

# NATR

September 29, 2021

## 1 Normalized Average True Range (NATR)

[https://stockcharts.com/school/doku.php?id=chart\\_school:technical\\_indicators:average\\_true\\_range\\_atr](https://stockcharts.com/school/doku.php?id=chart_school:technical_indicators:average_true_range_atr)

```
[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 = '2017-01-01'
end = '2019-01-01'

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

# View Columns
df.head()
```

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

```
[2]:
```

	Open	High	Low	Close	Adj Close	\
Date						
2017-01-03	115.800003	116.330002	114.760002	116.150002	111.286987	
2017-01-04	115.849998	116.510002	115.750000	116.019997	111.162437	
2017-01-05	115.919998	116.860001	115.809998	116.610001	111.727715	
2017-01-06	116.779999	118.160004	116.470001	117.910004	112.973305	
2017-01-09	117.949997	119.430000	117.940002	118.989998	114.008080	

	Volume
Date	

```

2017-01-03  28781900
2017-01-04  21118100
2017-01-05  22193600
2017-01-06  31751900
2017-01-09  33561900

```

```

[3]: n = 14
df['HL'] = df['High'] - df['Low']
df['HC'] = abs(df['High'] - df['Adj Close'].shift())
df['LC'] = abs(df['Low'] - df['Adj Close'].shift())
df['TR'] = df[['HL', 'HC', 'LC']].max(axis=1)
df['ATR'] = df['TR'].rolling(n).mean()
df['NATR'] = df['ATR'].shift(n)/df['Adj Close'].shift(n) * 100
df = df.drop(['HL', 'HC', 'LC', 'TR', 'ATR'],axis=1)

```

```

[4]: df.tail()

```

```

[4]:
           Open           High           Low           Close  Adj Close  \
Date
2018-12-24  148.149994  151.550003  146.589996  146.830002  145.090836
2018-12-26  148.300003  157.229996  146.720001  157.169998  155.308350
2018-12-27  155.839996  156.770004  150.070007  156.149994  154.300446
2018-12-28  157.500000  158.520004  154.550003  156.229996  154.379486
2018-12-31  158.529999  159.360001  156.479996  157.740005  155.871613

```

```

           Volume      NATR
Date
2018-12-24  37169200  3.377310
2018-12-26  58582500  3.558518
2018-12-27  53117100  3.425293
2018-12-28  42291400  3.500781
2018-12-31  35003500  3.517625

```

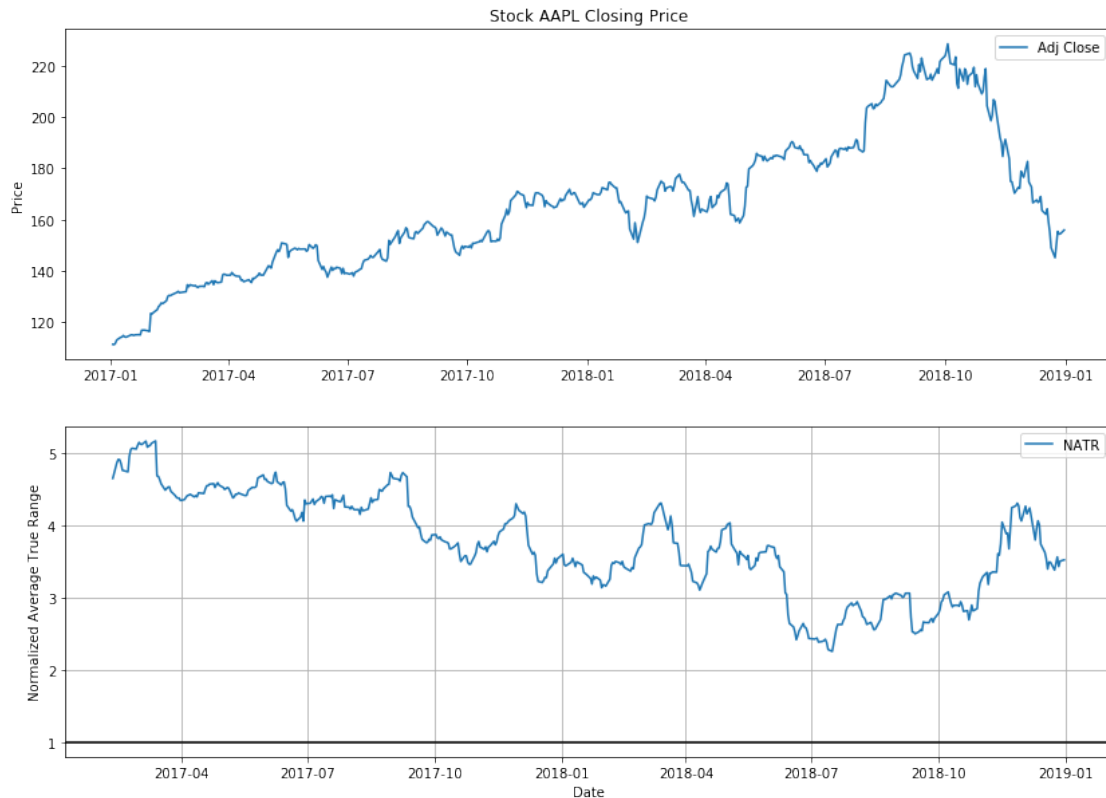
```

[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')
ax1.legend(loc='best')

ax2 = plt.subplot(2, 1, 2)
ax2.plot(df['NATR'], label='NATR')
ax2.axhline(y=1, color='black')
ax2.grid()
ax2.legend(loc='best')
ax2.set_ylabel('Normalized Average True Range')
ax2.set_xlabel('Date')

```

[5]: Text(0.5, 0, 'Date')



## 1.1 Candlestick with NATR

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

```
[6]:      Date      Open      High      Low      Close  Adj Close  \
0  736332.0  115.800003  116.330002  114.760002  116.150002  111.286987
1  736333.0  115.849998  116.510002  115.750000  116.019997  111.162437
2  736334.0  115.919998  116.860001  115.809998  116.610001  111.727715
3  736335.0  116.779999  118.160004  116.470001  117.910004  112.973305
4  736338.0  117.949997  119.430000  117.940002  118.989998  114.008080
```

	Volume	NATR	VolumePositive
0	28781900	NaN	False
1	21118100	NaN	False
2	22193600	NaN	False
3	31751900	NaN	False
4	33561900	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['NATR'], label='NATR')
ax2.axhline(y=1, color='black')
ax2.grid()
ax2.legend(loc='best')
ax2.set_ylabel('Average True Range')
ax2.set_xlabel('Date')
```

```
[7]: Text(0.5, 0, 'Date')
```

