Stock_Price_Analysis

March 27, 2024

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

[2]:
```
import glob
```

[ ]:
```
glob.glob(r'C:\Users\Asus\Desktop\data python␣
 ↪project\TimeSeries\individual_stocks_5yr\*csv')
```

[4]:
```
len(glob.glob(r'C:\Users\Asus\Desktop\data python␣
 ↪project\TimeSeries\individual_stocks_5yr\*csv'))
```

[4]:
```
505
```

[5]:
```
## use Warnings package to get rid of any future warning ..

import warnings
from warnings import filterwarnings
filterwarnings('ignore')
```

[6]:
```
company_list = [
    r'C:\\Users\\Asus\\Desktop\\data python␣
 ↪project\\TimeSeries\\individual_stocks_5yr\\AAPL_data.csv',
    r'C:\\Users\\Asus\\Desktop\\data python␣
 ↪project\\TimeSeries\\individual_stocks_5yr\\AMZN_data.csv',
    r'C:\\Users\\Asus\\Desktop\\data python␣
 ↪project\\TimeSeries\\individual_stocks_5yr\\GOOG_data.csv',
    r'C:\\Users\\Asus\\Desktop\\data python␣
 ↪project\\TimeSeries\\individual_stocks_5yr\\MSFT_data.csv'

]
```

[7]:
```
all_data = pd.DataFrame()

for file in company_list:

    current_df = pd.read_csv(file)
```

```
    ##all_data = current_df.append(all_data , ignore_index=True)
    all_data = pd.concat([all_data , current_df] , ignore_index=True)
```

[8]:
```
all_data.shape
```

[8]:
```
(4752, 7)
```

[9]:
```
all_data.head()
```

[9]:

	date	open	high	low	close	volume	Name
0	2013-02-08	67.7142	68.4014	66.8928	67.8542	158168416	AAPL
1	2013-02-11	68.0714	69.2771	67.6071	68.5614	129029425	AAPL
2	2013-02-12	68.5014	68.9114	66.8205	66.8428	151829363	AAPL
3	2013-02-13	66.7442	67.6628	66.1742	66.7156	118721995	AAPL
4	2013-02-14	66.3599	67.3771	66.2885	66.6556	88809154	AAPL

[10]:
```
all_data['Name'].unique()
```

[10]:
```
array(['AAPL', 'AMZN', 'GOOG', 'MSFT'], dtype=object)
```

0.1 Analysing Change in Price OF the Stock Overtime

[11]:
```
all_data.isnull()
```

[11]:

	date	open	high	low	close	volume	Name
0	False	False	False	False	False	False	False
1	False	False	False	False	False	False	False
2	False	False	False	False	False	False	False
3	False	False	False	False	False	False	False
4	False	False	False	False	False	False	False
…	…	…	…	…	…	…	…
4747	False	False	False	False	False	False	False
4748	False	False	False	False	False	False	False
4749	False	False	False	False	False	False	False
4750	False	False	False	False	False	False	False
4751	False	False	False	False	False	False	False

[4752 rows x 7 columns]

[12]:
```
all_data.isnull().sum()
```

[12]:
```
date      0
open      0
high      0
low       0
close     0
volume    0
```

```
Name      0
dtype: int64
```

[13]:
```
all_data.dtypes
```

[13]:
```
date       object
open      float64
high      float64
low       float64
close     float64
volume      int64
Name       object
dtype: object
```

[14]:
```
all_data['date'] = pd.to_datetime(all_data['date'])
```

[15]:
```
all_data['date']
```

[15]:
```
0      2013-02-08
1      2013-02-11
2      2013-02-12
3      2013-02-13
4      2013-02-14
          …
4747   2018-02-01
4748   2018-02-02
4749   2018-02-05
4750   2018-02-06
4751   2018-02-07
Name: date, Length: 4752, dtype: datetime64[ns]
```

