Pytech Summit
All about Python 2025

Ruslan Korniichuk

Introduction to Football Analytics with Python

10.12.2025

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techevents

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football analysis
Search term

sports analytics
Search term

football analyst
Search term

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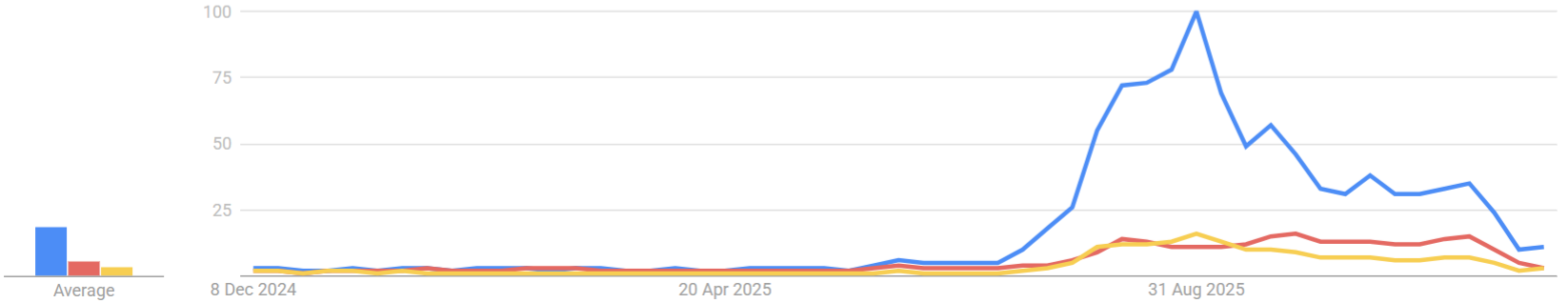

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01

Hudl Statsbomb

open-data

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cddr Update competitions file to include Women's Euros 3bfbffe · 5 months ago 1,087 Commits

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.DS_Store	Added 370 new games, updated 1087 games.	2 years ago
LICENSE.pdf	Update LICENSE.pdf	2 years ago
README.md	Update README.md	3 years ago

README License

StatsBomb Open Data

Welcome to the StatsBomb Open Data repository.

StatsBomb are committed to sharing new data and research publicly to enhance understanding of the game of Football. We want to actively encourage new research and analysis at all levels. Therefore we have made certain leagues of StatsBomb Data freely available for public use for research projects and genuine interest in football analytics.

StatsBomb are hoping that by making data freely available, we will extend the wider football analytics community and

About

Free football data from StatsBomb

statsbomb.com/resource-centre/

soccer open-data football-data football sports-stats sports-data

Readme
Activity
Custom properties
2.9k stars
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Report repository

Releases

No releases published

Packages

No packages published

Contributors 5

Hudl Statsbomb Open Data structure

The data is provided as **JSON files** exported from the Statsbomb Data API, in the following structure:

- competition and seasons stored in **competitions.json**
- matches for each competition and **season**, stored in the **matches** folder. Each folder within is named for a competition ID, each file is named for a season ID within that competition
- events and lineups for each match, stored in **events** and **lineups** respectively. Each file is named for a match ID

Files

master

Go to file t

data
events
lineups
matches
three-sixty
competitions.json
doc
img
.DS_Store
LICENSE.pdf
README.md

open-data / data / competitions.json

cddr Update competitions file to include Women's Euros 3bfbffe · 4 months ago History

Code Blame Raw


```
[ {
  "competition_id" : 9,
  "season_id" : 281,
  "country_name" : "Germany",
  "competition_name" : "1. Bundesliga",
  "competition_gender" : "male",
  "competition_youth" : false,
  "competition_international" : false,
  "season_name" : "2023/2024",
  "match_updated" : "2024-09-28T20:46:38.893391",
  "match_updated_360" : "2025-07-06T04:26:07.636270",
  "match_available_360" : "2025-07-06T04:26:07.636270",
  "match_available" : "2024-09-28T20:46:38.893391"
}, {
  "competition_id" : 9,
  "season_id" : 27,
  "country_name" : "Germany",
```

```
[ {
  "competition_id" : 9,
  "season_id" : 281,
  "country_name" : "Germany",
  "competition_name" : "1. Bundesliga",
  "competition_gender" : "male",
  "competition_youth" : false,
  "competition_international" : false,
  "season_name" : "2023/2024",
  "match_updated" : "2024-09-28T20:46:38.893391",
  "match_updated_360" : "2025-07-06T04:26:07.636270",
  "match_available_360" : "2025-07-06T04:26:07.636270",
  "match_available" : "2024-09-28T20:46:38.893391"
}, {
  "competition_id" : 9
```

Hudl Statsbomb: Competitions

statsbomb_0001.ipynb

Code | Open in... | Python 3 (ipykernel)

[1]:
```
import pandas as pd
import requests
```

[2]:
```
pd.set_option("display.max.columns", None)
pd.set_option("display.max.rows", None)
```

Load `competitions.json` file from Hudl Statsbomb GitHub and transform to Pandas DataFrame

[3]:
```
url = "https://raw.githubusercontent.com/statsbomb/open-data/refs/heads/master/data/competitions.json"
data = requests.get(url).json()
competitions = pd.json_normalize(data)
competitions.head(3)
```

[3]:

	competition_id	season_id	country_name	competition_name	competition_gender	competition_youth	competition_international	season_name	match_updated	match_updat
0	9	281	Germany	1. Bundesliga	male	False	False	2023/2024	2024-07-15T14:15:54.671676	2024-07-15T14:17:00.(
1	9	27	Germany	1. Bundesliga	male	False	False	2015/2016	2024-05-19T11:11:14.192381	
2	1267	107	Africa	African Cup of Nations	male	False	True	2023	2024-06-13T07:51:02.452825	

