

main

May 26, 2025

1 Análise e Predição de Química entre Jogadores de Futebol

No futebol moderno, a performance coletiva vai além das métricas individuais como gols, passes certos ou desarmes. A interação entre os jogadores - a chamada “química” - é um fator crucial, mas frequentemente ignorado, especialmente em decisões de recrutamento. Casos como a contratação simultânea de Andy Carroll e Luis Suárez pelo Liverpool em 2011 ilustram como a falta de entrosamento pode comprometer o desempenho, mesmo com atletas tecnicamente qualificados.

Este trabalho busca investigar a qualidade do entrosamento entre duplas de jogadores que atuaram juntas, utilizando dados de desempenho individual e coletivo. O objetivo é classificar o nível de química entre essas duplas e treinar um modelo capaz de prever a compatibilidade entre jogadores que nunca atuaram lado a lado.

Grupo: Gabriel Castelo, Matheus Vaz, Victor Kenji e Vinicius Gomes

Repositório no GitHub: <https://github.com/vinisilvag/cdaf-projeto>

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

from tqdm import tqdm

import socceraction.spadl as spd

from bs4 import BeautifulSoup, Comment
import requests

pd.set_option('future.no_silent_downcasting', True)
```

1.0.1 Scrapping de dados da FBref para enriquecer os dados que temos dos jogadores

A metodologia do trabalho de base usa dados proprietários. Assim, pretendemos contornar esse problema fazendo um scrapping de dados da FBref para enriquecer as informações dos jogadores e usar atributos semelhantes aos que eles utilizaram na nossa metodologia para cálculo das métricas e treinamento do modelo.

```

[2]: player_data = {
    "England": [
        ("https://fbref.com/en/comps/9/2017-2018/passing/
↪2017-2018-Premier-League-Stats", "stats_passing"),
        ("https://fbref.com/en/comps/9/2017-2018/defense/
↪2017-2018-Premier-League-Stats", "stats_defense"),
        ("https://fbref.com/en/comps/9/2017-2018/passing_types/
↪2017-2018-Premier-League-Stats", "stats_passing_types"),
        ("https://fbref.com/en/comps/9/2017-2018/misc/
↪2017-2018-Premier-League-Stats", "stats_misc"),
    ],
    "Spain": [
        ("https://fbref.com/en/comps/12/2017-2018/passing/
↪2017-2018-La-Liga-Stats", "stats_passing"),
        ("https://fbref.com/en/comps/12/2017-2018/defense/
↪2017-2018-La-Liga-Stats", "stats_defense"),
        ("https://fbref.com/en/comps/12/2017-2018/passing_types/
↪2017-2018-La-Liga-Stats", "stats_passing_types"),
        ("https://fbref.com/en/comps/12/2017-2018/misc/
↪2017-2018-La-Liga-Stats", "stats_misc"),
    ],
    "Germany": [
        ("https://fbref.com/en/comps/20/2017-2018/passing/
↪2017-2018-Bundesliga-Stats", "stats_passing"),
        ("https://fbref.com/en/comps/20/2017-2018/defense/
↪2017-2018-Bundesliga-Stats", "stats_defense"),
        ("https://fbref.com/en/comps/20/2017-2018/passing_types/
↪2017-2018-Bundesliga-Stats", "stats_passing_types"),
        ("https://fbref.com/en/comps/20/2017-2018/misc/
↪2017-2018-Bundesliga-Stats", "stats_misc"),
    ],
    "Italy": [
        ("https://fbref.com/en/comps/11/2017-2018/passing/
↪2017-2018-Serie-A-Stats", "stats_passing"),
        ("https://fbref.com/en/comps/11/2017-2018/defense/
↪2017-2018-Serie-A-Stats", "stats_defense"),
        ("https://fbref.com/en/comps/11/2017-2018/passing_types/
↪2017-2018-Serie-A-Stats", "stats_passing_types"),
        ("https://fbref.com/en/comps/11/2017-2018/misc/
↪2017-2018-Serie-A-Stats", "stats_misc"),
    ],
    "France": [
        ("https://fbref.com/en/comps/13/2017-2018/passing/
↪2017-2018-Ligue-1-Stats", "stats_passing"),
        ("https://fbref.com/en/comps/13/2017-2018/defense/
↪2017-2018-Ligue-1-Stats", "stats_defense"),
    ]
}

```

```

        ("https://fbref.com/en/comps/13/2017-2018/passing_types/
↪2017-2018-Ligue-1-Stats", "stats_passing_types"),
        ("https://fbref.com/en/comps/13/2017-2018/misc/
↪2017-2018-Ligue-1-Stats", "stats_misc"),
    ]
}

def get_data_by_league(league_data):
    scrapped_data = []
    for url, table_id in league_data:
        headers = {
            'User-Agent': 'Mozilla/5.0'
        }

        # Faz requisição
        response = requests.get(url, headers=headers)
        soup = BeautifulSoup(response.text, 'html.parser')

        # A tabela está dentro de um comentário HTML
        comments = soup.find_all(string=lambda text: isinstance(text, Comment))

        # Busca pela tabela dentro dos comentários
        table = None
        for comment in comments:
            comment_soup = BeautifulSoup(comment, 'html.parser')
            table = comment_soup.find('table', id=table_id)
            if table:
                break

        # Se tabela foi encontrada, extrair os dados
        if not table:
            raise ValueError(f'Table {table_id} not found!')

        # Extrair cabeçalhos
        headers = [th.text.strip() for th in table.find('thead').find_all('th')]
        headers = headers[1:] # ignora a coluna do checkbox

        # Extrair dados do corpo da tabela
        data = []
        for row in table.find('tbody').find_all('tr'):
            # Ignora linhas de subtítulos
            if row.get('class') and 'thead' in row.get('class'):
                continue
            cells = [td.text.strip() for td in row.find_all('td')]
            if cells:
                data.append(dict(zip(headers, cells)))

```

```

# Converter para DataFrame
df = pd.DataFrame(data)
scrapped_data.append(df)
return scrapped_data

```

1.0.2 Exemplo do scrapping para a Premier League

Para as outras ligas a ideia permanece a mesma, faltando apenas corrigir a captura dos headers da tabela, conectar os dados obtidos com cada player e filtrar exatamente o que iremos utilizar no cálculo das métricas de entrosamento/treinamento do modelo. A ideia é que uma vez que o script esteja pronto, os dados serão lidos e salvos num .csv separado, para evitar ter que realizar o scrapping com frequência e problemas caso o site atualize.

```
[3]: england_players_scrapped_data = get_data_by_league(player_data["England"])
```

```
[4]: # Dados de passe
england_players_scrapped_data[0]
```

```
[4]:
```

	Total	Short	Medium	Long	Expected	Rk	\
0	Patrick van Aanholt	nl NED	DF	Crystal Palace	884	1990	1176
1	Rolando Aarons	eng ENG	MF,FW	Newcastle Utd	29	1995	44
2	Tammy Abraham	eng ENG	FW	Swansea City	206	1997	314
3	Charlie Adam	sct SCO	MF	Stoke City	168	1985	285
4	Adrián	es ESP	GK	West Ham	266	1987	571
..
524	Wilfried Zaha	ci CIV	FW,MF	Crystal Palace	497	1992	716
525	Davide Zappacosta	it ITA	DF,MF	Chelsea	514	1992	660
526	Marvin Zeegelaar	nl NED	DF	Watford	436	1990	584
527	Oleksandr Zinchenko	ua UKR	DF	Manchester City	664	1996	729
528	Kurt Zouma	fr FRA	DF	Stoke City	869	1994	1154

	Player	Nation	Pos	Squad	Age	Born	90s	Cmp	Att	Cmp%	TotDist	PrgDist	\
0	75.2	14197	6422	479	532	90.0	311	28	6	92	152	48.7	
1	65.9	376	77	24	30	80.0	2	1	1	3	3	66.7	
2	65.6	2754	557	123	173	71.1	56	6	2	20	22	45.5	
3	58.9	3889	1505	51	66	77.3	72	7	4	30	107	42.1	
4	46.6	11798	10438	12	12	100.0	51	1	0	0	503	40.4	
..	
524	69.4	6815	2094	291	365	79.7	149	49	7	96	52	46.2	
525	77.9	7506	1763	297	322	92.2	164	14	13	22	49	57.1	
526	74.7	6677	3045	259	297	87.2	140	10	7	54	55	50.9	
527	91.1	9453	2333	391	414	94.4	218	8	0	57	46	67.4	
528	75.3	17015	7595	339	385	88.1	400	3	0	86	207	54.6	


```

Ast
0  Matches
1  Matches
2  Matches

```

```

3    Matches
4    Matches
..    ...
524  Matches
525  Matches
526  Matches
527  Matches
528  Matches

```

[529 rows x 20 columns]

```

[5]: # Dados de ações defensivas
england_players_scrapped_data[1]

```

```

[5]:
      Tackles Challenges Blocks      Rk Player Nation Pos Squad \
0    Patrick van Aanholt      nl NED      2 26 1990   24.3      47 32   29
1      Rolando Aarons      eng ENG      0 21 1995    1.5       4  4    3
2      Tammy Abraham      eng ENG      0 19 1997   19.2      10  8    1
3      Charlie Adam      sct SCO      2 31 1985    4.6       9  5    2
4      Adrián          es ESP      1 30 1987   19.0       2  1    2
..      ...            ...    ... ..    ...    ...    ...    ...
524    Wilfried Zaha      ci CIV      0 24 1992   28.3      30 23    9
525    Davide Zappacosta  it ITA      0 25 1992   12.2      26 11   14
526    Marvin Zeegelaar      nl NED      0 26 1990   11.0      23 18   15
527    Oleksandr Zinchenko ua UKR      0 20 1996    5.9      23 16   11
528      Kurt Zouma      fr FRA      2 22 1994   32.1      50 38   35

```

```

      Age ... 90s Tkl  TklW Def 3rd Mid 3rd Att 3rd Att Tkl% Lost      Sh
0    15 ... 16 19 47.1      18      24      5 47 94 64 Matches
1     1 ...  4  3 66.7      2       3      0  1  5  0 Matches
2     7 ...  1  7  7.7      12      8      1  1 11 11 Matches
3     5 ...  5  2 29.4      12      2      0  9 18 11 Matches
4     0 ...  1  1 25.0      3       1      0  0  2 15 Matches
..    .. ... .. ..    ...    ...    ... ..    ...    ...
524   13 ...  4 24 17.4      19      24      0  7 37  4 Matches
525    9 ... 11  9 44.0      14      11      2  6 32 26 Matches
526    3 ... 11  4 45.8      13       5      1 20 43 30 Matches
527    9 ...  7  3 53.8      6       3      0  6 29  7 Matches
528   13 ... 21 19 75.0      7      42      23 61 111 246 Matches

```

[529 rows x 21 columns]

```

[6]: # Dados de tipos de passe
england_players_scrapped_data[2]

```

```

[6]:
      Pass Types Corner Kicks Outcomes      Rk Player \
0    Patrick van Aanholt      nl NED      DF    Crystal Palace 26   1990

```

1	Rolando Aarons	eng	ENG	MF,FW	Newcastle Utd	21	1995
2	Tammy Abraham	eng	ENG	FW	Swansea City	19	1997
3	Charlie Adam	sct	SCO	MF	Stoke City	31	1985
4	Adrián	es	ESP	GK	West Ham	30	1987
..
524	Wilfried Zaha	ci	CIV	FW,MF	Crystal Palace	24	1992
525	Davide Zappacosta	it	ITA	DF,MF	Chelsea	25	1992
526	Marvin Zeegelaar	nl	NED	DF	Watford	26	1990
527	Oleksandr Zinchenko	ua	UKR	DF	Manchester City	20	1996
528	Kurt Zouma	fr	FRA	DF	Stoke City	22	1994

	Nation	Pos	Squad	Age	...	Live	Dead	FK	TB	Sw	Crs	TI	CK	In	Out
0	24.3	1176	897	276	...	56	235	11	3	5	2	884	3	31	Matches
1	1.5	44	41	2	...	2	0	0	0	0	0	29	1	3	Matches
2	19.2	314	286	28	...	13	1	0	0	0	0	206	0	6	Matches
3	4.6	285	252	28	...	30	4	10	3	4	3	168	5	9	Matches
4	19.0	571	332	235	...	0	0	0	0	0	0	266	4	0	Matches
..
524	28.3	716	695	18	...	76	14	0	0	0	0	497	3	39	Matches
525	12.2	660	526	131	...	84	128	1	0	0	0	514	3	33	Matches
526	11.0	584	453	131	...	38	124	1	0	1	0	436	0	27	Matches
527	5.9	729	678	51	...	10	47	0	0	0	0	664	0	8	Matches
528	32.1	1154	999	149	...	11	116	0	0	0	0	869	6	13	Matches

[529 rows x 23 columns]

```
[7]: # Outros dados
      england_players_scrapped_data[3]
```

```
[7]: Performance Aerial Duels                                     Rk Player Nation \
0    Patrick van Aanholt      nl NED      DF      Crystal Palace      26    1990
1          Rolando Aarons    eng ENG      MF,FW    Newcastle Utd      21    1995
2          Tammy Abraham    eng ENG      FW      Swansea City      19    1997
3          Charlie Adam     sct SCO      MF      Stoke City      31    1985
4          Adrián           es  ESP      GK      West Ham      30    1987
..          ...             ...  ...      ...      ...      ...
524        Wilfried Zaha     ci CIV      FW,MF    Crystal Palace      24    1992
525        Davide Zappacosta it  ITA      DF,MF      Chelsea      25    1992
526        Marvin Zeegelaar   nl  NED      DF      Watford      26    1990
527        Oleksandr Zinchenko ua UKR      DF    Manchester City      20    1996
528          Kurt Zouma     fr  FRA      DF      Stoke City      22    1994

      Pos Squad Age Born ... Fls Fld Off Crs Int TklW PKwon PKcon OG \
0    24.3     7   0   0   ... 47  32   0   0   0  162     6     5  54.5
1     1.5     0   0   0   ...  1   4   0   0   0   9     1     3  25.0
2    19.2     0   0   0   ...  1   8   0   0   0  41    39    58  40.2
3     4.6     2   1   0   ...  9   5   0   0   0  40     7     4  63.6
```

4	19.0	2	0	0	...	0	1	0	0	0	20	2	1	66.7
..
524	28.3	5	0	0	...	7	23	4	0	0	124	4	15	21.1
525	12.2	0	0	0	...	6	11	0	0	0	67	14	6	70.0
526	11.0	4	1	0	...	20	18	0	0	0	63	12	8	60.0
527	5.9	1	0	0	...	6	16	0	0	0	32	16	3	84.2
528	32.1	1	0	0	...	61	38	0	0	0	145	109	31	77.9

	Recov
0	Matches
1	Matches
2	Matches
3	Matches
4	Matches
..	...
524	Matches
525	Matches
526	Matches
527	Matches
528	Matches

[529 rows x 24 columns]

1.0.3 Funções úteis

```
[8]: def load_matches(path):
    matches = pd.read_json(path_or_buf=path)
    # as informações dos times de cada partida estão em um dicionário dentro da
    # coluna 'teamsData', então vamos separar essas informações
    team_matches = []
    for i in range(len(matches)):
        match = pd.DataFrame(matches.loc[i, 'teamsData']).T
        match['matchId'] = matches.loc[i, 'wyId']
        team_matches.append(match)
    team_matches = pd.concat(team_matches).reset_index(drop=True)
    return team_matches

def load_players(path):
    players = pd.read_json(path_or_buf=path)
    players['player_name'] = players['firstName'] + ' ' + players['lastName']
    players = players[['wyId', 'player_name', 'passportArea', 'role']].
    rename(columns={'wyId': 'player_id'})
    return players

def load_events(path):
    events = pd.read_json(path_or_buf=path)
```

```

# pré processamento em colunas da tabela de eventos para facilitar a
↳ conversão p/ SPADL
events = events.rename(columns={
    'id': 'event_id',
    'eventId': 'type_id',
    'subEventId': 'subtype_id',
    'teamId': 'team_id',
    'playerId': 'player_id',
    'matchId': 'game_id'
})
events['milliseconds'] = events['eventSec'] * 1000
events['period_id'] = events['matchPeriod'].replace({'1H': 1, '2H': 2})
return events

# def load_minutes_played_per_game(path):
#     minutes = pd.read_json(path_or_buf=path)
#     minutes = minutes.rename(columns={
#         'playerId': 'player_id',
#         'matchId': 'game_id',
#         'teamId': 'team_id',
#         'minutesPlayed': 'minutes_played'
#     })
#     minutes = minutes.drop(['shortName', 'teamName', 'red_card'], axis=1)
#     return minutes

```

```

[9]: leagues = ['England', 'Spain', 'Germany', 'Italy', 'France']
events = {}
matches = {}
for league in tqdm(leagues):
    path = r'data/matches/matches_{}.json'.format(league)
    matches[league] = load_matches(path)
    path = r'data/events/events_{}.json'.format(league)
    events[league] = load_events(path)

path = r'data/players.json'
players = load_players(path)
players['player_name'] = players['player_name'].str.decode('unicode-escape')

```

```

100%|          | 5/5 [00:33<00:00,
6.66s/it]

```

1.1 Mapeamento para SPADL

```

[10]: def spadl_transform(events, matches):
    spadl = []
    game_ids = events.game_id.unique().tolist()
    for g in tqdm(game_ids):

```



```

        match_events = events.loc[events.game_id == g]
        match_home_id = matches.loc[(matches.matchId == g) & (matches.side == 'home'), 'teamId'].values[0]
        match_actions = spd.wyscout.convert_to_actions(events=match_events, home_team_id=match_home_id)
        match_actions = spd.play_left_to_right(actions=match_actions, home_team_id=match_home_id)
        match_actions = spd.add_names(match_actions)
        spadl.append(match_actions)
    spadl = pd.concat(spadl).reset_index(drop=True)
    return spadl

```

```

[11]: spadl = {}
for league in leagues:
    spadl[league] = spadl_transform(events=events[league], matches=matches[league])
    # Adicionando o nome dos players
    spadl[league] = spadl[league].merge(players[['player_id', 'player_name']], on='player_id', how='left')

```

```

100%|          | 380/380 [04:15<00:00,
1.48it/s]
100%|          | 380/380 [03:11<00:00,
1.99it/s]
100%|          | 306/306 [02:26<00:00,
2.09it/s]
100%|          | 380/380 [04:14<00:00,
1.50it/s]
100%|          | 380/380 [05:04<00:00,
1.25it/s]

```

1.2 Análise exploratória

```

[12]: spadl['England']

```

```

[12]:
   game_id  period_id  time_seconds  team_id  player_id  start_x  start_y  \
0    2499719         1     2.758649    1609     25413     51.45     34.68
1    2499719         1     4.946850    1609     370224     32.55     14.96
2    2499719         1     6.542188    1609         3319     53.55     17.00
3    2499719         1     8.143395    1609    120339     36.75     19.72
4    2499719         1    10.302366    1609    167145     43.05       3.40
...      ...      ...      ...      ...      ...      ...      ...
483894    2500098         2    2785.702032    1633     20620     55.65       7.48
483895    2500098         2    2789.232666    1633     14703    103.95     19.04
483896    2500098         2    2790.457942    1623       8239       2.10     46.92
483897    2500098         2    2829.821084    1633     70965    105.00       0.00
483898    2500098         2    2834.127168    1633       8005     90.30     34.00

```

	end_x	end_y	original_event_id	bodypart_id	type_id	result_id	\
0	32.55	14.96	177959171	0	0	1	
1	53.55	17.00	177959172	0	0	1	
2	36.75	19.72	177959173	1	0	1	
3	43.05	3.40	177959174	1	0	1	
4	75.60	8.16	177959175	0	0	1	
...	
483894	103.95	19.04	251596226	0	0	1	
483895	103.95	19.04	251596229	5	1	0	
483896	0.00	46.24	251596408	0	10	1	
483897	92.40	36.04	251596232	0	5	1	
483898	105.00	27.20	251596236	3	11	0	

	action_id	type_name	result_name	bodypart_name	\
0	0	pass	success	foot	
1	1	pass	success	foot	
2	2	pass	success	head	
3	3	pass	success	head	
4	4	pass	success	foot	
...	
483894	1136	pass	success	foot	
483895	1137	cross	fail	foot_right	
483896	1138	interception	success	foot	
483897	1139	corner_crossed	success	foot	
483898	1140	shot	fail	head/other	

	player_name
0	Alexandre Lacazette
1	Rob Holding
2	Mesut Özil
3	Mohamed Naser Elsayed Elneny
4	Héctor Bellerín Moruno
...	...
483894	Pedro Mba Obiang Avomo
483895	Marko Arnautović
483896	Leighton Baines
483897	João Mário Naval da Costa Eduardo
483898	James Michael Collins

[483899 rows x 18 columns]

```
[13]: spadl['Spain']
```

```
[13]:
```

	game_id	period_id	time_seconds	team_id	player_id	start_x	start_y	\
0	2565548	1	2.994582	682	3542	38.85	26.52	
1	2565548	1	3.137020	682	274435	52.50	34.00	

2	2565548	1	6.709668	682	364860	47.25	47.60
3	2565548	1	8.805497	682	3534	39.90	59.84
4	2565548	1	14.047492	682	3695	33.60	21.08
...
474717	2565927	2	2940.515560	682	122832	92.40	66.64
474718	2565927	2	2942.098761	682	122832	101.85	53.72
474719	2565927	2	2943.089232	675	40756	8.40	17.68
474720	2565927	2	2943.668846	675	3306	9.45	29.92
474721	2565927	2	2943.668846	675	3306	9.45	29.92

	end_x	end_y	original_event_id	bodypart_id	type_id	result_id	\
0	52.50	34.00	180864419	0	0	1	
1	47.25	47.60	180864418	0	0	1	
2	39.90	59.84	180864420	0	0	1	
3	33.60	21.08	180864421	0	0	1	
4	32.55	42.84	180864422	0	0	1	
...
474717	101.85	53.72	253302673	0	21	1	
474718	96.60	50.32	253302674	4	1	0	
474719	9.45	29.92	253302698	0	0	1	
474720	9.45	29.92	253302695	0	10	1	
474721	9.45	29.92	253302695	0	18	0	

	action_id	type_name	result_name	bodypart_name	\
0	0	pass	success	foot	
1	1	pass	success	foot	
2	2	pass	success	foot	
3	3	pass	success	foot	
4	4	pass	success	foot	
...
474717	1479	dribble	success	foot	
474718	1480	cross	fail	foot_left	
474719	1481	pass	success	foot	
474720	1482	interception	success	foot	
474721	1483	clearance	fail	foot	

	player_name
0	Manuel Trigueros Muñoz
1	Enes Ünal
2	Rodrigo Hernández Cascante
3	Jaume Vicent Costa Jordá
4	Álvaro González Soberón
...	...
474717	Salem Mohammed Al Dawsari
474718	Salem Mohammed Al Dawsari
474719	Carlos Henrique Casimiro
474720	Sergio Ramos García

474721 Sergio Ramos García

[474722 rows x 18 columns]

```
[14]: spadl['Germany']
```

```
[14]:
```

	game_id	period_id	time_seconds	team_id	player_id	start_x	start_y	\
0	2516739	1	2.409746	2446	15231	52.50	34.00	
1	2516739	1	2.506082	2446	14786	52.50	35.36	
2	2516739	1	6.946706	2446	14803	23.10	53.04	
3	2516739	1	10.786491	2446	14768	6.30	36.72	
4	2516739	1	12.684514	2446	14803	21.00	61.20	
...	
389146	2517044	2	2817.761761	2463	94831	87.15	36.72	
389147	2517044	2	2818.280436	2451	14917	17.85	31.96	
389148	2517044	2	2823.180681	2451	14804	23.10	27.20	
389149	2517044	2	2828.080925	2451	14804	0.00	3.40	
389150	2517044	2	2829.509819	2463	15317	99.75	63.24	

	end_x	end_y	original_event_id	bodypart_id	type_id	result_id	\
0	52.50	35.36	179896442	0	0	1	
1	23.10	53.04	179896443	0	0	1	
2	6.30	36.72	179896444	0	0	1	
3	21.00	61.20	179896445	0	0	1	
4	28.35	65.28	179896446	0	0	1	
...	
389146	87.15	36.72	251206865	5	11	0	
389147	23.10	27.20	251206783	0	10	1	
389148	0.00	3.40	NaN	0	21	1	
389149	5.25	4.76	251206790	0	0	0	
389150	105.00	0.00	251206869	0	10	1	

	action_id	type_name	result_name	bodypart_name	\
0	0	pass	success	foot	
1	1	pass	success	foot	
2	2	pass	success	foot	
3	3	pass	success	foot	
4	4	pass	success	foot	
...	
389146	1148	shot	fail	foot_right	
389147	1149	interception	success	foot	
389148	1150	dribble	success	foot	
389149	1151	pass	fail	foot	
389150	1152	interception	success	foot	

	player_name
0	Kevin Volland

```

1          Karim Bellarabi
2          Sven Bender
3          Bernd Leno
4          Sven Bender
...
389146      Yūya Ōsako
389147      Robin Knoche
389148  Jakub Błaszczykowski
389149  Jakub Błaszczykowski
389150  Leonardo Bittencourt

```

[389151 rows x 18 columns]

