FDI data analysis

Wireframe

FDI_DATA

Required libraries:

1. Pandas

2. Matplotlib

#import libs

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

Retriving dataset of FDI

```
df=pd.read_csv('/Users/shashankpatil/Desktop/pan/FDI_India.csv')
df1=pd.read_csv('/Users/shashankpatil/Desktop/pan/FDI.csv')
df.head(10)
```

```
                                          Sector  2000-01  2001-02
2002-03  \
0                                          METALLURGICAL INDUSTRIES
                                           22.69    14.14

36.61
1                                          MINING     1.32     6.52
10.06
2                                          POWER    89.42   757.44
59.11
3                                          NON-CONVENTIONAL ENERGY
                                           0.00     0.00

1.70
4                                          COAL PRODUCTION     0.00
                                           0.00

0.00
5                                          PETROLEUM & NATURAL GAS
                                           9.35   211.07

56.78
6                                          BOILERS AND STEAM
                                           GENERATING PLANTS     0.00
                                           0.00

0.00
```

```
7                                          PRIME MOVER (OTHER THAN
                                           ELECTRICAL GENERATORS)
                                           0.00     0.00
0.00
8                                          ELECTRICAL EQUIPMENTS
                                           79.76    65.76
34.71
9                                          COMPUTER SOFTWARE &
                                           HARDWARE   228.39   419.39
314.24

   2003-04  2004-05  2005-06  2006-07  2007-08  2008-09  2009-10
2010-11  \
0     8.11   200.38   149.13   169.94  1175.75   959.94   419.88
      1098.14
1     23.48     9.92     7.40     6.62   444.36    34.16   174.40
      79.51
2     27.09    43.37    72.69   157.15   988.68   907.66  1271.79
      1271.77
3     4.14     1.27     1.35     2.44    58.82   125.88   622.52
      214.40
4     0.04     0.00     9.14     1.30    14.08     0.22     0.00
      0.00
5     80.64   102.78    12.09    87.71  1405.04   349.29   265.53
      556.43
6     0.04     0.54     0.00     3.31     1.51     0.00     3.96
      0.63
7     0.00     2.66     0.74    25.57    40.53    74.88    39.50
166.44
8     73.20    97.40    39.50    76.85   653.74   417.35   728.27
153.90
9     368.32   527.90  1359.97  2613.33  1382.25  1543.34   871.86
      779.81

   2011-12  2012-13  2013-14  2014-15  2015-16  2016-17  0
1786.14  1466.23   567.63   359.34   456.31  1440.18
1   142.65    57.89    12.73   684.39   520.67    55.75
2   1652.38   535.68  1066.08   707.04   868.80  1112.98
3   452.17  1106.52   414.25   615.95   776.51   783.57  4     0.00
    0.00     2.96     0.00     0.00     0.00  5  2029.98   214.80
    112.23  1079.02   103.02   180.40  6    31.79    20.05     0.17
    1.33    77.91    53.91  7   313.75   184.60   212.78   230.70
    159.13   286.88
8   566.39   195.87   134.31   574.83   444.88  2230.69
9   796.35   485.96  1126.27  2296.04  5904.36  3651.71
```

```
df1.head()
```

```
   FY year                     Sector     FDI
0  2000-01  METALLURGICAL INDUSTRIES   22.69
1  2001-02  METALLURGICAL INDUSTRIES   14.14
2  2002-03  METALLURGICAL INDUSTRIES   36.61
3  2003-04  METALLURGICAL INDUSTRIES    8.11
4  2004-05  METALLURGICAL INDUSTRIES  200.38
```

