

Title: Measuring spatial interaction behavior in team sports using superimposed Voronoi diagrams

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Abstract: In team sports, the spatial distribution of players on the field is determined by the interaction behavior established at both player and team levels. The distribution patterns observed during a game emerge from specific technical and tactical methods adopted by the teams, and from individual, environmental and task constraints that influence players' behaviour. By understanding how specific patterns of spatial interaction are formed, one can characterize the behavior of the respective teams and players. Thus, in the present work we suggest a novel spatial method for describing teams' spatial interaction behaviour, which results from superimposing the Voronoi diagrams of two competing teams. We considered theoretical patterns of spatial distribution in a well-defined scenario (5 vs 4+ GK played in a field of 20x20m) in order to generate reference values of the variables derived from the superimposed Voronoi diagrams (SVD). These variables were tested in a formal application to empirical data collected from 19 Futsal trials with identical playing settings. Results suggest that it is possible to identify a number of characteristics that can be used to describe players' spatial behavior at different levels, namely the defensive methods adopted by the players.

Author Keywords: Spatial interaction; Voronoi diagrams; Futsal; Spatial measures

Keywords Plus: Dynamics; Coordination; Football

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