Pointing devices in IPTV environment

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Abstract: Development of IPTV offers user to chose variety of different individual favored channels and this movements demands better & easier interface for searching channels. Therefore more variety interfaces should be proposed for future IPTV system and lot more studies should be made for suitable GUI device for multi-channeled IPTV environment. Mouse based pointing device is one of the suitable device to expand the possibility of user interaction and it is well matched device for IPTV system. By using such a pointing device, it will both increase the efficiency of researching system of IPTV and the quantity of data and therefore this will bring a better device system with better convergency and utility. First of all, the affinity diagram and the wire framed diagram for current IPTV Interaction pattern has been made to organize collecting data. Secondly, the proto-type of the pointing device has set up by using the data analysis and candidates of the new channel researching system. Lastly, there was the first usability test to make a clear comparison between two different devices and this provides the key factor of the better utility. The Experiment procedure has been designed to follow the whole contents from start to end. The second analysis was based on the first usability test and it contained tasks such as Metaphor, Direct Control, and simplicity. So, the evaluation could compare the Pros and Cons of each result from those tasks. As a result, it was clear to know that the proto-type pointing device marked higher level in using channel or contents searching.

1. Introduction

Development of Internet and digital technology brought a lot of changes in Television media environment. Digital cable based broad casting and IPTV(Internet Protocol Television) made two-way communication possible and a variety of service could be provided within using this technology. The market is getting large and therefore there must be a device which can control the complex functions of IPTV service. It's because there is a gap between Web controlling device based on TV viewing environment and Mobile controlling device. Rather

than simple manipulation of analog TV channels, the development of devices is emerging as a significant issue to satisfy Browsing and Viewing at the same time. Moreover, the development of IPTV gives many advantages to the user but on the other hand it needs a lot of learning to understand the whole concept. The new device research is needed for a easy and direct manipulating IPTV environment. So viewers of the content available to the convenient and intuitive use that can give satisfaction to have proposed This is the paper about the new concept of remote control devices which provide intuitive utility and satisfaction. The main goal of the research is to propose a new TV remote control that can manage a variety of services in the IPTV environment by extracting a key input device interface element. It will satisfy the user's taste in using control devices by increasing the chance of channel selection and this will lead to the demand of more convenient channel search interface

2. IPTV Remote Control

2.1 Present Environment of IPTV Remote Control

IPTV services is the IP-based new media-convergence service. SKYLIFE, the leading digital satellite broadcasting company first started their service in March 2002 and this is how a multi-channel era has started in Korea. Multi-channel, Mutii-media such as Cable TV and satellite broadcasting made a wider channel choices and program shortcuts for each genre and + / - button have provided as an interface. [1] Variety of additional features are enabled after a variety of multimedia forms and additional information have provided. Broadcasting network such as quiz show, home shopping, home banking, home betting, e-mail, chat, and club or community participation are available on same time and same screen and this bring changes on Remote Control layout. The functions which used to be only available in computer or mobile phone is now available in IPTV as well and therefore IPTV control device system must be able to replace the function of keyboard and mobile phone buttons. HANA TV, and MEGA TV, the leading IPTV companies in Korea have a similar looking menu structure of the remote control and also have similar looking bar-type design and each button system is relatively well placed in groups. But however shopping, SMS transmission, and adding new features are unavailable in IPTV STB and it is uncomfortable in using game, chat and program researching as the input of the character is hard. Overall this cannot be satisfied by users. [2]

2.2 Usability Analysis for Present IPTV Remote Control

The 1st user test was conducted to find out the channel researching behavior and services in current IPTV. The main purpose of the test was to find out IPTV's interaction, diversity, convenience and   multi-tasking ability. Each remote control of HANA TV and MEGA TV were needed for the test. The test collect data about the way people deal with the remote control; consistency of using, satisfied in the functional aspects, smooth interaction, and the functional capacity on handling variety of contents. The test was started divided into two group, the group of people using the IPTV and the other group that haven't. More over this one group is again divided into two different range of age, 20s and 40s.

2.3 Analysis result

The result of the test indicates three key problems. First, the multiple systems are existing on one screen made remote control hard to use it consistently and it provided a lack of user's needs on searching informations.

