

A Grouping Interface for Video Search

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ABSTRACT

With the rapid increase of video available online and in other collections, video retrieval systems are becoming even more important to countless people in many different and diverse fields. In this demo paper we present a novel video retrieval system that allows users to create semantic groups to help conceptualise and organise their results for complex video search tasks. The interface allows users to organise their results into semantic groups and to share results between multiple groups, these groups can be used to launch new searches, thus allowing users to view multiple result sets simultaneously. In addition to alleviating query ambiguity, it can also leave trails behind which can be useful for later access for the same or other users.

Categories and Subject Descriptors

H.5.1 Multimedia Information Systems, H.5.3 Group and Organization Interfaces

General Terms

Experimentation, Human Factors.

Keywords

Video, search, user studies, organise, group, interfaces.

1. INTRODUCTION

Many of the problems for video search systems can be attributed to the semantic gap between the low-level data representation and the high-level concepts the user associates with videos [1]. This problem can be addressed in part by improving the interaction between the user and the system. Our objective is to find a solution to these problems by offering an alternative search strategy, to achieve this objective we have developed a Group Interface search system for videos. This Group Interface system draws inspiration from similar systems for image retrieval and organisation [2], [3]. More recently other systems have been developed which allow users to create multiple facets for video search [4]. The Group Interface also allows users to carry out multiple searches but also gives users more tools for organising their search results and also tagging these results and attaching some semantic value. The Group Interface also allows users to

create groups of videos while carrying out video search tasks. This encourages the user to break the task up into related aspects to organise their ideas and concepts. The user labels or tags these groups adding some semantic value to the group. Using this paradigm the user can concentrate on solving specific tasks rather than trying to solve large and difficult tasks or having to create ideal queries in accordance with the retrieval mechanism. These groups also can be used as starting points for further searches and exploration of the collection.

2. INTERFACE

The Group Interface (see Figure 1) comprises of a search panel, results display area and workspace. These facilities enable the user to both search and organise results effectively. The search panel (on the left hand side of the interface) is where users formulate and carry out their searches. Users can carry out query by text or query by examples. The result panel is where users can view the search results. Similar to the Image Grouper [2] and EGO [3] systems, the main component of the interface is the workspace panel provided in the Group Interface. The workspace serves as an organisation ground for the user to construct groupings of images. Groups can be created by clicking on the create group button, the users then add a textual label for the group. Users can potentially add an infinite number of annotations to the group, but each group must have at least one annotation. Drag-and-drop techniques allow the user to drag videos into a group or reposition the group on the workspace. It should be noted that any video can belong to multiple groups simultaneously. Each group can be used as a starting point for further search queries. Users can select particular videos and can choose to view similar videos based on one or all of a set of feature categories (colour, texture, shape or text, respectively). The search results are displayed in a panel below the group component. The workspace is designed as a potentially infinite space to accommodate a large number of groups.

3. USER EVALUATION

In order to measure the effectiveness of our proposed approach we conducted a user-centred evaluation. The grouping system was compared with a baseline system by 16 users, each user carried out the 4 topics for the TRECVID 2007 evaluation. Each user carried out 2 topics with the baseline system and 2 topics with the grouping system. Users had 15 minutes to carry out each topic.

A number of interesting conclusions can be drawn about the grouping interface based on the user evaluation. We found that the number of results marked as being relevant did not change dramatically when using the grouping interface in comparison with the baseline system. It was found, however, that the behaviour of the users varied greatly depending on which system

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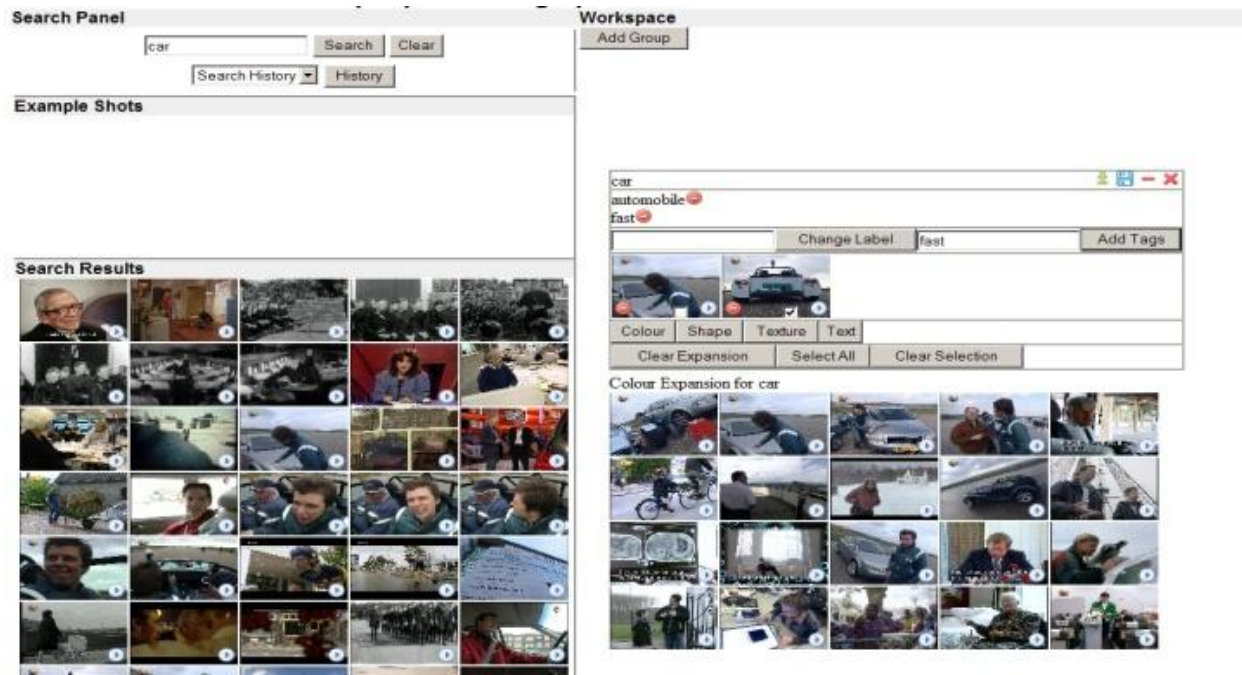


Figure 1: Screen shot of Group Interface system.

they were using. Users of the baseline system tended to find a relevant video and then navigate through that video looking for more relevant shots. Users of the baseline system played 133.28 video shots on average, where as users of the grouping interface played 97.28 videos on average. The tools provided by the grouping interface meant that users of this interface instead had more time to carry out more searches during the allotted time for each topic. Results of the questionnaire that users completed indicate that users find the baseline system easier to use and easier to learn how to use, however users found the Grouping Interface to be the best interface overall, they also found that the grouping interface allowed them to express different aspects of the search topics.

4. CONCLUSIONS

In conclusion there are a number of potential advantages of using the Group Interface. Firstly, the interactive grouping is a flexible means to communicate both short- and long-term, specific and multifaceted information needs. Secondly, the semantic gap is narrowed by the abstraction to high-level semantic groupings as opposed to having users focus on the task in hand. Thirdly, another aspect of the Grouping Interface which has not been investigated in this paper is that when using the Grouping Interface the user leaves trails of their actions behind that not only the system can exploit for adaptation but also that other people can trace. The results of a small user evaluation have shown that the Group Interface allows users to focus on the task in hand, and means that users do not have to navigate through large number of

videos in order to find search results. In conclusion, the use of the grouping interface present a potential work around to the semantic gap [1] and other problems associated with video search.

5. ACKNOWLEDGMENTS

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6. REFERENCES

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