```
[15]: spadl['Italy']
```

```

[15]:
   game_id period_id time_seconds team_id player_id start_x start_y \
0    2575959         1     2.530536    3158      8327    51.45    32.64
1    2575959         1     3.768418    3158     20438    45.15    38.08
2    2575959         1     5.941547    3158      8306    37.80    56.44
3    2575959         1     8.114676    3158      8306    81.90    29.92
4    2575959         1     8.647892    3158      8306    67.20    57.80
...
495868  2576338         2    2812.814903    3193     345740    70.35    19.72
495869  2576338         2    2823.098572    3193     116269    77.70    55.76
495870  2576338         2    2823.371314    3185      21234    27.30    12.24
495871  2576338         2    2824.741855    3185      21234    25.20     8.84
495872  2576338         2    2870.982660    3193      70974    78.75    52.36

   end_x end_y original_event_id bodypart_id type_id result_id \
0    45.15 38.08      180423957          0        0          1
1    37.80 56.44      180423958          0        0          1
2    81.90 29.92           NaN          0       21          1
3    67.20 57.80      180423960          0        7          1
4    75.60 57.80      180423961          0        7          1
...
495868    73.50 50.32      253567149          0        0          0
495869    79.80 59.16      253567155          0        7          1
495870    25.20  8.84      253567158          0        7          0
495871    25.20  8.84      253567159          0        8          0
495872    99.75 23.80      253567160          0        3          1

   action_id      type_name result_name bodypart_name \
0           0          pass      success          foot
1           1          pass      success          foot
2           2       dribble      success          foot
3           3       take_on      success          foot
4           4       take_on      success          foot

```

```

...
495868      1227      pass      fail      foot
495869      1228      take_on    success    foot
495870      1229      take_on    fail      foot
495871      1230      foul      fail      foot
495872      1231  freekick_crossed    success    foot

```

```

                                player_name
0                                Edin Džeko
1                                Daniele De Rossi
2                                Aleksandar Kolarov
3                                Aleksandar Kolarov
4                                Aleksandar Kolarov

```

```

...
495868  Pedro Miguel Almeida Lopes Pereira
495869      Diego Sebastián Laxalt Suárez
495870      Andrea Belotti
495871      Andrea Belotti
495872      Iuri José Picanço Medeiros

```

[495873 rows x 18 columns]

```
[16]: spadl['France']
```

```

[16]:      game_id  period_id  time_seconds  team_id  player_id  start_x  start_y  \
0      2500686           1      1.935181     3799     253784     52.50     33.32
1      2500686           1      3.599295     3799     29474      32.55     36.72
2      2500686           1      8.471820     3799     26265      71.40     17.68
3      2500686           1     13.344344     3799     26265      70.35     13.60
4      2500686           1     13.710413     3772     56441      28.35     40.80
...
476780  2501065           2     2816.954783    19830        3450      77.70     29.92
476781  2501065           2     2821.203869    19830     405977      91.35     23.80
476782  2501065           2     2888.383858     3795     295761      52.50     32.64
476783  2501065           2     2889.654402     3795     249926      46.20     36.04
476784  2501065           2     2891.153313     3795     393284      43.05     62.56

                                end_x  end_y  original_event_id  bodypart_id  type_id  result_id  \
0      32.55  36.72      176505119           0           0           1
1      71.40  17.68      176505121           0           0           1
2      70.35  13.60              NaN           0          21           1
3      76.65  27.20      176505132           0          10           1
4      35.70  40.80      176505021           0           0           1
...
476780      92.40  19.72      253316974           0           0           1
476781     105.00  37.40      253316980           4          11           1
476782      46.20  36.04      253316981           0           0           1

```

476783	43.05	62.56	253316982	0	0	1
476784	0.00	68.00	253316983	0	0	0

	action_id	type_name	result_name	bodypart_name	\
0	0	pass	success	foot	
1	1	pass	success	foot	
2	2	dribble	success	foot	
3	3	interception	success	foot	
4	4	pass	success	foot	
...	
476780	1333	pass	success	foot	
476781	1334	shot	success	foot_left	
476782	1335	pass	success	foot	
476783	1336	pass	success	foot	
476784	1337	pass	fail	foot	

	player_name
0	Baptiste Guillaume
1	Romain Thomas
2	Vincent Manceau
3	Vincent Manceau
4	Lukas Lerager
...	...
476780	Radamel Falcao García Zárate
476781	Jordi Mboula Queralto
476782	Samuel Grandsir
476783	Alois Confais
476784	Charles Traoré

[476785 rows x 18 columns]

1.2.1 Players

```
[17]: players_england = spadl['England']['player_name'].unique()
print("Número de jogadores na Premier League:", len(players_england))
players_england
```

Número de jogadores na Premier League: 514

```
[17]: array(['Alexandre Lacazette', 'Rob Holding', 'Mesut Özil',
'Mohamed Naser Elsayed Elneny', 'Héctor Bellerín Moruno',
'Harry Maguire', 'Granit Xhaka', 'Sead Kolašinac',
'Ignacio Monreal Eraso', 'Marc Albrighton',
'Onyinye Wilfred Ndidi', 'Christian Fuchs', 'Shinji Okazaki',
'Petr Čech', 'Daniel Nii Tackie Mensah Welbeck', 'Wes Morgan', nan,
'Alex Oxlade-Chamberlain', 'Riyad Mahrez', 'Jamie Vardy',
'Kasper Schmeichel', 'Matty James', 'Danny Simpson',
```

'Aaron Ramsey', 'Olivier Giroud', 'Daniel Amartey',
 'Theo Walcott', 'Kelechi Promise Iheanacho', 'Demarai Gray',
 'Sergio Leonel Agüero del Castillo', 'Fernando Luiz Rosa',
 'Nicolás Hernán Otamendi', 'Vincent Kompany', 'John Stones',
 'Lewis Dunk', 'Kyle Walker', 'Isaiah Brown', 'Tomer Hemed',
 'Ederson Santana de Moraes', 'Dale Stephens', 'Solly March',
 'Bruno Saltor Grau', 'Danilo Luiz da Silva', 'Pascal Groß',
 'Kevin De Bruyne', 'David Josué Jiménez Silva',
 'Gabriel Fernando de Jesus', 'Shane Duffy', 'Mathew Ryan',
 'Markus Suttner', 'Davy Pröpper', 'Jamie Murphy', 'Glenn Murray',
 'Leroy Sané', 'Anthony Knockaert', 'Raheem Shaquille Sterling',
 'Bernardo Mota Veiga de Carvalho e Silva', 'Jeff Hendrick',
 'James Tarkowski', 'Antonio Rüdiger', 'Francesc Fàbregas i Soler',
 'Jack Cork', 'Stephen Ward', 'Tom Heaton',
 'César Azpilicueta Tanco', 'Thibaut Courtois', 'Matthew Lowton',
 'Marcos Alonso Mendoza', 'Willian Borges da Silva',
 'David Luiz Moreira Marinho', 'Gary Cahill', 'N'Golo Kanté',
 'Robbie Brady', 'Ben Mee', 'Johann Berg Gudmunds\xadson',
 'Michy Batshuayi Tunga', 'Steven Defour', 'Jeremie Boga',
 'Sam Vokes', 'Andreas Christensen', 'Álvaro Borja Morata Martín',
 'Scott Arfield', 'Jonathan Walters', 'Jairo Riedewald',
 'Luka Milivojević', 'Patrick van Aanholt',
 'Christian Benteke Liolo', 'Mathias Jattah-Njie Jørgensen',
 'Christopher Schindler', 'Jason Puncheon', 'Chris Löwe',
 'Tom Ince', 'Ruben Loftus-Cheek', 'Aaron Mooy', 'Tom Smith',
 'Wayne Hennessey', 'Joel Ward', 'Philip Billing', 'Kasey Palmer',
 'Jonas Lössl', 'Scott Dann', 'Timothy Fosu-Mensah', 'Steve Mounié',
 'Wilfried Zaha', 'Elias Kachunga', 'Andros Townsend',
 'Daniel Williams', 'Collin Quaner', 'James Tomkins',
 'Rajiv van La Parra', 'Jordan Pickford', 'Erik Pieters',
 'Geoff Cameron', 'Michael Keane', 'Darren Fletcher',
 'Dominic Calvert-Lewin', 'Idrissa Gana Gueye', 'Wayne Rooney',
 'Jack Butland', 'Davy Klaassen', 'Morgan Schneiderlin',
 'Bojan Krkić Pérez', 'Kurt Happy Zouma', 'Xherdan Shaqiri',
 'Ashley Williams', 'Phil Jagielka', 'Leighton Baines',
 'Saïdo Berahino', 'Ryan Shawcross', 'Joe Allen',
 'Mame Biram Diouf', 'Sandro Ramírez Castillo',
 'Rhu-endly Martina', 'Tom Davies', 'Jean-Eric Maxim Choupo-Moting',
 'Peter Crouch', 'Kevin Mirallas', 'Juan Manuel Mata García',
 'Henrikh Mkhitaryan', 'Nemanja Matić', 'Paul Pogba', 'Phil Jones',
 'Daley Blind', 'Eric Bertrand Bailly', 'Pedro Mba Obiang Avomo',
 'Angelo Obinze Ogbonna', 'Mark Noble', 'Edimilson Fernandes',
 'André Ayew Pelé', 'Pablo Javier Zabaleta Girod', 'Arthur Masuaku',
 'Joe Hart', 'Luis Antonio Valencia Mosquera',
 'Javier Hernández Balcázar', 'David de Gea Quintana',
 'Marko Arnautović', 'Marcus Rashford', 'Romelu Lukaku Menama',
 'Winston Reid', 'Diafra Sakho', 'Declan Rice',

'Marouane Fellaini-Bakkioui', 'Anthony Martial', 'Aaron Cresswell',
 'Jesse Lingard', 'Jonjo Shelvey', 'Kyle Walker-Peters',
 'Paul Dummett', 'Ciaran Clark', 'Florian Lejeune',
 'Ayoze Pérez Gutiérrez', 'Hugo Lloris', 'Rob Elliot',
 'Jan Vertonghen', 'Javier Manquillo Gaitán', 'Matt Ritchie',
 'Eric Dier', 'Harry Kane', 'Moussa Sidi Yaya Dembélé',
 'Dwight Gayle', 'Isaac Hayden', 'Toby Alderweireld',
 'Moussa Sissoko', 'Ben Davies', 'Bamidele Alli',
 'Christian Atsu Twasam', 'Christian Dannemann Eriksen',
 'Jamal Lascelles', 'Chancel Mbemba Mangulu', 'Heung-Min Son',
 'Mikel Merino Zazón', 'Victor Wanyama', 'Harry Winks',
 'Wayne Routledge', 'Leon Britton', 'Alfie Mawson',
 'Federico Fernández', 'Kyle Naughton', 'Oriol Romeu Vidal',
 'Steven Davis', 'Jack Stephens', 'Cédric Ricardo Alves Soares',
 'James Ward-Prowse', 'Dušan Tadić', 'Ryan Bertrand',
 'Manolo Gabbiadini', 'Łukasz Fabiański', 'Jordan Ayew',
 'Martin Olsson', 'Nathan Redmond', 'Leroy Fer', 'Tom Carroll',
 'Fraser Forster', 'Maya Yoshida', 'Tammy Abraham',
 'Sofiane Boufal', 'Charlie Austin', 'Kyle Bartley', 'Jay Fulton',
 'Sam McQueen', 'Oliver McBurnie', 'Nathaniel Chalobah',
 'José Holebas', 'Daryl Janmaat', 'Sadio Mané', 'Younes Kaboul',
 'Miguel Ángel Britos Cabrera', 'Dejan Lovren', 'Simon Mignolet',
 'Stefano Okaka Chuka', 'Joël Andre Job Matip', 'Emre Can',
 'Trent Alexander-Arnold', 'Alberto Moreno Pérez',
 'Abdoulaye Doucouré', 'Nordin Amrabat', 'Heurelho da Silva Gomes',
 'Jordan Brian Henderson', 'Georginio Wijnaldum',
 'Roberto Firmino Barbosa de Oliveira', 'Mohamed Salah Ghaly',
 'Roberto Maximiliano Pereyra', 'Tom Cleverley',
 'Francisco Femenía Far', 'Richarlison de Andrade', 'Andre Gray',
 'James Milner', 'Divock Okoth Origi', 'Joe Gomez',
 'Jake Livermore', 'Chris Brunt', 'Charlie Daniels',
 'Allan-Romeo Nyom', 'Harry Arter', 'Asmir Begović', 'Steve Cook',
 'Simon Francis', 'Claudio Ariel Yacob', 'Ben Foster', 'Nathan Aké',
 'Andrew Surman', 'Joshua King', 'Ryan Fraser', 'Ahmed Hegazy',
 'Jay Rodriguez', 'James McClean', 'Sam Field', 'Matt Phillips',
 'Craig Dawson', 'Marc Pugh', 'Benik Afobe', 'Jordon Ibe',
 'Jermain Defoe', 'Hal Robson-Kanu', 'Adam Smith', 'Rekeem Harper',
 'José Salomón Rondón Giménez', 'Sebastian Prödl', 'Lys Mousset',
 'Etienne Capoue', 'Christian Kabasele', 'Ben Watson',
 'Gareth Barry', 'Ashley Barnes', 'José Luis Sanmartín Mato',
 'Mohamed Diamé', 'Jacob Murphy', 'Michael Hefele', 'Islam Slimani',
 'Andrew Robertson', 'Ragnar Klavan', 'Daniel Sturridge',
 'Dominic Solanke', 'Sullay Kaikai', 'James McArthur',
 'Jeffrey Schlupp', 'Mason Holgate', 'Gylfi Þór Sigurðsson',
 'Muhammed Bešić', 'Shkodran Mustafi', 'Jesé Rodríguez Ruiz',
 'Ramadan Sobhi', 'Alex Iwobi', 'Bruno Martins Indi',
 'Roque Mesa Quevedo', 'Luciano Narsingh', 'Ander Herrera Agüera',

'Victor Moses', 'Kieran Trippier', 'Tiemoué Bakayoko',
 'Pedro Eliezer Rodríguez Ledesma', 'Cheikhou Kouyaté',
 'Michail Antonio', 'João Mário Naval da Costa Eduardo ',
 'Pierre-Emile Højbjerg', 'Wesley Hoedt', 'Mario Lemina',
 'Alex McCarthy', 'Shane Long', 'Jordan Hugill', 'Josh Cullen',
 'Tyrone Mings', 'Dan Gosling', 'Benjamin Mendy', 'Aaron Lennon',
 'Sam Clucas', 'Mike van der Hoorn', 'Martin Kelly',
 'Chung-Yong Lee', 'Yohan Cabaye', 'Àngel Rangel Zaragoza',
 'Alexis Alejandro Sánchez Sánchez', 'Laurent Koscielny',
 'Loris Karius', 'Francis Coquelin', 'Marko Grujić', 'Andy King',
 'James Michael Collins', 'Manuel Lanzini', 'Aleksandar Mitrović',
 'Chris Wood', 'Ashley Westwood', 'Davinson Sánchez Mina',
 'Craig Cathcart', 'André Martín Carrillo Díaz', 'Liam Rosenior',
 'José Heriberto Izquierdo Mena', 'Troy Deeney', 'James Morrison',
 'Oliver Burke', 'Grzegorz Krychowiak', 'Jonny Evans',
 'Kieran Gibbs', 'Nick Pope', 'Levi Lumeka', 'Nikola Vlašić',
 'Davide Zappacosta', 'Eden Hazard', 'Claudio Andrés Bravo Muñoz',
 'Eliaquim Mangala', 'Adrian Mariappa', 'Kevin Wimmer',
 'Matteo Darmian', 'Jesús Gámez Duarte',
 'Renato Júnior Luz Sanches', 'Wilfried Guemiand Bony',
 'José Miguel da Rocha Fonte', 'Andy Carroll', 'Scott Malone',
 'Abdelhamid Sabiri', 'Bakary Sako', 'Ben Chilwell',
 'Laurent Depoitre', 'Jonathan Hogg', 'Philippe Coutinho Correia',
 'Ashley Young', 'DeAndre Yedlin', 'Serge Aurier',
 'Fernando Llorente Torres', 'İlkay Gündoğan',
 'Florent Hadergjonaj', 'Junior Stanislas',
 'El-Hadji Baye Oumar Niasse', 'Jonjoe Kenny', 'Mamadou Sakho',
 'Fabian Delph', 'Chris Smalling', 'Glen Johnson',
 'Ibrahim Afellay', 'Molla Wagué', 'Lewis Cook',
 'Vicente Iborra De La Fuente', 'Gaëtan Bong Songo',
 'Matias Ezequiel Schelotto', 'Dean Whitehead', 'Damien Delaney',
 'Freddie Ladapo', 'Virgil van Dijk', 'Uwe Hünemeier',
 'Julián Speroni', 'Charly Junior Musonda', 'Nacer Chadli',
 'Glyn Oliver Myhill', 'Gareth McAuley', 'Thomas Edwards',
 'Gnégneri Yaya Touré', 'Sung-Yeung Ki', 'Nathan Dyer',
 'Georges-Kevin N'Koudou Mbida', 'Per Mertesacker',
 'Ademola Lookman', 'Jack Wilshere', 'Victor Nilsson Lindelöf',
 'Callum Wilson', 'Danny Drinkwater', 'Beni Baningime',
 'Will Hughes', 'Charlie Adam', 'Orestis Karnezis', 'Martin Cranie',
 'Danny Rose', 'Paulo Dino Gazzaniga', 'Lee Grant',
 'Rolando Aarons', 'Zlatan Ibrahimović', 'Marvin Zeegelaar',
 'Adam Lallana', 'Phil Bardsley', 'Erik Lamela', 'Hamza Choudhury',
 'Faustino Marcos Alberto Rojo', 'Karl Darlow', 'Jérémy Pied',
 'Adrián San Miguel del Castillo', 'Kevin Long', 'Danny Ings',
 'José Leonardo Ulloa', 'Charlie Taylor', 'Ethan Ampadu',
 'Oleksandr Zinchenko', 'Ainsley Maitland-Niles', 'Luke Shaw',
 'Scott McTominay', 'Beram Kayal', 'Phil Foden', 'Josh Tymon',

```
'Connor Goldson', 'Jerome Sinclair', 'Nahki Wells', 'Jack Simpson',
'Matt Targett', 'Joe Lolley', 'Henri Saivet', 'Calum Chambers',
'Aleksandar Dragović', 'Yannick Bolasie Yala', 'James McCarthy',
'Julien Ngoy', 'Adrien Sebastian Perruchet Silva',
'Alex Pritchard', 'Terence Kongolo', 'Stephen Ireland',
'Moritz Bauer', 'Connor Roberts', 'Cenk Tosun', 'Joshua Sims',
'Sam Baldock', 'Reiss Nelson', 'Wilfredo Daniel Caballero',
'Brahim Abdelkader Diaz', 'Michel Vorm', 'Michael Obafemi',
'Sam Byram', 'Reece Oxford', 'Ross Barkley', 'Callum Hudson-Odoi',
'Séamus Coleman', 'Fousseni Diabaté',
'Robert Kenedy Nunes do Nascimento', 'Guido Marcelo Carrillo',
'Aymeric Laporte', 'Gerard Deulofeu Lázaro',
"Papa Alioune N'Diaye", 'Konstantinos Stafylidis',
'Pierre-Emerick Aubameyang', 'David Ospina Ramírez',
'Alexander Sørloth', 'Martin Dúbravka', 'Michael Carrick',
'Dodi Lukebakio', 'Jürgen Locadia', 'Aaron Wan-Bissaka',
'Lucas Rodrigues Moura da Silva', 'Tyrese Campbell',
'Patrice Evra', 'Eddie Nketiah', 'Emerson Palmieri dos Santos',
'Konstantinos Mavropanos', 'Eldin Jakupovic', 'Lukas Nmecha',
'Jan Bednarek', 'Nathaniel Clyne', 'Ben Hamer', 'Joe Willock',
'José Ramiro Funes Mori', 'Harvey Barnes', 'Yohan Benalouane',
'Emerson Hyndman', 'Dwight McNeil', "Pape N'Diaye Souaré",
'Ben Woodburn', 'Sergio Germán Romero', 'Massadio Haïdara',
'Lasse Sørensen'], dtype=object)
```

```
[18]: players_spain = spadl['Spain']['player_name'].unique()
print("Número de jogadores na La Liga:", len(players_spain))
players_spain
```

Número de jogadores na La Liga: 557

