ADX

September 29, 2021

1 Average Directional Index (ADX)

https://stockcharts.com/school/doku.php?id=chart_school:technical_indicators:average_directional_index_adx

Average Directional Index (ADX) is technical indicator; as a result, the values range from 0 to 100. The ADX gives a signal of trend strength.

If ADX is below 20, the trend is weak; however, if ADX is above 50, the trend is strong. ADX does not tell you the direction of the trend and it only gives the strength of the trend.

```python
[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()
```

```python
[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  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]:
```python
# Simple Line Chart
plt.figure(figsize=(14,10))
plt.plot(df['Adj Close'])
plt.legend(loc='best')
plt.title('Stock '+ symbol +' Closing Price')
plt.xlabel('Date')
plt.ylabel('Price')
plt.show()
```
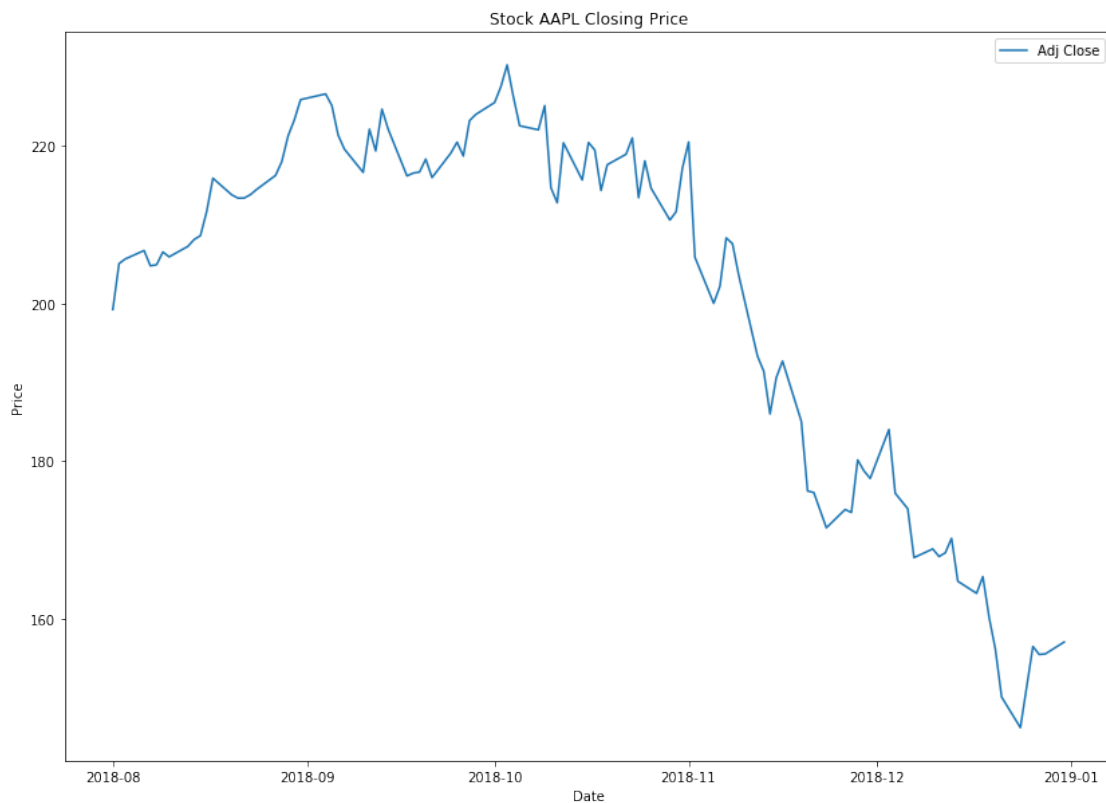

[4]:
```python
import talib as ta
```

