The SportSense User Interface for Holistic Tactical Performance Analysis in Football

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ABSTRACT

In today's team sports, the effective and user-friendly support of analysts and coaches in analyzing their team's tactics is essential. In this paper, we present an extended version of SportSense, a tool for searching in sports video by means of sketches, for creating and visualizing statistics of individual players and the entire team, and for visualizing the players' off-ball movement. SportSense has been developed in close collaboration with football coaches.

CCS CONCEPTS

• **Information systems** → **Information systems applications**; **Multimedia and multimodal retrieval**; • **Human-centered computing** → *Graphical user interfaces.*

KEYWORDS

Data-Driven Analysis; Video Analysis; Sketch-based Video Retrieval; Quantitative and Qualitative Match Analysis; Spatio-Temporal Data; Graphical User Interfaces.

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1 INTRODUCTION

The importance of tactical performance analysis in team sports and especially in football has enormously increased over the last years. However, this is a very complex and time-intensive task for coaches and analysts as they have to search for specific video scenes, handle large data sets, and identify key performance indicators to be well prepared for the next matches. In this paper, we present the SportSense UI, an analysis tool which allows a coach or analyst to search for video scenes by means of hand-drawn sketches of player interactions, as well as calculating statistics on-the-fly [2, 3, 5]. Additionally, off-ball movements of the players can be visualized. This helps a coach or an analyst to holistically analyze tactical elements and to evaluate player and team performances in a flexible and time-efficient manner.

2 SPORTSENSE

The SportSense user interface has been targeted to users with rather low IT affinity. The main rationale behind the UI and especially of its drawing area is to mimic the traditional tactic board coaches and analysts are familiar with.

The SportSense UI consists of four main components: (i) a video area (upper left part in Fig. 1), where the video source is displayed, (ii) a drawing area (upper middle part in Fig. 1), where the user can define areas and draw sketches to search for events and patterns of events, (iii) a filter area (upper right and middle layer in Fig. 1), where various filters can be set to further define the search, and (iv) a timeline (lower part of Fig. 1), where the results of the search are visualized.

Functionalities

SportSense supports three different sketch-based retrieval methods. With *Region Queries*, a user can define a region on the schematic pitch in the drawing area where specific events occurred. With *Event Cascades*, the search for patterns of events is supported. A user can define an area with a region query and search for events either happened before the