Personalized Cultural Information for Mobile Devices

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***Abstract*— Many systems are available for sightseeing information on mobile devices. The main drawback of such systems is that those systems are incapable of providing information according to users' feelings. In this approach, we are mainly considering on providing sightseeing information according to users feeling. We used "thought forms" (concatenation, balance, division, unification, crisscross), to add a swaying element within the word relationships. This paper describe a system where users can input their feelings and desired places information and the system returns an output where users can interact and explore more details. Users can also interact with the system using his/her mobile phone and obtain interesting information such as sightseeing information related to cultural heritage sites in Kyoto.**

Keywords- Cultural computing; Location-based services; Mobile Computing;

I. INTRODUCTION

Mobile applications provide wide variety of information such as sightseeing information [1, 2]. There are several attempts to provide cultural information through mobile phones as well [3, 4]. However, not many systems considered to provide sightseeing information or cultural information according to the users' feeling. Therefore, we developed mobile application which can provide sightseeing information according to user's location and feeling. This system is based on "i-plot" [5], which discovers hidden connections between unrelated words by tracing possible paths through a database, traversing many two-word connections built from content based on publicly available resources. It is used "thought forms" (concatenation, balance, division, unification, and crisscross), a "psychological thesaurus," and "chaos search," which uses a chaos engine to add a swaying element within the word relationships.

Basically, a user uses a mobile to submit his location and a feeling query to the system and the particular location is taken into consideration for the result. The system processes and generates the connections between words in the result while considering user's location and history data from database. The resultant images are depending on the feelings which are related to thought forms. The relationship between the feelings and the sightseeing images are also depending on thought forms. After all, some meaningful cultural information will be provided for mobile users.

II. BACKGROUND

With many mobile phones now capable of reading the user's location, either by GPS or GSM triangulation, it has become increasingly attractive to build applications which can make use of such a function to deliver relevant content to users. Location-based services can be useful in several contexts. For instance, if a tourist wishes to find a particular landmark, a location-based search is more effective and saves the time and effort of having to specify one's location. Location-based services can be divided into several classes, including information services and community services [6]. Information services, by far the most common and simplest form of location-based service, allow users to request for certain types of information relevant to their target location. Community services permit groups of people to gather in a closed user group and interact with one another using message services.

Recently, Google, Apple, Microsoft & others are actively developing new location based technologies on mobile devices. Nowadays, mobile navigation is already indispensable to our life. Our project takes an innovative attempt to use this kind of handy method for cultural information. What they need to do is just to touch their mobile and fill a simple form, and then they can choose their destinations ubiquitously. This is not like a passive guidebook system, because once a user use our system, the history data will be left and it will be used to provide more comprehensive service to others. We believe that our project can significantly contribute to provide meaningful cultural information for individual mobile users.

III. SYSTEM OVERVIEW

The core idea of the approach is providing appropriate set of words which are representing the user entered data and selected feeling query. The final output given to the user which consists of thought forms. The system consists of number of XML log files which are represented particular place and a feeling query. For example, to represent "Kyoto" as a place and "love" as a feeling query, there are 6 XML log files, other places, and feeling queries should be processed. New XML log files should be added to the system when new places and feeling queries are introduced.

When a user enters the place, name, and a feeling query, a XML log file is selected from the directories by considering three factors. Those factors are selected place, selected feeling query, and user's history. The main idea behind the usage of user history is to provide a new experience for the user at each time as each XML log file contains different set of words and connections. For instance, if a user enters a same place and felling query for multiple times, the user will be able to receive new output even though inputs are similar. After selecting the most suitable and minimally used XML log file, it is processed and the necessary parameters and information are derived. Such as words, connections, colors of connections which are representing different thought forms. After deriving required information, the next step is to select images for representing words that are derived from XML log files.

A. *Searching for images*

Since the system is providing sightseeing information, it consists of images of interesting places. The output which is given to the user is basically contained moving bubbles. Relevant image will be displayed when the user click on a bubble. Databases are used for the image searching algorithm which consists of corresponding data to each image such as, name of the place, theme, thought form type, and associate words representing thought form. Relevant images are selected using image searching algorithm.

With searching algorithm, appropriate image names are selected according to the set of words derived from XML log file. To do searching, system should have the username, place, and Feeling Query (FQ). To find an image for each word, the algorithm is repeatedly applied. Searching algorithm can be described as follows as well as illustrated in Figure 1.

