

Video Intensive User Interface for Content Selection

Toru Sadakata Takayuki Okimura Hisashi Kasahara

NTT Human Interface Laboratories

1-2356, Take, Yokosuka-shi, Kanagawa, 238-03, Japan

Tel : +81-468-59-8571, Fax : +81-468-59-2829,

E-mail : sadakata@nttvdt.hil.ntt.jp okimura @nttvdt.hil.ntt.jp
kasahara@nttvdt.hil.ntt.jp

ABSTRACT

This paper discusses the user interface for content selection with a video-on-demand system. We suggest two modes for the selection process: active and passive. This paper analyses various video intensive user interfaces using logs of user operation to understand how users behave in each mode.

1. Introduction

In recent years, there has been an increasing interest in video-on-demand services through which users are able to view the desired videos whenever they want from home.[1]

It has been found that when viewers use services of this kind, they sometimes already know what films, news, or dramas they want to watch, and wish simply to retrieve the desired content. Other times, they may wish to scan through available contents as they would when watching conventional television, stopping when they find something interesting or simply viewing to kill time.

That is why we think there are two types of user modes:

Active selection mode

In this mode, the user already knows what he or she wants to watch and are looking to simply retrieve the desired content. For examples, I would like to watch "ET."

Passive selection mode

In this mode, the user may not have any particular content in mind; they simply are looking for something interesting to watch. If they find something they like, they may ask to view it. For examples, I would like to see an amusing film to kill some time.

We expect that users tend to be in the passive mode more often, especially at home. To be successful in providing a service that requires the interaction of users at home, it is important to include a passive selection mode.

Studies of most efficient in retrieving the desired information on hierarchical menu were undertaken in past.[2-5]

But, these studies paid close attention to work in the office, where the tasks users are to perform are clear. Therefore, most of these studies are applicable to user interfaces in the "active selection mode," because the users almost always have a definite purpose.

On the other hand, extensive studies on interfaces for "passive selection mode" have yet to be done.

For video-on-demand services to be used from the home, however, the passive selection mode interface is extremely important.

To study how users make selections in a passive mode, the behavior of users were analyzed with users' logs of two types of selection method .

2. Elements of the content selection method

The content selection method will differ

depending on whether users are in an active selection mode or a passive selection mode.

The content selection method must be prepared to work in the appropriate mode.

We assumed that users would want a selection method that would require as little operation as possible in the passive mode. So we paid close attention to the following two elements when deciding what content selection method would be used:

Time management for screen transition

Is the screen transition timing determined by the system or by the user?

By the system: Screens change automatically even if users do not do anything. Users are presented with pieces of information in a linear fashion. The number of operations required from the user is small.

By the user: The screen will not change without some input from the user. This requires a greater number of operations from the user.

Number of choices per screen

Is the user presented with a single choice or multiple choices?

Single choice: Because the user only has to make a single decision, there are fewer operations per screen.

Multiple choices: When there are two or more choices to be made on a screen, more operations will be required of the user. The total number of operations required from the user is increased.

The relationship between these two factors and the content selection method is shown in Table 1.

Method A

In this method, screens are changed automatically by the system, and there is only one choice for users per screen. Users push the select button only when the content they desire is displayed. This way, they are presented with all the

Table 1 Relationship between the time management for screen transition and a number of choices.

		Time Management of Transition	
		System	User
Numbers of Choices	One	Method A	Method B
	Multiple	Method C	Method D

important information they need. With this method, users will receive new information (selection items) in succession, even if they do nothing. The only operation required of the user is to push the select button. The total number of operations required of the user is reduced.

Method B

In this method, screens are changed in response to user action, and there is only one choice for users to make per screen. The screen will not change unless the user so directs. More operations are required with this method than with Method A.

Method C

In this method, screens are changed by the system. There are also two or more choices to be made per screen, and the volume of information to be presented is larger. This way, users will receive new information (selection items) in succession, even if they do nothing. But when selecting items, users will have to perform two operations: selecting an item from a list and making a decision.

Method D

In this method, two or more choices are made per screen. To select an item that is not currently displayed, the user must consciously click through the screens. Users will not be presented with new information unless they actively change the screen. When making selections, users must do two operations: select an item from a list and make a decision. This method requires more operations from the user than the other methods.

Testing methods

We prepared two methods for the experiment: Method A (which requires the fewest number of

operations from users) and Method D (which, in contrast to Method A, requires the greatest number of operations). To understand how users deal with information in the "passive selection mode", we compiled logs detailing how the users worked with the system.

