APO

September 29, 2021

1 Absolute Price Oscillator (APO)

https://library.tradingtechnologies.com/trade/chrt-ti-absolute-price-oscillator.html

[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 = '2018-08-01'
end = '2018-12-31'

# 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
2018-08-01	199.130005	201.759995	197.309998	201.500000	198.478760	
2018-08-02	200.580002	208.380005	200.350006	207.389999	204.280457	
2018-08-03	207.029999	208.740005	205.479996	207.990005	204.871445	
2018-08-06	208.000000	209.250000	207.070007	209.070007	205.935257	
2018-08-07	209.320007	209.500000	206.759995	207.110001	204.004639	

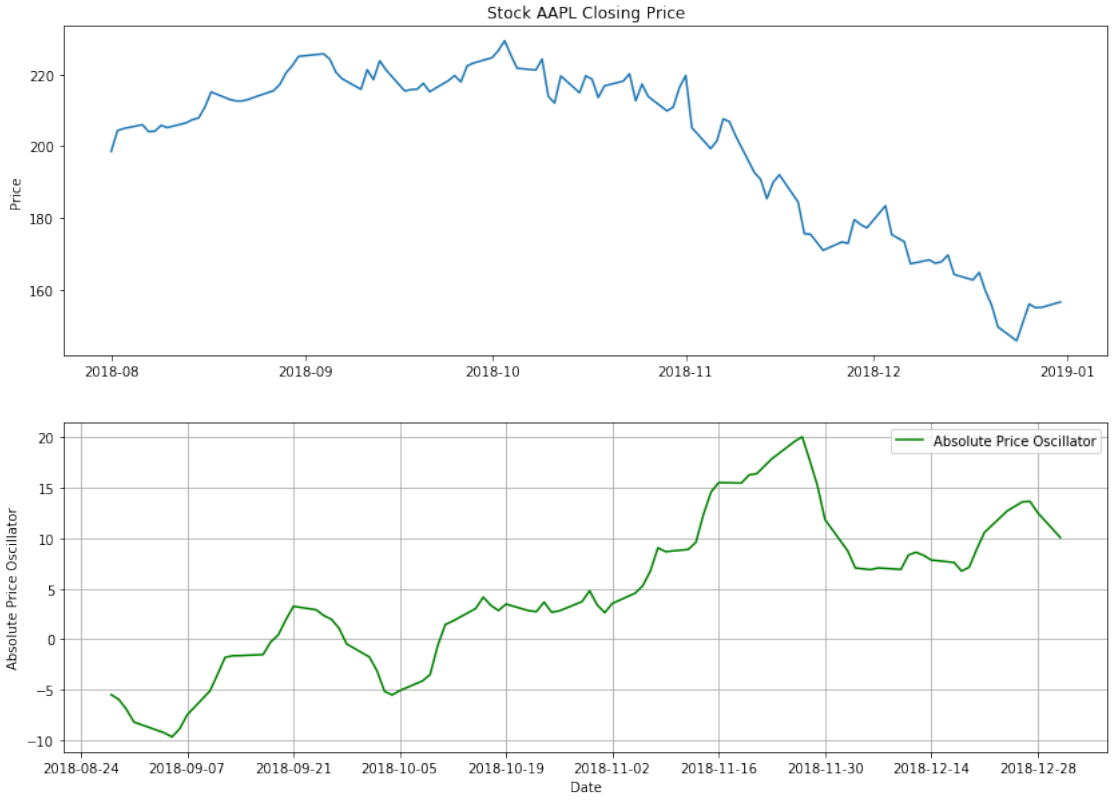
```
2018-08-01  67935700
2018-08-02  62404000
2018-08-03  33447400
2018-08-06  25425400
2018-08-07  25587400
```

[3]:
```
df['HL'] = (df['High'] + df['Low'])/2
df['HLC'] = (df['High'] + df['Low'] + df['Adj Close'])/3
df['HLCC'] = (df['High'] + df['Low'] + df['Adj Close'] + df['Adj Close'])/4
df['OHLC'] = (df['Open'] + df['High'] + df['Low'] + df['Adj Close'])/4
```

[4]:
```
df['Long_Cycle'] = df['Adj Close'].rolling(20).mean()
df['Short_Cycle'] = df['Adj Close'].rolling(5).mean()
df['APO'] = df['Long_Cycle'] - df['Short_Cycle']
```

