

Correlation between largest Banks & Nifty Indices by analysing one minute candlestick using Python

In [1]:

#Importing libraries that we need

```
import numpy as np
import pandas as pd
import seaborn as sns
import matplotlib.pyplot as plt

import os
for dirname, _, filenames in os.walk('/kaggle/input'):
    for filename in filenames:
        print(os.path.join(dirname, filename))
```

```
/kaggle/input/stock-market-india/FullData.h5
/kaggle/input/stock-market-india/FullDataCsv/SUNTV__EQ__NSE__NSE__MINUTE.csv
/kaggle/input/stock-market-india/FullDataCsv/MANAPPURAM__EQ__NSE__NSE__MINUTE.csv
/kaggle/input/stock-market-india/FullDataCsv/GODREJPROP__EQ__NSE__NSE__MINUTE.csv
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```

NUTE.csv
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MINUTE.csv
/kaggle/input/stock-market-india/StockMarketHelper/__init__.py
```

Creating a variable for each dataset

note- nifty_fin_ser is Nifty Finanacial Services index

In [2]:

```
hdfc = pd.read_csv('/kaggle/input/stock-market-india/FullDataCsv/HDFCBANK
__EQ__NSE__NSE__MINUTE.csv', index_col='timestamp')
bank_nifty = pd.read_csv('/kaggle/input/stock-market-india/FullDataCsv/NIFTY_BANK__EQ__INDICES__NSE__MINUTE.csv', index_col='timestamp')
kotak = pd.read_csv('/kaggle/input/stock-market-india/FullDataCsv/KOTAKBANK__EQ__NSE__NSE__MINUTE.csv', index_col='timestamp')
icici = pd.read_csv('/kaggle/input/stock-market-india/FullDataCsv/ICICIBANK__EQ__NSE__NSE__MINUTE.csv', index_col='timestamp')
axis = pd.read_csv('/kaggle/input/stock-market-india/FullDataCsv/AXISBANK__EQ__NSE__NSE__MINUTE.csv', index_col='timestamp')
sbi = pd.read_csv("/kaggle/input/stock-market-india/FullDataCsv/SBIN__EQ__NSE__NSE__MINUTE.csv", index_col='timestamp')
nifty_fin_ser = pd.read_csv('/kaggle/input/stock-market-india/FullDataCsv/NIFTY_FIN_SERVICE__EQ__INDICES__NSE__MINUTE.csv', index_col='timestamp')
nifty_50 = pd.read_csv('/kaggle/input/stock-market-india/FullDataCsv/NIFTY_50__EQ__INDICES__NSE__MINUTE.csv', index_col='timestamp')
```

In [4]:

```
sbi.head()
```

Out[4]:

	open	high	low	close	volume
timestamp					
2017-01-02 09:15:00+05:30	252.40	253.60	251.60	251.85	297611.0
2017-01-02 09:16:00+05:30	251.85	252.40	251.35	251.40	192754.0
2017-01-02 09:17:00+05:30	251.45	251.70	251.20	251.20	131924.0
2017-01-02 09:18:00+05:30	251.20	251.20	250.55	250.75	225075.0
2017-01-02 09:19:00+05:30	250.75	250.75	250.00	250.25	215535.0

dropping unnecessary columns

In [5]:

```
list=[hdfc,bank_nifty,kotak,icici,axis,sbi,nifty_fin_ser,nifty_50]
for i in list:
    i.drop('volume',axis=1,inplace=True)
    print(i)
```

timestamp	open	high	low	close
2017-01-02 09:15:00+05:30	605.00	605.00	601.00	601.45
2017-01-02 09:16:00+05:30	601.45	602.35	601.45	602.00
2017-01-02 09:17:00+05:30	601.95	602.35	599.25	599.25
2017-01-02 09:18:00+05:30	599.25	600.35	599.00	600.35
2017-01-02 09:19:00+05:30	600.35	600.50	599.75	600.00
...
2021-01-01 15:25:00+05:30	1424.35	1425.30	1423.00	1424.00
2021-01-01 15:26:00+05:30	1423.95	1424.40	1421.65	1423.00
2021-01-01 15:27:00+05:30	1423.00	1423.00	1422.10	1422.80
2021-01-01 15:28:00+05:30	1422.80	1422.90	1421.50	1421.50
2021-01-01 15:29:00+05:30	1421.95	1423.45	1421.20	1423.45