A preview selection method was used with Method A, and a title selection method for Method D.

3. Experiment

3.1. Selection method

Preview selection method

A conceptual diagram of this method is shown in Fig. 1. In this test, a preview of each screen is displayed for from a few seconds to a few minutes, and presented to the user one after another.

Title selection method

A conceptual diagram of this method is shown in Fig. 2. Titles are displayed on the screen and the system waits for the user to select one.

3.2. Contents

A news program was used for this experiment. Ten subjects were taken from the news program and used as main programs. For the preview selection method, each of the 10 subjects was edited into a preview and a main portion. The section in which the announcer described the news item from the studio was used as the preview, and collected pictures were used in the main portion.

The average running time of the previews was 23.3 seconds. The main segment average running time was 116.7 seconds.

3.3. Experiment

Using the 10 subjects, users' operating logs were compiled for each method. The authors had users view the content naturally, without having to perform any particular task.

preview selection method

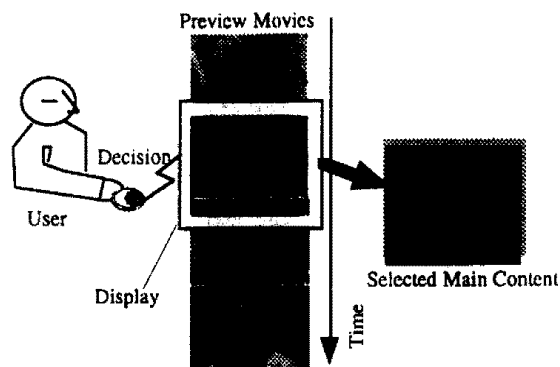


Fig.1 Preview selection method

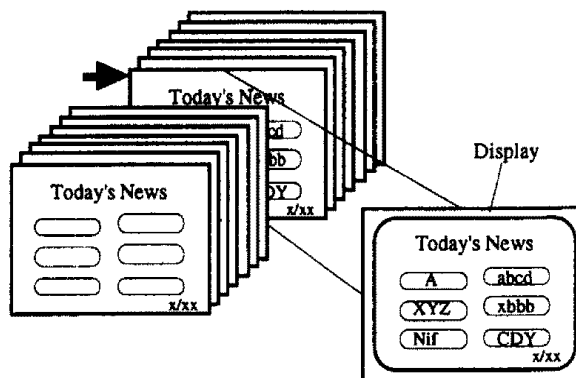


Fig. 2 Title selection method

The preview selection method allowed users to interactively control display of the preview. The user was able to flick through both the preview and the main portion in forward or reverse. The system was designed so that the screen would return to where it left off when a user returned to the previews after viewing a main content.

Title selection method

Ten buttons were displayed on the screen, with the title showing the details of each main content. As with the preview selection method, this method makes it possible to flick through previews both forward and backward. The screen also returns automatically to the selection screen when display of a main content is completed.

The experiment was performed with seven users. They were divided into two groups: one group using the preview selection method and the other using the title selection method.

3.4 Measurement of the efficiency

The following was used as one technique for measuring the efficiency of both methods. The purpose of this experiment was to analyze users' operations in the passive selection mode; the tester does not specify the content to be selected.

Therefore, for this experiment, users began viewing without any particular goal in mind. The contents that impressed them most after they finished viewing were assumed to be the content they would have selected. The time required for users to reach the contents which impressed them most was used as the parameter for measuring the method's efficiency.

4. Experiment results

Fig. 3 shows the users' operating logs for the preview selection method, while Fig. 4 indicates the logs for the title selection method.

The plotted points show how the users responded during the experiment; (J) indicates a jump forward during preview; (H) a jump in the reverse direction; (F,f) indicates fast forwarding; and (R,r) fast reverse.

Users' operations

A comparison of user operating logs for each method shows that users feed and rewind fast pictures after selecting the content more often in the preview selection method. In the title selection method, users, after selecting the content, often viewed it without performing any further operations.

The number of operations performed during viewing is shown in Table 2.

It can be seen that users tended to perform more operations with the preview selection method than with the title selection method.

We had expected fewer operations with the preview selection method because information is provided automatically. In the actual tests, however, users performed more operations with the

Table 2 Number of total operations

Preview Selection Method		Title Selection Method	
Name	Operations	Name	Operations
T.O	45	M.S	24
K.M	43	G.H	12
Y.K	60	M.I	22
		K.W	17
Average	49	Average	19

preview selection method. This may be because they wanted to have a look at the outline of the contents at the beginning. It is also true that a preview selection method will often turn passive users into active ones.