```
[18]: array(['Manuel Trigueros Muñoz', 'Enes Ünal',
'Rodrigo Hernández Cascante', 'Jaume Vicent Costa Jordá',
'Álvaro González Soberón', 'Víctor Ruíz Torre',
'Andrés Eduardo Fernández Moreno', 'Antonio Rukavina',
'Nicola Sansone', 'Sergio Postigo Redondo',
'José Luis Morales Nogales', 'Enis Bardhi',
'Jefferson Andrés Lerma Solís', 'José Ángel Gómez Campaña',
'Antonio García Aranda', 'José Manuel Rodríguez Benito',
'Iván López Mendoza', 'Raúl Fernández-Cavada Mateos',
'Alexander Alegría Moreno', 'David Remeseiro Salgueiro',
'Carlos Arturo Bacca Ahumada', 'Pablo Fornals Malla', nan,
'Leonardo Gabriel Suárez', 'Cheick Doukouré', 'Iván López Álvarez',
'Alfred John Momar N'Diaye', 'Emmanuel Okyere Boateng',
'Darío Poveda Romera', 'Willian José da Silva',
'Asier Illarramendi Andonegi', 'Raúl Rodríguez Navas',
'Aritz Elustondo Irribaria', 'Gerónimo Rulli',
'Kévin Manuel Rodrigues', 'Hugo Mallo Novegil',
```

'Mikel Oyarzabal Ugarte', 'Xabier Prieto Argarate',
 'Jonathan Castro Otto', 'Andreu Fontàs Prat',
 'Álvaro Odriozola Arzallus', 'Iago Aspas Juncal',
 'Jozabed Sánchez Ruiz', 'Gustavo Daniel Cabral Cáceres',
 'Sergio Álvarez Conde', 'Maximiliano Gómez González',
 'Pione Sisto Ifolo Emirmija', 'Sergio Canales Madrazo',
 'Daniel Wass', 'David Zurutuza Veillet', 'Nemanja Radoja',
 'Carlos Alberto Vela Garrido', 'Pedro Pablo Hernández',
 'Juan Miguel Jiménez López', 'Stanislav Lobotka',
 'Imanol Agirretxe Arruti', 'Andrew Hjulsager', 'Fayçal Fajr',
 'Gaku Shibasaki', 'Juan Torres Ruiz', 'Beñat Etxebarria Urkiaga',
 'Francisco José Molinero Calderón', 'Unai Núñez Gestoso',
 'Mikel Balenziaga Oruesagasti', 'Aymeric Laporte',
 'Óscar de Marcos Arana', 'Mikel San José Domínguez',
 'Iñaki Williams Arthuer', 'Iker Muniain Goñi',
 'Vicente Guaita Panadero', 'Amath Diedhiou Ndiaye',
 'Damián Nicolás Suárez Suárez', 'Jorge Molina Vidal',
 'Markel Susaeta Laskurain', 'Markel Bergara Larrañaga',
 'Álvaro José Jiménez Guerrero', 'Kepa Arrizabalaga Revuelta',
 'Djené Dakonam Ortega', 'Raúl García Escudero',
 'Iñigo Lekue Martínez', 'Aritz Aduriz Zubeldia',
 'Sergio Mora Sánchez', 'Ángel Luis Rodríguez Díaz',
 'Mauro Wilney Arambarri Rosa', 'Iñigo Córdoba Kerejeta',
 'Cristhian Ricardo Stuardi Curbelo', 'Alejandro Granell Nogué',
 'Pedro Alcalá Guirado', 'Marc Muniesa Martínez',
 'Borja García Freire', 'Pere Pons Riera',
 'Francesc Aday Benítez Caraballo', 'Juan Francisco Torres Belén',
 'Bernardo José Espinosa Zúñiga', 'Saúl Níguez Esclapez',
 'Jorge Resurrección Merodio', 'Lucas Hernández Pi',
 'Pablo Maffeo Becerra', 'Gabriel Fernández Arenas', 'Jan Oblak',
 'Stefan Savić', 'Antoine Griezmann',
 'José María Giménez de Vargas', 'Yannick Ferreira Carrasco',
 'Fernando José Torres Sanz', 'Gorka Iraizoz Moreno',
 'Cristian Portugués Manzanera', 'Ángel Martín Correa',
 'Osvaldo Nicolás Fabián Gaitán', 'Luciano Vietto',
 'Carles Planas Antolínez', 'Olarenwaju Ayoba Kayode',
 'Leonardo Carrilho Baptista', 'David López Silva',
 'Clément Lenglet', 'Papakouli Diop', 'David Soria Solís',
 'Steven N'Kemboanza Mike Christopher N'Zonzi', 'Sébastien Corchia',
 'Simon Thorup Kjær', 'Pablo Daniel Piatti', 'Aarón Martín Caricol',
 'Sergio Rico González', 'Javier Fuego Martínez',
 'Francisco Borja Lasso de la Vega Gayán', 'Manuel Agudo Durán',
 'Luis Fernando Muriel Fruto', 'José Manuel Jurado Marín',
 'Javier López Rodríguez', 'Gerard Moreno Balaguero',
 'Paulo Henrique Chagas de Lima', 'Jesús Navas González',
 'Pau López Sabata', 'Pablo Sarabia García',
 'Edinaldo Gomes Pereira', 'Éver Maximiliano David Banega',

'Esteban Félix Granero Molina', 'Guido Hernán Pizarro',
 'Hernán Arsenio Pérez González',
 'Charles Días Barbosa de Oliveira', 'Daniel García Carrillo',
 'José Ángel Valdés Díaz', 'Luis Hernández Rodríguez',
 'Zdravko Kuzmanović', 'Roberto José Rosales Altuve',
 'Borja González Tomás', 'Iván Ramis Barrios',
 'Ander Capa Rodríguez', 'Adrián González Morales',
 'Juan Pablo Añor Acosta', 'Paulo André Rodrigues de Oliveira',
 'Joan Jordán Moreno', 'Takashi Inui', 'Paul Baysse',
 'Enrique García Martínez', 'Roberto Jiménez Gago',
 'Juan Carlos Pérez López', 'Diego González Polanco',
 'José Luis García del Pozo', 'Rubén Peña Jiménez',
 'Marko Dmitrović', 'Iván Alejo Peralta', 'Javier Ontiveros Parra',
 'Jonathan Rodríguez Menéndez', 'Sergio Enrich Ametller',
 'Christian Rivera Hernández', 'Youssef En-Nesyri',
 'Lionel Andrés Messi Cuccittini', 'Sergio Busquets i Burgos',
 'Ivan Rakitić', 'Nélson Cabral Semedo',
 'Javier Alejandro Mascherano', 'Samuel Yves Umtiti',
 'Jordi Alba Ramos', 'Juan José Narváez Solarte',
 'Antonio Barragán Fernández', 'Sergi Roberto Carnicer',
 'Francisco Alcácer García', 'Antonio Adán Garrido',
 'Alin Dorinel Toşca', 'Zouhair Feddal', 'Aïssa Mandi',
 'Sergio León Limones', 'Gerard Deulofeu Lázaro',
 'José Andrés Guardado Hernández', 'Marc-André ter Stegen',
 'Joaquín Sánchez Rodríguez', 'Matías Nahuel Leiva Esquivel',
 'Víctor Camarasa Ferrando', 'Francisco Javier García Fernández',
 'Francisco Javier Guerrero Martín', 'Aleix Vidal Parreu',
 'Fabián Ruiz Peña', 'Denis Suárez Fernández', 'Lucas Digne',
 'Karim Benzema', 'Toni Kroos', 'Luka Modrić',
 'Daniel Carvajal Ramos', 'Sergio Ramos García',
 'Marcelo Vieira da Silva Júnior',
 'José Ignacio Fernández Iglesias',
 'Francisco Román Alarcón Suárez', 'Gareth Frank Bale',
 'Juan Francisco Moreno Fuertes', 'Carlos Henrique Casimiro',
 'Pedro Mosquera Parada', 'Fabian Lukas Schär',
 'Guilherme dos Santos Torres', 'Luis Carlos Correia Pinto',
 'Florin Andone', 'Sidnei Rechel da Silva Júnior',
 'Rubén Iván Martínez Andrade', 'Federico Nicolás Cartabia',
 'Celso Borges Mora', 'Keylor Navas Gamboa', 'Zakaria Bakkali',
 'Bruno Alexandre Vilela Gama', 'Adrián López Álvarez',
 'Marco Asensio Willemsen', 'Marcos Llorente Moreno',
 'Lucas Vázquez Iglesias', 'Borja Valle Balonga', 'Simone Zaza',
 'Ezequiel Marcelo Garay', 'Ignacio Vidal Miralles',
 'Rúben Miguel Nunes Vezo', 'José Luis Gayá Peña',
 'Leandro Chichizola', 'Pedro Bigas Rigo', 'Rodrigo Moreno Machado',
 'Dani Castellano Betancor', 'Álvaro Medrán Just',
 'Mauricio Lemos Merladet', 'Carlos Soler Barragán',

'Daniel Parejo Muñoz', 'Pedro Tanausú Domínguez Placeres',
 'Jonathan Viera Ramos', 'Alen Halilović',
 'David Simón Rodríguez Santana', 'Joaquín Navarro Jiménez',
 'João Pedro Cavaco Cancelo', 'Jonathan Calleri',
 'Víctor Machín Pérez', 'Norberto Murara Neto',
 'Ignacio Gil de Pareja Vicent', 'Santiago Mina Lorenzo',
 'Sergio Ezequiel Araújo', 'Javi Castellano Betancor',
 'Michel Macedo Rocha Machado', 'Nemanja Maksimović',
 'Rubén Sobrino Pozuelo', 'Alexis Ruano Delgado',
 'Ibai Gómez Pérez', 'Alfonso Pedraza Sag', 'Rodrigo Ely',
 'Carlos Martín Vigaray', 'Diego Rico Salguero',
 'Martín Maximiliano Mantovani', 'Ezequiel Muñoz',
 'Joseba Zaldúa Bengoetxea', 'Christian Robert Santos Kwasniewski',
 'Gabriel Appelt Pires', 'Julián Omar Ramos Suárez',
 'Mubarak Wakaso', 'Fernando Pacheco Flores',
 'Rubén Salvador Pérez Del Mármol', 'Jorge Franco Alviz',
 'Miguel Ángel Guerrero Martín', 'Javier Eraso Goñi',
 'Alexander Szymanowski', 'Iván Cuéllar Sacristán',
 'Manuel Alejandro García Sánchez', 'Tomás Pina Isla',
 'Óscar David Romero Villamayor', 'Erik Morán Arribas',
 'Nabil El Zhar', 'Héctor Hernández Ortega',
 'Unai Bustinza Martínez', 'Cédric Bakambu',
 'Rúben Afonso Borges Semedo', 'Samuel Castillejo Azuaga',
 'Mariano Damián Barbosa', 'Andrés Iniesta Luján',
 'Gerard Piqué Bernabéu', 'Enzo Alan Zidane Fernández',
 'José Paulo Bezzerá Maciel Júnior', 'Sergio García De La Fuente',
 'Roberto Román Triguero', 'Mauro Javier Dos Santos',
 'Óscar Melendo Jiménez', 'Gerard Gumbau Garriga', 'Emre Çolak',
 'Diego Roberto Godín Leal', 'Šime Vrsaljko', 'Thomas Teye Partey',
 'Hernán Daniel Santana Trujillo', 'Fabio González Estupiñán',
 'Jerónimo Figueroa Cabrera', 'Benito Ramírez del Toro',
 'Alejandro Miguel Mula Sanchez', 'Douglas Luiz Soares de Paulo',
 'Geoffrey Kondogbia', 'Jeison Fabián Murillo Cerón',
 'Antonio Latorre Grueso', 'Martín Montoya Torralbo',
 'Mateo Kovačić', 'Borja Mayoral Moya', 'Gabriel Iván Mercado',
 'Sergio Escudero Palomo', 'Vitorino Gabriel Pacheco Antunes',
 'Michael Krohn-Dehli', 'Nicolás Martín Pareja',
 'Wissam Ben Yedder', 'Francisco Portillo Soler',
 'Facundo Sebastián Roncaglia', 'Sergi Gómez Solà', 'Riza Durmisi',
 'Cristian Tello Herrera', 'Arnaldo Antonio Sanabria Ayala',
 'Eneko Bóveda Altube', 'Enric Saborit Teixidor',
 'Mikel Vesga Arruti', 'Tiago Manuel Dias Correia',
 'Jordi Amat Maas', 'Víctor Moya Martínez', 'Adnan Januzaj',
 'Íñigo Martínez Berridi', 'Przemysław Tytoń',
 'Lucas Pérez Martínez', 'Federico Santiago Valverde Dipetta',
 'Diego Javier Llorente Ríos', 'Gabriel Armando de Abreu',
 'Filipe Luis Kasmirski', 'Andreas Hoelgebaum Pereira',

'Gonçalo Manuel Ganchinho Guedes', 'Kevin Gameiro',
 'Roberto Suárez Pier', 'Theo Bernard François Hernández',
 'Francisco Casilla Cortés', 'Pedro López Muñoz',
 'Samuel García Sánchez', 'Claudio Beauvue', 'Bojan Krkić Pérez',
 'Daniel Alejandro Torres Rojas', 'Munir El Haddadi Mohamed',
 'Emre Mor', 'Iago Herrerin Buisán', 'Johan Andrés Mojica Palacio',
 'Ander Iturraspe Derteano', 'Ager Aketxe Barrutia',
 'Sabin Merino Zuloaga', 'Gonzalo Escalante',
 'Daniel Filipe Martins Carriço', 'Carlos Joaquín Correa',
 'Johannes Geis', 'Alberto Aquilani', 'Aythami Artiles Oliva',
 'Sergio Gontán Gallardo', 'Oussama Tannane',
 'Federico Ricca Rostagnol', 'Loïc Rémy',
 'Miguel Ángel Garrido Cifuentes', 'José Vicente Gómez Umpiérrez',
 'Luis Alberto Suárez Díaz', 'Sergi Darder Moll',
 'Víctor Sánchez Mata', 'Mario Hermoso Canseco', 'Ousmane Dembélé',
 'Marc Navarro Ceciliano', 'Dídac Vilá Rosselló',
 'André Filipe Tavares Gomes', 'Juan Pedro Ramírez López',
 'Lionel Jules Carole', 'Walter Iván Montoya',
 'Franco Damián Vázquez', 'Aleix García Serrano', 'Michael Olunga',
 'Costel Fane Pantilimon', 'Alejandro Arribas Garrido',
 'Fernando Navarro i Corbacho', 'Ryad Boudebouz',
 'Dimitrios Siovas', 'Alejandro Gálvez Jimena', 'Darko Brašanac',
 'José Manuel García Naranjo', 'Anaitz Arbilla Zabala',
 'Nordin Amrabat', 'Raphaël Varane', 'Daniel Ceballos Fernández',
 'Mario Gaspar Pérez Martínez', 'Denis Cheryshev',
 'Marc Roca Junqué', 'Gonzalo Castro Irizábal', 'Esteban Rolón',
 'Diego Alejandro Rolán Silva', 'Brais Méndez Portela',
 'Jefferson Antonio Montero Vite', 'David García Santana',
 'Hernán Darío Toledo', 'Igor Zubeldía Elorza',
 'Alberto De La Bella Madureño', 'Andoni Gorosabel Espinosa',
 'Jon Bautista Orgilles', 'David Juncà Reñé', 'Roberto Soriano',
 'Guillermo Alfonso Maripán Loaysa', 'Rubén Duarte Sánchez',
 'Cristiano Ronaldo dos Santos Aveiro', 'Borja Herrera González',
 'Raúl García Carnero', 'Jonás Ramalho Chimeno',
 'Marlos Moreno Durán', 'Alexander Mesa Travieso',
 'Rafael Jesús Navarro Mazuelos', 'Rubén Blanco Veiga',
 'John Guidetti', 'Jaume Doménech Sánchez', 'Rubén Pardo Gutiérrez',
 'Achraf Hakimi Mouh', 'Sergio Sánchez Ortega',
 'Miguel Torres Gómez', 'Adalberto Peñaranda Maestre',
 'Antonio Manuel Luna Rodríguez', 'Aleksandar Katai',
 'David Rodríguez Lombán', 'Ramiro Guerra Pereyra',
 'Gerard Valentín Sancho', 'Mehdi Lacen', 'Bruno González Cabrera',
 'Joel Nathaniel Campbell Samuels', 'Raúl Albentosa Redal',
 'Francis Odinaka Uzoho', 'Emanuel Cecchini',
 'Carlos Calderón López', 'Andrés Tomás Prieto Albert',
 'Daniele Bonera', 'Yassine Bounou', 'Adrián Diéguez Grande',
 'Sergi Samper Montaña', 'Raúl Lizoáin Cruz',

'Eduardo Expósito Jaén', 'David Timor Copoví', 'Shaquell Moore',
 'Imanol Sarriegi Isasa', 'Daniel Raba Antolí',
 'Augusto Matías Fernández', 'Jesús Vallejo Lázaro',
 'Mikel Rico Moreno', 'Oier Olazábal Paredes',
 'Erick Cathriel Cabaco Almada', 'Pau Francisco Torres',
 'Carles Gil de Pareja Vicent', 'Thomas Vermaelen',
 'Moctar El Hacen El Id', 'Martín Aguirregabiria Padilla',
 'Mathías Olivera Miramontes', 'Adrián Marín Gómez',
 'Mario González Gutiérrez', 'Xabier Etxeita Gorritxategi',
 'Sergio Asenjo Andrés', 'Daniel Pacheco Lobato',
 'Julio Gracia Gallardo', 'Aitor Ruibal García',
 'Ferrán Torres García', 'Saša Lukić', 'Óscar Esau Duarte Gaitán',
 'Ignasi Miquel i Pons', 'José Manuel Arnáiz Díaz',
 'Gabriel Martín Peñalba', 'Fabián Ariel Orellana Valenzuela',
 'Manuel Rolando Iturra Urrutia', 'Damián Emiliano Martínez',
 'Diego da Silva Costa', 'Jairo Samperio Bustara',
 'Víctor Laguardia Cisneros', 'Francis Coquelin',
 'Alberto Bueno Calvo', 'Rubén Castro Martín', 'Aldo One Esteve',
 'Jorge Andújar Moreno', 'Roger Martí Salvador',
 'Roger Beyker Martínez Tobinsson', 'Diego López Rodríguez',
 'Philippe Coutinho Correia', 'Ermedin Demirović',
 'Erik Alexander Expósito Hernández', 'Jaime Sierra Mateos',
 'Antonio Miguel Ramírez Martínez', 'Jon Guridi Aldalur',
 'Róbert Mazán', 'Yeray Álvarez López', 'Andoni López Saratxo',
 'Lorenzo Jesús Morón García', 'Marc Bartra Aregall',
 'Sandro Ramírez Castillo', 'Roque Mesa Quevedo',
 'Miguel Arturo Layún Prado', 'Giampaolo Pazzini',
 'Brown Ideye Aide', 'Matías Aguirregaray Guruceaga',
 'Oghenekaro Etebo', 'Isaac Ajayi Success',
 'Héctor Junior Firpo Adames', 'Carlos Alberto Sánchez Moreno',
 'Lucas Ariel Boyé', 'Anthony Rubén Lozano Colón',
 'Yerry Fernando Mina González', 'Mathieu Flamini',
 'Leandro Daniel Cabrera Sasía',
 'Merveille Valthy Streeker Ndockyt', 'Eloi Amagat Arimany',
 'Maxime Lestienne', 'Rubén Rochina Naixes', 'Imoh Ezekiel',
 'Armando Sadiku', 'Sulley Ali Muntari', 'Pedro León Sánchez Gil',
 'Alejandro Gutiérrez Mozo', 'Miguel Ángel Moyà Rumbo',
 'Héctor Alfredo Moreno Herrera', 'Guilherme Antonio Arana Lopes',
 'Maksym Koval', 'Hugo Duro Perales', 'Carlos Isaac Muñoz Obejero',
 'Antonio Moya Vega', 'Daniel Giménez Hernández',
 'Kévin Olivier Soni', 'Aly Abeid', 'Iván Rodríguez del Pozo',
 'Sergio Arribas Blázquez', 'Carlos Fernández Luna',
 'Diego Hernández Barriuso', 'Jasper Cillessen',
 'Pedro López Galisteo', 'Yoel Rodríguez Oterino',
 'Antonio Sivera Salvá', 'Axel Werner', 'Alberto Redondo Guijarro',
 'David Alba Fernández', 'Miguel Angel Rubio Lestan', 'Arona Sané',
 'Nereo Champagne', 'Fahad Mosaed Al Muwallad Al Harbi',


```
'Asier Riesgo Unamuno', 'Víctor López Ibáñez',
'Alberto López Jiménez', 'Mujaid Sadick Aliu',
'Carlos Martínez Díez', 'Jorge Ruiz Ojeda', 'Daniel Molina Orta',
'José Alonso Lara', 'Alejandro Robles García',
'Juan Cruz Diaz Espósito', 'Jon Ander Serantes Simon',
'Luca Zinedine Zidane', 'Salem Mohammed Al Dawsari'], dtype=object)
```

```
[19]: players_germany = spadl['Germany']['player_name'].unique()
print("Número de jogadores na Bundesliga:", len(players_germany))
players_germany
```

Número de jogadores na Bundesliga: 473

```
[19]: array(['Kevin Volland', 'Karim Bellarabi', 'Sven Bender', 'Bernd Leno',
'Wendell Nascimento Borges', 'Sebastian Rudy', 'Thomas Müller',
'Corentin Tolisso', 'Charles Mariano Aránguiz Sandoval',
'Arturo Erasmo Vidal Pardo', 'Jonathan Tah', 'Niklas Süle',
'David Olatukunbo Alaba', 'Robert Lewandowski', 'Joshua Kimmich',
'Franck Bilal Ribéry', 'Admir Mehmedi', 'Dominik Kohr',
'Leon Bailey Butler', 'Mats Hummels', 'Sven Ulreich',
'Benjamin Henrichs', nan, 'Julian Brandt', 'Aleksandar Dragović',
'Kevin Kampl', 'Márcio Rafael Ferreira de Souza', 'Arjen Robben',
'Kingsley Coman', 'Max Kruse', 'Maximilian Eggstein',
'Robert Bauer', 'Florian Kainz', 'Steven Zuber', 'Kevin Vogt',
'Benjamin Hübner', 'Dennis Geiger', 'Håvard Nordtveit',
'Jeremy Toljan', 'Nadiem Amiri', 'Thomas Delaney',
'Hans Carl Ludwig Augustinsson', 'Kerem Demirbay', 'Mark Uth',
'Theodor Gebre Selassie', 'Ádám Szalai', 'Jiří Pavlenka',
'Milos Veljkovic', 'Ludovic Lamine Sané', 'Oliver Baumann',
'Fin Bartels', 'Andrej Kramarić', 'Philipp Bargfrede',
'Serge Gnabry', 'Eugen Polanski', 'Jérôme Gondorf',
'Alexander Esswein', 'Vladimír Darida', 'Marcin Kamiński',
'Ailton Ferreira Silva', 'Per Ciljan Skjelbred', 'Vedad Ibišević',
'Ron-Robert Zieler', 'Salomon Armand Magloire Kalou',
'Christian Gentner', 'Takuma Asano', 'Marvin Plattenhardt',
'Karim Rekik', 'Sebastian Langkamp', 'Mitchell Weiser',
'Benjamin Pavard', 'Josip Brekalo', 'Mathew Leckie',
'Matthias Zimmermann', 'Chadrac Akolo', 'Simon Terodde',
'Orel Mangala', 'Rune Almenning Jarstein', 'Dennis Aogo',
'Niklas Stark', 'Holger Badstuber', 'Anastasios Donis',
'Genki Haraguchi', 'Jordan Torunarigha', 'Janik Haberer',
'Christian Günter', 'David Ángel Abraham', 'Julian Schuster',
'Alexander Schwolow', 'Philipp Lienhart', 'Marc-Oliver Kempf',
'Nicolas Höfler', 'Simon Falette', 'Timothy Chandler',
'Daichi Kamada', 'Florian Niederlechner', 'Jetro Willems',
'Pascal Stenzel', 'Tim Kleindienst', 'Mijat Gačinić',
'Gélson da Conceição Tavares Fernandes', 'Lukáš Hrádecký',
'Mike Frantz', 'Jonathan de Guzmán', 'Sébastien Haller',
```

'Makoto Hasebe', 'Nils Petersen', 'Kevin-Prince Boateng',
 'Marco Terrazzino', 'Danny Vieira da Costa', 'Branimir Hrgota',
 'Raffael Caetano de Araújo', 'Christoph Kramer', 'Matthias Ginter',
 'Jannik Vestergaard', 'Denis Lemi Zakaria Lako Lado',
 'Nico Elvedi', 'Ibrahima Traoré', 'Konstantin Rausch',
 'Leonardo Bittencourt', 'Jhon Andrés Córdoba Copete',
 'Miloš Jojić', 'Yann Sommer', 'Oscar Wendt', 'Timo Horn',
 'Dominique Heintz', 'Frederik Hillesborg Sørensen', 'Jonas Hector',
 'Marcel Risse', 'Lukas Klünter', 'Lars Stindl', 'Matthias Lehmann',
 'Thorgan Hazard', 'Jannes-Kilian Horn', 'Sehrou Guirassy',
 'Simon Zoller', 'Patrick Herrmann', 'Jonas Hofmann',
 'Raúl Marcelo Bobadilla', 'Franco Matías Di Santo',
 'Ronaldo Aparecido Rodrigues', 'Willi Orban', 'Timo Werner',
 'Naby Deco Keita', 'Marcel Halstenberg', 'Ralf Fährmann',
 'Marcel Sabitzer', 'Lukas Klostermann', 'Dayotchanculle Upamecano',
 'Thilo Kehrer', 'Leon Goretzka', 'Daniel Caligiuri',
 'Yussuf Yurary Poulsen', 'Stefan Ilsanker', 'Amine Harit',
 'Matija Nastasić', 'Bastian Oczipka', 'Nabil Bentaleb',
 'Péter Gulácsi', 'Konrad Laimer', 'Yevhen Konoplyanka',
 'Emil Forsberg', 'Fabian Reese', 'Armando Tué Na Bangna',
 'Jean-Kévin Augustin', 'Weston McKennie', 'Max Meyer',
 'Alfreð Finnbogason', 'Jeffrey Gouweleeuw', 'Dennis Diekmeyer',
 'Albin Ekdal', 'André Hahn', 'Martin Hinteregger', 'Daniel Baier',
 'Kyriakos Papadopoulos', 'Philipp Max', 'Ja-Cheol Koo',
 'Raphael Framberger', 'Rick van Drongelen',
 'Caiuby Francisco da Silva', 'Filip Kostić', 'Marwin Hitz',
 'Wallace Souza Silva', 'Nicolai Müller', 'Gideon Jung',
 'Michael Gregoritsch', 'Jonathan Schmid', 'Christian Mathenia',
 'Bobby Shou Wood', 'Aaron Hunt', 'Sergio Duvan Córdoba Lezama',
 'Gian-Luca Waldschmidt', 'Erik Thommy', 'Sven Schipplock',
 'Niclas Füllkrug', 'Pirmin Schwegler', 'Florian Hübner',
 'Philipp Tschauner', 'Viktor Fischer', 'Julian Korb',
 'Felix Klaus', 'Waldemar Anton', 'Martin Harnik', 'Abdou Diallo',
 'Giulio Donati', 'Daniel Brosinski', 'Danny Latza', 'Stefan Bell',
 'Pablo Ezequiel De Blasis', 'René Adler',
 'Felipe Trevizan Martins', 'Kenan Karaman', 'Fabian Frei',
 'Matthias Ostrzolek', 'Alexandru Iulian Maxim', 'Yoshinori Muto',
 'Levin Mete Öztunali', 'Robin Quaison', 'Marvin Bakalorz',
 'Kenan Kodro', 'Charlison Benschop', 'Pierre-Emerick Aubameyang',
 'Nuri Şahin', 'Sokratis Papastathopoulos', 'Marc Bartra Aregall',
 'Dan-Axel Zagadou', 'Mario Götze', 'Łukasz Piszczek',
 'Christian Pulisic', 'Paul Verhaegh', 'Jakub Błaszczykowski',
 'Maximilian Philipp', 'Gonzalo Castro Randon', 'Riechedly Bazoer',
 'Yannick Gerhardt', 'Ohis Felix Uduokhai', 'Robin Knoche',
 'Koen Casteels', 'Daniel Didavi', 'Roman Bürki', 'Kaylen Hinds',
 'Ignacio Camacho Barnola', 'Mario Gómez García',
 'Landry Nany Dimata', 'Mahmoud Dahoud', 'Josuha Guilavogui',

'Maximilian Arnold', 'Felix Passlack', 'Shinji Kagawa',
 'Ömer Toprak', 'Diego Demme', 'Onur Bulut', 'Florian Kath',
 'Dominik Kaiser', 'Mërgim Mavraj', 'Yūya Ōsako',
 'Christian Clemens', 'Lewis Harry Holtby', 'Manuel Neuer',
 'Thiago Alcântara do Nascimento', 'Johannes Eggestein',
 'Marcel Tisserand', 'Taleb Tawatha', 'Yunus Mallı',
 'Sandro Wagner', 'Ermin Bičakčić', 'Lukas Rupp', 'Pavel Kadeřábek',
 'Florian Grillitsch', 'André Ramalho Silva', 'Stefan Kießling',
 'László Bényi', 'Marcel Heller', 'Rani Khedira', 'Fabian Johnson',
 'Salif Sané', 'Guido Burgstaller', 'Jonathas Cristian de Jesus',
 'Sebastian Maier', 'Timo Baumgartl', 'Berkay Özcan',
 'Javier Martínez Aginaga', 'Nico Schulz',
 'James David Rodríguez Rubio', 'Philipp Ochs', 'Valentin Stocker',
 'Ishak Belfodil', 'Vincent Sierro', 'Yoric Ravet',
 'Marcel Schmelzer', 'Caglar Söyüncü', 'Amir Abrashi',
 'Lukas Kübler', 'Andriy Yarmolenko',
 'Carlos Joel Salcedo Hernández', 'Ante Rebić', 'Marco Russ',
 'Julio César Villalba Gaona', 'Benjamin Stambouli', 'Andreas Beck',
 'Santiago Lionel Ascacibar', 'Marco Höger', 'Daniel Tawiah Opare',
 'Jorge Meré Pérez', 'Jan Morávek',
 'Bernardo Fernandes da Silva Junior', 'Gotoku Sakai',
 'Leon-Aderemi Balogun', 'Suat Serdar', 'Kai Havertz',
 'Joel Pohjanpalo', 'Karim Onisiwo', 'Divock Okoth Origi',
 'William de Azevedo Furtado', 'Manuel Schmiedebach', 'Ihlas Bebou',
 'Jérôme Boateng', 'Jean-Philippe Gbamin', 'Julian Weigl',
 'Alexander Isak', 'Fabian Lustenberger', 'Peter Pekarík',
 'Ondrej Duda', 'Izet Hajrović', 'Breel-Donald Embolo',
 'Luka Jović', 'Konstantinos Stafylidis', 'Lars Bender',
 'Panagiotis Retsos', 'Ryan Kent', 'Bartosz Kapustka',
 'Julian Baumgartlinger', 'Bakery Jatta',
 'Douglas dos Santos Justino de Melo', 'Sejad Salihović',
 'Törles Knöll', 'Paul-Georges Ntep de Madiba', 'Dominik Maroh',
 'Marius Wolf', 'Tobias Sippel', 'Mickaël Cuisance',
 'Dzenis Burnić', 'Yvon Landry Mvogo', 'Benno Schmitz',
 'Marvin Compner', 'Vasilije Janjičić', 'Jacob Bruun Larsen',
 'Jairo Samperio Bustara', 'Luca Caldirola', 'Gian-Luca Itter',
 'Niklas Moisander', 'Lucas Nicolás Alario', 'Tatsuya Ito',
 'Salih Özcan', 'Gojko Kačar', 'Daniel Ginczek', 'Ibrahima Konaté',
 'Claudio Miguel Pizarro Bossio', 'Tim-Henry Handwerker',
 'Valentino Lazaro', 'Robin Hack', 'Vincenzo Grifo',
 'Marc Stendera', 'Slobodan Medojević', 'Ebenezer Ofori',
 'Ulisses Alexandre Garcia Lopes', 'Zlatko Junuzović',
 'Victor James Osimhen', 'Kevin Danso', 'Stefan Posch',
 'Marco Richter', 'Davie Selke', 'Alessandro Schöpf',
 'Aymen Barkok', 'Emiliano Adrián Insúa Zapata', 'Paweł Olkowski',
 'Arne Maier', 'Robin Koch', 'Jorge Andújar Moreno',
 'Neven Subotić', 'Jadon Sancho', 'Iver Fossum', 'Kevin Akpoguma',