[370546 rows x 4 columns]

timestamp	open	high	low	close
2017-01-02 09:15:00+05:30	18242.30	18248.20	18175.90	18181.20
2017-01-02 09:16:00+05:30	18181.85	18194.70	18179.95	18184.45
2017-01-02 09:17:00+05:30	18184.95	18189.25	18133.80	18133.80
2017-01-02 09:18:00+05:30	18135.10	18141.55	18118.55	18138.95
2017-01-02 09:19:00+05:30	18138.95	18142.55	18120.45	18124.30
...
2021-01-01 15:25:00+05:30	31247.90	31247.90	31217.70	31224.70
2021-01-01 15:26:00+05:30	31228.20	31228.95	31208.35	31216.55
2021-01-01 15:27:00+05:30	31214.85	31218.35	31209.40	31212.55
2021-01-01 15:28:00+05:30	31210.30	31215.65	31192.00	31201.40
2021-01-01 15:29:00+05:30	31199.30	31216.85	31192.85	31211.10

[370740 rows x 4 columns]

timestamp	open	high	low	close
2017-01-02 09:15:00+05:30	719.80	720.90	716.35	720.15
2017-01-02 09:16:00+05:30	720.15	720.50	718.75	718.75
2017-01-02 09:17:00+05:30	718.75	719.40	718.50	718.60
2017-01-02 09:18:00+05:30	718.60	718.95	717.05	718.95
2017-01-02 09:19:00+05:30	718.95	719.45	718.00	718.50
...
2021-01-01 15:25:00+05:30	1997.20	1997.65	1994.70	1995.10
2021-01-01 15:26:00+05:30	1995.90	1995.95	1994.40	1994.60

2021-01-01 15:27:00+05:30	1994.95	1995.15	1994.00	1994.05
2021-01-01 15:28:00+05:30	1994.40	1995.55	1994.00	1994.25
2021-01-01 15:29:00+05:30	1994.50	1996.00	1993.00	1993.20

[370546 rows x 4 columns]

	open	high	low	close
timestamp				
2017-01-02 09:15:00+05:30	232.95	233.00	231.59	231.73
2017-01-02 09:16:00+05:30	231.68	231.91	231.55	231.91
2017-01-02 09:17:00+05:30	232.09	232.09	231.36	231.55
2017-01-02 09:18:00+05:30	231.55	231.55	230.86	231.18
2017-01-02 09:19:00+05:30	231.32	231.41	230.95	231.23
...
2021-01-01 15:25:00+05:30	527.95	528.10	527.40	527.65
2021-01-01 15:26:00+05:30	527.60	527.75	527.55	527.75
2021-01-01 15:27:00+05:30	527.65	527.90	527.55	527.85
2021-01-01 15:28:00+05:30	527.85	527.90	527.50	527.90
2021-01-01 15:29:00+05:30	527.80	527.90	527.50	527.80

[370545 rows x 4 columns]

	open	high	low	close
timestamp				
2017-01-02 09:15:00+05:30	451.40	452.00	450.60	451.20
2017-01-02 09:16:00+05:30	451.15	451.15	450.50	450.80
2017-01-02 09:17:00+05:30	450.50	450.80	449.30	449.30
2017-01-02 09:18:00+05:30	449.30	450.10	448.95	449.75
2017-01-02 09:19:00+05:30	449.75	450.30	449.25	449.80
...
2021-01-01 15:25:00+05:30	624.35	624.35	623.65	624.00
2021-01-01 15:26:00+05:30	624.00	624.00	623.50	623.55
2021-01-01 15:27:00+05:30	623.55	623.60	622.95	623.00
2021-01-01 15:28:00+05:30	623.20	623.25	621.55	622.55
2021-01-01 15:29:00+05:30	622.20	624.50	622.00	623.40

