

Breadth_Indicators

September 29, 2021

1 Breadth Indicators

Breadth Indicators include:

On Balance Volume

McClellan Summation Index Arms Index (TRIN)

Force Index

Chaikin Oscillator

Up/Down Volume Ratio

Up/Down Volume Spread

Cumulative Volume Index

```
[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 = 'SPY'
start = '2012-01-01'
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					
2012-01-03	127.760002	128.380005	127.430000	127.500000	110.244629
2012-01-04	127.199997	127.809998	126.709999	127.699997	110.417557
2012-01-05	127.010002	128.229996	126.430000	128.039993	110.711548
2012-01-06	128.199997	128.220001	127.290001	127.709999	110.426208
2012-01-09	128.000000	128.179993	127.410004	128.020004	110.694260

	Volume
Date	
2012-01-03	193697900
2012-01-04	127186500
2012-01-05	173895000
2012-01-06	148050000
2012-01-09	99530200

```
[3]: df['Adj Close'][1:]
```

```
[3]:
```

Date	
2012-01-04	110.417557
2012-01-05	110.711548
2012-01-06	110.426208
2012-01-09	110.694260
2012-01-10	111.654045
2012-01-11	111.714554
2012-01-12	111.982590
2012-01-13	111.403275
2012-01-17	111.835632
2012-01-18	113.072098
2012-01-19	113.668709
2012-01-20	114.092407
2012-01-23	113.798370
2012-01-24	113.668709
2012-01-25	114.619827
2012-01-26	114.031883
2012-01-27	113.980011
2012-01-30	113.590881
2012-01-31	113.547661
2012-02-01	114.542015
2012-02-02	114.723579
2012-02-03	116.331863
2012-02-06	116.254051
2012-02-07	116.548042
2012-02-08	116.893898
2012-02-09	117.040901
2012-02-10	116.176231
2012-02-13	117.040901

```

2012-02-14    116.893898
2012-02-15    116.349159
...
2018-11-15    270.244537
2018-11-16    270.947357
2018-11-19    266.364441
2018-11-20    261.435028
2018-11-21    262.325867
2018-11-23    260.573883
2018-11-26    264.780670
2018-11-27    265.671539
2018-11-28    271.788696
2018-11-29    271.194794
2018-11-30    272.847839
2018-12-03    276.460693
2018-12-04    267.502716
2018-12-06    267.096893
2018-12-07    260.890656
2018-12-10    261.385559
2018-12-11    261.444946
2018-12-12    262.761414
2018-12-13    262.672302
2018-12-14    257.822144
2018-12-17    252.764099
2018-12-18    252.486938
2018-12-19    248.705765
2018-12-20    244.657349
2018-12-21    239.644424
2018-12-24    233.312317
2018-12-26    245.100388
2018-12-27    246.982117
2018-12-28    246.663513
2018-12-31    248.823990
Name: Adj Close, Length: 1759, dtype: float64

```

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

1.1 On Balance Volume

```
[5]: OBV = ta.OBV(df['Adj Close'], df['Volume'])
```

1.2 McClellan Summation Index Arms Index (TRIN)

<https://www.investopedia.com/terms/m/mcclellanos oscillator.asp>

```
[6]: import quandl as q
```

```
# For NASDAQ
#Advances = q.get('URC/NASDAQ_ADV')['Numbers of Stocks']
#Declines = q.get('URC/nASDAQ_DEC')['Numbers of Stocks']
#n = Advances - Declines
```

```
[7]: Advances = q.get('URC/NYSE_ADV', start_date = "2017-07-27")['Numbers of Stocks']
Declines = q.get('URC/NYSE_DEC', start_date = "2017-07-27")['Numbers of Stocks']
```

```
[8]: adv_vol = q.get("URC/NYSE_ADV_VOL", start_date = "2017-07-27")['Numbers of Stocks']
dec_vol = q.get("URC/NYSE_DEC_VOL", start_date = "2017-07-27")['Numbers of Stocks']
```

```
[9]: data = pd.DataFrame()
data['Advances'] = Advances
data['Declines'] = Declines
data['adv_vol'] = adv_vol
data['dec_vol'] = dec_vol
```