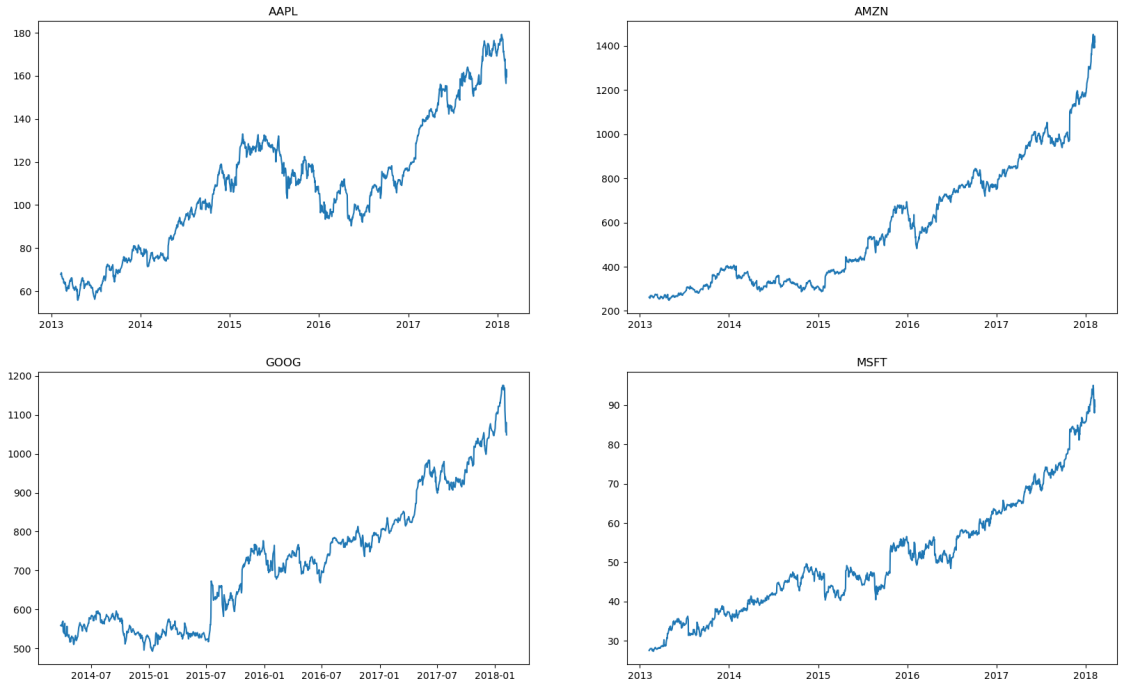
[16]:
```
tech_list = all_data['Name'].unique()
```

[17]:
```
tech_list
```

[17]:
```
array(['AAPL', 'AMZN', 'GOOG', 'MSFT'], dtype=object)
```

[18]:
```
plt.figure(figsize=(20,12))

for index , company in enumerate(tech_list , 1):
    plt.subplot(2 , 2 , index) ## creating subplot for each stock
    filter1 = all_data['Name']==company
    df = all_data[filter1]
    plt.plot(df['date'] , df['close']) ## plotting "date" vs "close"
    plt.title(company)
```



[ ]:

0.2 Analysing Moving Average of The Various stock

[19]:
```
all_data.head(10)
```

[19]:

	date	open	high	low	close	volume	Name
0	2013-02-08	67.7142	68.4014	66.8928	67.8542	158168416	AAPL
1	2013-02-11	68.0714	69.2771	67.6071	68.5614	129029425	AAPL
2	2013-02-12	68.5014	68.9114	66.8205	66.8428	151829363	AAPL
3	2013-02-13	66.7442	67.6628	66.1742	66.7156	118721995	AAPL
4	2013-02-14	66.3599	67.3771	66.2885	66.6556	88809154	AAPL
5	2013-02-15	66.9785	67.1656	65.7028	65.7371	97924631	AAPL
6	2013-02-19	65.8714	66.1042	64.8356	65.7128	108854046	AAPL
7	2013-02-20	65.3842	65.3842	64.1142	64.1214	118891367	AAPL
8	2013-02-21	63.7142	64.1671	63.2599	63.7228	111596821	AAPL
9	2013-02-22	64.1785	64.5142	63.7999	64.4014	82583823	AAPL

[20]:
```
all_data['close'].rolling(window=10).mean().head(14)
```

[20]:
```
0          NaN
1          NaN
2          NaN
3          NaN
4          NaN
```

```
5          NaN
6          NaN
7          NaN
8          NaN
9     66.03251
10    65.57280
11    65.13051
12    64.79722
13    64.43137
Name: close, dtype: float64
```

[21]:
```
new_data = all_data.copy()
```

[22]:
```
ma_day = [10 ,20 , 50]

for ma in ma_day:
    new_data['close_'+str(ma)] = new_data['close'].rolling(ma).mean()
```

[23]:
```
new_data.tail(7)
```

[23]:

	date	open	high	low	close	volume	Name	close_10	close_20	close_50
4745	2018-01-30	93.30	93.660	92.1000	92.74	38635053	MSFT	91.862	89.8285	86.5244
4746	2018-01-31	93.75	95.400	93.5100	95.01	48756338	MSFT	92.349	90.2815	86.7606
4747	2018-02-01	94.79	96.070	93.5813	94.26	47227882	MSFT	92.765	90.6770	86.9978
4748	2018-02-02	93.64	93.970	91.5000	91.78	47867753	MSFT	92.943	90.9105	87.1828
4749	2018-02-05	90.56	93.240	88.0000	88.00	51031465	MSFT	92.582	90.9010	87.2684
4750	2018-02-06	86.89	91.475	85.2500	91.33	67998564	MSFT	92.525	91.0535	87.4328
4751	2018-02-07	90.49	91.770	89.2000	89.61	41107592	MSFT	92.304	91.1230	87.5598

