

Synopsis: A Personal Summary Tool for Video.

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ABSTRACT: One of the more exciting developments in the personal computer world is the soon to come ubiquity of desktop video (local and online) [1]. However - with the promise of video on every desktop, severe interaction design challenges come into focus, with the need to solve problems that up till now only had to be dealt with by motivated professional media workers. This paper and live demo presents work we have done to enable learners with very little computer experience to be able to use video materials in an effective way for their studies. Using User Centered Interface Design methodologies, we have developed an interface model for creating personal summaries of movies by novice computer users.

Keywords: Video, Learning, Personal Summarizing, Learning Technology, Interaction Design, User Centered Interface Design.

INTRODUCTION: The use of digital video on personal computers has gained much press in the last two years. We are not long away from a time when every computer sold will have on board capabilities for digitizing and showing high quality video movies. But with this promise of video on every desktop, interface and interaction design problem that for the most part had to be dealt with by highly trained and motivated media workers, will now have to be dealt with by novice computer users also. The entry of a mass novice user base into the area of digital video usage presents a number of design challenges for the HCI field. In our research we have focused on helping make video into a viable and useful learning medium for novice computer users.

Our tool, Synopsis [*] focuses on enabling novice computer users the ability to watch and control a video movie while at the same time helping them create an interactive hyper-linked personal summary of the movie they are watching. The motivation for this comes from the fact that personal summarizing is a widely used learning technique which is used in a wide variety of learning situations, be it in a classroom or for self-learning, but until now has been difficult for those trying to learn from video materials.

PERSONAL SUMMARIZING: Personal summarizing allows learners to a. Translate learning stimuli into their own personal cognitive style, thereby helping them integrate the learning information into their existing knowledge networks [2] b. Strengthen memory retrieval of the learning material. By integrating the new material into their existing knowledge networks, learners create multiple associative pathways to the new material. c. Quickly assess information and decide if they understand it. One of the most important aspects of personal summarizing is the fact that the learners

are processing and manipulating the learning information in an *active* manner.

For various reasons, learners usually do not use this technique when using video materials. Video is mostly dealt with in a passive fashion [3]. Possible reasons for these differences in use are:

a. *Cognitive:* Learners are very well practiced in listening to a lecturer while writing their personal summaries. Because most frontal teaching is done using linear vocal communication, it is not very informationally dense and thus is well within the "cognitive bandwidth" of most learners. On the other hand, most learners are not practiced in attending to the audio-visual experience contained in video materials. This might cause video to rise above the "cognitive bandwidth" capabilities of most learners except for passive viewing.[4]

b. *Technical:* Analog video playback devices are too slow and cumbersome for effective use. In the digital domain, specific tools have been created for specific processing tasks (i.e. Video Editing or logging), but except for one tool [5] none of the tools we have seen focus on helping learners summarize dynamic and rich information sources such as video. Thus, although one could use existing computer applications to create a personal summary of a video movie, the process would be slow and frustrating.

SYNOPSIS: We have created a computer application that should help learners easily produce personal summaries of video materials. With our tool, we hope that learners will be better able to "read", analyze, remember, and understand video-based content. Our design challenge was to create an application that could be mastered and used successfully by novice computer users. We designed the application to take less than five minutes to learn to use by someone who can use a basic word processor in a GUI operating system (see figure 1).

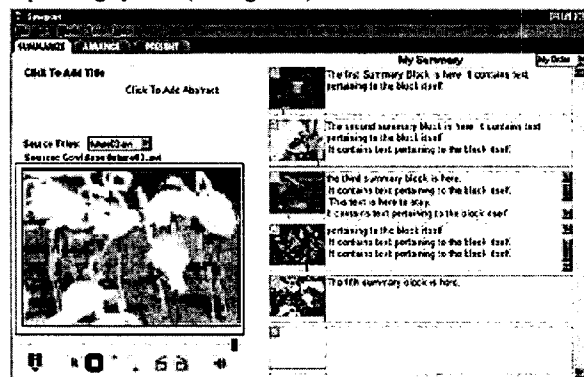


Figure 1: Synopsis summarizing interface.