Descriptive statistics of the Dataset

```
df.describe()
```

```
          2000-01     2001-02     2002-03     2003-04     2004-05  \
count   63.000000   63.000000   63.000000   63.000000   63.000000
mean    37.757302   63.931587   42.925714   34.727778   51.090317
std    112.227860  157.878737   86.606439   67.653735  101.934873
min      0.000000    0.000000    0.000000    0.000000    0.000000
25%      0.000000    0.000000    0.200000    0.215000    0.715000
50%      4.030000    5.070000   11.010000    6.370000    9.090000
75%     23.510000   44.830000   36.555000   38.660000   43.205000
max    832.070000  873.230000  419.960000  368.320000  527.900000

           2005-06      2006-07      2007-08      2008-09      2009-10
\ count    63.000000    63.000000    63.000000    63.000000    63.000000

mean      87.932540   198.281905   390.085714   498.348571   410.069524

std      206.436967   686.783115  1026.249935  1134.649040   926.814626

min        0.000000     0.000000     0.000000     0.000000     0.000000

25%        1.230000     4.160000     9.950000    11.950000     7.880000


50%       22.620000    25.820000    58.820000    84.880000    69.740000

75%       63.855000   108.325000   279.270000   383.320000   341.595000

max     1359.970000  4713.780000  6986.170000  6183.490000  5466.130000


           2010-11      2011-12      2012-13      2013-14      2014-15
\ count    63.000000    63.000000    63.000000    63.000000    63.000000

mean     339.413810   557.472698   355.930000   385.703492   490.959841

std      627.141139  1031.474056   778.091368   658.429944   837.787060

min        0.000000     0.000000     0.000000     0.000000     0.000000

25%        8.430000    22.720000    15.115000    16.610000    33.800000
```

```
50%       58.070000   129.360000    95.410000   113.780000   177.220000

75%      304.280000   593.525000   288.025000   473.060000   595.390000

max    3296.090000  5215.980000  4832.980000  3982.890000  4443.260000


            2015-16      2016-17
count    63.000000    63.000000
mean    634.936349   690.131111  std
1335.307706  1411.965354  min
0.000000     0.000000  25%
30.000000    19.905000
50%     159.130000   110.860000
75%     519.070000   741.220000
max    6889.460000  8684.070000
```

```
df1.describe()
```

```
                FDI
count  1071.000000
mean    309.982250
std     819.037233
min       0.000000
25%       3.140000
50%      37.940000
75%     213.740000
max    8684.070000
```

```
df.columns
```

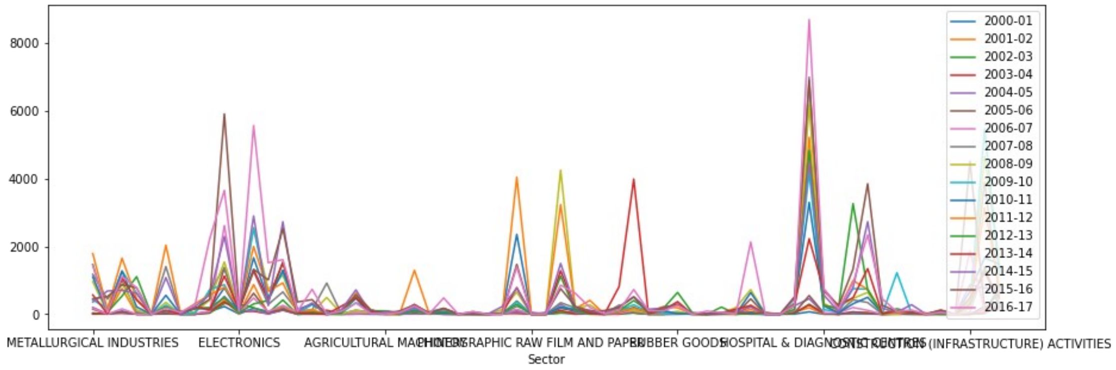
```
Index(['Sector', '2000-01', '2001-02', '2002-03', '2003-04', '200405',
       '2005-06', '2006-07', '2007-08', '2008-09', '2009-10', '2010-
11',
       '2011-12', '2012-13', '2013-14', '2014-15', '2015-16', '2016-
17'],
      dtype='object')
```

```
df.set_index('Sector',inplace=True)
```

Visaulization of the FDI dataset

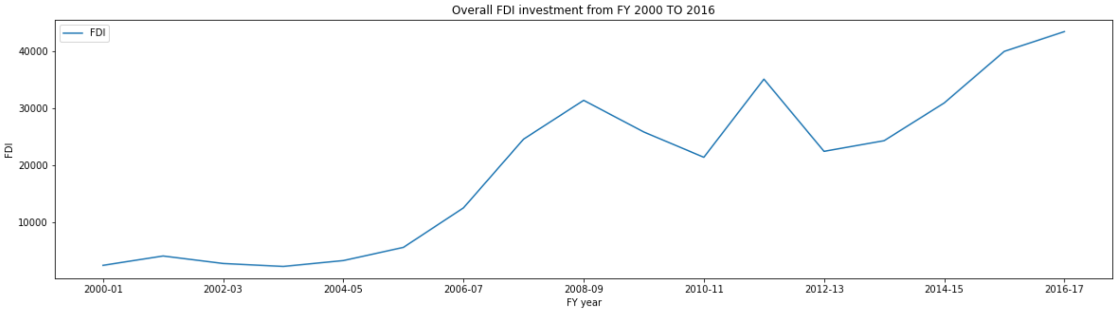
```
df.plot(figsize=(15,5))
```

```
<AxesSubplot:xlabel='Sector'>
```