[24]:
```
new_data.set_index('date' , inplace=True)
```

[25]:
```
new_data
```

[25]:

date	open	high	low	close	volume	Name	close_10	close_20	close_50
2013-02-08	67.7142	68.4014	66.8928	67.8542	158168416	AAPL	NaN	NaN	NaN
2013-02-11	68.0714	69.2771	67.6071	68.5614	129029425	AAPL	NaN	NaN	NaN
2013-02-12	68.5014	68.9114	66.8205	66.8428	151829363	AAPL	NaN	NaN	NaN

```
2013-02-13  66.7442  67.6628  66.1742  66.7156  118721995  AAPL       NaN
2013-02-14  66.3599  67.3771  66.2885  66.6556   88809154  AAPL       NaN
…             …       …        …        …         …        …         …
2018-02-01  94.7900  96.0700  93.5813  94.2600   47227882  MSFT    92.765
2018-02-02  93.6400  93.9700  91.5000  91.7800   47867753  MSFT    92.943
2018-02-05  90.5600  93.2400  88.0000  88.0000   51031465  MSFT    92.582
2018-02-06  86.8900  91.4750  85.2500  91.3300   67998564  MSFT    92.525
2018-02-07  90.4900  91.7700  89.2000  89.6100   41107592  MSFT    92.304

            close_20  close_50
date
2013-02-08       NaN       NaN
2013-02-11       NaN       NaN
2013-02-12       NaN       NaN
2013-02-13       NaN       NaN
2013-02-14       NaN       NaN
…                 …         …
2018-02-01   90.6770   86.9978
2018-02-02   90.9105   87.1828
2018-02-05   90.9010   87.2684
2018-02-06   91.0535   87.4328
2018-02-07   91.1230   87.5598

[4752 rows x 9 columns]
```

[26]:
```
new_data.columns
```

[26]:
```
Index(['open', 'high', 'low', 'close', 'volume', 'Name', 'close_10',
       'close_20', 'close_50'],
      dtype='object')
```

[27]:
```
plt.figure(figsize=(20,12))

for index , company in enumerate(tech_list , 1):
    plt.subplot(2 , 2 , index)
    filter1 = new_data['Name']==company
    df = new_data[filter1]
    df[['close_10','close_20', 'close_50']].plot(ax=plt.gca())
    plt.title(company)
```

1 analyse Closing price change in apple stock

[28]:
```
company_list
```

[28]:
```
['C:\\\\Users\\\\Asus\\\\Desktop\\\\data python
project\\\\TimeSeries\\\\individual_stocks_5yr\\\\AAPL_data.csv',
 'C:\\\\Users\\\\Asus\\\\Desktop\\\\data python
project\\\\TimeSeries\\\\individual_stocks_5yr\\\\AMZN_data.csv',
 'C:\\\\Users\\\\Asus\\\\Desktop\\\\data python
project\\\\TimeSeries\\\\individual_stocks_5yr\\\\GOOG_data.csv',
 'C:\\\\Users\\\\Asus\\\\Desktop\\\\data python
project\\\\TimeSeries\\\\individual_stocks_5yr\\\\MSFT_data.csv']
```

[30]:
```
apple = pd.read_csv(r'C:\\\\Users\\\\Asus\\\\Desktop\\\\data python␣
↪project\\\\TimeSeries\\\\individual_stocks_5yr\\\\AAPL_data.csv')
```

[31]:
```
apple.head()
```

[31]:

	date	open	high	low	close	volume	Name
0	2013-02-08	67.7142	68.4014	66.8928	67.8542	158168416	AAPL
1	2013-02-11	68.0714	69.2771	67.6071	68.5614	129029425	AAPL
2	2013-02-12	68.5014	68.9114	66.8205	66.8428	151829363	AAPL
3	2013-02-13	66.7442	67.6628	66.1742	66.7156	118721995	AAPL
4	2013-02-14	66.3599	67.3771	66.2885	66.6556	88809154	AAPL

[33]:
```
apple['daily_retun(in %)'] =apple['close'].pct_change()*100
```

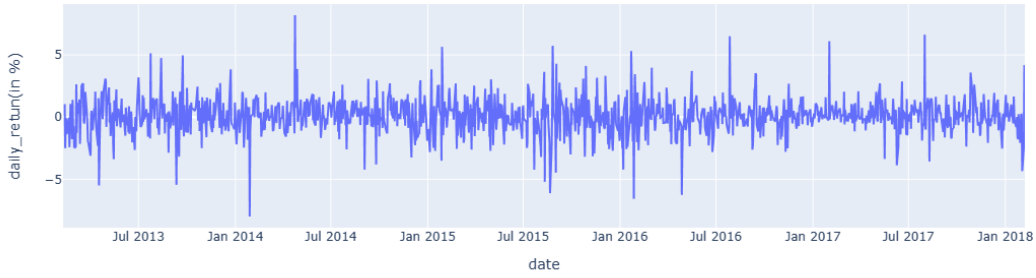
[34]:
```
apple.head(5)
```

[34]:
```
         date     open     high      low    close     volume  Name  \
0  2013-02-08  67.7142  68.4014  66.8928  67.8542  158168416  AAPL
1  2013-02-11  68.0714  69.2771  67.6071  68.5614  129029425  AAPL
2  2013-02-12  68.5014  68.9114  66.8205  66.8428  151829363  AAPL
3  2013-02-13  66.7442  67.6628  66.1742  66.7156  118721995  AAPL
4  2013-02-14  66.3599  67.3771  66.2885  66.6556   88809154  AAPL

   daily_retun(in %)
0                NaN
1           1.042235
2          -2.506658
3          -0.190297
4          -0.089934
```