```
'Tony Jantschke', 'Reece Oxford', 'Jann-Fiete Arp', 'Dong-Won Ji',
'John Anthony Brooks', 'Robin Zentner', 'Danny Blum',
'Oliver Sorg', 'Raphaël Adelino José Guerreiro', 'André Schürrle',
'Anto Grgic', 'Caleb Stanko', 'Aron Jóhannsson',
'Juan Bernat Velasco', 'Maximilian Mittelstädt', 'Josip Drmic',
'Michael Esser', 'Miiko Martín Alborno Inola', 'Gerrit Holtmann',
'Karim Guédé', 'Roman Weidenfeller', 'Yann Aurel Bisseck',
'Anas Ouahim', 'Nikolas Nartey', 'Alexander Hack',
'Emil Berggreen', 'Marco Friedl', 'Kwasi Okyere Wriedt',
'Birk Risa', 'Tom Starke', 'Chris Führich', 'Filip Kusič',
'Noah-Joel Sarenren-Bazee', 'Ole Käuper', 'Jeffrey Bruma',
'Marcel Benger', 'Renato Steffen', 'Marko Pjaca', 'Manuel Gulde',
'Omar Mascarell González', 'Lucas Höler', 'Mohamed Dräger',
'Julian Pollersbeck', 'Nigel de Jong', 'Anthony Ujah',
'Thomas Kraft', 'Rafał Gikiewicz', 'Josip Elez', 'Elvis Rexhebecaj',
'Sebastian Jung', 'Michy Batshuayi Tunga', 'Manuel Akanji',
'Robert Zulj', 'Ademola Lookman', 'Milot Rashica',
'Marco Jhonfai Fabián De La Mora', 'Marco Reus',
'Vincent Koziello', 'Tin Jedvaj', 'Killian Jakob', 'Shawn Parker',
'Mandela Egbo', 'Florian Müller',
'Josha Mamadou Karaboue Vagnomann', 'Christoph Janker',
'Ville Matti Steinmann', 'Pablo Ínsua Blanco', 'Julian Schieber',
'Cedric Teuchert', 'Florian Mayer', 'Stephan Kofi Ambrosius',
'Mohamed Gouaida', 'Sergio Gómez Martín', 'Paul Jaeckel',
'Tobias Strobl', 'Timo Hübers', 'Ramazan Özcan', 'Lars Lukas Mai',
'Frank Evina', 'Niklas Dorsch', 'Meritan Shabani', 'Marijan Čavar',
'Andreas Luthe', 'Palko Dárdai', 'Ridle Bote Nzuzi Baku',
'Alexander Meier', 'Simon Asta', 'Alexander Nübel',
'Abdul Rahman Baba', 'Linton Maina'], dtype=object)
```

```
[20]: players_italy = spadl['Italy']['player_name'].unique()
print("Número de jogadores na Serie A:", len(players_italy))
players_italy
```

Número de jogadores na Serie A: 534

```
[20]: array(['Edin Džeko', 'Daniele De Rossi', 'Aleksandar Kolarov',
'José Luis Palomino', 'Juan Guilherme Nunes Jesus',
'Diego Perotti', 'Etrit Berisha', 'Robin Gosens',
'Alejandro Darío Gómez', 'Remo Freuler', 'Konstantinos Manolas',
'Andrea Masiello', 'Rafael Tolói', 'Bryan Cristante',
'Alisson Ramsés Becker', 'Kevin Strootman', 'Gregoire Defrel',
'Bruno da Silva Peres', 'Radja Nainggolan', nan, 'Hans Hateboer',
'Andrea Petagna', 'Jasmin Kurtić', 'Andreas Evald Cornelius',
'Josip Iličić', 'Marten de Roon', 'Federico Julián Fazio',
'Stephan El Shaarawy', 'Federico Di Francesco', 'Domenico Maietta',
'Sebastien De Maio', 'Antonio Mirante', 'Davide Zappacosta',
'Nicolas N'Koulou', 'Emiliano Moretti', 'Afriyie Acquah',
```

'Vassilis Torosidis', 'Cristian Molinaro', 'Saphir Sliti Taider',
 'Adam Masina', 'Iago Falqué Silva', 'Andrea Belotti',
 'Joel Chukwuma Obi', 'Erick Antonio Pulgar Farfán', 'Andrea Poli',
 'Adem Ljajić', 'Mattia Destro', 'Salvatore Sirigu',
 'Alejandro Berenguer Remiro', 'Simone Verdi', 'Godfred Donsah',
 'Tomás Eduardo Rincón Hernández', 'Rodrigo Sebastián Palacio',
 'Ladislav Krejčí', 'Patrick Cutrone', 'Manuel Locatelli',
 'Franck Yannick Kessié', 'Mateo Pablo Musacchio',
 'Leonardo Bonucci', 'Ricardo Iván Rodríguez Araya',
 'Jesús Joaquín Fernández Sáez de la Torre', 'Marcello Trotta',
 'Rolando Mandragora', 'Federico Ceccherini',
 'Marco Davide Faraoni', 'Andrea Barberis', 'Andrea Conti',
 'Hakan Çalhanoğlu', 'Leandro Daniel Cabrera Sasía',
 'Adrian Marius Stoian', 'Bruno Martella', 'Ante Budimir',
 'Noë Dussenne', 'Alex Cordaz', 'Fabio Borini',
 'Gianluigi Donnarumma', 'Marcus Christer Rohdén', 'Andrea Nalini',
 'André Miguel Valente Silva', 'Ignazio Abate',
 'Mariano Julio Izco', 'José Mauri', 'Arkadiusz Milik',
 'Vlad Iulian Chiricheș', 'Kalidou Koulibaly', 'Mattia Zaccagni',
 'Samuel Souprayen', 'Thomas Heurtaux', 'Elseid Gëzim Hysaj',
 'Piotr Zieliński', 'Amadou Diawara', 'Faouzi Ghoulam',
 'Lorenzo Insigne', 'Marek Hamšík', 'José Martín Cáceres Silva',
 'Daniel Bessa', 'José Manuel Reina Páez',
 'Nicolas David Andrade ', 'Alex Ferrari',
 'Rômulo Souza Orestes Caldeira', 'Alessio Cerci', 'Daniele Verde',
 'Marcel Büchel', 'José María Callejón Bueno', 'Dries Mertens',
 'Mohamed Salim Fares', 'Allan Marques Loureiro',
 'Giampaolo Pazzini', 'Emanuele Giaccherini', 'Mattia Valoti',
 'Giovanni Pablo Simeone', 'Carlos Alberto Sánchez Moreno',
 'Davide Astori', 'Yuto Nagatomo', 'Jordan Veretout',
 'Matías Vecino Falero', 'Antonio Candreva', 'Danilo D'Ambrosio',
 'Marco Benassi', 'Samir Handanović', 'Borja Valero Iglesias',
 'João Miranda de Souza Filho', 'Gil Bastião Dias',
 'Vitor Hugo Franchescoli de Souza',
 'Maximiliano Martín Olivera De Andrea', 'Milan Škriniar',
 'Valentin Eysseric', 'Marcelo Brozović', 'Ivan Perišić',
 'Nenad Tomović', 'Mauro Emanuel Icardi Rivero ',
 'Marco Sportiello', 'Sebastián Carlos Cristóforo Pepe',
 'João Mário Naval da Costa Eduardo ', 'Khouma El Hadji Babacar',
 'Roberto Gagliardini', 'Eder Citadin Martins', 'Rafik Zekhnini',
 'Paulo Bruno Exequiel Dybala', 'Daniele Rugani',
 'Paolo Pancrazio Faragò', 'Duje Čop', 'Simone Padoin',
 'Miralem Pjanić', 'Gonzalo Gerardo Higuaín', 'Nicolò Barella',
 'Alessio Cragno', 'Artur Ioniță', 'Giorgio Chiellini',
 'Diego da Silva Farias', 'Stephan Lichtsteiner', 'Marco Capuano',
 'Luca Cigarini', 'Alex Sandro Lobo Silva', 'Fabio Pisacane',
 'Claudio Marchisio', 'Mario Mandžukić', 'Gianluigi Buffon',

'Marco Andreolli', 'Juan Guillermo Cuadrado Bello', 'Sami Khedira',
 'João Pedro Geraldino dos Santos Galvão', 'Blaise Matuidi',
 'Douglas Costa de Souza', 'Daniele Dessena', 'Marco Sau',
 'Ciro Immobile', 'Stefan de Vrij', 'Sergej Milinković-Savić',
 'Simone Palombi', 'Alfred Benjamin Gomis', 'Sauli Väisänen',
 'Federico Viviani', 'Francesco Vicari', 'Filippo Costa',
 'Dušan Basta', 'Luca Mora', 'Pasquale Schiattarella',
 'Marco Parolo', 'Marios Oikonomou', 'Manuel Lazzari',
 'Ștefan Daniel Radu', 'Wallace Fortuna dos Santos',
 'Luis Alberto Romero Alconchel', 'Senad Lulić', 'Alberto Paloschi',
 'Thomas Strakosha', 'Sergio Floccari', 'Michele Cremonesi',
 'Marco Borriello', 'Jordan Zacharie Lukaku Menama Mokele',
 'Adam Marušić', 'Felipe Salvador Caicedo Corozo',
 'Federico Mattiello', 'Fabio Quagliarella',
 'Matías Agustín Silvestre', 'Vasco Regini', 'Jacopo Sala',
 'Édgar Osvaldo Barreto Cáceres', 'Vid Belec', 'Lorenzo Venuti',
 'Dennis Praet', 'Fabio Lucioni', 'Andrea Costa', 'Daniel Pavlovic',
 'Lorenzo Del Pinto', 'Danilo Cataldi', 'Gaetano Letizia',
 'Christian Puggioni', 'Gianluca Caprari', 'Marco D'Alessandro',
 'Lucas Torreira Di Pascua', 'Massimo Coda', 'Amato Ciciretti',
 'Gastón Exequiel Ramírez Pereyra', 'George Alexandru Pușcaș',
 'Federico Bonazzoli', 'Karol Linetty', 'Gianluca Di Chiara',
 'Benito Nicolas Viola', 'Karamoko Cissé', 'Filip Đuričić',
 'Andrey Galabinov', 'Miguel Luís Pinto Veloso',
 'Santiago Juan Gentiletti Selak', 'Luca Rossettini',
 'Davide Biraschi', 'Darko Lazović', 'Diego Falcinelli',
 'Andrea Bertolacci', 'Pol Mikel Lirola Kosok', 'Domenico Berardi',
 'Stefano Sensi', 'Matteo Politano', 'Francesco Magnanelli',
 'Joseph Alfred Duncan', 'Mattia Perin', 'Andrea Consigli',
 'Francesco Acerbi', 'Paolo Cannavaro', 'Federico Peluso',
 'Adel Taarabt', 'Diego Sebastián Laxalt Suárez', 'Goran Pandev',
 'Raffaele Palladino', 'Simone Missiroli', 'Antonino Ragusa',
 'Stephane Omeonga', 'Eddy Anthony Salcedo Mora',
 'Alessandro Matri', 'Ivan Radovanović', 'Massimo Gobbi',
 'Roberto Inglese', 'Bram Nuytinck', 'Simone Scuffet',
 'Lucas Nahuel Castro', 'Giuseppe Pezzella',
 'Alessandro Gamberini', 'Gabriele Angelini', 'Fabrizio Cacciatore',
 'Perparim Hetemaj', 'Dario Dainelli', 'Valter Birsa',
 'Jakub Jankto', 'Cyril Théreau', 'Manuel Pucciarelli',
 'Rodrigo Javier de Paul', 'Emil Hallfreðsson', 'Seko Fofana',
 'Kevin Lasagna', 'Molla Wagué', 'Stefano Sorrentino',
 'Samir Caetano de Souza Santos', 'Stipe Perica', 'Valon Behrami',
 'Luca Garritano', 'Nicola Rigoni', 'Sergio Pellissier',
 'Fabio Giovanni Ceravolo', 'Filip Helander', 'Ibrahima M'baye',
 'Lorenzo Crisetig', 'Lucas Pezzini Leiva', 'Boštjan Cesar',
 'Mario Sampirisi', 'Bruno Zuculini', 'Arlind Ajeti',
 'Oliver Kragl', 'Giovanni Crociata', 'Simeon Tochukwu Nwankwo',

'Milan Badelj', 'Nicola Murru', 'Cristiano Biraghi',
 'Germán Alejandro Pezzella', 'Federico Chiesa',
 'Bruno Miguel Boialvo Gaspar', 'Gianmarco Ferrari',
 'Bartosz Bereszyński', 'Ricardo Gabriel Álvarez',
 'Andrea Barzagli', 'Adrián Ricardo Centurión', 'Gianluca Lapadula',
 'Rodrigo Bentancur Colmán', 'Riccardo Montolivo',
 'Lucas Rodrigo Biglia', 'Nikola Kalinić', 'Andrea Cossu',
 'Christian Maggio', 'Jorge Luiz Frello Filho',
 'Raúl Albiol Tortajada', 'Marko Rog ',
 'Dalbert Henrique Chagas Estevão', 'Cengiz Ünder',
 'João Pedro Cavaco Cancelo', 'Danilo Larangeira',
 'Bartosz Salamon', 'Antonín Barák', 'Eros Schiavon', 'Luca Rizzo',
 'Mirco Antenucci', 'Lorenzo De Silvestri', 'Marcello Gazzola',
 'Antonio Barreca', 'Claud Adjapong', 'Simone Edera',
 'Timothy Castagne', 'Mattia Caldara', 'Timo Letschert',
 'Luca Mazzitelli', 'Ledian Memushaj', 'Luca Antei',
 'M'Baye Babacar Niang', 'Pietro Iemmello', 'Daniele Baselli',
 'Achraf Lazaar', 'Emil Krafth', 'Bruno Petković',
 'Leonardo Pavoletti', 'Marco Tumminello', 'Moise Bioty Kean',
 'Alberto Grassi', 'Kwadwo Asamoah',
 'Medhi Amine El Mouttaqi Benatia', 'Wojciech Szczęśny',
 'Stefano Sturaro', 'Federico Bernardeschi',
 'Mehdi Pascal Marcel Lérís', 'Davide Calabria',
 'Bartolomeu Jacinto Quissanga', 'Giacomo Bonaventura',
 'Luiz Felipe Ramos Marchi', 'Emiliano Viviano', 'Ivan Strinić',
 'Duván Esteban Zapata Banguera', 'Lorenzo Pellegrini',
 'Alessandro Florenzi', 'Patrik Schick', 'Mirko Antonucci',
 'Gerson Santos da Silva', 'Maximiliano Gastón López',
 'Jens Stryger Larsen', 'Aleandro Rosi',
 'Ali Adnan Kadhim Al Tameemi', 'Samuel Bastien',
 'Pierluigi Gollini', 'Fabio Depaoli', 'Riccardo Orsolini',
 'Aleksandar Tonev', 'Andrea Ranocchia',
 'Giancarlo González Castro', 'Orji Okwonkwo', 'Isaac Cofie',
 'Ervin Zukanović', 'Nicolás Federico Spolli', 'Alessandro Murgia',
 'Federico Ricci', 'Pietro Pellegrini', 'Petar Brlek',
 'Alessio Romagnoli', 'Rijad Bajić', 'Ryder Matos Santos',
 'Kristiano Samuel Armenteros Nunez Mendoza Jansson',
 'Yussif Raman Chibsah', 'Cristiano Lombardi', 'Adam Ounas',
 'Vittorio Parigini', 'Marco Ezio Fossati',
 'Héctor Alfredo Moreno Herrera', 'Luca Ceppitelli',
 'Filippo Romagna', 'Samuel Gustafson', 'Lucas Ariel Boyé',
 'Luca Vido', 'Alessandro Bastoni', 'Maxime Gonalons',
 'Niccolò Giannetti', 'Davide Biondini', 'Luca Rigoni',
 'Antonio Aldo Caracciolo', 'Enrico Bearzotti', 'Valerio Verre',
 'Vincent Laurini', 'Cristian Eduardo Zapata Valencia',
 'Felipe Dias da Silva dal Belo',
 'Lyanco Evangelista Silveira Neves Vojnović ',

'Cristian Daniel Ansaldi', 'Senna Miangue', 'Mariusz Stępiński',
 'Andreaw Rayan Gravillon', 'Leonardo Spinazzola',
 'Gianluca Mancini', 'Patricio Gabarrón Gil', 'Seung-Woo Lee',
 'Davide Di Gennaro', 'Francesco Migliore', 'Yann Karamoh',
 'Albano Benjamín Bizzarri', 'Leonardo Capezzi',
 'Angelo Esmael da Costa Júnior', 'Nikola Maksimović',
 'Berat Djimsiti', 'Riccardo Saponara',
 'Luís Carlos Almeida da Cunha', 'Maurício dos Santos Nascimento',
 'Alessandro Deiola', 'Mário Rui Silva Duarte', 'Stefan Simić',
 'Mirko Valdifiori', 'Andrija Balić', 'Dawid Kownacki',
 'Armando Izzo', 'Gregory van der Wiel',
 'Rafael de Andrade Bittencourt Pinheiro', 'Sadiq Umar',
 'Silvan Widmer', 'Alberto Brignoli', 'Bright Gyamfi',
 'Davide Santon', 'Simone Lo Faso', 'Mamadou Yaye Kanoute',
 'Luca Crosta', 'Francesco Cassata', 'Ádám Nagy',
 'César Alejandro Falletti dos Santos', 'Riccardo Meggiorini',
 'Rick Karsdorp', 'Hermes Aristóteles Romero', 'Luca Antonelli',
 'Nicholas Pierini', 'Gianluca Scamacca', 'Svante Ingelsson',
 'Nicolas Haas', 'Luigi Sepe', 'Nicolás Andrés Burdisso',
 'Mattia De Sciglio', 'Felipe Anderson Pereira Gomes',
 'Rogério Oliveira da Silva', 'Gianluca Gaudino',
 'Benedikt Höwedes', 'Enrico Brignola', 'Edoardo Goldaniga',
 'Franco Zuculini', 'Paweł Jaroszyński',
 'Emerson Palmieri dos Santos', 'Simone Calvano',
 'Nikola Milenković', 'Lubomír Tupta', 'Giuseppe Rossi',
 'Gianfilippo Felicioli', 'Jean-Claude Billong', 'Mattia Bani',
 'Guilherme Costa Marques', 'Blerim Džemaili', 'Ahmed Benali',
 'Thiago Rangel Cionek', 'Boukary Dramé',
 'Sandro Ranieri Guimarães Cordeiro', 'Leandro Castán da Silva',
 'Charalampos Lykogiannis', 'Jagoš Vuković', 'Alex Meret',
 'Rafael Alcântara do Nascimento', 'Michele Rigione',
 'Felipe Nicolás Avenatti Dovillabichus',
 'Pedro Miguel Almeida Lopes Pereira', 'Oscar Hiljemark',
 'Iuri José Picanço Medeiros', 'Francesco Zampano',
 'Rolando Aarons', 'Mauricio Lemos Merladet', 'Musa Barrow',
 'Bacary Sagna', 'Lisandro Ezequiel López', 'Lorenzo Tonelli',
 'Everton Luiz Guimaraes Bilher', 'Lorenco Šimić', 'Kwang-Song Han',
 'Alin Dorinel Toșca', 'Cheick Tidiane Diabaté', 'Bryan Dabo',
 'Deian Boldor', 'Andrea Pinamonti', 'Simone Romagnoli',
 'Joachim Andersen', 'Damir Ceter Valencia', 'Kevin Bonifazi',
 'Niccolò Zanelato', 'Alessandro Buongiorno', 'Marco Silvestri',
 'Giovanni Volpicelli', 'Christian Dell'Orco', 'Matteo Bianchetti',
 'Antonio Santurro', 'Mattia Vitale', 'Simone Pontisso',
 'Gianluca Pegolo', 'Moussa Diaby', 'Cheick Keita',
 'Fabrizio Caligara', 'Jawad El Yamiq', 'Bartłomiej Dragowski',
 'Andrea Danzi', 'Jonathan Cristian Silva', 'Luca Sparandeo',
 'Elio Capradossi', 'Ognjen Stijepović', 'Eugenio Lamanna',


```
'Siriki Sanogo', 'Francesco Rossi', 'Oliva Christian Rutjens',
'Emanuele Torrasi', 'Carlo Pinsoglio', 'Łukasz Skorupski',
'Vanja Milinković-Savić'], dtype=object)
```

```
[21]: players_france = spadl['France']['player_name'].unique()
print("Número de jogadores na Ligue 1:", len(players_france))
players_france
```

Número de jogadores na Ligue 1: 542