[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['APO'], label='Absolute Price Oscillator', color='green')
ax2.grid()
ax2.set_ylabel('Absolute Price Oscillator')
ax2.set_xlabel('Date')
ax2.legend(loc='best')
```

[5]:
```
<matplotlib.legend.Legend at 0x1aa2dbee048>
```



1.1 Candlestick with Absolute Price Oscillator (APO)

[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]:

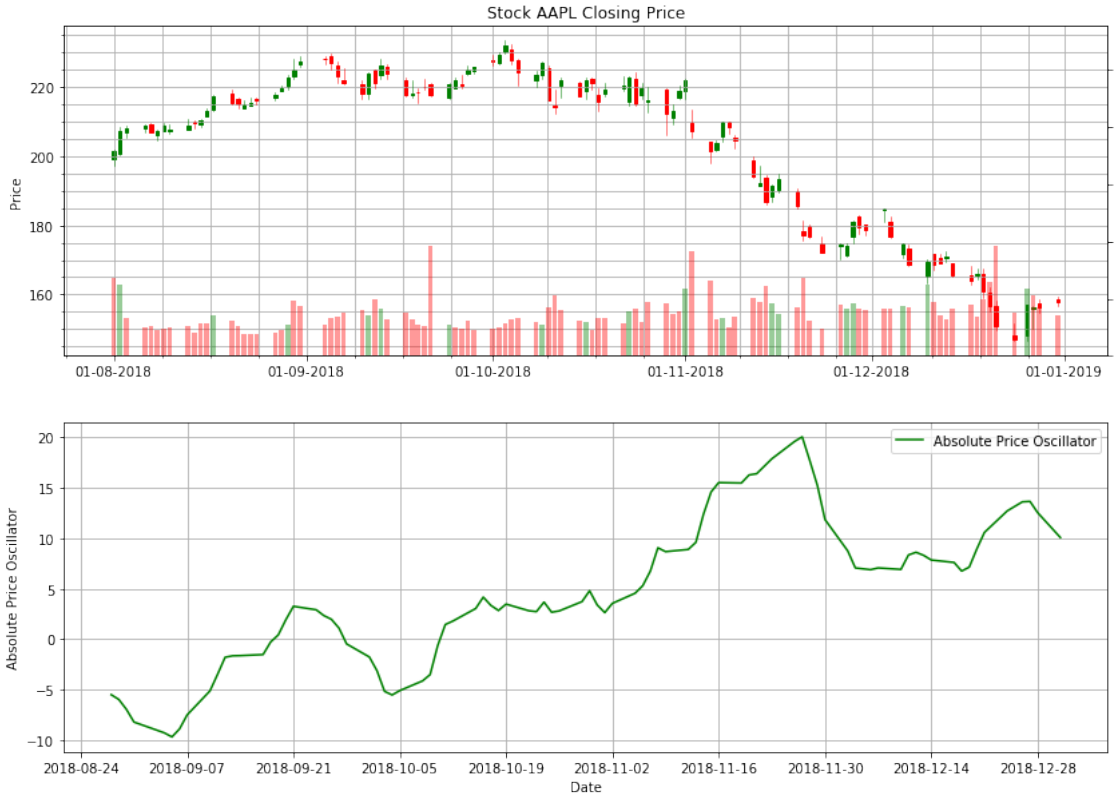
	Date	Open	High	Low	Close	Adj Close	\
0	736907.0	199.130005	201.759995	197.309998	201.500000	198.478760	
1	736908.0	200.580002	208.380005	200.350006	207.389999	204.280457	
2	736909.0	207.029999	208.740005	205.479996	207.990005	204.871445	
3	736912.0	208.000000	209.250000	207.070007	209.070007	205.935257	
4	736913.0	209.320007	209.500000	206.759995	207.110001	204.004639	

	Volume	HL	HLC	HLCC	OHLC	Long_Cycle	\
0	67935700	199.534997	199.182918	199.006878	199.169690	NaN	

```
1  62404000  204.365005  204.336823  204.322731  203.397618         NaN
2  33447400  207.110001  206.363815  205.990723  206.530361         NaN
3  25425400  208.160004  207.418421  207.047630  207.563816         NaN
4  25587400  208.129998  206.754878  206.067318  207.396160         NaN

   Short_Cycle  APO  VolumePositive
0          NaN  NaN           False
1          NaN  NaN            True
2          NaN  NaN           False
3          NaN  NaN           False
4   203.514112  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['APO'], label='Absolute Price Oscillator', color='green')
ax2.grid()
ax2.set_ylabel('Absolute Price Oscillator')
ax2.set_xlabel('Date')
ax2.legend(loc='best')
```

[7]:
```
<matplotlib.legend.Legend at 0x1aa2de21cf8>
```


Stock AAPL Closing Price
Price
220
200
180
160
01-08-2018
01-09-2018
01-10-2018
01-11-2018
01-12-2018
01-01-2019
Absolute Price Oscillator
Absolute Price Oscillator
20
15
10
5
0
−5
−10
2018-08-24
2018-09-07
2018-09-21
2018-10-05
2018-10-19
2018-11-02
2018-11-16
2018-11-30
2018-12-14
2018-12-28
Date