[35]:
```
import plotly.express as px
```

[36]:
```
px.line(apple , x = 'date' ,y= 'daily_retun(in %)')
```



2 Performing Resampling Analysis

[38]:
```
apple.dtypes
```

[38]:
```
date                 object
open                float64
high                float64
low                 float64
close               float64
volume                int64
Name                 object
```

```
daily_retun(in %)    float64
dtype: object
```

[39]:
```
apple['date'] = pd.to_datetime(apple['date'])
```

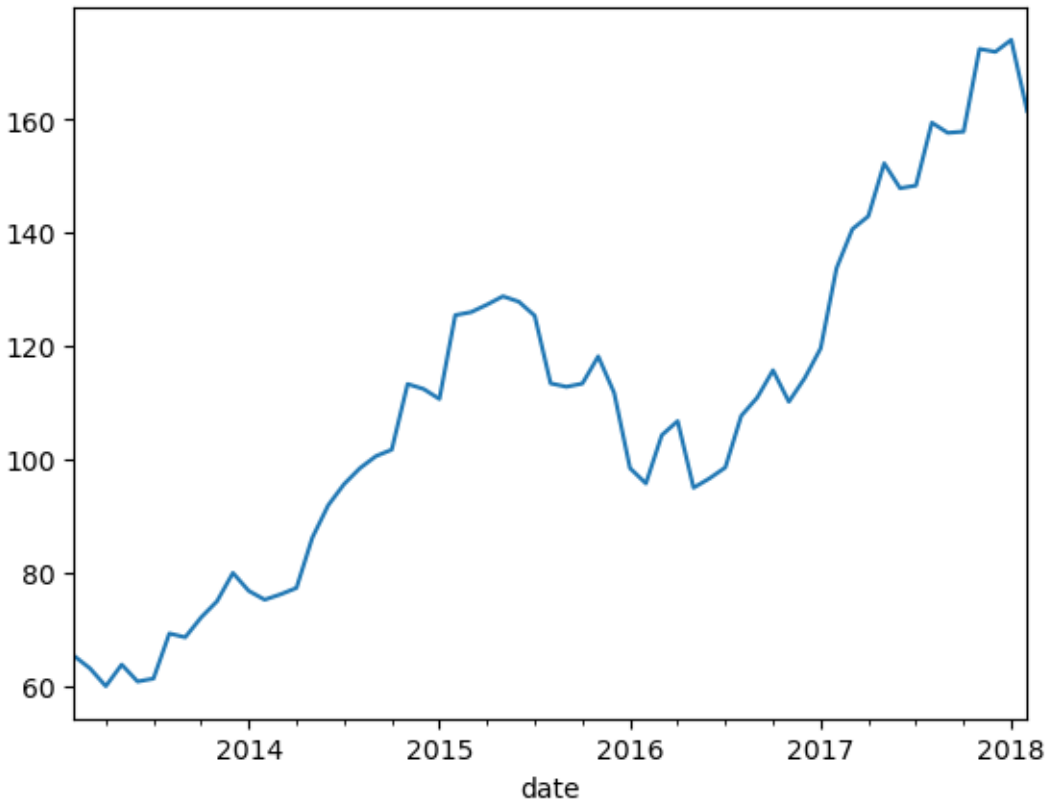
[40]:
```
apple.dtypes
```

[40]:
```
date                 datetime64[ns]
open                        float64
high                        float64
low                         float64
close                       float64
volume                        int64
Name                         object
daily_retun(in %)           float64
dtype: object
```

