

Contents Management System based on Kansei Information Processing -Investigation for Multimedia Contents Delivery Service-

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Abstract – Contents management system based on Kansei information processing is developed as an application of new network routing control. This study is a part of ubiquitous network project that supported by Ministry of Public management, Home affairs, Post and Telecommunications in Japan. The purpose of this study is to develop techniques, which enable to provide contents and service based on user’s subjective requests by using most suitable network routing. In this paper, results of investigation for multimedia contents delivery service under present network troubles are shown as feasibility study on Kansei information processing module of ubiquitous network environment.

I. INTRODUCTION

Contents management system based on Kansei information processing study is progressed under support by Ministry of Public management, Home affairs, Post and Telecommunications, as an application related to recent new network routing control technique [1]. “Kansei” means subjective reaction such like our taste. Purpose of this study is to realize contents delivery service based on user’s subjective aspect and tastes by using most suitable network routing. This study is developed as a part of the ubiquitous network project named “Ubila [2]”.

Fig. 1 shows the outline of our execution environment on ubiquitous networks. There are three main modules, real-time application, Kansei information processing and resource allocation modules. First, user gives his/her tastes and requests to the Kansei information processing module. This module analyses them and make requests to the resource allocation module based on user’s subjective requests. The resource allocation module manages resources and assigns these resources to tasks of the real-time application to satisfy the requests from the Kansei information processing module.

II. CONTENTS DELIVERY SERVICE

There is huge number of digital multimedia contents on the web, because of development of broadband network and digital broadcasting. We can browse digital contents easily, but it’s difficult to find the contents we want to get with our subjective requests, because each contents doesn’t have index that can treat our subjective request. A solution of this task is making Kansei index on each contents.

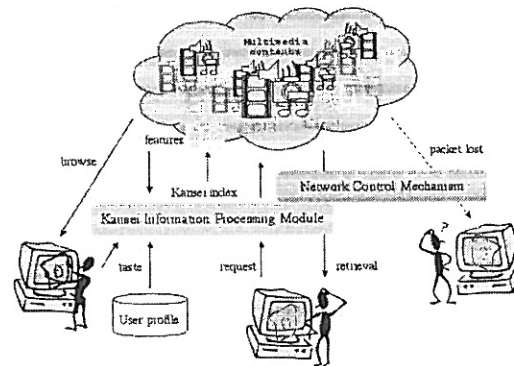


Fig. 2. Kansei information processing module

Here, Kansei information processing module [3] is described more detail. “Kansei” is a kind of affective reaction. Also we call retrieval with user’s subjective request as “Kansei retrieval”. For Kansei retrieval, contents should have proper index. Kansei information processing module makes Kansei index using contents features, colour, shape, motion and so on, based on user’s tastes.

Moreover, it’s very important to send as original content is to users. If packets are lost, user receives unexpected retrieval candidates, even Kansei information processing module works properly. Network routing control mechanism helps to provide multimedia contents as it is.

Considering contents management system based on Kansei information processing. According to increase of the number of broadband network user, they expect more rich contents such like high-quality music and movie. Therefore we need infrastructure that suitable for multimedia contents delivery service.

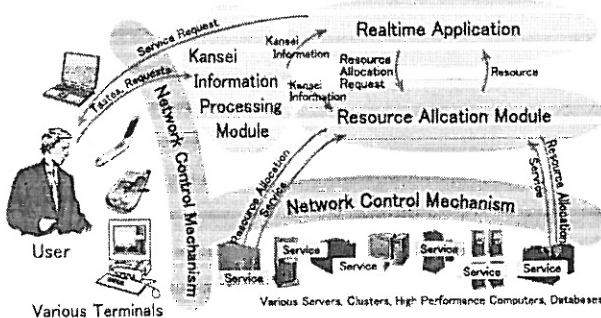


Fig. 1. Outline of execution environment on ubiquitous networks

Multimedia contents delivery service is considered as a killer service among broadband network service. The needs are summarized as follows.

- 1) User expects to receive high-quality contents without troubles.
- 2) Contents delivery service provider need to manage delivery and contents fee clearly.
- 3) Contents producer request security technique to prohibit illegal access to the contents and copyright protection.

III. QUESTIONNAIRE

The questionnaire is about tolerance level for present network troubles on contents delivery focused on users' needs "user expects to receive high-quality contents without any troubles". The purpose of the questionnaire is to be clear what is most expected contents for contents delivery service using best effort network routing control, and what is the network trouble which should be solved at first in the ubiquitous network project.

The questionnaire is performed with the title "questionnaire about multimedia contents" using online web questionnaire system. The first page of the questionnaire shows the sentence "please let me know your opinion about multimedia contents delivery service (as if TV show on PCs)"

A. Opinion Poll for Contents Delivery Service

At first, opinion poll for contents delivery service investigation is performed. In detail, the question "please select genres which you would like to use though contents delivery service" is shown on the questionnaire page on the web. It allows that subjects can select more than one genre. The genres are chose from major genres on TV timetable and VOD (video on demand) as below.