[370546 rows x 4 columns]

	open	high	low	close
timestamp				
2017-01-02 09:15:00+05:30	252.40	253.60	251.60	251.85
2017-01-02 09:16:00+05:30	251.85	252.40	251.35	251.40
2017-01-02 09:17:00+05:30	251.45	251.70	251.20	251.20
2017-01-02 09:18:00+05:30	251.20	251.20	250.55	250.75

2017-01-02 09:19:00+05:30	250.75	250.75	250.00	250.25
...
2021-01-01 15:25:00+05:30	279.25	279.70	279.10	279.20
2021-01-01 15:26:00+05:30	279.20	279.35	279.15	279.15
2021-01-01 15:27:00+05:30	279.15	279.30	279.15	279.20
2021-01-01 15:28:00+05:30	279.15	279.20	279.10	279.15
2021-01-01 15:29:00+05:30	279.15	279.20	279.05	279.05

[370545 rows x 4 columns]

	open	high	low	close
timestamp				
2017-01-02 09:15:00+05:30	7442.40	7442.40	7398.05	7399.30
2017-01-02 09:16:00+05:30	7399.70	7411.95	7399.70	7407.50
2017-01-02 09:17:00+05:30	7407.70	7408.95	7385.75	7385.75
2017-01-02 09:18:00+05:30	7386.05	7389.90	7382.40	7388.90
2017-01-02 09:19:00+05:30	7389.45	7389.90	7382.05	7384.05
...
2021-01-01 15:25:00+05:30	15190.35	15190.35	15175.90	15181.50
2021-01-01 15:26:00+05:30	15182.85	15183.05	15173.00	15177.00
2021-01-01 15:27:00+05:30	15176.15	15180.40	15175.35	15178.95
2021-01-01 15:28:00+05:30	15176.65	15179.65	15171.50	15174.35
2021-01-01 15:29:00+05:30	15173.35	15178.65	15168.25	15174.35

[370740 rows x 4 columns]

	open	high	low	close
timestamp				
2017-01-02 09:15:00+05:30	8210.10	8211.70	8189.00	8189.55
2017-01-02 09:16:00+05:30	8188.75	8193.95	8188.75	8189.95
2017-01-02 09:17:00+05:30	8190.15	8190.75	8173.70	8173.70
2017-01-02 09:18:00+05:30	8173.35	8177.55	8169.15	8177.55
2017-01-02 09:19:00+05:30	8177.85	8178.15	8173.45	8174.40
...
2021-01-01 15:25:00+05:30	14023.45	14024.20	14016.35	14019.00
2021-01-01 15:26:00+05:30	14019.65	14020.60	14015.70	14019.10
2021-01-01 15:27:00+05:30	14018.60	14019.60	14017.30	14018.15
2021-01-01 15:28:00+05:30	14017.85	14020.10	14012.85	14015.00
2021-01-01 15:29:00+05:30	14015.00	14016.35	14011.90	14014.80

[370740 rows x 4 columns]

Calculating returns of stocks and indices for one minute timeframe

In [6]:

```
fin_df = [hdfc, icici, axis, bank_nifty, kotak, sbi, nifty_fin_ser, nifty_50]
for i in fin_df:
    i['Difference'] = (i['open'] - i['close']) / i['open'] * 100
    i.drop(['open', 'high', 'close', 'low'], axis=1, inplace=True)
    print(i)
```

	Difference
timestamp	
2017-01-02 09:15:00+05:30	0.586777
2017-01-02 09:16:00+05:30	-0.091446
2017-01-02 09:17:00+05:30	0.448542
2017-01-02 09:18:00+05:30	-0.183563
2017-01-02 09:19:00+05:30	0.058299
...	...
2021-01-01 15:25:00+05:30	0.024573
2021-01-01 15:26:00+05:30	0.066716
2021-01-01 15:27:00+05:30	0.014055
2021-01-01 15:28:00+05:30	0.091369
2021-01-01 15:29:00+05:30	-0.105489