[44]:
```
apple.set_index('date', inplace = True )
```

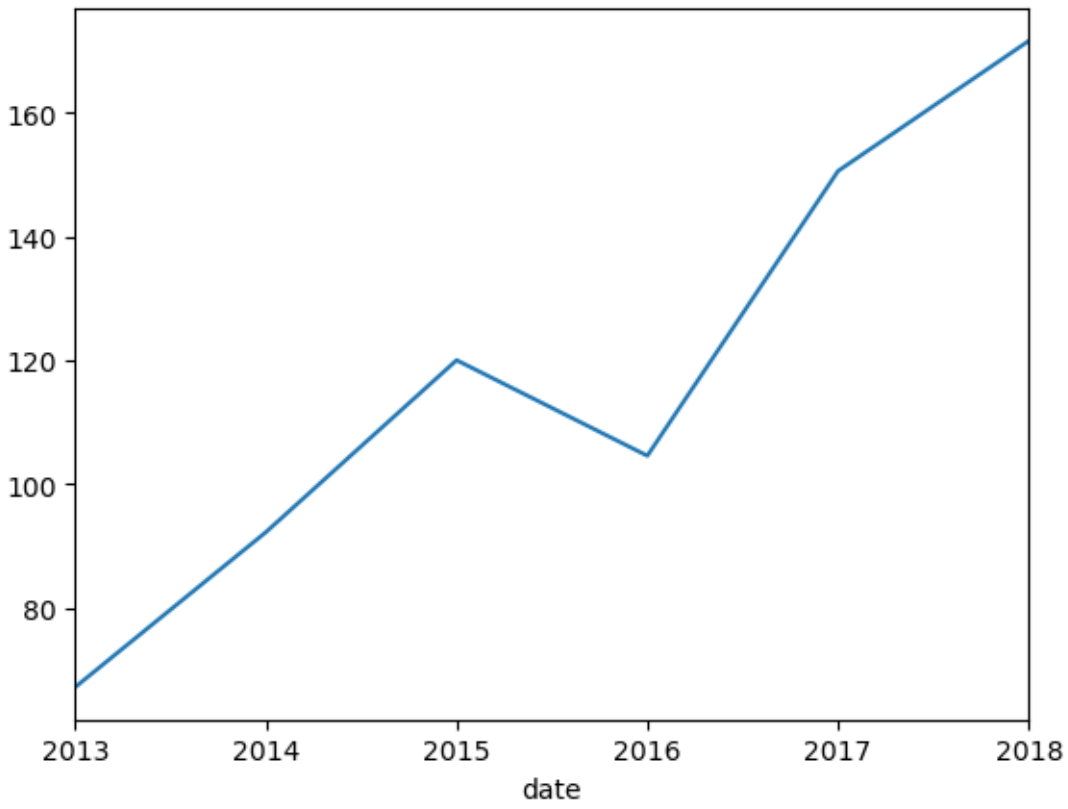
[46]:
```
apple['close'].resample('M').mean().plot()
```

[46]:
```
<Axes: xlabel='date'>
```



[47]:
```
apple['close'].resample('Y').mean().plot()
```

[47]: <Axes: xlabel='date'>



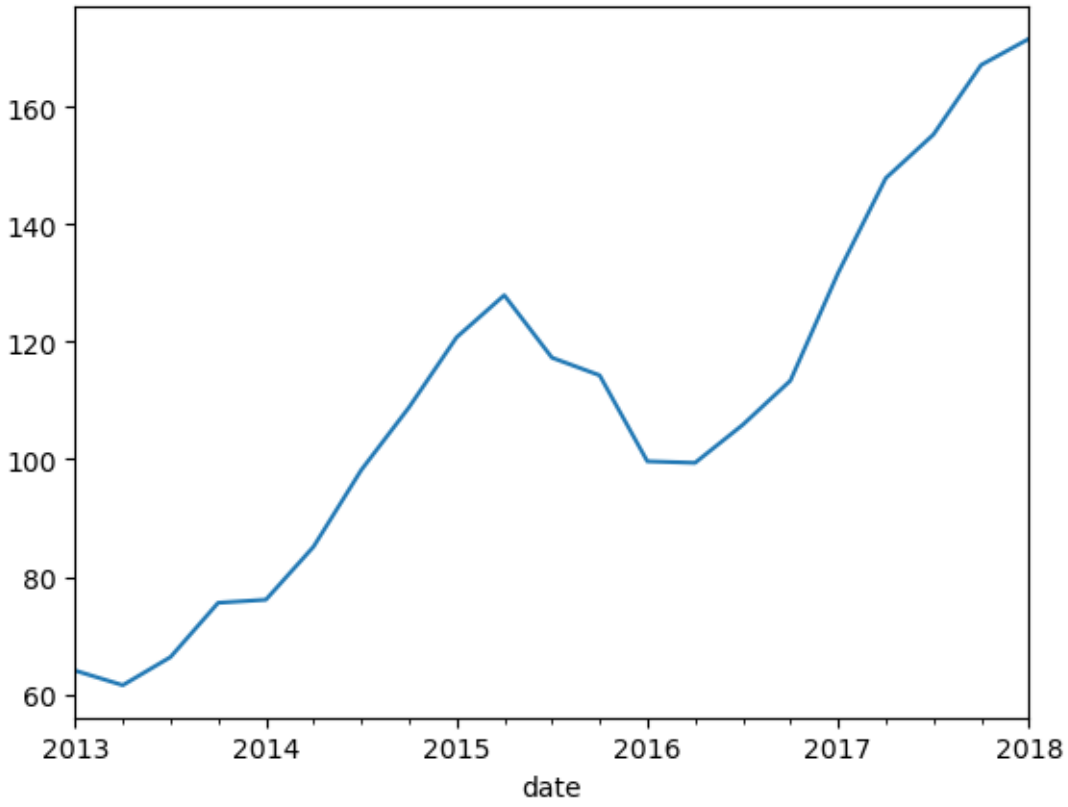
[48]:
```
apple['close'].resample('Q').mean()
```

[48]:
```
date
2013-03-31     64.020291
2013-06-30     61.534692
2013-09-30     66.320670
2013-12-31     75.567478
2014-03-31     76.086293
2014-06-30     85.117475
2014-09-30     98.163311
2014-12-31    108.821016
2015-03-31    120.776721
2015-06-30    127.937937
2015-09-30    117.303438
2015-12-31    114.299297
```

```
2016-03-31     99.655082
2016-06-30     99.401250
2016-09-30    105.866094
2016-12-31    113.399048
2017-03-31    131.712500
2017-06-30    147.875397
2017-09-30    155.304603
2017-12-31    167.148254
2018-03-31    171.594231
Freq: Q-DEC, Name: close, dtype: float64
```

