Video Browsing Interfaces for the Open Video Project

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Abstract

The Open Video Project is an on-going effort to develop an open source digital video collection that can be used by the research community and ultimately serve an even broader audience. The initial collection contains video or metadata for more than 1600 digitized video segments comprising nearly half a terabyte of content. Our primary goals for this project are to provide free digital video content to people doing a wide variety of research, to develop a collaborative research environment for people interested in digital video, and to provide a testbed for our own video browsing interface work. Each of these goals fit within a broader mission to understand how people think about, seek, and use digital video. This demonstration summarizes the current status of the project through a brief tour of the Open Video web site, describes our current work in developing surrogates to preview video segments, and shows an innovative video browsing interface we are developing.

Keywords

Digital video, browsing, video surrogates, test collection

THE OPEN VIDEO WEB SITE

A central goal of the Open Video Project is to enable users to find video segments that they can use for various research purposes, such as testing face recognition algorithms, designing multimedia interfaces, or developing video indexing techniques. Although other large collections of digital video do exist, such as the Informedia Project at Carnegie Mellon University [1], the video in these collections is not publicly available. The National Institute of Standards and Technology (NIST) has created a digital video test collection for the research community [4], but it is of limited size and scope. The Internet Archive has made public more than 1000 video segments [2], but currently provides no tools for searching or browsing. We are actively collaborating with each of these groups.

Finding Video

At the Open Video web site, users can search or browse for video and examine summary information in the search results page. When the user finds a video segment that looks like a good candidate for their needs, they can view various metadata details for the segment. Segments can be downloaded from both the search results and details pages.

Viewing Video Details

From the search results page, a user can quickly examine the list of segment titles found, checking the file size and duration for each segment, to determine which segments might be good candidates for their needs. A textual description of the segment, immediately available by mousing over the segment details icon, can also help with this task.

Clicking on the segment details icon displays the segment details page. This page shows a variety of descriptive and technical information about the segment. The user can download the video segment from this page, or click on one of the other available tabs to see more information about the segment. The Source Video tab displays general information about the video title from which the segment was extracted. The Segment Transcript tab shows the text transcript for the segment. The Segment Preview tab enables the user to preview the segment by viewing several types of video surrogates (see Figure 1).
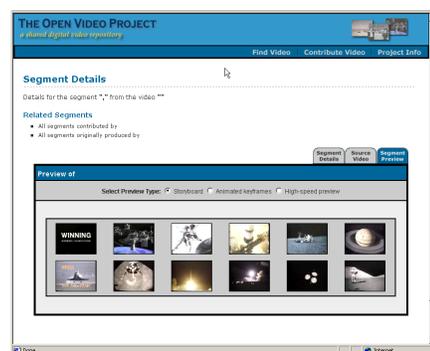

Figure 1.Storyboard Surrogate for Previewing Segment

VIDEO SURROGATES

Publishers and librarians have long created surrogates (summaries, abstracts, synopses) for information objects so that these alternative representations could aid retrieval and evaluation of the retrieved items. In video browsing, surrogates provide an important alternative to primary objects because they take far less time to download and examine and provide enough semantic cues to extract gist and allow users to assess the need for further processing of other surrogates and the primary object.

We are currently conducting the first of a series of studies to evaluate the advantages and disadvantages of different types of video surrogates. Specifically, we are testing slideshows (keyframes presented at 4 frames per second), storyboards (same keyframes displayed in a table format), and fast forwards. The slideshows and storyboards are accompanied by either text or audio keywords.

Figure 2. Slideshow and Storyboard Surrogates

Through this first study we expect to generate data we can use to begin developing guidelines that describe the tradeoffs of different types of surrogates that can aid in designing video browsing interfaces. For example, users might prefer storyboards, but if there is not a significant difference in performance between a storyboard and a slideshow, an interface designer might choose to use a slideshow in situations where screen real estate is limited.

AGILEVIEWS FOR VIDEO BROWSING

In addition to video surrogates, an interface design for interacting with a video collection must incorporate materials for controlling the display of the surrogates and video segments. AgileViews for Video Browsing, when fully implemented, will enable the user to easily move from high-level overviews of a video repository to previews of specific segments, and to enable the user to view overviews and previews according to indexes that best match their motivations for seeking video content. In Figure 3, the user has displayed an overview of the collection, organized by genre. This overview not only gives the user some visual information about the titles in the collection, but by displaying each video title on a separate tabbed panel according to which genre it is identified with, it enables the user to focus on the part of the collection that is most appropriate for her needs.
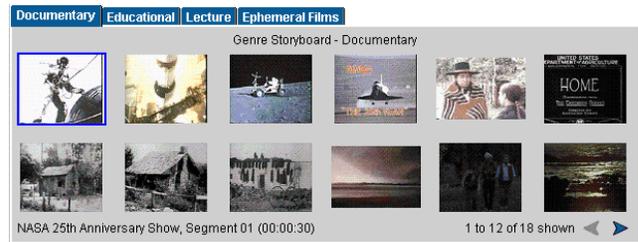

Figure 3. Collection Keyframes, Indexed by Genre

In a similar way, the user can easily display previews of specific segments that are indexed by visual and audio features such as human faces, colors, motions, and sounds, as well as words. In this way, a researcher working on face recognition algorithms could choose to view segment keyframes indexed by faces, as in Figure 4.

Figure 4. Segment Keyframes, Indexed by Faces

A researcher interested in outdoor scenes, on the other hand, could display keyframes for the same segment, but indexed by, for example, overall brightness.

In addition to overviews and previews, we will be incorporating histories, peripheral views, and shared views of video content.

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