[370546 rows x 1 columns]

	Difference
timestamp	
2017-01-02 09:15:00+05:30	0.523718
2017-01-02 09:16:00+05:30	-0.099275
2017-01-02 09:17:00+05:30	0.232668
2017-01-02 09:18:00+05:30	0.159793
2017-01-02 09:19:00+05:30	0.038907
...	...
2021-01-01 15:25:00+05:30	0.056824
2021-01-01 15:26:00+05:30	-0.028431
2021-01-01 15:27:00+05:30	-0.037904
2021-01-01 15:28:00+05:30	-0.009472
2021-01-01 15:29:00+05:30	0.000000

[370545 rows x 1 columns]

	Difference
timestamp	
2017-01-02 09:15:00+05:30	0.044307
2017-01-02 09:16:00+05:30	0.077580
2017-01-02 09:17:00+05:30	0.266371
2017-01-02 09:18:00+05:30	-0.100156
2017-01-02 09:19:00+05:30	-0.011117
...	...
2021-01-01 15:25:00+05:30	0.056058
2021-01-01 15:26:00+05:30	0.072115

2021-01-01 15:27:00+05:30	0.088205
2021-01-01 15:28:00+05:30	0.104300
2021-01-01 15:29:00+05:30	-0.192864

[370546 rows x 1 columns]

Difference

timestamp	
2017-01-02 09:15:00+05:30	0.334936
2017-01-02 09:16:00+05:30	-0.014300
2017-01-02 09:17:00+05:30	0.281277
2017-01-02 09:18:00+05:30	-0.021230
2017-01-02 09:19:00+05:30	0.080765
...	...
2021-01-01 15:25:00+05:30	0.074245
2021-01-01 15:26:00+05:30	0.037306
2021-01-01 15:27:00+05:30	0.007368
2021-01-01 15:28:00+05:30	0.028516
2021-01-01 15:29:00+05:30	-0.037821

[370740 rows x 1 columns]

Difference

timestamp	
2017-01-02 09:15:00+05:30	-0.048625
2017-01-02 09:16:00+05:30	0.194404
2017-01-02 09:17:00+05:30	0.020870
2017-01-02 09:18:00+05:30	-0.048706
2017-01-02 09:19:00+05:30	0.062591
...	...
2021-01-01 15:25:00+05:30	0.105147
2021-01-01 15:26:00+05:30	0.065134
2021-01-01 15:27:00+05:30	0.045114
2021-01-01 15:28:00+05:30	0.007521
2021-01-01 15:29:00+05:30	0.065179

[370546 rows x 1 columns]

Difference

timestamp	
2017-01-02 09:15:00+05:30	0.217908
2017-01-02 09:16:00+05:30	0.178678
2017-01-02 09:17:00+05:30	0.099423
2017-01-02 09:18:00+05:30	0.179140

2017-01-02 09:19:00+05:30	0.199402
...	...
2021-01-01 15:25:00+05:30	0.017905
2021-01-01 15:26:00+05:30	0.017908
2021-01-01 15:27:00+05:30	-0.017912
2021-01-01 15:28:00+05:30	0.000000
2021-01-01 15:29:00+05:30	0.035823

[370545 rows x 1 columns]

Difference

timestamp	
2017-01-02 09:15:00+05:30	0.579114
2017-01-02 09:16:00+05:30	-0.105410
2017-01-02 09:17:00+05:30	0.296313
2017-01-02 09:18:00+05:30	-0.038586
2017-01-02 09:19:00+05:30	0.073077
...	...
2021-01-01 15:25:00+05:30	0.058261
2021-01-01 15:26:00+05:30	0.038530
2021-01-01 15:27:00+05:30	-0.018450
2021-01-01 15:28:00+05:30	0.015155
2021-01-01 15:29:00+05:30	-0.006591