[49]:
```
apple['close'].resample('Q').mean().plot()
```

[49]:
```
<Axes: xlabel='date'>
```



3 performing Multi-Variante analysis to understand CO-Relation

[50]:
```
company_list
```

[50]:
```
['C:\\\\Users\\\\Asus\\\\Desktop\\\\data python
project\\\\TimeSeries\\\\individual_stocks_5yr\\\\AAPL_data.csv',
 'C:\\\\Users\\\\Asus\\\\Desktop\\\\data python
project\\\\TimeSeries\\\\individual_stocks_5yr\\\\AMZN_data.csv',
 'C:\\\\Users\\\\Asus\\\\Desktop\\\\data python
project\\\\TimeSeries\\\\individual_stocks_5yr\\\\GOOG_data.csv',
 'C:\\\\Users\\\\Asus\\\\Desktop\\\\data python
project\\\\TimeSeries\\\\individual_stocks_5yr\\\\MSFT_data.csv']
```

[51]:
```
company_list[0]
```

[51]:
```
'C:\\\\Users\\\\Asus\\\\Desktop\\\\data python
project\\\\TimeSeries\\\\individual_stocks_5yr\\\\AAPL_data.csv'
```

[54]:
```
app = pd.read_csv(company_list[0])
amzn = pd.read_csv(company_list[1])
google = pd.read_csv(company_list[2])
msft = pd.read_csv(company_list[3])
```

[53]:
```
app.head()
```

[53]:

	date	open	high	low	close	volume	Name
0	2013-02-08	67.7142	68.4014	66.8928	67.8542	158168416	AAPL
1	2013-02-11	68.0714	69.2771	67.6071	68.5614	129029425	AAPL
2	2013-02-12	68.5014	68.9114	66.8205	66.8428	151829363	AAPL
3	2013-02-13	66.7442	67.6628	66.1742	66.7156	118721995	AAPL
4	2013-02-14	66.3599	67.3771	66.2885	66.6556	88809154	AAPL

[55]:
```
closing_price = pd.DataFrame()
```

[57]:
```
closing_price['app_close'] = app['close']
closing_price['amzn_close'] = amzn['close']
closing_price['google_close'] = google['close']
closing_price['msft_close'] = msft['close']
```

