ativ_2

April 19, 2023

[1]:
```
import pandas as pd
import matplotlib.pyplot as plt
from sklearn.preprocessing import MinMaxScaler
```

[2]:
```
import mplcatppuccin
```

[3]:
```
plt.style.use("mocha")
```

[4]:
```
from mplsoccer import PyPizza, FontManager
```

[5]:
```
from typing import Tuple
```

1 [CDAF] Atividade 2

1.1 Nome e matrícula

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1.2 Introdução

Nesta atividade, vamos revisar os conceitos aprendidos em sala de aula sobre estatísticas agregadas. Para esta atividade, usaremos dados do Brasileirão 2022 do FBRef.

1.3 Questão 1

- Baixe o dataset de resultados em https://fbref.com/en/comps/24/2022/schedule/2022-Serie-A-Scores-and-Fixtures
- Crie uma média móvel de 5 jogos, para cada equipe, de cada uma das seguintes estatísticas: xG pró, xG contra, e dif. xG.
- Escolha 4 times para visualizar a série temporal das estatísticas acima. Uma visualização para cada uma das estatísticas, onde a média geral do campeonato é apresentada com uma linha pontilhada em conjunto com a média móvel dos times escolhidos.
- Interprete os resultados. O que isso pode indicar sobre a qualidade ofensiva e defensiva dos times escolhidos?

[6]:
```
df = pd.read_csv("./serie-a.csv")
```

[7]:
```
df = df.dropna()
```

[8]:
```
df.info()
```

```
<class 'pandas.core.frame.DataFrame'>
Int64Index: 326 entries, 0 to 405
Data columns (total 13 columns):
 #   Column        Non-Null Count  Dtype
---  ------        --------------  -----
 0   Wk            326 non-null    float64
 1   Day           326 non-null    object
 2   Date          326 non-null    object
 3   Time          326 non-null    object
 4   Home          326 non-null    object
 5   xG            326 non-null    float64
 6   Score         326 non-null    object
 7   xG.1          326 non-null    float64
 8   Away          326 non-null    object
 9   Attendance    326 non-null    float64
 10  Venue         326 non-null    object
 11  Referee       326 non-null    object
 12  Match Report  326 non-null    object
dtypes: float64(4), object(9)
memory usage: 35.7+ KB
```

[9]:
```
df = df.drop(columns=["Referee", "Attendance", "Venue", "Match Report"])
```

[10]:
```
df.head()
```

[10]:

	Wk	Day	Date	Time	Home	xG	Score	xG.1	Away
0	1.0	Sat	2022-04-09	16:30	Fluminense	1.6	0-0	0.1	Santos
1	1.0	Sat	2022-04-09	19:00	Atl Goianiense	1.4	1-1	1.2	Flamengo
2	1.0	Sun	2022-04-10	11:00	Coritiba	1.7	3-0	0.4	Goiás
3	1.0	Sun	2022-04-10	16:00	Atlético Mineiro	1.9	2-0	0.6	Internacional
4	1.0	Sun	2022-04-10	16:00	Botafogo (RJ)	1.5	1-3	2.1	Corinthians

[11]:
```
TEAMS = ["Fluminense", "Atlético Mineiro", "São Paulo", "Palmeiras"]
```

[12]:
```
WINDOW = 5
```

[13]:
```
expected_goals_global = df["xG"].rolling(WINDOW, min_periods=1).mean()
expected_goals_away_global = df["xG.1"].rolling(WINDOW, min_periods=1).mean()
diff_global = expected_goals_global.sub(expected_goals_away_global)
```

[14]:
```
dataTeam = Tuple[str, pd.Series, pd.Series, pd.Series]
```

[15]:
```
my_teams_data: list[dataTeam] = []
all_teams_data: list[dataTeam] = []
```

