GIS-based Football Game Analysis

Abstract

Since the mid-1990s, association football has been characterised by a growing extent in the game's digitisation. Regarding this, expert opinions differ as to whether it is a revolution of the game or part of its evolution. Despite that, professional game analyses are increasingly based on spatiotemporal data of players, the ball and game events. From a geospatial analyst's perspective, the acquisition of tracking and event data can be described as the game's georeferencing. Due to the data's spatial reference, game analyses should not be disregarded in the field of cartography and geoinformation science any longer. Furthermore, the growing competition on both, national and international level, leads to an increasing demand for new ways of analysing and characterising the game. Therefore, the primary aim of this thesis is the assessment of the practicability of geographic information systems (GIS) in football game analyses. For this purpose, football-specific geo data were classified initially. An expert survey was conducted to characterise current methods of football game analyses focusing on the game's spatio-temporal components. The results indicate that current practices are highly subjective.

In total, 13 case studies were performed with the objective to optimise parameters as well as to examine the game's collective spatiotemporal interactions and phenomena. Within the scope of single player and team analyses, the research encompasses three subject areas each. ProzoneSports provided game datasets. These provided the basis for 23 ArcGIS Custom Tools for data preparation and analysis. The tools are based on Python and were further assembled within an ArcToolbox.

In the course of a second expert survey, the developed tools were presented to professional game analysts. The experts' reactions and comments were then analysed conducting a qualitative content analysis. The results show that the practicability of GIS is given in this context. According to the experts, GIS is suitable for both, the evaluation of subjective impressions as well as the detection of anomalies and game patterns. Furthermore, advantages are seen in the possibility to analyse and visualise the course of the match more effectively. However, the success of GIS within the scope of football game analyses is only possible if scientists manage to establish an interface between GIS-based analyses and video analyses. As both approaches have their shortcomings, a combination of both would alleviate these.

Publications (peer-reviewed)