First, it gets the place and finds the relevant place id for the place. Then it searches for a row in database which consist an image name where both place and FQ in thought forms under the selected place id. If image not found then it searches for a row in database which consists image name where FQ in thought forms under the given place id. Again if an image is not found it then searches for a row in database which consists image name where FQ in themes under the given place.

If an image is not found that means there is no any matching image which is matching with the user's feeling. Then it starts next search for a row in database which consists image name where FQ in all themes without regarding the place. If image is not found again, then it search for a row in database which consists image name where FQ in all thought forms without regarding the place.

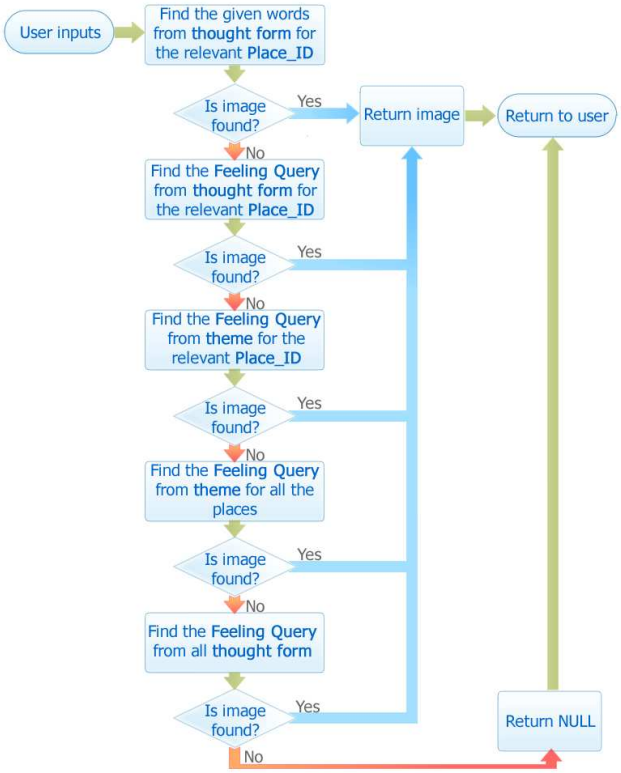

Figure 1. Flow chart of the proposed image searching algorithm

In case of image not found through above process, search for a row in the database which consist image name where FQ in all thought forms under the given place and select that image as the image for the given word.

For the consecutive request by the same user for the same place and feeling query, the system provides different words sets with new images. To provide new information each time, the database contains the image history data in database. The database contains image names which are used for words each time by the users. When the system searches for images it is avoiding image names used by the user previously.

B. *HistoryData*

One of the key features of the system is history information. Each user's history is stored in system databases. The basic idea behind user history is to provide new experience at each time when user requested information for same place feeling query multiple times. When considering on history, the system deals with three kinds of history data as follows:

- XML log files history
- Image History
- Thought form History

1) *XML log file history*

The final output of the system is to create SWF and return it to the user. To create SWF file, it is needed to derive set of words according to the concept, set of images to represent the set of words, and connection between words. This information is contained in XML log files. For each FQ and place, there are log files representing the place and feeling query. When a user selects same place and FQ multiple times, the system should provide with a different SWF. To accomplish that the system keeps history of used XML log files by users and use appropriate XML log files in a repeated way. Basically the names of used XML log files by the user are stored in database.

2) Image history

The purpose behind keeping history of used images is to provide new images each time to SWF. The used image names by users are stored and retrieved from database each time to avoid image repetition. The image history contains information such as user name, word, and given image name for the particular word at the time.

3) Thought form history

After deriving thought form details from XML log files, used words are stored in history databases. The purpose behind keeping history of thought forms is to derive statistical data from the system to provide new images each time to SWF.