Overall FDI from Financial year 2000-2016

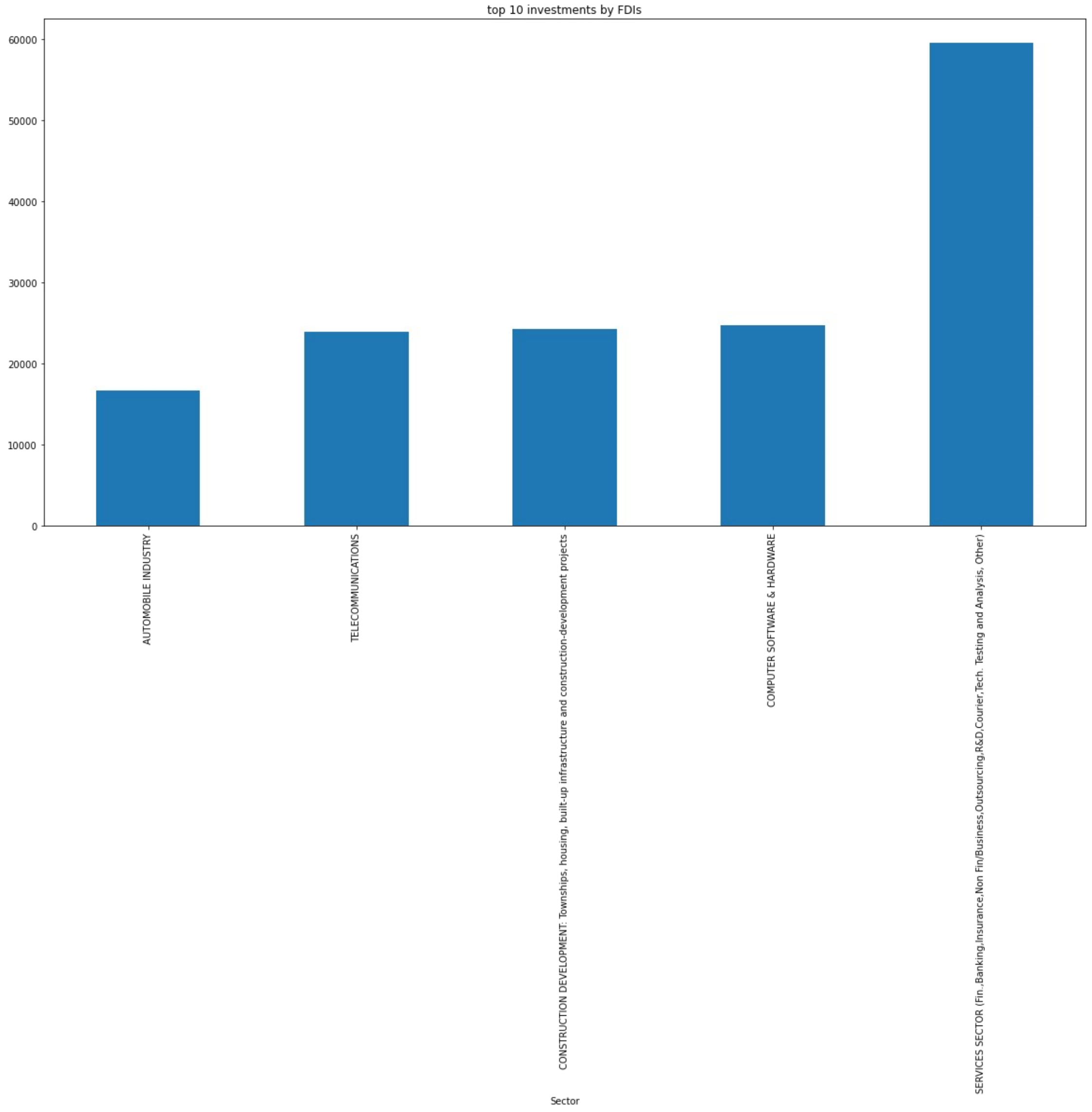
```
df1.groupby('FY year').sum().plot(figsize=(20,5))
plt.title('Overall FDI investment from FY 2000 TO 2016')
plt.xlabel('FY year') plt.ylabel('FDI') plt.show()
```



