A study on the device feature for Ubiquitous Guidance System

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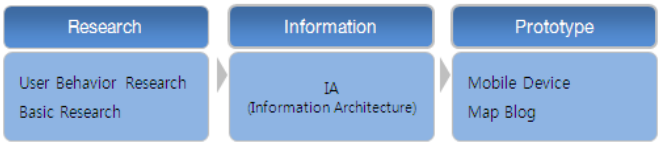
***Abstract*— As multi-media units are well developed recently, navigation kits with GPS functions are utilized and on-line map services provide information in advance. Thus, we can say that ways of using maps are more and more convenient as technology develops, and the time users need to spend looking for information is getting shortened. This study aims to offer location information and local information connecting mobile devices and PCs each other for users who visit a specific area. And Key feature of this research lies in the proposal of methods for offering much information to users through the connection of the two devices and on-and-off lines by using a network in real physical space and integrating and extending the sphere of information.**

***Index Terms*— Geographic information systems , Man-machine interfaces , User Interface , Interactive system**

I. Introduction

This study aims to offer location information and local information via mobile devices and PCs for users who visit a specific area. Currently, the service is being offered via mobile devices and PCs; however, the difference with this study lies in the proposal of methods for offering much information to users through the connection of the two devices and on-and-off lines by using a network in real physical space and integrating and extending the sphere of information.

II. Study Method



[Figure 1: Research Process]

Ahead of this study, the study collected information through a research survey and user behavior research, and information architecture was organized based on the analysis results.
The vehicles of the study were classified as mobile devices and PCs. The characteristics of each media include the following.

A. Mobile device

It mainly means a PDA, but it means all mobile terminals including mobile phones and PMPs, and it is aimed at terminals supporting a sensor that can detect the location of the user in any form.

- Ubiquitous-based tour guide system of Nara area in Japan

It provides tour information by reading a U-code from an IC tag and a wireless marker installed within a specific area with a PDA. It offers a road guide, an introduction in various languages, route navigation, tour information, nearby area information, and also other information by utilizing a GPS.

B. PC

It means a home or office PC that is not portable and is subject to spatial limitations in general, and the aim is for map-based contents serviced on-line.

- Cyworld (map.cyworld.nate.com)

It is a service shared with other members by combining listings of mini home pages or paper uploaded with personal experiences with location information of a map.
It connects the episodes and picture information of other people who have already visited a specific space with location information of the map in a form of a chat box.

III. Current Circumstance Survey

The study reviewed the current ubiquitous-based infrastructure and extracted several important key words about the characteristics and strengths of each device through a case analysis of a guide system using a PDA and a PC-based on-line map service as examples of service cases aimed at the two devices.

1) Infrastructure:

It is possible to recognize the location of a user with the development of location-based location identification technology (Zigbee, RFID, and IR) and coordinates-based location identification technology (LBS and GPS).

2) Features of PDA Guide:

• Extension of space: Detects a location with a ubiquitous sensor for both outdoor and indoor space
• Mobility: Is portable and may be connected wherever it can be connected to a network.
• Combination of on-and-off line contents: Creates an environment so that a visitor's experience may be continued on-line by promoting an on-line exhibition hall and community.
d. Multi-media support: Automatic video, voice guide

3) Features of PC-based Map Blog:

With the distribution of digital cameras and mobile phone cameras, it is possible to take a picture and videotape anywhere, and as the web becomes easier it is possible to upload and share video files easily on the web. The features of a blog may be as follows.

• Extension of User-Oriented Participation

With the influence of UCC (User Created Contents), share rich contents (article, picture, video, frequent visit, and map).

• User Experience Information

It is possible to obtain various user experience information for a specific space.

IV. Analysis

A. Features by Device

The study conducted a comparative analysis of the features and differences between mobile devices and PC devices supporting a digital map.

Since a desk top computer has a large space for saving information and is available for managing files, it is appropriate for a blog system that uses a map, and a mobile device is suitable for utilizing navigation that employs mobility and LBS or GIS.

When making a development in connection with this, it is necessary to prepare mutually different design strategies in consideration of the different features of the devices,

B. Features of the Service

Through a case study it was determined that it is possible to deduce the significant features and pattern of a map service as three factors. The map service could be divided largely into three including route search, transportation line, and user experience service; and on a PC users offer and share sensible information such as recommendable foods and recommendable places based on their experiences, which is closely related to reality, upon their participation.

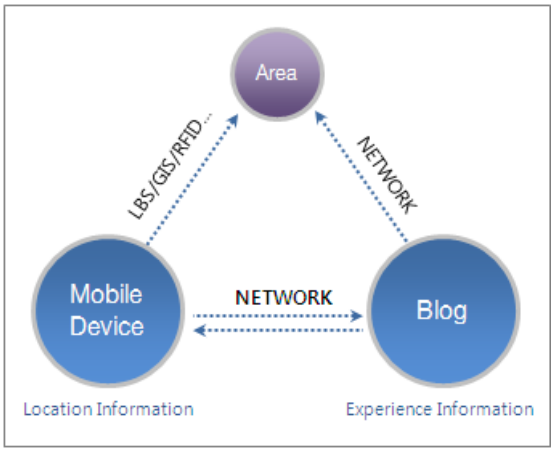
	Inforamtion	Mobile Device	PC
Finding Way	Location of destination, nearby area information	O	O
	Offer of the shortest route to destination and the indication of lead time to the destination	O	O
	Voice guide service	O	O
	Tour course guide	O	O
	Foreign language support	O	X
	Shopping/restaurant/convenient facility guide service	O	O
Traffic & Transportation	Real-time transportation condition identification	O	O
	Offer of lines by transportation vehicle	X	O
	Mock driving service	O	O
	Taxi fare, gas fee information	O	O
	Bus arrival notification(alarm)	O	X
Information by User participation	Possible to connect to a blog or cafe	O	O
	Upload pictures or stories of experiences	X	O
	Attach a drive or jogging course route	X	O
	Transfer searched map to email and/or a mobile device	O	O
	Experience of experimental scroll and manipulation method	X	O
	Enables users to create or edit a map in person	X	O

[Table 1: Feature of the map service which it follows in device dividing]

C. Information Factor

Analyzes an information factor offered on the screen by an internet map service focusing on a specific area, and utilizes it as an information structure for preparing a prototype.

V. Results



[Figure 2: Research Concept

This study analyzed the features by device type through a case study, and it was found that the interface between devices, manipulation features, and user environment are quite different. Furthermore, the study deduced the features of each service and information factors for preparing two types of prototype.

If features between and the strengths of the two devices may be utilized, it would be possible to offer much more information and services to users. Conditions and matters to consider for this may include the following.

A. Conditions for connection between the two devices

- Unification of identification code such as a information Factors and pictogram
- Securing of connection network such as network and communication

B. Matters to consider for information connection between devices

- Same type of digital map support between the two devices
- Maintenance of consistency of information structure despite the difference of interaction (manipulation method) and display size

C. Service for information connection between the two devices with the use of a network

- Route storing visited by users
- Transfer of picture taken or voice recorded at a traveling site on-line along with the location information of the current user, and save it to the blog
- Nearby restaurant location search and on-line reservation
- Offer of personalized service

VI. Conclusion and Follow-Up Tasks

As contents become diverse and information is delivered in real-time, the way of information exchange between the two mediums for utilizing such information will become diverse.

It is necessary to pursue much more research into the method of connectivity between on-and-off line media for accepting such a change. Also, it is necessary to develop a design concept for users through a user survey that observes user behavior in reading an actual map at the stage prior to prototype development.

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