Event Data Specification

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1. Introduction

This document contains the data specification of PFF event data for soccer games. PFF events are separated into game events (player is on the ball) and possession events (player executes a play). Game events can consist of multiple possession events. For example, when a player receives the ball and successfully dribbles past an opponent before passing it to a teammate, the game event consists of two possession events: a dribble and a pass. Game events and possession events are merged for your convenience. The table below lists all available columns.

Column name	Column type	Column description
game_id	int	A unique identifier for games.
game_event_id	int	A unique identifier for game events.
game_event_type	str	Type of game event, see section 2.
possession_event_id	int	A unique identifier for possession events.
possession_event_type	str	Type of possession event, see section 2.
team_id	int	A unique identifier for teams.
player_id	int	A unique identifier for players.
event_time	float	Time of the event takes place (recorded in seconds).
game_clock	str	Formatted game clock for time of the event.
period	int	The period (or half) the event took place.
game_event	dict	Dict containing information regarding the game event, see section 3.
initial_touch	dict	Dict containing information regarding the initial touch, see section 4.
pressure	dict	Dict containing information regarding pressure, see section 5.
passing	dict	Dict containing information regarding a pass, see section 6.
shooting	dict	Dict containing information regarding a shot, see section 7.
cross	dict	Dict containing information regarding a cross, see section 8.
clearance	dict	Dict containing information regarding a clearance, see section 9.
rebound	dict	Dict containing information regarding a rebound, see section 10.
ball_carry	dict	Dict containing information regarding a ball carry, see section 11.
challenge	dict	Dict containing information regarding a challenge, see section 12.
grades	dict	Dict containing PFF Player Grades, see section 13.
fouls	dict	Dict containing information regarding a first foul, see section 14.
substitution	dict	Dict containing information regarding a substitution, see section 15.
player_on_off	dict	Dict containing information regarding players entering and leaving the pitch, see section 16.
locations	dict	Dict containing manually collected shot locations, see section 17.

2. Event types

The table below shows the game event types that are available in column *game_event_type*.

Game Event Type	Description
1KO	First half kick-off
2KO	Second half kick-off
END	End of half
G	Ball hits woodwork or corner flag
OFF	Player off
ON	Player on
OTB	Player on the ball
OUT	Ball out of play
SUB	Substitution
VID	Video is missing

Note that initial touches are not added as separate events, but are tied into the game event. See section 4.

Note that pressures are not added as separate events, but are tied into the event that is being pressured. Pressures can happen on both entire game events (on the initial touch) and/or on individual possession events. See section 5.

The table below shows the possession event types that are available in column *possession_event_type*.

Possession Event Type	Description
BC	Ball carry or touch
CH	Challenge
CL	Clearance
CR	Cross
PA	Pass
RE	Rebound
SH	Shot

3. Game event information

Game event information is stored as a dict in column *game_event*. The table below lists the available information.

Column name	Column description	Column values
advantage_type	Indicates if the event is disallowed after the fact.	N - Non-event
duration	Duration of the game event (recorded in seconds).	
early_distribution	Was the ball distributed early? This is primarily for set pieces, where we are looking to see if the set piece was taken quickly, but can also be used in situations where the keeper immediately distributes the ball to start a counter attack.	0 - False
		1 - True
out_type	Indicates why the ball has gone out of play.	A - Away Score
		H - Home Score
		T - Out of touch
		W - Referee whistle
setpiece_type	The type of set piece, if applicable.	C - Corner
		D - Drop ball
		F - Free kick
		G - Goal kick
		K - Kick-off
		P - Penalty
		T - Throw-in
touches	Number of total touches a player takes on the ball in their possession. If they are receiving a pass, the reception marks their first touch. If a goalkeeper catches the ball and then kicks it, we will collect this as 2 touches, if they catch it and throw it straight out of their hands this will be 1 touch. If they drop the ball on the ground then kick it will still be 2 touches, any bounces of the ball in between we will add a touch each time it goes back into the goalkeeper's hands.	
touches_in_box	Number of total touches a player takes in the opposition box in their possession.	
video_angle_type	Captured when the camera angle is not the main broadcast angle.	M - Missing
video_missing	Indicates if the footage is showing a replay or focusing on something else to the point that the current event is not shown.	0 - False
		1 - True

4. Initial touch information

Initial touch information is stored as a dict in column *initial_touch*.

Column name	Column description	Column values
body_type	The body part the player receives the ball with. For an overview of body type values, see appendix A.	
height_type	The height the player receives the ball at. For an overview of height type values, see appendix B.	
facing_type	The direction the player is facing at the point of the first touch (it is left as the default on set pieces).	
initial_touch_type	This captures the initial touch of the player in possession of the ball.	B - Bad and difficult to control
		G - Good and difficult to control
		M - Miscontrol
		P - Plus
		S - Standard

5. Pressure information

Pressure information is stored as a dict in column *pressure*. If the column is empty, it implies that no attempt was taken to pressure the event. An attempt to apply pressure is recorded when a member of the opposing team is within 5 yards of the ball carrier and closing the space to them with intensity. A pressure is deemed to be successful if that opposing player closes to within 3 yards of the ball carrier, whilst continuing to close the space and affecting either the ball carrier or their options (for example cutting off pass lanes). Pressure will not be applied if the opposing team member is static or moving away from the ball carrier. Both the 5 and 3 yard radius are used as a guide and can expand or shrink depending on the intensity of the presser or direction of the pressure (smaller radius from behind). For example a player might be 4 yards from the ball carrier but at a full sprint could get awarded a successful pressure whereas a player within 3 yards and walking towards the carrier may not.

Column name	Column description	Column values
pressure_player_id	A unique identifier for the player applying the pressure.	
pressure_type	Type of pressure applied. Attempted pressure means that the attempt to pressure the event did not necessarily impact the ball carrier.	A - Attempted pressure
		L - Pressures lane
		P - Pressures player

6. Passing information

Pass information is stored as a dict in column *passing*. Passes make up the vast majority of events captured in a game and generally involve a player attempting to reach a teammate.

Column name	Column description	Column values
advantage_type	Indicates if the event is disallowed after the fact.	N - Non-event
ball_height_type	The height that the pass is played from. For an overview of height type values, see appendix B.	
better_option_player_id	A unique identifier for the player that was the better option for the passer to pass or cross to.	
better_option_time	The time that the better option was available, which allows to explain when a pass should have been played if the better option was simply to pass earlier.	
better_option_type	Describes what was the better option rather than the pass made by the passer. For an overview of better option type values, see appendix C.	
blocker_player_id	A unique identifier for the blocker of the pass.	
creates_space	Indicates an attempt to create space in order to pass the ball, without it qualifying as a ball carry.	0 - False
		1 - True
creates_space_vs_player_id	A unique identifier for the player against whom, the player in possession attempted to create space to pass the ball.	
defender_player_id	A unique identifier for the defender intercepting the pass.	
deflector_player_id	A unique identifier for the player deflecting the pass.	
failed_intervention_player_id	A unique identifier for the first defender failing to block the pass.	
failed_intervention_player_id2	A unique identifier for the second defender failing to block the pass.	
incompletion_reason_type	Only collected on passes that are incomplete and explains the primary reason for why the pass was incomplete. For an overview of incompletion reason type values, see appendix D.	
lines_broken_type	Captures which lines of the opposing team are broken by a pass. Lines must be made up of 2+ people and should be built from the back going forward (essentially there must always be a defensive line), so if a teams defensive shape is 4-1-4-1 for example, we would have just 2 lines, a defensive line of 4 and a midfield line of 4. For an overview of lines broken type values, see appendix E.	
missed_touch_player_id	A unique identifier for the player involved in the event without touching the ball.	
missed_touch_type	Describes how the player involved in the event without touching the ball missed it. For an overview of missed touch type values, see appendix F.	
opportunity_type	Indicates that a chance was created by the pass. For an overview of opportunity type values, see appendix G.	

pass_accuracy_type	Type of accuracy of the pass, captured to add context about the accuracy of a completed pass.	A - Away from a defender
		C - Forces receiver to check move
		E - Leads the target into a challenge
		H - Heavy pass
		I - Hits a target in stride
		L - Light pass
		P - Precise pass
		R - Forces receiver to redirect
		S - Standard
pass_body_type	The body part the player passes the ball with. For an overview of body type values, see appendix A.	
pass_high_point_type	The highest point of the pass. For an overview of height type values, see appendix B.	
pass_outcome_type	The outcome of the pass. A few things to note is that it will be “Blocked” when the blocker is not reacting to the pass, and just closing the space and the ball hits them, and “Defensive interception” when the defender has time to react to the trajectory of the pass. Stoppage is used in case the referee blows for a stoppage before the ball can reach the intended target.	B - Blocked
		C - Complete
		D - Defensive interception
		G - Inadvertent shot at own goal
		I - Inadvertent shot at goal
		O - Out of play
		S - Stoppage
pass_type	Captures the style of pass.	B - Cutback
		C - Create contest
		F - Flick on
		H - Long throw-in to the box
		O - Ball over the top
		S - Standard
		T - Through ball
		W - Switch
passer_player_id	A unique identifier for the player passing the ball	
pressure_player_id	A unique identifier for the player applying the pressure on the pass.	

pressure_type	Type of pressure applied on the pass. See section 5 for a detailed description.	
receiver_facing_type	The direction the receiver is facing at the point of the pass (will be the same as the target_facing_type unless the target is not the receiver). For an overview of facing type values, see appendix H.	
receiver_player_id	A unique identifier for the player receiving the pass.	
second_incompletion_reason_type	This is to capture an additional incompletion reason on passes which meet more than one criteria. For example, a pass that is intercepted and was in front of the intended target. For an overview of incompletion reason type values, see appendix D.	
target_facing_type	The direction the target is facing at the moment of the pass. For an overview of facing type values, see appendix H.	
target_player_id	A unique identifier for the target of the pass.	
bad_parry	**Only applicable if the pass outcome is inadvertent shot at goal/own goal**. Captures when a goalkeeper makes a save but has the opportunity to do better with his parry. This does not have to result in a chance for the opposition but often will.	See section 7 (shooting information for all available options).
clearer_player_id	**Only applicable if the pass outcome is inadvertent shot at goal/own goal and the outcome of the shot is goal line clearance**. A unique identifier for the player responsible for the goal line clearance	
keeper_player_id	**Only applicable if the pass outcome is inadvertent shot at goal/own goal.** A unique identifier for the keeper trying to save the inadvertent shot.	
save_rebound_type	**Only applicable if the pass outcome is inadvertent shot at goal/own goal.** Captures the direction that the ball goes (from the perspective of the shooter) after it has been saved by the goalkeeper.	See section 7 (shooting information for all available options).
saveable	**Only applicable if the pass outcome is inadvertent shot at goal/own goal.** Captures whether or not the goalkeeper had a chance to save the shot when it results in a goal.	See section 7 (shooting information for all available options).
shot_initial_height_type	**Only applicable if the pass outcome is inadvertent shot at goal/own goal.** Captures the height of the shot when it would have reached the goal line. Fails to reach is only used when the ball fails to reach to goal without intervention from a defender, e.g.. a scuffed shot that rolls to the keeper or goes wildly off target.	See section 7 (shooting information for all available options).
shot_outcome_type	**Only applicable if the pass outcome is inadvertent shot at goal/own goal.** Captures the outcome of the shot	See section 7 (shooting information for all available options).

7. Shooting information

Shot information is stored as a dict in column *shooting*. Shots are deliberate attempts at goal. When the result of another event is an inadvertent shot at goal or an inadvertent shot at own goal, the information of the shot is stored in that event.

Column name	Column description	Column values
advantage_type	Indicates if the event is disallowed after the fact.	N - Non-event
bad_parry	Captures when a goalkeeper makes a save but has the opportunity to do better with his parry. This does not have to result in a chance for the opposition but often will.	0 - False
		1 - True
ball_height_type	The height that the shot is taken from. For an overview of height type values, see appendix B.	
ball_moving	Captures whether or not the ball is moving when struck by the shooter.	0 - False
		1 - True
better_option_player_id	A unique identifier for the player that was the better option for the shooter to pass or cross to.	
better_option_time	The time that the better option was available, which allows to explain when a shot should have been played if the better option was simply to shoot earlier.	
better_option_type	Describes what was the better option rather than the shot made by the shooter. For an overview of better option type values, see appendix C.	
blocker_player_id	A unique identifier for the blocker of the shot.	
body_movement_type	Captures the movement of the shooter at the time of the shot.	AG - Away from goal
		LA - Lateral
		ST - Static
		TG - Towards goal
clearer_player_id	**Only applicable if the outcome of the shot is goal line clearance**. A unique identifier for the player responsible for the goal line clearance	
creates_space	Indicates an attempt to create space in order to shoot the ball, without it qualifying as a ball carry.	0 - False
		1 - True
creates_space_vs_player_id	A unique identifier for the player against whom the player in possession attempted to create space to pass the ball.	
deflector_player_id	A unique identifier for the player deflecting the shot.	
failed_intervention_player_id	A unique identifier for the first defender failing to block the shot.	
failed_intervention_player_id2	A unique identifier for the second defender failing to block the shot.	
failed_intervention_player_id3	A unique identifier for the third defender failing to block the shot.	
keeper_touch_type	The body part the goalkeeper touches the shot with. For an overview of body type	

	values, see appendix A.	
pressure_player_id	A unique identifier for the player applying the pressure on the shot.	
pressure_type	Type of pressure applied on the shot. See section 5 for a detailed description.	
save_height_type	The height the goalkeeper saves the shot at. For an overview of height type values, see appendix B.	
save_rebound_type	Captures the direction that the ball goes (from the perspective of the shooter) after it has been saved by the goalkeeper.	CB - Crossbar
		GL - Behind the goal left
		GR - Behind the goal right
		HL - Behind the goal left and high
		HR - Behind the goal left and right
		L6 - Left six yard box
		LA - Into left area
		LO - Out of box left
		LP - Left post
		M6 - Middle six yard box
		MA - Into the middle area
		MO - Out of box middle
		OC - Over crossbar
		R6 - Right six yard box
		RA - Into right area
		RO - Out of box right
		RP - Right post
saveable	Captures whether or not the goalkeeper had a chance to save the shot when it results in a goal.	0 - False
		1 - True
saver_player_id	A unique identifier for the player trying to save the shot.	

shooter_player_id	A unique identifier for the player shooting.	
shot_body_type	The body part the player shoots the ball with. For an overview of body type values, see appendix A.	
shot_initial_height_type	Captures the height of the shot when it would have reached the goal line. Fails to reach is only used when the ball fails to reach to goal without intervention from a defender, e.g.. a scuffed shot that rolls to the keeper or goes wildly off target.	1 - Bottom third
		2 - Middle third
		3 - Top third
		C - Cross bar
		F - Fails to reach
		G - Ground
		N - Narrowly over crossbar
		O - Far over the crossbar
		U - Narrowly under crossbar
shot_nature_type	The nature of the shot, captured to add context about the type of shot.	A - Placement
		F - Flick
		P - Power
		T - Toe punt
shot_outcome_type	The outcome of the shot.	B - Block on target
		C - Block off target
		F - Save off target
		G - Goal
		L - Goalline clearance
		O - Off target
		S - Save on target
shot_type	Captures the type of shot.	B - Bicycle
		D - Diving

		F - Side foot
		I - Sliding
		L - Lob
		O - Outside foot
		S - Standard
		T - Studs
		V - Volley
exp_goal	The PFF expected goal value for the shot.	

8. Cross information

Cross information is stored as a dict in column *cross*. A cross is when a player plays the ball into the box with the intention of it being attacked by a teammate. The key difference between a pass and a cross is simply intent.

Column name	Column description	Column values
advantage_type	Indicates if the event is disallowed after the fact.	N - Non-event
ball_height_type	The height that the cross is played from. For an overview of height type values, see appendix B.	
better_option_player_id	A unique identifier for the player that was the better option for the crosser to pass or cross to.	
better_option_time	The time that the better option was available, which allows to explain when a cross should have been played if the better option was simply to cross earlier.	
better_option_type	Describes what was the better option rather than the cross made by the crosser. For an overview of better option type values, see appendix C.	
blocker_player_id	A unique identifier for the blocker of the cross.	
complete_to_player_id	A unique identifier of the player the cross is completed to.	
creates_space	Indicates an attempt to create space in order to cross the ball, without it qualifying as a ball carry.	0 - False
		1 - True
cross_accuracy_type	Type of accuracy of the cross, captured to add context about the accuracy of a completed cross.	A - Away from a defender
		C - Forces receiver to check move
		E - Leads the target into a challenge

		H - Heavy cross
		I - Hits a target in stride
		L - Light cross
		P - Precise cross
		R - Forces receiver to redirect
		S - Standard
creates_space_vs_player_id	A unique identifier for the player against whom, the player in possession attempted to create space to pass the ball.	
cross_high_point_type	The highest point of the cross. For an overview of height type values, see appendix B.	
cross_outcome_type	The outcome of the cross	B - Block
		C - Complete
		D - Defensive interception
		I - Inadvertent shot at goal
		S - Stoppage
		T - Out of touch
		U - Untouched
cross_type	The type of cross.	D - Drilled
		F - Floated
		I - Inswinger
		O - Outswinger
		P - Placed
cross_zone_type	The zone a cross is played into. Near and far post trump six yard box as options if a cross is both.	C - Central
		F - Far post
		N - Near post
		S - Six yard box
crosser_body_type	The body part the player crosses the ball with. For an overview of body type values, see appendix A.	
crosser_player_id	A unique identifier for the player crossing the ball.	
defender_player_id	A unique identifier for the defender intercepting the cross.	
deflector_player_id	A unique identifier for the player deflecting the cross.	

failed_intervention_player_id	A unique identifier for the first defender failing to block the cross.	
failed_intervention_player_id2	A unique identifier for the second defender failing to block the cross.	
incompletion_reason_type	Only collected on crosses that are incomplete and explains the primary reason for why the cross was incomplete. For an overview of incompletion reason type values, see appendix D.	
intended_target_player_id	A unique identifier for the player the cross is intended for.	
missed_touch_player_id	A unique identifier for the player involved in the event without touching the ball.	
missed_touch_type	Describes how the player involved in the event without touching the ball missed it. For an overview of missed touch type values, see appendix F.	
opportunity_type	Indicates that a chance was created by the cross. For an overview of opportunity type values, see appendix G.	
pressure_player_id	A unique identifier for the player applying the pressure on the cross.	
pressure_type	Type of pressure applied on the cross. See section 5 for a detailed description.	
receiver_ball_height_type	The height the player receives the cross with. For an overview of height type values, see appendix B.	
receiver_body_type	The body part the player receives the cross with. For an overview of body type values, see appendix A.	
second_incompletion_reason_type	This is to capture an additional incompletion reason on crosses which meet more than one criteria. For an overview of incompletion reason type values, see appendix D.	
bad_parry	**Only applicable if the cross outcome is inadvertent shot at goal/own goal**. Captures when a goalkeeper makes a save but has the opportunity to do better with his parry. This does not have to result in a chance for the opposition but often will.	See section 7 (shooting information for all available options).
clearer_player_id	**Only applicable if the cross outcome is inadvertent shot at goal/own goal and the outcome of the shot is goal line clearance**. A unique identifier for the player responsible for the goal line clearance	
keeper_player_id	**Only applicable if the cross outcome is inadvertent shot at goal/own goal.** A unique identifier for the keeper trying to save the inadvertent shot.	
save_rebound_type	**Only applicable if the cross outcome is inadvertent shot at goal/own goal.** Captures the direction that the ball goes (from the perspective of the shooter) after it has been saved by the goalkeeper.	See section 7 (shooting information for all available options).
saveable	**Only applicable if the cross outcome is inadvertent shot at goal/own goal.** Captures whether or not the goalkeeper had a chance to save the shot when it results in a goal.	See section 7 (shooting information for all available options).
shot_initial_height_type	**Only applicable if the cross outcome is inadvertent shot at goal/own goal.**	See section 7 (shooting information for all available options).

	Captures the height of the shot when it would have reached the goal line. Fails to reach is only used when the ball fails to reach to goal without intervention from a defender, e.g.. a scuffed shot that rolls to the keeper or is going towards the touchline.	
shot_outcome_type	**Only applicable if the cross outcome is inadvertent shot at goal/own goal.** Captures the outcome of the shot	See section 7 (shooting information for all available options).

9. Clearance information

Clearance information is stored as a dict in column *clearance*. Clearances are when a defender clears the ball with no attempt to pass to a teammate. Most often this will occur in their own box in the form of a header after a cross, but it can occur anywhere in the field and with any body part. The key difference between a pass and a clearance is simply intent.

Column name	Column description	Column values
advantage_type	Indicates if the event is disallowed after the fact.	N - Non-event
ball_height_type	The highest point in the air that the clearance reaches. For an overview of height type values, see appendix B.	
better_option_player_id	A unique identifier for the player that was the better option for the clearer to pass or cross to.	
better_option_time	The time that the better option was available, which allows to explain when a clearance should have been played if the better option was simply to clearance earlier.	
better_option_type	Describes what was the better option rather than the clearance made by the clearer. For an overview of better option type values, see appendix C.	
blocker_player_id	A unique identifier for the blocker of the clearance.	
clearance_body_type	The body part the player clears the ball with. For an overview of body type values, see appendix A.	
clearance_outcome_type	The outcome of the clearance. Note that it will be a clearance if the ball is put deliberately out of play (most likely for a player to get medical attention), or deliberately giving the ball back to the opposing team (most likely fair-play). They are explained by outcomes “E” and “U”.	A - Inadvertent shot at goal
		B - Block
		D - Inadvertent shot at own goal
		E - Deliberate to Opposition
		O - Out of Play
		P - Player
		S - Stoppage
		U - Deliberate to Touch

clearance_player_id	A unique identifier for the player clearing the ball.	
creates_space	Indicates an attempt to create space in order to clear the ball, without it qualifying as a ball carry.	0 - False
		1 - True
creates_space_vs_player_id	A unique identifier for the player against whom, the player in possession attempted to create space to pass the ball.	
failed_intervention_player_id	A unique identifier for the first defender failing to block the clearance.	
failed_intervention_player_id2	A unique identifier for the second defender failing to block the clearance.	
height_type	The height that the clearance is played from. For an overview of height type values, see appendix B.	
missed_touch_player_id	A unique identifier for the player involved in the event without touching the ball.	
missed_touch_type	Describes how the player involved in the event without touching the ball missed it. For an overview of missed touch type values, see appendix F.	
opportunity_type	Indicates that a chance was created by the clearance. For an overview of opportunity type values, see appendix G.	
pressure_player_id	A unique identifier for the player applying the pressure on the clearance.	
pressure_type	Type of pressure applied on the clearance. See section 5 for a detailed description.	
bad_parry	**Only applicable if the clearance outcome is inadvertent shot at goal/own goal**. Captures when a goalkeeper makes a save but has the opportunity to do better with his parry. This does not have to result in a chance for the opposition but often will.	See section 7 (shooting information for all available options).
clearer_player_id	**Only applicable if the clearance outcome is inadvertent shot at goal/own goal and the outcome of the shot is goal line clearance**. A unique identifier for the player responsible for the goal line clearance	
keeper_player_id	**Only applicable if the clearance outcome is inadvertent shot at goal/own goal.** A unique identifier for the keeper trying to save the inadvertent shot.	
save_rebound_type	**Only applicable if the clearance outcome is inadvertent shot at goal/own goal.** Captures the direction that the ball goes (from the perspective of the shooter) after it has been saved by the goalkeeper.	See section 7 (shooting information for all available options).
saveable	**Only applicable if the clearance outcome is inadvertent shot at goal/own goal.** Captures whether or not the goalkeeper had a chance to save the shot when it results in a goal.	See section 7 (shooting information for all available options).
shot_initial_height_type	**Only applicable if the clearance outcome is inadvertent shot at goal/own goal.** Captures the height of the shot when it would have reached the goal line. Fails to reach is only used when the ball fails to reach to goal without intervention from a defender, e.g.. a scuffed shot that rolls to the keeper or is going towards the	See section 7 (shooting information for all available options).

	touchline.	
shot_outcome_type	**Only applicable if the clearance outcome is inadvertent shot at goal/own goal.** Captures the outcome of the shot	See section 7 (shooting information for all available options).

10. Rebound information

Rebound information is stored as a dict in column *rebound*. A rebound is when the ball bounces off of someone inadvertently. This can happen following any other event.

Column name	Column description	Column values
advantage_type	Indicates if the event is disallowed after the fact.	N - Non-event
missed_touch_player_id	A unique identifier for the player involved in the event without touching the ball.	
missed_touch_type	Describes how the player involved in the event without touching the ball missed it. For an overview of missed touch type values, see appendix F.	
originate_type	Captures where the rebound has originated from. Most often the result of a player.	C - Corner flag
		M - Miscellaneous
		P - Player
		W - Woodwork
rebound_body_type	The body part of the rebound. For an overview of body type values, see appendix A.	
rebound_height_type	The height of the rebound. For an overview of height type values. For an overview of height type values, see appendix B.	
rebound_high_point_type	The highest point of the rebound. For an overview of height type values, see appendix B.	
rebound_outcome_type	The outcome of the rebound.	A - Inadvertent shot at goal
		D - Inadvertent shot at own goal
		P - Player
		T - Out of touch
rebounder_player_id	A unique identifier for the player against whom the ball rebounded	
bad_parry	**Only applicable if the rebound outcome is inadvertent shot at goal/own goal**. Captures when a goalkeeper makes a save but has the opportunity to do better with his parry. This does not have to result in a chance for the opposition but often will.	See section 7 (shooting information for all available options).

clearer_player_id	**Only applicable if the rebound outcome is inadvertent shot at goal/own goal and the outcome of the shot is goal line clearance**. A unique identifier for the player responsible for the goal line clearance	
keeper_player_id	**Only applicable if the rebound outcome is inadvertent shot at goal/own goal.** A unique identifier for the keeper trying to save the inadvertent shot.	
save_rebound_type	**Only applicable if the rebound outcome is inadvertent shot at goal/own goal.** Captures the direction that the ball goes (from the perspective of the shooter) after it has been saved by the goalkeeper.	See section 7 (shooting information for all available options).
saveable	**Only applicable if the rebound outcome is inadvertent shot at goal/own goal.** Captures whether or not the goalkeeper had a chance to save the shot when it results in a goal.	See section 7 (shooting information for all available options).
shot_initial_height_type	**Only applicable if the rebound outcome is inadvertent shot at goal/own goal.** Captures the height of the shot when it would have reached the goal line. Fails to reach is only used when the ball fails to reach to goal without intervention from a defender, e.g.. a scuffed shot that rolls to the keeper or is going towards the touchline.	See section 7 (shooting information for all available options).
shot_outcome_type	**Only applicable if the rebound outcome is inadvertent shot at goal/own goal.** Captures the outcome of the shot	See section 7 (shooting information for all available options).

11. Ball carry information

Ball carry information is stored as a dict in column *ball_carry*. Ball carries is the catch-all name for carries and touches. Dribbles are captured within challenges, see section 12.

Column name	Column description	Column values
advantage_type	Indicates if the event is disallowed after the fact.	N - Non-event
ball_carrier_player_id	A unique identifier for the player carrying the ball	
ball_carry_outcome	Outcome of the ball carry when the *ball_carry_type* is "C"	C - Leads into Challenge
		L - Ball Loss
		R - Retains
		S - Stoppage
ball_carry_type	Indicates whether it is a carry or a touch.	C - Carry
		T - Touch

better_option_player_id	A unique identifier for the player that was the better option for the carrier to pass or cross to.	
better_option_time	The time that the better option was available, which allows to explain when a pass should have been played if the better option was simply to pass earlier.	
better_option_type	Describes what was the better option rather than the pass made by the passer. For an overview of better option type values, see appendix C.	
carry_intent	The intent of the player carrying the ball	B - Break line
		C - Create space
		E - Escape Pressure
carry_type	A carry is captured when a player tries to escape a pressure, break a line of defense, or create space by either driving with intent or changing directions.	B - Line break
		C - Change of direction
		D - Drive with intent
defender_player_id	A unique identifier for the defender involved in the event.	
lines_broken_type	Captures which lines of the opposing team are broken by a carry. For an overview of lines broken type values, see appendix E.	
opportunity_type	Indicates that a chance was created by the carry. For an overview of opportunity type values, see appendix G.	
pressure_player_id	A unique identifier for the player applying the pressure on the carry.	
pressure_type	Type of pressure applied on the carry. See section 5 for a detailed description.	
successful	Captures whether or not the carrier was successful in what they intended to accomplish with the ball carry.	0 - False
		1 - True
touch_outcome_type	The outcome of the touch. Only captured if *ball_carry_type* equals T.	A - Inadvertent shot at Goal
		C - Challenge
		D - Inadvertent shot at own goal
		O - Out of play
		P - Player
		R - Retain
touch_type	The type of touch. A couple clarifications, Failed trap is a failing to control, whereas heavy touch is a controlled touch, but too heavy so that the ball escapes the player in possession. A Failed Cross, shot, pass, or clearance differs from an actual cross, shot, pass or clearance in that for it to be classed as “failed” the	C - Failed cross
		D - Deliberate handball
		F - Failed trap
		H - Heavy touch
		L - Failed clearance

	player needs to completely miss the ball with the intended body part, with the ball hitting the player in a different body part, even though the intention was the same.	P - Failed pass
		S - Failed shot
		T - Take over
bad_parry	**Only applicable if the touch outcome is inadvertent shot at goal/own goal**. Captures when a goalkeeper makes a save but has the opportunity to do better with his parry. This does not have to result in a chance for the opposition but often will.	See section 7 (shooting information for all available options).
clearer_player_id	**Only applicable if the touch outcome is inadvertent shot at goal/own goal and the outcome of the shot is goal line clearance**. A unique identifier for the player responsible for the goal line clearance	
keeper_player_id	**Only applicable if the touch outcome is inadvertent shot at goal/own goal.** A unique identifier for the keeper trying to save the inadvertent shot.	
save_rebound_type	**Only applicable if the touch outcome is inadvertent shot at goal/own goal.** Captures the direction that the ball goes (from the perspective of the shooter) after it has been saved by the goalkeeper.	See section 7 (shooting information for all available options).
saveable	**Only applicable if the touch outcome is inadvertent shot at goal/own goal.** Captures whether or not the goalkeeper had a chance to save the shot when it results in a goal.	See section 7 (shooting information for all available options).
shot_initial_height_type	**Only applicable if the touch outcome is inadvertent shot at goal/own goal.** Captures the height of the shot when it would have reached the goal line. Fails to reach is only used when the ball fails to reach to goal without intervention from a defender, e.g.. a scuffed shot that rolls to the keeper or is going towards the touchline.	See section 7 (shooting information for all available options).
shot_outcome_type	**Only applicable if the touch outcome is inadvertent shot at goal/own goal.** Captures the outcome of the shot	See section 7 (shooting information for all available options).

12. Challenge information

Challenge information is stored as a dict in column *challenge*. Challenges capture all tackle attempts, including dribbles, 50/50s and aerial duels.

Column name	Column description	Column values
additional_challenger1	A unique identifier for the first additional challenger, captured in case there are more than 2 players challenging for the ball.	
additional_challenger2	A unique identifier for the second additional challenger, captured in case there are more than 3 players challenging for the ball.	

advantage_type	Indicates if the event is disallowed after the fact.	N - Non-event
ball_carrier_player_id	A unique identifier for the carrier of the ball.	
better_option_player_id	A unique identifier for the player that was the better option for the ball carrier to pass or cross to.	
better_option_time	The time that the better option was available.	
better_option_type	Describes what was the better option rather than dribble made by the ball carrier. For an overview of better option type values, see appendix C.	
challenge_outcome_type	The outcome of the challenge. Outcomes M and N are only captured on dribbles.	B - Distribution disrupted
		C - Forces carrier out of play
		D - Distributes ball
		F - Foul
		I - Shields in play
		K - Keeps ball without contact
		L - Rolls by challenger
		M - Beats man loses ball
		N - Keeps ball without beating man
		O - Ball out of play
		P - Player
		R - Retain
		S - Shields out of play
challenge_type	The type of challenge being captured.	5 - 50/50
		A - Aerial duel
		B - Tackle from behind
		D - Dribble
		G - Goalkeeper smothers ball
		H - Shielding
		K - Hand tackle by goalkeeper
		L - Slide tackle
		S - Shoulder to shoulder
		T - Standing tackle

challenge_winner_player_id	A unique identifier for the player winning the challenge.	
challenger_away_player_id	A unique identifier for the player of the away team in challenge type 5 and A.	
challenger_home_player_id	A unique identifier for the player of the home team in challenge type 5 and A.	
challenger_player_id	A unique identifier for the player attempting the challenge.	
dribble_type	The way a player attempts to beat a defender on a dribble. Trick takes priority over all other dribble types.	B - Between two defenders
		I - Inside
		K - Knocks in front
		O - Outside
		T - Trick
keeper_player_id	A unique identifier for the goalkeeper attempting the challenge, captured in case of *challenge_type* G and K.	
lines_broken_type	Captures which lines of the opposing team are broken by a dribble. For an overview of lines broken type values, see appendix E.	
missed_touch_player_id	A unique identifier for the player involved in the event without touching the ball.	
missed_touch_type	Describes how the player involved in the event without touching the ball missed it. For an overview of missed touch type values, see appendix F.	
opportunity_type	Indicates that a chance was created by the dribble. For an overview of opportunity type values, see appendix G.	
tackle_attempt_type	The attempt by the defender as the dribbler tries to beat him. Only captured on dribbles.	D - Deliberate foul
		F - No tackle because the dribbler has faked a pass/cross/shot/clearance
		G - Defender attempts to win the ball
		T - No tackle attempt
trick_type	Type of trick attempted by dribbler. Only captured on dribbles.	C - Cruijff turn
		D - Drag back
		E - Elastico
		F - Flick over
		N - Nutmeg
		O - Other
		R - Roulette
		S - Step Over
		U - Dummy

13. Grades

PFF Player Grades are stored as a dict in column *grades*. The grading system evaluates every player on every event during a game. Each player is given a grade of -2 to +2 in 0.5 increments on a given event with 0 being the expected grade. The zero grade is important as most events feature many players doing their job at an expected level.

Column name	Column description
away_player_player_grade	PFF Player Grade for the player of the away team in challenge type 5 and A.
away_player_player_id	A unique identifier for the player of the away team in challenge type 5 and A.
ball_carrier_player_grade	PFF Player Grade for the carrier of the ball for carries and challenges of type B, D, G, H, K, L, S and T.
ball_carrier_player_id	A unique identifier for the carrier of the ball for carries and challenges of type B, D, G, H, K, L, S and T.
blocker_player_grade	PFF Player Grade for the blocker of the ball.
blocker_player_id	A unique identifier for the blocker of the ball.
challenger_player_grade	PFF Player Grade for the first challenger.
challenger_player_id	A unique identifier for the first challenger.
challenger2_player_grade	PFF Player Grade for the second challenger.
challenger2_player_id	A unique identifier for the second challenger.
clearer_player_grade	PFF Player Grade for the clearer of the ball.
clearer_player_id	A unique identifier for the clearer of the ball.
closing_down_player_grade	PFF Player Grade for the first defender closing down the ball carrier.
closing_down_player_id	A unique identifier for the first defender closing down the ball carrier.
closing_down2_player_grade	PFF Player Grade for the second defender closing down the ball carrier.
closing_down2_player_id	A unique identifier for the second defender closing down the ball carrier.
crosser_player_grade	PFF Player Grade for the crosser of the ball.
crosser_player_id	A unique identifier for the crosser of the ball.
dab_player_grade	PFF Player Grade for the player defending away from the ball.
dab_player_id	A unique identifier for the player defending away from the ball.
defender_player_grade	PFF Player Grade for the main defender associated with the event.
defender_player_id	A unique identifier for the main defender associated with the event.

deflector_player_grade	PFF Player Grade for the deflector of the ball.
deflector_player_id	A unique identifier for the deflector of the ball.
discipline_player_grade	PFF Player Grade for the player being disciplined.
discipline_player_id	A unique identifier for the player being disciplined.
fint_player_grade	PFF Player Grade for the first defender failing to block the event.
fint_player_id	A unique identifier for the first defender failing to block the event.
fint2_player_grade	PFF Player Grade for the second defender failing to block the event.
fint2_player_id	A unique identifier for the second defender failing to block the event.
home_player_player_grade	PFF Player Grade for the player of the home team in challenge type 5 and A.
home_player_player_id	A unique identifier for the player of the home team in challenge type 5 and A.
keeper_player_grade	PFF Player Grade for the goalkeeper associated with the event.
keeper_player_id	A unique identifier for the goalkeeper associated with the event.
movement_player_grade	PFF Player Grade for the first attacker with movement off the ball.
movement_player_id	A unique identifier for the first attacker with movement off the ball.
mt_player_player_grade	PFF Player Grade for the player involved in the event without touching the ball.
mt_player_player_id	A unique identifier for the player involved in the event without touching the ball.
passer_player_grade	PFF Player Grade for the passer of the ball.
passer_player_id	A unique identifier for the passer of the ball.
position_player_grade	PFF Player Grade for the first defender positioning himself.
position_player_id	A unique identifier for the first defender positioning himself.
position2_player_grade	PFF Player Grade for the second defender positioning himself.
position2_player_id	A unique identifier for the second defender positioning himself.
receiver_player_grade	PFF Player Grade for the receiver of the ball.
receiver_player_id	A unique identifier for the receiver of the ball.
shooter_player_grade	PFF Player Grade for the shooter of the ball.
shooter_player_id	A unique identifier for the shooter of the ball.
target_player_grade	PFF Player Grade for the target of a pass or cross.
target_player_id	A unique identifier for the target of a pass or cross.
touch_player_player_grade	PFF Player Grade for the player touching the ball.

touch_player_player_id	A unique identifier for the player touching the ball.

14. Fouls

Fouls information is stored as a dict in columns *foul_one* and *foul_two*. Fouls can be captured on every event type, both when a foul occurs or when a clear foul is missed. There can be multiple fouls associated with a single event.

Column name	Column description	Column values
correct_decision	Indicates whether or not the referee made the correct decision.	0 - False
		1 - True
culprit_player_id	A unique identifier for the player who commits the foul.	
foul_outcome_type	Any punishment or action taken by the referee as a result of the foul.	F - No foul
		N - No warning
		R - Red card
		S - Second yellow card
		W - Warning
		Y - Yellow card
foul_type	The type of foul. Missed infringement is only used for clear missed offenses.	A - Advantage
		I - Infringement
		M - Missed infringement
potential_offense_type	Captures what type of offense the culprit commits on the foul.	D - Dissent
		F - Off the ball
		H - Handball
		N - On the ball
		O - Offside
		T - Technical
		V - Dive
var	Indicates whether or not the VAR was used.	0 - False
		1 - True
var_culprit_player_id	A unique identifier for the player who commits the foul in case VAR is used. Will be the same as the culprit_player_id unless it was a case of misidentification on a card.	
var_outcome_type	Any punishment or action taken by the referee as a result of the foul after using VAR.	F - No foul

		N - No warning
		R - Red card
		S - Second yellow card
		W - Warning
		Y - Yellow card
var_reason_type	Indicates whether VAR was used because a foul was missed, or to overturn a decision by the referee.	I - Missed infringement
		O - Overturn infringement
victim_player_id	A unique identifier for the victim of the foul.	

15. Substitution

Substitution information is stored as a dict in column *substitution*.

Column name	Column description	Column values
player_off_id	A unique identifier for the player coming off the pitch.	
player_on_id	A unique identifier for the player coming on the pitch.	
sub_type	Type of substitution.	H - Concussion substitute
		S - Standard

16. Player on or off

Information about players leaving or entering the pitch outside of substitutions, is stored as a dict in column *player_on_off*.

Column name	Column description	Column values
player_off_type	Reason for player leaving the pitch.	E - Equipment
		I - Injury
		M - Miscellaneous
		R - Red card
player_on_or_off	Indicates whether the player enters or leaves the pitch.	ON
		OFF

17. Locations

Shot location data is manually collected and stored as a dict in column *locations*. All location data have attacking direction left to right with the bottom left corner as the origin (0, 0).

Column name	Column description	Column values
shot_location	The location of the shooter at the time of the shot	x - x-coordinate
		y - y-coordinate
shot_end_location	The end location of the shot. For example, the point at which the shot is blocked.	x - x-coordinate
		y - y-coordinate
goalkeeper_location	The location of the goalkeeper at the time of the shot	x - x-coordinate
		y - y-coordinate
keeper_touch_location	The location where the goalkeeper touched the ball if the shot was converted after the goalkeeper touch.	x - x-coordinate
		y - y-coordinate
defender	The location(s) of the defender(s) at the time of the shot	x - x-coordinate
		y - y-coordinate
offender	The location(s) of the offender(s) at the time of the shot	x - x-coordinate
		y - y-coordinate

A. Body types

The table below shows the body part type values that are available in all columns that contain a *body_type*.

Body type	Description
2H	Two hands - mostly throw-ins, goalkeeper will have CA, PA and PU mostly.
BA	Back
BO	Bottom
CA	Two hand catch
CH	Chest
HE	Head
LA	Left arm
LB	Left back heel
LC	Left shoulder
LF	Left foot
LH	Left hand
LK	Left knee
LS	Left shin
LT	Left thigh
PA	Two hand palm
PU	Two hand punch
RA	Right arm
RB	Right back heel
RC	Right shoulder
RF	Right foot
RH	Right hand
RK	Right knee
RS	Right shin
RT	Right thigh
VM	Video missing

B. Height types

The table below shows the height type values that are available in all columns that contain a *height_type*.

Height type	Description
A	Above head
G	On the ground
H	Between waist and head
L	Off the ground but below waist
M	Video missing
V	Half volley

Note that a half volley is a ball that is hit as it comes up after bouncing. The difference between half volley and off ground but below waist is that for a half volley the ball will still be rising when hit.

Note that headers are considered to be above head. The exceptions here will be diving headers, or headers where the passer ducks their head to the point where it would be somewhere between head height and waist.

C. Better option types

The table below shows the better option type values that are available in all columns that contain a *better_option_type*.

Better option type	Description
B	Ball carry
C	Cross
H	Hold
L	Clearance
O	Continue
P	Pass
S	Shot

D. Incompletion reason types

The table below shows the incompletion reason type values that are available in all columns that contain a *incompletion_reason_type*.

Incompletion reason type	Description
BH	Behind
BL	Blocked
CA	Caught
CO	Defensive Contact
DC	Defensive Challenge
DF	Deflected
DI	Defender Interception
FO	Foul
HI	High
HO	Hit Official
IF	In Front
LB	Receiver Lets Ball Run
MC	Miscommunication
MH	Miss Hit
PS	Passer Slipped
RB	Receiver Didn't Come Back To Ball
RF	Receiver Slipped
RM	Receiver Misses Ball
RS	Receiver Stopped
RW	Referee In Way
SP	Speculative
UH	Underhit

E. Lines broken types

The table below shows the lines broken type values that are available in all columns that contain a *lines_broken_type*.

Lines Broken type	Description
A	Attack
AD	Attack and defense (bypassing the midfield)
AM	Attack and midfield
AMD	Attack, midfield and defense
D	Defense
M	Midfield
MD	Midfield and defense

F. Missed touch types

The table below shows the missed touch type values that are available in all columns that contain a *missed_touch_type*.

Missed touch type	Description
C	Missed Cross - missing the ball when trying to cross.
D	Dummy - intentionally leaving a ball to another teammate.
I	Missed Interception - missing the ball when trying to intercept (usually a pass or a cross).
L	Missed Clearance - missing the ball when trying to clear.
M	Missed Touch - missing the ball when trying to control.
O	Missed Shot - missing the ball when trying to shoot.
P	Missed Pass - missing the ball when trying to pass.
S	Slipped - missed the ball due to a slip.

G. Opportunity types

The table below shows the opportunity type values that are available in all columns that contain a *opportunity_type*.

Opportunity type	Description
C	Chance created (receiver should score)
D	Dangerous position (receiver in position to create a chance)
H	Half chance (receiver has a decent chance to score)
N	Negative chance created
P	Negative dangerous position

H. Facing types

The table below shows the facing type values that are available in all columns that contain a *facing_type*.

Facing type	Description
B	Back to goal
G	Facing goal
L	Lateral

Note that the hips of the player are taken as the reference for which way he is facing.