Competitions with `season_name`, `competition_id`, and `season_id`

[4]:
```
competitions[["competition_name", "season_name", "competition_id", "season_id"]].head(3)
```

[4]:

	competition_name	season_name	competition_id	season_id
0	1. Bundesliga	2023/2024	9	281
1	1. Bundesliga	2015/2016	9	27
2	African Cup of Nations	2023	1267	107

Hudl Statsbomb: Matches

statsbomb_0002.ipynb

Code | Open in... | Python 3 (ipykernel)

[1]:
```
import pandas as pd
import requests
```

FIFA World Cup 2022

[2]:
```
competition_id = 43
season_id = 106
```

[3]:
```
url = f"https://raw.githubusercontent.com/statsbomb/open-data/refs/heads/master/data/matches/{competition_id}/{season_id}.json"
data = requests.get(url).json()
matches = pd.json_normalize(data)
matches.head(2)
```

[3]:

	match_id	match_date	kick_off	home_score	away_score	match_status	match_status_360	last_updated	last_updated_360	match_week	...	competition_stage.id	c
0	3857256	2022-12-02	21:00:00.000	2	3	available	available	2023-02-17T23:45:15.306706	2023-04-26T23:49:58.956186	3	...	10	
1	3869151	2022-12-03	21:00:00.000	2	1	available	available	2023-07-30T07:46:05.382784	2023-07-30T07:48:51.865595	4	...	33	

2 rows × 42 columns

[4]:
```
len(matches)
```

[4]:
```
64
```

[5]:
```
for _, row in matches.head(2).iterrows():
    print(
        f"{row['home_team.home_team_name']} {row['away_team.away_team_name']} "
        f"{row['home_score']}:{row['away_score']} ({row['match_id']})"
    )
```

```
Serbia Switzerland 2:3 (3857256)
Argentina Australia 2:1 (3869151)
```

Hudl Statsbomb: Matches (filtered)

statsbomb_0003.ipynb

Code | Open in... | Python 3 (ipykernel)

[1]:
```
import pandas as pd
import requests
```

FIFA World Cup 2022

[2]:
```
competition_id = 43
season_id = 106
```

[3]:
```
url = f"https://raw.githubusercontent.com/statsbomb/open-data/refs/heads/master/data/matches/{competition_id}/{season_id}.json"
data = requests.get(url).json()
matches = pd.json_normalize(data)
```

Germany

[4]:
```
team = "Germany"

filtered = matches[(matches["home_team.home_team_name"] == team) | (matches["away_team.away_team_name"] == team)]

for _, row in filtered.iterrows():
    print(
        f"{row['home_team.home_team_name']} {row['away_team.away_team_name']} "
        f"{row['home_score']}:{row['away_score']} ({row['match_id']})"
    )
```

```
Spain Germany 1:1 (3857263)
Germany Japan 1:2 (3857284)
Costa Rica Germany 2:4 (3857292)
```

Statsbomb event data

Hudl Statsbomb: Match events

statsbomb_0004.ipynb

Code | Open in... | Python 3 (ipykernel)

[1]:
```
import pandas as pd
import requests
```

Costa Rica 2:4 Germany

[2]:
```
match_id = 3857292
```

[3]:
```
url = f"https://raw.githubusercontent.com/statsbomb/open-data/refs/heads/master/data/events/{match_id}.json"
data = requests.get(url).json()
events = pd.json_normalize(data)
```

[4]:
```
len(events)
```

[4]:
```
3869
```

[5]:
```
events.head(3)
```

[5]:

	id	index	period	timestamp	minute	second	possession	duration	type.id	type.name	...	substitution.outcome.name	substitution.replacement.id	substitution.replacemen
0	2194e9dd-089b-44f8-a5c7-60436a00f0f9	1	1	00:00:00.000	0	0	1	0.0	35	Starting XI	...	NaN	NaN	
1	1247d52e-3c53-4106-bcf9-36c14a0c352d	2	1	00:00:00.000	0	0	1	0.0	35	Starting XI	...	NaN	NaN	
2	5ba53280-4efe-4482-b727-1328f6654d2a	3	1	00:00:00.000	0	0	1	0.0	18	Half Start	...	NaN	NaN	

3 rows × 116 columns

[6]:
```
events.to_pickle("events.pkl")
```

Hudl Statsbomb: Event types

statsbomb_0005.ipynb

Code | Open in... | Python 3 (ipykernel)

[1]:
```
import pandas as pd
```

[2]:
```
events = pd.read_pickle("events.pkl")
```

Event type frequency

[3]:
```
events["type.name"].value_counts().head(5)
```

[3]:
```
type.name
Pass             1140
Ball Receipt*    1062
Carry             868
Pressure          265
Ball Recovery     105
Name: count, dtype: int64
```

Event type frequency (Germany)

[4]:
```
events_de = events.loc[events["possession_team.name"] == "Germany"]
events_de["type.name"].value_counts().head(5)
```

[4]:
```
type.name
Pass             776
Ball Receipt*    733
Carry            606
Pressure         128
Ball Recovery     66
Name: count, dtype: int64
```

[5]:
```
events_de.to_pickle("events_de.pkl")
```

Hudl Statsbomb: Event types

statsbomb_0006.ipynb

Code | Open in... | Python 3 (ipykernel)

[1]:
```
import pandas as pd
```

[2]:
```
events_de = pd.read_pickle("events_de.pkl")
```

Passes (Germany)

[3]:
```
passes_de = events_de.loc[events_de['type.name'] == 'Pass']
passes_de[["player.name", "pass.recipient.name", "location", "pass.end_location"]].head(3)
```