[370740 rows x 1 columns]

Difference

timestamp	
2017-01-02 09:15:00+05:30	0.250301
2017-01-02 09:16:00+05:30	-0.014654
2017-01-02 09:17:00+05:30	0.200851
2017-01-02 09:18:00+05:30	-0.051387
2017-01-02 09:19:00+05:30	0.042187
...	...
2021-01-01 15:25:00+05:30	0.031733
2021-01-01 15:26:00+05:30	0.003923
2021-01-01 15:27:00+05:30	0.003210
2021-01-01 15:28:00+05:30	0.020331
2021-01-01 15:29:00+05:30	0.001427

[370740 rows x 1 columns]

concatenating the DataFrames vertically and changing their column names

In [7]:

```
concat_df = pd.concat(fin_df, axis=1, ignore_index=True)
concat_df
```

Out[7]:

	0	1	2	3	4	5	6
2017-01-02 09:15:00+05:30	0.586777	0.523718	0.044307	0.334936	-0.048625	0.217908	0.57
2017-01-02 09:16:00+05:30	-0.091446	-0.099275	0.077580	-0.014300	0.194404	0.178678	-0.1
2017-01-02 09:17:00+05:30	0.448542	0.232668	0.266371	0.281277	0.020870	0.099423	0.29
2017-01-02 09:18:00+05:30	-0.183563	0.159793	-0.100156	-0.021230	-0.048706	0.179140	-0.0
2017-01-02 09:19:00+05:30	0.058299	0.038907	-0.011117	0.080765	0.062591	0.199402	0.07
...
2017-07-10 12:25:00+05:30	NaN	NaN	NaN	0.000000	NaN	NaN	0.00
2017-07-10 12:26:00+05:30	NaN	NaN	NaN	0.000000	NaN	NaN	0.00
2017-07-10 12:27:00+05:30	NaN	NaN	NaN	0.000000	NaN	NaN	0.00
2017-07-10 12:28:00+05:30	NaN	NaN	NaN	0.000000	NaN	NaN	0.00
2017-07-10 12:29:00+05:30	NaN	NaN	NaN	0.000000	NaN	NaN	0.00

370741 rows × 8 columns

In [8]:

```
#[hdfc, icici, axis, bank_nifty, kotak, sbi, nifty_fin_ser, nifty_50]
new_col_name = {0:'hdfc', 1:'icici', 2:"axis", 3:'bank_nifty', 4:'kotak',
5:'sbi', 6:'nifty_fin_ser', 7:'nifty_50'}
concat_df.rename(columns=new_col_name, inplace=True)
concat_df
```

Out[8]:

	hdfc	icici	axis	bank_nifty	kotak	sbi	nifty
2017-01-02 09:15:00+05:30	0.586777	0.523718	0.044307	0.334936	-0.048625	0.217908	0.57
2017-01-02 09:16:00+05:30	-0.091446	-0.099275	0.077580	-0.014300	0.194404	0.178678	-0.1
2017-01-02 09:17:00+05:30	0.448542	0.232668	0.266371	0.281277	0.020870	0.099423	0.29
2017-01-02 09:18:00+05:30	-0.183563	0.159793	-0.100156	-0.021230	-0.048706	0.179140	-0.0
2017-01-02 09:19:00+05:30	0.058299	0.038907	-0.011117	0.080765	0.062591	0.199402	0.07
...
2017-07-10 12:25:00+05:30	NaN	NaN	NaN	0.000000	NaN	NaN	0.00
2017-07-10 12:26:00+05:30	NaN	NaN	NaN	0.000000	NaN	NaN	0.00
2017-07-10 12:27:00+05:30	NaN	NaN	NaN	0.000000	NaN	NaN	0.00
2017-07-10 12:28:00+05:30	NaN	NaN	NaN	0.000000	NaN	NaN	0.00
2017-07-10 12:29:00+05:30	NaN	NaN	NaN	0.000000	NaN	NaN	0.00

