Soccer formations analysis suggests home advantage is result of execution

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An automated analysis by Disney Research Pittsburgh of team formations used during an entire season of professional soccer provides further evidence that visiting teams are less successful than home teams because they play conservatively, not because of a mythical home advantage.

The researchers, employing the first automated method for detecting formations, analyzed a whole season of player and ball tracking data compiled by Prozone for a top-tier professional soccer league. They found that teams usually played the same formations for both home and away games, but that the way they executed those formations was significantly different.

The players consistently played more forward up the field at home than they do on the road, both when attacking and defending. The home team thus is more likely to win the ball when it is in an advanced position, which can lead to more shots on goal.

"It also means that home teams actually run less, so they don't get as tired during the match," said Patrick Lucey, a Disney researcher specializing in automatic measurement of human behavior.

The researchers will present their findings at the MIT Sloan Sports Analytics Conference, Feb. 28-March 1 in Boston, MA.

The automated formation detection method developed by Disney

Research also summarizes game information in a visual form.

According to Lucey, "You can think of it as a weather map that shows which team is dominating and the tactics that each team is using."

An earlier study by Lucey and his colleagues, which used ball action data compiled by Opta for a professional soccer league's season, showed that performance measures such as shooting and passing percentages were similar for home and visiting teams. But home teams more often had the ball in the forward third of the field, where players were in position to get more shots on goal. Lucey said it appeared visiting teams were playing "not to lose," rather than playing "to win," reflecting the common wisdom to "win at home and draw away."

The new study takes that analysis deeper, showing that the home/away differences are the result of how formations are executed, not different formations.

Recognizing player formations is relatively easy for human observers, but until now has been difficult for computerized methods, Lucey said. The Disney researchers, however, have found a way to account for players as they swap roles during the course of play.

While a team scout might be able to summarize the formations used in a game by an upcoming opponent, the computerized method enables detailed analysis of multiple games or an entire season of play – far more data than any human could make sense of. This formation analysis also can occur during a game, providing a tool that might help both coaches and broadcast commentators visualize team performance in real time.

Provided by Disney Research