```
[21]: array(['Baptiste Guillaume', 'Romain Thomas', 'Vincent Manceau',
'Lukas Lerager', 'Younousse Sankharé', 'Alexandre Letellier',
'Ismaël Traoré', 'Baptiste Santamaria', 'Vukašin Jovanović',
'Jérémy Toulalan', 'Benoît Costil', 'Valentín Vada',
'Youssef Sabaly', 'Malcom Filipe Silva de Oliveira',
'Pierrick Capelle', nan, 'Théo Pellenard', 'Thomas Mangani',
'François Kamano', 'Gilles Sunu', 'Lassana Coulibaly',
'Angelo Fulgini', 'Alexandre Mendy', 'Karl Toko Ekambi',
'Flavien Tait', 'Jaroslav Plašil', 'Mateo Pavlović',
'Gaëtan Laborde', 'Thomas Touré', 'Emiliano Sala',
'Préjuce Nguimbé Nakoulma', 'Diego Carlos Santos Silva',
'Júnior Osmar Ignacio Alonso Mujica',
'Luiz de Araújo Guimarães Neto', 'Nicolas de Roussel de Préville',
'Valentin Rongier', 'Abdoulaye Touré', 'Alexander Kačaniklić',
'Mike Maignan', 'Fodé Ballo Touré', 'Lévy Koffi Djidji',
'Nicolas Pallois', 'Thiago Henrique Mendes Ribeiro',
'Edgar Miguel Ié', 'Ibrahim Amadou', 'Kévin Malcuit',
'Yassine Benzia', 'Léo Dubois', 'Anwar El Ghazi', 'Maxime Dupé',
'Jules Iloki', 'Rominigue Kouamé N'Guessan', 'Adrien Thomasson',
'Guillaume Gillet', 'Ezequiel Ponce Martínez',
'Chidozie Collins Awaziem', 'Thiago Maia Alencar', 'Idriss Saadi',
'Jonas Martin', 'Kenny Lala', 'Fernando Marçal de Oliveira',
'Memphis Depay', 'Jean Eudès Aholou', 'Sergi Darder Moll',
'Mariano Díaz Mejía', 'Bertrand Isidore Traoré',
'Bingourou Kamara', 'Rafael Pereira da Silva', 'Yoann Salmier',
'Marcelo Antônio Guedes Filho', 'Dimitri Liénard',
'Pablo Martinez', 'Abdou Kader Mangane', 'Benjamin Corgnet',
'Lucas Tousart', 'Jérémy Morel', 'Nabil Fekir',
'Nuno Miguel da Costa Jôia', 'Anthony Lopes', 'Myziane Maolida',
'Anthony Gonçalves', 'Ihsan Sacko', 'Gnaly Maxwell Cornet',
'Stéphane Bahoken', 'Jordan Ferri', 'Jordan Marié',
'Wesley Lautoa', 'Chang-Hoon Kwon', 'Luiz Gustavo Dias',
'Morgan Sanson', 'Florian Thauvin', 'Maxime Lopez', 'Patrice Evra',
'Oussama Haddadi', 'Hiroki Sakai', 'Baptiste Reynet',
'Steve Mandanda', 'Adil Rami', 'Rolando Jorge Pires da Fonseca',
'Valentin Rosier', 'Naïm Sliti', 'Romain Amalfitano',
'Dimitri Payet', 'Cédric Yamberé', 'Wesley Saïd',
'Valère Germain', 'Cédric Varrault', 'Benjamin Jeannot',
```

'Clinton Mua N'Jie', 'Frédéric Sammaritano',
 'André-Frank Zambo Anguissa', 'Florent Balmont', 'Grégory Sertic',
 'Renaud Cohade', 'Milan Biševac', 'Benoît Assou-Ekotto',
 'Fallou Diagne', 'Simon Falette', 'Gerónimo Gastón Poblete',
 'Yann Jouffre', 'Iván Balliu Campeny', 'Nolan Roux', 'Lucas Deaux',
 'Jérémy Sorbon', 'Jordan Ikoko', 'Lebogang Phiri',
 'Christophe Kerbrat', 'Pedro Miguel Braga Rebocho',
 'Abdoul Razzagui Camara', 'Thomas Didillon', 'Karl-Johan Johnsson',
 'Marcus Coco', 'Gauthier Hein', 'Yannis Salibur', 'Jimmy Briand',
 'Ludovic Blas', 'Ibrahima Niane', 'Florent Mollet',
 'Moustapha Elhadji Diallo', 'Habibou Mouhamadou Diallo',
 'Radamel Falcao García Zárate', 'João Filipe Iria Santos Moutinho',
 'Djibril Sidibé', 'Kamil Glik', 'Jemerson de Jesus Nascimento',
 'Fábio Henrique Tavares', 'Jacques François Moubandje',
 'Corentin Jean', 'Marcos Paulo Mesquita Lopes', 'Jimmy Durmaz',
 'Andy Delort', 'Christopher Jullien',
 'Jorge Marco de Oliveira Moraes', 'Thomas Lemar', 'Alban Lafont',
 'Kelvin Amian Adou', 'Ibrahim Sangaré', 'Danijel Subašić',
 'Kylian Mbappé Lottin', 'Steeve Yago', 'Zinédine Machach',
 'Alexis Blin', 'Guido Marcelo Carrillo',
 'Wergiton do Rosário Calmon', 'Yann Bodiger', 'Yaya Sanogo',
 'Allan Saint-Maximin', 'Youri Tielemans', 'Souleymane Camara',
 'Kévin Bérigaud', 'Paul Lasne', 'Jérôme Roussillon',
 'Daniel Congré', 'Pedro Filipe Teodósio Mendes',
 'Nordi Mukiele Mulere', 'Alexander Djiku', 'Hervé Bazile',
 'Julien Féret', 'Vincent Bessat', 'Ivan Santini',
 'Romain Genevois', 'Benjamin Lecomte', 'Ellyes Skhiri',
 'Isaac Mbenza', 'Nanitamio Jonathan Ikoné', 'Rémy Vercoutre',
 'Bel Durel Avounou', 'Frédéric Guilbert', 'Ronny Rodelin',
 'Jonathan Delaplace', 'Rodrigue Casimir Ninga',
 'Christian Kouakou Yao', 'Stef Peeters', 'Stéphane Sessègnon',
 'Adama Mbengue', 'Seybou Koita', 'Daniel Alves da Silva',
 'Thiago Motta', 'Marcos Aoás Corrêa', 'Mathieu Bodmer',
 'Prince-Désir Gouano', 'Oualid El Hajjam',
 'Tanguy Ndombélé Alvaro', 'Issa Cissokho',
 'Abdul Khaled Akiola Adénon', 'Thomas Monconduit',
 'Marco Verratti', 'Adrien Rabiot', 'Thiago Emiliano da Silva',
 'Ángel Fabián di María Hernández', 'Layvin Kurzawa',
 'Alphonse Aréola', 'Javier Matías Pastore', 'Guessouma Fofana',
 'Régis Gurtner', 'Edinson Roberto Cavani Gómez',
 'Harisson Manzala', 'Presnel Kimpembe', 'Charly Charrier',
 'Blaise Matuidi', 'Emmanuel Bourgaud', 'Brighton Labeau',
 'Gonçalo Manuel Ganchinho Guedes', 'Alassane Pléa', 'Rémi Walter',
 'Dante Bonfim da Costa Santos', 'Yoan Cardinale',
 'Maxime Le Marchand', 'Oussama Tannane', 'Saidy Janko',
 'Ole Kristian Selnæs', 'Valentin Eysseric',
 'Assane Dioussé El Hadji', 'Stéphane Ruffier', 'Loïc Perrin',

'Kévin Théophile Catherine', 'Jonathan Bamba', 'Romain Hamouma',
 'Arnaud Souquet', 'Malang Sarr', 'Bassem Srarfi',
 'Vincent Koziello', 'Ronaël Pierre-Gabriel', 'Bryan Dabo',
 'Pierre Lees Melou', 'Vincent Marcel', 'Loïs Diony',
 'Jean-Victor Makengo', 'Rayan Souici', 'Adrien Tameze',
 'Adama Niane', 'Benjamin Nivet', 'Benjamin Bourigeaud',
 'Benjamin André', 'Ramy Bensebaini', 'Mamadou Samassa',
 'Tristan Dingomé', 'Karim Azamoum',
 'Christ Emmanuel Faitout Maouassa', 'Ludovic Baal',
 'Abdoulaye Diallo', 'Joris Gnagnon', 'Adrien Hunou',
 'Hamari Traoré', 'Oswaldo Augusto Vizcarrondo Araújo',
 'Christopher Hérelle', 'Stéphane Darbion', 'Johann Obiang',
 'Mathieu Deplagne', 'Ismaila Sarr', 'Samuel Grandsir',
 'Firmin Ndombe Mubele', 'James Edward Lea Siliki', 'Jordan Tell',
 'Saïf-Eddine Khaoui', 'Bryan Pelé', 'Jonathan Tinhan',
 'Gaël Kakuta', 'Yoann Andreu', 'Enzo Crivelli', 'Bakaye Dibassy',
 'Mamadou Jean-Luc Diarra Dompé', 'Guy Adolphe N'Gosso Massouma',
 'Chris Philipps', 'Jonathan Rivierez', 'Opa Nguette',
 'Moussa Niakhaté', 'Jonathan Renato Barbosa', 'Damien Da Silva',
 'Digbo G'nampa Habib Maïga', 'Gabriel Moisés Antunes da Silva',
 'Ádám Lang', 'Arnold Bouka Moutou', 'Adama Diakhaby',
 'Fouad Chafik', 'Gil Bastião Dias', 'Étienne Didot',
 'Neymar da Silva Santos Junior', 'Marcus Thuram',
 'Lucas Pedro Alves De Lima', 'Yacine Bammou',
 'Anton Ciprian Tătărușanu', 'Samuel Moutoussamy',
 'Lucas Ariel Ocampos', 'Rémy Cabella', 'Jean Michaël Seri',
 'François Bellugou', 'Charles Traoré', 'Hicham Mahou',
 'Christophe Jallet', 'Alois Confais', 'Edson André Siteo',
 'Kenny Tete', 'Yves Bissouma', 'Jérémy Grimm', 'Yannick Cahuzac',
 'Ola Toivonen', 'Clément Michelin', 'Giovanni-Guy Yann Sio',
 'Ruben Aguilar', 'Nicolas Pépé', 'Youssef Aït Bennasser',
 'Kouakou Hervé Koffi', 'Imad Faraj', 'Mouctar Diakhaby',
 'Jordan Amavi', 'Bouna Sarr', 'Matheus Dória Macedo',
 'Ablie Jallow', 'Carlos Miguel Ribeiro Dias', 'Rachid Ghezzal',
 'Matthieu Udol', 'Facundo Julián Píriz González', 'Keagan Dolly',
 'Wesley Sneijder', 'Mario Barwuah Balotelli', 'Issa Diop',
 'Max-Alain Gradel', 'Giovani Lo Celso', 'Julian Draxler',
 'Morgan Amalfitano', 'Júlio Tavares', 'Dylan Bahamboula',
 'Julien Ielsch', 'Moussa Konaté', 'Hernani Azevedo Júnior',
 'Andrei Girotto', 'David Alcibiade', 'Anthony Walongwa',
 'Mariusz Stępiński', 'Najib Gandi', 'Yassine El Ghanassy',
 'Wilfride Kanga Aka', 'Miguel Ângelo da Silva Rocha',
 'Otávio Henrique Passos Santos', 'Eiji Kawashima',
 'Emmanuel Imorou', 'Brian Leonel Fernández',
 'Salomon Junior Sambisa', 'Martin Terrier',
 'Jonathan Martins-Pereira', 'Nicolas Benezet', 'Tomáš Hubočan',
 'Almamy Touré', 'Kalifa Coulibaly', 'Ferland Mendy',

'Houssem Aouar', 'Thomas Meunier', 'Vincent Pajot', 'Léo Lacroix',
 'Yuri Berchiche Izeta', 'Raïs M'Bolhi Ouhab', 'Nicolas Janvier',
 'Papiss Mison Djilobodji', 'Jan Repas',
 'Christopher Martins Pereira', 'Felix Eboa Eboa', 'Gerzino Nyamsi',
 'Wahbi Khazri', 'Tomáš Koubek', 'Aymen Abdenmour', 'Sanjin Prcić',
 'Emmanuel Rivière', 'Mathieu Dossevi',
 'Lucas Rodrigues Moura da Silva', 'Christopher Nkunku',
 'Vitorino Hilton da Silva', 'Marlon Santos da Silva Barbosa',
 'Stevan Jovetić', 'Ignatius Kpene Ganago', 'Nampalys Mendy',
 'Abdoulaye Bamba', 'Mehdi Jean Tahrat', 'Serge Gakpé',
 'Bongani Zungu', 'Jeremy Blayac', 'Lacina Traoré',
 'Gilbert Gianelli Imbula Wanga', 'Issiaga Sylla', 'Yohann Pelé',
 'Nathan Allan de Souza', 'Kévin Monnet-Paquet', 'Farès Bahloul',
 'Bakary Koné', 'Diego Benaglio', 'Ernest Seka', 'Keita Baldé Diao',
 'Soualiho Meité', 'Hyun-Jun Suk', 'Danilo Fernando Avelar',
 'Baïssama Sankoh', 'Clément Grenier', 'Willem Geubbels',
 'Driss Khalid', 'Jimmy Giraudon', 'Jérémy Cordoval',
 'Alexander Toft Söderlund', 'Enock Kwateng', 'Rene Krhin',
 'Quentin Cornette', 'Igor Lewczuk', 'Michaël Jordan Nkololo',
 'Mathieu Michel', 'Franck Tabanou',
 'Afonso Mendes Ribeiro Figueiredo', 'Sloan Privat',
 'Chaouki Ben Saada', 'Adama Traoré', 'Mapou Yanga-Mbiwa',
 'Terence Kongolo', 'Gabriel Boschilia', 'Lilian Fournier',
 'Konstantinos Mitroglou', 'Saliou Ciss', 'Mehdi Abeid',
 'Andrea Raggi', 'Arnaud Lusamba', 'Dimitri Foulquier',
 'Hamza Mendyl', 'Yoel Armougom', 'Boubacar Kamara',
 'Vincent Thill', 'Brandon Thomas Llamas', 'Jérémy Gelin',
 'Patrick Burner', 'Walter Daniel Benítez', 'Cheikh M'Bengue',
 'Jessy Deminguet', 'Ismaël Tiémoko Diomandé', 'Nicolas Basin',
 'Boubakary Soumaré', 'Morgan Poaty', 'Quentin Boisgard',
 'Milan Gajić', 'Romain Danzé', 'Florentin Pogba',
 'Vincent Nogueira', 'Sekou Baradji', 'Olivier Verdon',
 'Billy Ketkeophomphone', 'Nicolas Louis Marcel Cozza',
 'Amine Gouiri', 'Mehdi Zeffane', 'Yoann Gourcuff',
 'Bakary Adama Soumaoro', 'Anthony Ribelin', 'Séga Coulibaly',
 'Vagner José Dias Gonçalves', 'Ervin Taha', 'Zaydou Youssouf',
 'Kevin N'Doram', 'Kevin Trapp', 'Loïc Puyo', 'Santy Ngom',
 'Alexandre Oukidja', 'Thomas Carrique', 'Julian Palmieri',
 'Vahid Selimovic', 'Maxime Poundjé', 'Jérôme Prior',
 'Jessy Moulin', 'Landry Bonnefoi', 'George Gope-Fenepej',
 'Vincent Rüfli', 'Stanley Nsoki', 'Brice Samba',
 'Georges Constant Mandjeck', 'Danijel Miličević',
 'Ludovic Butelle', 'Jean-Christophe Bouet', 'Wylan Cyprien',
 'Henri Bedimo Nsamè', 'Robert Berić', 'Jules Koundé',
 'Paul Baysse', 'John Stiven Mendoza Valencia', 'Prince Oniangue',
 'Timo Stavitski', 'Yeni Atito N'Gbakoto', 'Thibault Giresse',
 'Yann M'Vila', 'Eden Massouema', 'Quentin Beunardeau',

```
'Farid Boulaya', 'Pablo Nascimento Castro', 'Racine Coly',
'Paul-Georges Ntep de Madiba', 'Romain Perraud', 'Erwin Zelazny',
'Kouadio Yves Dabila', 'Neven Subotić',
'Gabriel dos Santos Magalhães', 'Mathieu Debuchy',
'Lassana Diarra', 'Seydou Sy', 'Diafra Sakho',
'Martin Braithwaite', 'Jeff Reine-Adelaide', 'Lebo Mothiba',
'Diego Contento', 'Pietro Pellegrini', 'Joris Kayembe Ditu ',
'Bryan Mbeumo', 'Dylan Lempereur', 'Mathieu Gorgelin',
'Kévin Lucien Zohi', 'Timothy Weah', 'Abdallah N'Dour',
'Steven Fortès', 'Pape Cheik Diop Gueye', 'Mickaël Le Bihan',
'Moussa Sylla', 'Julien Serrano',
'Adrián Luciano Santos Sahibeddine', 'Enzo Loiodice',
'Jordi Mboula Queralt', 'Ambroise Oyongo Bitolo',
'Lemouya Goudiaby', 'Kolbeinn Sigþórsson', 'Kevin Rimane',
'Yacine Adli', 'Jérémy Porsan-Clemente'], dtype=object)
```

1.2.2 Número médio de ações por jogo em cada liga

Observações - Mais ou menos o mesmo número médio de ações por jogo.

```
[22]: spadl['England'].groupby('game_id').size().mean()
```

```
[22]: 1273.4184210526316
```

```
[23]: spadl['Spain'].groupby('game_id').size().mean()
```

```
[23]: 1249.2684210526315
```

```
[24]: spadl['Germany'].groupby('game_id').size().mean()
```

```
[24]: 1271.735294117647
```

```
[25]: spadl['Italy'].groupby('game_id').size().mean()
```

```
[25]: 1304.928947368421
```

```
[26]: spadl['France'].groupby('game_id').size().mean()
```

```
[26]: 1254.6973684210527
```

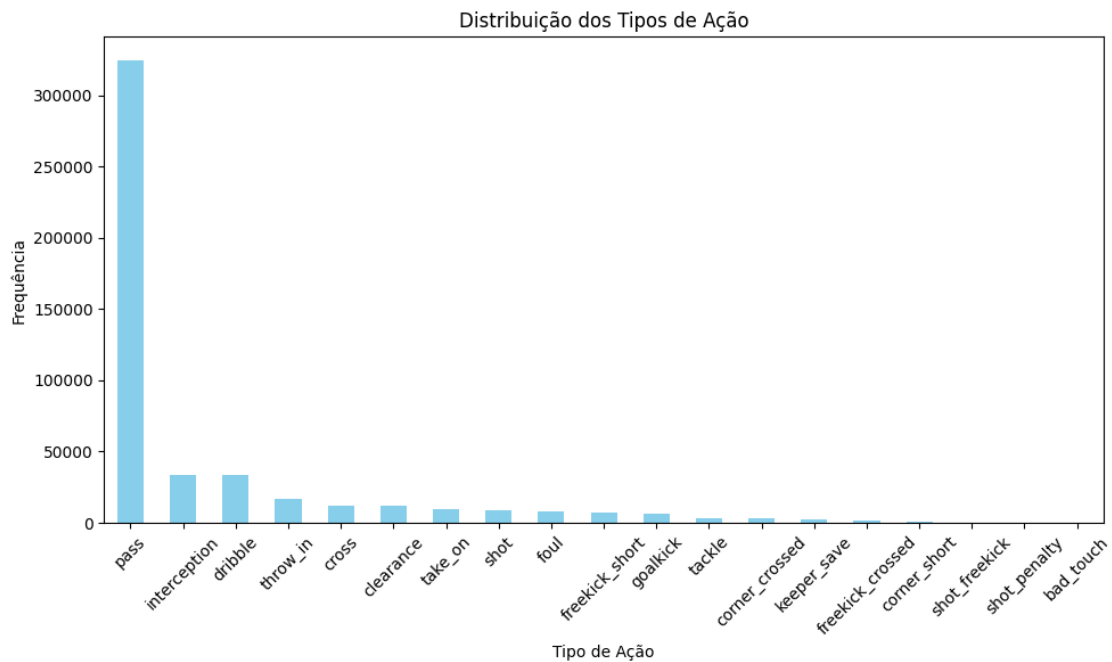
1.2.3 Distribuição dos Tipos de Ação

Histograma com a frequência de cada tipo de ação existente nos dados analisados.

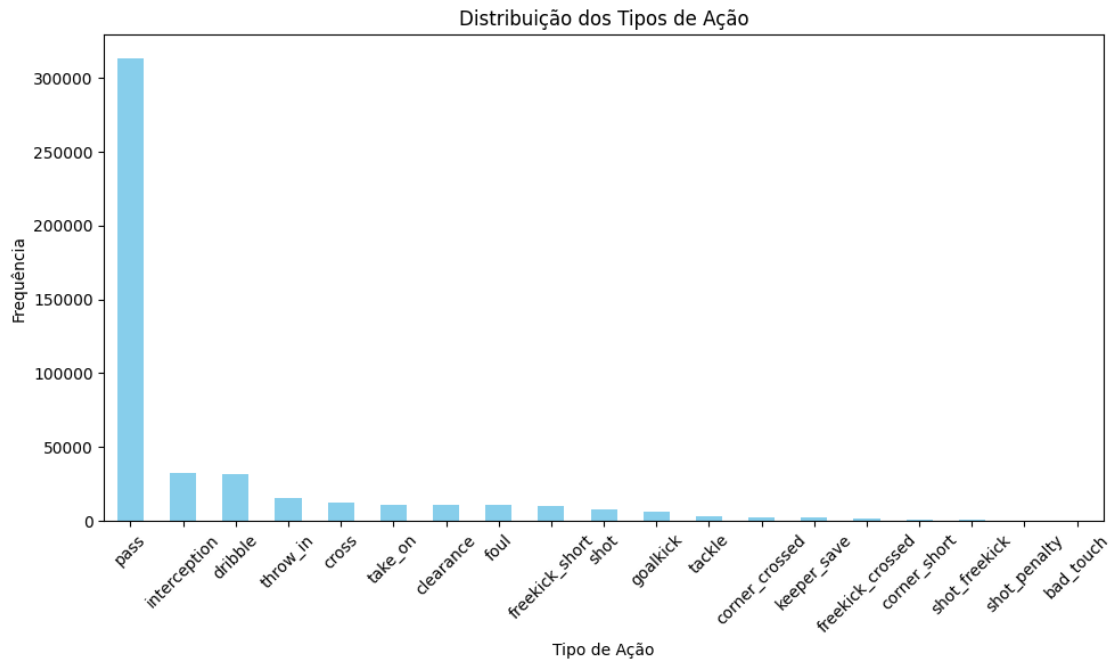
Observações: - Passe é a ação mais comum; - Alternância, a depender da liga, entre interceptações e bolas carregadas como segundo tipo de ação mais realizada; - Ocorrências menos frequentes de lançamentos, cruzamentos, “chutes” e desarmes.

```
[27]: def plot_action_counts(action_counts):
plt.figure(figsize=(10, 6))
action_counts.plot(kind='bar', color='skyblue')
plt.title('Distribuição dos Tipos de Ação')
plt.xlabel('Tipo de Ação')
plt.ylabel('Frequência')
plt.xticks(rotation=45)
plt.tight_layout()
plt.show()
```

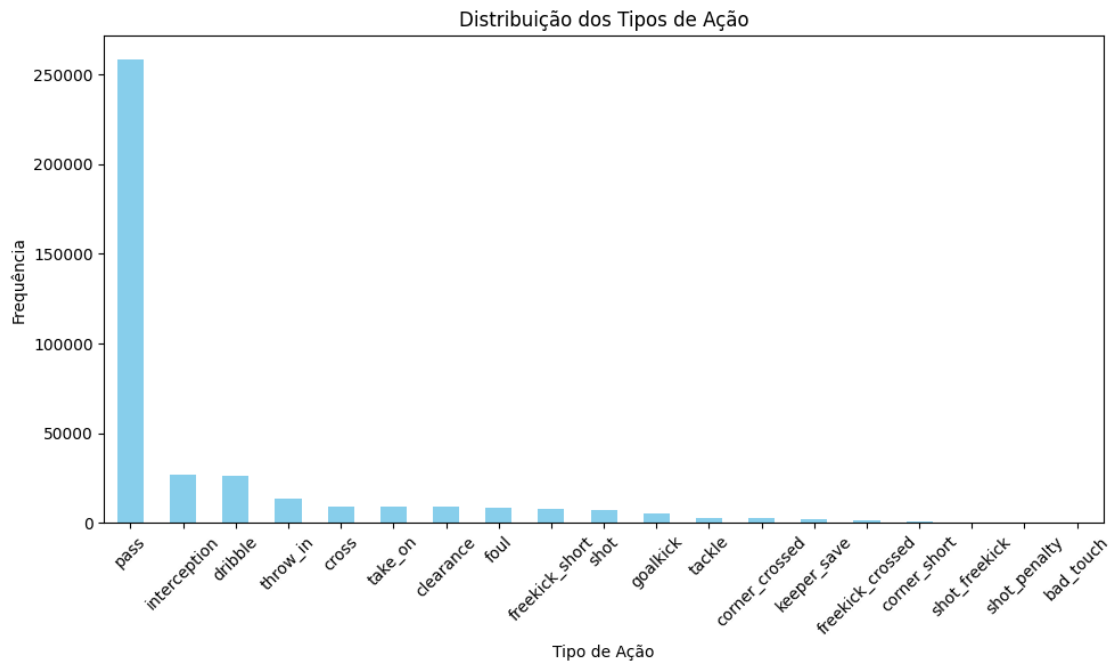
```
[28]: plot_action_counts(spadl['England']['type_name'].value_counts())
```



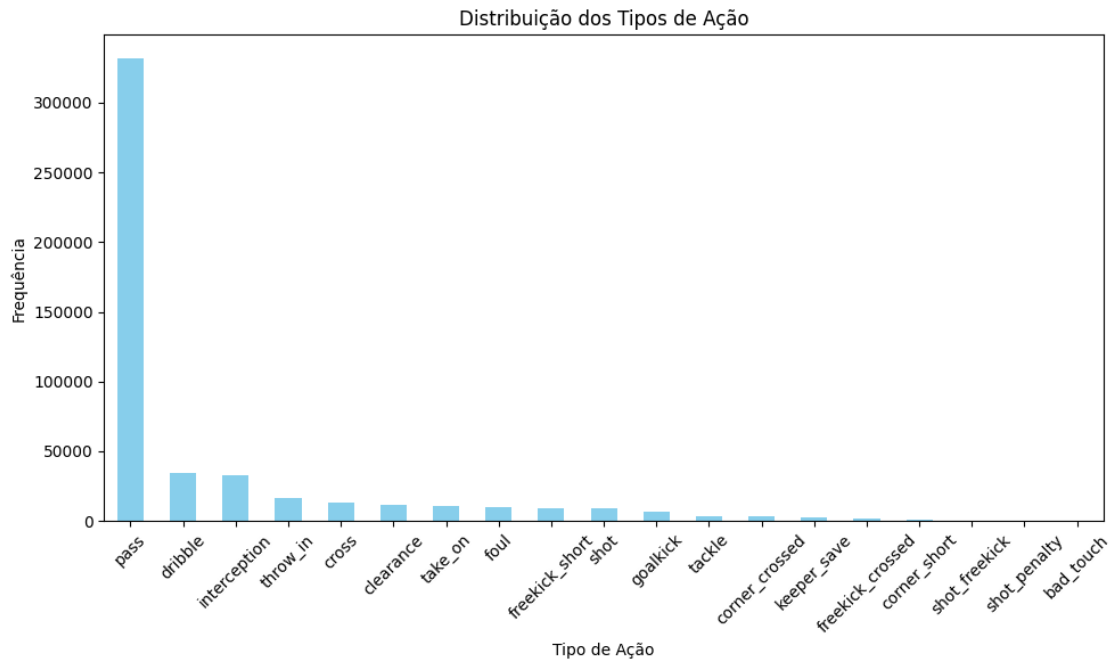
```
[29]: plot_action_counts(spadl['Spain']['type_name'].value_counts())
```



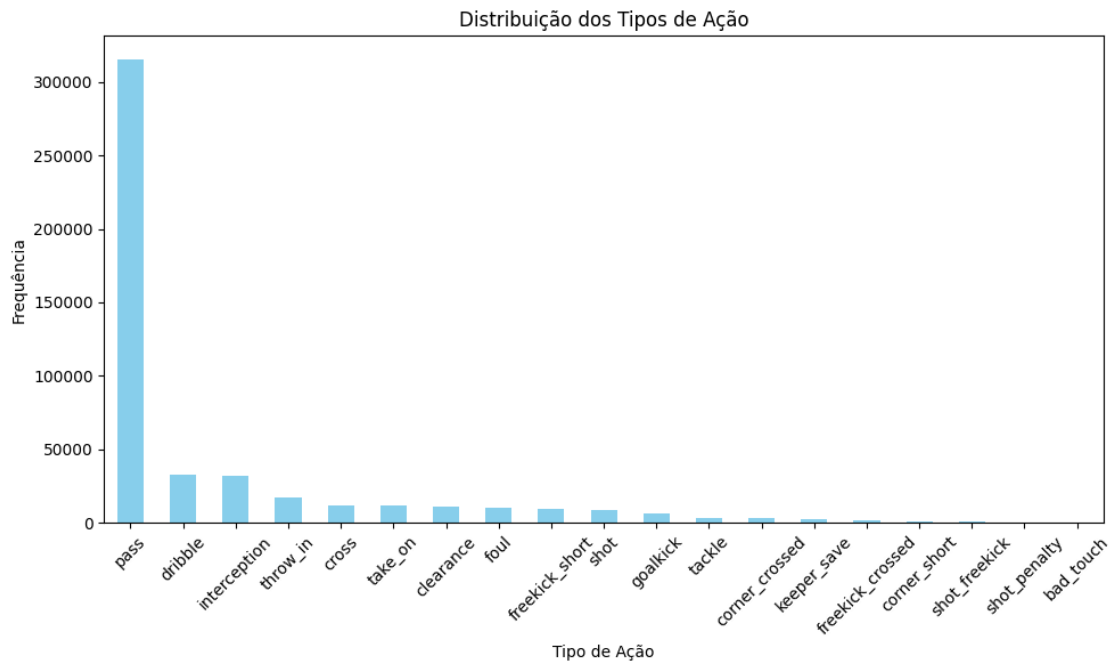
```
[30]: plot_action_counts(spadl['Germany']['type_name'].value_counts())
```