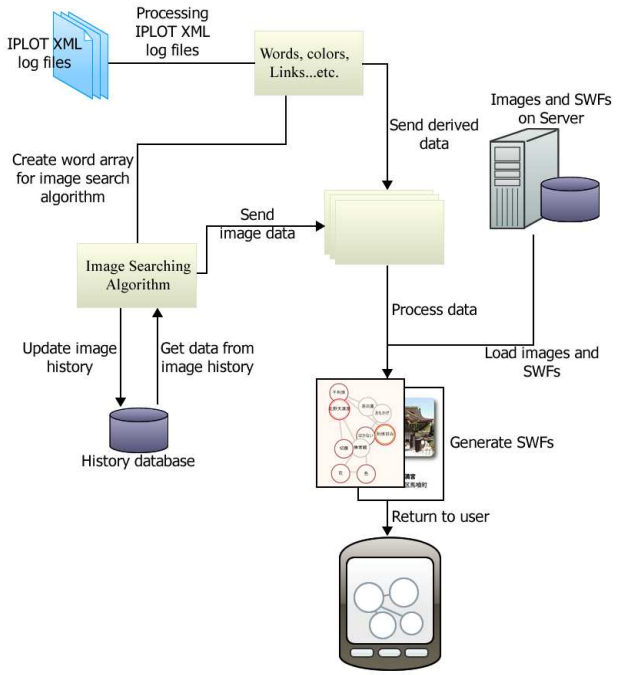

Figure 2. Process of generating thought form in SWF.

C. Generating SWF

Processing XML log files, image searching, and history provide better set of data to create SWF. After user entered data [username, place, and feeling query], the user should send the data [click enter once] to load data. Then each SWF [bubbles] will be loaded its data which included words, image file name, type of thought form, coordination, and link which show as bubbles and links to text files. Using the data written on to the text files, the SWF is loaded to users interface. Then user can use "UP" key or "DOWN" key to choose the word they want and click it to get more information. If the word chosen is element of a thought form, then it will show a thought form and user can click again to see images of each word in the thought form. Otherwise, it will directly show images. Process of generating thought form in SWF is shown in Figure 2.

IV. RESULTS

Basically, the system is providing a mobile user interface where a user can input choices and then at the server side it process the system databases and log files and then it creates a SWF according to the user's request and returns the SWF to the Mobile phone. The client's user interface allow user to enter user's name, a place, and a feeling query. For example, user can enter the place as "Kitanotenmangu" and feeling query as "Rikyukonomi". Then server returns a SWF as response where information is represented with a rich set of UI components. The user is able to explore more details through links.

As mentioned above, the user interface is consisting of three inputs. Those are 1) user name, 2) place and 3) feeling Query. The user should type his/her name and select place and feeling query from available lists from the interface as shown in Figure 3. There are 110 places and 35 feeling queries that can be selected by user with the current version of implementation. After user clicks send button the request is sent to the server.

Figure 3. User interface.

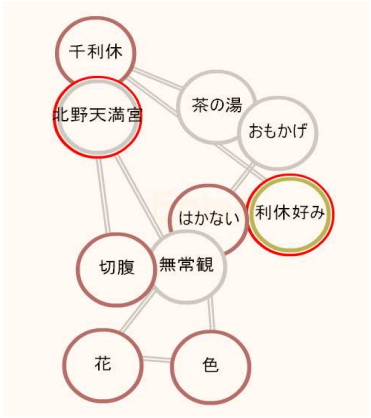

Figure 4. An example of result returned from server according to user inputs.

As for the response, the server processed i.plot log files and databases to get the images and data for SWF. The initial SWF is basically a moving set of connected bubbles where the relevant thought forms are represented by links between bubbles. So each moving bubble inside SWF has been linked to another SWF (if there is a thought form) or image. Those images are based on particular words and thought forms. An example for a SWF is shown in following Figure 4.

As mentioned above, when user clicks on each bubble in SWF, then the user is shown a picture or another set of moving bubbles which describes thought forms related to that word. There is an example shown in Figure 5 and Figure 6.

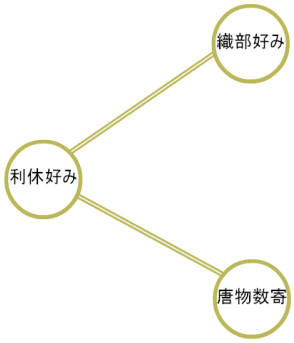

Figure 5. An example of a thought form displayed after clicking on a bubble in main SWF

Figure 6. An example of a spot image recommended to user.

V. CONCLUSION

This project provides cultural information of sightseeing spots which are related to cultural heritage in Kyoto. Individual traveling is very popular in Kyoto and let a cultural system guide a tourists instead of a travel guide might be interesting. Using handy mobile interface is also easily acceptable to users. With more sophisticated searching algorithm and friendly interface, we can provide services which are more comprehensive. Our system can provide traditional and cultural information using modern device like mobile. This increases the possibility for the users to obtain some useful results, which are based on their own feelings. In addition to that personalized cultural information on mobile devices can lead to a new social cultural networking which can be borderless and limitless.

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