A Plan of Regional Tourist Information System

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Abstract

A method of sharing tourist's information is studied as an application of Internet communication. WWW pages are created by providers with an extended HTML format, and are transferred to contents servers. Contents servers analyze HTML texts, and store their contents in server databases. In addition, contents servers have views of information which reflect user's thinking process to assist in search of information. Linkage of views and database is also discussed. Problems and difficulties of information providing are originally pointed at a study group held in Ishikawa prefecture, and are briefly introduced at first.

Keywords

Internet, navigation, tourist's information

1. INTRODUCTION

One of the authors has been, for a year, a member of a meeting to discuss how to offer regional tourist information of Ishikawa prefecture. In the meeting, it is pointed that in a centralized information providing system, system administrator cannot often update information, since he does not know exact information until someone brings it to him. Therefore, to offer attractive information, it is important to provide it by people who are responsible to the information. For this objective, the members of the above meeting considered that the Internet is effective to solve these problems. The meeting is now closed. But we started to study a model of regional tourist information system. This conceptual model is assumed to have

- (1)function to show Internet address,
- (2)function to show contents of Internet pages,
- (3)function to offer services of online shopping and reservation and so on.

In this study, we discuss how to realize functions (1) and (2), in order to assist in offering and searching information.

2. AIMS OF OUR STUDY

2.1 Technological Trend

The Internet is originally a network for specialists whose interests are file transfer and so on. Navigation, which means address search, has been recognized as an important problem. Several navigation supporting tools have been appeared, including Gopher, Veronica, WAIS etc. Basic ideas of the tools are keyword input and menu selecting.

Recently, WWW makes the Internet popular for the masses who are interested in HTML documents. Navigation in WWW is realized by links of pages like hypertexts. Thus, Web offers very easy operations to access relating information.

2.2 Requirements

We suppose that users of our system have the minimal knowledge of operating viewers, Netscape etc, of WWW. We also assume information providers, listed in Table 1.

Table 1. Example of providers

provider	contents
railway company	time table, railway map, tariff,...
hotel	location, restraints, tariff,...
hall	location, concert/events, closed day,...
ski	snow condition,...
:	:

From Table 1, we find the following requirements.

- R1. When existing database is large, such as time table, we cannot reconstruct Web pages. Thus, database must be accessed through HTML format.
- R2. Daily updated information, such as snow condition, must be provided by those who directly know information.
- R3. Contrarily to R2, increasing URLs make difficult to access information. Thus, only the most representative URL, tourist home page, should be distributed. Naturally, users must be leaded to his desired pages from the tourist home page.
- R4. Individual provider does not know all the URLs relating to his pages, and links are not sufficient to search information. Thus, navigation tools must be installed to the tourist home page.
- R5. Objectives to scan tourist home page vary dependent to users. Someone may view like magazine, but some others may plan their travel. Thus, human interface of information providing system must construct user model to specify user's requirement.

3. OUR PLAN

3.1 System architecture

Regional tourist information system, which we are now studying, is composed of users, information providers and contents servers. Figure 1 illustrates its system architecture.

Fig.1 System architecture

These components are designated as sites. Sites are geographically distributed, and messages between sites conform to HTTP protocol.

3.2 Contents server

Contents server stores summaries of sites' data. Basic procedure of information reference is as follows.

[Reference procedure]

step1: User accesses tourist's home page.

User's intention is understood.

step2: If sufficient information is stored in contents server, it is presented.

step3: If data are missing in contents server, and if address of site having data is already known, inquiry message is transferred to the site.

step4: If data don't exist in contents server, and if site having data is not known, inquiry message is distributed to all sites.

In step1, user's intention is categorized to three types U1~U3.

[User's intention]

U1. He/she is just browsing Internet pages. This case, precise and attractive information is required. WWW already offers this class of information.

