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/

```python
[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()
```

```python
[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]:            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

                   Volume
```

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

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

[4]:
```python
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]:
```python
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>`

Stock AAPL Closing Price
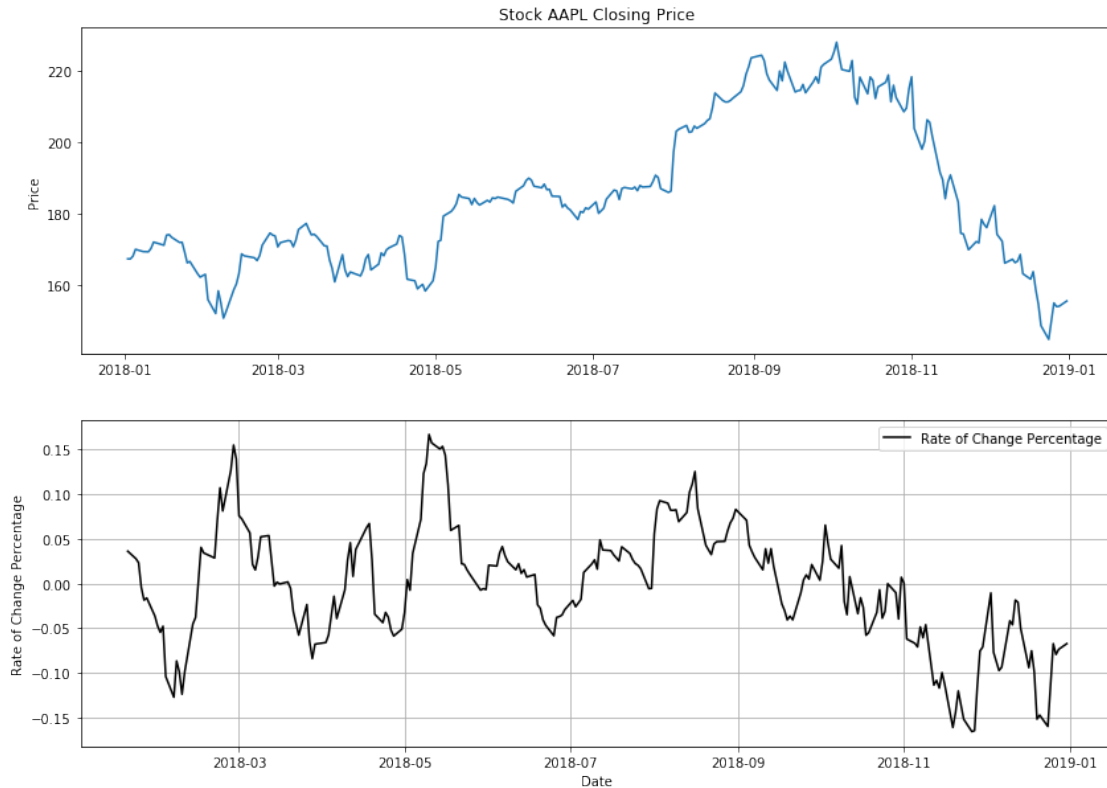
1.1 Candlestick with (ROCP)

```
[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  \
     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

         Volume  ROCP  VolumePositive
```

4

```
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