# MFI

September 29, 2021

## 1 Money Flow Index (MFI)

Money Flow Index (MFI) is a technical oscillator that uses price and volume for identifying overbought or oversold conditions in an asset. It can also be used to spot divergences which warn of a trend change in price. The oscillator moves between 0 and 100.

https://www.investopedia.com/terms/m/mfi.asp

[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 = '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 |
|---|---|---|---|---|---|
| 2018-08-01 | 199.130005 | 201.759995 | 197.309998 | 201.500000 | 199.243088 |
| 2018-08-02 | 200.580002 | 208.380005 | 200.350006 | 207.389999 | 205.067123 |
| 2018-08-03 | 207.029999 | 208.740005 | 205.479996 | 207.990005 | 205.660416 |
| 2018-08-06 | 208.000000 | 209.250000 | 207.070007 | 209.070007 | 206.728317 |

```
2018-08-07  209.320007  209.500000  206.759995  207.110001  204.790268

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

[3]:
```
import talib as ta
```

[4]:
```
df['MFI'] = ta.MFI(df['High'], df['Low'],df['Adj Close'], df['Volume'],␣
 ↪timeperiod=14)
```

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

[5]:
```
                 Open        High         Low       Close   Adj Close  \
Date
2018-12-24  148.149994  151.550003  146.589996  146.830002  146.202972
2018-12-26  148.300003  157.229996  146.720001  157.169998  156.498810
2018-12-27  155.839996  156.770004  150.070007  156.149994  155.483154
2018-12-28  157.500000  158.520004  154.550003  156.229996  155.562820
2018-12-31  158.529999  159.360001  156.479996  157.740005  157.066376

               Volume        MFI
Date
2018-12-24  37169200  22.837777
2018-12-26  58582500  30.569679
2018-12-27  53117100  37.665928
2018-12-28  42291400  43.782846
2018-12-31  35003500  50.947126
```

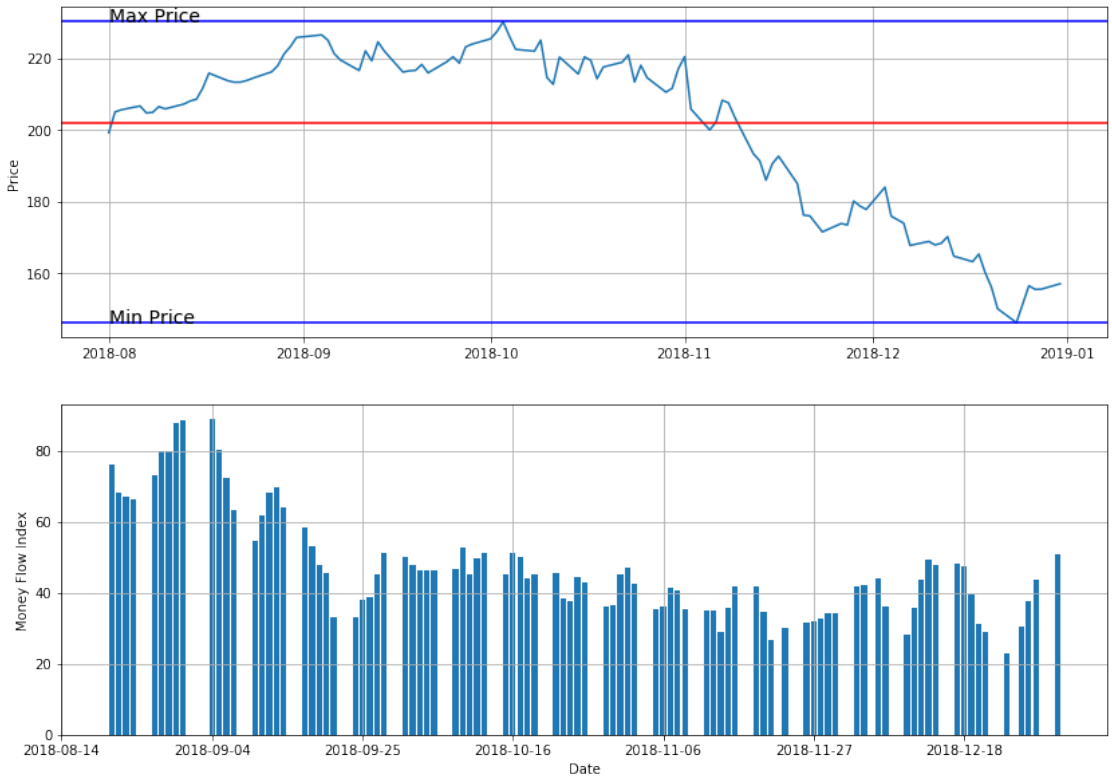
[6]:
```
df['Positive'] = df['MFI'] > 0
```

[7]:
```
df['MFI'] = ta.MFI(df['High'], df['Low'],df['Adj Close'], df['Volume'],␣
 ↪timeperiod=14)# Line Chart
fig = plt.figure(figsize=(14,10))
ax1 = plt.subplot(2, 1, 1)
ax1.plot(df.index, df['Adj Close'])
ax1.axhline(y=df['Adj Close'].mean(),color='r')
ax1.axhline(y=df['Adj Close'].max(),color='b')
ax1.axhline(y=df['Adj Close'].min(),color='b')
ax1.text(s='Max Price', x=df['Adj Close'].index[0], y=df['Adj Close'].max(),␣
 ↪fontsize=14)
ax1.text(s='Min Price', x=df['Adj Close'].index[0], y=df['Adj Close'].min(),␣
 ↪fontsize=14)
```