Interface Model: The main problem facing a learner wanting to summarize a video movie is being able to

*: Synopsis is Patent Pending.

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attend at the same time to the external audio-visual channels coming from a video presentation device, and to the internal summarization process. This might be because the audio-visual channels of the video take up a lot of the learner's attention, making it difficult for them to attend to the internal summarization process.

By using a task oriented approach to interface design we have devised an interaction model that allows the learner to watch the movie while allowing them to summarize the movie at the same time with a minimal amount of effort.

Our model is based around recognizing the major tasks involved in personal video summarizing and offloading as many of them as possible from the learner to the tool.

The major tasks we recognized:

1. Writing down initial thoughts relating to sections in the movie.
2. Signifying where the related section begins (in point).
3. Signifying where the related section ends (out point).
4. Creating a hyper-linked visual signifier of a section (Thumbnail Picture Icon - Picon)

From day one, our interface design methodology was driven by the belief that we should focus on the tasks at hand. Thus we were able to clean the interface design for the tasks needed to be achieved at each point in the summarization process and not fall into the featuritis trap that so many applications fall into [6]. As can be seen in the demo, our tool moves three of four major tasks from the learner to the tool.

This is a point to be stressed: By making assumptions about what the user wants to do in specific situations, we can interpret their actions in a way that allows the tool to react accordingly. Such a model cleans the interface of anything not directly involved in getting the task done.

When watching a movie, typing on the keyboard initiates the following actions:

- 1) A text editing box is opened.
 - a. User typing is echoed in the text box.
 - b. A visual signifier (Picon) is created, by taking a snapshot of c. the movie, and is shown.
 - d. The "in" point is saved.
- 2) While entering text, pressing the escape (Esc) key initiates the following actions:
 - a. The text box is closed.
 - b. The "out" point is saved.
 - c. Picons and summary text are shown in a summary block.
- 3) Clicking on a Picon initiates the following actions:
 - a. Moves the playback head to the "in" point represented by the Picon.
 - b. The movie goes into play mode (to show the section).
- 4) Clicking on a text summary block initiates the following actions:
 - a. Moves the playback head to the "in" point associated with the summary block.
 - b. The text editing box is opened, allowing user to edit the text.

Ease of Use: The automatic actions performed by the application as related above, allow the learner to go through any length of video footage and create a personal and interactive summary of the footage without having to do anything but type on the keyboard. *The user never has to move the mouse, never has to click on screen objects, and*

never has to decide on giving the application any explicit command. [a]

Initial User Testing Results: We ran a number of user testing sessions throughout the development process. In all of them we found strong support for the model: 69% of our users were able to use the application without effort after a short 3-minute explanation and all users could use the application after a 5 minute training session.. The user testing did bring up a number of problems that we fixed in subsequent versions (i.e. using the Escape key instead of the Enter key in order to exit a summary block [see a) above).

Pretest: We tested our hypothesis that learners using Synopsis would better remember information in the video movie. We used two movies, each one of them in digital and analog form. We used a within subjects design (n=7) with two counterbalanced conditions. One condition had the subjects summarizing a movie using traditional pen and paper while watching a movie on a TV and controlling it via the VCR controls. The second condition had them summarizing a movie on a computer with Synopsis. After each condition, participants were asked ten comprehension and memory questions about the movie. Participants were also asked which of the conditions they preferred.

Results: Although we did not find a statistically significant difference between the groups (probably because of the small group size), six of seven participants preferred summarizing with Synopsis versus traditional pen and paper. They especially liked the fact that after a few minutes of practice they felt that they were "ahead of things" and didn't feel like they were "running after" the video. All said that they would love to use such a tool. We are now in the process of conducting a full-scale study with the Open University in Israel.

Future Research: We are now in the process of starting to explore the effectiveness of Synopsis' other features.

a. A presentation manager that allows teachers to easily and quickly create classroom video presentations using the Synopsis interface. b. A Question and Answer manager that allows teachers to intersperse time sensitive questions into a movie, so when a learner watches it, questions will pop up intermittently depending on where they are in the movie.

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^a Except for one: pressing the escape key in order to close the present summary section and continue.