Project 2

Following is the code for my second data science project at Metis/Chicago.

Title: Predicting Points in Soccer League

Blog: click here (https://tangming2008.github.io/project/)

This project mainly consists of two parts:

- Scape the information from the web
- Apply linear regression model to correlate features with target

Import packages

In [1]:
```
from __future__ import print_function, division

import pandas as pd
import numpy as np
import seaborn as sns

import requests
import pickle
import requests

import os
from bs4 import BeautifulSoup
from selenium import webdriver
from selenium.webdriver.common.keys import Keys

%matplotlib inline
import matplotlib.pyplot as plt
from IPython.display import Image
```

Scrape the data from internet

Scrape the data from the fox website

Two datasets were used:

1. Standings (http://www.foxsports.com/soccer/standings?competition=2&season=2013): total scores
2. Team stats (http://www.foxsports.com/soccer/team-stats?competition=2&season=20130&category=STANDARD): detailed infor

Write a function which can scrape the data from the table available on the fox website.

In [2]:
```
def year_to_season (year_start):
    '''
    input: start year of the season
    output: the season string
    '''
    season = f'{year_start}-{year_start + 1}'
    return season

def year_to_url_standings (year_start):
    '''
    get data of "standings" with respect to the year
    '''
    url = f'http://www.foxsports.com/soccer/standings?competition=2&season={year_start}'
    return url

def year_to_url_stats (year_start):
    '''
    get data of "stats" with respect to the year
    '''
    url = f'http://www.foxsports.com/soccer/team-stats?competition=2&season={year_start}0&category=standa
    return url

def df_standings_change_title (df, year_start):
    '''
    for 'standings' data, change title of features
    '''
    df['Season'] = year_to_season (year_start)
    df.columns = ['Team', 'Played', 'Points', 'Win', 'Draw', 'Lose', 'Goals_Scored', 'Goals_Kicked', 'Goals_diff', 'Hom
    cols = ['Season', 'Team', 'Played', 'Points', 'Win', 'Draw', 'Lose', 'Goals_Scored', 'Goals_Kicked', 'Goals_diff', 'Ho
    df = df.loc[:,cols]
    return df

def df_stats_change_title (df):
    '''
    for 'stats' data, change title of features
    '''
    df.columns = ['Team','Played', 'Goals', 'Assist', 'Shots_On_Goal', 'Shots', 'Goals_Header', 'Goals_Kicked', 'Cards
    cols = ['Team','Played', 'Goals', 'Assist', 'Shots_On_Goal', 'Shots', 'Goals_Header', 'Goals_Kicked', 'Cards_Yellov
    df = df.loc[:,cols]
    return df
```

In [3]:
```
from fuzzywuzzy import process
from fuzzywuzzy import fuzz

def correct_teamname(teamname):
    '''
    correct and standardize the teamname
    '''
    correct_teamnames = ['Alaves', 'Athletic Bilbao', 'Atletico Madrid', 'Barcelona', 'Betis', 'Celta Vigo', 'Deportivo
     'Eibar', 'Espanyol', 'Granada', 'Las Palmas', 'Leganes', 'Malaga', 'Osasuna', 'Real Madrid',
     'Real Sociedad', 'Sevilla', 'Sporting Gijon', 'Valencia', 'Villarreal']

    new_name, score = process.extractOne(teamname, correct_teamnames)
    if score < 30:
        return teamname, score
    else:
        return new_name, score
```

```
/Users/MingTang/anaconda/lib/python3.6/site-packages/fuzzywuzzy/fuzz.py:35: UserWarning: Using slow p
ure-python SequenceMatcher. Install python-Levenshtein to remove this warning
  warnings.warn('Using slow pure-python SequenceMatcher. Install python-Levenshtein to remove this warni
ng')
```

In [4]:
```
def table_list_standings(year_start):
    '''
    input: 'stats' data from website
    output: raw dataframe
    '''
    season = year_to_season(year_start)
    url = year_to_url_standings(year_start)

    # scrap the data from the foxsports website
    r = requests.get(url)
    soup = BeautifulSoup(r.text, 'lxml')

    # locate the table which contains the information I need
    contents = soup.find(class_='wisbb_expandableTable wisbb_teamFixed wisbb_standingsTable')

    my_list = []

    for table in contents.find_all('td'):
        title = table.text
        title = title.strip()
        title = title.strip('\n')
        title = title.replace('\n','')
        # title = re.split('(\d+)',title)
        title = title.replace(',', '')
        # print(title)
        my_list.append(title)
        # print(my_list)

    df = pd.DataFrame(np.array(my_list).reshape(20,11))

    df_standings_change_title(df, year_start)

    df['Team'], df['Name_score'] = zip(*df['Team'].apply(correct_teamname))

    return df
```

In [5]:
```
df_2013_standings = table_list_standings(2013)
df_2013_standings.head()
```

Out[5]:

	Team	Played	Points	Win	Draw	Lose	Goals_Scored	Goals_Kicked	Goals_diff	Home	Aw
0	Atletico Madrid	38	90	28	6	4	77	26	51	15-4-0	13-
1	Barcelona	38	87	27	6	5	100	33	67	16-2-1	11-
2	Real Madrid	38	87	27	6	5	104	38	66	16-1-2	11-
3	Athletic Bilbao	38	70	20	10	8	66	39	27	13-4-2	7-6
4	Sevilla	38	63	18	9	11	69	52	17	11-4-4	7-5