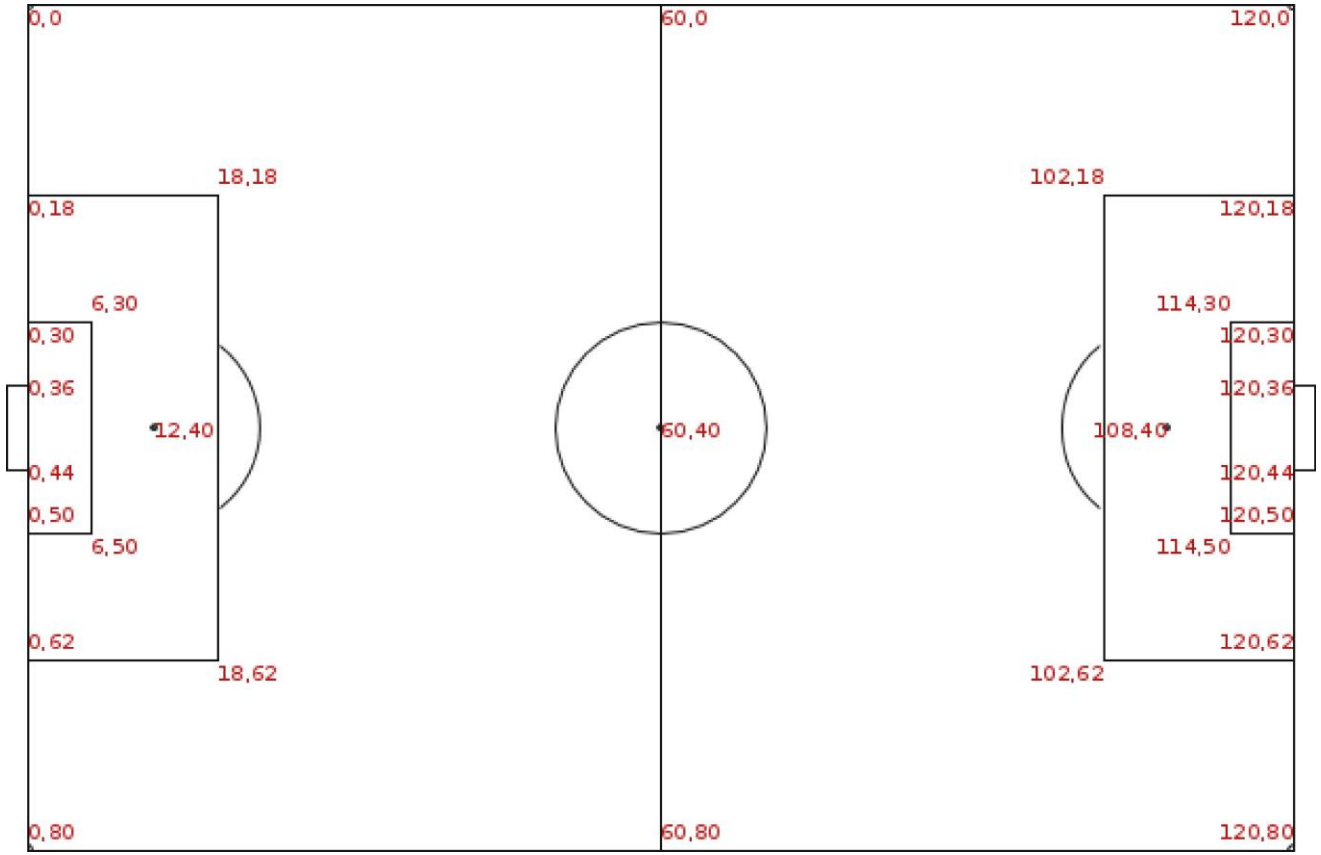
[3]:

	player.name	pass.recipient.name	location	pass.end_location
4	Thomas Müller	Antonio Rüdiger	[61.0, 40.1]	[40.1, 36.2]
7	Antonio Rüdiger	Joshua Kimmich	[39.8, 36.4]	[40.6, 58.5]
10	Joshua Kimmich	Thomas Müller	[47.2, 62.2]	[89.9, 45.4]

Most frequent passing combinations between players

[4]:
```
passes_de[["player.name", "pass.recipient.name"]].value_counts().head(10)
```

[4]:
```
player.name      pass.recipient.name
Joshua Kimmich   Niklas Süle            29
Niklas Süle      Joshua Kimmich         26
                 Antonio Rüdiger        22
Antonio Rüdiger  Niklas Süle            20
Niklas Süle      İlkay Gündoğan         18
Antonio Rüdiger  David Raum             16
İlkay Gündoğan   Niklas Süle            15
David Raum       Antonio Rüdiger        15
Joshua Kimmich   Lukas Klostermann      14
Antonio Rüdiger  Joshua Kimmich         14
Name: count, dtype: int64
```


0,0
60,0
120,0
18,18
102,18
0,18
120,18
6,30
114,30
0,30
120,30
0,36
120,36
12,40
60,40
108,40
0,44
120,44
0,50
120,50
6,50
114,50
0,62
120,62
18,62
102,62
0,80
60,80
120,80

Hudl Statsbomb: Team's formation

statsbomb_0007.ipynb

Code | Open in... | Python 3 (ipykernel)

[1]:
```
import pandas as pd
```

[2]:
```
events_de = pd.read_pickle("events_de.pkl")
```

Team's formation (Germany)

[3]:
```
events_de['type.id'].isin([35]).any() # starting eleven
```

[3]:
```
False
```

[4]:
```
events_de['type.id'].isin([36]).any() # tactical shift
```

[4]:
```
True
```

[5]:
```
', '.join(sorted(events_de['type.name'].unique()))
```

[5]:
```
'50/50, Ball Receipt*, Ball Recovery, Block, Carry, Clearance, Dispossessed, Dribble, Dribbled Past, Duel, Foul Committed, Foul Won, Goal Keeper, Injury Stoppage, I
nterception, Miscontrol, Offside, Pass, Pressure, Referee Ball-Drop, Shot, Substitution, Tactical Shift'
```