- U2. He/she needs formal information such as opening time, tariff etc. This information is usually represented by character data, and so, contents server may store it.
- U3. He/she is planning trips. Then, final outputs of inquiry may be arranged time tables. This objective is accomplished by U2 process with some intelligent framework, like optimizing cost and so on.

In step2 and 3, contents servers play role of searching data stored in databases. The next section 3.3 discusses details of our strategy.

There are two factors relating to necessities of step 4. The first factor is that contents servers only contain standard information which seems to be valuable for most of users. The second factor is that contents servers may not acquire any information of some sites. Both two factors are related to how to assemble contents of sites, manually or automatically. This topic is discussed in section 3.4.

3.3 Search of contents

Generally, there are two ways, keyword and menu, of specifying range of information which one wants to know. Clearly, menu is easier to operate, but its defect is that there is not a formal method of selecting menu set.

In order to formalize menu selection, it is necessary to classify and organize tourist's information.

Fig.2 Organization of tourist's information

In order to select menu set, it is necessary to classify and organize tourist's information. Figure 2 shows an example of information structure. Here, four planes correspond to user's view, which is defined as follows.

[View]

View is a background of defining concept. It is composed of a focus and of relations. For example, "Ishikawa"(= name of prefecture) is a focus of "Category" view. "Culture" is one of the relations in "Category" view.

All the relations appeared in a view are listed from the same point of view. For example, relations of listening, playing etc in a "Music" view are enumerated as human activity. With respect to view, the following properties hold.

[Properties of view]

- V1. View has its template. Template has structure of focus and relations, but these values are not assigned. By assigning values, one can generate various views. Figure 3 shows an example.

Fig.3 An example of generating view from template

- V2. Generally, a set of view is dynamically changing. It depends on viewpoint of users and of providers. Therefore, introduction of new view arises decomposing/combining processes. For example, in Figure 4, there is a decomposing process from "Ishikawa" view to "Culture" view. Contrarily, "buying" view combines existing views.

Fig.4 Decomposing and combining of view

3.4 Database for contents server

Contents server is assumed to offer character-based information. Hence, physically, it is a relational database(RDB), or an object-oriented database(OODB). Relating to database, there are following problems.

P1. Who initializes and updates database?

P2. Who initializes and updates views?

P3. How views are linked to database?

For problem P1, change of schema/class is usually difficult, and it requires specialist's work. However, inclusion of record/instance may be (partially) automated. With this respect, we are planning to extend HTML text format. In an extended format, several contexts are introduced, which are all related to tourist's information. An example of tags is given in Table 2.

Table 2. Example of additional tags

Tag	Meaning
attribute	Semantic type of data : museum, hall,...
address	Zipcode, geographical location,...
open/close	Day and time in operation,...
:	:

When a provider makes extended HTML files, mediators are necessary both to provider's sites, and to contents server's sites. Mediator's roles are summarized in Figure 5.

Fig.5 Extracting contents from HTML text

For problem P2, it is important that view is defined from user's point of view, and independent of data structure in contents server. Therefore, view is proposed by users. Practically, terms are not standardized, and same concept may be expressed with different views. Hence, a specialist is required to manage views.

Problem P3 is concerned with methods of issuing database queries. To explain it, let us suppose that user is interested in "Buying" view, but that database has not "Buying" object. Figure 6 shows the situation. It is shown that one's desired object can be found by navigating views.

Fig.6 From view to OODB

4. CONCLUSION

This paper presents our study results of tourist information system, which was originally discussed at study project of public sector. Since this project is finished, there is no public investment in future. However, we are expecting that importance and necessity of information providing will be recognized by many people living in Ishikawa prefecture.

We now start designing prototype system based on this study. In this design, we are studying some other topics. For example, concept of norm defined between two entities (= objects appeared in our system) is very important. "Restaurant near a museum", "replacement of same cost" etc are common requirements which we experience. Suppose a user finds a picture, and he/she wants to visit a museum where similar pictures are displayed, what we can do? These seem to be difficult but challenging problems remained as future research topics.

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