```
[5]: adx = ta.ADX(df['High'], df['Low'],df['Adj Close'], timeperiod=14)
     adx = adx.dropna()
     adx
```

[5]: Date
     2018-09-10   62.531606
     2018-09-11   59.716709
     2018-09-12   57.256106
     2018-09-13   55.642423
     2018-09-14   54.124601
     2018-09-17   50.932470
     2018-09-18   47.923933
     2018-09-19   44.593145
     2018-09-20   42.191964
     2018-09-21   39.416968
     2018-09-24   36.651108
     2018-09-25   34.517000
     2018-09-26   32.787120
     2018-09-27   31.855957
     2018-09-28   30.991306
     2018-10-01   30.990275
     2018-10-02   31.106783
     2018-10-03   31.855445
     2018-10-04   31.419180
     2018-10-05   29.258502
     2018-10-08   27.177840
     2018-10-09   25.817106
     2018-10-10   24.800296
     2018-10-11   24.523185
     2018-10-12   23.458783
     2018-10-15   22.470410
     2018-10-16   21.271855
     2018-10-17   20.158910
     2018-10-18   20.373058
     2018-10-19   20.170461
                        …
     2018-11-15   33.020647
     2018-11-16   33.818358
     2018-11-19   34.924261
     2018-11-20   36.577722
     2018-11-21   38.113078
     2018-11-23   39.796565
     2018-11-26   41.460844
     2018-11-27   43.006245
     2018-11-28   42.906678
     2018-11-29   42.492468
     2018-11-30   42.175102
```

```
2018-12-03    40.895699
2018-12-04    40.266692
2018-12-06    40.247424
2018-12-07    40.415826
2018-12-10    40.977604
2018-12-11    41.127003
2018-12-12    41.236237
2018-12-13    41.181737
2018-12-14    41.546472
2018-12-17    42.111931
2018-12-18    42.637000
2018-12-19    43.574753
2018-12-20    44.722386
2018-12-21    46.144672
2018-12-24    47.633779
2018-12-26    47.605682
2018-12-27    47.579591
2018-12-28    47.128893
2018-12-31    46.503216
Length: 78, dtype: float64
```

[6]:
```python
# Line Chart
fig = plt.figure(figsize=(14,10))
ax1 = plt.subplot(2, 1, 1)
ax1.plot(df['Adj Close'])
#ax1.grid(True, which='both')
ax1.grid(which='minor', linestyle='-', linewidth='0.5', color='black')
ax1.grid(which='major', linestyle='-', linewidth='0.5', color='red')
ax1.minorticks_on()
ax1.legend(loc='best')
ax1.set_title('Stock '+ symbol +' Closing Price')
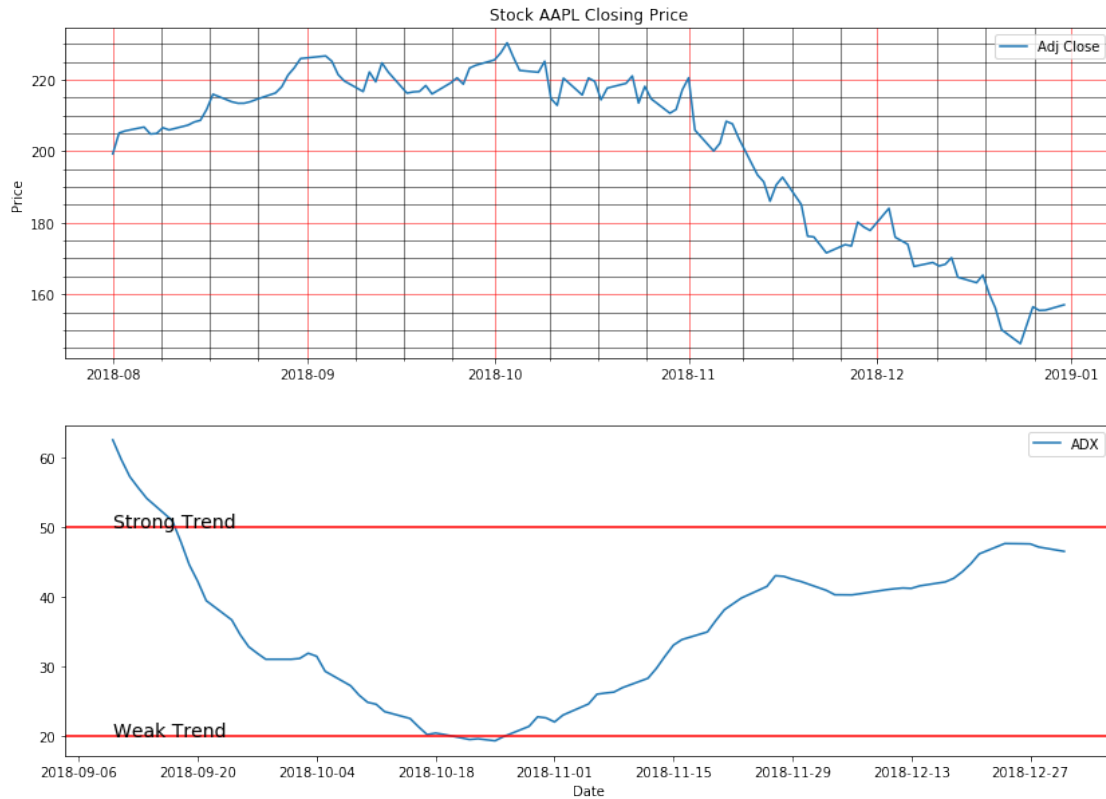ax1.set_ylabel('Price')


ax2 = plt.subplot(2, 1, 2)
ax2.plot(adx, '-', label='ADX')
ax2.text(s='Strong Trend', x=adx.index[0], y=50, fontsize=14)
ax2.text(s='Weak Trend', x=adx.index[0], y=20, fontsize=14)
ax2.axhline(y=50,color='r')
ax2.axhline(y=20,color='r')
ax2.set_xlabel('Date')
ax2.legend(loc='best')
```

[6]: <matplotlib.legend.Legend at 0x292d4ac4080>

1.1 Candlestick with ADX

```
[7]: # Candlestick
     dfc = df.copy()

     from matplotlib import dates as mdates
     import datetime as dt

     dfc['ADX'] = ta.ADX(dfc['High'], dfc['Low'],dfc['Adj Close'], timeperiod=14)
     dfc = dfc.dropna()
     dfc.head()
```

```
[7]:                  Open        High         Low       Close    Adj Close  \
     Date
     2018-09-10  220.949997  221.850006  216.470001  218.330002  216.641724
     2018-09-11  218.009995  224.300003  216.559998  223.850006  222.119049
     2018-09-12  224.940002  225.000000  219.839996  221.070007  219.360550
     2018-09-13  223.520004  228.350006  222.570007  226.410004  224.659256
     2018-09-14  225.750000  226.839996  222.520004  223.839996  222.109100

                    Volume         ADX
```

```
Date
2018-09-10  39516500  62.531606
2018-09-11  35749000  59.716709
2018-09-12  49278700  57.256106
2018-09-13  41706400  55.642423
2018-09-14  31999300  54.124601
```

```
[8]: dfc = dfc.reset_index()
     dfc['Date'] = mdates.date2num(dfc['Date'].astype(dt.date))
     dfc.head()
```

```
[8]:         Date        Open        High         Low       Close   Adj Close  \
     0   736947.0  220.949997  221.850006  216.470001  218.330002  216.641724
     1   736948.0  218.009995  224.300003  216.559998  223.850006  222.119049
     2   736949.0  224.940002  225.000000  219.839996  221.070007  219.360550
     3   736950.0  223.520004  228.350006  222.570007  226.410004  224.659256
     4   736951.0  225.750000  226.839996  222.520004  223.839996  222.109100

           Volume        ADX
     0   39516500  62.531606
     1   35749000  59.716709
     2   49278700  57.256106
     3   41706400  55.642423
     4   31999300  54.124601
```

```
[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.grid(which='minor', linestyle='-', linewidth='0.5', color='black')
     #ax1.grid(which='major', linestyle='-', linewidth='0.5', color='red')
     ax1.minorticks_on()
     #ax1.legend(loc='best')
     ax1.set_title('Stock '+ symbol +' Closing Price')
     ax1.set_ylabel('Price')


     ax2 = plt.subplot(2, 1, 2)
     ax2.plot(adx, '-', label='ADX')
     ax2.text(s='Strong Trend', x=adx.index[0], y=50, fontsize=14)
     ax2.text(s='Weak Trend', x=adx.index[0], y=20, fontsize=14)
     ax2.axhline(y=50,color='r')
```

```
ax2.axhline(y=20,color='r')
ax2.set_xlabel('Date')
ax2.legend(loc='best')
```

[9]: <matplotlib.legend.Legend at 0x292d4c3dc18>

[10]:
```python
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()
dfc['VolumePositive'] = dfc['Open'] < dfc['Adj Close']
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(adx, '-', label='ADX')
ax2.text(s='Strong Trend', x=adx.index[0], y=50, fontsize=14)
ax2.text(s='Weak Trend', x=adx.index[0], y=20, fontsize=14)
ax2.axhline(y=50,color='r')
ax2.axhline(y=20,color='r')
ax2.set_xlabel('Date')
ax2.legend(loc='best')
```

[10]: <matplotlib.legend.Legend at 0x292d5199748>