

Title	ホームネットワークにおけるプッシュ型情報提示システムの実用化に向けた研究
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Citation	
Issue Date	2012-03
Type	Thesis or Dissertation
Text version	author
URL	http://hdl.handle.net/10119/10448
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Description	Supervisor:丹 康雄, 情報科学研究科, 修士

A practical push type information notification sysytem for home network

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February 6, 2012

Keywords: Home network, Push type information, User notification, Urgent information.

Network that corresponds to home appliances and sensors has been constructed at home and availability of Internet connection has become indispensable in common homes. This network infrastructure enables us to control home appliances from not only inside homes but also outside.

The "user notification system for push type information", as suggested by previous research, uses home appliances that are connected the home network as an information terminal for users. Push type information is used as the information to be notified to the user. By "push type", we mean the form of notification information that is one-sidedly transmitted from the information origin to the user. For example, Earthquake Early Warning and the task-finish notification signals of washing machine are different kinds of push type information. In this system, push type information is conveyed to the users through the operation of home appliances near them. The good point of using this system is that this system does not use special output devices, but home appliances in order to notify the push type information. Therefore, a user will be able to get the information promptly, since the appliances used for the notification are nearby user. However, in this system there are some practical problems to be solved, such as how this system informs the user of information and how user receives information from this system.

The purpose of my research is to solve these problems.

There are 5 problems. First one is lack of reachability of information to the user (problem 1. reachability of information). Second is lack of real-time performance (problem 2. keeping real-time performance). Third is hard to distinguish one notification from another (problem 3. multiplexing of information). Fourth is that the output devices should not be operated too often (problem 4. frequency in operating of the output devices). Fifth is that there are problems of maintenance and cost to set server inside home (problem 5. problem of managing server).

In this research, we suggested the proposed method to solve these five problems and did experiments using illumination in order to evaluate some proposed methods. For reachability of information(problem 1), we made an action list that the user would probably perform when he gets the notification successfully. Then the system observes the user's behavior using sensors after it has show him/her the information. If the user perform one of the predicted actions in the action list, we conclude that the notification has successfully reached the user. As result of the experiment, we confirmed that the user did the assumed action. For keeping real-time performance (problem 2), a user recognizes the needed real-time information in constant time with showing vary ways of display. Result of the experiment, we confirmed that time until the user recognize the information exist. Multiplexing of information (problem 3), we made four type of information. We made some output patterns. The user tell one information from another information by output patterns. Result of the experiment, we confirmed that the user recognized the information in 75%(whole), 74%(daytime) and 80%(night-time). Frequency in operating of the output devices (problem 4), we solved by the user choosing information that the user wants this system to notify. Problem of managing server (problem 5), we considered wether it is possible to operate the system from an external location. The advantages are having outside is easy to maintenance of software and hardware, and low cost of initial investment and maintenance cost. However, if the server is located outside the house, it is impossible to notify the user with real-time information and adapt to each home appliance's environment.

Now we face two new problems. One problem is how to notify the user

who doesn't have enough knowledge of this system. Another problem is how to change safely and in a simple manner the system's performance.