Secondly, complexity on way of watching TV. IPTV has all the characteristics of both the capabilities of the computer and Television but it hard to manage these two in same time with current remote controlling system. Uncomfortable situation that you can not use the keyboard to search and search results are not very correct when using the web portal. Different from the previous TV channel device, those people who did not have used it before have a negative reaction on using it. And for each screen, there're certain limitation on the buttons which respond but however many number of user who haven't experienced it before pressed the inactive button for several times. And lastly, there was a complexity on using remote control because IPTV itself has a lot of different contents and two transform each category into button would make too many buttons. But even though the device step up the certain steps to reach the contents, users still have hard time to understand the whole concept of manipulation steps. So it is needed to minimize the manipulation steps.

3. IPTV Pointing Device

3.1 Proposing Point Device System in IPTV Environment

The Analysis showed that the user felt uncomfortable when dealing with remote control device because it takes long time to access the content they want. As the bar-type remote control has limitation to freely using the whole digital contents, the conceptual mouse pointing device should be replaced as the key control device. The observation of the user shows that as the larger quantity of the contents, user movement of their remote control holding hand gets wider. Moreover, user press the button more strongly when they pressed the 'ENTER' button. By using this unique aspect of both body and the device such as strong/weakness of button and wheel type button,   a new gesture based pointing remote control device has designed. By using mouse wheel based device and Gesture-based device, it is possible to increase the connect ratio by using multi tasking utility and It made people expected.

3.2 The Experiment Procedure

Remote Control 1 for the current MEGA TV remote control device and Remote Control 2 for the new designed pointing device and we analyzed and compared them with task scenario and index interview. The Experiment procedure has been designed to understand and follow the whole contents from start to end. As the user test indicates 3 different types of problems, 2 tasks for each problem, total 6 tasks of scenario have been set up. The second analysis was based on the first usability test and it contained tasks such as Metaphor, Direct Control, and simplicity. Additional comments have been collected by index interview. Following all this procedure, the evaluation could compare the Pros and Cons of each result from those tasks.

[Table 1] IPTV content from the remote device user rating

Task	Evaluation Items	Questions
Task1	The queen of the home(MBC)	Replay the last episode of 'WIFE QUEEN'
Task2	Multi-Tasking	Find out how old TAEBONG is in 'WIFE QUEEN'
Task3	Use of Service	Go back to home menu and check todays whether broad cast.

3.3 Experiment results

The analysis could be divided in to two, one for shortening the time of choosing channel and the other one for comfortable use of services. The succeed and failure of IPTV test questions were quite similar for both Remote Control 1 and 2. As Remote Control 1 is more friendly device to user, users relatively succeed   to achieve the

goal and did not get frustrated even though they spent much more time than Remote Control 2. Remote Control 2 needed to study the device at first time, but users get interested on manipulation and it succeed to shorten the time. However it has a lot of user who didn't succeed compare to Remote Control 1. But those to succeed shows a variety use of the button and wheel of the device. Overall, the result of the test shows that user felt Remote Control 1 as the TV device and Remote Control 2 as the Computer device. Additionally, the group of age 20s showed a better adeptness to use compare to the group of age 40s. Through the Index Interview, it was clear to know that group of age 20s has high ability of using Remote Control 2 compare to Remote Control 1. And these people showed positive reaction about the multi-tasking ability while watching a different channel at the same time.

4. Conclusions

The 1st user test shows that the remote control device based on key mapping system is easier for the simple order such as changing channel or volume up but however there was a limitation to control the variety services because it takes too many button clicks and takes a lot of time as well. To make up for the weakness of current remote control device, the conceptual mouse pointing device was proposed as the key control device and there was the 2nd user test to evaluate these two different devices. The succeed and failure of IPTV test questions were quite similar for both devices. Users relatively succeed and did not get frustrated with previous remote control but also showed high ability of using the new device. It was clear to know that the user's interests and comforts rises as well as the degree of freedom rises. However, more device design and graphic user interface should be studied as it is still a proto-type device and it should cover up larger range of age too.

Acknowledgment

5. References

[1] Hae Goo Lee, A Study on The Usability of The Action Area With a Pointing Device, Hanyang Univ.

[2] Sukyoon Jang, (2008), Design of Background Image Based Multi-Degree-of-Freedom Pointing Device