- | | |
|-----------|---------------|
| (Genre 1) | drama / movie |
| (Genre 2) | sport |
| (Genre 3) | music |
| (Genre 4) | entertainment |
| (Genre 5) | documentaries |
| (Genre 6) | leisure |
| (Genre 7) | news |
| (Genre 8) | anime |
| (Genre 9) | others |

B. Tolerance Level for Network Troubles

Next, tolerance level for present network troubles investigation is performed. In detail, the question "please let us know about your opinion for network troubles on multimedia content delivery service" is shown. It allows that subjects can select only one answer with "acceptable", "tolerative", "not tolerative", and "not acceptable".

The following situations are taken as network troubles on multimedia content delivery service. Actually, the question "please choose one tolerance level for each trouble situation" is shown on each genre shown in previous subsection.

(Situation 1)

Movie is no problem, but sound is interrupted some times. (there may be no sound term.)

(Situation 2)

Movie is no problem, but sound is delayed. (There may be movie-sound gap.)

(Situation 3)

Movie is no problem, but sound is with noise. (It may be difficult to catch sound clearly.)

(Situation 4)

Movie is no problem, but text view instead of no sound. (It's like subtitles with silence.)

(Situation 5)

Sound is no problem, but movie is interrupted some times. (There may be blind term.)

(Situation 6)

Sound is no problem, but frame drop occur some times. (Other frame except dropped frame is normal.)

(Situation 7)

Sound is no problem, but movie freeze. (Movie stops some times.)

(Situation 8)

Sound is no problem, but movie get blur.

(Situation 9)

Sound and movie is no problem, but it starts delayed. (There is a few seconds till start.)

(Situation 10)

There is no movie and no sound, only text is broadcasted.

IV. EXPERIMENTAL RESULTS

The questionnaire was held in February 2004 with 5 days on the web. The number of subjects was 1014, including 44% male and 56% female. The age group between 20 and 30 was 25% and between 30 and 40 was 40%, however youngest subject was 14 years old and oldest was 76 years old. It shows we could get wide range subject in this investigation.

Fig. 3 shows how the subjects access to the net mainly. Most subject use DSL, and next using CATV and FTTH. This shows well recent network access situation in Japan.

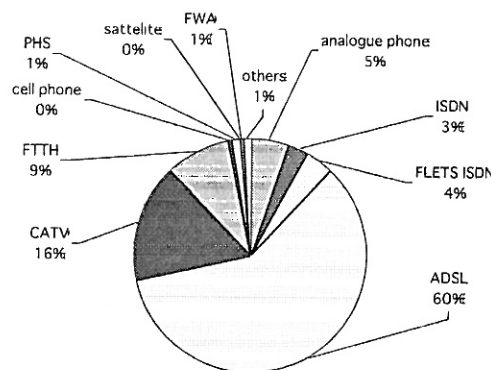


Fig. 3. How to access the net for the subjects

A. Opinion Poll for Contents Delivery Service

At first, the result of opinion poll for contents delivery service investigation is shown. Fig. 4 shows which genre is the most expected genre for contents delivery service.

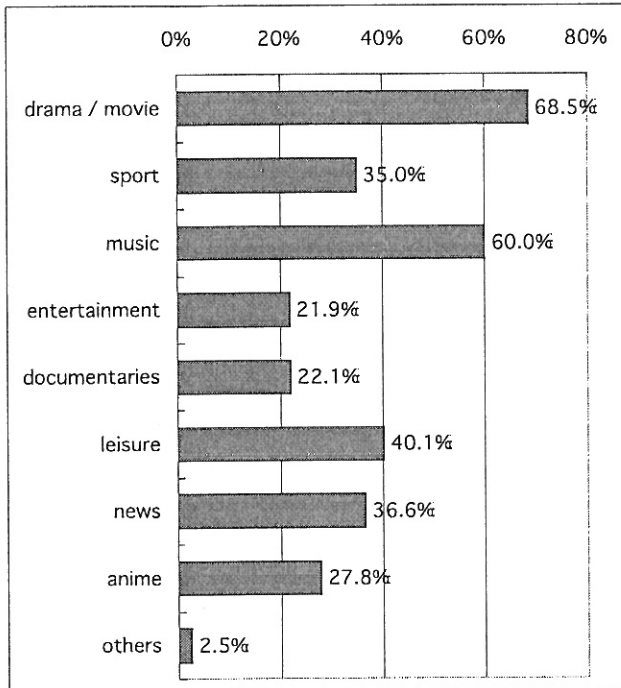


Fig. 4. Expected genre for contents delivery service (Subjects can select more than one genre)

Some subjects answered to expect educational contents, stock information, hobby, scenery movie, and so on. Also really few subjects gave their opinion, it's too early to provide multimedia contents delivery service.