```
[10]: data['Net_Advances'] = data['Advances'] - data['Declines']
data['Ratio_Adjusted'] = (data['Net_Advances'] / (data['Advances'] + data['Declines'])) * 1000
data['19_EMA'] = ta.EMA(data['Ratio_Adjusted'], timeperiod=19)
data['39_EMA'] = ta.EMA(data['Ratio_Adjusted'], timeperiod=39)
data['RANA'] = (data['Advances'] - data['Declines']) / (data['Advances'] + data['Declines']) * 1000
```

```
[11]: # Finding the TRIN Value
data['ad_ratio'] = data['Advances'].divide(data['Declines']) # AD Ratio
data['ad_vol'] = data['adv_vol'].divide(data['dec_vol']) # AD Volume Ratio
data['TRIN'] = data['ad_ratio'].divide(data['ad_vol']) # TRIN Value
```

```
[12]: data.head()
```

```
[12]:
```

	Advances	Declines	adv_vol	dec_vol	Net_Advances	\
Date						
2017-07-27	1320.0	1610.0	1.795852e+09	2.081253e+09	-290.0	
2017-07-28	1585.0	1347.0	1.392776e+09	1.757435e+09	238.0	
2017-07-31	1583.0	1400.0	1.727800e+09	1.574906e+09	183.0	
2017-08-01	1774.0	1169.0	1.777532e+09	1.535265e+09	605.0	
2017-08-02	1172.0	1764.0	1.335177e+09	2.024331e+09	-592.0	

	Ratio_Adjusted	19_EMA	39_EMA	RANA	ad_ratio	ad_vol	\
Date							
2017-07-27	-98.976109	NaN	NaN	-98.976109	0.819876	0.862871	
2017-07-28	81.173261	NaN	NaN	81.173261	1.176689	0.792505	
2017-07-31	61.347637	NaN	NaN	61.347637	1.130714	1.097082	

2017-08-01	205.572545	NaN	NaN	205.572545	1.517536	1.157801
2017-08-02	-201.634877	NaN	NaN	-201.634877	0.664399	0.659564

TRIN

Date

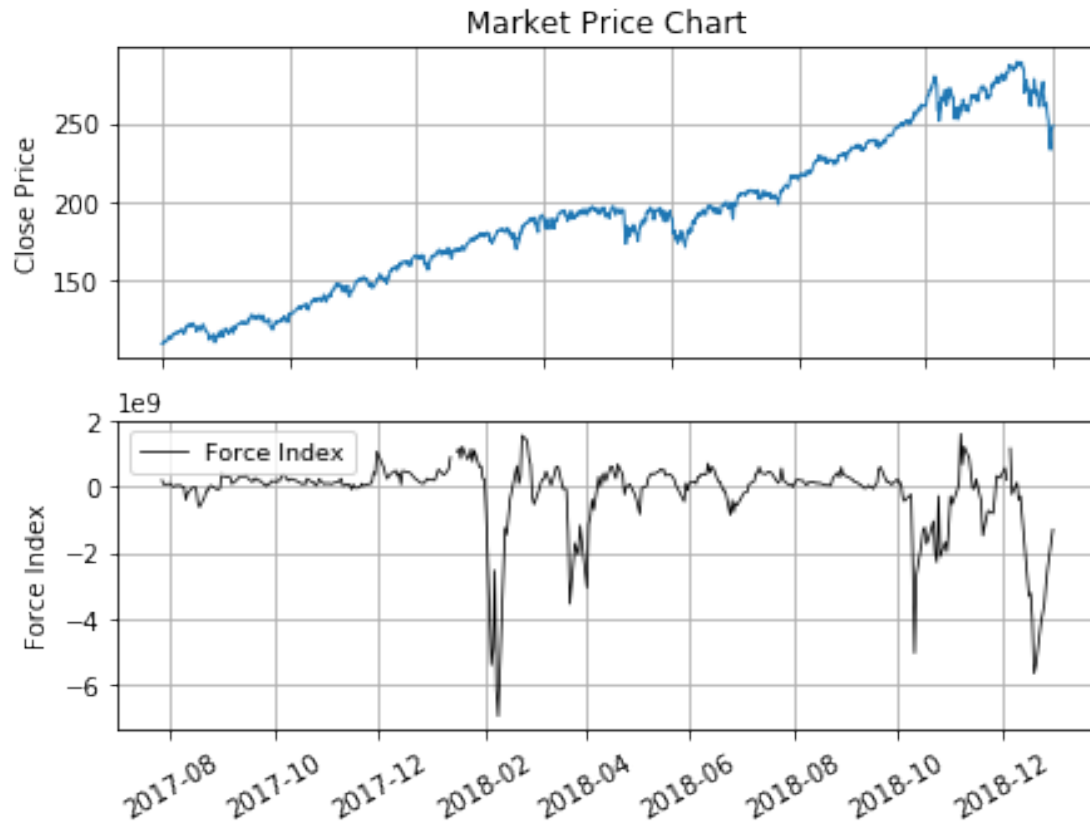
2017-07-27	4.565387e-10
2017-07-28	8.448513e-10
2017-07-31	6.544241e-10
2017-08-01	8.537323e-10
2017-08-02	4.976114e-10

1.3 Force Index