[6]:
```
tactical_shifts = events_de[events_de['type.id'] == 36]
tactical_shifts = tactical_shifts.copy()
tactical_shifts["tactics.formation"] = tactical_shifts["tactics.formation"].astype(int).astype(str)
```

[7]:
```
tactical_shifts[["type.name", "tactics.formation"]]
```

[7]:

	type.name	tactics.formation
2384	Tactical Shift	442
2757	Tactical Shift	352
3492	Tactical Shift	343

[8]:
```
tactical_shifts.to_pickle("tactical_shifts.pkl")
```

Hudl Statsbomb: Team's formation

statsbomb_0008.ipynb

Code | Open in... | Python 3 (ipykernel)

[1]:
```
import pandas as pd
```

[2]:
```
tactical_shifts = pd.read_pickle("tactical_shifts.pkl")
```

[3]:
```
exploded = tactical_shifts.explode('tactics.lineup').reset_index(drop=True)
normalized = pd.json_normalize(exploded["tactics.lineup"])
pd.concat([exploded[["type.name", "tactics.formation"]], normalized], axis=1).head(11)
```

[3]:

	type.name	tactics.formation	jersey_number	player.id	player.name	position.id	position.name
0	Tactical Shift	442	1	5570	Manuel Neuer	1	Goalkeeper
1	Tactical Shift	442	16	8507	Lukas Klostermann	2	Right Back
2	Tactical Shift	442	15	6322	Niklas Süle	3	Right Center Back
3	Tactical Shift	442	2	3167	Antonio Rüdiger	5	Left Center Back
4	Tactical Shift	442	3	12034	David Raum	6	Left Back
5	Tactical Shift	442	14	39565	Jamal Musiala	9	Right Defensive Midfield
6	Tactical Shift	442	6	5579	Joshua Kimmich	11	Left Defensive Midfield
7	Tactical Shift	442	19	3053	Leroy Sané	12	Right Midfield
8	Tactical Shift	442	10	8400	Serge Gnabry	16	Left Midfield
9	Tactical Shift	442	9	8546	Niclas Füllkrug	22	Right Center Forward
10	Tactical Shift	442	13	5562	Thomas Müller	24	Left Center Forward

position number	position abbreviation	position name
1	GK	Goalkeeper
2	RB	Right Back
3	RCB	Right Center Back
4	CB	Center Back
5	LCB	Left Center Back
6	LB	Left Back
7	RWB	Right Wing Back
8	LWB	Left Wing Back
9	RDM	Right Defensive Midfield
10	CDM	Center Defensive Midfield
11	LDM	Left Defensive Midfield
12	RM	Right Midfield
13	RCM	Right Center Midfield
14	CM	Center Midfield
15	LCM	Left Center Midfield

position number	position abbreviation	position name
16	LM	Left Midfield
17	RW	Right Wing
18	RAM	Right Attacking Midfield
19	CAM	Center Attacking Midfield
20	LAM	Left Attacking Midfield
21	LW	Left Wing
22	RCF	Right Center Forward
23	ST	Striker
24	LCF	Left Center Forward
25	SS	Secondary Striker

Hudl IQ
(American football)

The unrivaled standard for verified football data.

Powered by AI, computer vision and expert data collectors, Hudl IQ delivers **10x more data** than any one provider, and in less time.

- **Save Hours Every Week**
- **Advanced Physical Metrics**
- **Revolutionary Recruiting Tools**
- **Dedicated Analysis Platforms**
- **Commitment to Your Privacy**
- **Transparent Data Collection Methods**

02

Sportmonks

FREE SUBSCRIPTION

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You are currently on the Free Subscription, please check the leagues and features below

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Standard Data Features

4 Leagues

V3

Cricket Free Plan

Standard Data Features

3 Leagues

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Total of plan €0

Cricket
Cricket Free Plan €0

Total of plan €0

Free Widgets €0

Total of widgets €0

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This plan has *standard* features and access to API Version 3

	BASIC	STANDARD	ADVANCED
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Events	✓	✓	✓
Livescores	✓	✓	✓
Tv Stations	-	✓	✓
Commentaries	-	✓	✓
Match Statistics	-	✓	✓
Lineups	-	✓	✓
Ball Coordinates	-	-	✓
Trends Analyses	-	-	✓

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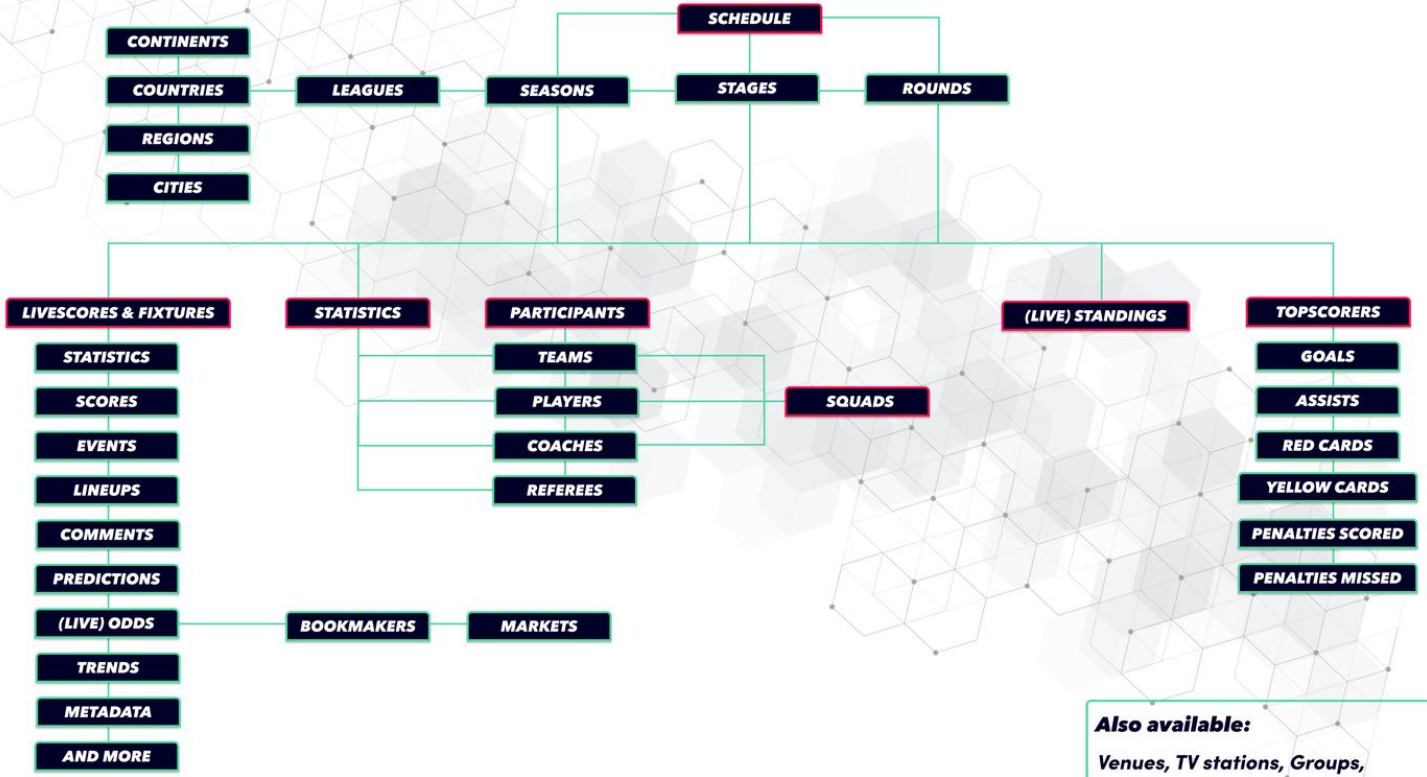
sportmonks.

API STRUCTURE

Subscription and API

- ENRICHMENTS
- FILTERS
- RESOURCES
- TYPES
- LEAGUES



Also available:

Venues, TV stations, Groups, Transfers, Rivals and More

Sportmonks: Leagues and countries

sportmonks_0001.ipynb

Code | Open in... | Python 3 (ipykernel)

[1]:
```
import pandas as pd
import requests
```

[2]:
```
API_TOKEN = "tqz8BHX2O0tyVADTRuvyBaGmLVrZkwcwrhfbRjR9T5ZAQWXovTUeBytl4onZ"
params = {"api_token": API_TOKEN}
```

Get leagues

[3]:
```
leagues = requests.get("https://api.sportmonks.com/v3/football/leagues", params=params).json()["data"]
len(leagues)
```

[3]:
```
4
```

[4]:
```
country_ids = set()
for league in leagues:
    country_id = league["country_id"]
    country_ids.add(country_id)
```

[5]:
```
country_ids
```

[5]:
```
{320, 1161}
```

Get countries

[6]:
```
for country_id in country_ids:
    name = requests.get(f"https://api.sportmonks.com/v3/core/countries/{country_id}", params=params).json()["data"]["name"]
    print(name)
```

```
Denmark
Scotland
```

Sportmonks: Fixtures (matches) by date

sportmonks_0002.ipynb

Code | Open in... | Python 3 (ipykernel)

[1]:
```
import pandas as pd
import requests
```

[2]:
```
API_TOKEN = "tqz8BHX2O0tyVADTRuvyBaGmLVrZkwcwrhfbRjR9T5ZAQWXovTUeBytl4onZ"
params = {"api_token": API_TOKEN}
```

Fixtures (matches) by date (`YYYY-MM-DD`)

[3]:
```
date = "2025-04-21"
data= requests.get(f"https://api.sportmonks.com/v3/football/fixtures/date/{date}", params=params).json()["data"]
matches = pd.json_normalize(data)
matches
```

[3]:

	id	sport_id	league_id	season_id	stage_id	group_id	aggregate_id	round_id	state_id	venue_id	name	starting_at	result_info	leg	details	length	placeholder	has_odds	has
0	19404981	1	271	23584	77471147	None	None	369912	5	4832	Vejle Boldklub vs Silkeborg IF	2025-04-21 12:00:00	Silkeborg IF won after full-time.	1/1	None	90	False	True	
1	19404982	1	271	23584	77471147	None	None	369912	5	1467	Viborg FF vs Lyngby Boldklub	2025-04-21 12:00:00	Game ended in draw.	1/1	None	90	False	True	
2	19404953	1	271	23584	77471146	None	None	369902	5	5659	Brøndby IF vs Randers FC	2025-04-21 14:00:00	Brøndby IF won after full-time.	1/1	None	90	False	True	
3	19404954	1	271	23584	77471146	None	None	369902	5	5655	FC København vs AGF	2025-04-21 16:00:00	FC København won after full-time.	1/1	None	90	False	True	

Sportmonks: Fixtures (matches) by date range

sportmonks_0003.ipynb

Code | Open in... | Python 3 (ipykernel)

[1]:
```
import pandas as pd
import requests
```

[2]:
```
API_TOKEN = "tqz8BHX2O0tyVADTRuvyBaGmLVrZkwcwrhfbRjR9T5ZAQWXovTUeBytl4onZ"
```

Fixtures (matches) by date range (max 100 days)

[3]:
```
start_date = "2025-01-01"
end_date = "2025-04-01"

data = []
page = 1
has_more = True

while has_more:
    params = {"api_token": API_TOKEN, "per_page": 50, "page": page}
    r = requests.get(f"https://api.sportmonks.com/v3/football/fixtures/between/{start_date}/{end_date}", params=params).json()
    data.extend(r["data"])
    has_more = r["pagination"]["has_more"]
    page += 1
```

[4]:
```
matches = pd.json_normalize(data)
matches.head(2)
```

[4]:

	id	sport_id	league_id	season_id	stage_id	group_id	aggregate_id	round_id	state_id	venue_id	name	starting_at	result_info	leg	details	length	placeholder	has_odds	has
0	19146817	1	501	23690	77471570	None	None	340593	5	8928	Aberdeen vs Ross County	2025-01-02 15:00:00	Ross County won after full-time.	1/1	None	90	False	True	
1	19146818	1	501	23690	77471570	None	None	340593	5	336296	Hearts vs Motherwell	2025-01-02 15:00:00	Hearts won after full-time.	1/1	None	90	False	True	

Sportmonks: Fixture (match) by ID

Sportmonks: Fixture (match) statistics

sportmonks_0005.ipynb

Code | Open in... | Python 3 (ipykernel)

[1]:
```
import pandas as pd
import requests
```

[2]:
```
API_TOKEN = "tqz8BHX2O0tyVADTRuvyBaGmLVrZkwcwrhfbRjR9T5ZAQWXovTUeBytl4onZ"
params = {"api_token": API_TOKEN, "include": "statistics.type;events;formations;timeline;lineups.details.type"}
```

[3]:
```
data = requests.get("https://api.sportmonks.com/v3/football/fixtures/19146817", params=params).json()["data"]
match = pd.json_normalize(data)
match.columns
```

[3]:
```
Index(['id', 'sport_id', 'league_id', 'season_id', 'stage_id', 'group_id',
       'aggregate_id', 'round_id', 'state_id', 'venue_id', 'name',
       'starting_at', 'result_info', 'leg', 'details', 'length', 'placeholder',
       'has_odds', 'has_premium_odds', 'starting_at_timestamp', 'statistics',
       'events', 'formations', 'timeline', 'lineups'],
      dtype='object')
```

[4]:
```
statistics = pd.json_normalize(match.statistics[0])
```

[5]:
```
statistics.head(5)
```

[5]:

	id	fixture_id	type_id	participant_id	location	data.value	type.id	type.name	type.code	type.developer_name	type.model_type	type.stat_group
0	207022998	19146817	34	273	home	9	34	Corners	corners	CORNERS	statistic	offensive
1	207023003	19146817	84	273	home	2	84	Yellowcards	yellowcards	YELLOWCARDS	statistic	overall
2	207023280	19146817	1605	273	home	33	1605	Successful Dribbles Percentage	successful-dribbles-percentage	SUCCESSFUL_DRIBBLES_PERCENTAGE	statistic	offensive
3	207023287	19146817	1605	246	away	38	1605	Successful Dribbles Percentage	successful-dribbles-percentage	SUCCESSFUL_DRIBBLES_PERCENTAGE	statistic	offensive
4	207023271	19146817	45	273	home	66	45	Ball Possession %	ball-possession	BALL_POSSESSION	statistic	overall

sport round stage group aggregate league season venue state
weatherReport lineups events timeline comments trends statistics
periods participants odds premiumOdds ↗ inplayOdds postmatchNews
prematchNews metadata tvStations predictions referees formations
ballCoordinates sidelined metadata scores

Sportmonks: Fixture (match) events

sportmonks_0006.ipynb

Code | Open in... | Python 3 (ipykernel)

[1]:
```
import pandas as pd
import requests
```

[2]:
```
API_TOKEN = "tqz8BHX2O0tyVADTRuvyBaGmLVrZkwcwrhfbRjR9T5ZAQWXovTUeBytl4onZ"
params = {"api_token": API_TOKEN, "include": "events"}
```

[3]:
```
data = requests.get("https://api.sportmonks.com/v3/football/fixtures/19146817", params=params).json()["data"]
match = pd.json_normalize(data)
```

[4]:
```
events = pd.json_normalize(match.events[0])
len(events)
```

[4]: 17

[5]:
```
events.head(5)
```

[5]:

	id	fixture_id	period_id	participant_id	type_id	section	player_id	related_player_id	player_name	related_player_name	...	info	addition	minute	extra_minute	injured	on_ber
0	148273586	19146817	5800865	273	18	event	173059	464190.0	Kevin Nisbet	Ester Sokler	...	None	1st Substitution	30	NaN	None	Fa
1	148273591	19146817	5800865	246	19	event	123690	NaN	James Brown	None	...	Foul	2nd Yellowcard	31	NaN	None	Fa
2	148273534	19146817	5800865	273	19	event	37344344	NaN	T. Keskinen	None	...	Foul	1st Yellowcard	23	NaN	None	Fa
3	148273728	19146817	5800865	273	14	event	173059	NaN	Kevin Nisbet	None	...	Field Goal	2nd Goal	45	11.0	None	Fa
4	148273645	19146817	5800865	246	18	event	4893665	546803.0	George Harmon	Michee Efete	...	None	2nd Substitution	44	NaN	None	Fa

5 rows × 21 columns

Sportmonks: Fixture (match) timeline

sportmonks_0008.ipynb

Code | Open in... | Python 3 (ipykernel)

[1]:
```
import pandas as pd
import requests
```

[2]:
```
API_TOKEN = "PTdd20P9btERrQPcRSTXpxLtfl2iIwz7OWi8LrLg9jhw51MtOC9CtTuWzP6Y"
params = {"api_token": API_TOKEN, "include": "timeline"}
```

[3]:
```
data = requests.get("https://api.sportmonks.com/v3/football/fixtures/19146817", params=params).json()["data"]
match = pd.json_normalize(data)
```

[4]:
```
timeline = pd.json_normalize(match.timeline[0])
len(timeline)
```

[4]: 17

[5]:
```
def head_skip_all_nan(df, n):
    return df.dropna(axis=1, how='all').head(n)

head_skip_all_nan(timeline, 5)
```

[5]:

	id	fixture_id	period_id	participant_id	type_id	section	addition	minute	extra_minute	on_bench	sort_order
0	148273597	19146817	5800865	246	126	timeline	3rd Corner	37	NaN	False	3
1	148273435	19146817	5800865	246	126	timeline	1st Corner	6	NaN	False	1
2	148273535	19146817	5800865	246	126	timeline	2nd Corner	24	NaN	False	2
3	148273629	19146817	5800865	273	126	timeline	6th Corner	38	NaN	False	6
4	148273735	19146817	5800865	273	126	timeline	8th Corner	45	NaN	False	8

Sportmonks: Formations

sportmonks_0007.ipynb

Code | Open in... | Python 3 (ipykernel)

[1]:
```
import pandas as pd
import requests
```

[2]:
```
API_TOKEN = "tqz8BHX2O0tyVADTRuvyBaGmLVrZkwcwrhfbRjR9T5ZAQWXovTUeBytl4onZ"
params = {"api_token": API_TOKEN, "include": "formations"}
```

[3]:
```
data = requests.get("https://api.sportmonks.com/v3/football/fixtures/19146817", params=params).json()["data"]
match = pd.json_normalize(data)
```

[4]:
```
formations = pd.json_normalize(match.formations[0])
```

[5]:
```
formations.head(5)
```

[5]:

	id	fixture_id	participant_id	formation	location
0	8387600	19146817	246	3-5-1-1	away
1	8387601	19146817	273	4-2-3-1	home

Sportmonks: Fixture (match) lineups

sportmonks_0009.ipynb

Code | Open in... | Python 3 (ipykernel)

[1]:
```
import pandas as pd
import requests
```

[2]:
```
API_TOKEN = "PTdd20P9btERrQPcRSTXpxLtfl2iIwz7OWi8LrLg9jhw51MtOC9CtTuWzP6Y"
params = {"api_token": API_TOKEN, "include": "lineups.details.type"}
```

[3]:
```
data = requests.get("https://api.sportmonks.com/v3/football/fixtures/19146817", params=params).json()["data"]
match = pd.json_normalize(data)
```

[4]:
```
lineups = pd.json_normalize(match.lineups[0])
len(lineups)
```

[4]:
```
40
```

[5]:
```
def head_skip_all_nan(df, n):
    return df.dropna(axis=1, how='all').head(n)

head_skip_all_nan(lineups.drop('details', axis=1), 5)
```

[5]:

	id	sport_id	fixture_id	player_id	team_id	position_id	type_id	formation_position	player_name	jersey_number
0	14597927439	1	19146817	123690	246	26	11	5.0	James Brown	2
1	14597927412	1	19146817	580993	246	25	11	4.0	Ryan David Leak	3
2	14597927435	1	19146817	9654	246	25	11	2.0	Akil Wright	4
3	14597927126	1	19146817	174741	246	26	12	NaN	Scott Allardice	6
4	14597927130	1	19146817	34422813	246	26	12	NaN	Victor Loturi	7

[6]:
```
lineups.to_pickle("lineups.pkl")
```

Sportmonks: Fixture (match) lineups details

sportmonks_0010.ipynb

Code | Open in... | Python 3 (ipykernel)

[1]:
```
import pandas as pd
import requests
```

[2]:
```
lineups = pd.read_pickle("lineups.pkl")
```

[3]:
```
exploded = lineups.explode('details').reset_index(drop=True)
normalized = pd.json_normalize(exploded["details"])
pd.concat([exploded.drop('details', axis=1), normalized[["data.value", "type.name"]]], axis=1)
```

[3]:

	id	sport_id	fixture_id	player_id	team_id	position_id	formation_field	type_id	formation_position	player_name	jersey_number	data.value	type.name
0	14597927439	1	19146817	123690	246	26	None	11	5.0	James Brown	2	75	Accurate Passes Percentage
1	14597927439	1	19146817	123690	246	26	None	11	5.0	James Brown	2	6	Total Duels
2	14597927439	1	19146817	123690	246	26	None	11	5.0	James Brown	2	2	Fouls Drawn
3	14597927439	1	19146817	123690	246	26	None	11	5.0	James Brown	2	4	Duels Won
4	14597927439	1	19146817	123690	246	26	None	11	5.0	James Brown	2	12	Accurate Passes
...	...	...	...	...	...	...	...	...	...	...	...	...	...
880	14597927129	1	19146817	37344344	273	26	None	11	8.0	Topi Keskinen	81	1	Big Chances Missed
881	14597927129	1	19146817	37344344	273	26	None	11	8.0	Topi Keskinen	81	27	Possession Lost
882	14597927129	1	19146817	37344344	273	26	None	11	8.0	Topi Keskinen	81	1	Passes In Final Third
883	14597927129	1	19146817	37344344	273	26	None	11	8.0	Topi Keskinen	81	8	Backward Passes
884	14597927129	1	19146817	37344344	273	26	None	11	8.0	Topi Keskinen	81	5	Turn Over

885 rows × 13 columns

03

Understat

Expected goals (xG) is the new revolutionary football metric, which allows you to evaluate team and player performance.

In a low-scoring game such as football, final match score does not provide a clear picture of performance.

This is why more and more sports analytics turn to the advanced models like xG, which is a statistical measure of the quality of chances created and conceded.

