



THE OPEN VIDEO DIGITAL LIBRARY

2005 COMPUTERWORLD HONORS CASE STUDY

MEDIA, ARTS & ENTERTAINMENT

AN INNOVATIVE TEST BED AND AN EXEMPLAR FOR RESEARCHERS AND EARLY ADOPTERS OF DIGITAL VIDEO MAKES DIGITAL VIDEO FILES AVAILABLE TO THE EDUCATION AND RESEARCH COMMUNITIES FOR VIEWING AND RE-USE, AND FACILITATES RESEARCH THAT WILL HELP US TO UNDERSTAND HOW PEOPLE INTERACT WITH DIGITAL VIDEO MATERIALS. [20055428]

A Search for New Stories



SUMMARY

The Open Video Digital Library Project has two primary goals: 1) to make digital video files available to the education and research communities for viewing and re-use, and 2) to conduct research that will help us to understand how people interact with digital video materials. Thus, this project provides both a test bed and an exemplar for researchers and early adopters of digital video. In educational settings and other arenas, video opens up new possibilities for communication and expression. First, video elements offer language-independent visual and aural exchange in a global context. Second, video provides new possibilities for researchers and artists who wish to incorporate multiple media into their creative expressions. Third, the advent of the popular adoption of personal video tools opens new economic and conceptual spaces for large portions of the population. In summary, through its digital library and its research program, the Open Video Project has taken the lead in enabling people (artists, educators, and others) to use and re-use digital video materials.

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APPLICATION

The Project has addressed its primary goals on four axes: its collections, the user interface to the collections, the tools and procedures supporting the Project, and its program of research. First, the Project has developed its collections by assembling a large number of open access videos (i.e., those that are copyright-free or for which permission for distribution has been granted by the owner). Important collections within the digital library include documentary films from various US government agencies such as the Department of the Interior and NASA. For example, the entire set of educational NASA programs broadcast on cable and satellite is included. Videos donated by the Prelinger Archives to the Internet Archive are also included. The entire twenty years of annual videos from the University of Maryland's Human-Computer Interaction Laboratory and many of the ACM conference videos over the past twenty years are also included. For each collection, video files rather than streams are provided so that people can re-use the video in innovative ways. The broad spectrum of materials can serve as a source for educators and artists to incorporate in their work and, simultaneously, as a testbed for research on digital video indexing and retrieval.

Second, we have developed and tested a unique and highly effective user interface to the video collections. This interface introduces several kinds of visual surrogates (i.e., keyframes or video clips that "stand for" the full video) that accompany the textual descriptions (metadata) for each video. We provide poster frames, storyboards made up of keyframes from the videos, fast forwards (for selected videos at this point), and short seven-second extracts (for selected videos at this point). The surrogates are embedded in an interface that provides word search and visual browsing capabilities that allow people to see overviews of the entire collection or subsets, to see previews of individual videos, and to see related videos. This interface has evolved based on extensive user testing and evaluation.

Third, we have developed and integrated tools and procedures for operationalizing a large-scale digital video library. These tools range from servers and distributed disk arrays, to off-the shelf and open source software, to customized programs and services.

Fourth, the Project has conducted a series of studies into the ways in which people search for, use, and re-use digital video materials. A number of studies supported the development of novel visual surrogates; others evaluated the effectiveness of the site's user interface; and others were methodological in nature, developing measures of user performance with video materials that can be used in additional studies. In addition, the collection can serve as the basis for studies conducted by

other researchers, such as those developed as part of the 2002 TREC video track (sponsored by the National Institute of Standards and Technology). The results of all the Open Video Project studies have been reported at conferences and in scholarly journals, so that they can provide a foundation for other researchers interested in this area.

BENEFITS

The Open Video Digital Library is used by an average of 15,000 unique users every month. These users include teachers at K-12 and university levels, students at all levels, artists, and scholars and researchers ranging from cultural studies to video retrieval. Additionally, the project serves as a model for libraries, museums, and other institutions that wish to make video assets available through the WWW.

IMPORTANCE

This project stretches the limits of some of today's information technologies. High speed connectivity plays an obvious role in digital video services and the Open Video Project was the first video channel in a project (Internet 2 Distributed Storage Initiative 2000-2003), sponsored by the National Science Foundation, to test large scale distributed file services in Internet 2. The Open Video Project participated in the international TREC video track (sponsored by NIST) that draws research teams from universities and industry around the globe to test video retrieval tools and techniques. Thus, in addition to providing a practical service to the general population, the Open Video Project is an active participant in creating the next generation of IT tools. The Open Video Project also stands out among other video libraries and research projects through its success in developing and evaluating, through user testing and practical usage, a highly effective user interface for finding video assets.

ORIGINALITY

The visual surrogates and easy to use interface are the most original contributions of this project. It straddles the research communities (e.g., human-computer interaction, information retrieval) and practical web services communities (e.g., search services and digital libraries) and is among only a few projects that blend cutting edge research with large-scale operational services. Thus, the OV Project has not only devised innovative user interfaces and tested them in the laboratory to produce scholarly papers, but it has also deployed these interfaces in practice. Thus, the Project's approach to technology transfer from theory to practice is another kind of originality.

SUCCESS

The project enjoys several kinds of success. First, there is a large user base (the site consistently logs about 15,000 unique visitors a month and well over a million hits). This user base is international in scope, with significant usage from Europe and Asia. The Project has been selected as a Yahoo pick (October 2003), been featured in the New York Times (December 2003), and in diverse print (e.g., Sydney Morning Herald) and electronic venues (e.g., NY1). Based on the email questions received from teachers, there are users in K-12 and college environments who make use of the videos in many disciplines. On the research side, the Project received a three-year grant from the National Science Foundation and has published more than a dozen peer reviewed papers in the top conferences and journals; one paper reporting on an empirical study that informed the design of our fast forward surrogates won the Vannevar Bush Best Paper Award at the 2003 ACM/IEEE Joint Conference on Digital Libraries.

DIFFICULTY

The main challenges to the project are sustainability over time as new video is added and the user interface is improved. The Project has been dependent on research funding to build and operate the repository and discussions are underway with libraries that may want to take on the production tasks. It is feasible to maintain the current state for many years without additional funding, but continued expansion and improvement will require new sources of funding.

A related challenge is the curatorial demands of contributions of new video. Many individuals and institutions contact the Project wanting to contribute video to the library. Tens of thousands of hours of film and video have been offered, but the Project has been unable to assume the costs of digitizing (for the materials that are not in digital form), creating multiple video formats, and adding metadata and visual surrogates. This will remain a long-term challenge for the foreseeable future and points to

the variety of business services required to manage, preserve, and distribute digital video contributed by organizations and individuals.