

Moving_Dispersion

September 29, 2021

1 Moving Dispersion

<https://www.fmlabs.com/reference/default.htm>

```
[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]:
```

	Open	High	Low	Close	Adj Close	\
Date						
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	

	Volume
Date	

```

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

```

```

[3]: from math import sqrt, log
n = 14 # Number of days
df['Disp'] = np.sqrt(((abs(np.log(df['Adj Close']/df['Adj Close'].shift()))).
↪rolling(n).sum())/n)

```

```

[4]: df.head(20)

```

```

[4]:
      Date      Open      High      Low      Close      Adj Close \
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
2018-08-08 206.050003 207.809998 204.520004 207.250000 204.142532
2018-08-09 207.279999 209.779999 207.199997 208.880005 205.748108
2018-08-10 207.360001 209.100006 206.669998 207.529999 205.135254
2018-08-13 207.699997 210.949997 207.699997 208.869995 206.459793
2018-08-14 210.160004 210.559998 208.259995 209.750000 207.329651
2018-08-15 209.220001 210.740005 208.330002 210.240005 207.813995
2018-08-16 211.750000 213.809998 211.470001 213.320007 210.858459
2018-08-17 213.440002 217.949997 213.160004 217.580002 215.069290
2018-08-20 218.100006 219.179993 215.110001 215.460007 212.973755
2018-08-21 216.800003 217.190002 214.029999 215.039993 212.558609
2018-08-22 214.100006 216.360001 213.839996 215.050003 212.568481
2018-08-23 214.649994 217.050003 214.600006 215.490005 213.003418
2018-08-24 216.600006 216.899994 215.110001 216.160004 213.665680
2018-08-27 217.149994 218.740005 216.330002 217.940002 215.425140
2018-08-28 219.009995 220.539993 218.919998 219.699997 217.164825

```

```

      Date      Volume      Disp
2018-08-01 67935700      NaN
2018-08-02 62404000      NaN
2018-08-03 33447400      NaN
2018-08-06 25425400      NaN
2018-08-07 25587400      NaN
2018-08-08 22525500      NaN
2018-08-09 23469200      NaN
2018-08-10 24611200      NaN
2018-08-13 25869100      NaN

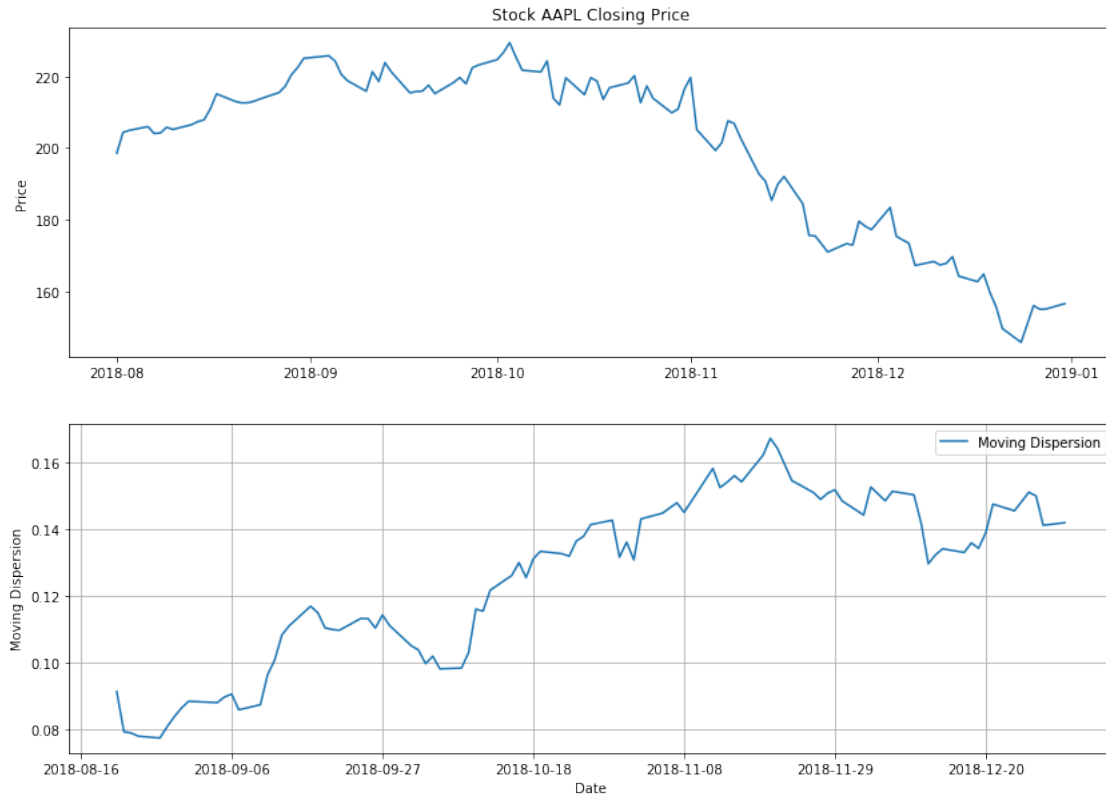
```

2018-08-14	20748000	NaN
2018-08-15	28807600	NaN
2018-08-16	28500400	NaN
2018-08-17	35427000	NaN
2018-08-20	30287700	NaN
2018-08-21	26159800	0.091349
2018-08-22	19018100	0.079309
2018-08-23	18883200	0.078928
2018-08-24	18476400	0.077984
2018-08-27	20525100	0.077424
2018-08-28	22776800	0.080751

```
[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['Disp'], label='Moving Dispersion')
ax2.grid()
ax2.legend(loc='best')
ax2.set_ylabel('Moving Dispersion')
ax2.set_xlabel('Date')
```

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



1.1 Candlestick with Moving Dispersion

```
[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	Disp	VolumePositive
0	67935700	NaN	False

1	62404000	NaN	True
2	33447400	NaN	False
3	25425400	NaN	False
4	25587400	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['Disp'], label='Moving Dispersion')
ax2.grid()
ax2.legend(loc='best')
ax2.set_ylabel('Moving Dispersion')
ax2.set_xlabel('Date')
```

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