370741 rows × 8 columns

dropping null values. as they might affect our analysis

In [9]:

```
concat_df.isnull().sum()
```

Out[9]:

hdfc	336
icici	337
axis	333
bank_nifty	64
kotak	336
sbi	337
nifty_fin_ser	64
nifty_50	64
dtype: int64	

In [10]:

```
concat_df.dropna(axis=0,inplace = True)
concat_df
```

Out[10]:

	hdfc	icici	axis	bank_nifty	kotak	sbi	nift
2017-01-02 09:15:00+05:30	0.586777	0.523718	0.044307	0.334936	-0.048625	0.217908	0.5
2017-01-02 09:16:00+05:30	-0.091446	-0.099275	0.077580	-0.014300	0.194404	0.178678	-0.
2017-01-02 09:17:00+05:30	0.448542	0.232668	0.266371	0.281277	0.020870	0.099423	0.2
2017-01-02 09:18:00+05:30	-0.183563	0.159793	-0.100156	-0.021230	-0.048706	0.179140	-0.
2017-01-02 09:19:00+05:30	0.058299	0.038907	-0.011117	0.080765	0.062591	0.199402	0.0
...
2021-01-01 15:25:00+05:30	0.024573	0.056824	0.056058	0.074245	0.105147	0.017905	0.0
2021-01-01 15:26:00+05:30	0.066716	-0.028431	0.072115	0.037306	0.065134	0.017908	0.0
2021-01-01 15:27:00+05:30	0.014055	-0.037904	0.088205	0.007368	0.045114	-0.017912	-0.
2021-01-01 15:28:00+05:30	0.091369	-0.009472	0.104300	0.028516	0.007521	0.000000	0.0
2021-01-01 15:29:00+05:30	-0.105489	0.000000	-0.192864	-0.037821	0.065179	0.035823	-0.

370362 rows × 8 columns

Statistical Summary

In [11]:

```
concat_df.describe()
```

Out[11]:

	hdfc	icici	axis	bank_nifty	kotak
count	370362.000000	370362.000000	370362.000000	370362.000000	370362.000000
mean	0.000710	0.000576	0.000786	0.000207	0.000517
std	0.077821	0.102615	0.114293	0.066306	0.096716
min	-5.406876	-2.478674	-10.437419	-6.035976	-10.214992
25%	-0.028166	-0.037994	-0.039463	-0.023531	-0.034937
50%	0.000000	0.000000	0.000000	0.000000	0.000000
75%	0.028871	0.040425	0.041017	0.023578	0.035719
max	4.456907	2.429055	4.687500	2.679392	7.190086

Finding correlation

In [12]:

```
concat_df.corr()
```

Out[12]:

	hdfc	icici	axis	bank_nifty	kotak	sbi	nifty_fin_ser
hdfc	1.000000	0.339305	0.336867	0.731982	0.362691	0.331090	0.740410
icici	0.339305	1.000000	0.412388	0.705904	0.286460	0.435251	0.672642
axis	0.336867	0.412388	1.000000	0.656542	0.308394	0.413084	0.603825
bank_nifty	0.731982	0.705904	0.656542	1.000000	0.596695	0.647639	0.946818
kotak	0.362691	0.286460	0.308394	0.596695	1.000000	0.299446	0.577743
sbi	0.331090	0.435251	0.413084	0.647639	0.299446	1.000000	0.599758
nifty_fin_ser	0.740410	0.672642	0.603825	0.946818	0.577743	0.599758	1.000000
nifty_50	0.621194	0.595334	0.571882	0.859672	0.523126	0.589592	0.887069

displaying a pairplot to determine their correlation

In [13]:

```
sns.set(font_scale=1)
sns.pairplot(data=concat_df)
plt.show()
```



displaying a Heatmap to summarize their correlation

In [14]:

```
plt.figure(figsize=(20,10))
sns.set(font_scale=1.5)
sns.heatmap(data=concat_df.corr(), cmap="Blues", annot=True)
plt.show()
```