Interval of jump operations

With the preview selection method, there are three types of jump operations.

Jump after 1 - 3 sec. Users were not interested in the main content. They did this only to transfer between previews.

Jump after the time of approx. 5 sec. Users briefly checked the details concerning the content and then moved to the next.

Jump after 5 sec. Users checked the details concerning the content in detail and spent some time deciding whether or not to view the main content.

In interviews with the users made after the completion of the experiment, some expressed dissatisfaction saying "it was difficult to judge what the main content was about from the preview unless they listened to the voice of the announcer." Previews tended to look somewhat alike. It took approximately five seconds for users to pick up enough from the announcers' words to determine what the story was about.

A jump after more than five seconds is considered to indicate that users would watch a preview, then decide that they didn't want to see the main. Users were bothered that it took about 5 seconds to find out what the content was about.

We discovered that when it takes longer than five seconds for a user to make a jump, it is desirable to

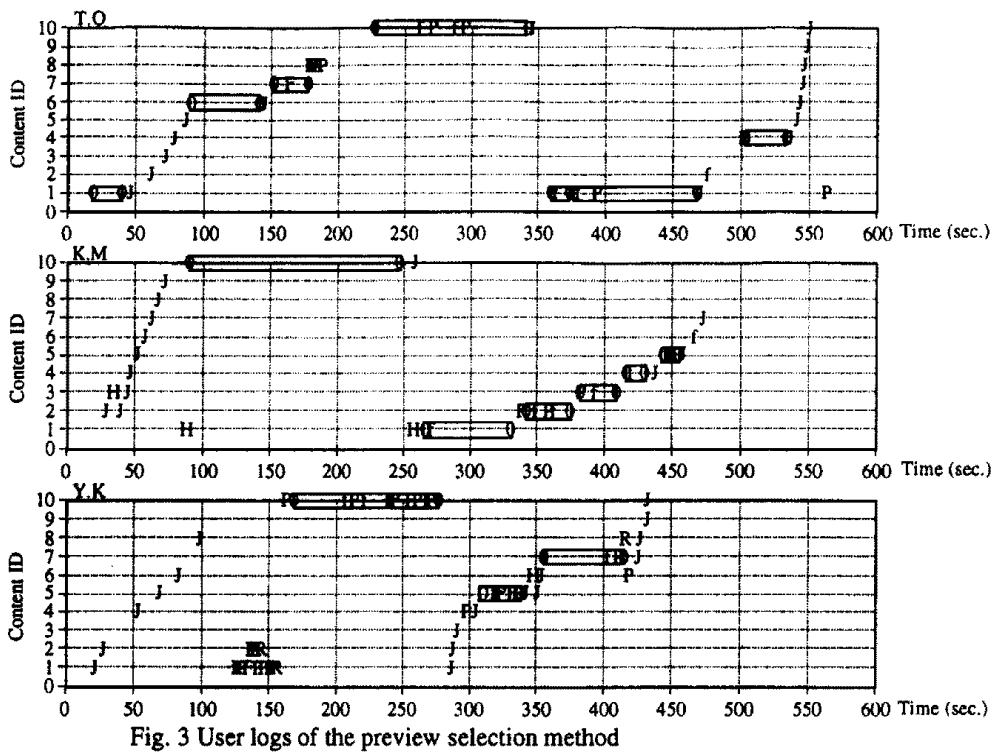


Fig. 3 User logs of the preview selection method

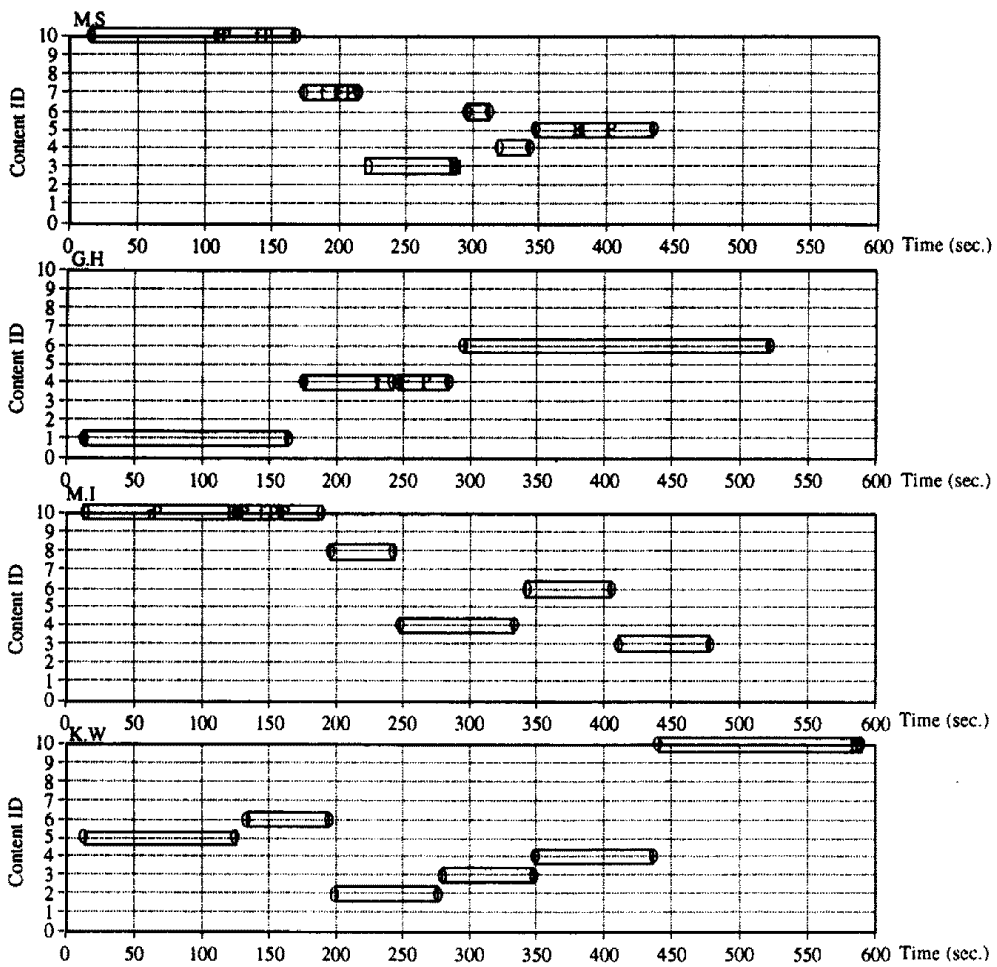


Fig. 4 User logs of the title selection method

include some kind of a title to help the user determine the content of a content.

When pictures are used to help with selection, as in the preview selection method, those pictures should accurately represent the content

Errors during viewing

Some users made an error when viewing a main content and had to return to the content again. In this case, they selected the same content again and returned to the portion they had been viewing by fastforwarding and rewinding.

This behavior appeared both with the preview selection method and the title selection method.

In the preview selection method, user "T.K.", while content ID 1, made an error after 16 seconds of viewing. He selected the content again, fastforwarded it and continued to watch. In the end, he watched 85 percent (104 sec.) of the content.

