

# Elder\_Force\_Index

September 29, 2021

## 1 Elder Force Index (EFI)

<https://library.tradingtechnologies.com/trade/chrt-ti-elder-force-index.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]:
```

|            | 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]: df.tail()
```

```

[3]:
      Date      Open      High      Low      Close  Adj Close  \
2018-12-24  148.149994  151.550003  146.589996  146.830002  145.642090
2018-12-26  148.300003  157.229996  146.720001  157.169998  155.898438
2018-12-27  155.839996  156.770004  150.070007  156.149994  154.886688
2018-12-28  157.500000  158.520004  154.550003  156.229996  154.966034
2018-12-31  158.529999  159.360001  156.479996  157.740005  156.463837

      Volume
      Date
2018-12-24  37169200
2018-12-26  58582500
2018-12-27  53117100
2018-12-28  42291400
2018-12-31  35003500

```

```

[4]: n = 14
      df['EMA'] = df['Adj Close'].
      ↪ewm(ignore_na=False,span=n,min_periods=n,adjust=True).mean()

```

```
[5]: EFI = df['Adj Close'] - df['Adj Close'].shift() * df['Volume']
```

```
[6]: df['EFI'] = EFI.ewm(ignore_na=False,span=n,min_periods=n,adjust=True).mean()
```

```
[7]: df.head(20)
```

```

[7]:
      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

```

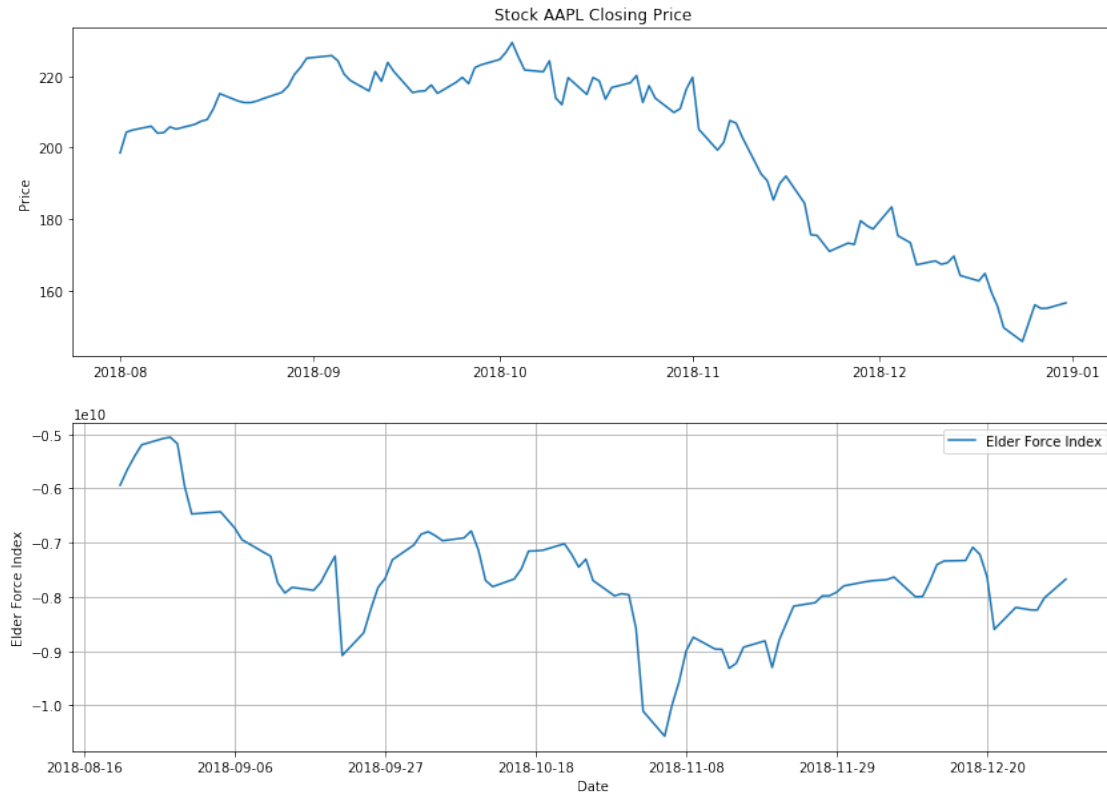
|            |            |            |            |            |            |
|------------|------------|------------|------------|------------|------------|
| 2018-08-16 | 211.750000 | 213.809998 | 211.470001 | 213.320007 | 210.858459 |
| 2018-08-17 | 213.440002 | 217.949997 | 213.160004 | 217.580002 | 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 |

|            | Volume   | EMA        | EFI           |
|------------|----------|------------|---------------|
| Date       |          |            |               |
| 2018-08-01 | 67935700 | NaN        | NaN           |
| 2018-08-02 | 62404000 | NaN        | NaN           |
| 2018-08-03 | 33447400 | NaN        | NaN           |
| 2018-08-06 | 25425400 | NaN        | NaN           |
| 2018-08-07 | 25587400 | NaN        | NaN           |
| 2018-08-08 | 22525500 | NaN        | NaN           |
| 2018-08-09 | 23469200 | NaN        | NaN           |
| 2018-08-10 | 24611200 | NaN        | NaN           |
| 2018-08-13 | 25869100 | NaN        | NaN           |
| 2018-08-14 | 20748000 | NaN        | NaN           |
| 2018-08-15 | 28807600 | NaN        | NaN           |
| 2018-08-16 | 28500400 | NaN        | NaN           |
| 2018-08-17 | 35427000 | NaN        | NaN           |
| 2018-08-20 | 30287700 | 208.667778 | NaN           |
| 2018-08-21 | 26159800 | 209.255222 | -5.940029e+09 |
| 2018-08-22 | 19018100 | 209.746788 | -5.653531e+09 |
| 2018-08-23 | 18883200 | 210.222798 | -5.410281e+09 |
| 2018-08-24 | 18476400 | 210.719656 | -5.194722e+09 |
| 2018-08-27 | 20525100 | 211.391350 | -5.077941e+09 |
| 2018-08-28 | 22776800 | 212.207810 | -5.053496e+09 |

```
[8]: 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.index, df['EFI'], label='Elder Force Index')
ax2.grid()
ax2.set_ylabel('Elder Force Index')
ax2.set_xlabel('Date')
ax2.legend(loc='best')
```

```
[8]: <matplotlib.legend.Legend at 0x2968b157278>
```



## 1.1 Candlestick with Elder Force Index

```
[9]: 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()
```

```
[9]:
```

|   | 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   | EMA | EFI | VolumePositive |
|---|----------|-----|-----|----------------|
| 0 | 67935700 | NaN | NaN | False          |

|   |          |     |     |       |
|---|----------|-----|-----|-------|
| 1 | 62404000 | NaN | NaN | True  |
| 2 | 33447400 | NaN | NaN | False |
| 3 | 25425400 | NaN | NaN | False |
| 4 | 25587400 | NaN | NaN | False |

```
[10]: 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.index, df['EFI'], label='Elder Force Index')
ax2.grid()
ax2.set_ylabel('Elder Force Index')
ax2.set_xlabel('Date')
ax2.legend(loc='best')
```

```
[10]: <matplotlib.legend.Legend at 0x2968b382cc0>
```