Top 5 Investment Sectors by FDI

```
df_trans = df.transpose()
df_trans.sum().sort_values()[-5:].plot(figsize=(20,10),kind='bar',
title ='top 10 investments by FDIs')
```

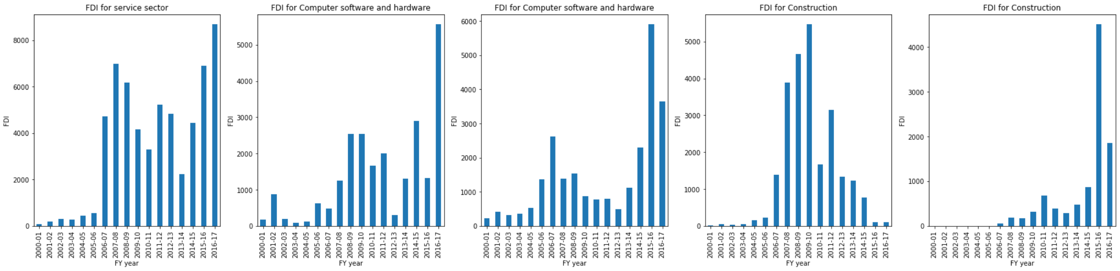
```
<AxesSubplot:title={'center':'top 10 investments by FDIs'},
xlabel='Sector'>
```



Detailed FDI year on year for the top 5 best performing sector

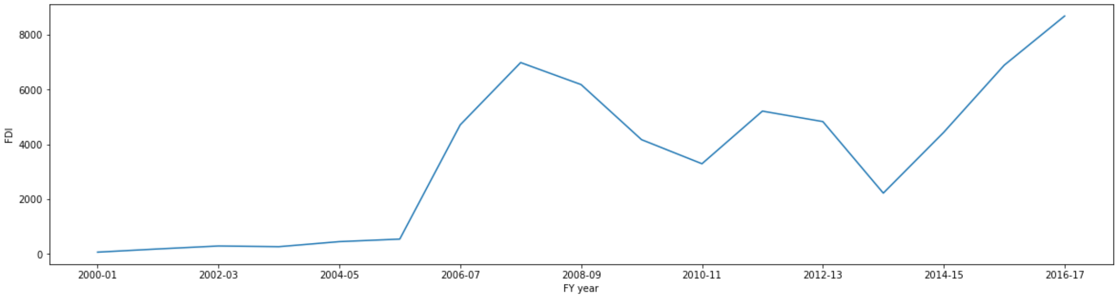
```
plt.subplot(1, 5, 1)
df.loc['SERVICES SECTOR (Fin.,Banking,Insurance,Non
Fin/Business,Outsourcing,R&D,Courier,Tech. Testing and Analysis,
Other)'].plot(kind='bar',figsize=(30,6))
plt.title('FDI for service sector')
plt.xlabel('FY year')
plt.ylabel('FDI')
plt.subplot(1, 5, 2)
df.loc['TELECOMMUNICATIONS'].plot(kind='bar',title='FDI for Computer
software and hardware',figsize=(40,5)) plt.xlabel('FY year')
plt.ylabel('FDI') plt.subplot(1, 5, 3)
df.loc['COMPUTER SOFTWARE & HARDWARE'].plot(kind='bar',title='FDI for
Computer software and hardware',figsize=(40,5))
plt.xlabel('FY year') plt.ylabel('FDI')
plt.subplot(1, 5, 4)
df.loc['CONSTRUCTION DEVELOPMENT: Townships, housing, built-up
infrastructure and construction-development
projects'].plot(kind='bar',title='FDI for
Construction',figsize=(30,6))
plt.xlabel('FY year')
plt.ylabel('FDI')
plt.subplot(1, 5,5)
df.loc['CONSTRUCTION (INFRASTRUCTURE)
ACTIVITIES'].plot(kind='bar',title='FDI for
Construction',figsize=(30,6))
plt.xlabel('FY year')
plt.ylabel('FDI')
```

```
Text(0, 0.5, 'FDI')
```