B. Tolerance Level for Network Troubles

Next, the result of tolerance level for present network troubles investigation is shown. Most "unacceptable" network trouble was "text only (situation 10)" on all genre.

As examples of the results, cases of "drama / movie" and "music", which are expected for multimedia contents delivery service by many subjects, are shown in Fig. 5 and Fig. 6.

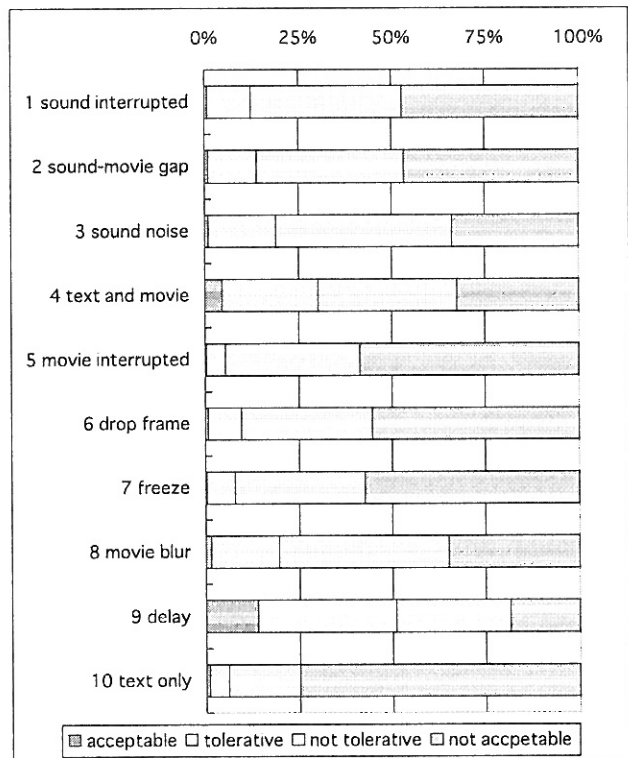


Fig. 5. Tolerance level for network trouble (Genre 1: drama / movie)

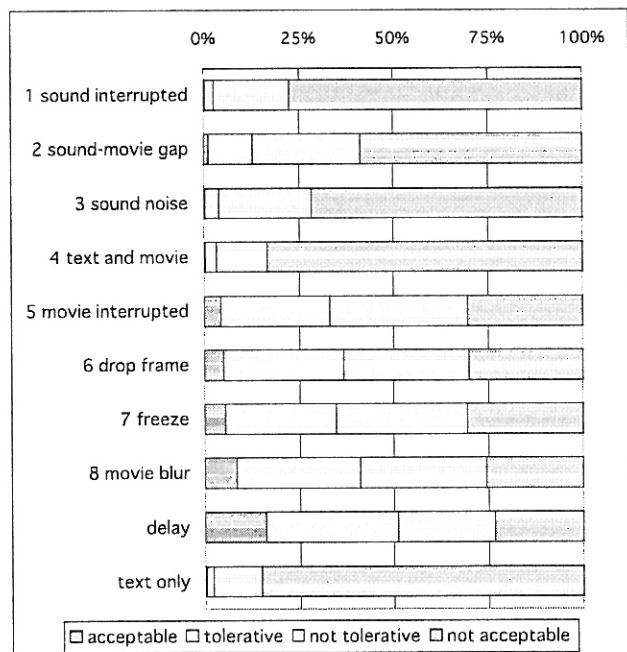


Fig. 6. Tolerance level for network trouble (Genre 3: music)

V. REMARKS

In this paper, the results of investigation for multimedia contents delivery service under present network troubles were shown. They are part of feasibility study on Kansei information processing module of ubiquitous network environment. The results of first investigation about opinion poll for contents delivery service make clear genre people expected to contents delivery service. The results of second investigation about tolerance level for network troubles on contents delivery service make clear people's tolerance level for network troubles on each genre. Some troubles taken in the questionnaire as network trouble situations seem to be possible to solve by suitable network routing technique.

In this investigation, we could get subjects' answer of over 40 attributes, not only sex, age and how to access to the net. We will make study with these data to analyze users demands using data mining technique in the near future.

VI. ACKNOWLEDGMENT

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VII. REFERENCES

- [1] Hedia Kochkar, Takeshi Ikenaga, Yuji Oie: Multi-class QoS routing strategies based on the network state, Proc. of IASTED Communications, Internet, & Information Technology, pp.497-502 (2003)
- [2] Ubila Project: <http://www.ubila.org/>
- [3] Kaori Yoshida: A Proposal of Kansei Description for Multimedia Contents, 7th International Conference on Knowledge-Based Intelligent Information & Engineering System (2003)