

mediaWalker: A Video Archive Explorer based on Time-Series Semantic Structure

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ABSTRACT

We introduce a video browsing interface ‘mediaWalker’ that lets users explore a news video archive based on a time-series semantic structure; the ‘topic thread’ structure. The interface lets users efficiently track up and down the development of news in an archive with more than 1,000 hours of video.

Categories and Subject Descriptors

H.5.2 [Information Interfaces and Presentation (e.g., HCI)]: User Interfaces

General Terms

Design

Keywords

News video, topic threading

1. INTRODUCTION

Advance in data-storage technologies has enabled the on-line archiving and retrieval of massive amount of broadcast video. We have been archiving a news program for more than six years, which accumulates up to more than 1,000 hours of video [1]. When considering the search and browsing of news video covering such a long time period, a function to track a topic-of-interest over time is essential.

We have previously proposed a method that extracts a time-series semantic structure such as shown in Fig. 1; *topic threads*, based on this motivation [2]. This paper introduces an interface that lets users track up and down the topic thread structure originating from a specified story.

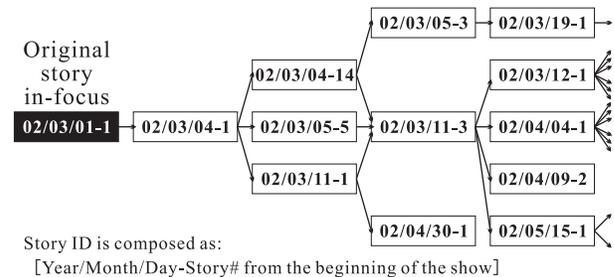


Figure 1: Example of a news topic thread structure. All paths that connect the root node to the leaves are topic threads.

2. THE TOPIC THREAD STRUCTURE

The topic thread structure is a directed graph that connects related stories along the time line. This structure, however, is created so that it does not contain duplicate stories by rearranging the edge connections of a simple related story tree with duplicate stories.

The topic thread structure represents both local relations between directly connected stories and a global flow of the development of the topics such as the divergence or merger of topics along time. Since our topic threading algorithm does not collect related stories beforehand, as in traditional topic tracking methods, the thread structure may end up in a totally different topic than the original story. This, however, is informative to users, since tracking down such a thread structure reveals how the seemingly unrelated stories are connected by various events along time.

Once the thread structure is obtained, locally homogeneous stories in the structure are clustered as *topic clusters*. Refer to [2] for details of the algorithm.

3. THE ‘MEDIWALKER’ INTERFACE

In order to let users track up and down the development of news stories that match their topics-of-interest, we implemented a browsing interface: *mediaWalker* based on the topic threading technology.



Figure 2: mediaWalker: A thread-based news video browsing interface.

First users select the initial story as shown in Fig. 2 (a). The list of initial stories can be any kind; results from a keyword-based query, list of all stories broadcast on a specific date, and so on. The users then specifies which direction of the time to track; to the past (the button left of the thumbnail image) or to the future (the right button).

Next, the screen changes to the thread-based browsing interface shown in Fig. 2 (b). The interface shows the thread structure originating from the specified story with each story represented by a thumbnail image, and also topic clusters in the background. The topic clusters are shown so that users can hop through the structure according to the progress of stories.

When the mouse pointer enters a thumbnail image region, information such as keywords and broadcast date of the corresponding story appears at the left bottom of the window. Once the thumbnail image is selected, it expands and plays the video. At the same time, direct links are high-lighted and the zoom rate is automatically adjusted so that all the directly linked stories should be visible.

Users can track down the thread structure by browsing story after story in this manner as shown in Fig. 3, which allows the understanding of not only the details of individual stories, but at the same time, the long-term development of the topics. Although not shown in the figures, users can also track back how the specified story occurred by selecting the thread structure to the past direction.

4. CONCLUSION

We have introduced an interface that lets users explore a large-scale news video archive efficiently based on the previously proposed topic threading technology. Future works

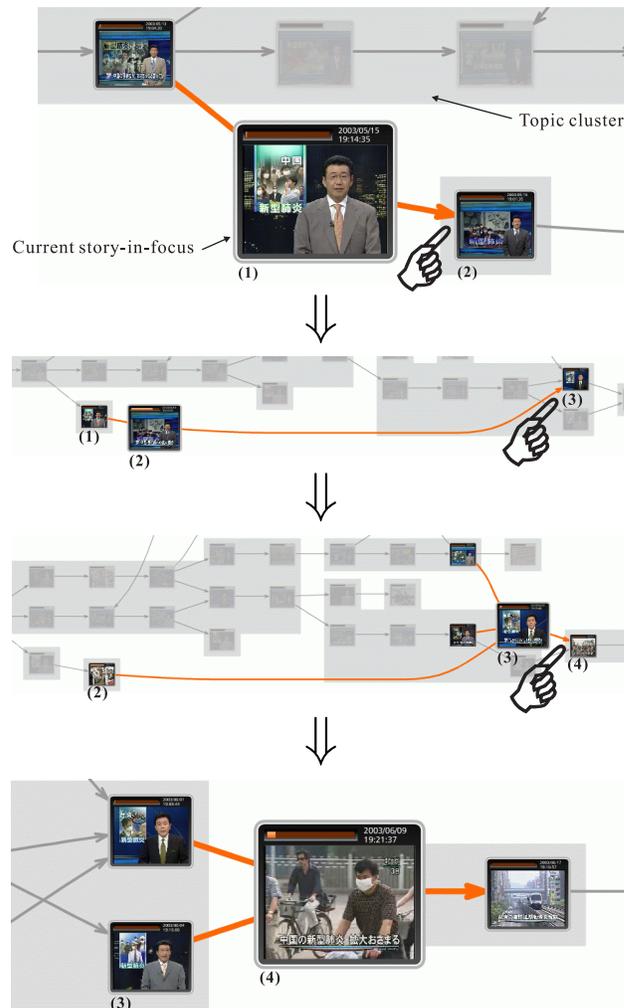


Figure 3: Browsing story after story along the thread structure. The example shows how stories (1) to (4) were tracked.

include user study and adding more information in the interface to guide users through the structure.

5. ACKNOWLEDGMENTS

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6. REFERENCES

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