FDI overall growth of the best performing Sector from FY 2000-2016

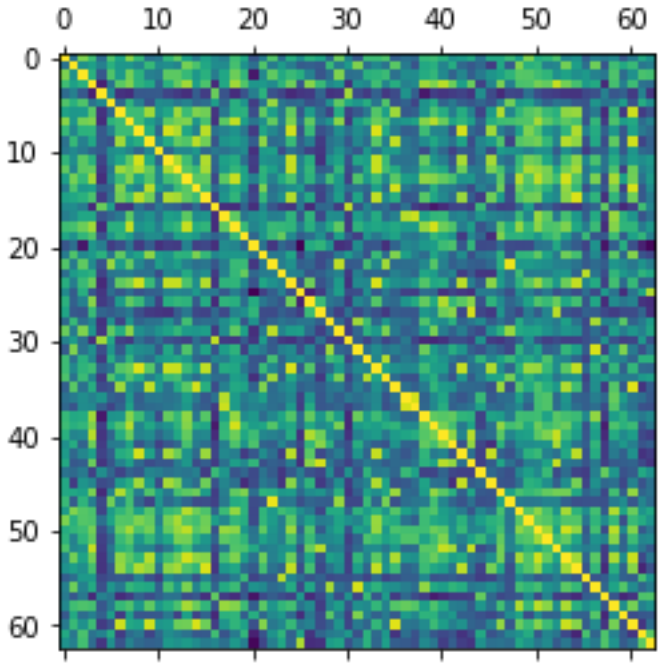
```
df.loc['SERVICES SECTOR (Fin.,Banking,Insurance,Non
Fin/Business,Outsourcing,R&D,Courier,Tech. Testing and Analysis,
Other)'].plot(figsize=(20,5))
plt.xlabel('FY year')
plt.ylabel('FDI') plt.show()
```



Visualizing the correlation among sectors

```
corr = df_trans.corr()
plt.matshow(corr)
```

```
<matplotlib.image.AxesImage at 0x7fde4962a700>
```



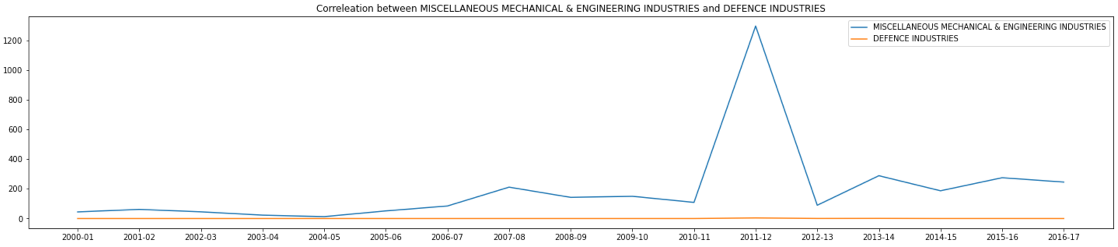
###Top 10 correlated sectors

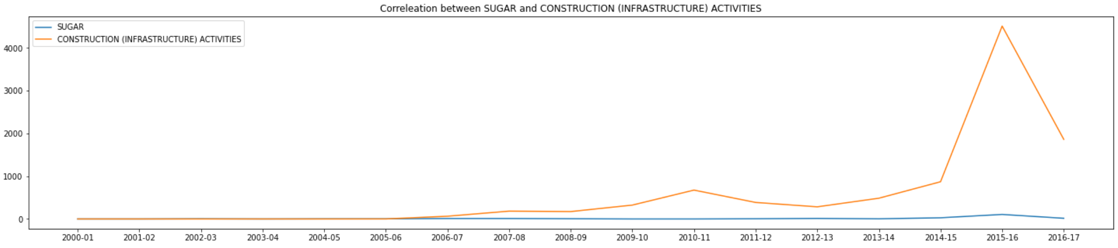
```
def get_redundant_pairs(df):     pairs_to_drop =
set()     cols = df.columns     for i in range(0,
df.shape[1]):          for j in range(0, i+1):
pairs_to_drop.add((cols[i], cols[j]))     return
pairs_to_drop

def get_top_abs_correlations(df, n=5):
au_corr = df.corr().abs().unstack()
labels_to_drop = get_redundant_pairs(df)
au_corr =
au_corr.drop(labels=labels_to_drop).sort_values(ascending=False)
return au_corr[0:n]

print("Top Absolute Correlations")
get_top_abs_correlations(df_trans,10)
```

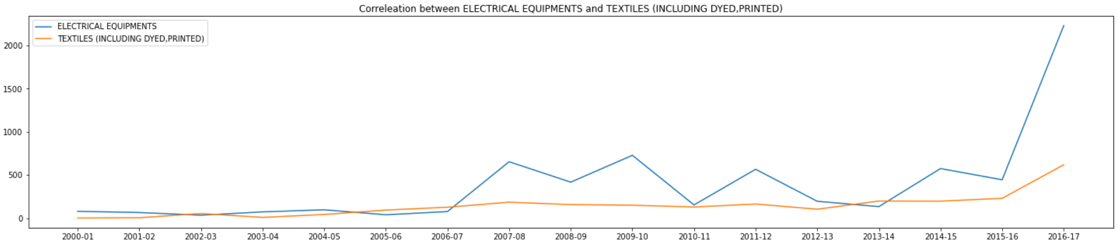
```
Top Absolute Correlations

Sector                                                   Sector

MISCELLANEOUS MECHANICAL & ENGINEERING INDUSTRIES  DEFENCE INDUSTRIES
0.958449
SUGAR                                                    CONSTRUCTION
(INFRASTRUCTURE) ACTIVITIES    0.937258
ELECTRICAL EQUIPMENTS                                    TEXTILES (INCLUDING
DYED,PRINTED)          0.926705
MEDICAL AND SURGICAL APPLIANCES                          TEXTILES (INCLUDING
DYED,PRINTED)           0.919642
SEA TRANSPORT                                      RETAIL TRADING
0.918936
DYE-STUFFS                                         DIAMOND,GOLD
ORNAMENTS                      0.916723
AIR TRANSPORT (INCLUDING AIR FREIGHT)              CONSTRUCTION
(INFRASTRUCTURE) ACTIVITIES    0.916622
FERMENTATION INDUSTRIES                            FOOD PROCESSING
INDUSTRIES                  0.910990
ELECTRICAL EQUIPMENTS                              GLUE AND GELATIN
0.908833
MATHEMATICAL,SURVEYING AND DRAWING INSTRUMENTS     GLASS
0.908687
dtype: float64
```

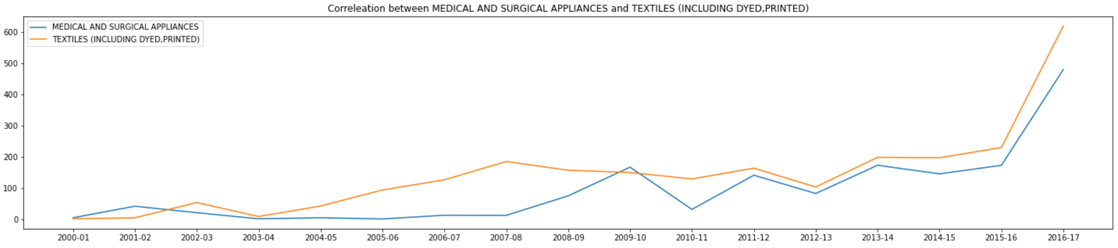
###Plotting the correlated sector

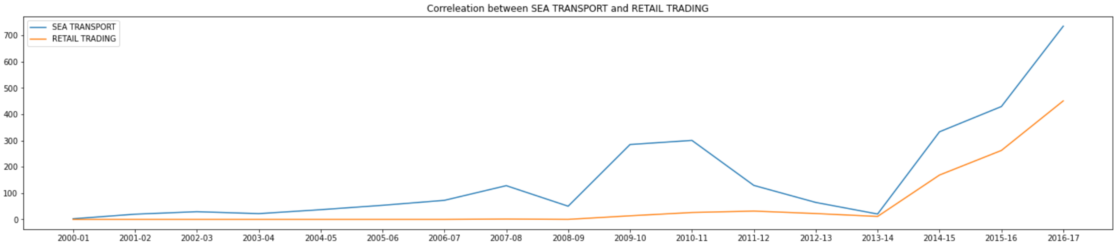
```
abs_corr = get_top_abs_correlations(df_trans,10)
plt.rcParams['figure.figsize'] = [25, 5] for i in range(10):
plt.plot(df.loc[abs_corr.index[i][0]], label = abs_corr.index[i][0])
plt.plot(df.loc[abs_corr.index[i][1]], label = abs_corr.index[i][1])
plt.title(f'Correleation between {abs_corr.index[i][0]} and
{abs_corr.index[i][1]}')
plt.legend()
plt.show()
```

