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Increasing the Chance of Interest Learning in the User-Aw...
Keywords: Information Distribution System, Smart Watch, U...

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Increasing the Chance of Interest Learning in the User-Aware Information Distribution System Using a Smart Watch

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Abstract: In order to solve information overload in news information on the Internet, smartphone applications that provide news suitable for personal interests have been developed in previous research. However, if the user does not use the application, even if interesting news is distributed, since the news is not browsed, a loss of opportunity to learn the user's interest in the application has occurred. In this research, in order to prevent the loss of learning opportunities, we proposed an information distribution application that facilitates startup and browsing using smart watch. As a result of evaluation, no increase in the number of times of learnings was seen by using smart watch with this application. The cause is that the information displayed on the smart watch with a small screen size does not satisfy the amount of information desired by the user. Devices to provide users with saved information are required.
Keywords: Information Distribution System, Smart Watch, User-Aware

1. INTRODUCTION

Many people get news information from the Internet. However, news delivered via the Internet does not take into consideration individual interests. Therefore, when a user acquires news, it is necessary to find news of interest from a huge amount of news. It is said information overload that makes it difficult for users to select useful information due to an increase in information. In order to solve the information overload in Internet news, individuals information development system "PINOT" （Personalized INformation On Television screen） which displays news information on television was developed in previous research[1].

Also, the spread of smartphones has been rapidly advanced in recent years. Acquisition of news information is raised above the utilization rate of Internet services using smartphones. However, many news applications just provide users with the all information they are receiving. Information overload has occurred here, too. In order to solve information overload in news applications for smartphones, smartphone application using PINOT was developed in previous research[1].

However, the developed application could not acquire news unless the user spontaneously launches the application. Therefore, even if news of interest is delivered, the news may not be provided to the user, causing a loss of interest learning opportunities. In order to acquire user's interest more accurately and provide only the news of interest to the user, it is better to have more learning opportunities, so it was necessary to prevent losses. Therefore, we propose an application that adds news headline display function on watch type wearable terminal to smartphone application using PINOT.

2. SMARTPHONE VERSION PINOT

2.1 Overview

An overview of smartphone version PINOT is shown in Figure 1. The smartphone version PINOT consists of an information distribution server that distributes news and a smartphone that the user uses. When the user activates the PINOT application on the smartphone, the smartphone acquires the news information from the information distribution server. Information filtering based on the
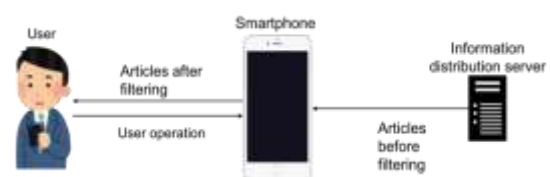

Figure 1: Overall image of smartphone version PINOT

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interests of the user is performed on the acquired news information, so that only news that the user is interested in is provided to the user.

2.2 Problem of Smartphone Version PINOT

In order to accurately provide articles suitable for the user's interests, PINOT needs to have the user read the article headline delivered to the user and have the user select articles of interest from among them. However, the articles PINOT provides to users is limited to those delivered when the user launches the PINOT application, for articles delivered during the period the user did not use the application, the user Even if it is content that responded to the interest of user, it will not be offered to the user, the opportunity to learn the user's interest will be lost. As the learning opportunities decrease, it is possible that articles provided to the user may not be accurately considering the user's interests. That is, when the user selects and selects information, there arises a situation in which information of interest can not be obtained. In order to reduce the necessity of sorting out information by the person, it is required to prevent the loss of learning opportunities.

3. SMART WATCH COOPERATION PINOT

3.1 About Smart Watch Cooperation PINOT

Smart watch cooperation PINOT is a smartphone version of PINOT plus news provision function with smart watch[2]. Like the conventional PINOT, it is possible to provide news considering the user's interest. This reduces the necessity of screening information which the user must originally perform, which leads to a reduction in burden on the user. Also, by providing news using smart watch, users can know the news without operating the smartphone. Furthermore, with the conventional smartphone version PINOT, the news delivered during the period when the user did not launch the application never was provided to the user even when meeting the contents of interest. However, since smart watch cooperation PINOT automatically acquires news information and provides news considering the user's interest, the possibility that the user misses the news of interest is reduced.

3.2 Overview

An overview of the proposed system is shown in Figure 2. This system consists of a server that sends a silent notification, a server of a news site, an iPhone that the user uses, and an Apple Watch. Silent notification is one

type of PUSH notification. However, it can be used as a trigger to do arbitrary processing without including a message. The server of the news site provides news

Figure 2: Overall image of smart watch cooperation PINOT information to the iPhone. The iPhone provides news information to the user and learns the user's interest from the user's behavior on the provided news information. Through learning, articles that are determined to be interested are sent by Apple Watch. Articles sent from iPhone are displayed on Apple Watch, and those that the user wanted to read are designated as "articles to be read later".

3.3 Devices to Encourage Users to Launch Applications

When user tap the headline sentence displayed by Apple Watch, it will return the article as "article to read later" and return it to the iPhone. The returned "article to read later" is stored on the iPhone for 5 days, and it is displayed when the iPhone application is launched by the user. By tapping this headline sentence, the user can know the detailed information of the article. In order to know the details of "article to read later", the user needs to use the application of the iPhone, which allows the user to launch the application.

