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Keynote

Visual Football Analytics

Natalia & Gennady Andrienko

Abstract

Modern movement tracking technologies enable acquisition of high-quality data about movements of the players and the ball in the course of a football match. However, there is a big difference between the raw data and the insights into team behaviors that analysts would like to gain. To enable such insights, it is necessary first to establish relationships between the concepts characterizing behaviors and what can be extracted from data. This task is challenging since the concepts are not strictly defined. We systematically explore all stages of data analysis process and identify situations when purely computational or purely visual approaches are not sufficient thus calling for visual analytics that enables synergy of human and computational processing. Thus, computationally-supported human involvement is needed for validating derived data (e.g. quantification of passes or conflicting situations), tuning parameters of computations (e.g. quantification of pressure forces or pass chances) and pattern detection methods (e.g. quantification of the clustering of situations), and interpretation of findings (e.g. explaining team tactics and suggesting how to improve it). The key components of the proposed approach are space transformation, visually-validated calculation of derived attributes, selection of classes of situations based on interactive queries from multiple perspectives, quantification of the interestingness, and clustering of configurations, followed by a visual assessment of aggregated data. We shall demonstrate examples of an application of visual analytics approaches to exemplary problems of football analytics, based on real data and our experience of cooperation with domain experts.

Short Biographies

Prof. Dr. Gennady Andrienko and Prof. Dr. Natalia Andrienko (www.geoanalytics.net/and) are lead scientists responsible for the visual analytics research at Fraunhofer Institute IAIS and full professors (part-time) at City University London, UK. They co-authored monographs "Exploratory Analysis of Spatial and Temporal Data" (Springer, 2006) and "Visual Analytics of Movement" (Springer, 2013) and more than 90 peer-reviewed journal papers.

From 2007 till 2015, Gennady Andrienko was a chair the Commission on GeoVisualization of the ICA - International Cartographic Association. He co-organized scientific events on visual analytics, geovisualization, and visual data mining, and co-edited numerous special issues of major journals.

Gennady Andrienko is associate editor of IEEE Transactions on Visualization and Computer Graphics (2012-2016), Information Visualization (since 2012), and International Journal of Cartography (since 2014). Natalia Andrienko is associate editor of IEEE Transactions on Visualization and Computer Graphics (since 2016). Gennady and Natalia Andrienko received best paper awards at AGILE 2006, EuroVis 2015, and IEEE VAST 2011 and 2012 conferences, honorable mention awards at IEEE VAST 2010 and EuroVis 2017, VAST challenge awards 2008 and 2014, and best poster awards at AGILE 2007, ACM GIS 2011, and IEEE VAST 2016 conferences.