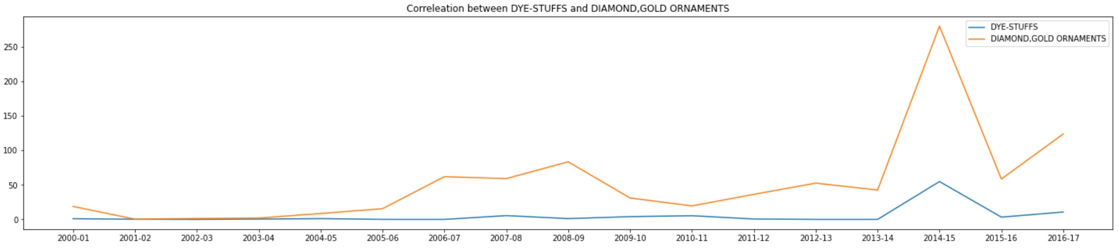

Correleation between MISCELLANEOUS MECHANICAL & ENGINEERING INDUSTRIES and DEFENCE INDUSTRIES

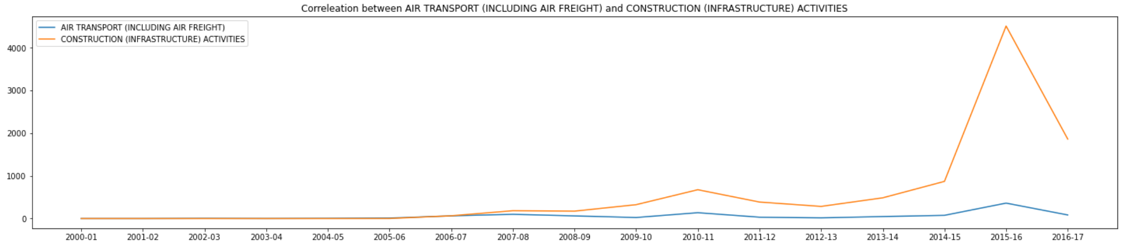

Correleation between SUGAR and CONSTRUCTION (INFRASTRUCTURE) ACTIVITIES

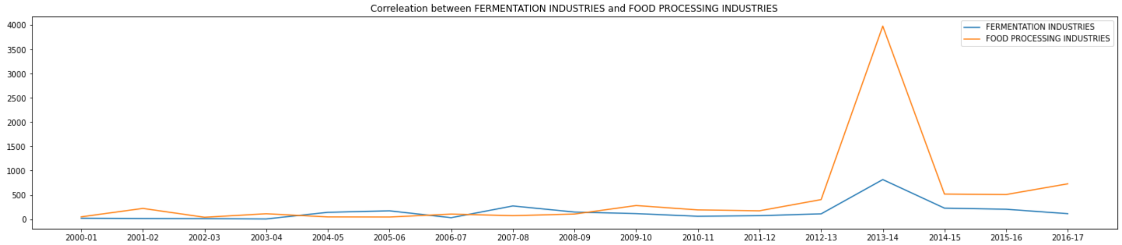

Correleation between ELECTRICAL EQUIPMENTS and TEXTILES (INCLUDING DYED,PRINTED)

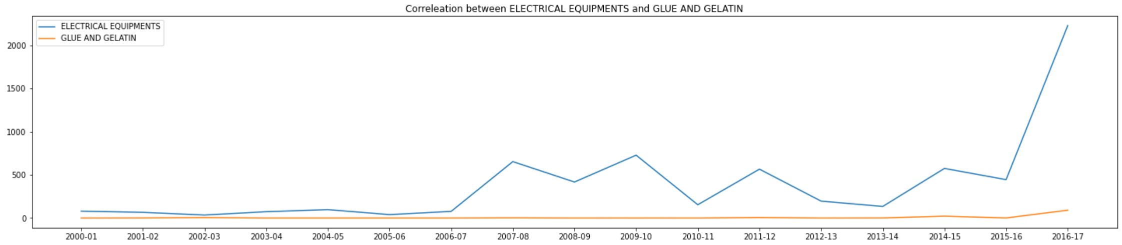

Correleation between MEDICAL AND SURGICAL APPLIANCES and TEXTILES (INCLUDING DYED,PRINTED)