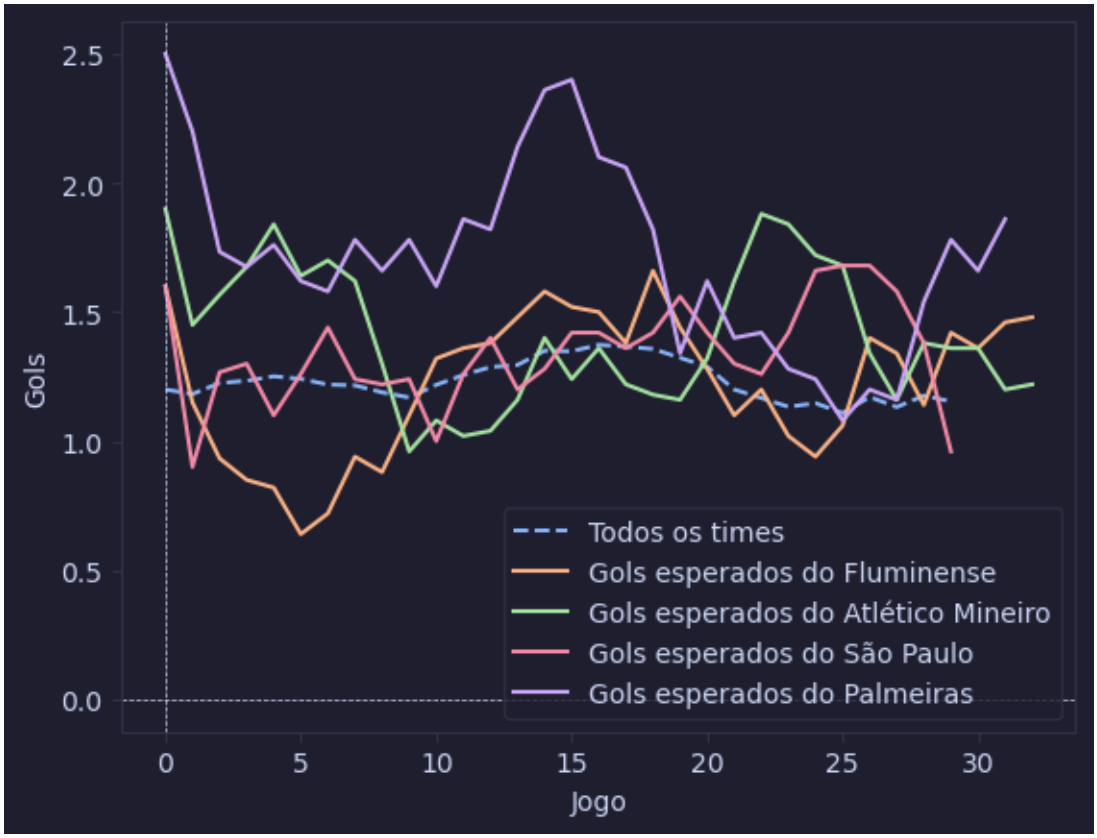
[16]:
```
all_teams = df["Home"].unique()
for team in all_teams:
    df_team = df.query(f"Home == '{team}' or Away == '{team}'")
    expected_team = df_team.apply(
        lambda x: x["xG"] if x["Home"] == team else x["xG.1"],
        axis=1,
    ).reset_index(drop=True)
    expected_team = expected_team.rolling(WINDOW, min_periods=1).mean()
    expected_away = df_team.apply(
        lambda x: x["xG.1"] if x["Home"] == team else x["xG"],
        axis=1,
    ).reset_index(drop=True)
    diff = expected_team - expected_away
    team_data = (team, expected_team, expected_away, diff)

    all_teams_data.append(team_data)

    if TEAMS.count(team) > 0:
        my_teams_data.append(team_data)
```

[17]:
```
# Dados gerais
expected = []
for series in zip(*[tup[1] for tup in all_teams_data]):
    item_mean = sum(series) / len(series)
    expected.append(item_mean)
away = []
for series in zip(*[tup[2] for tup in all_teams_data]):
    item_mean = sum(series) / len(series)
    away.append(item_mean)
diff = []
for series in zip(*[tup[3] for tup in all_teams_data]):
    item_mean = sum(series) / len(series)
    diff.append(item_mean)
```

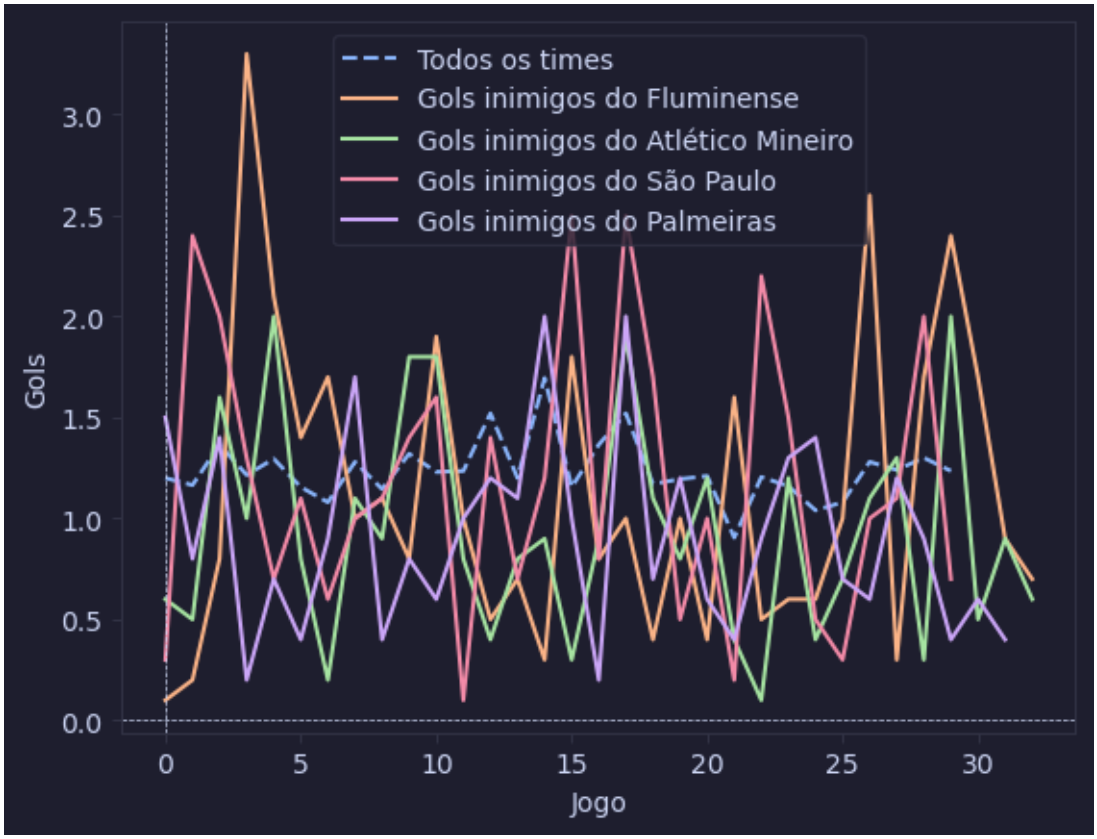
[18]:
```
def plot_common():
    plt.ylabel("Gols")
    plt.xlabel("Jogo")
    plt.axhline(0, color="#cdd6f4", linestyle="--", linewidth=0.5)
    plt.axvline(0, color="#cdd6f4", linestyle="--", linewidth=0.5)
    plt.legend()
    plt.show()
```