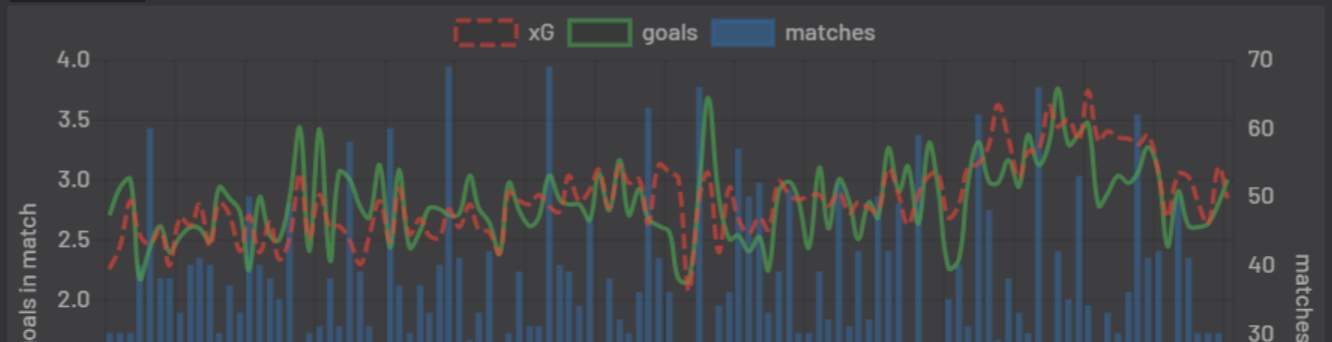
Our goal was to create the most precise method for shot quality evaluation.

For this case, we trained neural network prediction algorithms with the large dataset (>100,000 shots, over 10 parameters for each).

On this site, you will find our detailed xG statistics for the top European leagues.

league

EPL



04

Extras

mplsoccer

Public

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andrewRowlinson update python version to a minimum of 3.10 (#117) 64c1db1 · last month 695 Commits

docs	refactored mplsoccer for multiple sports (#115)	2 months ago
examples	refactored mplsoccer for multiple sports (#115)	2 months ago
mplsoccer	update python version to a minimum of 3.10 (#117)	last month
tests	refactored mplsoccer for multiple sports (#115)	2 months ago
.gitignore	refactored mplsoccer for multiple sports (#115)	2 months ago
.pylintrc	update .pylintrc and linting fixes.	3 years ago
.readthedocs.yml	Install via uv rather than Conda. Fix docs.	8 months ago
CHANGELOG.md	update python version to a minimum of 3.10 (#117)	last month
LICENSE	Install via uv rather than Conda. Fix docs.	8 months ago
README.md	fix README version 1.2.1.	2 years ago
pyproject.toml	update python version to a minimum of 3.10 (#117)	last month

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About

Football pitch plotting library for matplotlib

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Choose a League

Then a Club

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The sports search engine that was made for *fans like you*

The dev-friendly football API

RESTful. Reliable. Free to use. Easy to integrate.

Did you realize the delay in the table below? That was the time it took to make a

```
GET https://api.football-data.org/v4/matches
```

in the background. But in the end it's that easy... one request.

Date/Status	Opponents			Score
FINISHED	Grêmio FBPA	vs.	CR Vasco da Gama	2:0
FINISHED	Fluminense FC	vs.	CR Flamengo	2:1
20/11/2025 19h00 TIMED	EC Juventude	vs.	Cruzeiro EC	-:-
20/11/2025 22h30 TIMED	SC Corinthians Paulista	vs.	São Paulo FC	-:-
20/11/2025 21h00 TIMED	EC Bahia	vs.	Fortaleza EC	-:-
FINISHED	Santos FC	vs.	Mirassol FC	1:1

05

Learning materials

The Strings That Bind Us

Episode aired Apr 26, 2023 · TV-MA · 57m

Comedy Drama Sport

The Greyhounds try a new strategy that has everyone thinking outside the box. Sam prepares to host a VIP guest at Ola's.

★ **8.3**/10 8.4K ☆ Rate

Director Matt Lipsey

Writers Phoebe Walsh · Sasha Garron · Keeley Hazell

Stars Jason Sudeikis · Hannah Waddingham · Jeremy Swift

FOOTBALL STATSBOMB PERFORMANCE ANALYSIS

How To Get Started In Football Analytics

29 AUG 2024 7 MIN READ

Since our inception, Hudl Statsbomb has been at the forefront of educating the next generation of football analysts. We're committed to providing materials and resources to develop the skills needed to enter the industry, from free datasets and code to industry-standard education and training courses. We've opened the doors to our extensive knowledge base, all to help aspiring analysts hone their craft.

One of the most common questions we receive is, "How do I get started in football analytics?" This article is our answer — a comprehensive guide that gathers all our resources in one place, designed to be your go-to reference for both inspiration and education. Whether you're just starting out or looking to upskill, you'll find everything you need here.

How to Learn Sports Analytics for Beginners: A Step-by-Step Guide

By McKay Johns • November 24, 2024

If you feel lost with learning sports analytics, let's dive into the step by step guide on how to do it.

Python R sports analytics coding

Sports analytics has revolutionized how teams, coaches, and fans understand the game. From predicting player performance to optimizing game strategies, analytics plays a pivotal role in modern sports. If you're a beginner intrigued by the idea of analyzing game data and uncovering actionable insights, this guide will show you how to get started.

What is Sports Analytics?

Specialization - 5 course series

Sports analytics has emerged as a field of research with increasing popularity propelled, in part, by the real-world success illustrated by the best-selling book and motion picture, Moneyball. Analysis of team and player performance data has continued to revolutionize the sports industry on the field,

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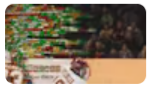
Moneyball and Beyond

Course 2 • 28 hours



Prediction Models with Sports Data

Course 3 • 33 hours

Wearable Technologies and Sports Analytics

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06

Closing slides

python-on-the-pitch-pytech-summit-2025

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Introduction to Football Analytics with Python

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