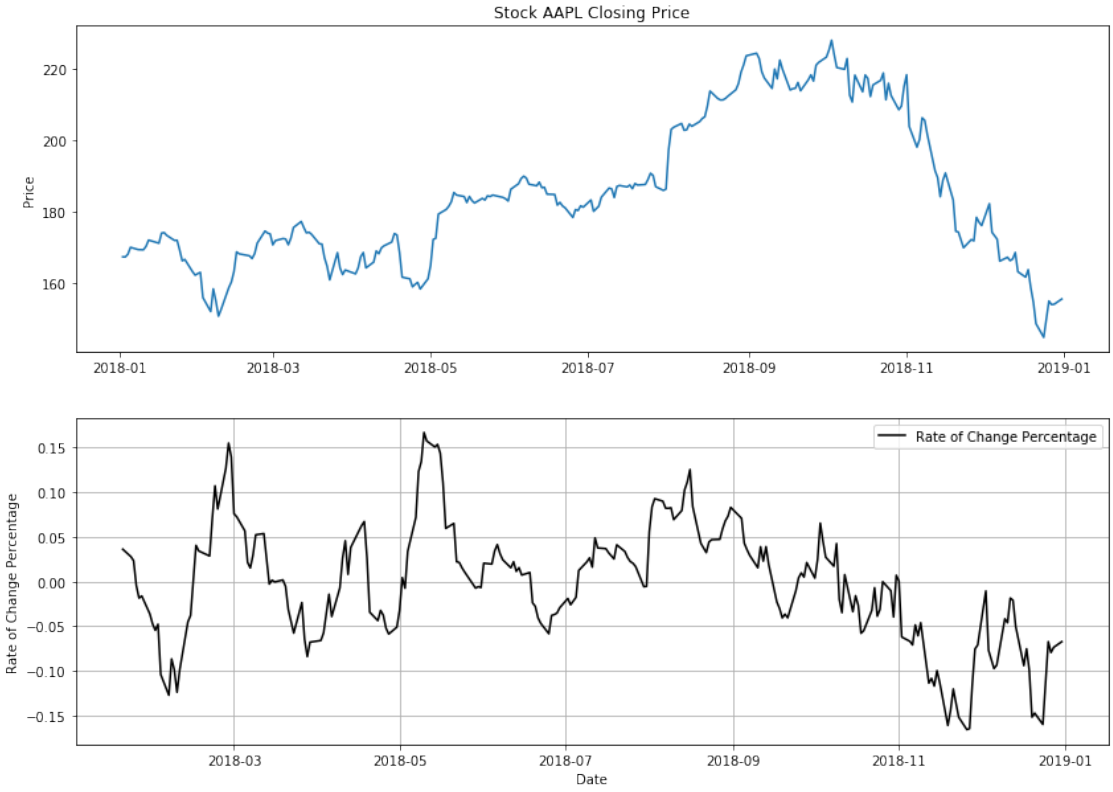
[5]:
```
              Adj Close       Close        High         Low        Open  \
Date
2018-12-24  144.656540  146.830002  151.550003  146.589996  148.149994
2018-12-26  154.843475  157.169998  157.229996  146.720001  148.300003
2018-12-27  153.838562  156.149994  156.770004  150.070007  155.839996
2018-12-28  153.917389  156.229996  158.520004  154.550003  157.500000
2018-12-31  155.405045  157.740005  159.360001  156.479996  158.529999

               Volume      ROCP
Date
2018-12-24  37169200 -0.159627
2018-12-26  58582500 -0.067185
2018-12-27  53117100 -0.079304
2018-12-28  42291400 -0.073534
2018-12-31  35003500 -0.067179
```

[6]:
```
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['ROCP'], label='Rate of Change Percentage', 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 Percentage')
ax2.set_xlabel('Date')
ax2.legend(loc='best')
```

[6]:
```
<matplotlib.legend.Legend at 0x1af1b9405c0>
```



1.1 Candlestick with (ROCP)

[7]:
```
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'] = pd.to_datetime(dfc['Date'])
dfc['Date'] = dfc['Date'].apply(mdates.date2num)
dfc.head()
```

[7]:

	Date	Adj Close	Close	High	Low	Open	Volume	ROCP	VolumePositive
0	736696.0	167.199890	172.259995	172.300003	169.259995	170.160004			
1	736697.0	167.170776	172.229996	174.550003	171.960007	172.529999			
2	736698.0	167.947266	173.029999	173.470001	172.080002	172.539993			
3	736699.0	169.859406	175.000000	175.369995	173.050003	173.440002			
4	736702.0	169.228500	174.350006	175.610001	173.929993	174.350006			

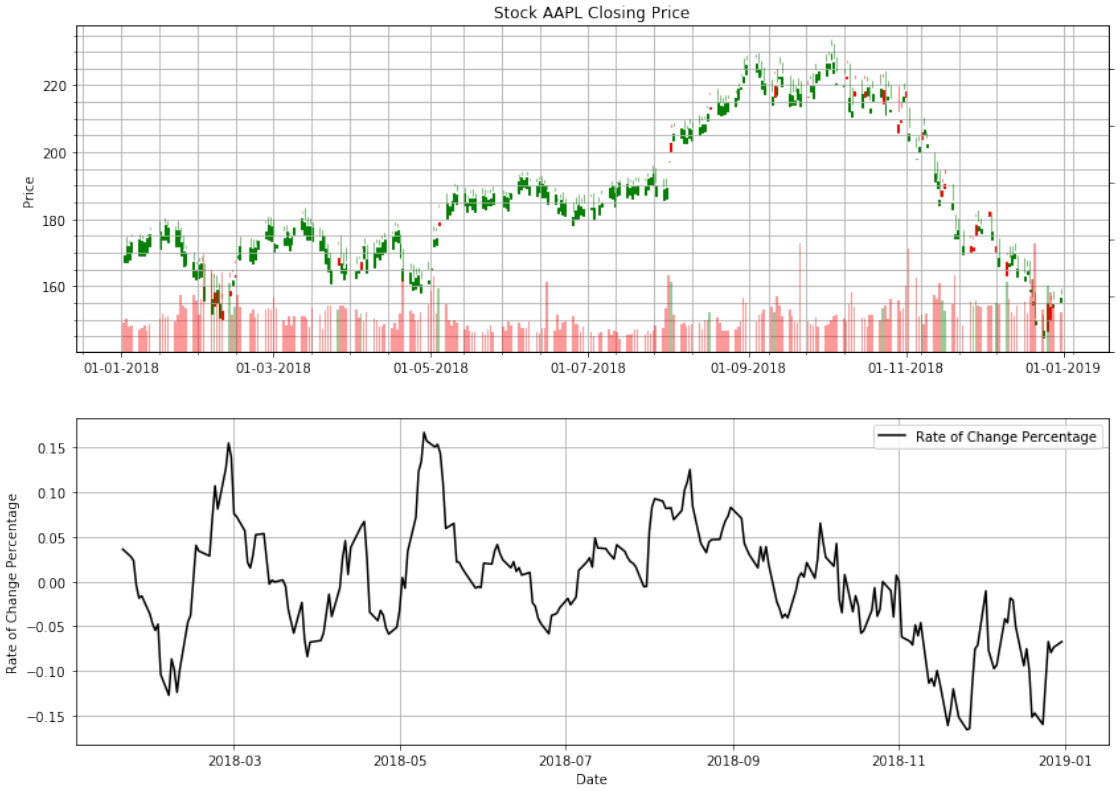
```
0  25555900   NaN           False
1  29517900   NaN           False
2  22434600   NaN           False
3  23660000   NaN           False
4  20567800   NaN           False
```

[8]:
```
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['ROCP'], label='Rate of Change Percentage', 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 Percentage')
ax2.set_xlabel('Date')
ax2.legend(loc='best')
```

[8]:
```
<matplotlib.legend.Legend at 0x1af1c066940>
```


Stock AAPL Closing Price
Price
220
200
180
160
01-01-2018
01-03-2018
01-05-2018
01-07-2018
01-09-2018
01-11-2018
01-01-2019
Rate of Change Percentage
Rate of Change Percentage
0.15
0.10
0.05
0.00
−0.05
−0.10
−0.15
2018-03
2018-05
2018-07
2018-09
2018-11
2019-01
Date