```
[31]: plot_action_counts(spadl['Italy']['type_name'].value_counts())
```



```
[32]: plot_action_counts(spadl['France']['type_name'].value_counts())
```



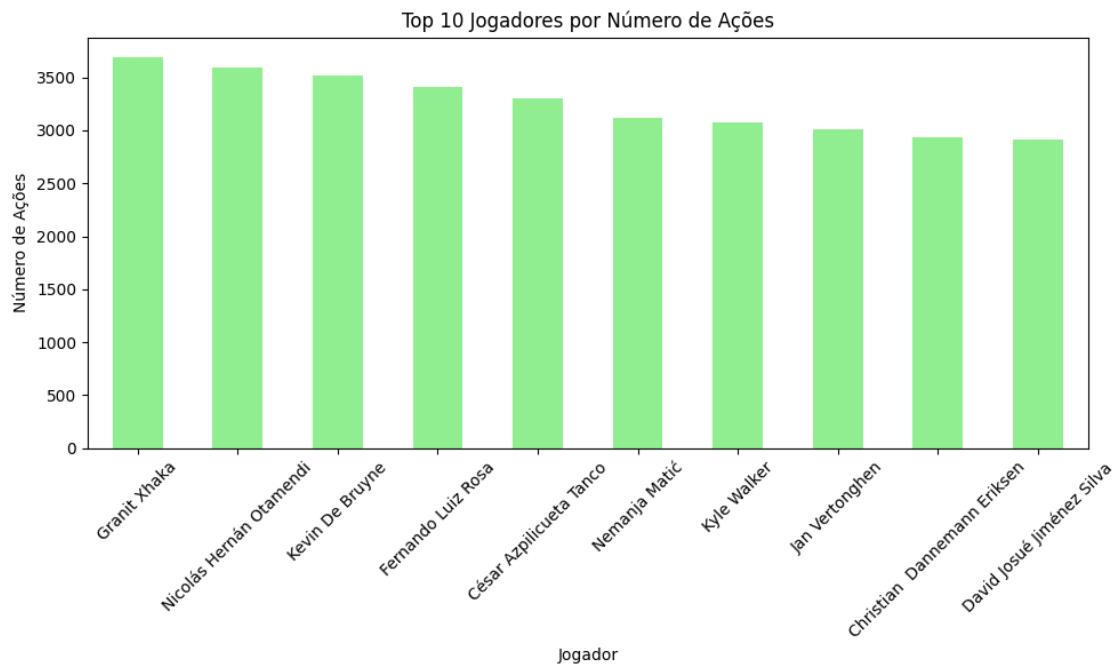
1.2.4 Ações por Jogador

Top 10 jogadores com mais ações registradas na liga.

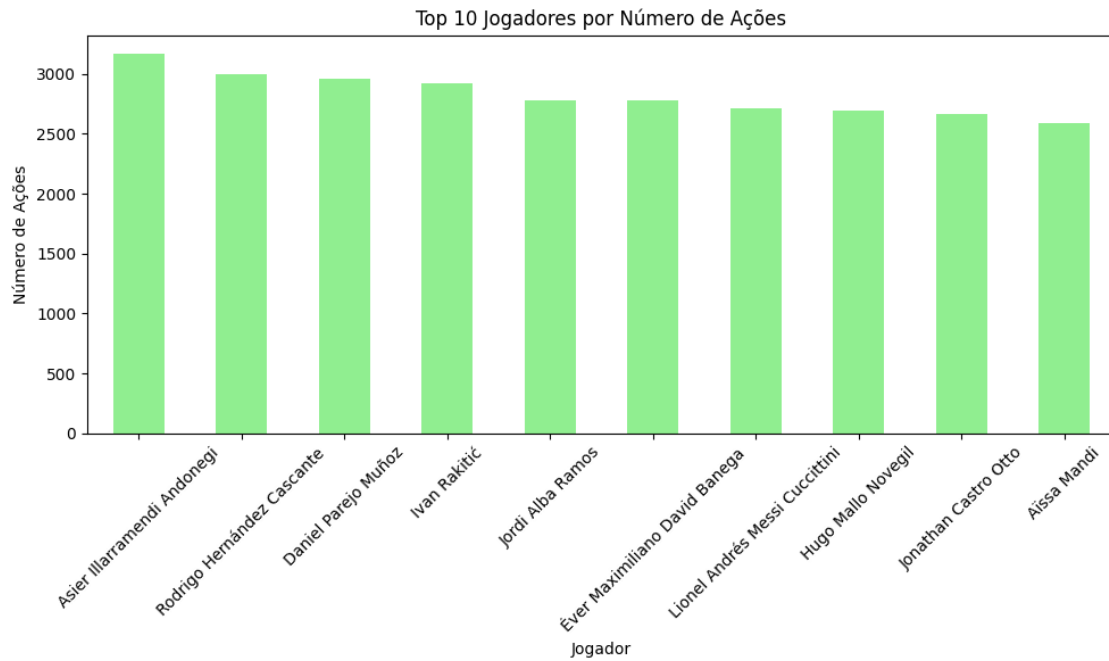
Observações: - Os jogadores mais participativos são, em geral, meio campistas ou jogadores muito importantes do time; - O número de ações parece flutuar pouco.

```
[33]: def plot_top_active_players(top_players):  
    plt.figure(figsize=(10, 6))  
    top_players.plot(kind='bar', color='lightgreen')  
    plt.title('Top 10 Jogadores por Número de Ações')  
    plt.xlabel('Jogador')  
    plt.ylabel('Número de Ações')  
    plt.xticks(rotation=45)  
    plt.tight_layout()  
    plt.show()
```

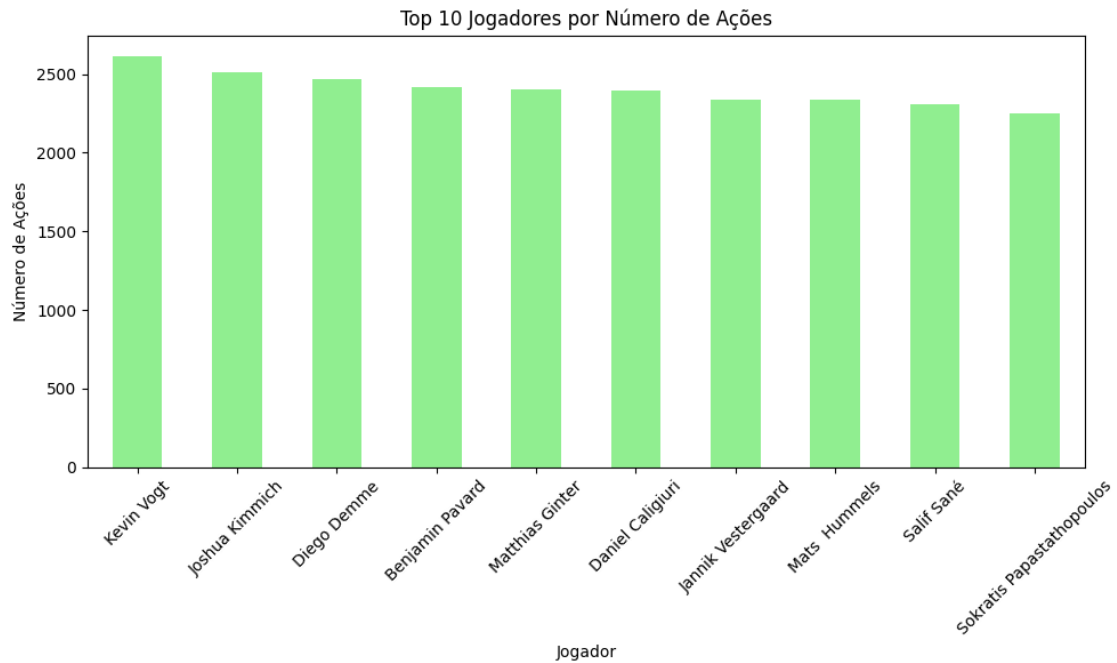
```
[34]: plot_top_active_players(spadl['England']['player_name'].value_counts().head(10))
```



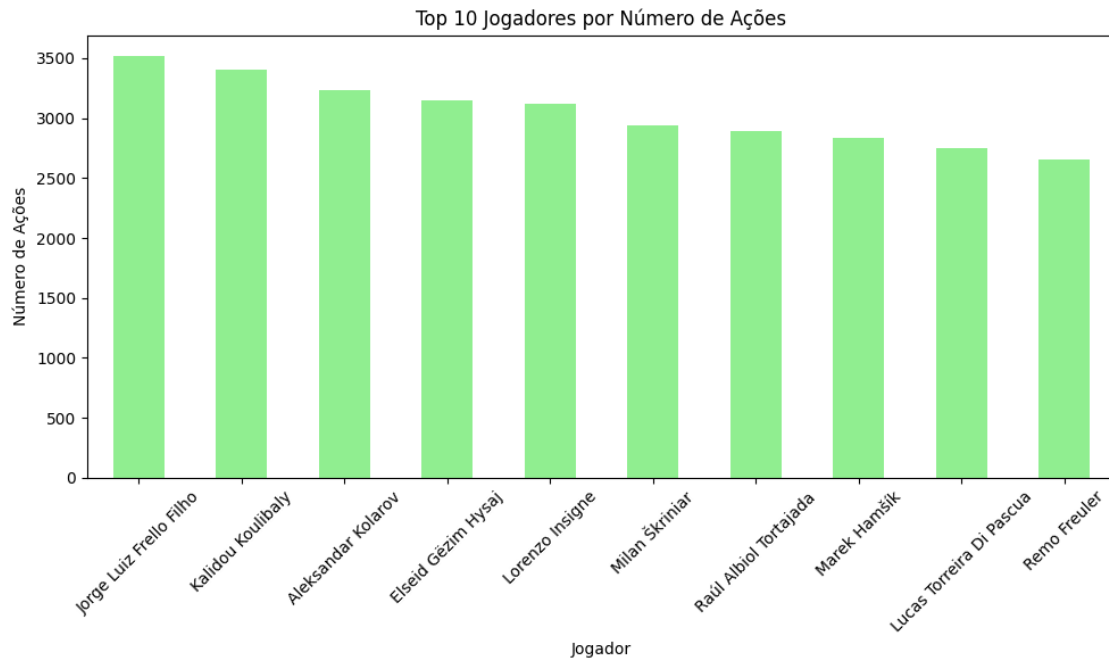
```
[35]: plot_top_active_players(spadl['Spain']['player_name'].value_counts().head(10))
```



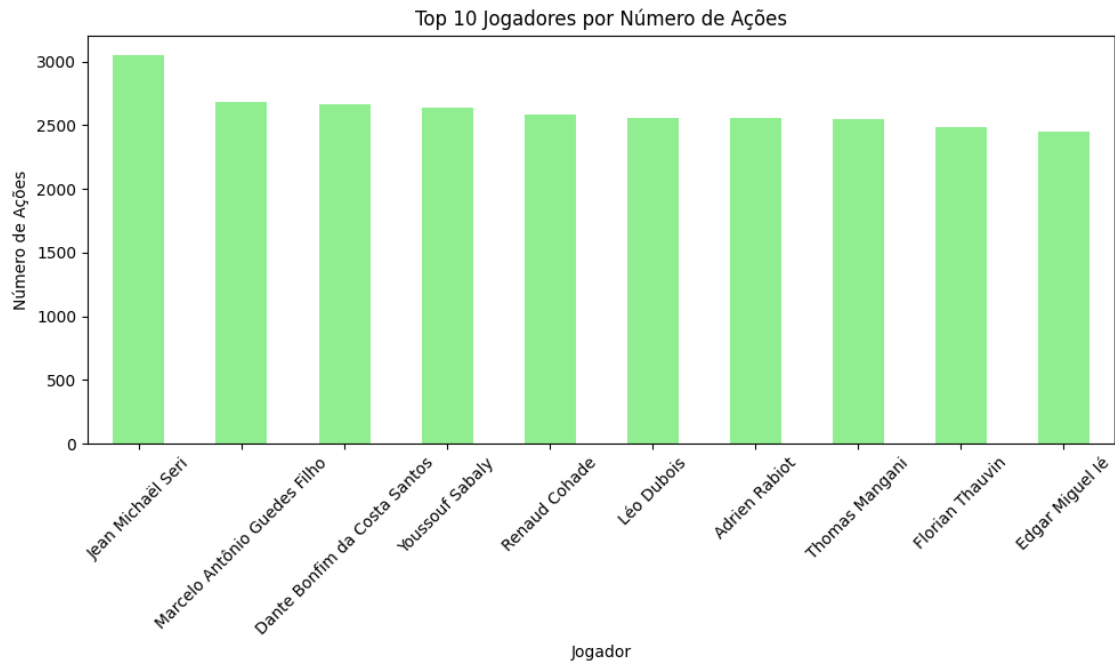
```
[36]: plot_top_active_players(spadl['Germany']['player_name'].value_counts().head(10))
```



```
[37]: plot_top_active_players(spadl['Italy']['player_name'].value_counts().head(10))
```



```
[38]: plot_top_active_players(spawl['France']['player_name'].value_counts().head(10))
```



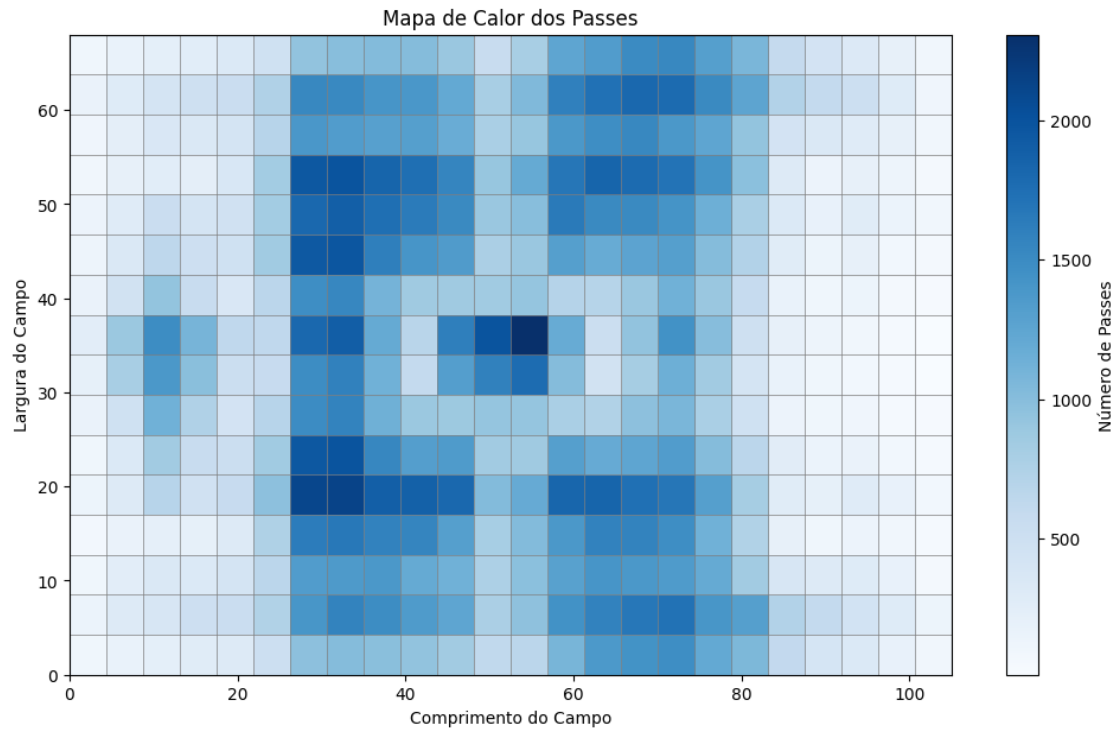
1.2.5 Mapa de Calor dos Passes

Mapa de calor dos passes em função das áreas do campo.

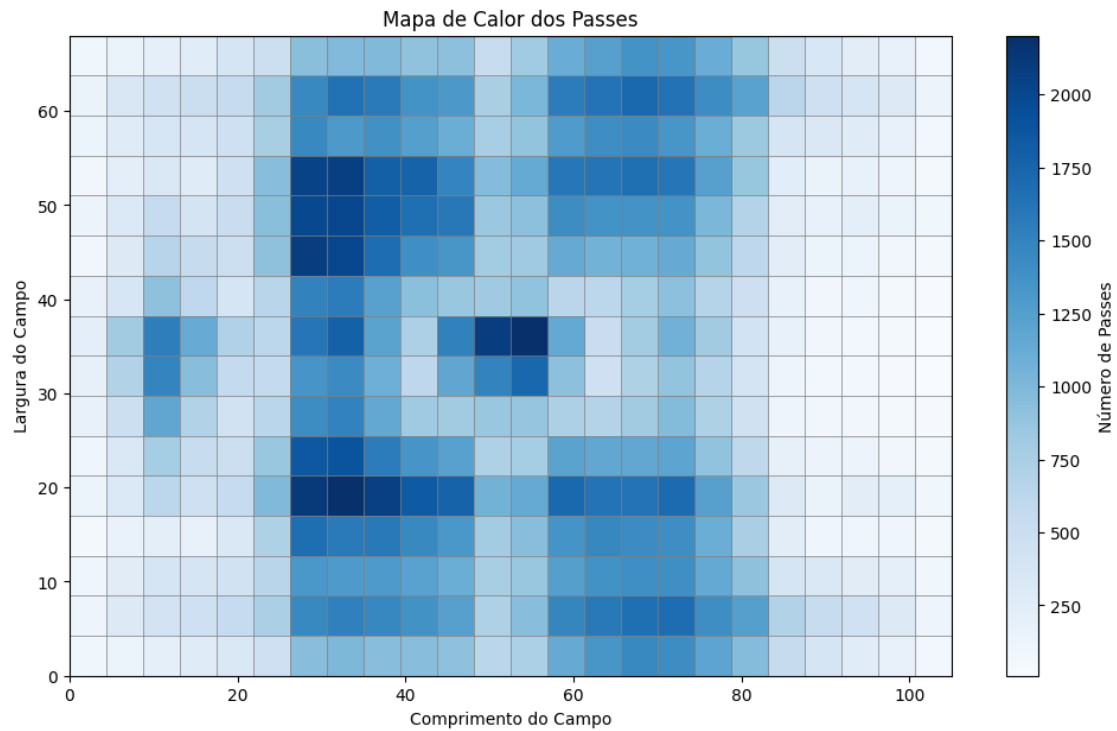
Observações: - A troca de passes nas 5 ligas segue mais ou menos a mesma distribuição pelo campo;
- Pouca troca de passe na área adversária; - Parece comum a existência de um jogador no meio do campo que distribui e conecta a bola entre a defesa e o ataque.

```
[39]: def plot_pass_heatmap(passes):  
    n_x, n_y = 24, 16  
    x_bins = np.linspace(0, 105, n_x + 1)  
    y_bins = np.linspace(0, 68, n_y + 1)  
  
    # Conta quantos passes começaram em cada quadrante  
    heatmap, _, _ = np.histogram2d(passes['start_y'], passes['start_x'],  
    ↪bins=[y_bins, x_bins])  
  
    # Plot  
    fig, ax = plt.subplots(figsize=(12, 7))  
    im = ax.imshow(heatmap, cmap='Blues', origin='lower', extent=[0, 105, 0, 68],  
    ↪aspect='auto')  
  
    # Adiciona a grade  
    for x in x_bins:  
        ax.axvline(x, color='gray', linewidth=0.5)  
    for y in y_bins:  
        ax.axhline(y, color='gray', linewidth=0.5)  
  
