GOALGLE: A SOCCER VIDEO SEARCH ENGINE

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ABSTRACT

Goalgle is a prototype search engine for soccer video. Browsing and retrieval functionality is provided by means of a web based interface. This interface allows users to jump to video segments from a collection of prerecorded and analyzed soccer matches based on queries on specific players, events, matches, and/or text. In this contribution we discuss the system architecture and functionality of the *Goalgle* soccer video search engine.

1. INTRODUCTION

The vast amount of sport video that is broadcasted on a daily basis, is even for sport enthusiasts too much to handle. To manage the video content, annotation is required. However, manual annotation of this material is cumbersome and tedious. This fact has already been acknowledged by the multimedia research community more than a decade ago, and has resulted in numerous methodologies for automatic analysis and indexing of video assets. For an extensive overview of the general field of video indexing, including the sports domain, we refer to [2].

After analysis and indexing of sport video assets, tools are necessary to browse and retrieve video segments of interest. The *Goalgle* demonstrator is such a tool, tailored for the domain of soccer. For this specific domain, a user would typically like to find highlight events such as goals, cards, and substitutions or search for a particular player. In this contribution we will first focus on the system architecture of the *Goalgle* search engine. In section 3 the user interface is discussed, and we end in section 4 with some possible future extensions of the system. For the multimodal video analysis part we refer to [3].

2. ARCHITECTURE

The *Goalgle* search engine is a web based application based on a three tier architecture, see figure 1. The results of automatic multimodal video analysis [3] are stored in a rela-
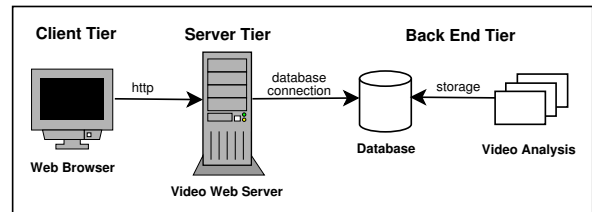
Figure 1: *Three tier system architecture.*

tional database, which serves as the back end tier. The middle tier is formed by the video web server and scripts that are executed on the server, the MPEG-2 video sources are also stored on this server. A user can interact with the system by means of a web browser, the client tier. The browser sends HTTP requests to the middle tier. The middle tier will get the requested data from the back end database and send the reply back to the client, after some processing.

3. USER INTERFACE

The web based user interface of the *Goalgle* search engine is composed of four different panels, see figure 2. We will now briefly discuss the functionality of each panel.

3.1. Query panel

The query panel provides different ways of querying the system. Most interesting queries are based on finding soccer highlight events, such as goals, cards, and substitutions. One can choose to search the entire collection or search for events in a specific match. The closed captions can be searched by entering a keyword, like is used by standard text retrieval based search engines. Furthermore, one can search for video segments showing favorite players or coaches.

3.2. Result panel

The result panel displays a ranked list of video segments that adhere to the query entered in the query panel. Results
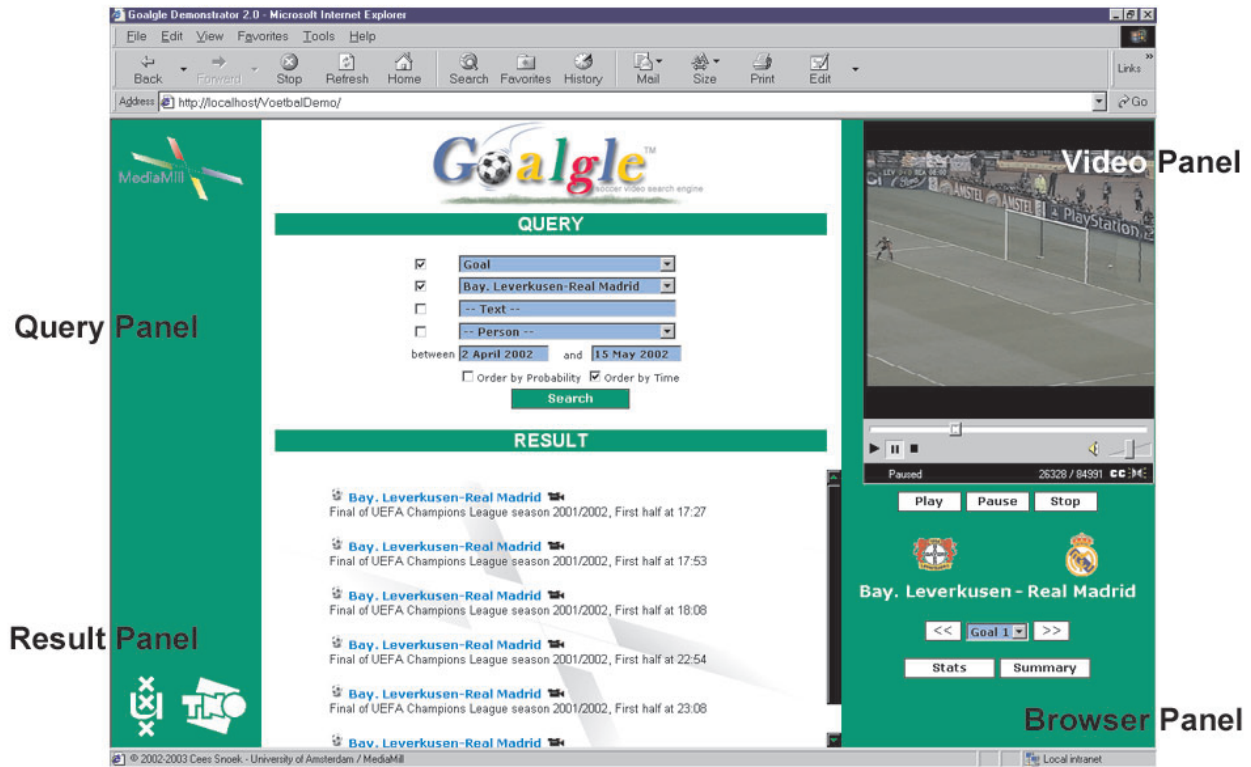
Figure 2: *User interface of the Goalgle soccer video search engine.*

can be ranked on probability or by their time stamp.

3.3. Video panel

When a result is clicked, the segment is displayed in the video panel. In the current implementation of *Goalgle* we use an integrated Microsoft Windows Media Player for display of the MPEG-2 video sources.

3.4. Browser panel

When a segment is selected, a browser panel is revealed that allows to browse through the current soccer match that is displayed in the video panel. A user can jump to previous and next events within this game.

4. FUTURE EXTENSIONS

The current version of the *Goalgle* soccer video search engine can be extended in several ways. First of all, the number of indexed events can be increased, including penalty kicks, free kicks, corner kicks and so on. Secondly, the indexed segments can be exploited to generate intelligent storyboards that summarize the different soccer matches and provide users with an intuitive browsing experience. Those storyboards can also easily be displayed on small mobile devices instead of a web browser, allowing for personalized multimedia alert services. Finally, the query panel could be extended with *query by location*, like proposed in [1]. Instead of using a map of the world, a map of the playing field could be used to enter queries by selecting an area. This would allow for queries such as: "Give me all the video segments that show soccer actions in the left goal area.".

5. REFERENCES

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