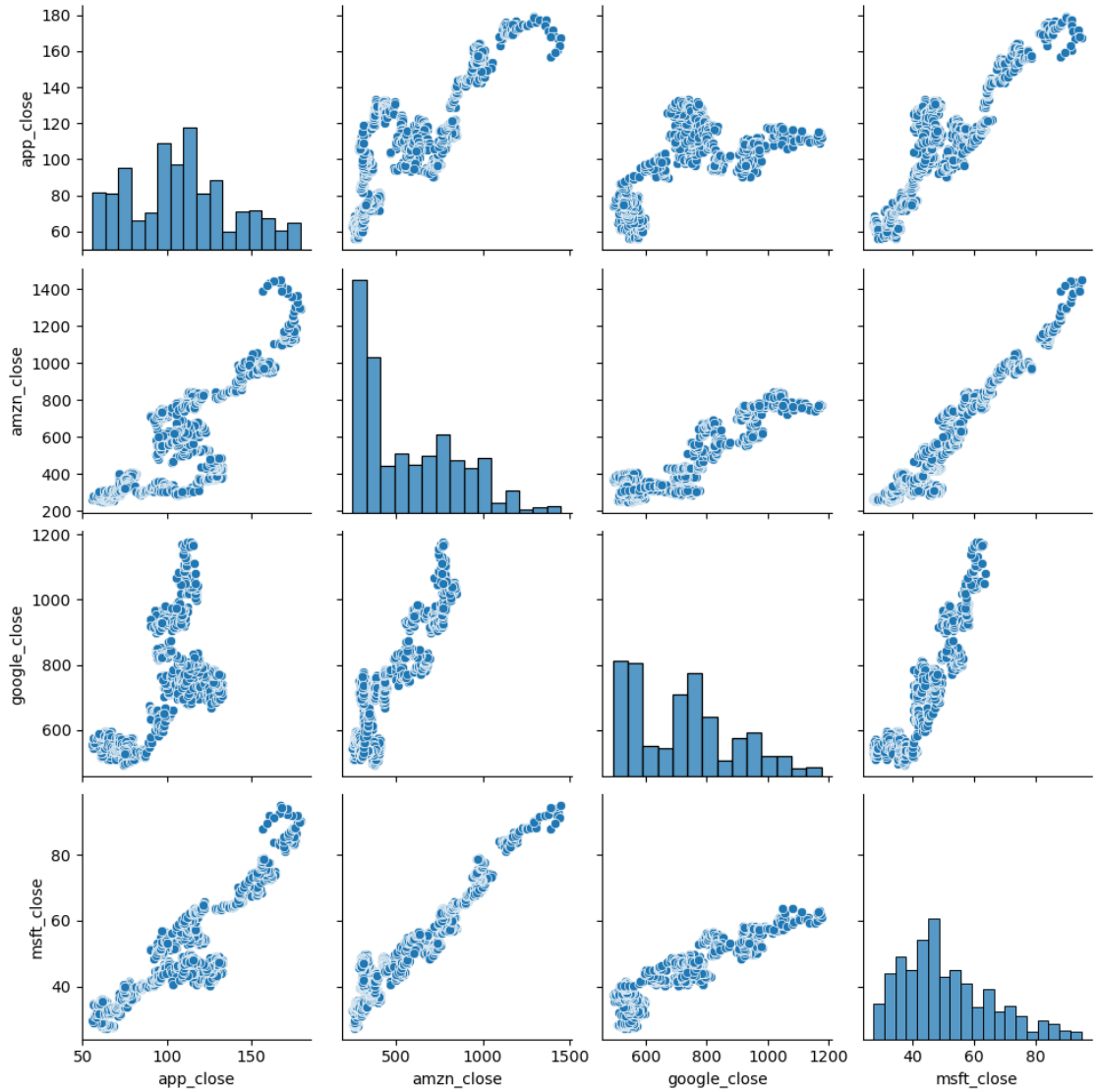
[58]:
```
closing_price.head()
```

[58]:

	app_close	amzn_close	google_close	msft_close
0	67.8542	261.95	558.46	27.55
1	68.5614	257.21	559.99	27.86
2	66.8428	258.70	556.97	27.88
3	66.7156	269.47	567.16	28.03
4	66.6556	269.24	567.00	28.04

[59]:
```
sns.pairplot(closing_price)
```

[59]:
```
<seaborn.axisgrid.PairGrid at 0x1cbf5b48710>
```



[60]:
```
closing_price.corr()
```

[60]:

	app_close	amzn_close	google_close	msft_close
app_close	1.000000	0.819078	0.640522	0.899689
amzn_close	0.819078	1.000000	0.888456	0.955977
google_close	0.640522	0.888456	1.000000	0.907011
msft_close	0.899689	0.955977	0.907011	1.000000

[61]:
```
sns.heatmap(closing_price.corr() , annot = True)
```

[61]: <Axes: >

4 CO-Relation analysis

[62]:
```
closing_price
```

[62]:

	app_close	amzn_close	google_close	msft_close
0	67.8542	261.95	558.46	27.55
1	68.5614	257.21	559.99	27.86
2	66.8428	258.70	556.97	27.88
3	66.7156	269.47	567.16	28.03
4	66.6556	269.24	567.00	28.04
…	…	…	…	…
1254	167.7800	1390.00	NaN	94.26
1255	160.5000	1429.95	NaN	91.78
1256	156.4900	1390.00	NaN	88.00
1257	163.0300	1442.84	NaN	91.33
1258	159.5400	1416.78	NaN	89.61

[1259 rows x 4 columns]

[63]:
```
(closing_price['app_close'] - closing_price['app_close'].shift(1))/
↪closing_price['app_close'].shift(1)*100
```

[63]:
```
0           NaN
1      1.042235
2     -2.506658
3     -0.190297
4     -0.089934
         …
1254   0.209043
1255  -4.339015
1256  -2.498442
1257   4.179181
1258  -2.140710
Name: app_close, Length: 1259, dtype: float64
```

[64]:
```
for col in closing_price.columns:
    closing_price[col + '_pct_change']=(closing_price[col] - closing_price[col].
 ↪shift(1))/closing_price['app_close'].shift(1)*100
```

[65]:
```
closing_price.head(2)
```

[65]:

	app_close	amzn_close	google_close	msft_close	app_close_pct_change	amzn_close_pct_change	google_close_pct_change	msft_close_pct_change
0	67.8542	261.95	558.46	27.55	NaN	NaN	NaN	NaN
1	68.5614	257.21	559.99	27.86	1.042235	-6.985566	2.254835	0.456862

[66]:
```
closing_price.columns
```

[66]:
```
Index(['app_close', 'amzn_close', 'google_close', 'msft_close',
       'app_close_pct_change', 'amzn_close_pct_change',
       'google_close_pct_change', 'msft_close_pct_change'],
      dtype='object')
```

[67]:
```
closing_p = closing_price[['app_close_pct_change', 'amzn_close_pct_change',
       'google_close_pct_change', 'msft_close_pct_change']]
```

[68]:
```
closing_p
```

[68]:

	app_close_pct_change	amzn_close_pct_change	google_close_pct_change	msft_close_pct_change
0	NaN	NaN	NaN	NaN
1	1.042235	-6.985566	2.254835	0.456862
2	-2.506658	2.173235	-4.404811	-0.239824
3	-0.190297	16.112431	15.244723	0.000000
4	-0.089934	-0.344747	-0.239824	0.000000
…	…	…	…	…
1254	0.209043	-36.367437	NaN	NaN