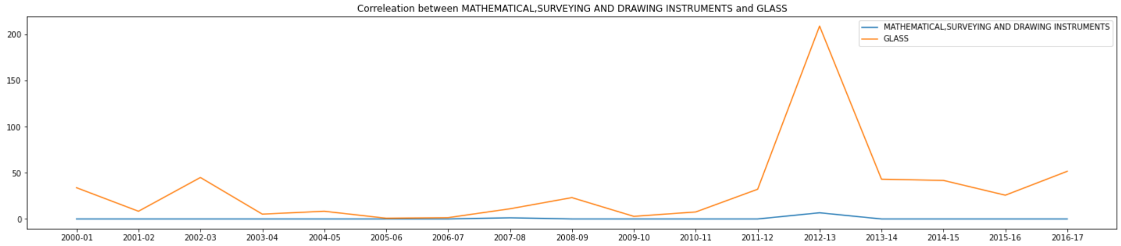

Correleation between SEA TRANSPORT and RETAIL TRADING


Correleation between DYE-STUFFS and DIAMOND,GOLD ORNAMENTS



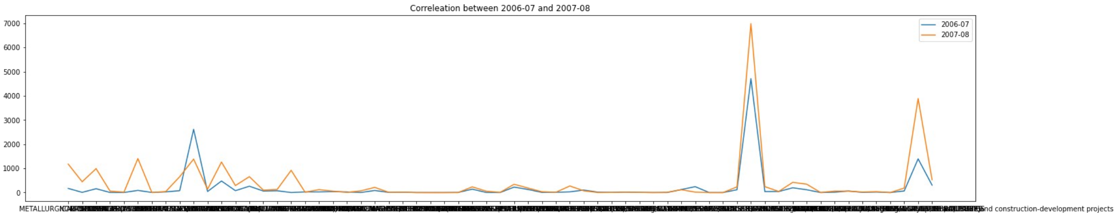




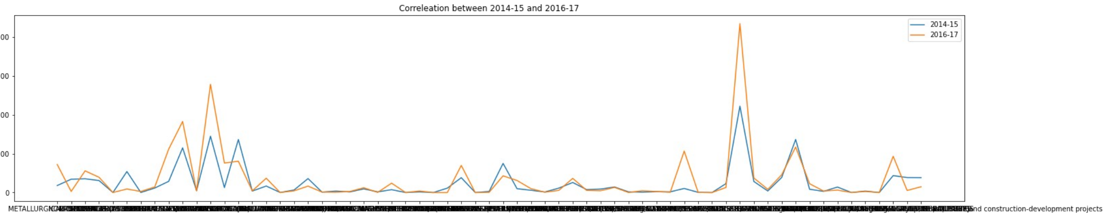


Lets look at the 3 most correlated years

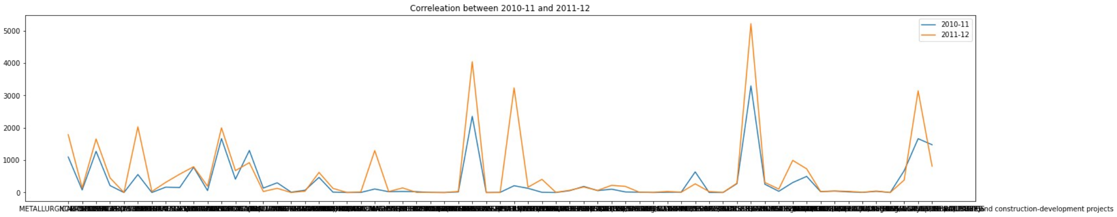
```
abs_corr = get_top_abs_correlations(df,3) abs_corr for
i in range(3):
plt.plot(df_trans.loc[abs_corr.index[i][0]], label =
abs_corr.index[i][0])
  plt.plot(df_trans.loc[abs_corr.index[i][1]], label =
abs_corr.index[i][1])
  plt.title(f'Correleation between {abs_corr.index[i][0]} and
{abs_corr.index[i][1]}')
plt.legend()
plt.show()
```



Correleation between 2006-07 and 2007-08



Correleation between 2014-15 and 2016-17



Correleation between 2010-11 and 2011-12