```
[13]: def ForceIndex(data,n):
        ForceIndex=pd.Series(df['Adj Close'].diff(n)*_
        ↪df['Volume'],name='ForceIndex')
        data = data.join(ForceIndex)
        return data
```

```
[14]: n=10
        ForceIndex = ForceIndex(data,n)
        ForceIndex = ForceIndex['ForceIndex']
```

```
[15]: fig=plt.figure(figsize=(7,5))
        ax=fig.add_subplot(2,1,1)
        ax.set_xticklabels([])
        plt.plot(df['Adj Close'],lw=1)
        plt.title('Market Price Chart')
        plt.ylabel('Close Price')
        plt.grid(True)
        bx=fig.add_subplot(2,1,2)
        plt.plot(ForceIndex,'k',lw=0.75,linestyle='-',label='Force Index')
        plt.legend(loc=2,prop={'size':9.5})
        plt.ylabel('Force Index')
        plt.grid(True)
        plt.setp(plt.gca().get_xticklabels(),rotation=30)
        plt.show()
```



1.4 Chaikin Oscillator

```
[16]: def Chaikin(data):
    money_flow_volume = (2 * df['Adj Close'] - df['High'] - df['Low']) / \
    ↪ (df['High'] - df['Low']) * df['Volume']
    ad = money_flow_volume.cumsum()
    Chaikin = pd.Series(ad.ewm(com=(3-1)/2).mean() - ad.ewm(com=(10-1)/2).
    ↪ mean(), name='Chaikin')
    data = data.join(Chaikin)
    return data
```