```
ax1.set_ylabel('Price')
ax1.grid()

ax2 = plt.subplot(2, 1, 2)
# ax2.bar(df.index, df['MFI'], color=df.Positive.map({True: 'g', False: 'r'}))
ax2.bar(df.index, df['MFI'])
ax2.grid()
ax2.set_ylabel('Money Flow Index')
ax2.set_xlabel('Date')
```

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




## 1.1 Candlestick with MFI

[8]:
```
from matplotlib import dates as mdates
import datetime as dt

dfc = df.copy()
dfc['MFI'] = ta.MFI(dfc['High'], dfc['Low'],dfc['Adj Close'], dfc['Volume'],␣
 ↪timeperiod=14)
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()
```

[8]:

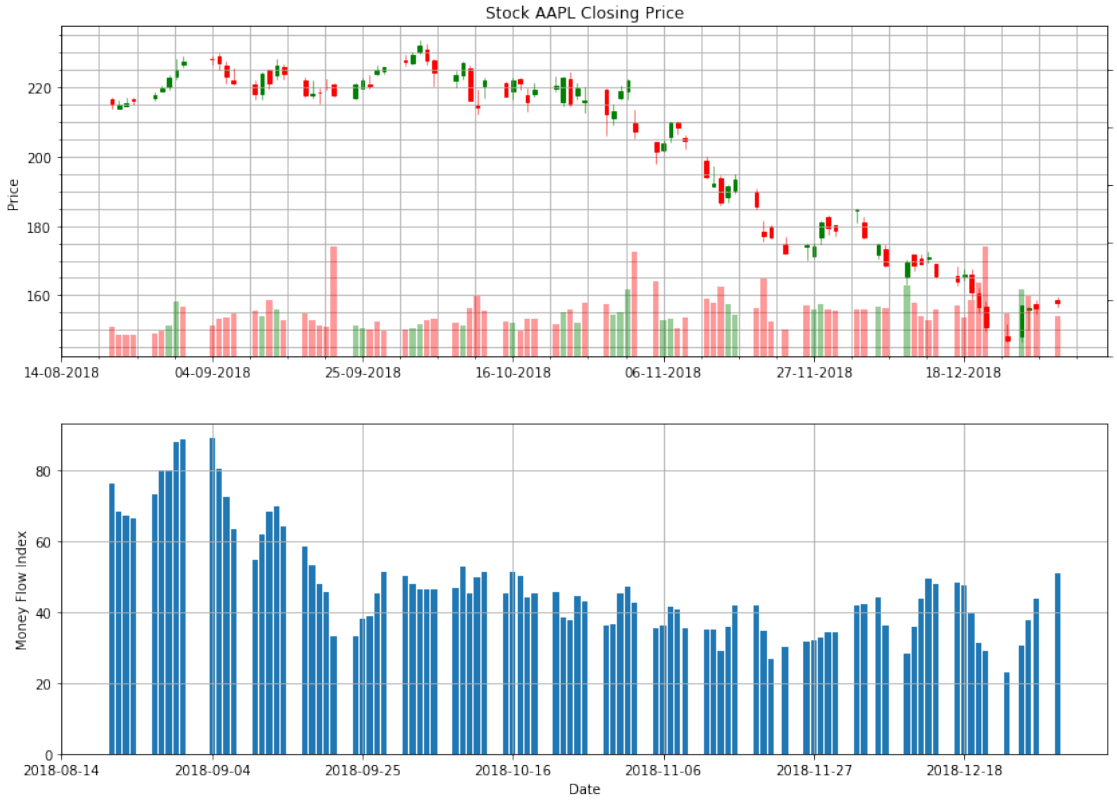
| | Date | Open | High | Low | Close | Adj Close | Volume | MFI | Positive | VolumePositive |
|---|---|---|---|---|---|---|---|---|---|---|
| 0 | 736927.0 | 216.800003 | 217.190002 | 214.029999 | 215.039993 | 213.377167 | 26159800 | 76.119850 | True | False |
| 1 | 736928.0 | 214.100006 | 216.360001 | 213.839996 | 215.050003 | 213.387085 | 19018100 | 68.208761 | True | False |
| 2 | 736929.0 | 214.649994 | 217.050003 | 214.600006 | 215.490005 | 213.823685 | 18883200 | 67.000609 | True | False |
| 3 | 736930.0 | 216.600006 | 216.899994 | 215.110001 | 216.160004 | 214.488495 | 18476400 | 66.418692 | True | False |
| 4 | 736933.0 | 217.149994 | 218.740005 | 216.330002 | 217.940002 | 216.254745 | 20525100 | 73.306063 | True | False |

[9]:
```
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.bar(df.index, df['MFI'])
ax2.grid()
ax2.set_ylabel('Money Flow Index')
ax2.set_xlabel('Date')
```

[9]:
```
Text(0.5,0,'Date')
```


Stock AAPL Closing Price
Price
220
200
180
160
14-08-2018
04-09-2018
25-09-2018
16-10-2018
06-11-2018
27-11-2018
18-12-2018
Money Flow Index
80
60
40
20
0
2018-08-14
2018-09-04
2018-09-25
2018-10-16
2018-11-06
2018-11-27
2018-12-18
Date