Heiken_Ashi

September 29, 2021

1 Heiken Ashi

https://www.investopedia.com/trading/heikin-ashi-better-candlestick/

```
[1]: import numpy as np
     import matplotlib.pyplot as plt
     import seaborn as sns
     import pandas as pd

     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 = '2018-10-01'
     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
     2018-10-01  227.949997  229.419998  226.350006  227.259995  225.502670
     2018-10-02  227.250000  230.000000  226.630005  229.279999  227.507050
     2018-10-03  230.050003  233.470001  229.779999  232.070007  230.275482
     2018-10-04  230.779999  232.350006  226.729996  227.990005  226.227036
     2018-10-05  227.960007  228.410004  220.580002  224.289993  222.555634

                    Volume
```

```
            Date
            2018-10-01   23600800
            2018-10-02   24788200
            2018-10-03   28654800
            2018-10-04   32042000
            2018-10-05   33580500
```

```python
[3]: def Heiken_Ashi(df):
         df['HA_Close']=(df['Open']+ df['High']+ df['Low']+ df['Close'])/4
         df['HA_Open']=(df['Open']+df['Close'])/2

         for i in range(1, len(df)):
             df['HA_Open'][i]=(df['HA_Open'][i-1]+df['HA_Close'][i-1])/2
         df['HA_High']=df[['HA_Open','HA_Close','High']].max(axis=1)
         df['HA_Low']=df[['HA_Open','HA_Close','Low']].min(axis=1)
         return

     Heiken_Ashi(df)
```

```python
[4]: df.head()
```

```
[4]:                    Open        High         Low       Close    Adj Close  \
     Date
     2018-10-01   227.949997  229.419998  226.350006  227.259995  225.502670
     2018-10-02   227.250000  230.000000  226.630005  229.279999  227.507050
     2018-10-03   230.050003  233.470001  229.779999  232.070007  230.275482
     2018-10-04   230.779999  232.350006  226.729996  227.990005  226.227036
     2018-10-05   227.960007  228.410004  220.580002  224.289993  222.555634

                   Volume     HA_Close     HA_Open     HA_High      HA_Low
     Date
     2018-10-01   23600800  227.744999  227.604996  229.419998  226.350006
     2018-10-02   24788200  228.290001  227.674998  230.000000  226.630005
     2018-10-03   28654800  231.342503  227.982499  233.470001  227.982499
     2018-10-04   32042000  229.462502  229.662501  232.350006  226.729996
     2018-10-05   33580500  225.310001  229.562501  229.562501  220.580002
```

```python
[5]: HA = df[['HA_Open','HA_High','HA_Low','HA_Close', 'Volume']]
```

```python
[6]: HA.head()
```

```
[6]:               HA_Open     HA_High      HA_Low    HA_Close     Volume
     Date
     2018-10-01  227.604996  229.419998  226.350006  227.744999   23600800
     2018-10-02  227.674998  230.000000  226.630005  228.290001   24788200
     2018-10-03  227.982499  233.470001  227.982499  231.342503   28654800
     2018-10-04  229.662501  232.350006  226.729996  229.462502   32042000
```

```
2018-10-05  229.562501  229.562501  220.580002  225.310001  33580500
```

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

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

```
[7]:        Date      HA_Open      HA_High       HA_Low     HA_Close     Volume
     0  736968.0  227.604996  229.419998  226.350006  227.744999  23600800
     1  736969.0  227.674998  230.000000  226.630005  228.290001  24788200
     2  736970.0  227.982499  233.470001  227.982499  231.342503  28654800
     3  736971.0  229.662501  232.350006  226.729996  229.462502  32042000
     4  736972.0  229.562501  229.562501  220.580002  225.310001  33580500
```

```
[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()
      dfc['VolumePositive'] = dfc['HA_Open'] < dfc['HA_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 (Heiken Ashi)')
      ax1.set_ylabel('Price')

      ax2 = plt.subplot(2, 1, 2)
      ax2.bar(dfc.index, dfc['Volume'], color=dfc.VolumePositive.map({True: 'g',␣
      ↪False: 'r'}))
      ax2.grid()
      ax2.set_ylabel('Volume')
      ax2.set_xlabel('Date')
```

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

Stock AAPL Closing Price (Heiken Ashi)
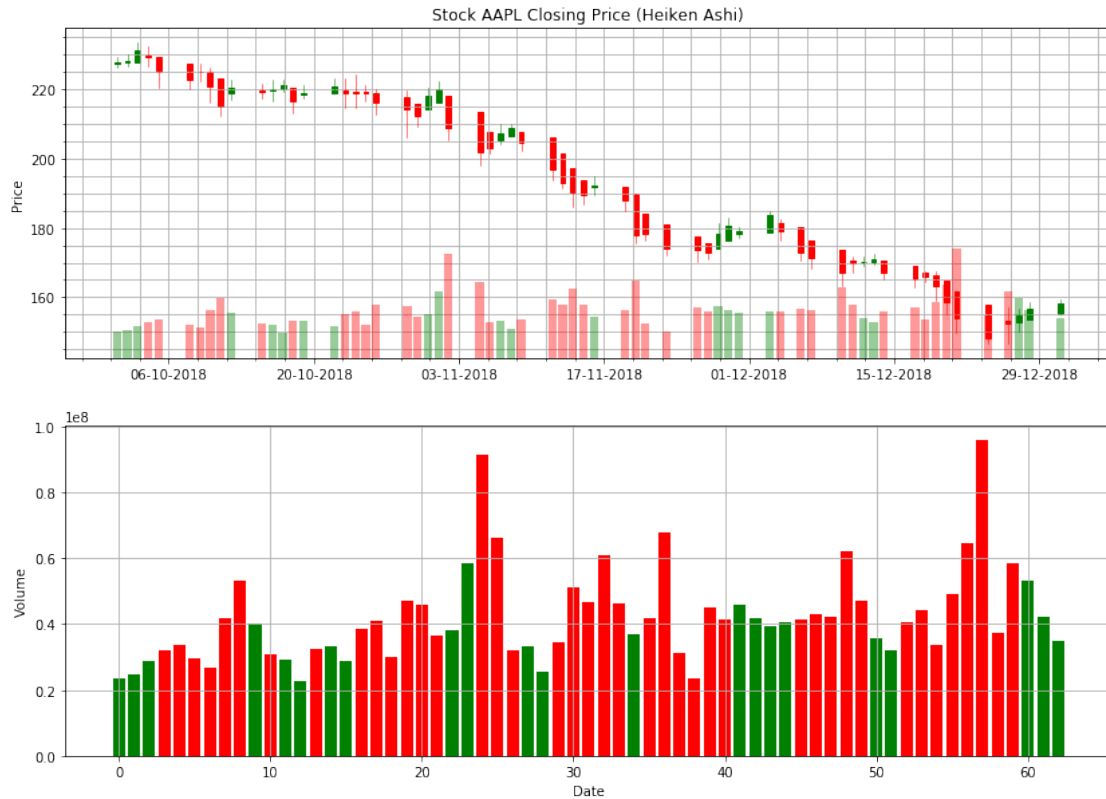
1.1 Compare Heiken Ashi and Candlesticks

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

      cs = df.reset_index()
      cs['Date'] = mdates.date2num(cs['Date'].astype(dt.date))
      cs.head()
```

```
[11]:        Date        Open        High         Low       Close    Adj Close  \
      0   736968.0  227.949997  229.419998  226.350006  227.259995  225.502670
      1   736969.0  227.250000  230.000000  226.630005  229.279999  227.507050
      2   736970.0  230.050003  233.470001  229.779999  232.070007  230.275482
      3   736971.0  230.779999  232.350006  226.729996  227.990005  226.227036
      4   736972.0  227.960007  228.410004  220.580002  224.289993  222.555634

            Volume    HA_Close     HA_Open     HA_High      HA_Low
      0   23600800  227.744999  227.604996  229.419998  226.350006
      1   24788200  228.290001  227.674998  230.000000  226.630005
      2   28654800  231.342503  227.982499  233.470001  227.982499
      3   32042000  229.462502  229.662501  232.350006  226.729996
```

4

```
4   33580500   225.310001   229.562501   229.562501   220.580002
```

[12]:
```python
cs = cs[['Date', 'Open', 'High', 'Low', 'Close', 'Volume']]
```

[17]:
```python
fig = plt.figure(figsize=(14,10))
ax1 = plt.subplot(2, 1, 1)
candlestick_ohlc(ax1,cs.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()
cs['VolumePositive'] = cs['Open'] < cs['Close']
colors = cs.VolumePositive.map({True: 'g', False: 'r'})
ax1v.bar(cs.Date, cs['Volume'], color=colors, alpha=0.4)
ax1v.axes.yaxis.set_ticklabels([])
ax1v.set_ylim(0, 3*cs.Volume.max())
ax1.set_title('Stock '+ symbol +' Closing Price (Candlestick)')
ax1.set_ylabel('Price')

ax2 = plt.subplot(2, 1, 2)
ax2.bar(cs.index, cs['Volume'], color=cs.VolumePositive.map({True: 'g', False:␣
 ↪'r'}))
ax2.grid()
ax2.set_ylabel('Volume')
ax2.set_xlabel('Date')
```

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

Stock AAPL Closing Price (Candlestick)
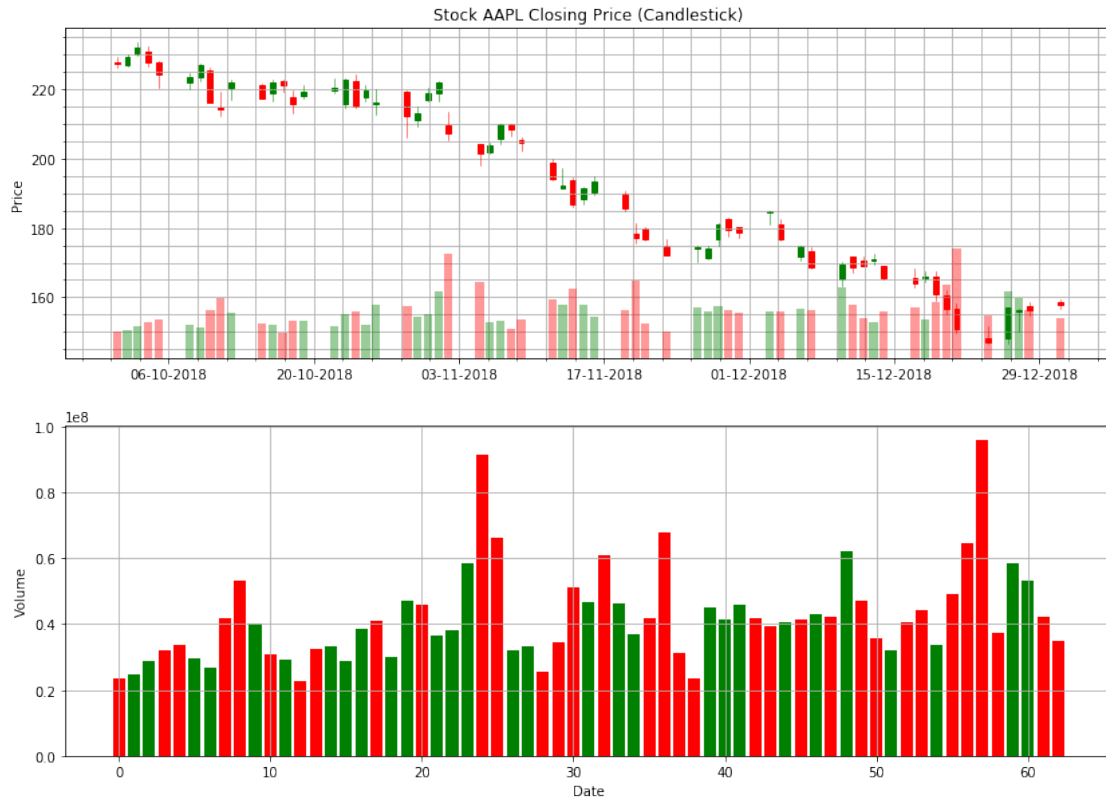
```
[36]: fig = plt.figure(figsize=(30,14))
      ax1 = plt.subplot(2, 2, 1)
      candlestick_ohlc(ax1,dfc.values, width=0.5, colorup='g', colordown='r', alpha=1.
      ↪0)
      ax1.xaxis_date()
      ax1.xaxis.set_major_formatter(mdates.DateFormatter('%d-%m-%Y'))
      ax1.grid(True, which='both')
      ax1.minorticks_on()
      ax1v = ax1.twinx()
      dfc['VolumePositive'] = dfc['HA_Open'] < dfc['HA_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 (Heiken Ashi)',␣
      ↪fontweight="bold", fontsize=18)
      ax1.set_ylabel('Price')
      ax1.set_xlabel('Date')

      ax2 = plt.subplot(2, 2, 2)
```

```
candlestick_ohlc(ax2,cs.values, width=0.5, colorup='g', colordown='r', alpha=1.
 ↪0)
ax2.xaxis_date()
ax2.xaxis.set_major_formatter(mdates.DateFormatter('%d-%m-%Y'))
ax2.grid(True, which='both')
ax2.minorticks_on()
ax2v = ax2.twinx()
cs['VolumePositive'] = cs['Open'] < cs['Close']
colors = cs.VolumePositive.map({True: 'g', False: 'r'})
ax2v.bar(cs.Date, cs['Volume'], color=colors, alpha=0.4)
ax2v.axes.yaxis.set_ticklabels([])
ax2v.set_ylim(0, 3*cs.Volume.max())
ax2.set_title('Stock '+ symbol +' Closing Price (Candlestick)',␣
 ↪fontweight="bold", fontsize=18)
ax2.set_ylabel('Price')
ax2.set_xlabel('Date')
```

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