Global Digital Museum (3) Application for Museum Education

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1.　Introduction

WWW is the most effective mechanism on the Internet for individuals to access and share distributed information and the usage become increasingly frequent.

Recently according to the increase of digitalization the museum has been changing from a place where visitors can look at a part of museum collections in a restricted exhibition space to an information base where any (networked) visitors can access any collections as they want. The Global Digital Museum (GDM) will (1) build a virtual museum on WWW with a distributed database of museum collections, (2) provide a common access method to the heterogeneous information independent of each museum, (3) provide an environment to retrieve and author museum collection and to share them among users. In this platform, GDM user can build a "personal museum" in the Internet which leads to a new paradigm into the museum education without limitation of space and time for exhibition of museum collections.

2.　Limitation of WWW

However the present WWW transfers the information by a stateless protocol in which servers can not keep the information of ongoing interactions with clients [1], the information access has characteristics of (1) unidirectional, (2) synchronous, (3) file-oriented, (4) hypertext access [2]. Basically HTTP is based on a client-server model which uses a stateless protocol so that browsers can't directly engage in ongoing interactivity with stateful servers [3]. Therefore on WWW it is difficult to realize an interactive and collaborative application in which users can access and retrieve information from the Internet and share it with others. To address this issue several methods have been proposed [4]. One is to define special "document" types for stateful services. Another one is to employ a Translation Server to process the HTTP requests from front-end and transform them into dialog-type communication with the back-end. In

the current prototype, several tags as HTML comment scripts are defined for client application to save the client state and CGI scripts are developed to register user content on GDM WWW page.

3.　GDM prototype

A GDM content is managed by a unit of "book". A GDM "book" consists of "sheets" and "objects" which have a multi-layered structure. A "book" is defined as an extension of HTML. The layout and layer information of GDM contents can only be interpreted by GDM book viewer that can load the contents correctly.

The GDM system configuration is shown in the following figure.
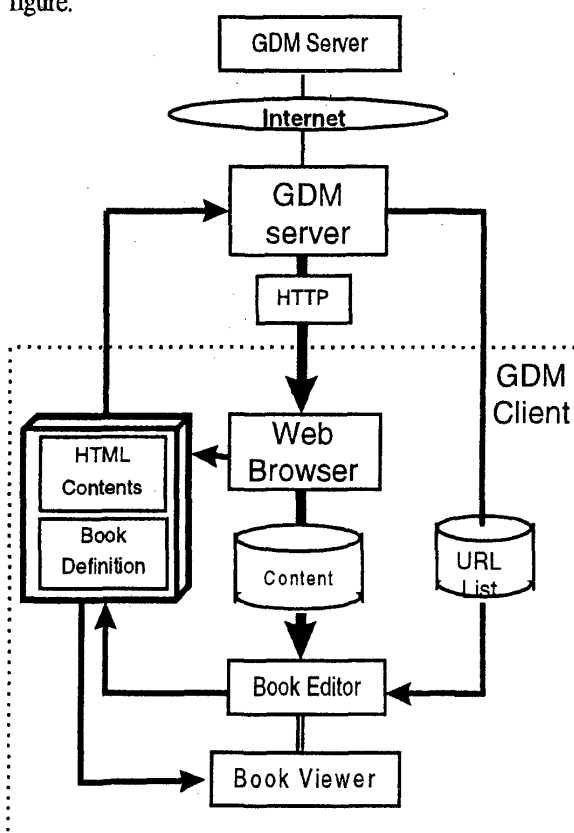
The server consists of WWW server (HTTPD), CGI server, distributed query manager , search engine. Once a query has made by a GDM client, the search engine in each GDM site will start to run asynchronously and return results to the client. The client consists of WWW browser and GDM Book Editor/Viewer which send and receive data with the server by HTTP and FTP.

A GDM user can download resource files from the query result page and drag and drop to create and layout "user books". Or he can load others' "books" from GDM page.

After authoring "books" and uploading them to the server, CGI server will register them into the user book area to be shared with other users.

For example, when a teacher can create a "text-book" to distribute to his students, students can investigate his "text-book" and query museum contents to answer his questions and author the "personal museum (book)". In these process it may be necessary to collaborate with other students in order to supplement each "book". This is an typical application of GDM in the museum education.

4. Evaluation

To evaluate the current GDM prototype, we installed server software to the server located in NME and BM via Internet. The client software are distributed to the GDM homepage.

As for the museum contents, 220 still images of Mongolian life (JPEG 512X768 24 bit color, gif, bitamp), their related documents (110 Kbytes) and 40 slide images are prepared at NME, and 40 still images of Aztec culture (JPEG 8 bit mono, gif, bitmap) and their related documents (20 Kbytes), and 30 still images of ancient Mexican culture (JPEG 8 bit color, gif, bitmap) are prepared at British Museum. In the near future , sounds and movies will be available.

To query museum contents, two kinds of ethnological thesaurus were used. The first one is OCM (Outline of Culture Materials) to classify cultural materials from all societies and the second one is OWC (Outline of World Culture) to classify the known cultures of the world.

The evaluation is done according to the evaluation scenario on GDM page.

In the evaluation of GDM search, the following scenario are prepared.

(1) Global Search
(2) Annotation of search results

(3) Related search

In the evaluation of GDM Book, the following scenario are prepared.

(1) Book authoring
(2) Book Browsing
(3) Exchange books with other user

About 10 evaluators are selected at each site from curators, researchers, students, office workers who will input the evaluation sheet on WWW.

5. Conclusion

In this paper, we described the problems of WWW to build the collaborative application in the Internet and showed the implementation of Global Digital Museum on WWW.

The current prototype used CGI and HTML extension to control the client status and not to correspond to the content update and the user access control. However these defects may make it difficult to maintain the museum contents and allow users to change or destroy the "personal museums".

In the next prototype, we plan to implement GDM on Java which can solve these defects.

6. Acknowledgment

References

[1] Comer, Douglas E., Stevens, David L. Internetworking with TCP/IP Volume III.Client-server programming and applications: Prentice-Hall. 1994.

[2] Sankar Virdhagriswaran, at al. " Shared Information Space - An Interactive, Collaborative System Enablement Perspective", Workshop on WWW and Collaboration, September 11-12, 1995, Cambridge, MA

[3] Martin Gleeson, Tina Westaway. Beyond Hypertext: Using the WWW for Interactive Applications, AusWeb95 Conference, May 1st, 1995, Sydney

[4] Perrochon, L. Translation Servers: Gateways between Stateless and Stateful Information Systems. Network Service Conference (NSC'94), November 28-30, 1994, London