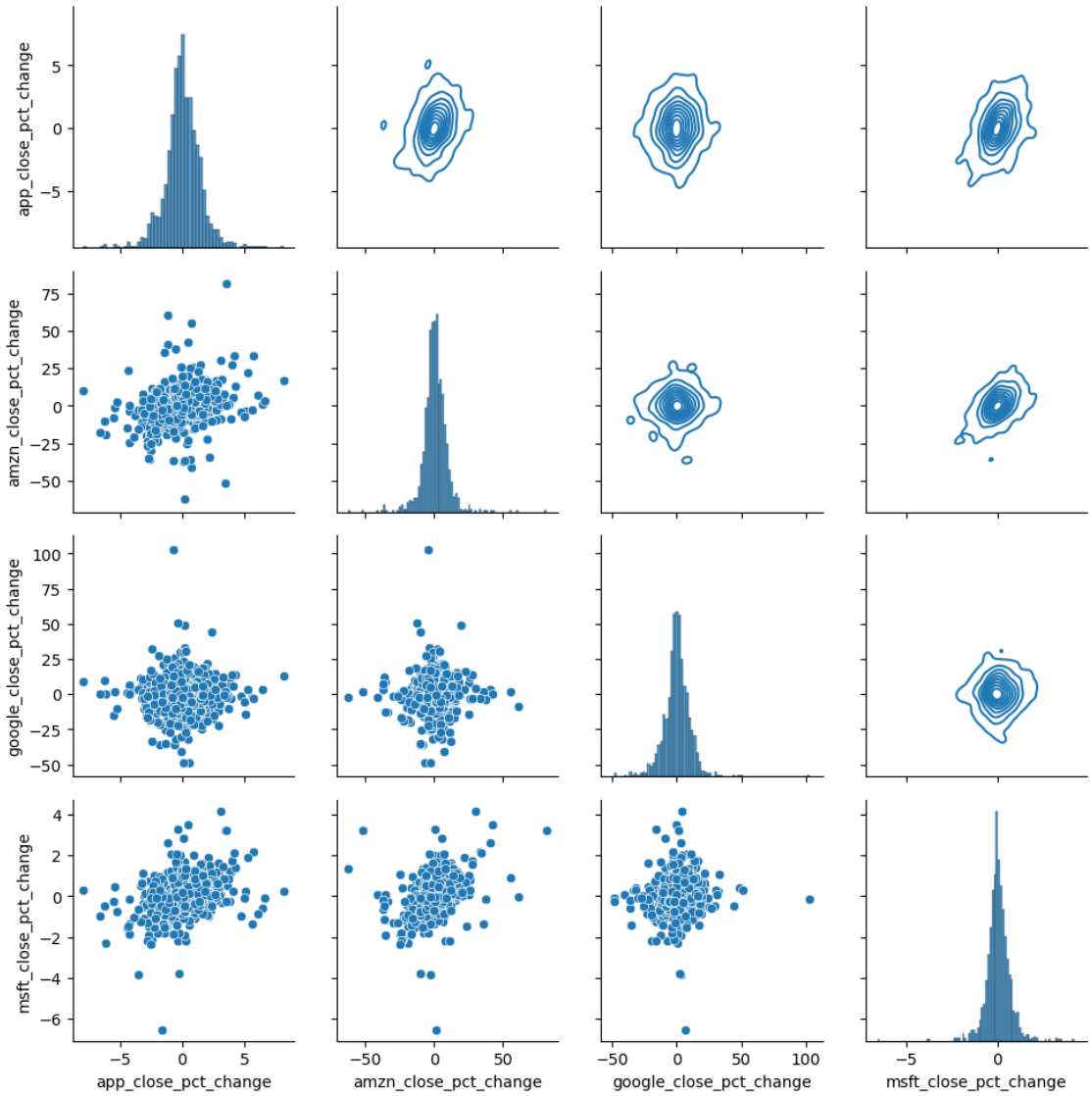
```
1255             -4.339015              23.810943                      NaN
1256             -2.498442             -24.890966                      NaN
1257              4.179181              33.765736                      NaN
1258             -2.140710             -15.984788                      NaN

      msft_close_pct_change
0                       NaN
1                  0.456862
2                  0.029171
3                  0.224407
4                  0.014989
…                       …
1254              -0.447948
1255              -1.478126
1256              -2.355140
1257               2.127931
1258              -1.055021

[1259 rows x 4 columns]
```

[71]:
```
g = sns.PairGrid(data = closing_p)
g.map_diag(sns.histplot)
g.map_lower(sns.scatterplot)
g.map_upper(sns.kdeplot)
```

[71]:
```
<seaborn.axisgrid.PairGrid at 0x1cbf713ef50>
```



[72]:
```
closing_p.corr()
```

[72]:

	app_close_pct_change	amzn_close_pct_change	google_close_pct_change	msft_close_pct_change
app_close_pct_change	1.000000	0.295576	0.038247	0.360594
amzn_close_pct_change	0.295576	1.000000	0.030862	0.408107
google_close_pct_change	0.038247	0.030862	1.000000	0.051796
msft_close_pct_change	0.360594	0.408107	0.051796	1.000000

[ ]: