Using Tracking Data

1. Introduction

During a football game players make important contributions both on and off the ball. Tracking data captures the movements of all players and the ball over the course of the match, making it possible to examine how these movements contribute to phases of play.

I describe how we can analyse play using this data. I then use the described methods to look into how players contributed to a goal before focussing on an individual player's attacking contribution.

2. How can we analyse phases of play?

The simplest thing we can do with tracking data is to plot the positions of the players and ball on the pitch. The top-down view this creates really highlights where spaces are on the field of play.

We can add context to such a snapshot in time by looking at the movements of players, and here I enhance analysis by considering

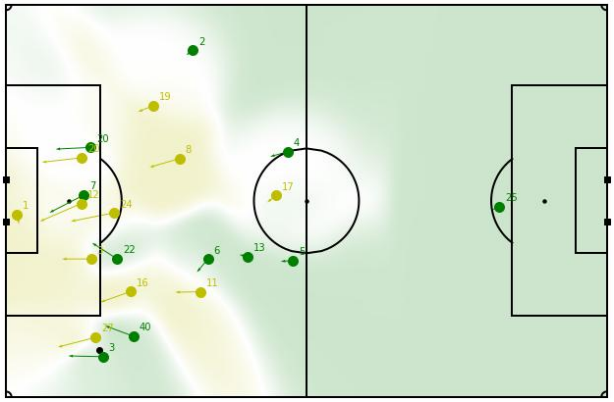
- Speed, direction and acceleration of players.
- Distance to the centre of the opposition goal. This is linked to the expected goals (xG) value of a chance on goal, so is valuable in analysing attacking play.
- Distance between each player and the nearest opponent, which can show how effective players are at finding space. The nature of that space is also important, and not captured by this simple metric.
- Distance between each player and their nearest teammate.
- Pitch control, a measure of which player would get to the ball first if it was played to each point on the field.

3. Analysing a goal

Here I use these measures to analyse the first goal scored by Hammerby in their home league match against Elfsborg in 2019.

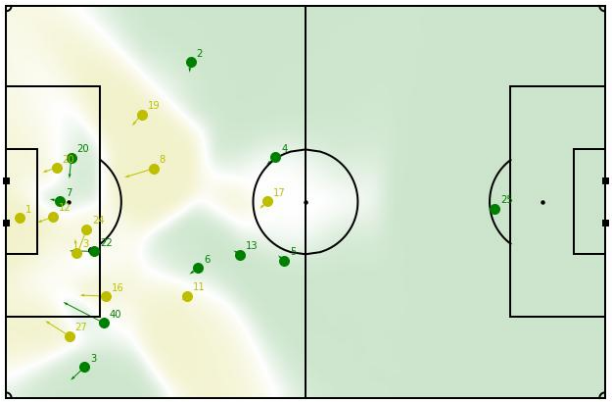
Note: all plots produced using Signality data

In the 18th minute, following a period of build up play, Hammerby's number 6 Bojanic drives over the half way line and passes to Widgren (3) to create the attacking opportunity below.

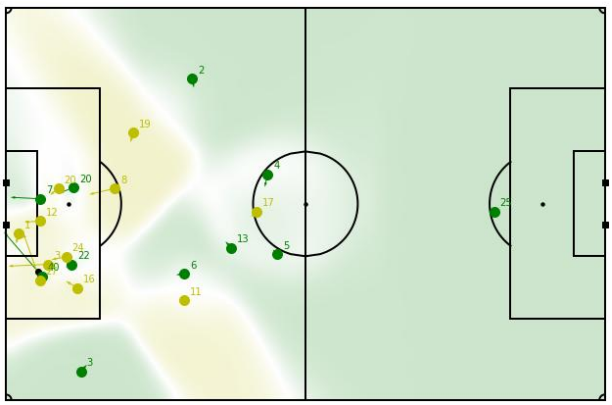


The plot shows player positions and velocities, and also the pitch control. The green shading represents areas where, if the ball is played into it, Hammerby are likely to retain possession.

Hammerby players are making runs into the box, but are closely marked by opposition players. Instead Widgren passes to Tankovic (22) who is in controlling the space on the edge of the area.

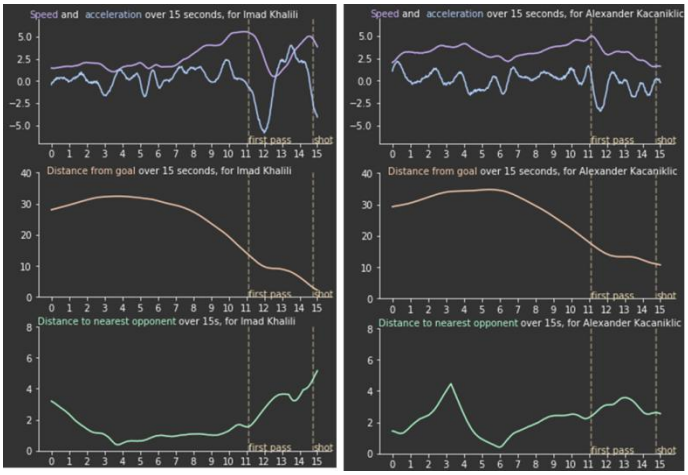


As the ball reaches Tankovic, movement by three Hammerby players captures space in dangerous areas. Subtly, Kacaniklic (20) checks his forwards run and Khalili (7) slows and changes direction, both creating space in the centre of the area. More obviously Djurdjic (40) accelerates towards the left by-line, and this is where Tankovic passes.



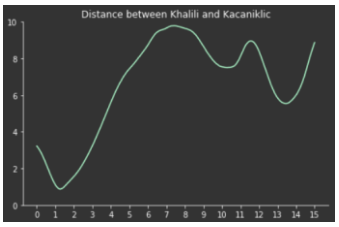
As Djurdjic receives the pass opposition players scramble to close him down. Khalili has completely lost his marker and accelerates towards the far post, meanwhile Kacaniklic's movement has kept opposition defender 20 just interested enough.

Of the two options in the middle, Djurdjic picks out Khalili, the higher xG option, and he taps into an empty net to open the scoring.



Plotting the movement over the 15 seconds that led to this goal for Khalili and Kacaniklic helps to understand their contribution further. The middle and bottom plots show that as the two players near the goal, the distance between each player and their nearest opponent increases.

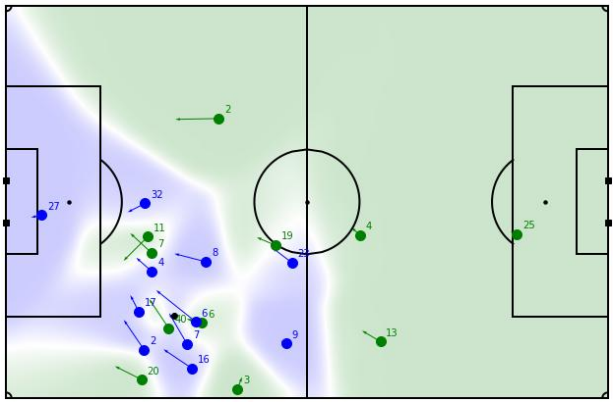
It is also notable that the two attacking players keep a distance of almost 8m between each other so both cannot be successfully marked by the one opposition defender. Ultimately opposition player 20 who is marking Kacaniklic at the start of the play ends up placed almost exactly between the two players as the ball is played in by Djurdjic.



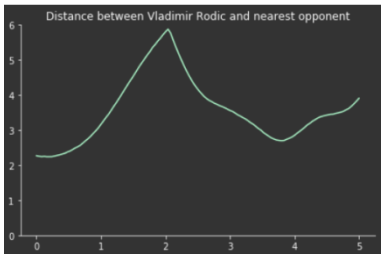
The pitch control model, with accompanying plots shows how Hammerby's attacking unit works together to make space and carve out clear goalscoring opportunities.

4. Analysing a player

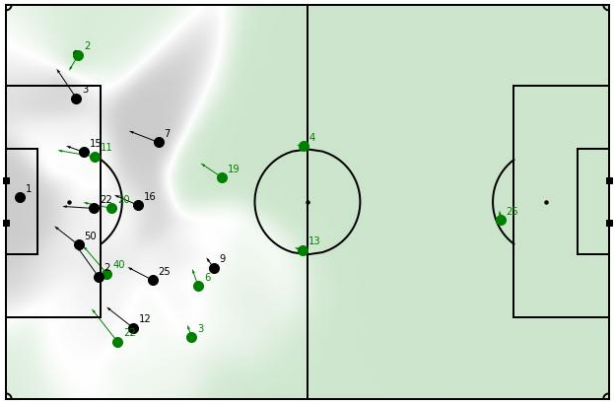
I now look at an individual player, Vladimir Rodic, with a particular focus on his explosive off the ball runs to create space in attacking situations. To do this, I look at the distance between Rodic and his nearest opponent and a pitch control model.



In this first situation from the match against Malmo, as Djurdjic is receiving the ball on the left of the field, Khalili and Rodic who a couple of seconds prior to this moment were being marked by Malmo's number 4 and 32 respectively, are making forward runs to cross sides. The green in the top left of the 'D' is a great place for Djurdic to pass to, and Rodic latches onto the through ball. The plot to the right shows the space created by the run, and Rodic ends up in a relatively unchallenged shooting situation, although unfortunately his shot is saved.



In the second situation, from the match against Orebro, Rodic bursts past the defending number 15, as Hammerby's right back, Sandberg, has the ball on the right wing.

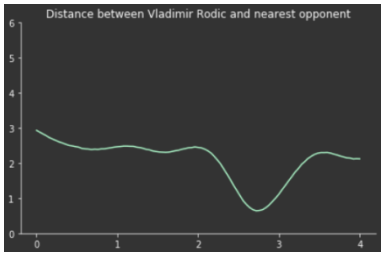


The pitch control model shows that with this run Rodic has gained control of the pitch towards to right of the 6 yard box. Sandberg spots Rodic's

Note: all plots produced using Signality data

movement and plays a ball to the front post, where Rodic heads in to open the scoring.

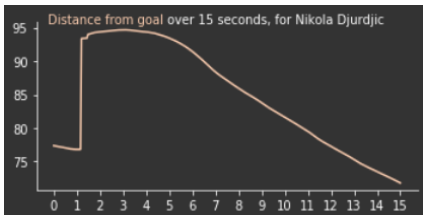
The plot shows this run. The distance to the nearest player decreases as Rodic moves past the defending player, then increases as he moves into space beyond the defender in the area.



Pitch control shows us just how effective Rodic's acceleration and speed are in creating scoring valuable attacking opportunities, and he goes on to score three goals in the match against Orebro.

5. Strengths and limitations of the data

The primary limitation of tracking data is that player identification can be incorrect. This plot from the 43rd minute of the match against Elfsborg shows this well: here Djurdjic appears to jump 20 metres away from the opponent goal in an instant.



This issue tends to occur when players are close together, for example during set plays or goal celebrations. The phases of play analysed above are all from open play, where tracking data is more reliable.

There are also limitations when it comes to orientation of players. This can alter the impact of positioning and could enhance a pitch control model, but is not captured by tracking data. Likewise there are many ways we could calculate acceleration from the data, here I have opted for a simple version of how the speed changes, not taking into account direction of movement or orientation.

6. Conclusions

In this write-up, I have looked into the value of tracking data when analysing key moments of football matches. I first used plots and simple metrics to demonstrate the impact of player movement in the build up to a goal. I then looked into an individual player, considering pitch control model to quantify the space they capture with their movements.

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