    # Rótulos e título  
    ax.set_title('Mapa de Calor dos Passes')  
    ax.set_xlabel('Comprimento do Campo')  
    ax.set_ylabel('Largura do Campo')  
    fig.colorbar(im, ax=ax, label='Número de Passes')  
    plt.show()
```

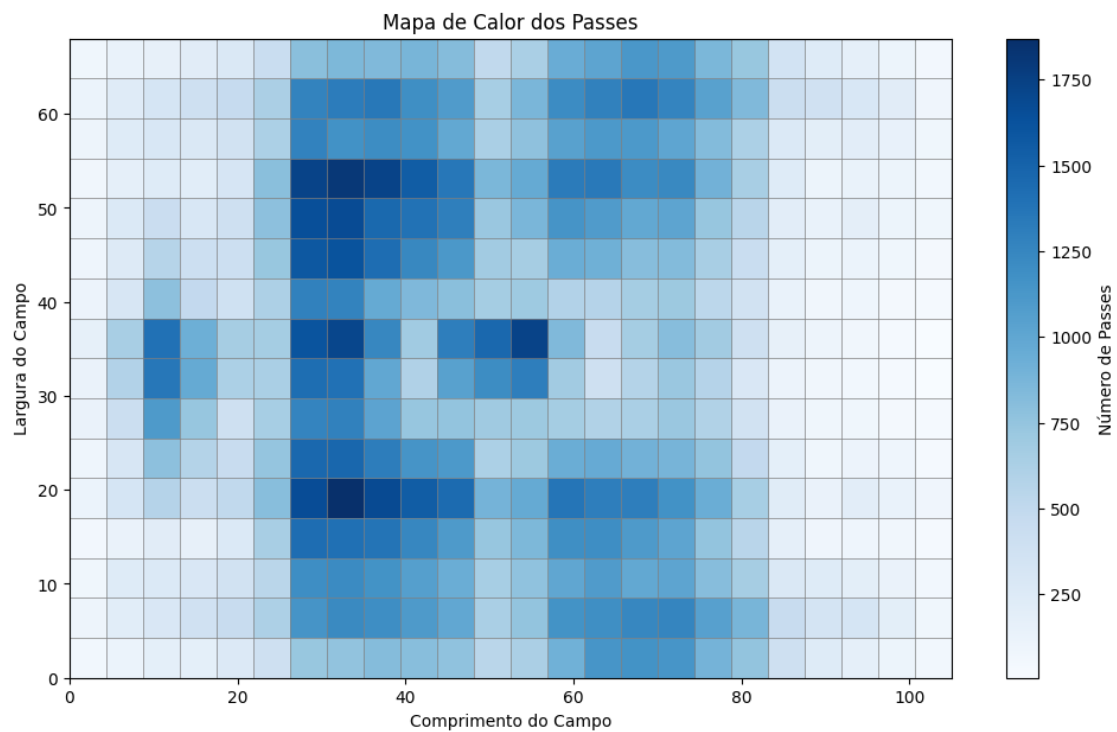
```
[40]: england_passes = spadl['England'][spadl['England']['type_name'] == 'pass']  
plot_pass_heatmap(england_passes)
```



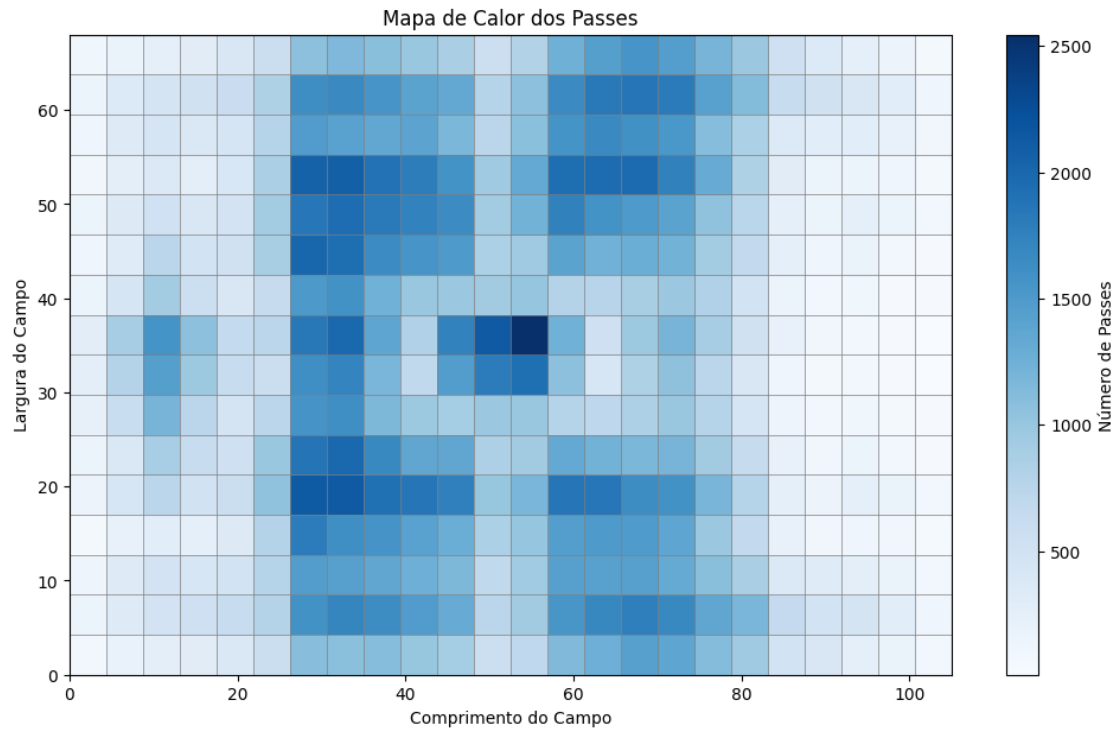
```
[41]: spain_passes = spadl['Spain'][spadl['Spain']['type_name'] == 'pass']
      plot_pass_heatmap(spain_passes)
```



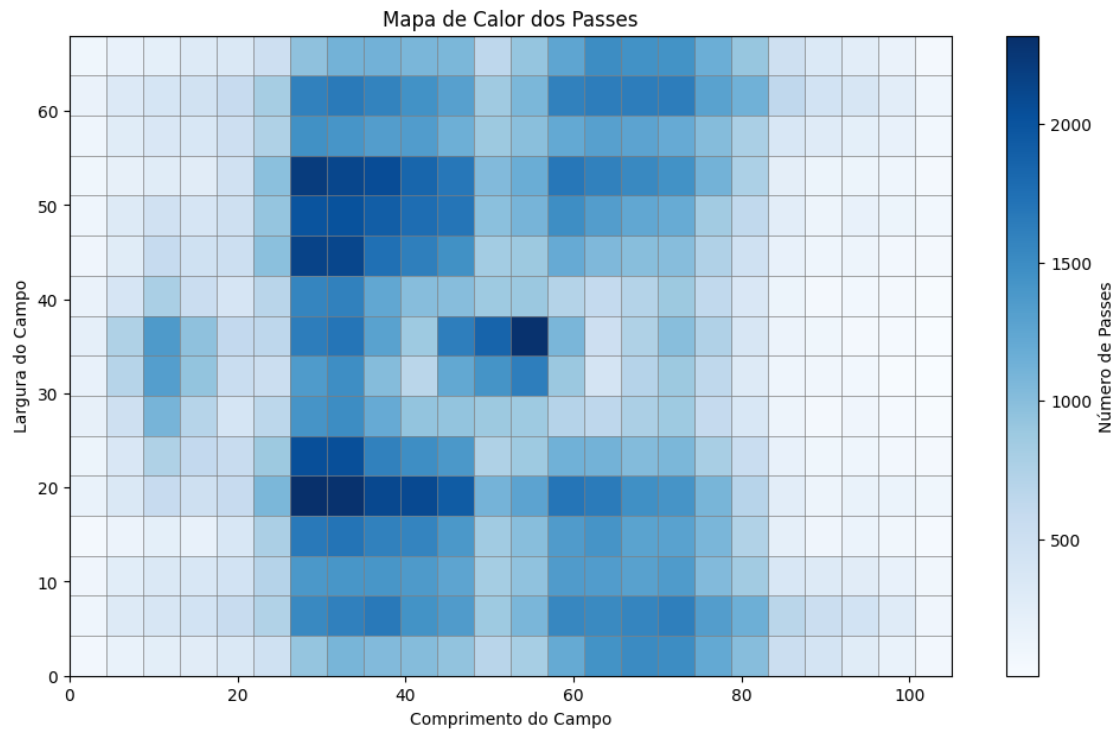
```
[42]: germany_passes = spadl['Germany'][spadl['Germany']['type_name'] == 'pass']  
plot_pass_heatmap(germany_passes)
```



```
[43]: italy_passes = spadl['Italy'][spadl['Italy']['type_name'] == 'pass']  
plot_pass_heatmap(italy_passes)
```



```
[44]: france_passes = spadl['France'][spadl['France']['type_name'] == 'pass']
      plot_pass_heatmap(france_passes)
```

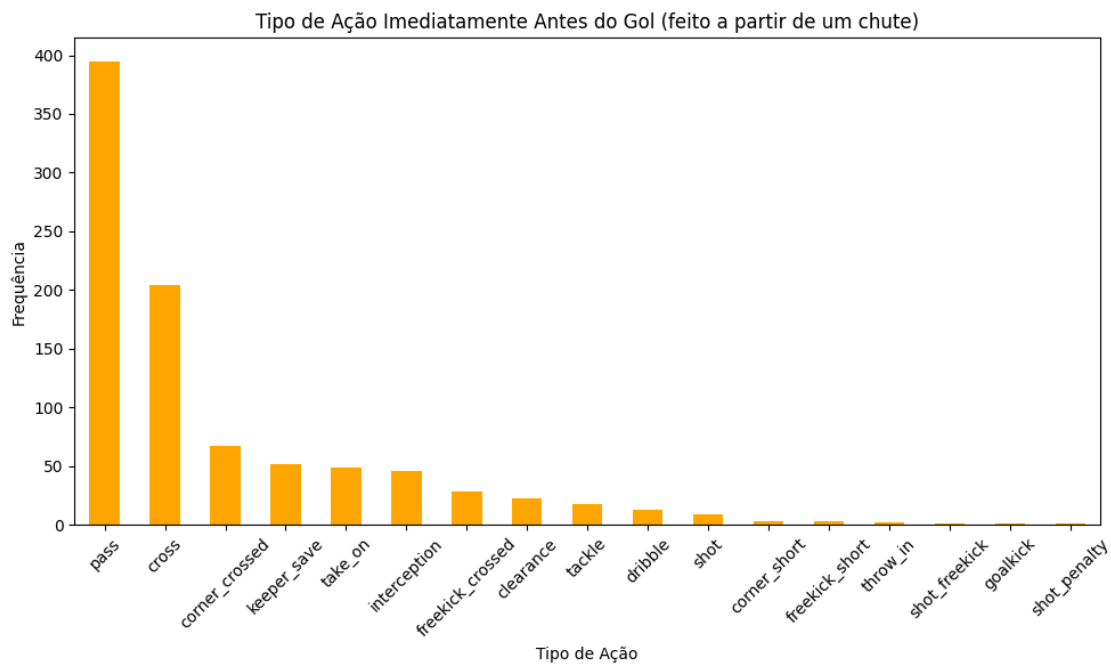


1.2.6 Sequência: Ações que Levaram a Gol

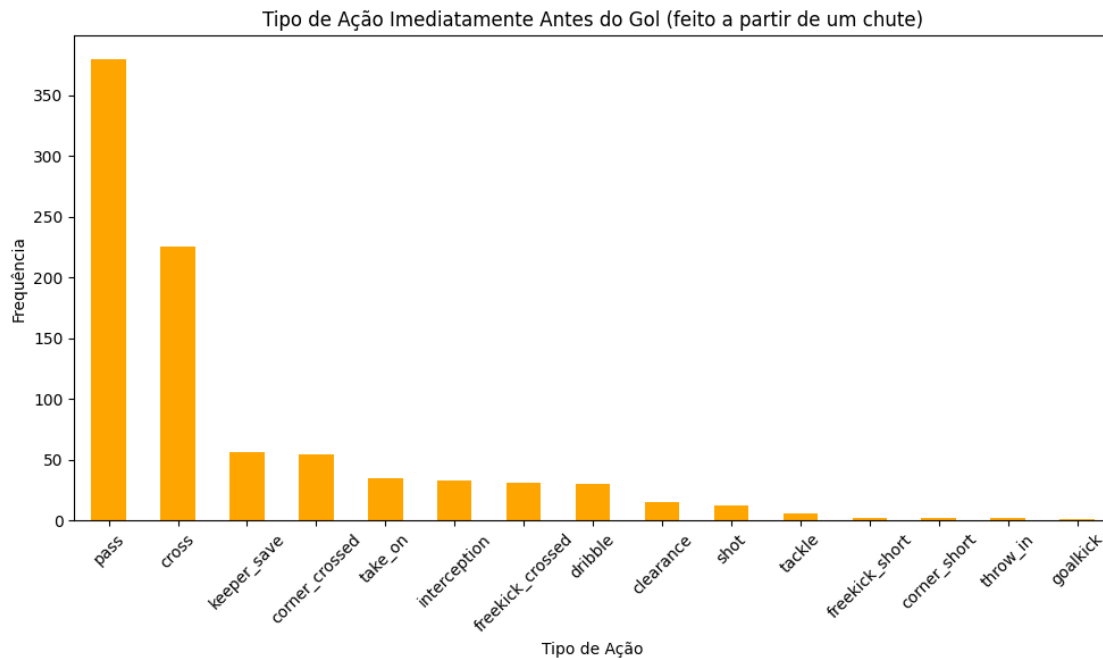
Histograma com a frequência de cada tipo de ação executada que precedeu um gol.

Observações: - Passes e cruzamentos lideram como ações que precedem gols; - Bolas carregadas não resultam em tantos gols; - Na La Liga, rebotes tendem a gerar mais gols do que escanteios.

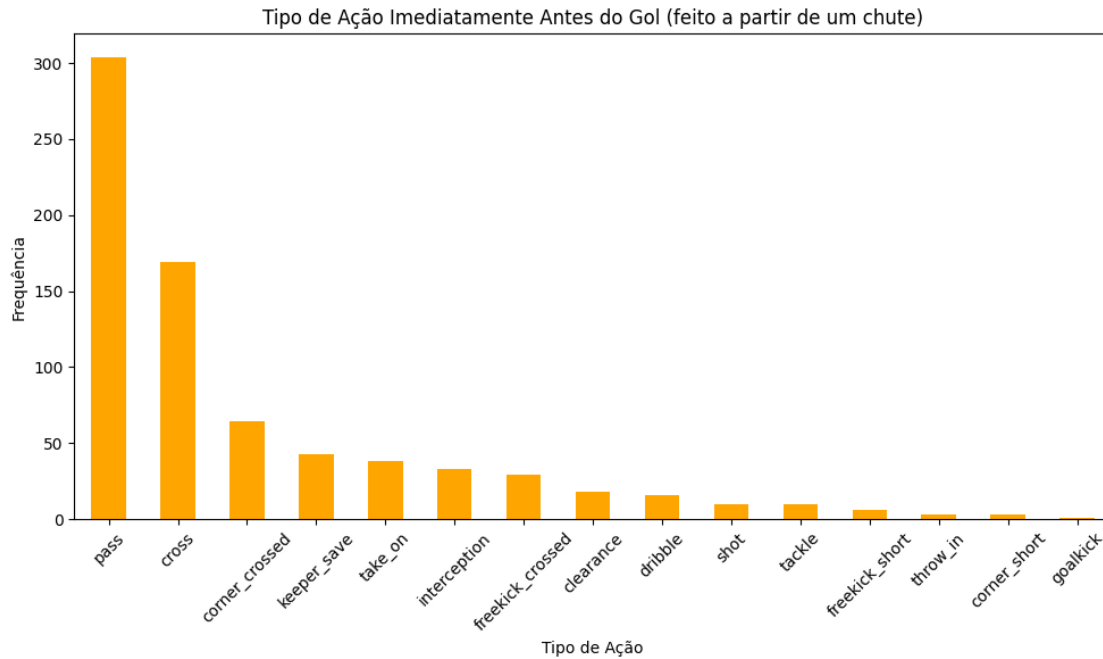
```
[45]: def plot_action_sequences(action_sequences):  
    plt.figure(figsize=(10, 6))  
    action_sequences.plot(kind='bar', color='orange')  
    plt.title('Tipo de Ação Imediatamente Antes do Gol (feito a partir de um ↵  
    ↵ chute)')  
    plt.xlabel('Tipo de Ação')  
    plt.ylabel('Frequência')  
    plt.xticks(rotation=45)  
    plt.tight_layout()  
    plt.show()  
  
[46]: goal_indices = spadl['England'][(spadl['England']['type_name'] == 'shot') & ↵  
    ↵ (spadl['England']['result_name'] == 'success')].index  
    pre_goal_actions = spadl['England'].loc[goal_indices - 1]  
    action_sequences = pre_goal_actions['type_name'].value_counts()  
    plot_action_sequences(action_sequences)
```



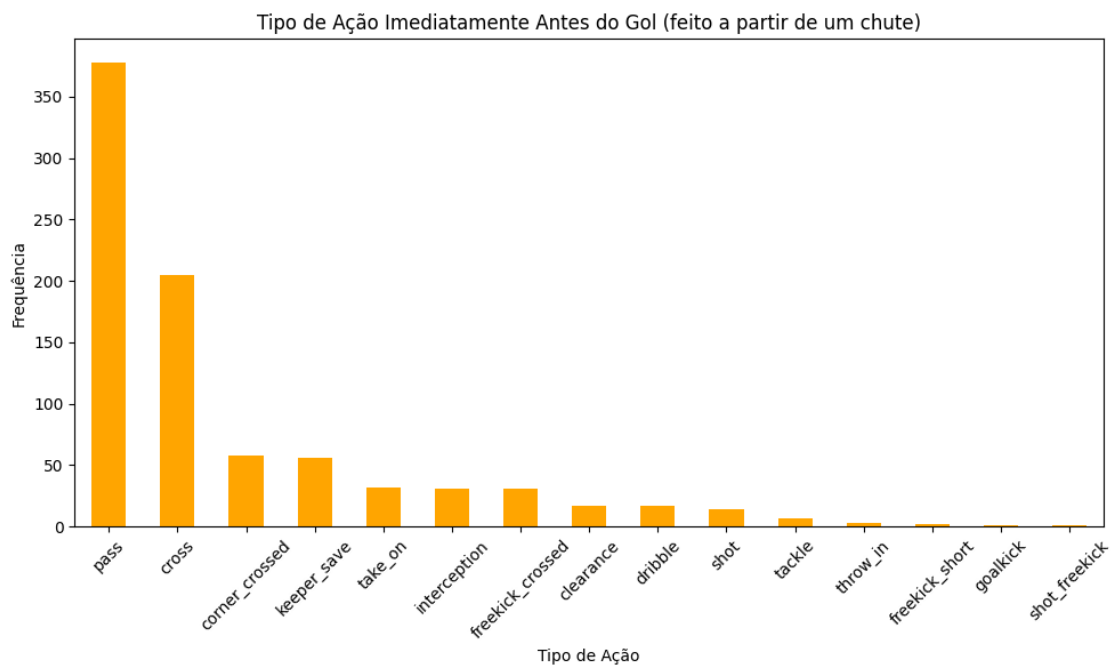

```
[47]: goal_indices = spadl['Spain'][(spadl['Spain']['type_name'] == 'shot') &
    ↳ (spadl['Spain']['result_name'] == 'success')].index
pre_goal_actions = spadl['Spain'].loc[goal_indices - 1]
action_sequences = pre_goal_actions['type_name'].value_counts()
plot_action_sequences(action_sequences)
```



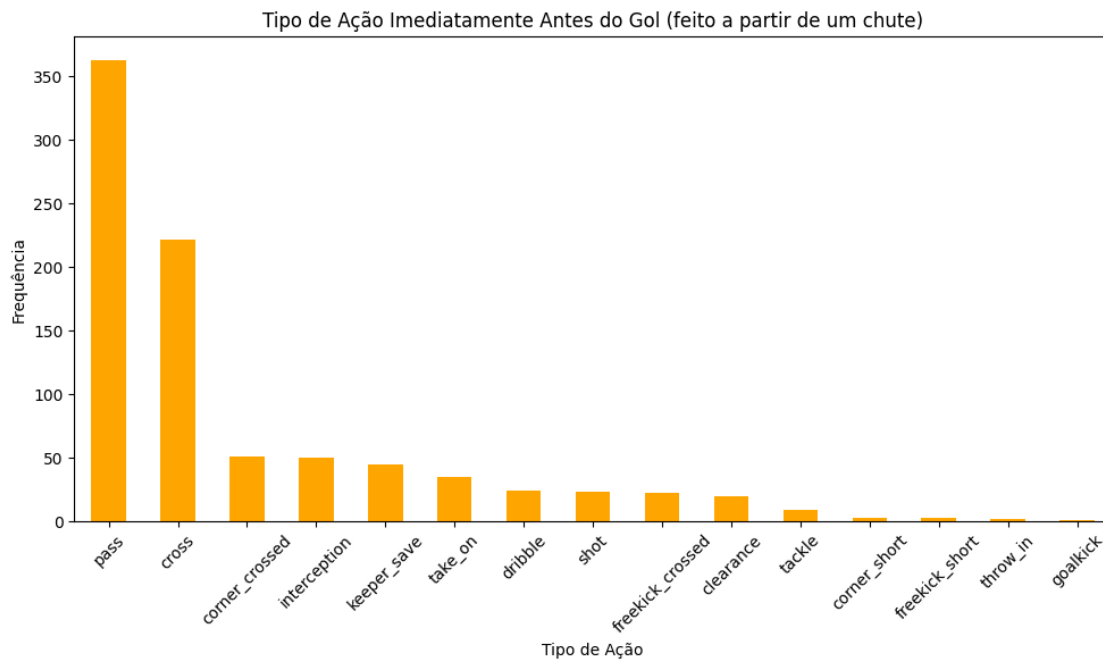
```
[48]: goal_indices = spadl['Germany'][(spadl['Germany']['type_name'] == 'shot') &
    ↳ (spadl['Germany']['result_name'] == 'success')].index
pre_goal_actions = spadl['Germany'].loc[goal_indices - 1]
action_sequences = pre_goal_actions['type_name'].value_counts()
plot_action_sequences(action_sequences)
```



```
[49]: goal_indices = spadl['Italy'][(spadl['Italy']['type_name'] == 'shot') &
    ↳ (spadl['Italy']['result_name'] == 'success')].index
pre_goal_actions = spadl['Italy'].loc[goal_indices - 1]
action_sequences = pre_goal_actions['type_name'].value_counts()
plot_action_sequences(action_sequences)
```



```
[50]: goal_indices = spadl['France'][(spadl['France']['type_name'] == 'shot') &
↳ (spadl['France']['result_name'] == 'success')].index
pre_goal_actions = spadl['France'].loc[goal_indices - 1]
action_sequences = pre_goal_actions['type_name'].value_counts()
plot_action_sequences(action_sequences)
```



1.2.7 Mapa de Calor de Finalizações

Mapa de calor com as finalizações realizadas na liga.

Observações: - As 5 ligas seguem o mesmo padrão de finalizações.

```
[51]: def plot_shot_heatmap(shots):
    n_x, n_y = 24, 16
    x_bins = np.linspace(0, 105, n_x + 1)
    y_bins = np.linspace(0, 68, n_y + 1)

    # Conta quantos passes começaram em cada quadrante
    heatmap, _, _ = np.histogram2d(shots['start_y'], shots['start_x'],
↳ bins=[y_bins, x_bins])

    # Plot
    fig, ax = plt.subplots(figsize=(12, 7))
```

```

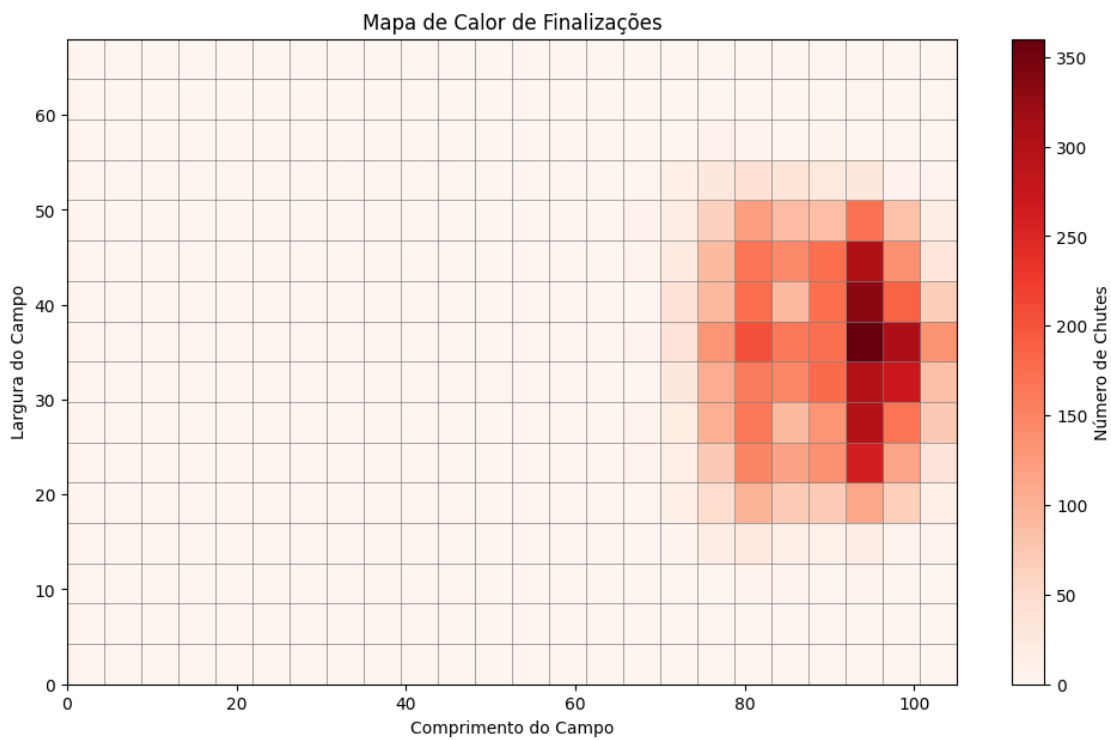
    im = ax.imshow(heatmap, cmap='Reds', origin='lower', extent=[0, 105, 0, 68], aspect='auto')

    # Adiciona a grade
    for x in x_bins:
        ax.axvline(x, color='gray', linewidth=0.5)
    for y in y_bins:
        ax.axhline(y, color='gray', linewidth=0.5)