Using the title selection method, user "G.H" made an error after viewing 76 seconds of content ID 5. He selected the same content again, fastforwarded it and continued to watch. He viewed the content to its completion (84 sec.)

In this way, users may stop viewing a content owing to operational errors made during viewing. In this experiment, because the total number of contents was limited, users promptly recovered from errors. But when there is a large number of available contents, users may find it difficult to reselect contents they were viewing.

It is therefore necessary to provide an UNDO function that will help users to return to what they were doing when an error is made.

Measurement of the efficiency

Table 5 shows the most popular contents and the time it took users to reach them. In this experiment, there were great variations in results. It was also found that there was no significant difference in efficiency between the two methods.

Table 3 Reaching times to the most impressed content

Preview Selection Method		Title Selection Method	
Name	Time (sec)	Name	Time (sec)
T.O	227.1	M.S	16.1
K.M	89.0	G.H	294.5
Y.K	355.9	M.I	13.8
		K.W	440.1
Average	224	Average	191

5. Conclusion

To determine the best content selection method for passive users, we developed two types of content selection methods and analyzed users' behavior.

It has been established that methods which provide information in a stream (like the preview selection method) tend to motivate users in passive mode.

With the preview selection method, there are three types of user behavior patterns observed. It has also been shown that, when a picture is used to provide a selection, an element that clearly shows content must be at the beginning of the clip.

In future works, we need to analyze the user logs when we increase the number of contents. Also, we will study on a multi preview interface, which shows multiple preview videos in one screen, to provide many selection items to users at once.

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