SKILLcorner

Dynamic Events

CSV Specifications

2025/02/16

Changelog Since 2024/07/12

1/ Addition of one New Out of Possession Dynamic Event: On-Ball Engagement

2/ Addition of Phase of Play information.

3/ Reordering of the columns and bug correction.

- To include phases of play properly we reorder the columns in the csv file that is delivered.
- We noticed that previously the values for the game_interruption_before, game_interruption_before_id were inverted with game_interruption_after, game_interruption_after_id. We have corrected this issue in the new version.

Changelog Since 2024/02/15

1/ Addition of two New Dynamic Events: Passing Options and Player Possessions

2/ Changes to Off-Ball runs Dynamic Event

<u>New data points including</u>

- Positions (LWB, LB, CD, ...) of the player in possession and the player performing the off-ball runs.
- Game states (winning, losing, drawing) and team scores at the moment of the event.
- last_defensive_line_height (distance of the last defender from their own goal).

<u>Renaming of attributes</u>

Former name	**New name**
player_possession_frame_start	associated_player_possession_frame_start
passing_option	predicted_passing_option
passing_option_start	passing_option_at_start
simultaneous_runs	n_simultaneous_runs
opponents_ahead_start	n_opponents_ahead_start
opponents_ahead_end	n_opponents_ahead_end
opponents_overtaken	n_opponents_overtaken

<u>Give and Go</u>

Previously, we classified as give_and_go any off-ball runs that started within 2 seconds after a pass from the same player.

Based on feedback we have received we have decided to restrict it to off-ball runs of subtype behind, cross_receiver, overlap, pulling_half_space, pulling_wide, run_ahead_of_the_ball, underlap, support (for support run we also impose that it starts in the attacking third and in a half_space/the central channel).

As a consequence, coming_short, dropping_off and some support off-ball runs are not taken into account to determine whether there is a give and go or not.

Event filtering

Previously, we only considered off-ball runs where we were able to match the tracking data with the end of the associated player possession.

Now, we include cases where tracking data could not be matched. We provide the field is_player_possession_end_matched to indicate whether the end of the possession was successfully matched.

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Tracking Data

Dynamic Events are generated using SkillCorner Tracking v3.

Many **Dynamic Event** attributes are derived either directly **from tracking data or** through machine learning models using tracking data as input.
Hence **the quality of Dynamic Events depends on the quality of SkillCorner Tracking v3**.

This quality can be affected by several factors, including:

- Video feed quality and associated production limitations (such as close-ups, replays, and players moving out of the camera's field of view)
- Camera location and stadium conditions
- SkillCorner ability to accurately detect the player and the ball, as well as read jersey numbers

To reduce the risk of delivering inaccurate information, we only provide Dynamic Events for matches that meet the following criteria:

- A quality index above 4 for both the players and the ball
- Successful matching of a sufficient number of Wyscout events with SkillCorner Tracking v3.

For more information on the quality of SkillCorner Tracking v3, please refer to the associated validation study.

Event Definitions

Player Possession

For an activity to be detected as a **Player Possession (PP)** the player needs to be in control of the ball, i.e. able to do a pass, shot or carry.

A player possession starts from the first touch of the player up to the last touch.

A one-touch is a player possession that lasts only one frame.

If a player is not in control of the ball then it does not qualify as a player possession.

Typically, if a player intercepts the ball without controlling it afterward, like for blocks, it does not count as a player possession.

Off-ball Run

For an activity to be detected as an (in possession) **Off-Ball Run (OBR)** it needs to have the following characteristics:

- lasts at least 0.7 seconds,
- be above 4.2 m/s = 15 km/h,
- the player needs to have been on screen for at least 0.5 second during his run.

Additionally, the runner needs to be a passing option during or within 8 frames of his active run finishing or have received a pass after/during his run.

We extend the window as a player can make an active run, in anticipation of the ball carrier turning towards them to make a pass, but they may only become an option after they have stopped their run.

For more details on what off-ball runs are and which are the different types we detect, please refer to this article.

We detect Off-Ball Runs occurring during a Player Possession i.e. when a player is in control of the ball.
As a consequence, we don't detect Off-Ball Runs occurring during set pieces or restarts.

Passing Option

For an activity to be detected as a **Passing Option (PO)** it needs to have the following characteristics:

- The player performing the event should be a highly likely target for a pass by the player in possession as predicted by our Receiver Model. It is reflected by the constraint that the player passing option score should be above 0.6.
- Lasts at least 0.3 seconds.

The passing option score is derived from our Receiver Model that predicts at each moment whether a player is a likely target for a pass. For further details read this article.

Certain players while being close to the player in possession may not be identified as passing options since on average they are not targeted by the player in possession.

We also create a Passing Option event whenever a player has been targeted by a pass regardless of his passing option score.

If the player who was targeted by the pass did not have a passing option score above 0.6 for 0.3 seconds before being targeted, the event we create lasts 0.3 seconds and it ends with the frame of the pass from the player in possession.

We detect Passing Options occurring during a Player Possession i.e. when a player is in control of the ball.

As a consequence, we don't detect Passing Options occurring during set pieces or restarts.

To detect passing options for one-touch passes (that lasts only one frame), we extend the window to determine what are the passing options by two frames before and two frames after the first touch.

On-ball Engagement

For an activity to be detected as an **On-Ball Engagement (OBE)**, it must satisfy two criteria:

1. The event is performed by a player from the team out of possession.
2. The player is interacting with the player in possession in a way that influences their action—either by actively pressing/challenging them or by controlling/containing their movement.

To determine whether a player is engaging the player in possession, we use a machine learning model (GNN LSTM) that predicts, for each frame, if an on-ball engagement (OBE) is occurring.

This model was trained using "expert" annotations, which are sequential in nature and define both the start and end of each engagement. The criteria for identifying these points are based on player positions, distances, and dynamics.

Since some on-ball engagements can originate from a significant distance—such as in recovery press, where the defender starts far from the player in possession—we introduced a secondary attribute called physical_frame_start. This attribute indicates when the player began moving at a speed of over 15 km/h and maintained it up to the point of engaging the player in possession.

Relationship Between Events

Every Passing Option and every Off-Ball Run is associated with one and only one Player Possession.
It is the Player Possession when the event occurs.

A Passing Option or an Off-ball Run can start before and end after the player possession it is associated with but it can't overlap with two player possession.

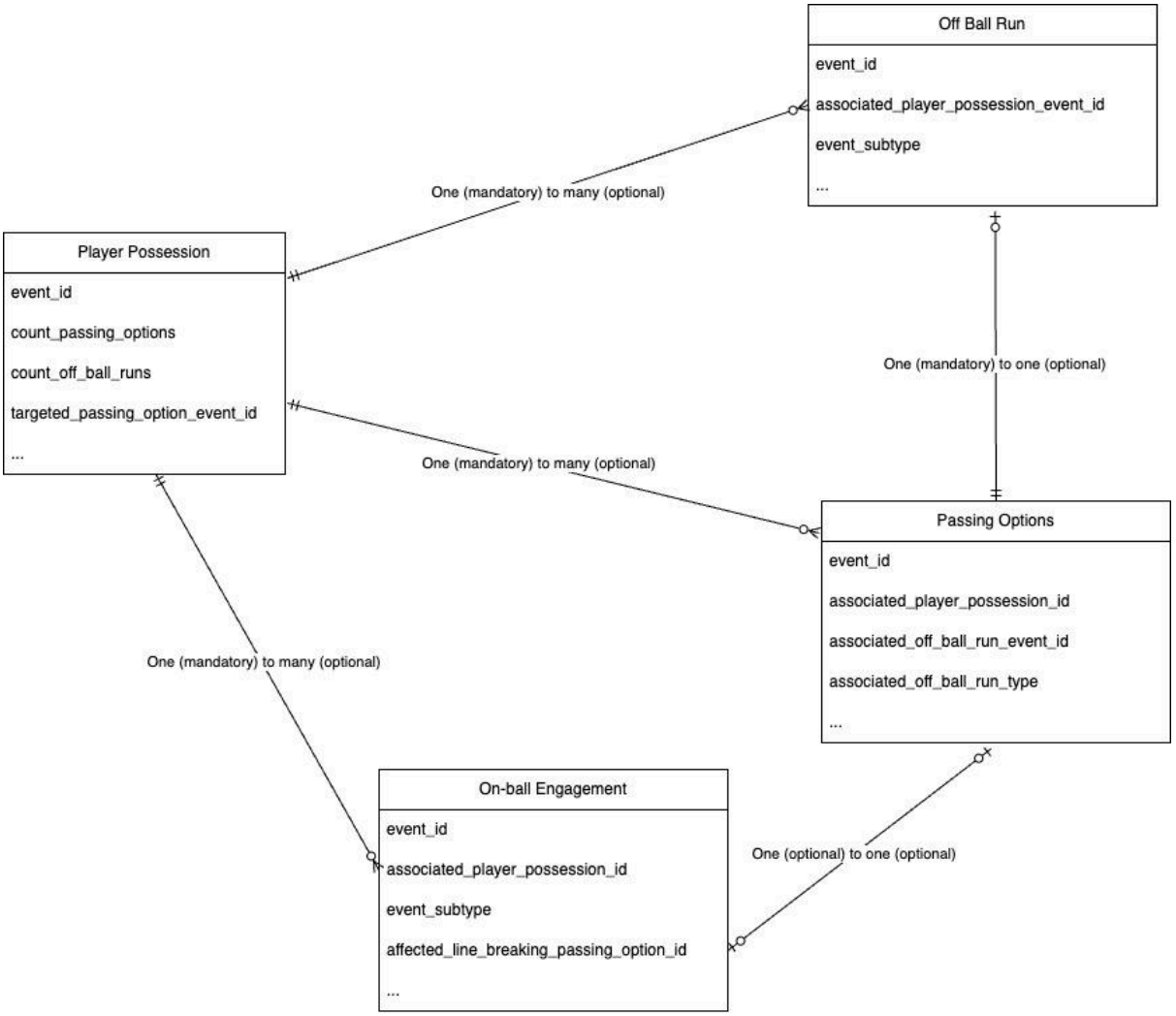
Consequently, if a player is a passing option over several consecutive player possessions it will be represented by several passing option events (one for each player possession where the player is a passing option).

Every Off-Ball Run is associated with one and only one Passing Option.
For a player to be recorded as performing an Off-Ball Run, they need to have been a Passing Option at one point during his Off-Ball Run.

For a given Player Possession, if the player in possession attempted a pass, the Player Possession event references the Passing Option that was targeted.

The Player Possession event aggregates and references numerous data points related to the Passing Options and Off-Ball Runs that occurred during the Player Possession.

Every On-ball Engagement is associated with one and only one Player Possession event and it can be associated with one (line breaking) Passing Option.



Merging Consecutive Events

If during the same player possession, two Passing Options are recorded for the same player with less than 0.5 sec between them, then the two events are merged into a single one.

If during the same player possession, two Off-Ball Runs are recorded for the same player with less than 0.5 sec between them, then the two events are merged into a single one.

If during the same player possession, two On-Ball Engagement are recorded for the same player with less than 0.5 sec between them, then the two events are merged into a single one.

Window Extension

For any events that last less than 5 frames like a one touch pass, we use the 5 frames leading to the end of the event to compute speeds and trajectory angles.

Passing Moment Frame Selection

For each Passing Option and Off-ball Run event, we assign a passing_option_score, xthreat value, xpass_completion value and line breaking pass opportunity.

When a player is served a pass we compute the metrics at the moment of the pass.

When the player is not served, we compute the metrics at a (theoretical) passing moment.

The passing moment corresponds to the most likely passing moment the player could have been served the ball. It is the frame that, when passing_option_score is above 0.6, maximises:

$$passing\_option\_score \times xthreat \times xpass\_completion$$

This calculation maximises the threat potential ($xthreat \times xpass\_completion$) and weights it via the passing_option_score (likeliness of receiving the ball next).

We deliver the corresponding frame for Passing Option events under the attribute peak_passing_option_frame.

Model Used

Model used	Role	Associated Metrics
Receiver model (see details here)	A standardised score to measure the likelihood of a player being the target of a pass at a given frame. This model is used to determine whether a player is a passing option (to do so he needs to have passing_option_score > 0.6).	passing_option_score; passing_option; passing_option_start
xThreat model (see details here)	Probability for a goal to happen within 10 sec if a given player was to be the target of a complete pass at a given frame.	xthreat; dangerous_run; player_targeted_dangerous

Pass completion model (Graph Neural Network)	Probability of completing a pass to a player at a given frame.	xpass_completion; difficult_target; player_targeted_difficult
Run classification model (see details here)	Determines the type of off-ball run performed.	event_subtype
On-ball engagement detection (GNN-LSTM)	Detect on-ball engagements.	event_type
On-ball engagement classification (GNN-LSTM)	Determine the type of on-ball engagement.	event_subtype
Expected Possession Value (GNN-LSTM)	Determine the chances for a team to score within the next 90 seconds or before the ball goes out of play.	possession_danger; beaten_by_possession; beaten_by_movement; stop_possession_danger; reduce_possession_danger;
Progression model (GNN-LSTM)	Considering current player possession predicts whether it will end with a loss, a shot, a progression, regressive or neutral complete pass.	force_backward; xloss_player_possession_start; xloss_player_possession_end; xloss_player_possession_max; xshot_player_possession_start; xshot_player_possession_end; xshot_player_possession_max

Direction Of Play And Pitch Coordinates

We deliver every player orientation dependent attribute - except attacking_side and attacking_side_id - assuming the team in possession is attacking from left to right.

It means that, for each period, we mirror the coordinates of the team that is actually attacking from right to left.

We consider that the center of the pitch coordinates are (0,0).
Coordinates are expressed in metres.

Event Matching

In order to produce Dynamic events, we combine SkillCorner Tracking data with Wyscout Events.

Our ability to synchronise our tracking data with Wyscout events is critical and it also reflects our confidence in the accuracy of our dynamic events.

We check whether we are able to match:

- the start of a player possessions (this one does not exist in Wyscout, we have trained our own model to detect the beginning of a player possession)
- end of player possessions
- pass receptions

For every event we report whether we were able to match the start of the player possession, its end, and if relevant the previous pass and the next pass reception.
This matching is based on the distance between the player and the ball.

If we are not able to match any of these, the quality of the data associated with these particular moments can be lowered.

Empty Attribute Values

Several attributes including speed_avg, xy coordinates, or passing_option_score, xthreat, xpass_completion can sometimes be empty.

This is due to either the absence of enough information to deliver the metrics (e.g. when there is a very long close shot we don't provide tracking data after 10 sec) or, due to low confidence in the data (in particular for speed_avg).

Further details can be found in the description of the attributes.

Line Breaking Passes

For every Passing Option event (whether the player was served or not) we serve information about (potential) line breaks, especially which line is broken and how (through or around).

To identify line breaks we:

1. Determine if there is a defensive structure and the associated lines in place.
2. If there is a defensive structure, we determine whether these lines are (could have been) broken.

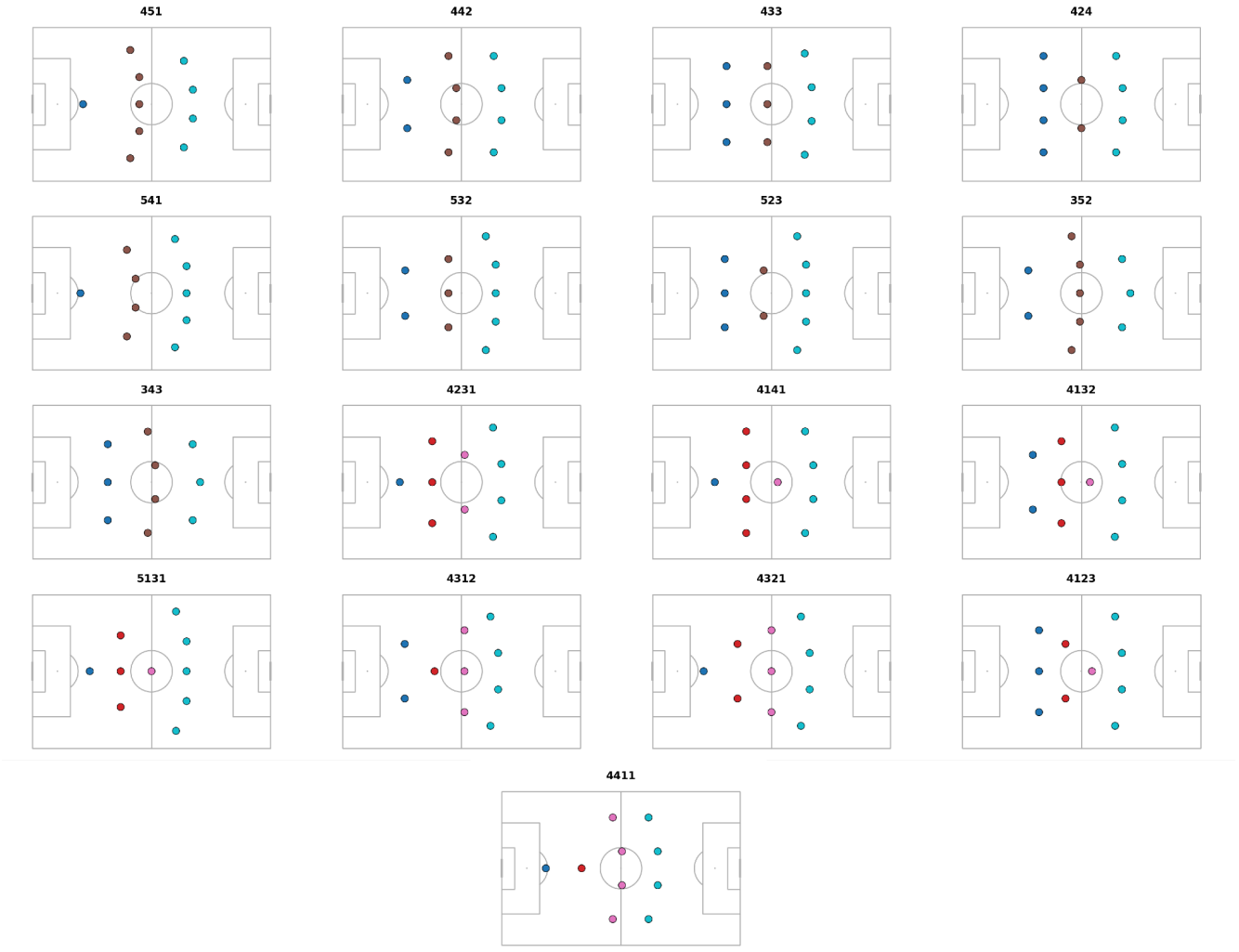
Defensive Structure

We use the terminology defensive structure and not formation to reflect that these structures can be dynamic and evolve significantly during the same play.

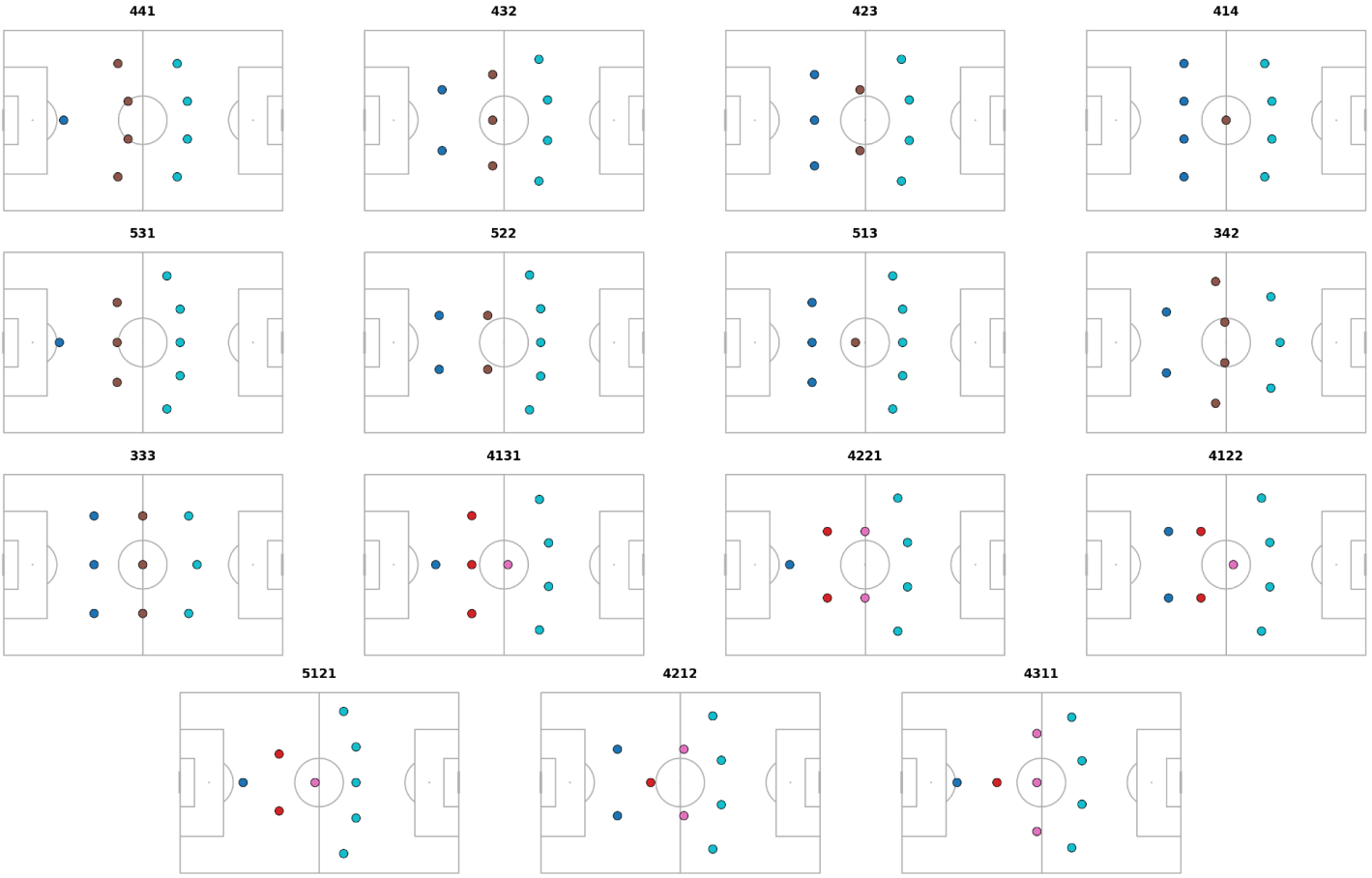
Templates

We have a set of defensive structures *Templates* that correspond to the defensive structure we can detect.

Here are the *Templates* for a team of 11 defending players :



Here are the *Templates* for a team of 10 defending players (in case of a red card).



In case of 2 missing players we don't detect any defensive structure and we don't deliver line breaks.

Defensive Structure

For each Passing Option, we find which defensive structure *Template* fits best with the defending players positions during the pass if one occurs or at the passing moment if not.

For the Passing Options that were not served, we detect the defensive structure by looking at the defending teams players positions between:

- the passing moment
- and passing moment + 1 second

Serving Line Breaks

We define a line break situation as one where the defending team is organised and the state of play is not a counter attack or chaotic phase.

We have trained a model which evaluates how structured the defending team is using features like the speeds of the players and how well the defending team's structure fits a template.

As a result we rule out counter attacks, chaotic phases or situations where the defensive unit is highly disorganised and defensive lines cannot be clearly defined by using our machine learning model.

As a result we provide a field, organised_defense, which if True we deliver the defensive structure we identified and if False we do not provide a value.

Defensive Lines

If there is no structure then we don't define lines and we don't deliver line breaks.

If there is a structure then we define a line as a block of 2 or more players in the defensive structure.

Defensive Lines Naming Convention

The last defensive line is the one closest to the goal of the defending team.

The second last defensive line is the second closest to the defending team's goal.

If there are at least three lines, the first defensive line is the furthest from the defending team's goal.

A defensive line is not necessarily a straight line but rather a set of segments that links the players that are part of the same line.

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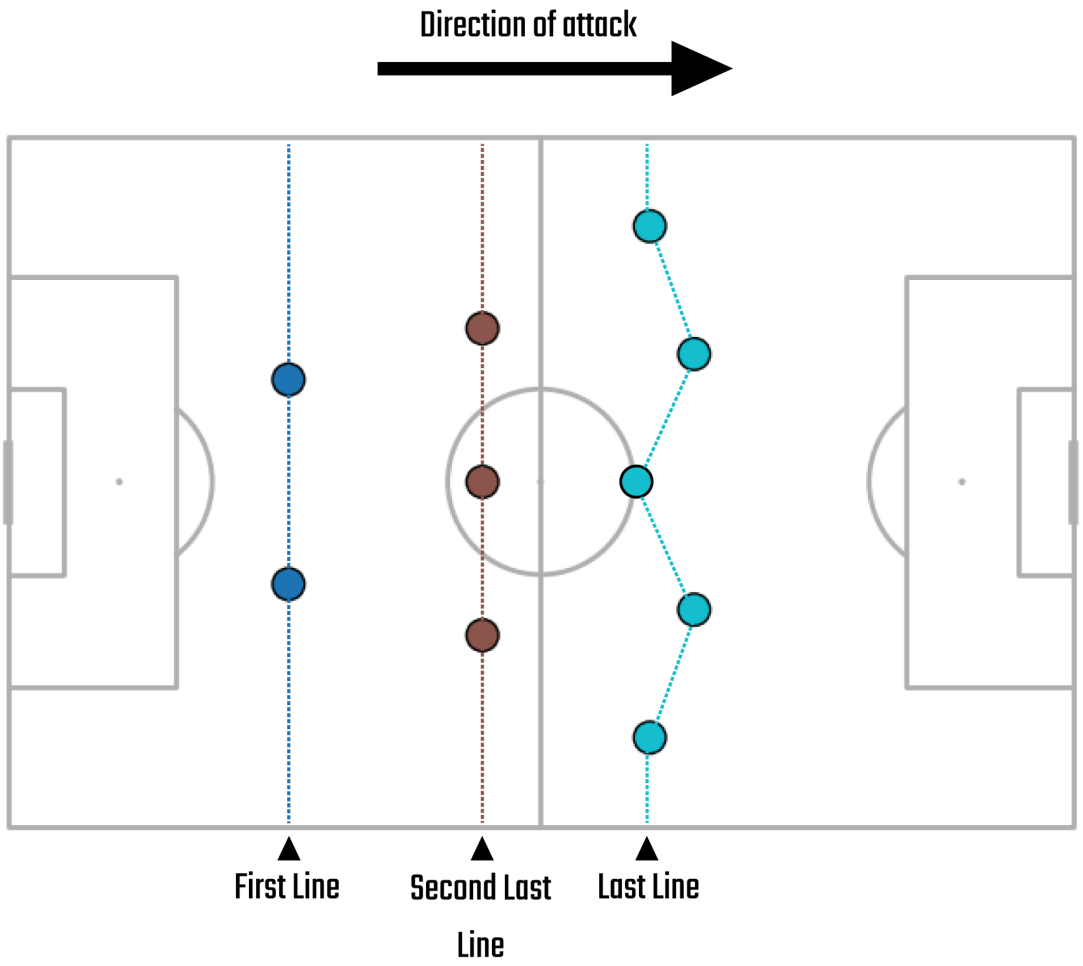
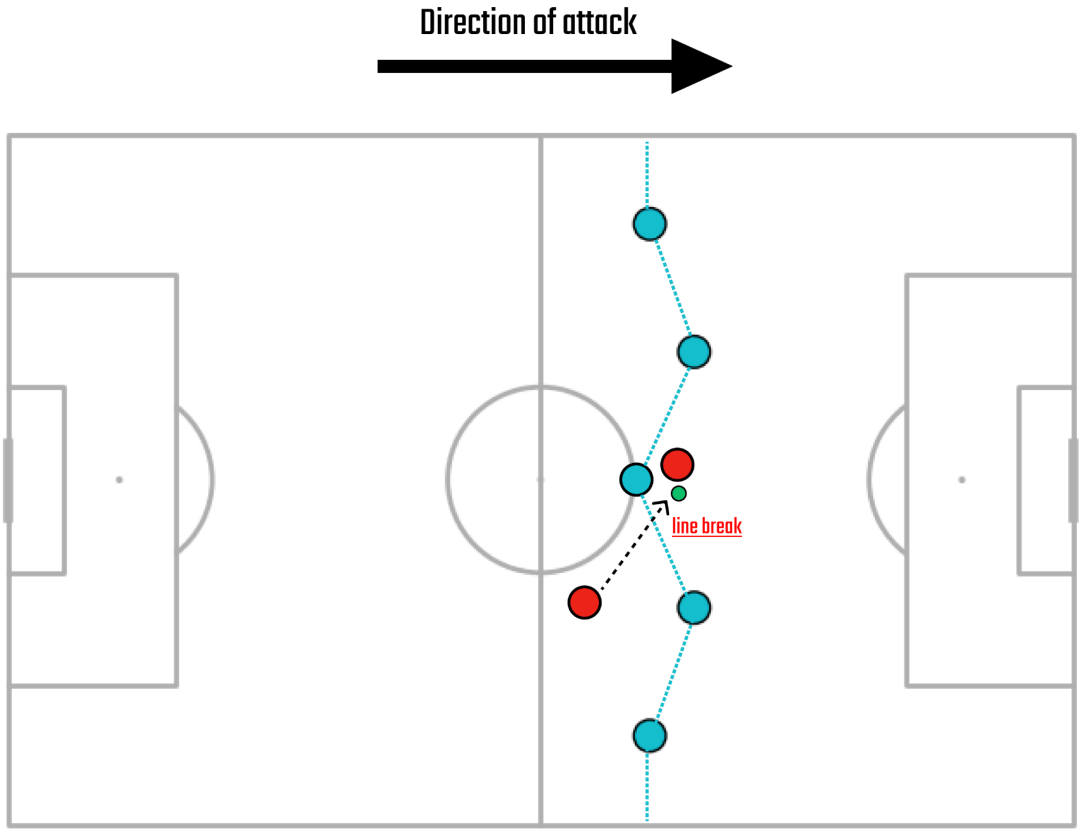


If we have been able to identify a defensive structure and the associated defensive lines, the next step is to deliver line breaks.

Determining Whether A Line Is Broken

For successful passes, we track the ball and player positions for each frame of the pass.

We determine if the line has been bypassed, either through or around the defenders.
To determine if a line has been bypassed, we check whether the ball is at the left of the line at the frame of the pass, and at the right of the line at the moment of the reception.



As seen in the figure above, we do not simply draw a horizontal line; the line follows the organization of the players within the unit. Therefore, breaking a line does not necessarily mean surpassing the deepest defender. We choose this approach as it better reflects the actual football situation. In the example above, the receiver does not break the 'deepest line' but bypasses the central defender and receives the ball between the two wider center-backs. Given the space the attacker now has in front of them, it makes sense to say the line has been broken.

Then, we use a Machine Learning model to filter non relevant line breaks (for example passes that bypassed the line around with a very high angle, passes that bypassed the line through 2 defenders that are 30 metres away from each other, passes where the pass distance is very low, …). This model is based on geometrical features about the pass (pass distance, pass angle, distance passer-line, distance receiver-line, …).

For unsuccessful passes, we track the ball and player positions for each frame until the ball is intercepted or goes out of play. Then depending on whether the ball was intercepted closely, we can rely on the actual trajectory of the ball or infer it to detect line breaks.
Then as for complete pass, we use the Machine Learning model to filter non relevant line breaks.

For Passing Options that were not targeted by a pass, we only know the passing moment using the passing moment equation. We infer the trajectory of the pass the player in

possession would have played to the passing option and determine what potential line break would have occurred. Once again, we then filter out non relevant line breaks using the same Machine Learning model as for previous situations.

The methodology used to infer ball trajectory is based on the player 's speed and trajectory. We validated this methodology on actual successful passes. To do so we predicted whether a line break would have occurred on a set of actual successful passes and we reached an accuracy of 95%.

We have been asked several times whether we could predict if a pass would be played over a line. As of now we are not confident with predicting it accurately.
For every successful pass we deliver the high_pass flag that indicates whether the ball reached at least 1.8m during the pass. As a result, for every successful pass, one is able to further determine if a line breaking pass went around through and/or over the line(s).

For unsuccessful pass attempts, we indicate when the ball went above 1.8m (high_pass = True) but we cannot say it would not have. It means that the value of high_pass can only be True or None in this case.

Phases Of Play

For each dynamic event, we specify the corresponding phase of play:

- Phases of play capture which phase the attacking and defending team are in concurrently.
- Phases of play are only defined when the ball is in play. When the ball is out of play there is no phase of play.
- Each in-possession phase directly corresponds to an out-of-possession phase.

In Possession Phase	**Out of Possession Phase**	**Description** (from the team in possession point of view)
Build up	High Block	The ball is in the team's own third; the ball carrier is under pressure or the opposing players are positioned and stay very high.
Create	Medium Block	This is the default phase, typically occurring near the middle third of the pitch. However, it can also take place: • In the team in possession defensive third, if the ball carrier is not under pressure, or • In the team in possession attacking third, if the defending team's last defensive line is positioned away from its penalty area.
Finish	Low Block	The ball is in the final (attacking or defending depending on point of view) or middle third; the defensive line is close to the penalty area, with established possession for at least 1 second.

Direct	Defending Direct	Begins with a long ball pass (32+ meters along the x axis, without being a switch of play) from own half targeting a player near reception, lasting until reception.
Quick Break	Defending Quick Break	Starts with regaining possession in the opponent's half, followed by rapid progression up the pitch.
Transition	Defending Transition	Begins with regaining possession in own half, followed by rapid progression up the pitch.
Set Play	Defending Set Play	This phase includes corners, free-kicks, and long throw-ins directed into the penalty area. The phase ends when: ● The opposition establishes clear possession, ● The ball is cleared back to the defending team's half, ● The ball goes out of play, or ● 20 seconds have passed since the set piece was taken. Important point: It excludes quick free-kicks in the team's own half or any free-kick without a cross attempt within 10 seconds, unless in a wide channel. These free-kicks are considered as the start of Build Up, Create or Finish.
Chaotic	Chaotic	A chaotic phase is marked by a short contested possession. For a phase to avoid being labelled chaotic, it must meet one of these criteria: ● Include at least three passes with no more than one header, or ● Involve at least 5 seconds of possession. Clearances under pressure are always considered chaotic.

How It Works

To establish which team has possession at any given moment, we apply specific rules based on player possession dynamic events:

1. When a player has possession, their team is considered to be in possession.
2. If two consecutive player possessions are recorded for the same team (Team A), then Team A retains possession between those possessions.
3. If possession transitions between two teams (Team A and Team B), possession shifts to Team B at the start of their player possession event.
4. If no events (player possession, set piece or goal) occur for more than 30 seconds, we consider the ball to be out of bounds.

Once team possession is established, we break it down into sequences to which we attach one for the aforementioned phases of play. This process primarily relies on:

- **Player possession** dynamic events,
- **Ball tracking data** (the position on the pitch, particularly the third where the ball is located),
- **Player tracking data**, e.g. to determine if the ball carrier is under pressure, which qualifies the phase as a build-up phase, or to determine the last defensive line height, and
- **Set pieces and goal data**.

The phase of play attributed to a player_possession event corresponds to the phase of play at the end of that player_possession.

The phase of play associated with an off-ball run or a passing option corresponds to the phase of play associated with the associated player possession (as a reminder each off-ball run and each passing option is associated with one and only one player possession).

Special Case: Disruption

Phases of play can be temporarily disrupted, for instance, when a defender blocks a shot and unsuccessfully attempts to clear the ball, allowing the attacking team to regain possession and resume their finish phase.

We don't want to cut phases of play due to these short interruptions.

In this scenario, the defending player's possession is labelled as 'Disruption.' However, the overall phase index remains assigned to the 'Finish' phase for example.

On-Ball Engagement Types

We have 5 types of on-ball engagements:

- pressing,
- pressure,
- recovery press,
- counter press
- and others.

Pressing Vs Pressure

A key feature for describing if a player is actively pressing vs applying pressure is the wider team context. For instance

- if a player applies pressure by themselves this is an individual act separate from the team, we would therefore class this as applying pressure.
- If a defender applies pressure within a chain, for example defender 1 presses attacker 1 who passes to attacker 2 who is then pressed by another defender this is now a collective action (pressing chain) and becomes pressing.

Pressure
A defender applies direct pressure (moves forward or sideways towards the player in possession). We classify pressure as a singular action outside of a pressing chain (see below).

Pressing
Is the same as pressure except within a pressing chain (see below). Given the player is acting as part of a collective this changes the context of the engagement. Since we only define pressing within a chain, any actions that occur during a transition, finish or set play phase remain as a pressure.

Pressing Chain
A pressing chain consists of two player possessions which receive either a pressing, counter press or recovery press.
The possessions must be within 4 seconds of each other (they do not need to be consecutive).

Pressing chains can only occur when the attacking team is within a Build Up, Direct or Create Phase as defined within our Phases of Play model.
These phases correspond approximately to the final and middle third of the pitch.
Pressures within Finish, Transition, Chaotic and Set Play phases are not considered for pressing phases as they represent a different tactical approach for the defending team.

In addition, pressing chains can be broken when the attacking team performs a fast break within their possession.
We define this as when an attacker carries the ball forward >= 15m's and has less than 8 defenders ahead of them by the end of the carry. We apply this break as it captures when the defending team is having to recover in an emergency situation rather than having a controlled collective press.

Recovery Press, Counter Press And Other

Recovery Press
A defender runs backwards to attempt to apply pressure to the ball carrier.

Counter Press
After a team loses possession in open play, a defender must apply pressure to the team in possession within 3 seconds of the ball being turned over.
This can be any type of defensive engagement (pressure, recovery press, others). We take the approach to include all engagement types due to the chaotic nature of counter pressing. Defenders may be in close proximity already in a contested duel situation or they may hold their position as the attacker dribbles towards them as they haven't had the time to actively press.

Other

A defender is not directly applying pressure to the attacker in possession. There are several situations this includes:

- An attacker dribbles towards the defender and the defender stays in the position they are in. In this situation the attacker is engaging the defender therefore we do not classify this as the defender actively applying pressure.
- A defender is jockeying the attacker, moving backwards or to the side as the attacker carries the ball. The defender is also goalside of the attacker.
- A Contested Duel. We attempt to separate situations where a defender is already close to an attacker when the ball is turned over. We do not consider these situations as pressure actions since the defender may have just lost the ball to the player in possession and is applying pressure simply by being close, or if a player was targeted with a pass which was Intercepted and the defender is not actively applying pressure, they are just close to the new player in possession.

Average number of each type of engagements capture per match and per category

Categories	Premier League 2023/2024	Championship 2023/2024
Pressing	212	203
Pressure	242	222
Counter Press	78	74
Recovery Press	188	173
Other	184	174
Total	904	846

Affected Line Breaking Passing Options

A **defender engages** the player in possession when they have a **realistic line-breaking passing option**. Passing options that are **too difficult or too far** are excluded.

Based on Video Analysis we consider that due to defensive pressure, the player in possession often **chooses a safer pass** instead of exploiting the line-breaking option.

For an event to be assessed:

- The **player in possession must attempt a pass**.
- If the player is **disrupted before passing**, the event is analyzed as a **defensive regain or disruption** instead.

A **valid line-breaking pass option** must be **within 35m, inside the defensive structure, and have a high probability of completion (xP > 0.68)**.

A **defender is considered influential** if they are **goalside, close to the player in possession, and actively engaging them before the passing option ends**. Tighter proximity rules apply for **Recovery Press situations**.

Attributes Specific Consideration

Speeds

Every event has a speed average attribute.

To compute this speed average
- We need at least 5 frames where the player is detected.
- We apply data filtering to limit the risk of delivering inaccurate speed averages.

Consequently for some events the speed_avg attribute has no value.
It corresponds to cases where:
- We filtered out the speed_avg value.
- The player is not detected (especially when they are off-camera) during the whole event. This is often the case for passing options.

Here are some stats for a match:

Event Type	Number of events	% of Events with speed_avg values
Player Possession	1062	91.6%
Passing Options	2574	71.2%
Off Ball Run	486	97.9%

The average speed is not equal to the distance_covered divided by the event duration for several reasons
- This calculation would not work for one touch passes
- distance_covered takes into account the distance covered when the player is detected but also when he is extrapolated while speed is only computed based on the frame where the player is detected
- We apply filters to limit potential errors.

Lastly, we bucket speed_avg into speed bands.

Name of the Band	Speed
None	If no speed average is available
jogging	speed_avg below 15 km/h
running	speed_avg between 15 km/h and 20km/h
hsr	speed_avg between 20 km/h and 25km/h
sprinting	speed_avg above 25 km/h

Pass Range

We bucket pass distance into ranges as follow:

Ranges	Conditions
Short	less than 15m
Medium	between 15m and 30 m
Long	above 30m

By extension we also attribute a range to the distance between two players.

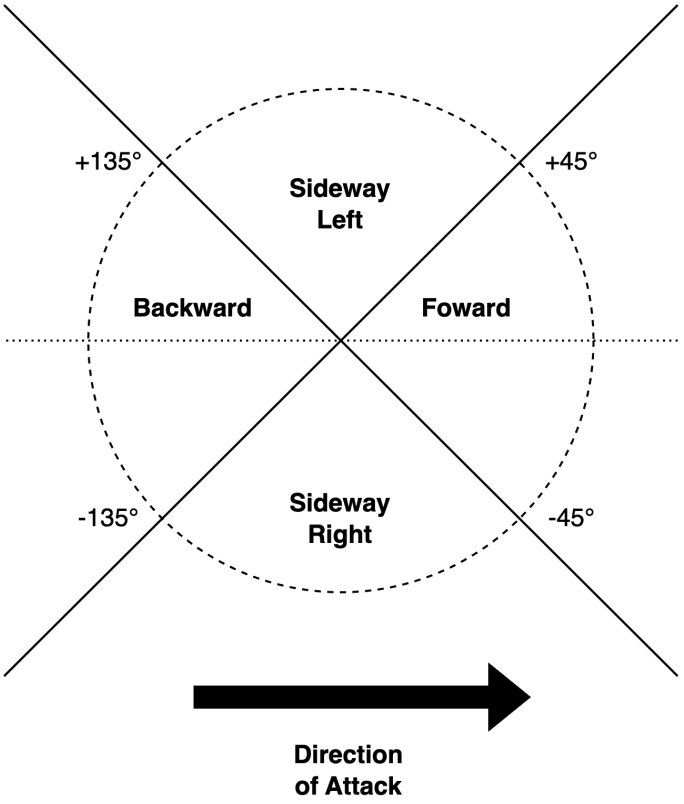
Angles And Directions

Most angles are expressed relative to the direction of attack.

We use degrees to measure angles.

Direction is always defined relative to the direction of attack, using a circle that spans from -180° to 180° (rotating anticlockwise). Here are the definitions for various directions:

- Forward: Corresponds to an angle between -45° and +45°
- Backward: Corresponds to an angle below -135° or above 135°
- Sideway Left: Corresponds to an angle between 45° and 135°
- Sideway Right: Corresponds to an angle between -135° and -45°



Ahead, Same line And Behind

For some attributes like location_to_player_in_possession_start - which indicates the location of the player performing the event at its start compared to the player in possession - we have 3 possible values:

- Ahead: when the player is at least 3 metres ahead of the player in possession along the x axis.
- Same Line: when the player is between 3 m behind and 3 metres ahead of the player in possession along the x axis.
- Behind: when the player is at least 3 metres behind the player in possession along the x axis.

Forward Momentum

With Forward Momentum the emphasis is on capturing players that perform an action centred around their first touch that results in a progressive outcome.

To do so we identify when a player is capable of initiating (sometimes continuing) a progressive move/action from his first touch (or the start of his possession), knowing that he received a pass from the back or from the side and that an opponent is at less than 6 metres from him at the moment of the first touch.

For instance it captures situations where the player is able to turn forward and move forward quickly.

We only capture forward momentum for player possessions that start within the central channel and the half space.

CSV File

The csv files consist of the list of all the Player Possession, Passing Option and Off-ball Runs detected during a match.

Each row corresponds to an event performed by a player from the team in possession.

Event Attributes

The goal here is to deliver an exhaustive list of the attributes grouped under key themes.
The order of the attributes does not necessarily reflect the order in which the columns are in the csv files.

Basics

These attributes define fundamental event details: when and where it occurs, who performs it (active player), who is in possession, the event type, and its subtype. These attributes provide the foundation for further analysis.

Attribute	Type	Description	Values	OBR	PO	PP	OBE
event_id	str	ID of the event. It is match specific.	e.g.	✓	✓	✓	✓
index	int	Sequence notation for the ordering of events within each match. If two events happen at the same time, we order them using their id.	e.g. 1	✓	✓	✓	✓
match_id	int	The ID of the match the event is associated with.	e.g. 32839	✓	✓	✓	✓
frame_start	int	Frame associated with the start of the event in SkillCorner extrapolated tracking data.	e.g. 304	✓	✓	✓	✓
frame_end	int	Frame associated to the end of the event in SkillCorner extrapolated tracking data.	e.g. 350	✓	✓	✓	✓
frame_physical_start	int	**On-Ball Engagements** Frame where the player initiates his physical activities (going above 15 km/h). It is necessarily prior to the start_frame. If the player does not reach 15 km/h prior to frame_start and maintains it up to frame_start, it is equal to frame_start	e.g. 3233				✓
time_start	timest	Time the event starts, recorded to the millisecond. The second	e.g. 00:00:06.293	✓	✓	✓	✓

Attribute	Type	Description	Values	OBR	PO	PP	OBE
	amp	period starts at 00:45:00.					
time_end	timestamp	Time in the period the event ends, recorded to the millisecond. The second period starts at 00:45:00.	e.g. 00:00:10.331	✓	✓	✓	✓
minute_start	int	The minutes on the clock at the time of this event. Resets to 45 at half- time, 90 at the start of extra time etc.	e.g. 25	✓	✓	✓	✓
second_start	int	The seconds part of the timestamp.	e.g. 10	✓	✓	✓	✓
duration	float	Number of seconds the event lasts.	e.g. 4.1	✓	✓	✓	✓
period	int	An identified identifier for the period of the match when the event happens.	1: first half / 2: second half / 3: first extratime / 4: second extratime / 5: penalty shootout	✓	✓	✓	✓
attacking_side_id	int		1 (left_to_right) / 2 (right_to_left)	✓	✓	✓	✓
attacking_side	str	Attacking side of the team of the player.	left_to_right / right_to_left	✓	✓	✓	✓
event_type_id	int	int corresponding to the event type	1 (off_ball_run) / 7 (passing_option) / 8 (player_possession) / 9 (on_ball_engagement)	✓	✓	✓	✓
event_type	str	The type of event.	player_possession / off_ball_run / passing_option / defensive_engagement	✓	✓	✓	✓
event_subtype_id	int		1 (behind) / 2 (coming_short) / 3 (cross_receiver) / 4 (dropping_off) / 5 (overlap) / 6 (pulling_half_space) / 7 (pulling_wide) / 8 (run_ahead_of_the_ball) / 9 (support) / 10 (underlap) / 11 (pressing) / 12 (pressure) / 13 (counter_press) / 14 (recovery_press) / 15 (other)	✓			✓

Attribute	Type	Description	Values	OBR	PO	PP	OBE
event_subtype	str	Subtype of the event. None for Player Possessions and Passing Options.	behind / coming_short / cross_receiver / dropping_off / overlap / pulling_half_space / pulling_wide / run_ahead_of_the_ball / support / underlap / pressing / pressure / counter_press / recovery_press / other / None	✓			✓
player_id	int	ID of the player performing the event.	e.g. 11746	✓	✓	✓	✓
player_name	str	Name of the player performing the event.	e.g. "T. Alexander-Arnold"	✓	✓	✓	✓
player_position_id	int		1(GK),2(LB),3(LWB),4(LCB),5(CB),6(RCB),7(RWB),8(RB),9(LDM),10(DM),11(RDM),12(LM),13(CM),14(RM),15(AM),16(LW),17(RW),18(LF),19(CF),20(RF)	✓	✓	✓	✓
player_position	str	Position of the player.	GK,LB,LWB,LCB,CB,RCB,RWB,RB,LDM,DM,RDM,LM,CM,RM,AM,LW,RW,LF,CF,RF	✓	✓	✓	✓
player_in_possession_id	int	ID of the player in possession.	e.g. 11746	✓	✓		✓
player_in_possession_name	str	Name of the player in possession.	e.g. "T. Alexander-Arnold"	✓	✓		✓
player_in_possession_position_id	int		1(GK),2(LB),3(LWB),4(LCB),5(CB),6(RCB),7(RWB),8(RB),9(LDM),10(DM),11(RDM),12(LM),13(CM),14(RM),15(AM),16(LW),17(RW),18(LF),19(CF),20(RF)	✓	✓		✓
player_in_possession_position	str	Position of the player.	GK,LB,LWB,LCB,CB,RCB,RWB,RB,LDM,DM,RDM,LM,CM,RM,AM,LW,RW,LF,CF,RF	✓	✓		✓
team_id	int	ID of the team of the player performing the event.	e.g. 2	✓	✓	✓	✓

Attribute	Type	Description	Values	OBR	PO	PP	OBE
team_shortname	str	Shortname of the team of the player performing the event.	e.g. Fiorentina	✓	✓	✓	✓
x_start	float	x coordinate of the player concerned by the event at the start of the event.	e.g. -5,2	✓	✓	✓	✓
y_start	float	y coordinate of the player concerned by the event at the start of the event.	e.g. 10,8	✓	✓	✓	✓
channel_id_start	int		1 (wide_left) / 2 (half_space_left) / 3 (center) / 4 (half_space_right) / 5 (wide_right)	✓	✓	✓	✓
channel_start	str	Channel where the event starts.	wide_left / half_space_left / center / half_space_right / wide_right	✓	✓	✓	✓
third_id_start	int		1 (defensive_third) / 2 (middle_third) / 3 (attacking_third)	✓	✓	✓	✓
third_start	str	Third where the event starts.	defensive_third / middle_third / attacking_third	✓	✓	✓	✓
penalty_area_start	bool	TRUE if the event start location is in the penalty area. Else FALSE.	TRUE / FALSE	✓	✓	✓	✓
x_end	float	x coordinate of the player concerned by the event at the end of the event.	e.g. -5,2	✓	✓	✓	✓
y_end	float	y coordinate of the player concerned by the event at the end of the event.	e.g. 10,8	✓	✓	✓	✓
channel_id_end	int		1 (wide_left) / 2 (half_space_left) / 3 (center) / 4 (half_space_right) / 5 (wide_right)	✓	✓	✓	✓
channel_end	str	Channel where the event ends.	wide_left / half_space_left / center / half_space_right / wide_right	✓	✓	✓	✓

Attribute	Type	Description	Values	OBR	PO	PP	OBE
third_id_end	int		1 (defensive_third) / 2 (middle_third) / 3 (attacking_third)	✓	✓	✓	✓
third_end	str	Third where the event ends.	defensive_third / middle_third / attacking_third	✓	✓	✓	✓
penalty_area_end	bool	TRUE if the event end location is in the penalty area. Else FALSE.	TRUE / FALSE	✓	✓	✓	✓

Associated Events

These attributes link the current event to related events, helping to understand event relationships—especially for those analyzing event sequences and interactions.

Attribute	Type	Description	Values	OBR	PO	PP	OBE
associated_player_possession_event_id	str	ID of the associated player possession event.	e.g.	✓	✓		✓
associated_player_possession_frame_start	int	Frame when the associated possession of player_in_possession starts.	e.g. 34	✓	✓		✓
associated_player_possession_frame_end	int	Frame when the associated player possession ends.					✓
associated_player_possession_end_type_id	int		1 (pass) / 2 (shot) / 3 (clearance) / 4 (foul_suffered) / 5 (possession_loss) / 6 (unknown)				✓
associated_player_possession_end_type	str	How the associated possession ended.	pass / shot / clearance / foul_suffered / possession_loss / unknown				✓
associated_off_ball_run_event_id	str	If the player performing the passing options is also performing an off-ball run, ID of the off-ball run event. Else None.	e.g. 1_30		✓		
associated_off_ball_run_subtype_id	int	If the player performing the passing options is also performing an off-ball run, ID of the type of the off-ball run event. Else None.	1 (behind) / 2 (coming_short) / 3 (cross_receiver) / 4 (dropping_off) / 5 (overlap) / 6 (pulling_half_space) / 7 (pulling_wide) / 8 (run_ahead_of_the_ball) / 9 (support) / 10 (underlap)		✓		

Attribute	Type	Description	Values	OBR	PO	PP	OBE
associated_off_ball_run_subtype	str	If the player performing the passing options is also performing an off-ball run, type of the off-ball run event. Else None.	behind / coming_short / cross_receiver / dropping_off / overlap / pulling_half_space / pulling_wide / run_ahead_of_the_ball / support / underlap		✓		

Game Context

These attributes capture the overall match state, including the scoreline and phase of play.

Attribute	Type	Description	Values	OBR	PO	PP	OBE
game_state_id	int		1 (Winning) / 2 (Losing) / 3 (Drawing)	✓	✓	✓	✓
game_state	str	Whether the player team is winning, losing or drawing at the start of the event.	Winning / Losing / Drawing	✓	✓	✓	✓
team_score	int	Player own team score at the start of the player possession	e.g. 0	✓	✓	✓	✓
opponent_team_score	int	Player opponent team score at the start of the player possession	e.g. 1	✓	✓	✓	✓
phase_index	int	Index of the Phase of Play ordered chronologically.	e.g. 621	✓	✓	✓	✓
player_possession_phase_index	int	The index of the player possession within the current phase_id (based on team_in_possession_phase_type_end). This is between 1 (first possessions) to the n_player_possessions_in_phase.	e.g. 3			✓	
first_player_possession_in_team_possession	bool	TRUE if the player possession is the first one of the team possession. Else FALSE.	TRUE / FALSE			✓	
last_player_possession_in_team_possession	bool	TRUE if the player possession is the last one of the team possession. Else FALSE.	TRUE / FALSE			✓	

Attribute	Type	Description	Values	OBR	PO	PP	OBE
lead_to_different_phase	bool	TRUE if - the player possession ends the team possession - or if the player possession phase is different from the next player possession phase. Else FALSE.	TRUE / FALSE			✓	
issued_from_different_phase	bool	TRUE if - the player possession starts his team possession - or if the player possession phase is different from the previous player possession phase. Else FALSE.	TRUE / FALSE			✓	
n_player_possessions_in_phase	int	Number of player possession associated to the same phase as the current player possession.	e.g. 3			✓	
team_possession_loss_in_phase	bool	TRUE if team possession ends during the current phase. Else FALSE. Note that temporary disruptions are not considered as ending the team possession.	TRUE / FALSE			✓	✓
team_in_possession_phase_type_id	int		0 (build_up) / 1 (create) / 2 (finish) / 3 (quick_break) / 4 (transition) / 5 (chaotic) / 6 (direct) / 7 (set_play) / 14 (disruption)	✓	✓	✓	✓
team_in_possession_phase_type	str	Phase of play for the team in possession.	build_up / create / finish / quick_break / transition / chaotic / direct / set_play / disruption	✓	✓	✓	✓
team_out_of_possession_phase_type_id	int		5 (chaotic) / 8 (low_block) / 9 (medium_block) / 10 (high_block) / 11 (defending_transition) / 12 (defending_quick_break) / 13 (defending_set_play) / 14 (disruption) / 15	✓	✓	✓	✓

Attribute	Type	Description	Values	OBR	PO	PP	OBE
			(defending_direct)				
team_out_of_possession_phase_type	str	Phase of play for the team out of possession.	chaotic / low_block / medium_block / high_block / defending_transition / defending_quick_break / defending_set_play / disruption	✓	✓	✓	✓
current_team_in_possession_next_phase_type_id	int		0 (build_up) / 1 (create) / 2 (finish) / 3 (quick_break) / 4 (transition) / 5 (chaotic) / 6 (direct) / 7 (set_play) / 8 (low_block) / 9 (medium_block) / 10 (high_block) / 11 (defending_transition) / 12 (defending_quick_break) / 13 (defending_set_play) / 14 (disruption) / 15 (defending_direct)			✓	
current_team_in_possession_next_phase_type	str	Next phase of the team that is currently in possession. Note that this phase can be an in possession or an out of possession phase depending on whether the team loses possession during the current phase. Refer to team_possession_loss_in_phase to know whether the team loses possession during the current phase.	build_up / create / finish / quick_break / transition / chaotic / direct / set_play / low_block / medium_block / high_block / defending_transition / defending_quick_break / defending_set_play / defending_direct			✓	
current_team_out_of_possession_next_phase_type_id	int		0 (build_up) / 1 (create) / 2 (finish) / 3 (quick_break) / 4 (transition) / 5 (chaotic) / 6 (direct) / 7 (set_play) / 8 (low_block) / 9 (medium_block) / 10 (high_block) / 11 (defending_transition) / 12 (defending_quick_break) / 13 (defending_set_play) / 14 (disruption) / 15 (defending_direct)			✓	

Attribute	Type	Description	Values	OBR	PO	PP	OBE
current_team_out_of_possession_next_phase_type	str	Next phase of the team that is currently out of possession. Note that this phase can be an in possession or an out of possession phase depending on whether the team regains possession during the current phase. Refer to team_possession_loss_in_phase to know whether the team in possession loses possession during the current phase.	build_up / create / finish / quick_break / transition / chaotic / direct / set_play / low_block / medium_block / high_block / defending_transition / defending_quick_break / defending_set_play / disruption / defending_direct			✓	
current_team_in_possession_previous_phase_type_id	int		0 (build_up) / 1 (create) / 2 (finish) / 3 (quick_break) / 4 (transition) / 5 (chaotic) / 6 (direct) / 7 (set_play) / 8 (low_block) / 9 (medium_block) / 10 (high_block) / 11 (defending_transition) / 12 (defending_quick_break) / 13 (defending_set_play) / 14 (disruption) / 15 (defending_direct)			✓	
current_team_in_possession_previous_phase_type	str	Previous phase of the team that is currently in possession. Note that this phase can be an in possession or an out of possession phase depending on whether the team in possession was the same during the previous phase.	build_up / create / finish / quick_break / transition / chaotic / direct / set_play / low_block / medium_block / high_block / defending_transition / defending_quick_break / defending_set_play / disruption / defending_direct			✓	
current_team_out_of_possession_previous_phase_type_id	int		0 (build_up) / 1 (create) / 2 (finish) / 3 (quick_break) / 4 (transition) / 5 (chaotic) / 6 (direct) / 7 (set_play) / 8 (low_block) / 9 (medium_block) / 10 (high_block) / 11 (defending_transition) / 12 (defending_quick_break) / 13 (defending_set_play) / 14 (disruption) / 15			✓	

Attribute	Type	Description	Values	OBR	PO	PP	OBE
			(defending_direct)				
current_team_out_of_possession_previous_phase_type	str	Previous phase of the team that is currently out of possession. Note that this phase can be an in possession or an out of possession phase depending on whether the team in possession was the same during the previous phase.	build_up / create / finish / quick_break / transition / chaotic / direct / set_play / low_block / medium_block / high_block / defending_transition / defending_quick_break / defending_set_play / disruption / defending_direct			✓	

Event Start / End

These attributes define how an event begins and concludes, such as whether a player's possession ends with a pass or a shot.

Attribute	Type	Description	Values	OBR	PO	PP	OBE
game_interruption_before_id	int		1 (corner_for) / 2 (corner_against) / 3 (free_kick_for) / 4 (free_kick_against) / 5 (goal_for) / 6 (goal_against) / 7 (goal_kick_for) / 8 (goal_kick_against) / 9 (penalty_for) / 10 (penalty_against) / 11 (throw_in_for) / 12 (throw_in_against)			✓	✓
game_interruption_before	str	None if the player possession was preceded by another player possession. Else game interruption that preceded the player possession.	corner_for / corner_against / free_kick_for / free_kick_against / goal_for / goal_against / goal_kick_for / goal_kick_against / penalty_for / penalty_against / throw_in_for / throw_in_against / None			✓	✓
game_interruption_after_id	int		1 (corner_for) / 2 (corner_against) / 3 (free_kick_for) / 4 (free_kick_against) / 5 (goal_for) / 6 (goal_against) / 7 (goal_kick_for) / 8 (goal_kick_against) / 9 (penalty_for) / 10 (penalty_against) / 11 (throw_in_for) / 12 (throw_in_against)			✓	✓
game_interruption_after	str	None if the player possession was followed by another player possession. Else game interruption that followed the player possession.	corner_for / corner_against / free_kick_for / free_kick_against / goal_for / goal_against / goal_kick_for / goal_kick_against / penalty_for / penalty_against / throw_in_for / throw_in_against / None			✓	✓

Attribute	Type	Description	Values	OBR	PO	PP	OBE
start_type_id	int		1 (pass_reception) / 2 (pass_interception) / 3 (keep_possession) / 4 (recovery) / 5 (free_kick_reception) / 6 (free_kick_interception) / 7 (throw_in_reception) / 8 (throw_in_interception) / 9 (goal_kick_reception) / 10 (goal_kick_interception) / 11 (corner_reception) / 12 (corner_interception) / 13 (unknown)			✓	
start_type	str	How the player got in possession of the ball. Keep possession corresponds to when the player possession does not start with a pass reception but the team in possession is still the same. For instance - if a player attempts a pass that is intercepted by an opponent and the ball bounces back to the player's own team. - if a player shoots to the goal and the ball is saved or hits the post to be recovered but one player from the same team as the player who shot the ball.	pass_reception / pass_interception / keep_possession / recovery / free_kick_reception / free_kick_interception / throw_in_reception / throw_in_interception / goal_kick_reception / goal_kick_interception / corner_reception / corner_interception / unknown			✓	
end_type_id	int		1 (pass) / 2 (shot) / 3 (clearance) / 4 (foul_suffered) / 5 (possession_loss) / 6 (unknown) / 7 (direct_regain) / 8 (indirect_regain) / 9 (direct_disruption) / 10 (indirect_disruption) / 11 (foul_committed)			✓	✓

Attribute	Type	Description	Values	OBR	PO	PP	OBE
end_type	str	How the possession ended.	pass / shot / clearance / foul_suffered / possession_loss / unknown / direct_regain / indirect_regain / direct_disruption / indirect_disruption / foul_committed / None			✓	✓
pass_angle_received	float	*Related to the pass reception that started the player possession.* None if the event does not start with a pass reception (start_type = pass_reception) or if the we cannot evaluate the pass trajectory. Angle of the ball trajectory before reception compared to the direction of attack.	e.g. 30			✓	
pass_direction_received_id	int		1 (forward) / 2 (backward) / 3 (sideway left) / 4 (sideway right)			✓	
pass_direction_received	str	*Related to the pass reception that started the player possession.* None if the event does not start with a pass reception (start_type = pass_reception) or if the we cannot evaluate the pass trajectory. Direction of the ball before the player first touch and the start of the event.	forward / backward / sideway left / sideway right			✓	

Attribute	Type	Description	Values	OBR	PO	PP	OBE
pass_distance_received	float	*Related to the pass reception that started the player possession.* None if the event does not start with a pass reception (start_type = pass_reception) or if the we cannot evaluate the pass distance. Distance between the pass location to the location of the reception where the player started his possession.	e.g. None, 30.1			✓	
pass_range_received_id	int		1 (short) / 2 (medium) / 3 (long)			✓	
pass_range_received	str	*Related to the pass reception that started the player possession.* None if the event does not start with a pass reception (start_type = pass_reception) or if the we cannot evaluate the pass distance. Range of the pass received that led to the player possession.	short (between 0 to 15 m) / medium (between 15 to 30m) / long (over 30m) / None			✓	
pass_outcome_id	int		1 (successful) / 2 (unsuccessful) / 3 (offside)			✓	
pass_outcome	str	None, if the player possession did not end with a pass. Outcome of the pass that ended the player possession.	successful / unsuccessful / offside / None			✓	
targeted_passing_option_event_id	str	Event ID of the passing option targeted by the player if he attempted a pass at the end of his possession. None if the player possession event did not end with a pass attempt.	e.g. 7_5			✓	

Attribute	Type	Description	Values	OBR	PO	PP	OBE
high_pass	bool	**Player Option** None, if the passing option was not targeted or if we cannot appreciate its trajectory. If the passing option receives the ball - TRUE if the ball max z-coordinates during the pass is above 1.8 metres. - Else FALSE. If the passing option is targeted but does not receive the ball - TRUE if the ball max z-coordinates during the pass is above 1.8 metres. - Else None. **Player Possession** None if the player possession did not end up with a pass. If the pass is complete - TRUE if the ball max z-coordinates during the pass is above 1.8 metres. - Else FALSE. If the pass is incomplete - TRUE if the ball max z-coordinates during the pass is above 1.8 metres. - Else None (we cannot predict it).	None / TRUE / FALSE		✓	✓	

Outcome

These attributes describe the consequences of an event, including its impact on possession, team advantage, and defensive effectiveness.

Attribute	Type	Description	Values	OBR	PO	PP	OBE
lead_to_shot	bool	TRUE if there is a shot within the 10 seconds after the end of the event. Else FALSE.	TRUE / FALSE	✓	✓	✓	✓
lead_to_goal	bool	TRUE if there is a goal within the 10 seconds after the end of the event. Else FALSE.	TRUE / FALSE	✓	✓	✓	✓
targeted	bool	TRUE if the player is targeted by a pass. Else FALSE.	TRUE / FALSE	✓	✓		
received	bool	TRUE if the player receives the ball. Else FALSE.	TRUE / FALSE	✓	✓		
received_in_space	bool	None if the player does not receive the ball (received = FALSE). TRUE if the ball is received with the nearest opponent at least at 3 m away. Else FALSE.	None / TRUE / FALSE	✓	✓		
possession_danger	bool	TRUE if the Team in possession EPV is above 3% for at least one frame during between the start of the engagement and the end of the player possession. Else FALSE.	TRUE / FALSE				✓

Attribute	Type	Description	Values	OBR	PO	PP	OBE
beaten_by_possession	bool	This flag captures when the defending player was beaten by the player in possession while on-ball. TRUE if the team in possession chances of scoring significantly increase during the player possession, and the defender, who was goal-side and close enough to intervene, fails to prevent this increase. The flag can be canceled in specific situations, such as interceptions, possession regain, or valid defensive positioning. Else FALSE.	TRUE / FALSE				✓
beaten_by_movement	bool	This flag captures when the defending player was beaten by the player in possession before he received the ball. TRUE if the player fails to prevent a significant increase in the chances of scoring of the opponent team between the last pass and its reception, despite being positioned to control the receiving player at some point. This flag can be canceled in specific attenuating circumstances, such as when the defender faces a 2v1 situation, maintains a stronger goal-side position, or when the reception occurs under non-threatening conditions, like a header or controlled positioning. Else FALSE.	TRUE / FALSE				✓
stop_possession_danger	bool	This flag captures when the defending annihilated a situation where the attacking team had high chances of scoring. TRUE if the Team in possession has high chances of scoring at the end of the possession and the possession finishes by a pass intercepted by the defender or a regain and the defender	TRUE / FALSE				✓

Attribute	Type	Description	Values	OBR	PO	PP	OBE
		was close to the player in possession at the possession end. Else FALSE.					
reduce_possession_danger	bool	This flag captures when the defending player reduced the danger in a situation where the attacking team had high chances of scoring. TRUE if the team in possession chances of scoring decreases significantly from its peak value to the end of an opponent's possession, and the defender is positioned goal-side and close (within 5 meters) or very close (within 2.5 meters) at the end of the possession. The possession must not end with a shot. Else, FALSE.	TRUE / FALSE				✓
force_backward	bool	TRUE if the player in possession was forced to play a backward pass due to the defensive engagement. In particular, the chances of the player in possession regressing need to grow significantly (+30% in percentage point) near the end of his possession and the player applying the engagement needs to be either very close or goalside. Else FALSE.	TRUE / FALSE				✓

Physical

These attributes capture movement and effort during an event, providing insights into player dynamics and positioning.

Attribute	Type	Description	Values	OBR	PO	PP	OBE
distance_covered	float	**On-ball Engagements** Distance covered (in metres) by the player between when the player starts his physical effort (frame_physical_start) and when the event ends (frame_end). **Other Event Types** Distance covered (in metres) by the player during the event (between frame_start and frame_end). It is based on the actual player's trajectory.	e.g. 10	✓	✓	✓	✓
trajectory_angle	float	Refers to the angle of a player's movement, measured from the starting location of the event to where the event ends, in relation to the horizontal line directed towards the opposing goal.	e.g. 33	✓	✓	✓	✓
trajectory_direction_id	int		1 (forward) / 2 (backward) / 3 (sideway left) / 4 (sideway right)	✓	✓	✓	✓
trajectory_direction	str	Direction of the player trajectory.	forward / backward / sideway left / sideway right	✓	✓	✓	✓

Attribute	Type	Description	Values	OBR	PO	PP	OBE
in_to_out	bool	None if the player did not cover at least 2m during the event. TRUE if the player the player - moved sideway (here we use trajectory_angle absolute value is between 22.5° and 157°). - started from the center channel and ends in the half space or wide channel OR started in the half space and ends in the wide channel Else FALSE.	TRUE / FALSE	✓	✓	✓	
out_to_in	bool	None if the player did not cover at least 2m during the event. TRUE if the player the player - moved sideway (here we use trajectory_angle absolute value is between 22.5° and 157°). - started from the wide channel and ends in the center or a half space channel OR started in the half space and ends in the central channel Else FALSE.	TRUE / FALSE	✓	✓	✓	

Attribute	Type	Description	Values	OBR	PO	PP	OBE
speed_avg	float	The average speed of a player during the event (km/h) when he is detected on screen. None if there are not enough data points to compute the average or if the value is not considered trustworthy enough. **On-ball engagements** Computed between the frame_physical_start and frame_end. **Other event types** Computed between the frame_start and frame_end.	e.g. 19.1	✓	✓	✓	✓
speed_avg_band_id	int		None / 1 (jogging) / 2 (running) / 3 (hsr) / 4 (sprinting)	✓	✓	✓	✓
speed_avg_band	str	Speed band of the average speed. None if speed_avg cannot be delivered.	None / jogging (if speed_avg below 15 km/h) / running (if speed_avg between 15 km/h and 20km/h) / hsr (if speed_avg between 20 km/h and 25km/h) / sprinting (if speed_avg above 25 km/h)	✓	✓	✓	✓

Player In Possession Details

These attributes describe the player in possession and their positioning throughout the event.

Attribute	Type	Description	Values	OBR	PO	PP	OBE
location_to_player_in_possession_id_start	int		1 (behind) / 2 (same_line) / 3 (ahead)	✓	✓		
location_to_player_in_possession_start	str	Related position compared to the player in possession at the start of the event (on x).	behind / same_line / ahead	✓	✓		
location_to_player_in_possession_id_end	int		1 (behind) / 2 (same_line) / 3 (ahead)	✓	✓		
location_to_player_in_possession_end	str	Related position compared to the player in possession at the end of the event (on x).	behind / same_line / ahead	✓	✓		
distance_to_player_in_possession_start	float	Distance (in metres) between player and player in possession at the start of the event.	e.g. 10.9	✓	✓		
distance_to_player_in_possession_end	float	Distance (in metres) between player and player in possession at the end of the event.	eg. 23.4	✓	✓		
player_in_possession_x_start	float	x coordinate of the player in possession at the start of the event.	e.g. 10.8	✓	✓		
player_in_possession_y_start	float	y coordinate of the player in possession at the start of the event.	e.g. 10.8	✓	✓		
player_in_possession_channel_id_start	int	ID of the channel of the player in possession at the start of the event	1 (wide_left) / 2 (half_space_left) / 3 (center) / 4 (half_space_right) / 5 (wide_right)	✓	✓		
player_in_possession_channel_start	str	Channel where the player in possession is when the event starts. Note that the ball may be travelling towards the player in possession at this moment and he may not have done his first touch yet.	wide_left / half_space_left / center / half_space_right / wide_right	✓	✓		

Attribute	Type	Description	Values	OBR	PO	PP	OBE
player_in_possession_third_id_start	int	ID of the third the player in possession is at the start of the event.	1 (defensive_third) / 2 (middle_third) / 3 (attacking_third)	✓	✓		
player_in_possession_third_start	str	Third where the player in possession is when the event starts. Note that the ball may be travelling towards the player in possession at this moment and he may not have done his first touch yet.	defensive_third / middle_third / attacking_third	✓	✓		
player_in_possession_penalty_area_start	bool	TRUE if the player in possession is in the penalty area when the event starts. Else FALSE.	TRUE / FALSE	✓	✓		
player_in_possession_x_end	float	x coordinate of the player in possession at the end of the event.	e.g. -5.2	✓	✓		
player_in_possession_y_end	float	y coordinate of the player in possession at the end of the event.	e.g. -5.2	✓	✓		
player_in_possession_channel_id_end	int		1 (wide_left) / 2 (half_space_left) / 3 (center) / 4 (half_space_right) / 5 (wide_right)	✓	✓		
player_in_possession_channel_end	str	Channel where the player in possession is when the event ends. Note that the ball may be travelling towards the player in possession at this moment and he may not have done his first touch yet.	wide_left / half_space_left / center / half_space_right / wide_right	✓	✓		
player_in_possession_third_id_end	int		1 (defensive_third) / 2 (middle_third) / 3 (attacking_third)	✓	✓		
player_in_possession_third_end	str	Third where the player in possession is when the event ends. Note that the ball may be travelling towards the player in possession at this moment and he may not have done	defensive_third / middle_third / attacking_third	✓	✓		

Attribute	Type	Description	Values	OBR	PO	PP	OBE
		his first touch yet.					
player_in_possession_penalty_area_end	bool	TRUE if the player in possession is in the penalty area when the event ends. Else FALSE.	TRUE / FALSE	✓	✓		
passing_option_at_player_possession_start	bool	TRUE if the player was a passing option during the first 0.5 seconds of the associated player possession. Else FALSE.	TRUE / FALSE	✓	✓		
xloss_player_possession_start	float	The probability that the player in possession will lose the ball during that possession (including via an incomplete pass but excluding shots). Computed at the start of the player possession.	TRUE / FALSE				✓
xloss_player_possession_end	float	The probability that the player in possession will lose the ball during that possession (including via an incomplete pass but excluding shots). Computed at the end of the player possession.	e.g. 0.41				✓
xloss_player_possession_max	float	The maximum probability observed at any point that the player in possession will lose the ball (including via an incomplete pass but excluding shots). Evaluated over the duration of a player's possession.	e.g. 0.41				✓
xshot_player_possession_start	float	The probability that the player's possession will result in a shot. Calculated at the start of a player's possession.	e.g. 0.13				✓

Attribute	Type	Description	Values	OBR	PO	PP	OBE
xshot_player_possession_end	float	The probability that the player's possession will result in a shot. Calculated at the end of a player's possession.	e.g. 0.15				✓
xshot_player_possession_max	float	The maximum probability observed at any point that the player's possession will end with a shot. Evaluated over the duration of a player's possession.	e.g. 0.20				✓

Player Targeted

These attributes define the player targeted by a pass or engagement, capturing positioning, movement, danger and pass difficulty.

Attribute	Type	Description	Values	OBR	PO	PP	OBE
player_targeted_id	int	**Player Possessions** None if the player possession event did not end with a pass attempt or we cannot determine who was the pass target. Player ID of the player targeted by the player in possession if he attempted a pass at the end of his possession. **On-Ball Engagements** Player ID of the (On Ball) Player that was targeted by the on-ball engagement.	e.g. 11746			✓	✓
player_targeted_name	str	**Player Possessions** None if the player possession event did not end with a pass attempt or we cannot determine who was the pass target. Name of the player targeted by the player in possession if he attempted a pass at the end of his possession. **On-Ball Engagements** Name of the (On Ball) Player that was targeted by the on-ball engagement.	e.g. "T. Alexander-Arnold"			✓	✓
player_targeted_position_id	int		1(GK),2(LB),3(LWB),4(LCB),5(CB),6(RCB),7(RWB),8(RB),9(LDM),10(DM),11(RDM),12(LM),13(CM),14(RM),15(AM),16(LW),17(RW),18(LF),19(CF),20(RF)			✓	✓

Attribute	Type	Description	Values	OBR	PO	PP	OBE
player_targeted_position	str	**Player Possessions** None if the player possession event did not end with a pass attempt or we cannot determine who was the pass target. Position of the pass target. **On-Ball Engagements** Position of the (On Ball) Player that was targeted by the on-ball engagement."	GK,LB,LWB,LCB,CB,RCB,RWB,RB,LDM,DM,RDM,LM,CM,RM,AM,LW,RW,LF,CF,RF			✓	✓
player_targeted_x_pass	float	*Related to the final pass attempted by the player in possession.* None if the player possession event did not end with a pass attempt or we cannot determine who was the pass target. x location of the targeted player at the moment of the pass.	e.g. -3.23			✓	
player_targeted_y_pass	float	*Related to the final pass attempted by the player in possession.* None if the player possession event did not end with a pass attempt or we cannot determine who was the pass target. y location of the targeted player at the moment of the pass.	e.g. +12.45			✓	
player_targeted_channel_pass_id	int		1 (wide_left) / 2 (half_space_left) / 3 (center) / 4 (half_space_right) / 5 (wide_right)			✓	

Attribute	Type	Description	Values	OBR	PO	PP	OBE
player_targeted_channel_pass	str	*Related to the final pass attempted by the player in possession.* None if the player possession event did not end with a pass attempt or we cannot determine who was the pass target. Channel of the targeted player at the moment of the pass.	wide_left / half_space_left / center / half_space_right / wide_right			✓	
player_targeted_third_pass_id	int		1 (defensive_third) / 2 (middle_third) / 3 (attacking_third)			✓	
player_targeted_third_pass	str	*Related to the final pass attempted by the player in possession.* None if the player possession event did not end with a pass attempt or we cannot determine who was the pass target. Third of the targeted player at the moment of the pass.	defensive_third / middle_third / attacking_third			✓	
player_targeted_penalty_area_pass	bool	*Related to the final pass attempted by the player in possession.* None if the player possession event did not end with a pass attempt or we cannot determine who was the pass target. TRUE if the targeted player is in the penalty area when the pass occurs. Else FALSE.	TRUE / FALSE / None			✓	

Attribute	Type	Description	Values	OBR	PO	PP	OBE
player_targeted_x_reception	float	*Related to the final pass attempted by the player in possession.* None if there was no pass or the pass was incomplete. x location of the targeted player at the moment of the pass reception.	e.g. -3.23			✓	
player_targeted_y_reception	float	*Related to the final pass attempted by the player in possession.* None if there was no pass or the pass was incomplete. y location of the targeted player at the moment of the pass reception.	e.g. +12.45			✓	
player_targeted_channel_reception_id	int		1 (wide_left) / 2 (half_space_left) / 3 (center) / 4 (half_space_right) / 5 (wide_right)			✓	
player_targeted_channel_reception	str	*Related to the final pass attempted by the player in possession.* None if there was no pass or the pass was incomplete. Channel of the targeted player at the moment of the pass reception.	wide_left / half_space_left / center / half_space_right / wide_right			✓	
player_targeted_third_reception_id	int		1 (defensive_third) / 2 (middle_third) / 3 (attacking_third)			✓	

Attribute	Type	Description	Values	OBR	PO	PP	OBE
player_targeted_third_reception	str	*Related to the final pass attempted by the player in possession.* None if there was no pass or the pass was incomplete. Third of the targeted player at the moment of the pass reception.	defensive_third / middle_third / attacking_third			✓	
player_targeted_penalty_area_reception	bool	*Related to the final pass attempted by the player in possession.* None if there was no pass or the pass was incomplete. TRUE if the targeted player is in the penalty area at the moment of the pass reception. Else FALSE.	TRUE / FALSE / None			✓	
player_targeted_distance_to_goal_start	float	Distance between the player targeted and the (active) player goal at the start of the event.					✓
player_targeted_distance_to_goal_end	float	Distance between the player targeted and the (active) player goal at the end of the event.					✓
player_targeted_angle_to_goal_start	float	Angle (in degree) of the player targeted with the (active) player goal at the start of the event.	e.g. 45				✓
player_targeted_angle_to_goal_end	float	Angle (in degree) of the player targeted with the (active) player goal at the end of the event.	e.g. 51				✓
player_targeted_average_speed	float	Average speed of the targeted player. Computed between frame_physical_start and frame_end.	e.g. 14.3				✓
player_targeted_speed_avg_band_id	int		None / 1 (jogging) / 2 (running) / 3 (hsr) / 4 (sprinting)				✓

Attribute	Type	Description	Values	OBR	PO	PP	OBE
player_targeted_speed_avg_band	str	Speed band associated to the target_average_speed.	None / jogging (if speed_avg below 15 km/h) / running (if speed_avg between 15 km/h and 20km/h) / hsr (if speed_avg between 20 km/h and 25km/h) / sprinting (if speed_avg above 25 km/h)				✓
speed_difference	float	average_speed minus target_average_speed. None if any of these speeds is not available.	e.g. 1.5				✓
player_targeted_xpass_completion	float	*Related to the final pass attempted by the player in possession.* None if the player possession event did not end with a pass attempt or if we cannot determine who was the pass target. Pass completion probability if the player attempted a pass at the end of his possession.	e.g. 0.65			✓	
player_targeted_difficult_pass_target	float	*Related to the final pass attempted by the player in possession.* None if the player possession event did not end with a pass attempt or if we cannot determine who was the pass target. TRUE if the probability (xpass_completion) of completing a pass to the targeted player is below 0.65 i.e. the completion chances are below 65%. Else FALSE.	TRUE / FALSE / None			✓	

Attribute	Type	Description	Values	OBR	PO	PP	OBE
player_targeted_xthreat	float	*Related to the final pass attempted by the player in possession.* None if the player possession event did not end with a pass attempt or if we cannot determine who was the pass target. Probability of a goal being scored in the next 10s after the pass was completed. Computed at the moment of the pass, whether the pass was completed or not.	e.g. 0.012			✓	
player_targeted_dangerous	bool	*Related to the final pass attempted by the player in possession.* None if the player possession event did not end with a pass attempt or if we cannot determine who was the pass target. TRUE if the probability of a goal being scored in the next 10s after the pass was completed is about 2%. FALSE if it was below 2%. Computed at the moment of the pass, whether the pass was completed or not.	TRUE / FALSE / None			✓	
interplayer_distance	float	**Player possession** If a pass occurs, distance between the pass location to the player targeted at the moment of the pass. **Passing options** Distance from the pass location to the player at the moment of the pass.	e.g. None, 30.1		✓	✓	
interplayer_distance_range_id	int		1 (short) / 2 (medium) / 3 (long)		✓	✓	

Attribute	Type	Description	Values	OBR	PO	PP	OBE
interplayer_distance_range	str	Range of the interplayer_distance_range.	short (between 0 to 15 m) / medium (between 15 to 30m) / long (over 30m)		✓	✓	
interplayer_distance_start	float	**On Ball Engagements** Distance between the player and the player targeted at the start of the event.	e.g. 3.1				✓
interplayer_distance_end	float	**On Ball Engagements** Distance between the player and the player targeted at the end of the event.	e.g. 1.8				✓
interplayer_distance_min	float	**On Ball Engagements** Minimal distance between the player and the player targeted during the event when the player in possession has the ball (on-ball engagements can start before the future player in possession receives the ball).	e.g. 0.6				✓
interplayer_distance_start_physical	float	**On Ball Engagements** Distance between the player and the player targeted when the player starts his physical activity.	e.g. 6.9				✓
close_at_player_possession_start	bool	**On Ball Engagements** TRUE when the defender is at less than 1.5m and goalside at player possession start. Else FALSE. None if the defensive engagement does not overlap with the player possession start.	TRUE / FALSE				✓

Attribute	Type	Description	Values	OBR	PO	PP	OBE
interplayer_angle	float	**Player possession** Angle (in degree) between the direction of attack and the vector from the pass location to the player targeted at the moment of the pass. **Passing options** Angle (in degree) between the direction of attack and the vector from the pass location to the player targeted at the moment of the pass.	e.g. None, 30.1		✓	✓	
interplayer_direction_id	int		1 (forward) / 2 (backward) / 3 (sideway left) / 4 (sideway right)		✓	✓	
interplayer_direction	str	Direction associated to the interplayer_angle	forward / backward / sideway left / sideway right		✓	✓	
angle_of_engagement	float	Angle (in degree) between the player speed and the target speed at the start of the event.	e.g. 130				✓
goal_side_start	bool	TRUE if the (active) player is closer to the center of his goal than the player targeted at the start of the event. Else FALSE.	TRUE / FALSE				✓
goal_side_end	bool	TRUE if the (active) player is closer to the center of his goal than the player targeted at the end of the event. Else FALSE.	TRUE / FALSE				✓

Teammates And Opponent Context

These attributes describe a player's positioning relative to the defensive line, team shape, and surrounding players.

Attribute	Type	Description	Values	OBR	PO	PP	OBE
last_defensive_line_x_start	float	x coordinate of the last defender at the start of the event.	e.g. 10.1	✓	✓	✓	✓
last_defensive_line_x_end	float	x coordinate of the last defender at the end of the event.	e.g. 10.1	✓	✓	✓	✓
delta_to_last_defensive_line_start	float	Distance along the x axis (in metres) between the last defender and the player at the start of the event (negative if the player passed the line).	e.g. -2.1	✓	✓	✓	✓
delta_to_last_defensive_line_end	float	Distance along the x axis (in metres) between the last defender and the player at the end of the event (negative if the player passed the line).	e.g. 3.7	✓	✓	✓	✓
delta_to_last_defensive_line_gain	float	Difference between delta_to_last_defensive_line_end and delta_to_last_defensive_line_start.	e.g.10,1	✓	✓	✓	✓
last_defensive_line_height_start	float	Distance (in metres) between the last defender and its own goal at the start of the event.	e.g. 43.0	✓	✓	✓	✓
last_defensive_line_height_end	float	Distance (in metres) between the last defender and its own goal at the end of the event.	e.g. 28.8	✓	✓	✓	✓
last_defensive_line_height_gain	float	Difference between last_defensive_line_height_end and last_defensive_line_height_start.	e.g.10.1	✓	✓	✓	✓
inside_defensive_shape_start	bool	TRUE if the player location at the start of the event is inside the opponent team shape. Else FALSE. The team shape corresponds to the smallest convex polygon that contains all the players from the opponent team.	TRUE / FALSE	✓	✓	✓	

Attribute	Type	Description	Values	OBR	PO	PP	OBE
inside_defensive_shape_end	bool	TRUE if the player location at the end of the event is inside the opponent team shape. Else FALSE. The shape corresponds to the smallest convex polygon that contains all the players from the opponent team.	TRUE / FALSE	✓	✓	✓	
n_teammates_ahead_end	int	Number of player teammates between the player and the opponent goal at the end of the event.	e.g. 5			✓	✓
n_teammates_ahead_start	int	Number of player teammates between the player and the opponent goal at the start of the event.	e.g. 5			✓	✓
n_player_targeted_opponents_ahead_start	int	Player targeted opponents between him and his opponent goal when the event starts.	e.g. 2				✓
n_player_targeted_opponents_ahead_end	int	Player targeted opponents between him and his opponent goal when the event ends.	e.g. 2				✓
n_player_targeted_teammates_ahead_start	int	Player targeted teammates between him and his opponent goal when the event starts.	e.g. 2				✓
n_player_targeted_teammates_ahead_end	int	Player targeted teammates between him and his opponent goal at the end of the event.	e.g. 2				✓
n_player_targeted_teammates_within_5m_start	int	Player targeted teammates within 5m from him at the start of the event.	e.g. 2				✓
n_player_targeted_teammates_within_5m_end	int	Player targeted teammates within 5m from him at the end of the event.	e.g. 2				✓
n_player_targeted_opponents_within_5m_start	int	Player targeted opponents within 5m from him at the start of the event.	e.g. 2				✓
n_player_targeted_opponents_within_5m_end	int	Player targeted opponents within 5m from him at the end of the event.	e.g. 2				✓
separation_start	float	Distance (in metres) from the closest opponent at the start of	e.g. 3.7	✓	✓	✓	

Attribute	Type	Description	Values	OBR	PO	PP	OBE
		the event.					
separation_end	float	Distance (in metres) from the closest opponent at the end of the event.	e.g. 3.7	✓	✓	✓	
separation_gain	float	Difference between separation_end and separation_start. A value > 0 shows an attacker's separation has increased. A value < 0 shows an attacker's separation has decreased.	e.g. 1.1	✓	✓	✓	

Pass / Passing Options Details

These attributes define key characteristics of passes, including distance, direction, difficulty, and threat level.

Attribute	Type	Description	Values	OBR	PO	PP	OBE
pass_distance	float	If a pass occurs and is completed, distance between the pass location to the reception location. Else None.	e.g. None, 30.1		✓	✓	
pass_range_id	int		1 (short) / 2 (medium) / 3 (long)		✓	✓	
pass_range	str	Range of the pass_distance.	short (between 0 to 15 m) / medium (between 15 to 30m) / long (over 30m)		✓	✓	
pass_angle	float	If a pass occurs and is completed, angle (in degree) between the direction of attack and the vector from the pass location to the reception location. None if there was no complete pass or if we cannot complete the angle of the pass.	e.g. None, 30.1		✓	✓	
pass_direction_id	int		1 (forward) / 2 (backward) / 3 (sideway left) / 4 (sideway right)		✓	✓	
pass_direction	str	Direction associated with pass_angle.	forward / backward / sideway left / sideway right		✓	✓	

Attribute	Type	Description	Values	OBR	PO	PP	OBE
pass_ahead	bool	**Player Possession** None if no pass occurs. TRUE if the player targeted is at least 3 m ahead of the player (in possession) along the x axis at the moment of the pass. Else FALSE. **Passing Option** TRUE if the player is at least 3m ahead of the player in possession at the passing moment. Else FALSE.	True / False / None		✓	✓	
passing_option_at_pass_moment	bool	TRUE if the player is a passing option during the 0.5 seconds before the player in possession attempts a pass (decision frame). Else FALSE.	TRUE / FALSE		✓		
dangerous	bool	TRUE if the probability of a goal being scored in the next 10 seconds (xthreat) is greater than 0.02, assuming a pass was successfully served to the player. Else FALSE. If the player was not targeted by a pass, it is calculated at the passing moment. If the player was targeted by a pass it is calculated at the moment of the pass.	TRUE / FALSE	✓	✓		

Attribute	Type	Description	Values	OBR	PO	PP	OBE
difficult_pass_target	bool	TRUE if the probability (xpass_completion) of completing a pass to the player is below 0.65 i.e. the completion chances are below 65%. Else FALSE. IIf the player was not targeted by a pass, it is calculated at the passing moment. If the player was targeted by a pass it is calculated at the moment of the pass.	TRUE / FALSE	✓	✓		
xthreat	float	The probability that a goal will be scored 10 seconds after a player is successfully served a pass. If the player was not targeted by a pass, it is calculated at the passing moment. If the player was targeted by a pass it is calculated at the moment of the pass.	e.g. 0.013	✓	✓		
xpass_completion	float	The probability of completing a pass to the player. If the player was not targeted by a pass, it is calculated at the passing moment. If the player was targeted by a pass it is calculated at the moment of the pass.	e.g. 0.732	✓	✓		
passing_option_score	float	The likelihood that a player will be served the ball. If the player was not targeted by a pass, it is calculated at the passing moment. If the player was targeted by a pass it is calculated at the	e.g. 0.791	✓	✓		

Attribute	Type	Description	Values	OBR	PO	PP	OBE
		moment of the pass.					
predicted_passing_option	bool	TRUE if the target is a passing option (xreceiver >= 0.6). Else FALSE.	TRUE / FALSE	✓	✓		
peak_passing_option_frame	int	Frame considered as the passing moment. If the passing option is targeted it is the actual frame of the pass otherwise it is estimated (when xR.xP.xT is maximal and xR >= 0.6).	e.g. 1662		✓		
n_simultaneous_passing_options	int	The number of passing options that overlap with the current event or that happen less than 5 frames before or after it.	e.g. 3		✓		

Line Breaks

These attributes describe whether a line breaking pass occurred or could have occurred.

Attribute	Type	Description	Values	OBR	PO	PP	OBE
organised_defense	bool	**Player Possession** None if the player possession did not end with a pass. TRUE if the defense is considered as organised at the moment of the pass. Else FALSE. Line breaks and defensive structure information are delivered only if the organised_defense is TRUE. **Passing Option** TRUE if the defense is considered as organised at the passing moment. Else FALSE. Line breaks and defensive structure information are delivered only if the organised_defense is TRUE.	TRUE / FALSE		✓	✓	
defensive_structure	int	Defensive structure used to determine line breaks during the pass. It is dynamic and therefore differs from the formation. None if the organised_defense is FALSE or None.	e.g. 442, None		✓	✓	
n_defensive_lines	int	None if organised_defense is FALSE or None. Else, correspond to the number of blocks of 2 or more players in the defensive_structure.	e.g. 2 or 3		✓	✓	

Attribute	Type	Description	Values	OBR	PO	PP	OBE
first_line_break	bool	None if organised_defense is FALSE or None. None if for the corresponding player possession, is_header is TRUE or hand_pass is TRUE. **For Player Possession** - Assuming the player possession ended with a pass, TRUE if it breaks the first line, Else FALSE. If the pass was incomplete, this value is predicted assuming the pass was completed. - None, if -- we cannot evaluate/predict properly the location of the pass and/or its reception -- OR if no pass was attempted -- OR if there was no first line. **For Passing Options** - TRUE if it could break the first line, Else FALSE. If the player did not receive the ball (because there was no pass attempt or the pass was incomplete), this value is predicted assuming the player had been served the ball. - None, -- if we know that a pass occurred but we are not able to have an accurate reception location -- OR if there was no first line. -- we cannot evaluate/predict properly the location of the pass and/or its reception	None / TRUE / FALSE		✓	✓	
first_line_break_type_id	int		None / 1 (Through) / 2 (Around)		✓		

Attribute	Type	Description	Values	OBR	PO	PP	OBE
first_line_break_type	str	None, if we know that a pass occurred but we are not able to have an accurate reception location. None if it did not broke the first line, Around if it broke the line around. Through if it broke the line through. If the player did not receive the ball, this value is predicted assuming the player had received the ball.	None / Through / Around		✓		
second_last_line_break	bool	**Player Possession** - None, if we know that a pass occurred but we are not able to have an accurate reception location OR if no pass was attempted OR if there was no middle line. - Assuming the player possession ended with a pass, TRUE if it could break the middle line, Else FALSE. If the player did not receive the ball, this value is predicted assuming the player had been served the ball. **Passing Options** - None, if we know that a pass occurred but we are not able to have an accurate reception location OR if there was no middle line. - TRUE if it could break the middle line, Else FALSE. If the player did not receive the ball, this value is predicted assuming the player had been served the ball.	None / TRUE / FALSE		✓	✓	
second_last_line_break_type_id	int		None / 1 (Through) / 2 (Around)		✓		

Attribute	Type	Description	Values	OBR	PO	PP	OBE
second_last_line_break_type	str	None, if we know that a pass occurred but we are not able to have an accurate reception location. None if it did not break the middle line, Around if it did break the line around. Through if it did break the line through. If the player did not receive the ball, this value is predicted assuming the player had received the ball.	None / Through / Around		✓		
last_line_break	bool	**Player Possession** - None, if we know that a pass occurred but we are not able to have an accurate reception location OR if no pass was attempted OR if there was no last line. - Assuming the player possession ended with a pass, TRUE if it could break the last line, Else FALSE. If the player did not receive the ball, this value is predicted assuming the player had been served the ball. **Passing Option** - None, if we know that a pass occurred but we are not able to have an accurate reception location OR if there was no last line. - TRUE if it could break the last line, Else FALSE. If the player did not receive the ball, this value is predicted assuming the player had been served the ball.	None / TRUE / FALSE		✓	✓	
last_line_break_type_id	int		None / 1 (through) / 2 (around)		✓		

Attribute	Type	Description	Values	OBR	PO	PP	OBE
last_line_break_type	str	None, if we know that a pass occurred but we are not able to have an accurate reception location. None if it did not break the last line, Around if it did break the line around. Through if it did break the line through. If the player did not receive the ball, this value is predicted assuming the player had received the ball.	None / Through / Around		✓		
furthest_line_break_id	int		None / 1 (first_line) / 2 (second_last_line) / 3 (last_line)		✓	✓	
furthest_line_break	str	**Player Possession** None if the player did not attempt a pass or if he attempted a pass that was not a line breaking pass. If a pass was attempted and completed by the player in possession, line broken that is the closest to the opponent goal. If a pass was attempted but not completed by the player in possession, line that could have been broken if the pass was completed and that is the closest to the opponent goal. **Passing Option** None if at the passing moment, no line would have been broken with a complete pass. Line that could have been broken with a complete pass and that is the closest to the opponent goal.	None / first_line / second_last_line / last_line		✓	✓	
furthest_line_break_type_id	int		None / 1 (Through) / 2 (Around)		✓	✓	
furthest_line_break_type	str	Type of the furthest line break.	None / Through / Around		✓	✓	

Player Bypassed

These attributes help assess passing effectiveness in bypassing players.

Attribute	Type	Description	Values	OBR	PO	PP	OBE
n_opponents_ahead_player_in_possession_pass_moment	int	Opponents ahead of the player in possession when he passed the ball to the player. None, if we know that a pass occurred but we are not able to have an accurate reception location.	e.g. 4, , None		✓	✓	
n_opponents_ahead_pass_reception	int	Opponents ahead of the player when he received the ball. If the player in possession did not pass the ball to the player, it is calculated at the passing moment. None, if we know that a pass occurred but we are not able to have an accurate reception location.	e.g. 3, None		✓	✓	
n_opponents_bypassed	int	For a complete pass, the difference between the number of opponents ahead of the player in possession when he releases the ball and the number of opponents ahead of the player targeted when he receives the ball. For an incomplete pass, or a passing option that was not targeted, difference between the number opponents ahead of the player in possession at the pass moment and the number opponents ahead of the potential pass target at the pass moment. It can be negative for a backward pass. None, if we know that a pass occurred but we are not able to have an accurate reception location.	e.g. -1, 2, , None		✓	✓	

Player Possession Specifics

These attributes provide further details on how a player possession is executed.

Attribute	Type	Description	Values	OBR	PO	PP	OBE
one_touch	bool	TRUE if the player possession consisted of just one touch. Else FALSE.	TRUE / FALSE			✓	
quick_pass	bool	TRUE if the possession lasts less than 1 second and ends with a pass but the player possession was not a one-touch. Else FALSE.	TRUE / FALSE			✓	
carry	bool	TRUE if the player covers at least 2 metres between the start and the end of his possession. Else FALSE.	TRUE / FALSE			✓	
forward_momentum	bool	TRUE if the forward momentum conditions are respected. Else FALSE.	TRUE / FALSE			✓	
is_header	bool	TRUE if the possession was a header. Else FALSE.	TRUE / FALSE			✓	
hand_pass	bool	None if the player is not the Goalkeeper. TRUE if the GK possession finishes by a hand pass. FALSE if the player is the Goalkeeper and he did not do a hand pass. A GK can have the ball in his hand, then put it on the ground and do the pass with his foot - in this case the field hand_pass will be FALSE.	TRUE / FALSE / None			✓	

Attribute	Type	Description	Values	OBR	PO	PP	OBE
initiate_give_and_go	bool	TRUE when, within 2 seconds after passing the ball, the player performs an off-ball run of subtype behind, cross_receiver, overlap, pulling_half_space, pulling_wide, run_ahead_of_the_ball, underlap, support. For support runs we also impose that it starts in the attacking third and in a half_space or the central channel. Else FALSE.	TRUE / FALSE			✓	

Passing Option Availability

These attributes describe the number and characteristics of passing options available to the player in possession.

Attribute	Type	Description	Values	OBR	PO	PP	OBE
n_passing_options	int	*Related to the passing options available to the player in possession.* The number of passing options occurring during the player possession.	e.g. 4			✓	
n_off_ball_runs	int	The number of off-ball runs occurring during the player possession.	e.g. 3			✓	
n_passing_options_line_break	int	*Related to the passing options available to the player in possession.* Number of passing options events happening during the player possession that offer a line break.	e.g. 1			✓	
n_passing_options_first_line_break	int	*Related to the passing options available to the player in possession.* Number of passing options events happening during the player possession that offer a first line break. If a passing option would break several lines, we report only the closest line to the opponent goal that would be broken. As a result there is no double counting between passing_options_break_first_line, passing_options_middle_line and passing_options_break_last_line.	e.g. 1			✓	

Attribute	Type	Description	Values	OBR	PO	PP	OBE
n_passing_options_second_last_line_break	int	*Related to the passing options available to the player in possession.* Number of passing options events happening during the player possession that offer a middle line break. If a passing option would break several lines, we report only the closest line to the opponent goal that would be broken. As a result there is no double counting between passing_options_break_first_line, passing_options_middle_line and passing_options_break_last_line.	e.g. 1			✓	
n_passing_options_last_line_break	int	*Related to the passing options available to the player in possession.* Number of passing options events happening during the player possession that offer a last line break. If a passing option would break several lines, we report only the closest line to the opponent goal that would be broken. As a result there is no double counting between passing_options_break_first_line, passing_options_middle_line and passing_options_break_last_line.	e.g. 1			✓	
n_passing_options_ahead	int	*Related to the passing options available to the player in possession.* Number of passing options events happening during the player possession that are at least 3m ahead along the x axis at one moment.	e.g. 1			✓	

Attribute	Type	Description	Values	OBR	PO	PP	OBE
n_passing_options_dangerous_difficult	int	*Related to the passing options available to the player in possession.* Number of passing options events happening during the player possession that are dangerous and difficult.	e.g. 1			✓	
n_passing_options_dangerous_not_difficult	int	*Related to the passing options available to the player in possession.* Number of passing options events happening during the player possession that are dangerous and not difficult.	e.g. 1			✓	
n_passing_options_not_dangerous_not_difficult	int	*Related to the passing options available to the player in possession.* Number of passing options events happening during the player possession that are not dangerous and not difficult.	e.g. 1			✓	
n_passing_options_not_dangerous_difficult	int	*Related to the passing options available to the player in possession.* Number of passing options events happening during the player possession that are not dangerous and difficult.	e.g. 1			✓	
n_passing_options_at_start	int	*Related to the passing options available to the player in possession.* Number of passing options available during the first 0.5 seconds of the player possession. None if the player possession lasts less than 0.5 seconds (e.g. one touch pass).	e.g. 1			✓	

Attribute	Type	Description	Values	OBR	PO	PP	OBE
n_passing_options_at_end	int	*Related to the passing options available to the player in possession.* Number of passing options available during the last 0.5 seconds of the player possession. None if the player possession lasts less than 0.5 seconds (e.g. one touch pass).	e.g. 1			✓	
n_passing_options_ahead_at_start	int	*Related to the passing options available to the player in possession.* Number of passing options available during the first 0.5 second of the player possession and are at least 3m ahead along the x axis from the player in possession during these first 0.5 sec.	e.g. 1			✓	
n_passing_options_ahead_at_end	int	*Related to the passing options available to the player in possession.* Number of passing options available during the last 0.5 second of the player possession and are at least 3m ahead along the x axis from the player in possession during these last 0.5 sec.	e.g. 1			✓	

Off-Ball Run Specifics

These attributes describe off-ball runs, their impact on defensive lines, and their connection to passing options.

Attribute	Type	Description	Values	OBR	PO	PP	OBE
n_simultaneous_runs	int	The number of off-ball runs that overlap with the current event or that happen less than 5 frames before or after it.	e.g. 2	✓			
give_and_go	bool	TRUE if the player starts his off-ball run less than 2 sec after passing the ball. Else FALSE. Applies only to off-ball runs of subtype behind, cross_receiver, overlap, pulling_half_space, pulling_wide, run_ahead_of_the_ball, underlap, support (for support run we also impose that it starts in the attacking third and in a half_space or the central channel).	TRUE / FALSE	✓			
intended_run_behind	bool	None if the off-ball run is not a run in behind (event_subtype <> "behind"). TRUE if a player shows intention to run behind the defensive line. This captures attackers who may hold their run to not be offside, or runs where players are tracked by a defender but there is intent to receive behind the defensive line. Else FALSE. For example a player does break the defensive line.	None / TRUE / FALSE	✓			

Attribute	Type	Description	Values	OBR	PO	PP	OBE
push_defensive_line	bool	None if the off-ball run is not a run in behind (event_subtype <> "behind"). TRUE if the last defender moves back at least 10 m back during the off-ball run (between time_start and time_end). Else FALSE.	None / TRUE / FALSE	✓			
break_defensive_line	bool	None if the off-ball run is not a run in behind (event_subtype <> "behind"). TRUE if between end_time - 1s and end_time + 1s, there is at least a frame when the player is 1 meter behind the last defender. Else FALSE.	None / TRUE / FALSE	✓			
passing_option_at_start	bool	TRUE if the player was a passing option during the first 0.5 seconds of the off-ball run. Else FALSE.	TRUE / FALSE	✓			

Player Overtaken

These attributes help evaluate a player's ability to overtake opponents through his off-ball runs.

Attribute	Type	Description	Values	OBR	PO	PP	OBE
n_opponents_ahead_end	int	The number of opponents (goalkeeper excluded) between the opposing team goal at the end of the event.	e.g. 3	✓		✓	
n_opponents_ahead_start	int	The number of opponents (goalkeeper excluded) between the opposing team goal at the start of the event.	e.g. 5	✓		✓	
n_opponents_overtaken	int	Difference between opponents_ahead_start and opponents_ahead_end.	e.g. 2	✓		✓	

On-Ball Engagement Specifics

These attributes help evaluate defensive coordination and ability to affect an opponent's line breaking passing options.

Attribute	Type	Description	Values	OBR	PO	PP	OBE
affected_line_breaking_passing_option_id	str	**On-ball Engagements** None if the player in possession did not have any line break option during the event that was not difficult (xpass > 0.65). If the player in possession had at least one passing option that was line breaking, and not difficult, then it corresponds to the event_id of one passing option with the highest xreceiver_score.	e.g. 7_5				✓
affected_line_break_id	int		None / 1 (first_line) / 2 (second_last_line) / 3 (last_line)				✓
affected_line_break	str	**On-ball Engagements** None if the player in possession did not have a potential line breaking passing option. Else, the furthest line that was broken/would have been broken if the pass would have been attempted and completed.	None / first_line / second_last_line / last_line				✓
affected_line_breaking_passing_option_attempted	bool	**On-ball Engagements** None if the player in possession did have a potential line break passing option. TRUE if the player in possession attempted a pass to his most likely line breaking option.	TRUE / FALSE / None				✓

Attribute	Type	Description	Values	OBR	PO	PP	OBE
affected_line_breaking_passing_option_xthreat	float	**On-ball Engagements** None if the player in possession did have a most likely line break passing option. xthreat of the player in possession most likely line breaking option.	e.g. 0.04				✓
affected_line_breaking_passing_option_dangerous	bool	**On-ball Engagements** None if the player in possession did have a most likely line break passing option. TRUE if the player in possession most likely line breaking option was dangerous. Else FALSE.	TRUE / FALSE / None				✓
affected_line_breaking_passing_option_run_subtype_id	int		1 (behind) / 2 (coming_short) / 3 (cross_receiver) / 4 (dropping_off) / 5 (overlap) / 6 (pulling_half_space) / 7 (pulling_wide) / 8 (run_ahead_of_the_ball) / 9 (support) / 10 (underlap)				✓
affected_line_breaking_passing_option_run_subtype	str	**On-ball Engagements** None if the player in possession did have a most likely line break passing option. If the most likely passing option is associated with an off-ball run, then it corresponds to this off-ball run subtype.	behind / coming_short / cross_receiver / dropping_off / overlap / pulling_half_space / pulling_wide / run_ahead_of_the_ball / support / underlap / None				✓
pressing_chain	bool	TRUE if the event is part of a pressing chain. Else FALSE.	TRUE / FALSE				✓

Attribute	Type	Description	Values	OBR	PO	PP	OBE
pressing_chain_length	int	Number of pressing events in the pressing chain. None if the player was not involved in a pressing chain.	e.g. 3				✓
pressing_chain_end_type_id	int		1 (regain) / 2 (disruption) / None				✓
pressing_chain_end_type	str	Outcome of the pressing chain the player was involved in. None if the player was not involved in a pressing chain or if the team in possession kept possession without any interruption.	regain / disruption / None				✓
pressing_chain_index	int	It represents the sequential identifier for pressing chains that occur during a match.	e.g. 33				✓
index_in_pressing_chain	int	It represents the sequential position of the on-ball engagement within a specific pressing chain. The ordering is based on the start frame of the pressing.	e.g. 2				✓
simultaneous_defensive_engagement_same_target	bool	The number of defensive engagements towards the same target that have at least one frame in common with the current engagement.	e.g. 2				✓
simultaneous_defensive_engagement_same_target_rank	int	If there is at least one simultaneous engagement on the same player targeted, rank of the current engagement ordered by frame start. Else None.	e.g. 1				✓
consecutive_on_ball_engagements	bool	TRUE if the player performed another on ball engagement in the preceding 4 seconds. Else FALSE.	TRUE / FALSE				✓

Data Matching

These attributes indicate to what extent key moments align with tracking data. The better the alignment, the more confident one can be in the accuracy of the event data.

Attribute	Type	Description	Values	OBR	PO	PP	OBE
is_player_possession_start_matched	bool	TRUE if we are able to match the start of the player possession with the tracking data based on the player and ball position. Else FALSE	TRUE / FALSE	✓	✓	✓	✓
is_player_possession_end_matched	bool	TRUE if we are able to match the end of the player possession with the tracking data based on the player and ball position. Else FALSE	TRUE / FALSE	✓	✓	✓	✓
is_previous_pass_matched	bool	None if the player possession did not start with a pass reception. If the player possession started with a pass reception, - TRUE if the reception was matched with the tracking. - Else FALSE. Then it makes sense to look at all the fields that concern the pass received (“pass_distance_received”, …).	TRUE / FALSE / None			✓	✓

Attribute	Type	Description	Values	OBR	PO	PP	OBE
is_pass_reception_matched	bool	None if the player possession did not end with a complete pass. If the player possession ended with a complete pass, - TRUE if the reception was matched with the tracking - Else FALSE. Then it makes sense to look at all the fields that concern the pass (“pass_angle”, …).	TRUE / FALSE / None	✓	✓	✓	✓
fully_extrapolated	bool	TRUE if the player is never detected in the video during the whole event meaning that his position is totally predicted by our extrapolation model (either because the player is not in the field of view of the camera or he is not detected). Else FALSE.	TRUE / FALSE		✓	✓	