[19]:
```python
def plot_metric(
    teams_data: list[dataTeam],
    name: str,
    general: list[float],
    index: int,
):
    plt.plot(general, label="Todos os times", linestyle="--")
    for team in teams_data:
        plt.plot(team[index], label=f"{name} {team[0]}")
    plot_common()
```

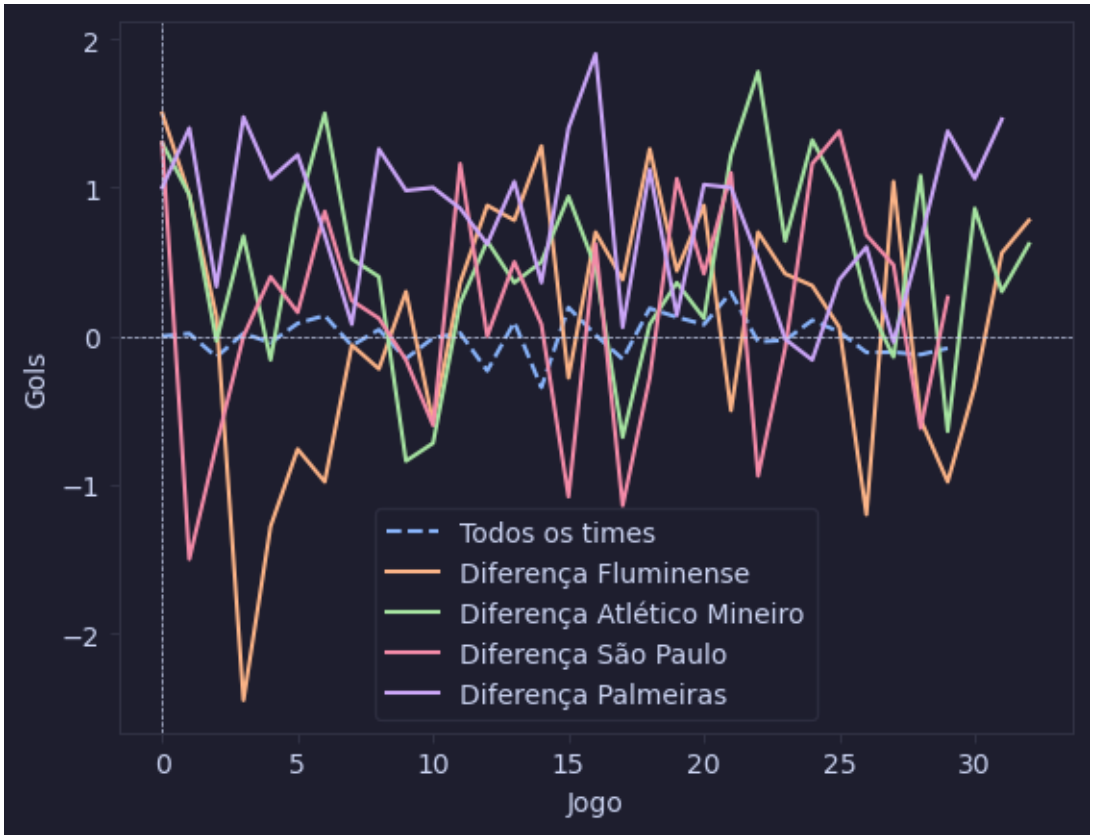
[20]:
```python
plot_metric(my_teams_data, "Gols esperados do", expected, 1)
```



[21]:
```python
plot_metric(my_teams_data, "Gols inimigos do", away, 2)
```



[22]:
```
plot_metric(my_teams_data, "Diferença", diff, 3)
```


2
1
0
−1
−2
Gols
0
5
10
15
20
25
30
Jogo
Todos os times
Diferença Fluminense
Diferença Atlético Mineiro
Diferença São Paulo
Diferença Palmeiras