```
[17]: Chaikin(df)
```

```
[17]:
```

	Open	High	Low	Close	Adj Close \
Date					
2012-01-03	127.760002	128.380005	127.430000	127.500000	110.244629
2012-01-04	127.199997	127.809998	126.709999	127.699997	110.417557
2012-01-05	127.010002	128.229996	126.430000	128.039993	110.711548
2012-01-06	128.199997	128.220001	127.290001	127.709999	110.426208
2012-01-09	128.000000	128.179993	127.410004	128.020004	110.694260

2012-01-10	129.389999	129.649994	128.949997	129.130005	111.654045
2012-01-11	128.729996	129.369995	128.520004	129.199997	111.714554
2012-01-12	129.570007	129.699997	128.539993	129.509995	111.982590
2012-01-13	128.639999	129.050003	127.720001	128.839996	111.403275
2012-01-17	130.080002	130.320007	128.899994	129.339996	111.835632
2012-01-18	129.309998	130.839996	129.080002	130.770004	113.072098
2012-01-19	131.220001	131.570007	130.800003	131.460007	113.668709
2012-01-20	131.240005	131.949997	130.919998	131.949997	114.092407
2012-01-23	131.509995	132.250000	130.979996	131.610001	113.798370
2012-01-24	130.800003	131.500000	130.600006	131.460007	113.668709
2012-01-25	131.259995	132.869995	130.750000	132.559998	114.619827
2012-01-26	133.149994	133.399994	131.360001	131.880005	114.031883
2012-01-27	131.240005	132.050003	131.149994	131.820007	113.980011
2012-01-30	130.509995	131.440002	130.059998	131.369995	113.590881
2012-01-31	132.020004	132.179993	130.679993	131.320007	113.547661
2012-02-01	132.289993	133.139999	132.130005	132.470001	114.542015
2012-02-02	132.729996	133.020004	132.210007	132.679993	114.723579
2012-02-03	134.000000	134.619995	133.770004	134.539993	116.331863
2012-02-06	133.979996	134.509995	133.830002	134.449997	116.254051
2012-02-07	134.169998	135.020004	133.639999	134.789993	116.548042
2012-02-08	134.860001	135.220001	134.309998	135.190002	116.893898
2012-02-09	135.410004	135.589996	134.559998	135.360001	117.040901
2012-02-10	134.160004	134.470001	133.839996	134.360001	116.176231
2012-02-13	135.320007	135.520004	134.740005	135.360001	117.040901
2012-02-14	135.000000	135.270004	134.250000	135.190002	116.893898
...
2018-11-15	268.779999	273.540009	267.010010	273.019989	270.244537
2018-11-16	271.790009	274.750000	271.209991	273.730011	270.947357
2018-11-19	273.049988	273.380005	268.070007	269.100006	266.364441
2018-11-20	265.359985	267.000000	263.149994	264.119995	261.435028
2018-11-21	265.859985	267.149994	265.010010	265.019989	262.325867
2018-11-23	263.179993	264.820007	263.070007	263.250000	260.573883
2018-11-26	265.779999	267.750000	265.339996	267.500000	264.780670
2018-11-27	266.339996	268.399994	265.660004	268.399994	265.671539
2018-11-28	269.600006	274.579987	268.329987	274.579987	271.788696
2018-11-29	273.709991	275.549988	272.429993	273.980011	271.194794
2018-11-30	273.809998	276.279999	273.450012	275.649994	272.847839
2018-12-03	280.279999	280.399994	277.510010	279.299988	276.460693
2018-12-04	278.369995	278.850006	269.899994	270.250000	267.502716
2018-12-06	265.920013	269.970001	262.440002	269.839996	267.096893
2018-12-07	269.459991	271.220001	262.630005	263.570007	260.890656
2018-12-10	263.369995	265.160004	258.619995	264.070007	261.385559
2018-12-11	267.660004	267.869995	262.480011	264.130005	261.444946
2018-12-12	267.470001	269.000000	265.369995	265.459991	262.761414
2018-12-13	266.519989	267.489990	264.119995	265.369995	262.672302
2018-12-14	262.959991	264.029999	259.850006	260.470001	257.822144
2018-12-17	259.399994	260.649994	253.529999	255.360001	252.764099

2018-12-18	257.200012	257.950012	253.279999	255.080002	252.486938
2018-12-19	255.169998	259.399994	249.350006	251.259995	248.705765
2018-12-20	249.860001	251.619995	244.649994	247.169998	244.657349
2018-12-21	246.740005	249.710007	239.979996	240.699997	239.644424
2018-12-24	239.039993	240.839996	234.270004	234.339996	233.312317
2018-12-26	235.970001	246.179993	233.759995	246.179993	245.100388
2018-12-27	242.570007	248.289993	238.960007	248.070007	246.982117
2018-12-28	249.580002	251.399994	246.449997	247.750000	246.663513
2018-12-31	249.559998	250.190002	247.470001	249.919998	248.823990

Date	Volume	Chaikin
2012-01-03	193697900	0.000000e+00
2012-01-04	127186500	-4.543919e+08
2012-01-05	173895000	-1.035752e+09
2012-01-06	148050000	-2.213366e+09
2012-01-09	99530200	-3.386944e+09
2012-01-10	115282000	-4.898310e+09
2012-01-11	111540700	-6.153837e+09
2012-01-12	118983700	-6.979759e+09
2012-01-13	179836200	-7.907538e+09
2012-01-17	132209200	-8.458773e+09
2012-01-18	163395200	-8.784849e+09
2012-01-19	126328900	-9.797472e+09
2012-01-20	138230200	-1.068820e+10
2012-01-23	129295800	-1.115189e+10
2012-01-24	103083300	-1.152341e+10
2012-01-25	198613200	-1.159977e+10
2012-01-26	184880500	-1.159130e+10
2012-01-27	135259100	-1.217402e+10
2012-01-30	147311800	-1.243961e+10
2012-01-31	157212000	-1.258395e+10
2012-02-01	166234500	-1.336666e+10
2012-02-02	113090400	-1.404009e+10
2012-02-03	160598500	-1.516611e+10
2012-02-06	107694500	-1.603744e+10
2012-02-07	135528100	-1.603639e+10
2012-02-08	139361400	-1.630917e+10
2012-02-09	148602900	-1.658528e+10
2012-02-10	167907500	-1.822975e+10
2012-02-13	115841900	-1.894844e+10
2012-02-14	165329500	-1.935730e+10
...
2018-11-15	135101400	-4.923658e+08
2018-11-16	126668000	-4.767755e+08
2018-11-19	103061700	-4.809125e+08
2018-11-20	136021300	-5.207224e+08

2018-11-21	75563700	-5.740263e+08
2018-11-23	42807900	-5.961248e+08
2018-11-26	79981400	-5.882331e+08
2018-11-27	75502400	-5.553501e+08
2018-11-28	127629600	-4.870751e+08
2018-11-29	82346400	-4.618119e+08
2018-11-30	98204200	-4.540384e+08
2018-12-03	103176300	-4.662504e+08
2018-12-04	177986000	-5.158297e+08
2018-12-06	204185400	-4.738282e+08
2018-12-07	161018900	-4.855518e+08
2018-12-10	151445900	-4.536402e+08
2018-12-11	121504400	-4.528543e+08
2018-12-12	97976700	-4.873435e+08
2018-12-13	96662700	-5.143298e+08
2018-12-14	116961100	-5.519359e+08
2018-12-17	165492300	-5.811294e+08
2018-12-18	134515100	-5.975792e+08
2018-12-19	214992800	-6.271603e+08
2018-12-20	252053400	-6.622767e+08
2018-12-21	255345600	-7.032859e+08
2018-12-24	147311600	-7.166639e+08
2018-12-26	218485400	-5.995531e+08
2018-12-27	186267300	-4.544885e+08
2018-12-28	153100200	-3.983379e+08
2018-12-31	144299400	-3.393576e+08

[1760 rows x 7 columns]

1.5 Up/Down Volume Ratio

Volume Spread = Up Volume - Down Volume

```
[18]: Up = q.get('URC/NYSE_ADV', start_date = "2017-07-27")['Numbers of Stocks']
      Down = q.get('URC/NYSE_DEC', start_date = "2017-07-27")['Numbers of Stocks']
      Volume_Spread = Up - Down
```

```
[19]: Volume_Spread
```

```
[19]: Date
      2017-07-27    -290.0
      2017-07-28     238.0
      2017-07-31     183.0
      2017-08-01     605.0
      2017-08-02    -592.0
      2017-08-03    -429.0
      2017-08-04     385.0
```

2017-08-07	-121.0
2017-08-08	-787.0
2017-08-09	-1156.0
2017-08-10	-2218.0
2017-08-11	204.0
2017-08-14	1576.0
2017-08-15	-808.0
2017-08-16	616.0
2017-08-17	-1884.0
2017-08-18	199.0
2017-08-21	46.0
2017-08-22	1277.0
2017-08-23	170.0
2017-08-24	46.0
2017-08-25	1023.0
2017-08-28	-200.0
2017-08-29	-53.0
2017-08-30	707.0
2017-08-31	1394.0
2017-09-01	1164.0
2017-09-05	-1178.0
2017-09-06	710.0
2017-09-07	71.0
	...
2019-02-07	-1102.0
2019-02-08	-109.0
2019-02-11	917.0
2019-02-12	1484.0
2019-02-13	872.0
2019-02-14	221.0
2019-02-15	1637.0
2019-02-19	811.0
2019-02-20	622.0
2019-02-21	-649.0
2019-02-22	1338.0
2019-02-25	-34.0
2019-02-26	-511.0
2019-02-27	145.0
2019-02-28	-251.0
2019-03-01	851.0
2019-03-04	-334.0
2019-03-05	-142.0
2019-03-06	-1422.0
2019-03-07	-1152.0
2019-03-08	-284.0
2019-03-11	1733.0
2019-03-12	520.0

```

2019-03-13    1079.0
2019-03-14   -182.0
2019-03-15     499.0
2019-03-18    1040.0
2019-03-19   -590.0
2019-03-20   -316.0
2019-03-21    1271.0
Name: Numbers of Stocks, Length: 418, dtype: float64

```

1.6 Up/Down Volume Spread

Volume Ratio = Up Volume / Down Volume