In [6]:
```
def table_list_stats(year_start):
    '''
    input: 'stats' data from website
    output: raw dataframe
    '''
    season = year_to_season(year_start)
    url = year_to_url_stats(year_start)

    # scrap the data from the foxsports website
    r = requests.get(url)
    soup = BeautifulSoup(r.text, 'lxml')

    # locate the table which contains the information I need
    contents = soup.find(class_='wisbb_expandableTable wisbb_teamFixed wisbb_statsTable')

    my_list = []

    for table in contents.find_all('td'):
        title = table.text
        title = title.strip()
        title = title.strip('\n')
        title = title.replace('\n','')
        # title = re.split('(\d+)',title)
        title = title.replace(',', '')
        # print(title)
        my_list.append(title)
        # print(my_list)

    df = pd.DataFrame(np.array(my_list).reshape(20,12))

    df_stats_change_title(df)

    # df['Team'], df['Name_score'] = zip(*df['Team'].apply(correct_team))

    return df
```

In [7]:
```
df_2013_stats = table_list_stats(2013).head(5)
df_2013_stats['Team'], df_2013_stats['Name_score'] = zip(*df_2013_stats['Team'].apply(correct_teamname))
df_2013_stats.head()
```

Out[7]:

	Team	Played	Goals	Assist	Shots_On_Goal	Shots	Goals_Header	Goals_Kicked	Cards_Yell
0	Real Madrid	38	104	79	315	740	14	89	
1	Barcelona	38	100	72	290	641	5	91	
2	Atletico Madrid	38	77	56	212	486	18	56	
3	Sevilla	38	69	48	180	500	10	58	
4	Athletic Bilbao	38	66	46	203	503	18	46	

Explore the data

Two example data frames above are representative results scraped from the internet. For simplicity, I combined all results for the past 4 years into a csv file, which is later used for linear regression analysis. The raw data is available from my Github account (link here (https://raw.githubusercontent.com/tangming2008/Projects/master/02_Soccer/data/laliga3.csv))

In [8]:
```
df_all = pd.read_csv('https://raw.githubusercontent.com/tangming2008/Projects/master/02_Soccer/data/laliga
# read the csv file, this is the raw data I complied together with results got from the website.

df = df_all
df.columns = ['Season', 'Rank', 'Team', 'Played', 'Win', 'Draw', 'Loss', 'Goal_for', 'Goal_against', 'Goal_diff', 'Points
df['Goal_index'] = df['Goal_for'] / (df['Goal_for'] + df['Goal_against'])
df['match_check'] = df['Goal_for'] - df['Goals'] # this is to check the match between two datasets
cols = ['Season', 'Rank', 'Team', 'Points', 'Goal_for', 'Goal_against', 'Goal_diff', 'Goals', 'Assist', 'Shots_On_Goal', '
df = df.loc[:,cols]

df.sort_values(by='Rank',ascending=True).head()
```

Out[8]:

	Season	Rank	Team	Points	Goal_for	Goal_against	Goal_diff	Goals	Assist	Shots_On_Go
3	2014-2015	1	Barcelona	94	110	21	89	110	80	2
74	2016-2017	1	Real Madrid	93	106	41	65	106	81	2
22	2013-2014	1	Atletico Madrid	90	77	26	51	77	56	2
42	2015-2016	1	Barcelona	91	112	29	83	112	79	2
23	2013-2014	2	Barcelona	87	100	33	67	100	72	2

5 rows × 24 columns

Split train/test

- Training data: results from 2014 - 2017, named "df", 60 rows
- Test data: results from 2013-2014, names ""df_test", 20 rows

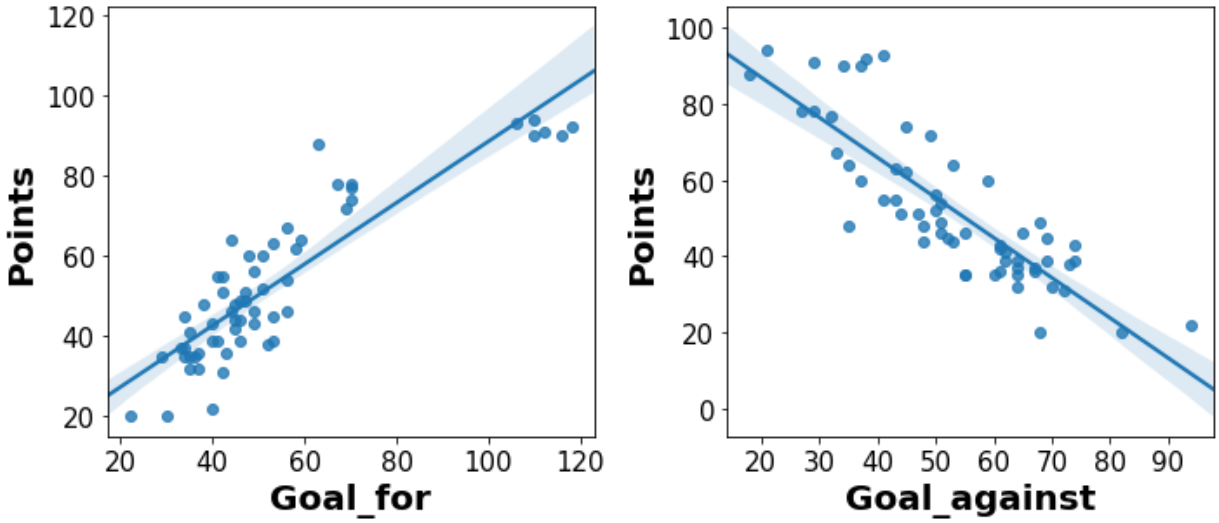
In [9]:
```
df_test = df[df['Season'] == '2013-2014']
# df_test.describe()
```

