

# VIVO -A Video Indexing and Visualization Organizer

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## Introduction

Due to the development of digital library techniques and video retrieval research, vast amounts of digital videos are becoming available on the web. However, it is still difficult for people to find the relevant videos they want. This situation is partly caused by the lack of extensive and high quality video metadata. Traditional video libraries only catalog and index videos at the piece level. Thus users can only search whole videos, however, they might also want to search specific segments of videos, such as a frame which has a child's face, a scene of a train getting into a rail station, or a segment which has some 1950s' music as background. Digital videos need to be catalogued and indexed both on multiple levels (e.g. video, segment and frame) and through multiple modalities (e.g., textual description and visual surrogate). MPEG-7 [1] provides such a standard schema to create video metadata. More importantly, convenient tools need to be developed to help digital video librarians to do the cataloguing and indexing work, since creating metadata for videos is a complicated and time-consuming task.

## VIVO system

VIVO (Video Indexing and Visualization Organizer) is such a prototype tool we developed to help digital video librarians to input, edit and manage video metadata elements on different levels. It is also part of the work in NSF-funded Open Video Digital Library [2]. Figure 2 shows the prototype interface for VIVO system. It has the following characteristics:

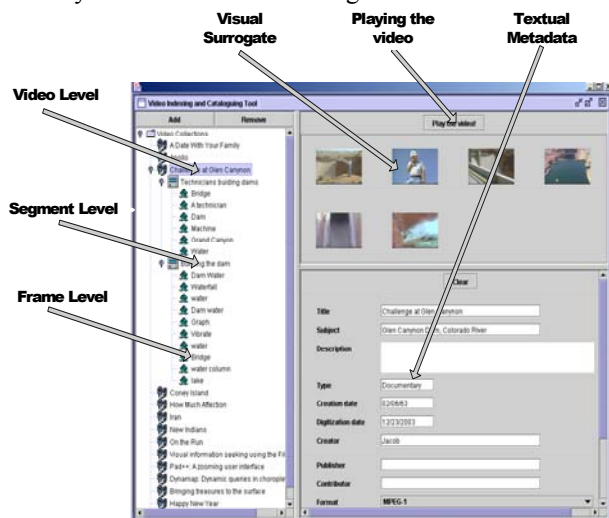


Figure 2. VIVO Interface

- Multiple level

VIVO uses a hierarchical tree to organize the multiple-level (e.g., video, segment and frame) video structure. Each segment or frame can inherit some or all metadata elements such as date and creator from the video level, and also might have their own metadata such as format, description and subject. New video/segment/frames can be added to the tree structure.

- Multiple modality

VIVO supports both visual surrogate and textual metadata for each video level. For instance, each video has visual storyboard and textual metadata such as title and description. Each segment also has its own storyboard and textual metadata such as title and keywords. Each frame also has its own metadata and indexes such as title and color. Previous research [3] demonstrates that using visual surrogates such as storyboard can effectively help people to index videos.

Some additional features of VIVO include playing the video or segment, and grabbing the start and end time for each new segment. A preliminary user test for VIVO demonstrates its viability. The digital librarian for the Open Video Digital Library [2] appreciated the convenient links between video, segment and frame and stated that it would speed the current cataloguing and indexing process. Some users from the education school would also like to use VIVO to catalogue some classroom digital videos made for teacher training.

## Future work

According to the feedback of preliminary user tests, some additional functions will be added to VIVO, such as controlled vocabulary for indexing, grabbing new frames while watching videos and providing dynamic metadata elements for different users. More formal user studies will be conducted to further develop VIVO.

## Reference:

1. MPEG-7, <http://ipsi.fhg.de/delite/Projects/MPEG7/>
2. Open Video Digital Library, [www.open-video.org](http://www.open-video.org)
3. Stachowicz, C. (2002). *The Effectiveness of Storyboard Surrogates in the Subject Indexing of Digital Video*. A Master's paper at University of North Carolina at Chapel Hill

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