```

[20]: Up = q.get('URC/NYSE_ADV', start_date = "2017-07-27")['Numbers of Stocks']
      Down = q.get('URC/NYSE_DEC', start_date = "2017-07-27")['Numbers of Stocks']
      Volume_Ratio = Up/Down

```

```

[21]: Volume_Ratio

```

```

[21]: Date
2017-07-27    0.819876
2017-07-28    1.176689
2017-07-31    1.130714
2017-08-01    1.517536
2017-08-02    0.664399
2017-08-03    0.746304
2017-08-04    1.297527
2017-08-07    0.921224
2017-08-08    0.578694
2017-08-09    0.439651
2017-08-10    0.155048
2017-08-11    1.147292
2017-08-14    3.194986
2017-08-15    0.572713
2017-08-16    1.521151
2017-08-17    0.227869
2017-08-18    1.147298
2017-08-21    1.031944
2017-08-22    2.513033
2017-08-23    1.122744
2017-08-24    1.032123
2017-08-25    2.068966
2017-08-28    0.873498
2017-08-29    0.964453
2017-08-30    1.628444
2017-08-31    2.798710
2017-09-01    2.309336

```

```

2017-09-05    0.432015
2017-09-06    1.637343
2017-09-07    1.049512
...
2019-02-07    0.455534
2019-02-08    0.928431
2019-02-11    1.901672
2019-02-12    3.021798
2019-02-13    1.842512
2019-02-14    1.162979
2019-02-15    3.495427
2019-02-19    1.759363
2019-02-20    1.535284
2019-02-21    0.636415
2019-02-22    2.657993
2019-02-25    0.977135
2019-02-26    0.703596
2019-02-27    1.104693
2019-02-28    0.842238
2019-03-01    1.815134
2019-03-04    0.794462
2019-03-05    0.906824
2019-03-06    0.349199
2019-03-07    0.436675
2019-03-08    0.821944
2019-03-11    3.808752
2019-03-12    1.433695
2019-03-13    2.160215
2019-03-14    0.883557
2019-03-15    1.413079
2019-03-18    2.089005
2019-03-19    0.665343
2019-03-20    0.804697
2019-03-21    2.523981

```

Name: Numbers of Stocks, Length: 418, dtype: float64

1.7 Cumulative Volume Index

[https://www.marketinout.com/technical_analysis.php?t=Cumulative_Volume_Index_\(CVI\)&id=38](https://www.marketinout.com/technical_analysis.php?t=Cumulative_Volume_Index_(CVI)&id=38)

```
[22]: # CVI = Yesterday's CVI + (Advancing Volume - Declining Volume)
      data['CVI'] = data['Net_Advances'][1:] + (data['Advances'] - data['Declines'])
```

```
[23]: data.head()
```

```
[23]:
```

	Advances	Declines	adv_vol	dec_vol	Net_Advances	\
Date						

2017-07-27	1320.0	1610.0	1.795852e+09	2.081253e+09	-290.0
2017-07-28	1585.0	1347.0	1.392776e+09	1.757435e+09	238.0
2017-07-31	1583.0	1400.0	1.727800e+09	1.574906e+09	183.0
2017-08-01	1774.0	1169.0	1.777532e+09	1.535265e+09	605.0
2017-08-02	1172.0	1764.0	1.335177e+09	2.024331e+09	-592.0

	Ratio_Adjusted	19_EMA	39_EMA	RANA	ad_ratio	ad_vol \
Date						
2017-07-27	-98.976109	NaN	NaN	-98.976109	0.819876	0.862871
2017-07-28	81.173261	NaN	NaN	81.173261	1.176689	0.792505
2017-07-31	61.347637	NaN	NaN	61.347637	1.130714	1.097082
2017-08-01	205.572545	NaN	NaN	205.572545	1.517536	1.157801
2017-08-02	-201.634877	NaN	NaN	-201.634877	0.664399	0.659564

	TRIN	CVI
Date		
2017-07-27	4.565387e-10	NaN
2017-07-28	8.448513e-10	476.0
2017-07-31	6.544241e-10	366.0
2017-08-01	8.537323e-10	1210.0
2017-08-02	4.976114e-10	-1184.0