In [10]:
```
df = df[df['Season'] != '2013-2014']
# df.describe()
```

Check the linear correlation between the goals scored & goals lost and the final points

In [11]:
```
def plot_linear(df, x, y):
    '''
    plot the linear correlation
    '''
    ax = sns.regplot(df[x], df[y])
    plt.xlabel(x, rotation=0, fontsize=label_font_size, weight='bold')
    plt.ylabel(y, rotation=90, fontsize=label_font_size, weight='bold')
    plt.xticks(rotation=axis_rotation, fontsize=axis_font_size)
    plt.yticks(rotation=axis_rotation, fontsize=axis_font_size)
    ax.grid(False)

def plot_scatter(df, x, y):
    '''
    make a scatter plot
    '''
    plt.scatter(df[x], df[y])
    plt.xlabel(x, rotation=0, fontsize=label_font_size, weight='bold')
    plt.ylabel(y, rotation=90, fontsize=label_font_size, weight='bold')
    plt.xticks(rotation=axis_rotation, fontsize=axis_font_size)
    plt.yticks(rotation=axis_rotation, fontsize=axis_font_size)
```

In [12]:
```
plt.figure(figsize=(10,8))

axis_rotation = 0
axis_font_size = 15
label_rotation = 0
label_font_size = 20

plt.subplot(221);
plot_linear(df, 'Goal_for', 'Points')

plt.subplot(222)
plot_linear(df, 'Goal_against', 'Points')

plt.tight_layout()
# tight_layout automatically adjusts subplot params so that the subplot(s) fits in to the figure area.
```

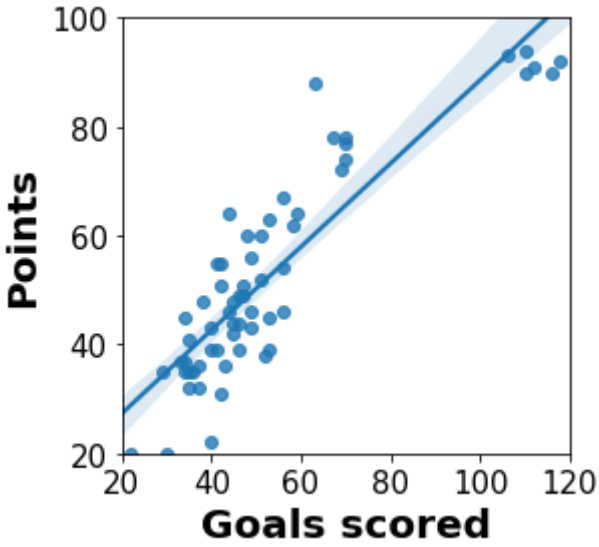


Correlation between a single feature (*goals scored*) and the target (*final*

***points*)**

In [13]:
```
fig, ax = plt.subplots()
fig.set_size_inches(4,4)

ax = sns.regplot(df['Goal_for'], df['Points'])
ax.grid(False)

ax.set_xlim([20, 120])
plt.xticks([20, 40, 60, 80, 100, 120])
plt.xticks(rotation=0, fontsize=15)

ax.set_ylim([20, 100])
plt.yticks([20, 40, 60, 80, 100])
plt.yticks(rotation=0, fontsize=15)

plt.xlabel('Goals scored', rotation=0, fontsize=label_font_size, weight='bold')
plt.ylabel('Points', rotation=90, fontsize=label_font_size, weight='bold')
```

Out[13]: <matplotlib.text.Text at 0x1116f0588>



Linear Regression

Steps:

1. Make pairplot & map to visulize the dependence between features and targets
2. Performed linear fitting with statsmodels

In [14]:
```
# remove other unnecessary columns
cols_all = ['Points', 'Goal_for', 'Goal_against', 'Goal_diff', 'Assist', 'Shots_On_Goal', 'Shots', 'Goals_Header', 'Goal
df_corr = df.loc[:,cols_all]
df_corr.head()
```

Out[14]:

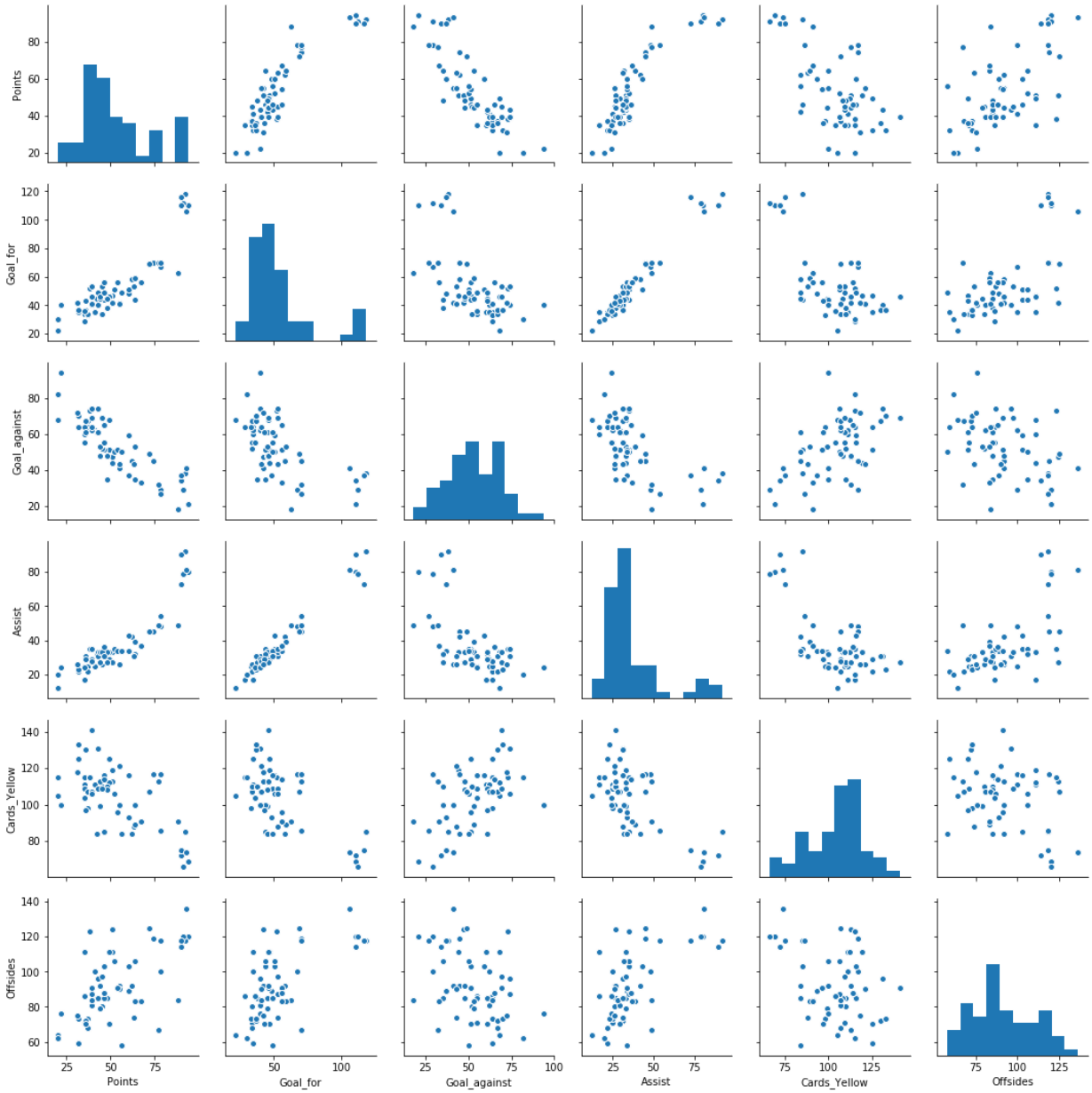
	Points	Goal_for	Goal_against	Goal_diff	Assist	Shots_On_Goal	Shots	Goals_Header	Goals_Ki
0	32	35	64	-29	22	131	398	6	
1	55	42	41	1	26	153	441	11	
2	78	67	29	38	48	197	443	25	
3	94	110	21	89	80	291	631	16	
4	51	47	44	3	33	177	501	9	

In [15]:
```
df_corr.corr().sort_values('Points')
```

Goal_against	-0.842390	-0.593030	1.000000	-0.847566	-0.602743	-0.548748	-0.498873
Cards_Yellow	-0.613230	-0.643178	0.526635	-0.664431	-0.651467	-0.626257	-0.599927
Fouls	-0.534670	-0.652456	0.414663	-0.619408	-0.672743	-0.678433	-0.658300
Cards_Red	-0.394784	-0.352766	0.327417	-0.382039	-0.357481	-0.312691	-0.264739
Goals_Header	0.542403	0.596555	-0.353229	0.554507	0.647479	0.550340	0.556111
Offsides	0.602229	0.620706	-0.393152	0.588657	0.610310	0.670468	0.645484
Shots	0.745031	0.877055	-0.498873	0.805899	0.881104	0.943418	1.000000
Shots_On_Goal	0.824391	0.950725	-0.548748	0.877233	0.939472	1.000000	0.943418
Goals_Kicked	0.828934	0.966633	-0.545530	0.886248	0.941965	0.922160	0.846901
Goal_for	0.884015	1.000000	-0.593030	0.929933	0.977698	0.950725	0.877055
Assist	0.884097	0.977698	-0.602743	0.919670	1.000000	0.939472	0.881104
Goal_diff	0.967371	0.929933	-0.847566	1.000000	0.919670	0.877233	0.805899

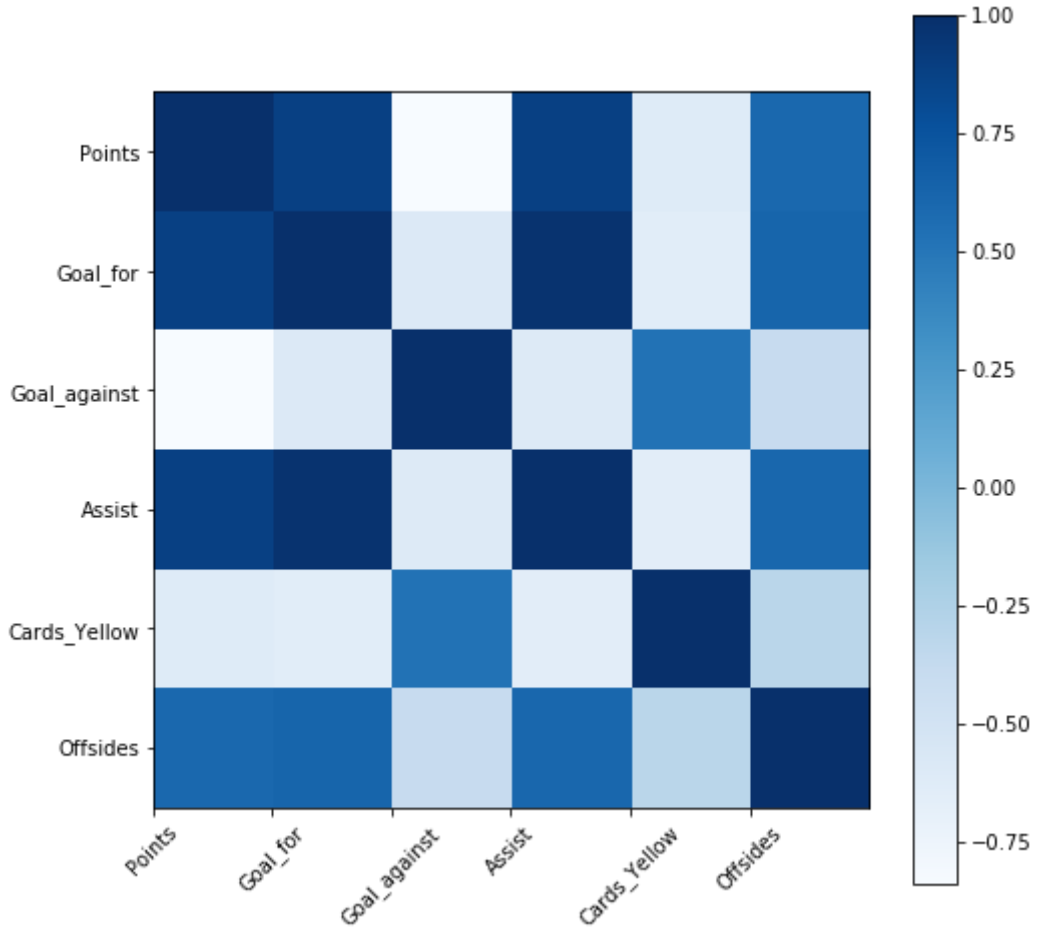
In [16]:
```
import seaborn as sns
cols_pair = ['Points', 'Goal_for', 'Goal_against', 'Assist', 'Cards_Yellow', 'Offsides']
df_pair = df.loc[:,cols_pair]

sns.pairplot(df_pair)
# sns.pairplot(df_corr)
```

Out[16]: <seaborn.axisgrid.PairGrid at 0x1116da898>



Note that the coeff of -1 indicates a strong negative correlation. A coeff of 0 (light blue) implies weak dependence.

In [17]:
```
smaller_df = df_pair

corr = smaller_df.corr()
corr.shape

plt.figure(figsize=(8,8))
ax = plt.gca()
plt.imshow(corr, cmap='Blues', interpolation='nearest')
cbar = plt.colorbar()
plt.grid(False)
plt.yticks(np.arange(corr.shape[1]))
plt.xticks(np.arange(corr.shape[0])-0.5, rotation=45)
ax.set_xticklabels(list(smaller_df.columns), minor=False)
ax.set_yticklabels(list(smaller_df.columns), minor=False);
```



I started the quantitative analysis with the correlation between a single feature of ""Goal_for" and the target of "Points". The distribution of residuals seems normal, which supports the linear fitting.

In [18]:
```
import statsmodels.api as sm
import statsmodels.formula.api as smf

model1 = smf.ols('Points ~ Goal_for', data=df_corr)
fit1 = model1.fit()
# fit1.summary()
```

```
/Users/MingTang/anaconda/lib/python3.6/site-packages/statsmodels/compat/pandas.py:56: FutureWarnin
g: The pandas.core.datetools module is deprecated and will be removed in a future version. Please use the p
andas.tseries module instead.
  from pandas.core import datetools
```

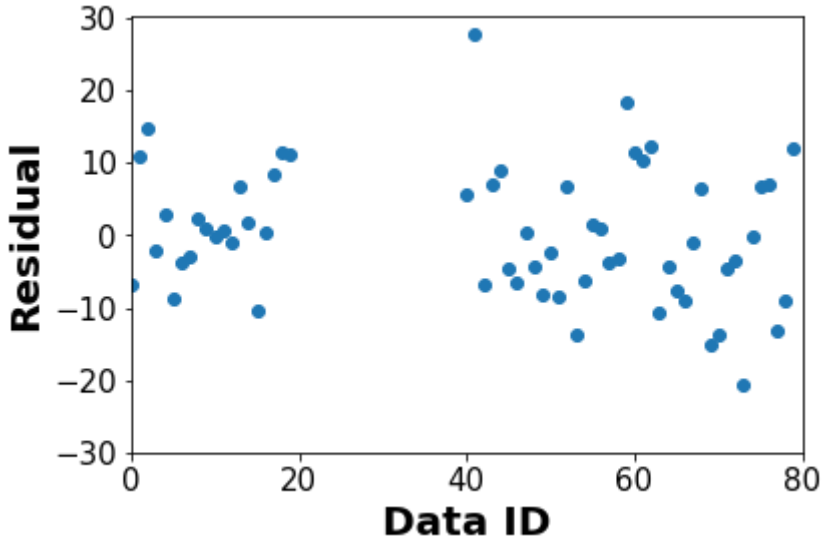
In [19]:
```
print('Parameters: ', fit1.params)
print('R2: ', fit1.rsquared)
print('adjusted_R2: ', fit1.rsquared_adj)
```

```
Parameters:  Intercept    12.026718
Goal_for      0.765351
dtype: float64
R2:  0.781481760946
adjusted_R2:  0.7777142051
```

Plotting Residuals

In [20]:
```
fit1.resid.plot(style='o')
plt.xlabel('Data ID', rotation=0, fontsize=20, weight='bold') # data 21-40 is left for testing, not for training
plt.ylabel('Residual',rotation=90, fontsize=20, weight='bold')

plt.grid(False)
ax.set_xlim([0,80])
plt.xticks([0, 20, 40, 60, 80])
plt.xticks(rotation=0, fontsize=15)

ax.set_ylim([-30, 30])
plt.yticks([-30, -20, -10, 0, 10, 20, 30])
plt.yticks(rotation=0, fontsize=15)
```

Out[20]:
```
(array([-30, -20, -10,   0,  10,  20,  30]),
 <a list of 7 Text yticklabel objects>)
```



In [21]:
```
model2 = smf.ols('Points ~ Goal_for + Goal_against', data=df_corr)
fit2 = model2.fit()
# fit2.summary()
```

In [22]:
```
model3 = smf.ols('Points ~ Goal_for + Goal_against + Goal_diff + Assist + Shots_On_Goal + Shots + Goals_Kicked
fit3 = model3.fit()
# fit3.summary()
```

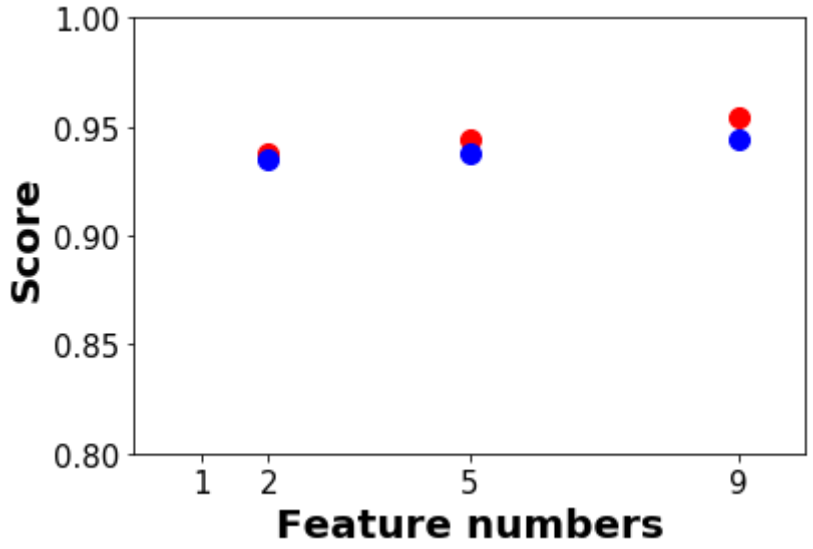
In [23]:
```
model4 = smf.ols('Points ~ Goal_for + Goal_against + Goal_diff + Assist + Shots_On_Goal + Shots + Goals_Heade
fit4 = model4.fit()
# fit4.summary()
```

Model optimization

I compared R_squ and r_squ_adj to justify the optimization of the model. The final model assumes linear model and includes two features (goals scored and goals lost). The adjusted R score indicates a good linear fit and low complexity avoids overfitting.

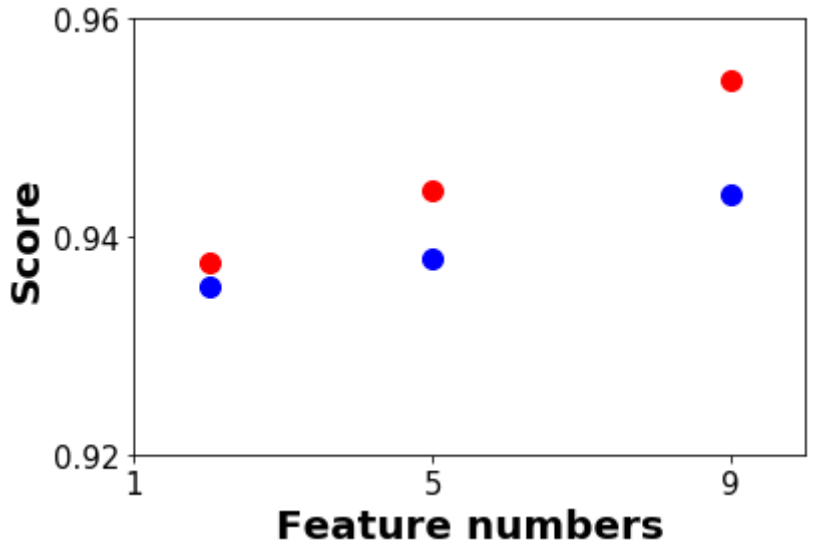
In [24]:
```
r_group = [1, fit1.rsquared, fit1.rsquared_adj, 2, fit2.rsquared, fit2.rsquared_adj, 5, fit3.rsquared, fit3.rsquared_
df_r = pd.DataFrame(np.array(r_group).reshape(-1,3), columns = ('id', 'sq', 'sq_adj'))
df_r
ax = df_r.plot.scatter(['id'], ['sq'], color='r', s=100)
df_r.plot.scatter(['id'], ['sq_adj'], color='b', ax=ax, s=100)

plt.xlabel('Feature numbers', rotation=0, fontsize=20, weight='bold')
plt.ylabel('Score',rotation=90, fontsize=20, weight='bold')

ax.set_xlim([0,10])
plt.xticks([1, 2, 5,9])
plt.xticks(rotation=0, fontsize=15)

ax.set_ylim([0.8,1])
plt.yticks([0.8, 0.85, 0.9, 0.95, 1])
plt.yticks(rotation=0, fontsize=15)

# labels = ['R squared', 'R squared adjusted']
# ax.legend(labels, loc='center left', bbox_to_anchor=(1, 0.5), fontsize=14)
```

Out[24]:
```
(array([ 0.8 ,  0.85,  0.9 ,  0.95,  1.  ]),
 <a list of 5 Text yticklabel objects>)
```



In [25]:
```
ax = df_r.plot.scatter(['id'], ['sq'], color='r', s=100)
df_r.plot.scatter(['id'], ['sq_adj'], color='b', ax=ax, s=100)

plt.xlabel('Feature numbers', rotation=0, fontsize=20, weight='bold')
plt.ylabel('Score',rotation=90, fontsize=20, weight='bold')

ax.set_xlim([2, 10])
plt.xticks([1, 5, 9])
plt.xticks(rotation=0, fontsize=15)

ax.set_ylim([0.92,0.96])
plt.yticks([0.92, 0.94, 0.96])
plt.yticks(rotation=0, fontsize=15)
```

Out[25]: (array([0.92, 0.94, 0.96]), <a list of 3 Text yticklabel objects>)



Final model

In [26]:
```
# remove other unnecessary columns
cols_final = ['Points', 'Goal_for', 'Goal_against']

df_train = df.loc[:,cols_final] # 80 rows, 3 columns
df_test = df_test.loc[:,cols_final] # 80 rows, 3 columns

model_final = smf.ols('Points ~ Goal_for + Goal_against', data=df_train)
fit_final = model_final.fit()

# df_train.describe()
# df_test.describe()
# fit_final.summary()

coef_1 = 0.5305
coef_2 = -0.5903
inter = 55.6632
```

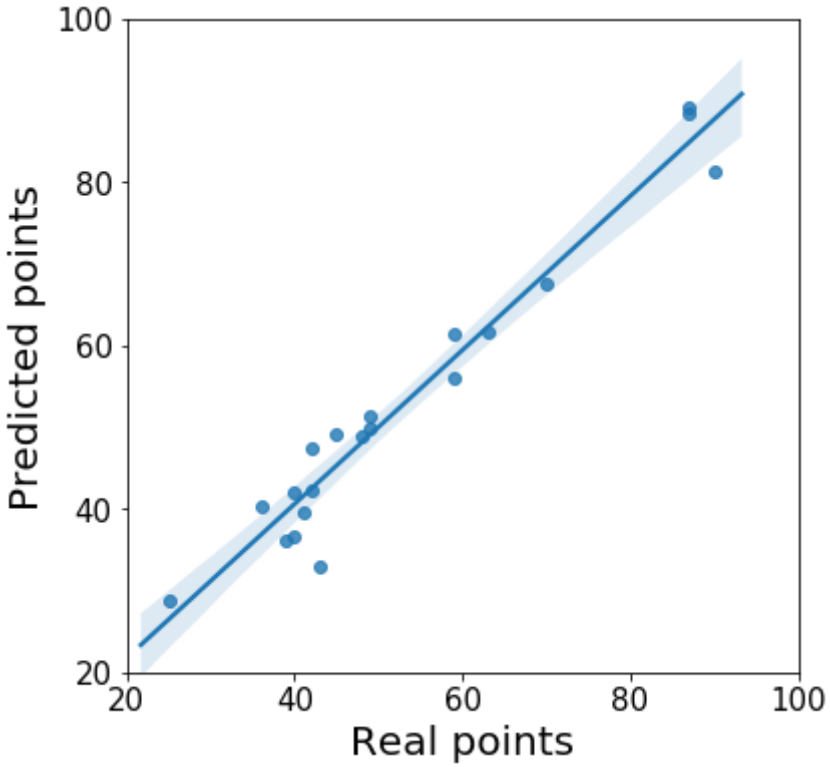
Model prediction / Validation

The model above was validated with test data (2013-2014 season): it correctly estimated final points for most teams but failed to predict the champion of that year.

In [27]:
```
X = df_test.drop(['Points'], axis = 1)
y = df_test['Points']
df_test['Predict'] = df_test['Goal_for'] * coef_1 + df_test['Goal_against'] * coef_2 + inter
x= df_test['Points']
y = df_test['Predict']
```

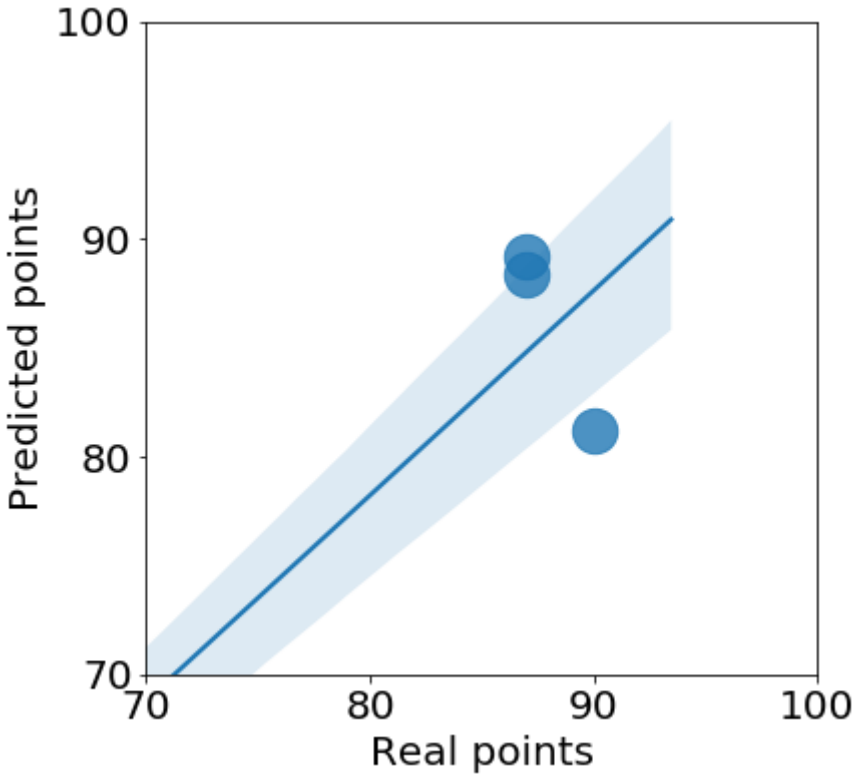
In [28]:
```
fig, ax = plt.subplots()
fig.set_size_inches(6,6)
ax = sns.regplot(x, y)
# ax.scatter(x,y)

ax.set_xlim([20, 100])
plt.xticks([20, 40, 60, 80, 100]) # 20, 40, 60,
plt.xticks(rotation=0, fontsize=15)

ax.set_ylim([20, 100])
plt.yticks([20, 40, 60, 80, 100]) # 20, 40, 60,
plt.yticks(rotation=0, fontsize=15)

plt.xlabel('Real points', rotation=0, fontsize=20)#, weight='bold')
plt.ylabel('Predicted points',rotation=90, fontsize=20)#, weight='bold')
```

Out[28]: <matplotlib.text.Text at 0x116f03c88>



In [29]:
```
fig, ax = plt.subplots()
fig.set_size_inches(6,6)
ax = sns.regplot(x, y, scatter_kws={"s": 500})
# ax.scatter(x,y)

ax.set_xlim([70, 100])
plt.xticks([70, 80, 90, 100]) # 20, 40, 60,
plt.xticks(rotation=0, fontsize=20)#, weight='bold')

ax.set_ylim([70, 100])
plt.yticks([70, 80, 90, 100]) # 20, 40, 60,
plt.yticks(rotation=0, fontsize=20)#, weight='bold')
plt.xlabel('Real points', rotation=0, fontsize=20) #weight='')
plt.ylabel('Predicted points',rotation=90, fontsize=20)#, weight='bold')
```

Out[29]: <matplotlib.text.Text at 0x11706deb8>



In [ ]:

In [30]:
```
df_2013 = df_all[df_all['Season'] == '2013-2014']
df_2013_top2 = df_2013[df_2013['Rank'] < 4]
df_2013_top2['Predict'] = df_2013_top2['Goal_for'] * coef_1 + df_2013_top2['Goal_against'] * coef_2 + inter
cols_final = ['Team', 'Rank', 'Points', 'Predict', 'Goal_for', 'Goal_against', 'Goal_diff', 'Assist', 'Shots_On_Goal', 'Sh
df_2013_top2 = df_2013_top2.loc[:,cols_final] # 80 rows, 3 columns
df_2013_top2.head()
```

```
/Users/MingTang/anaconda/lib/python3.6/site-packages/ipykernel_launcher.py:3: SettingWithCopyWarnin
g:
A value is trying to be set on a copy of a slice from a DataFrame.
Try using .loc[row_indexer,col_indexer] = value instead

See the caveats in the documentation: http://pandas.pydata.org/pandas-docs/stable/indexing.html#indexin
g-view-versus-copy (http://pandas.pydata.org/pandas-docs/stable/indexing.html#indexing-view-versus-cop
y)
  This is separate from the ipykernel package so we can avoid doing imports until
```

Out[30]:

	Team	Rank	Points	Predict	Goal_for	Goal_against	Goal_diff	Assist	Shots_On_Goal	Shc
22	Atletico Madrid	1	90	81.1639	77	26	51	56	212	4
23	Barcelona	2	87	89.2333	100	33	67	72	290	6
34	Real Madrid	3	87	88.4038	104	38	66	79	315	7

In [31]:
```
df_2013_final3 = pd.read_csv('https://raw.githubusercontent.com/tangming2008/Projects/master/02_Soccer/d
# pd.to_numeric(df_2013_final3)
df_2013_final3.columns = ['Game', 'AM_goal_for', 'AM_goal_against','Barca_goal_for',  'Barca_goal_against','RM
df_2013_final3['AM'] = df_2013_final3['AM_goal_for'] - df_2013_final3['AM_goal_against']
df_2013_final3['Barca'] = df_2013_final3['Barca_goal_for'] - df_2013_final3['Barca_goal_against']
df_2013_final3['RM'] = df_2013_final3['RM_goal_for'] - df_2013_final3['RM_goal_against']
cols_2013_final3 = ['Game', 'AM_goal_for', 'AM_goal_against','Barca_goal_for',  'Barca_goal_against','RM_goal_
df_2013_final3 = df_2013_final3.loc[:,cols_2013_final3] # 80 rows, 3 columns
df_2013_final3 = df_2013_final3.apply(pd.to_numeric)
```

The following graph compares the distribution of goals difference among top 3 teams and can be used to explain why the model fails at the extreme values. The details of the distribution of features during **each match** matters. 'AM' (Atlético Madrid) scored less, but this team lost much less goals (the 2nd bottom line is higher than other two teams). 3 points means the best after one match: 1:0 is more efficient than a victory.

In [32]:
```
cols_plot = ['AM', 'Barca', 'RM']
df_plot = df_2013_final3.loc[:,cols_plot]
df_plot.plot.box()

# ax.set_xlim([20, 100])
# plt.xticks([20, 40, 60, 80, 100])
plt.xticks(rotation=0, fontsize=15)

ax.set_ylim([-3, 8])
plt.yticks([-2, 0, 2 , 4, 6, 8])
plt.yticks(rotation=0, fontsize=15)

plt.ylabel('Goal difference',rotation=90, fontsize=15, weight='bold')
```

Out[32]: <matplotlib.text.Text at 0x1170efdd8>