Users can also see other news by launching an application, and if there is content of interest among them, the user is expected to read the news, which leads to an increase in the number of times of learning.

4. EXPERIMENT

4.1 Experiment Method

In this experiment, in order to compare when using PINOT application with using Apple Watch and when using PINOT application without using Apple Watch, decide the period during which Apple Watch is used and the period during which apple watch is not used. And have multiple people actually use the application in each period. Record the number of times of launches of the application,

the number of times of interest learning, and the number of times of transmission of "article to read later" from Apple Watch to the iPhone during each period. Since learning is performed when a user reads an article, counting that the user confirms one article detail is counted as one learning.

Since the objective of this research is to increase the number of times of learning, we evaluate whether or not the number of times of learning changes will occur between when using Apple Watch and when not using it. If it can be shown that the number of times of learning is larger in the period using Apple Watch, it can be said that the number of times of learning increases by using Apple Watch.

Also, it counts the number of times the viewed article was the article specified as "article to read later" and the number of times of reading the article being distributed after reading the "article to read later". Reading other articles that are distributed after reading "article to read later" is conceivable that the existence of "article to read later" triggered reading of other articles. If this number is large, it can be said that using Apple Watch increases the number of times of learning.

4.2 Experimental Result and Discussion

Experimental results when using Apple Watch are shown in Table 1 and the experimental results when not using it are shown in Table 2. The table shows the average per day of the number of times of launches of the application and the average number of times of learning performed by one application launch.

From Table 1, the average number of times of application launches for all employees when using Apple Watch was 1.37 and the average number of times of learning was 1.63. On the other hand, when Apple Watch was not used, the average number of times of application launches from Table 2 was 2.28 and the average number of times of learning was 2.12. From this result, it can be seen that no increase in the number of times of learning by

Table 1: Experimental results when using Apple Watch

User	Average number of times of application launches	Average number of times of learning
User A	1.33	1.86
User B	1	1
User C	1	1
User D	2.5	2.47
User E	1	1.8

Table 2: Experimental results when not using Apple Watch

User	Average number of times of application launches	Average number of times of learning
User A	1.2	1.67
User B	2	0.5
User C	2.2	3.45
User D	1.75	1.76
User E	4.25	3.24

using Apple Watch is seen. However, it can be said that there was a situation that user B's number of times of learning in Table 2 was less than 1 and that the user did not browse the news even though the user started the application. The situation where the user launched the application and looked at the headline sentence of the news but the news of interest was not delivered has caused the user to waste useless time. This situation has not occurred when using Apple Watch, so it can be said to be one of the advantages of using Apple Watch.

Next, the number of times user read the "article to read later" when using Apple Watch, the number of times user launched the application to read "article to read later", and the number of articles read after reading "article to read later" is shown in Table 3. User read "article to read later" just after launching application is Judged user launches the application to read "article to read later". User read distributed news after reading "article to read later" is judged "article to read later" triggered reading other distributed news.

From Table 3, 3 out of 5 people had launched the application to read "article to read later". Also, User D reads "article to read later" and then reads 5 other articles. Therefore, it can be said that Apple Watch is increasing the number of times of learning with respect to user D.

4.3 Problem of the Proposed System

In the application proposed this time, Apple Watch displayed only the news headline, but in this case, when

Table 3: Numbers related to "article to read later"

User	Number of times reading "article to read later"	Launch application for "article to read later"	Articles that were read by "article to read later"
User A	0	0	0
User B	0	0	0
User C	4	3	0
User D	16	4	5
User E	5	2	0

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user wants to know the details of the news user learned with Apple Watch, user needs to use the iPhone There is therefore a weak benefit of using Apple Watch for users and it is probable that the user did not want to use Apple Watch. So not using smartphones, It is required to provide it.

5. SUMMARY AND FUTURE CHALLENGES

In this paper, we proposed PINOT with smart watch interaction for the purpose of increasing the number of times of learning in smartphone version PINOT. By using smart watch, we thought that information could be confirmed and the number of times of learning of the application increased even when it was not possible to confirm the smartphone. Evaluation results showed no increase in the number of times of learning, but we saw the advantage of using smart watch. For future work, we will discuss ways to provide detailed information on news using devices other than smart watch.

As a method of providing detailed information on news to users without using smartphones, we are considering providing news detailed information by speech reading. Due to the spread of wireless earphone etc. in recent years, the time when the user can receive voice information is increasing compared with the past. We think that voice is an effective means as a method of providing information outside the screen of smartphone and smart watch.

From now, we will investigate the characteristics of information provision by voice and compare it with information provided by letters. After that, we develop and evaluate an application that can realize effective information provision by voice rather than providing information with the current PINOT application.

ACKNOWLEDGMENTS

REFFERENCES

[1] Satoshi Ono, Tsutomu Inamoto, Yoshinobu Higami, Shinya Kobayashi: "Development of the Smartphone Application to Choose and Display News for Individuals based on an Operation History", Multimedia, Distributed, Cooperative and Mobile Symposium 2016 Proceedings, 2016, pp.436-442,2016.

[2] Takuya Ogawa, Takuya Fujihashi, Keiichi Endo, Shinya Kobayashi: "A study on the increase of opportunities for assuming interest in information distribution system for individuals using smart watch", Proceedings of the 80th National Conference Papers, 2018(1), pp.829-830, 2018.