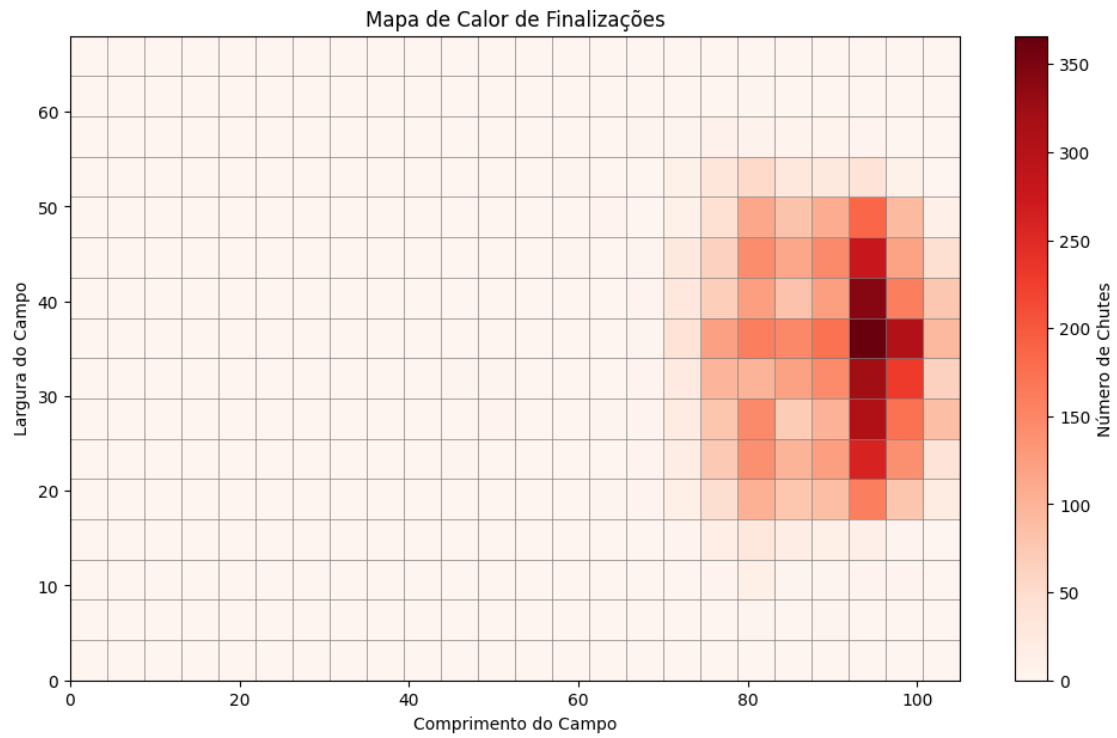
    # Rótulos e título
    plt.title('Mapa de Calor de Finalizações')
    ax.set_xlabel('Comprimento do Campo')
    ax.set_ylabel('Largura do Campo')
    fig.colorbar(im, ax=ax, label='Número de Chutes')
    plt.show()

```

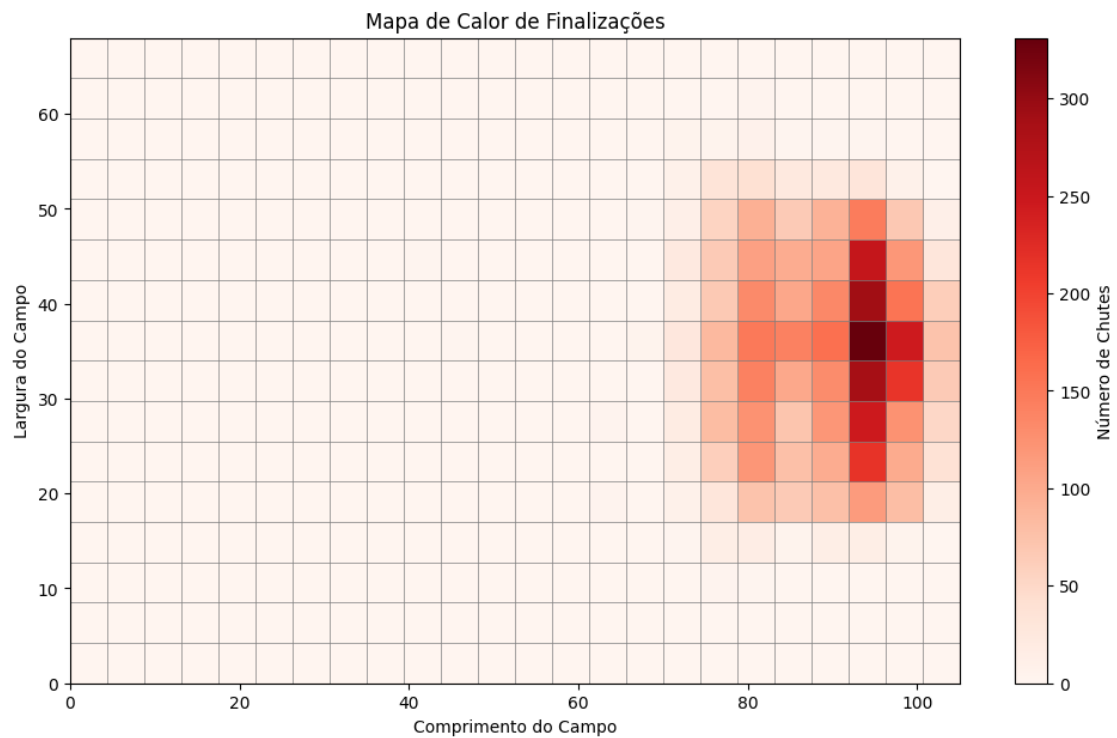
```
[52]: plot_shot_heatmap(spadl['England'][spadl['England']['type_name'] == 'shot'])
```



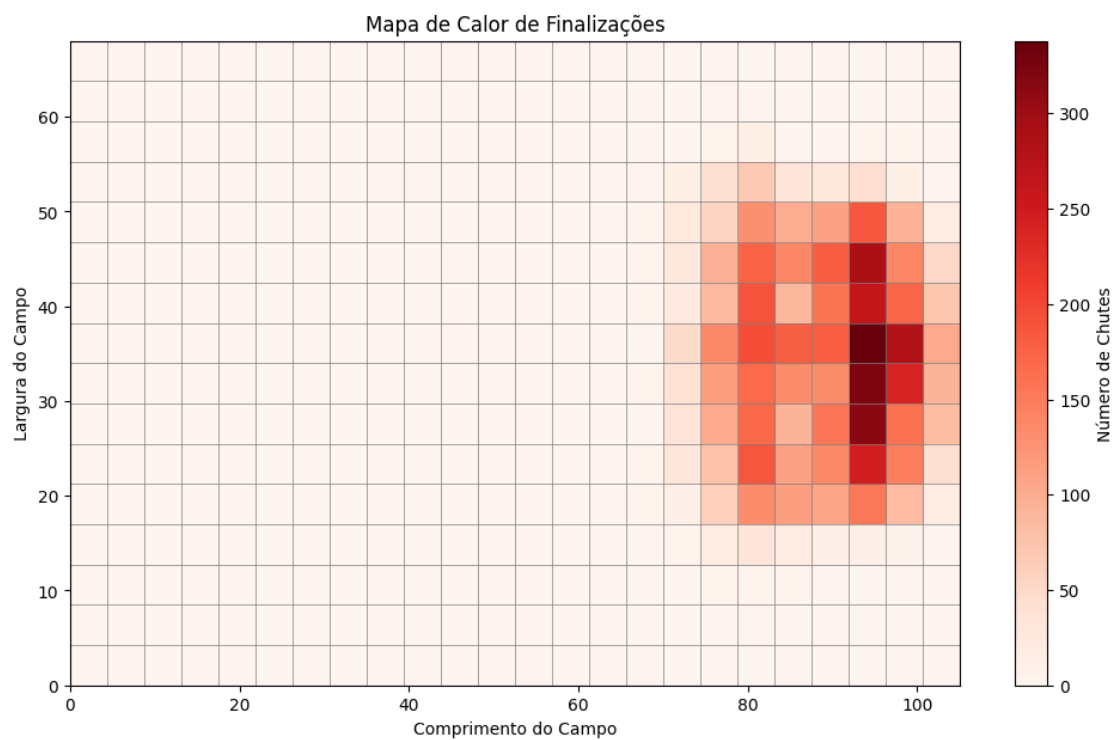
```
[53]: plot_shot_heatmap(spadl['Spain'][spadl['Spain']['type_name'] == 'shot'])
```



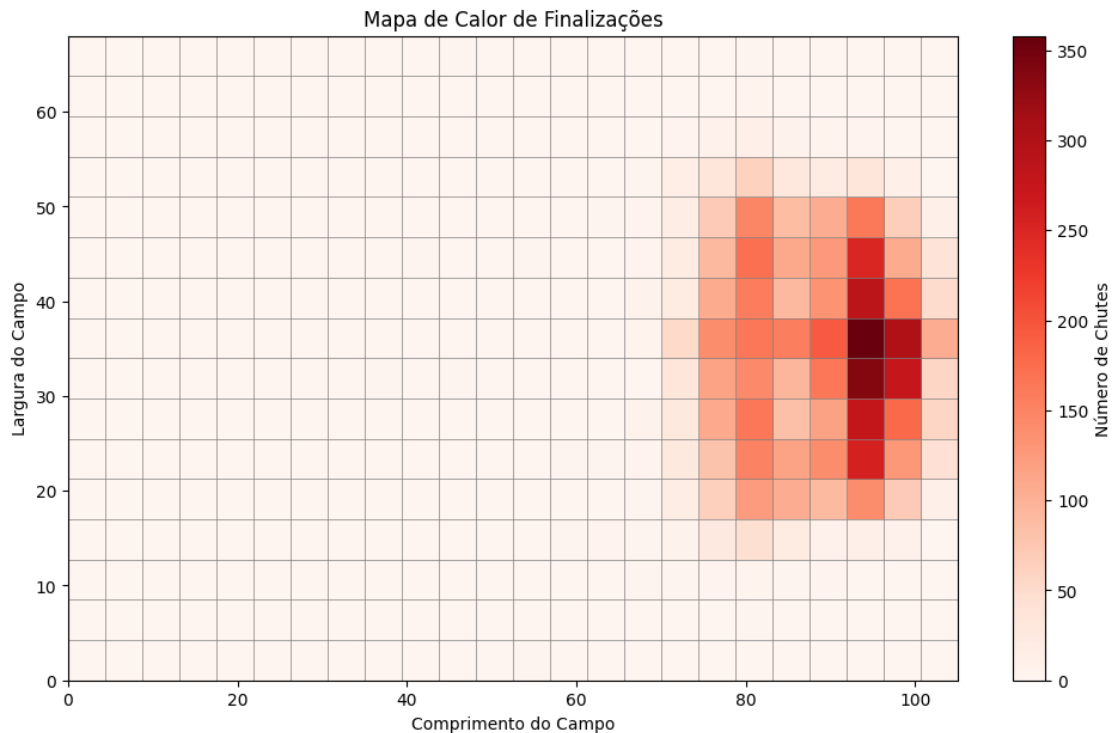
```
[54]: plot_shot_heatmap(spadl['Germany'][spadl['Germany']['type_name'] == 'shot'])
```



```
[55]: plot_shot_heatmap(spadl['Italy'][spadl['Italy']['type_name'] == 'shot'])
```



```
[56]: plot_shot_heatmap(spadl['France'][spadl['France']['type_name'] == 'shot'])
```



1.2.8 Mapa de Assistências

Mapa com as setas que indicam passes que antecedem um chute.

Observações: - Apenas uma amostra das assistências foram plotadas, para evitar poluição; - As assistências precedem chutes contra o gol adversário, majoritariamente; - Os chutes em sequência partem principalmente da grande área do goleiro adversário.

```
[57]: def plot_assists_heatmap(assists):
    plt.figure(figsize=(12, 7))
    for _, row in assists.iterrows():
        plt.arrow(row['start_x'], row['start_y'],
                  row['end_x'] - row['start_x'], row['end_y'] - row['start_y'],
                  head_width=1, head_length=1, color='green', alpha=0.5)

    plt.title('Passes que Antecederam Chutes')
    plt.xlim(0, 105)
    plt.ylim(0, 68)
    plt.gca().set_aspect('equal')
    plt.show()
```

```
[58]: shot_idx = spadl['England'][spadl['England']['type_name'] == 'shot'].index
assist_idx = shot_idx - 1
```

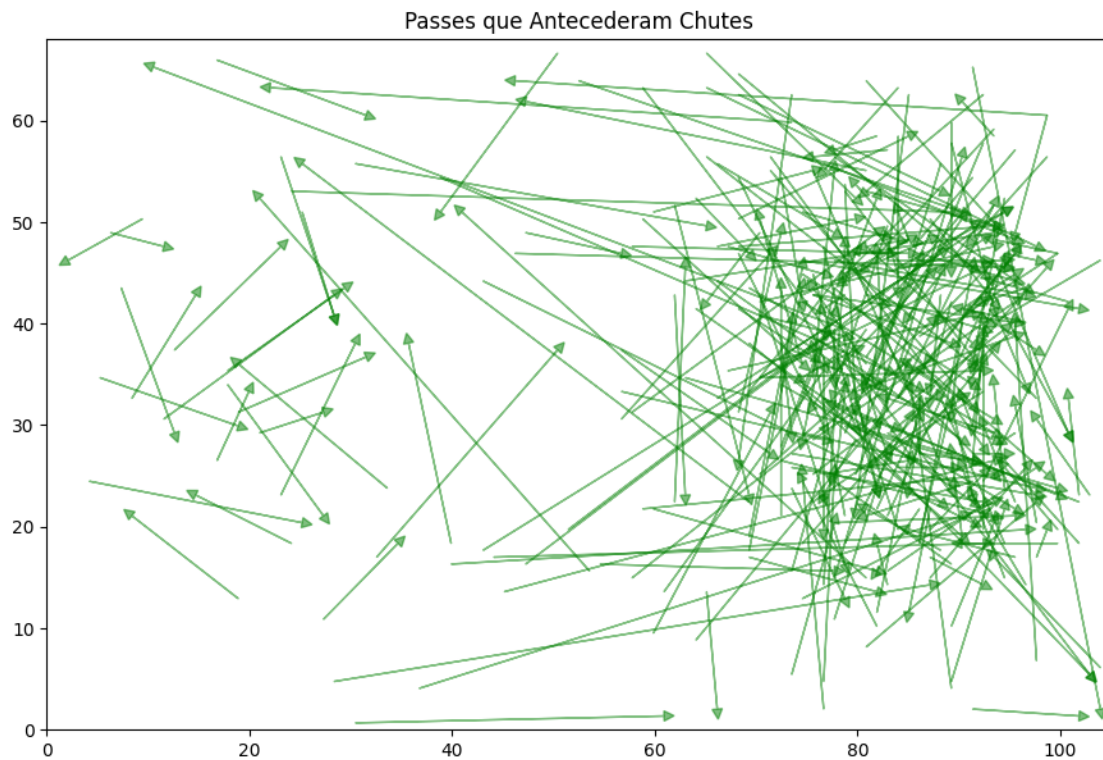
```

assists = spadl['England'].loc[assist_idx][spadl['England'].  

    ↳loc[assist_idx]['type_name'] == 'pass']  

plot_assists_heatmap(assists.head(300))

```



```

[59]: shot_idx = spadl['Spain'][spadl['Spain']['type_name'] == 'shot'].index  

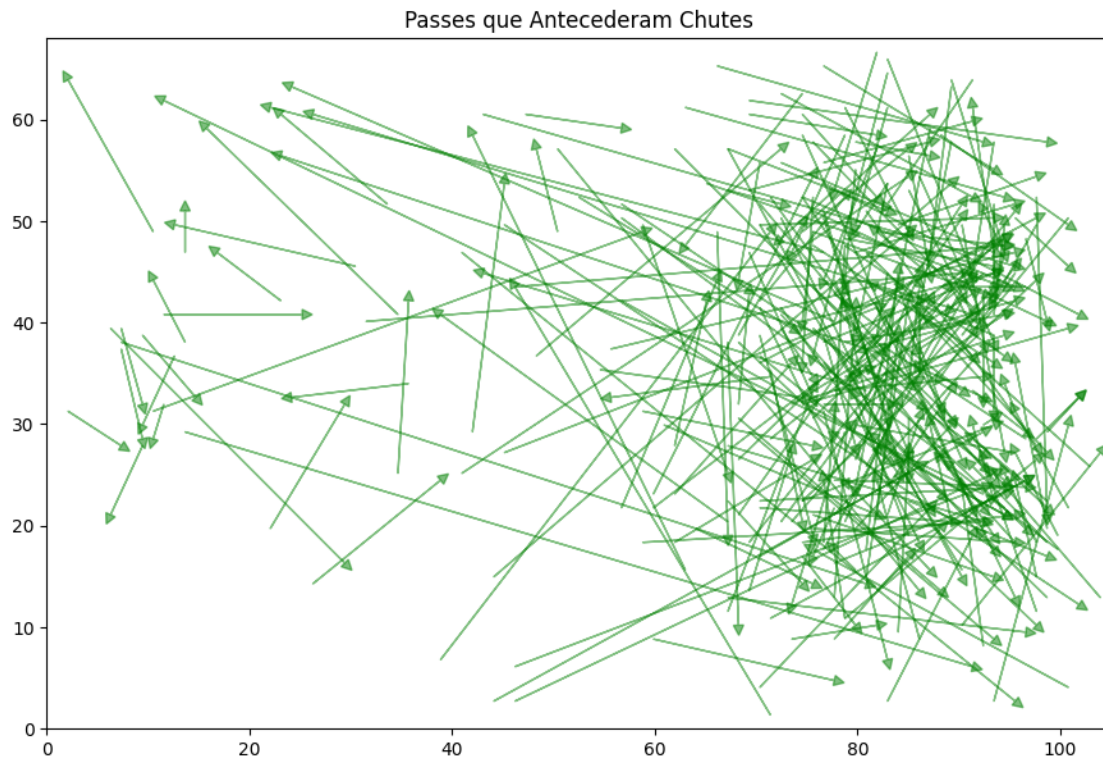
assist_idx = shot_idx - 1  

assists = spadl['Spain'].loc[assist_idx][spadl['Spain'].  

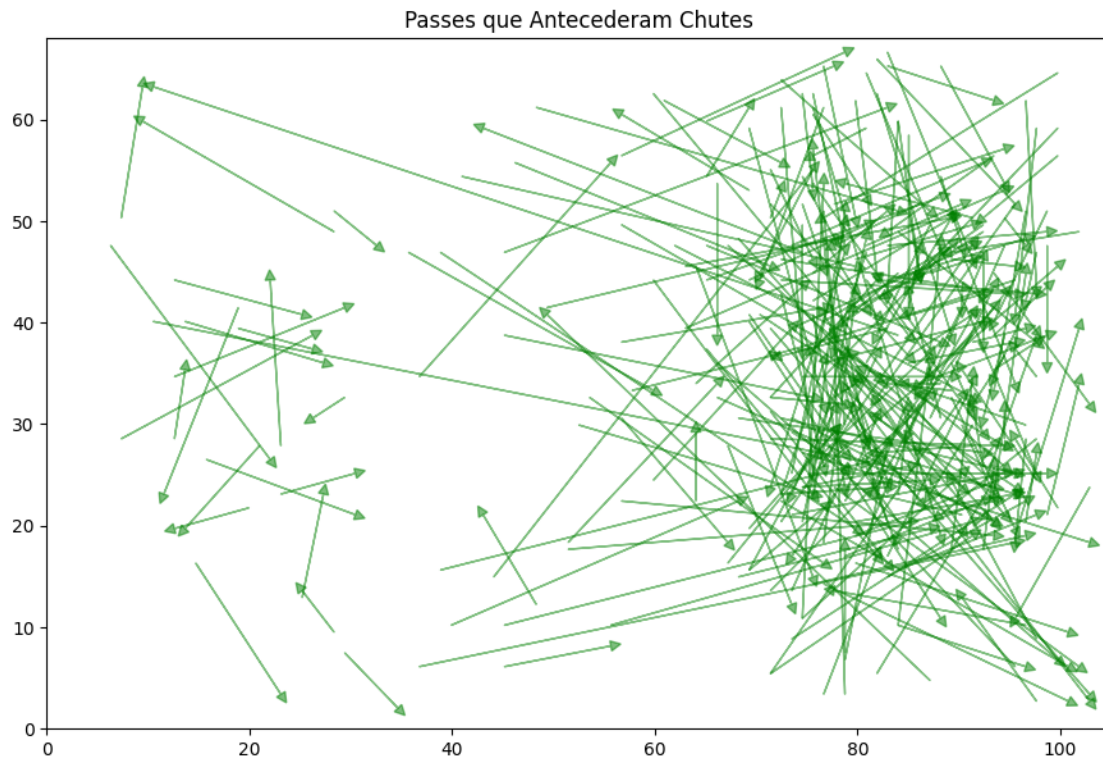
    ↳loc[assist_idx]['type_name'] == 'pass']  

plot_assists_heatmap(assists.head(300))

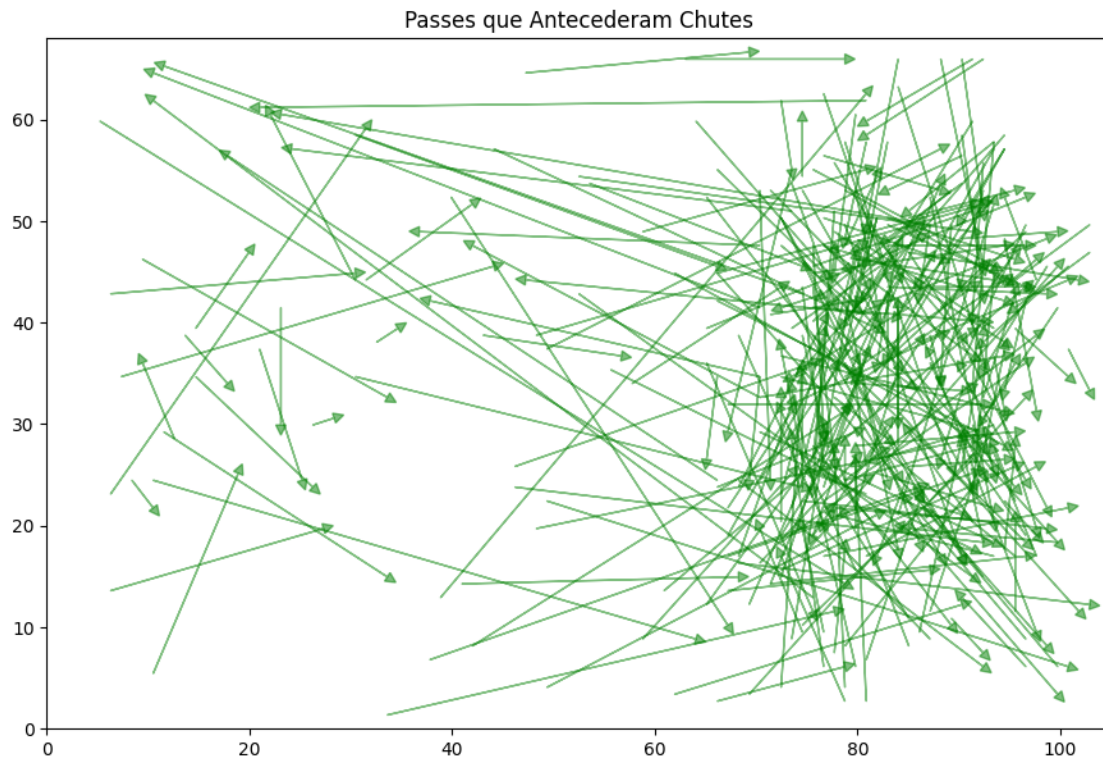
```

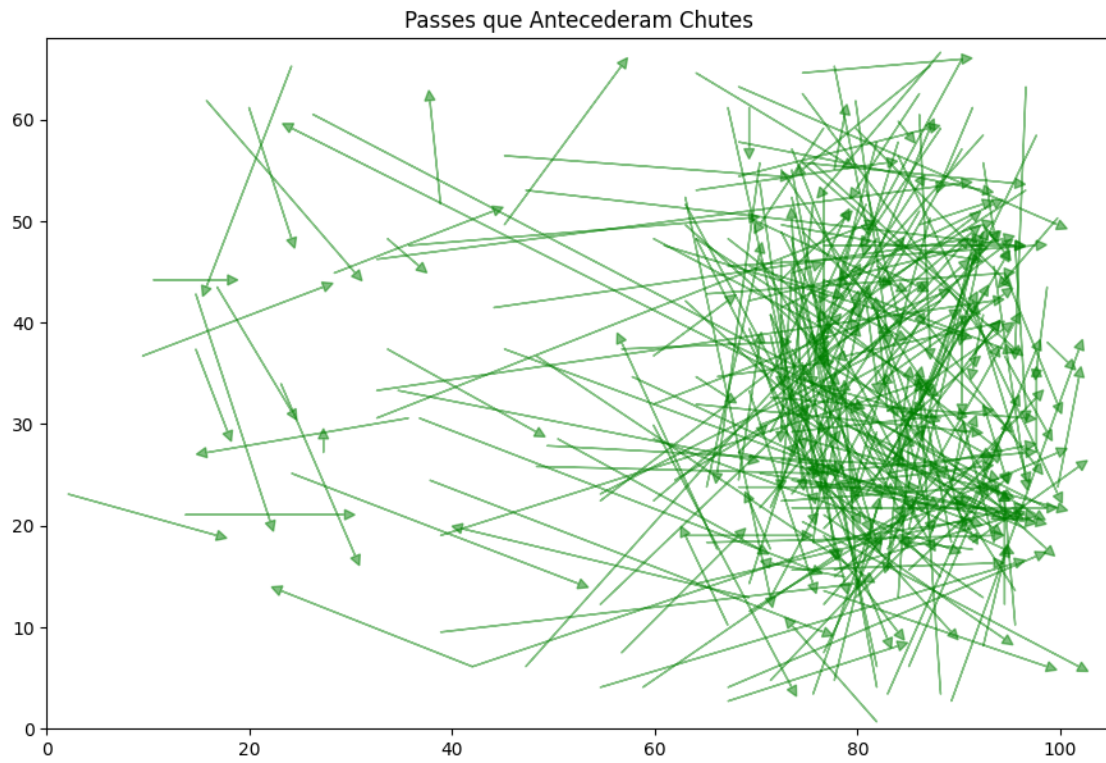
```
[60]: shot_idx = spadl['Germany'][spadl['Germany']['type_name'] == 'shot'].index
      assist_idx = shot_idx - 1
      assists = spadl['Germany'].loc[assist_idx][spadl['Germany'].
      ↪loc[assist_idx]['type_name'] == 'pass']
      plot_assists_heatmap(assists.head(300))
```



```
[61]: shot_idx = spadl['Italy'][spadl['Italy']['type_name'] == 'shot'].index
      assist_idx = shot_idx - 1
      assists = spadl['Italy'].loc[assist_idx][spadl['Italy'].
      ↳loc[assist_idx]['type_name'] == 'pass']
      plot_assists_heatmap(assists.head(300))
```



```
[62]: shot_idx = spadl['France'][spadl['France']['type_name'] == 'shot'].index
      assist_idx = shot_idx - 1
      assists = spadl['France'].loc[assist_idx][spadl['France'].
      ↳loc[assist_idx]['type_name'] == 'pass']
      plot_assists_heatmap(assists.head(300))
```



[]: