

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
```

```
[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)
```

```
[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

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

```
[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()
```

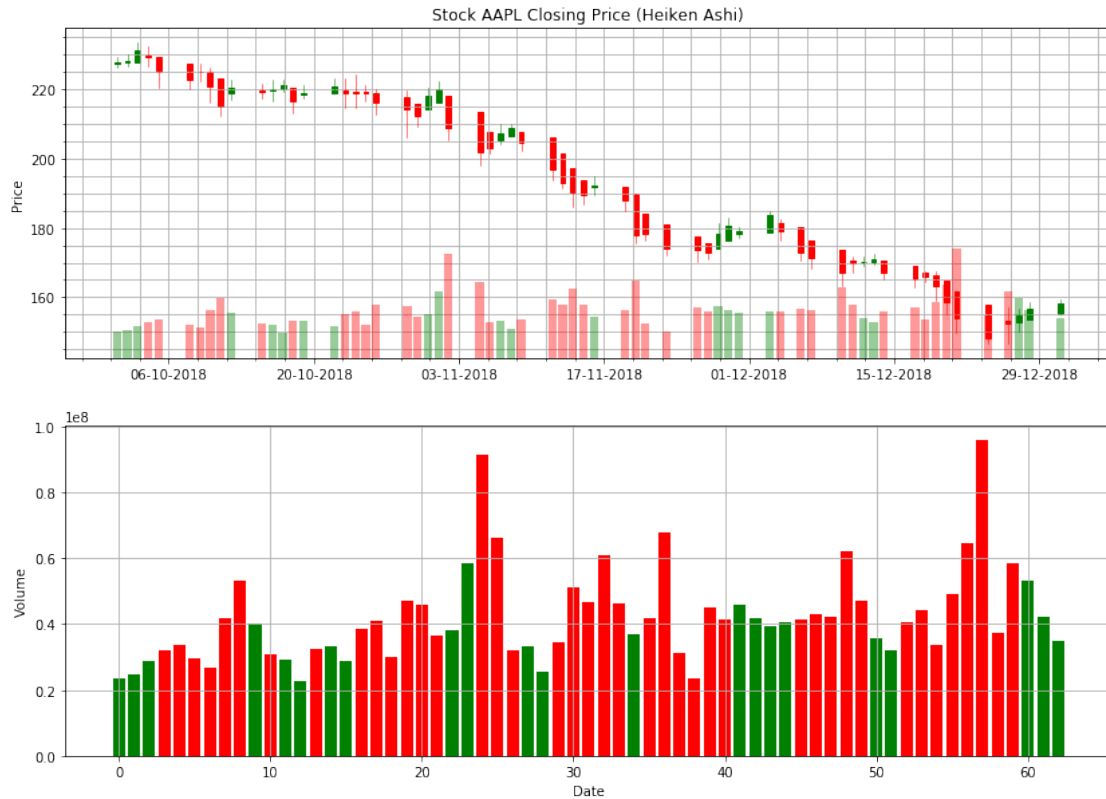
```
[7]:      Date      HA_Open      HA_High      HA_Low      HA_Close      Volume
0  736968.0  227.604996  229.419998  226.350006  227.744999  23600800
1  736969.0  227.674998  230.000000  226.630005  228.290001  24788200
2  736970.0  227.982499  233.470001  227.982499  231.342503  28654800
3  736971.0  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*dfc.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')
```



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

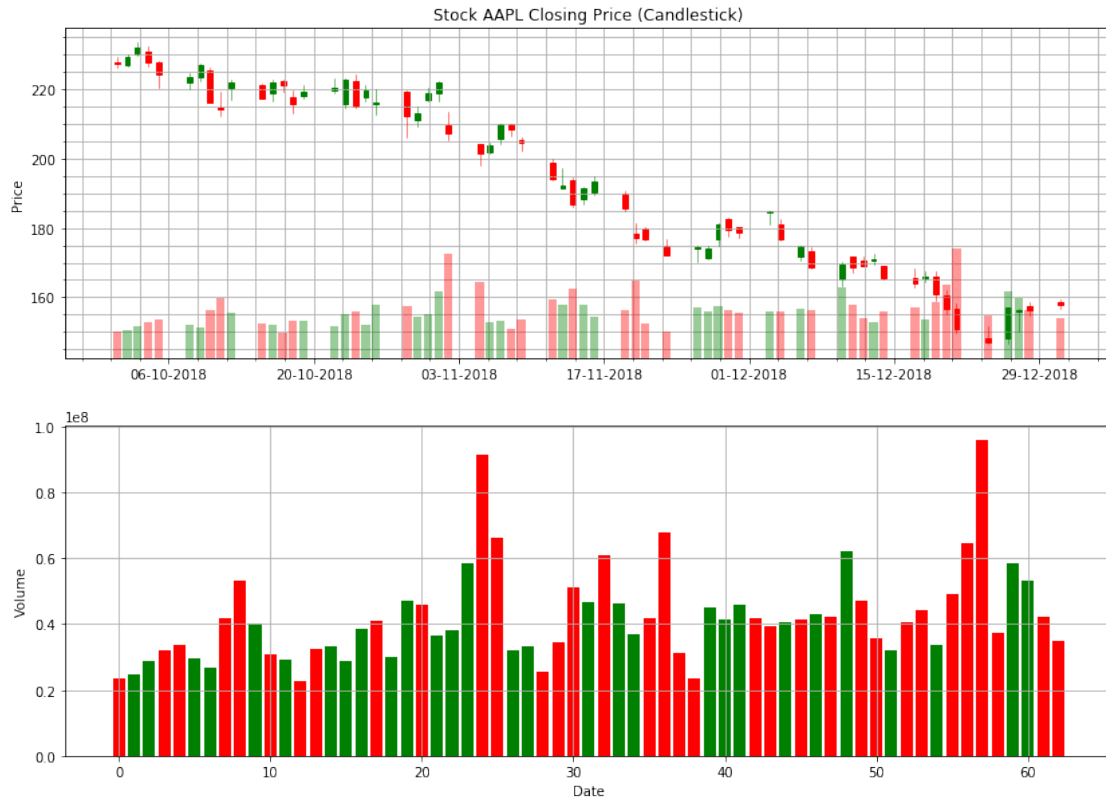
```
4 33580500 225.310001 229.562501 229.562501 220.580002
```

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

```
[17]: 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')
```



```
[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*dfc.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')

