A Tour Guide System for Mobile Learning in Museums[★]

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Abstract

In the paper we present a tour guide system, which brings the portable devices into museums to be your own expert guide. The purpose of the system is to construct a mobile learning environment with positioning technology and portable devices. People who are in this environment would obtain the detailed information, and even the history of the exhibit displayed in text, voice or video clips. Moreover, unequal explanations, mobile group learning, and learning activities management are provided in the proposed system.

1. Introduction

As we can see in most of museums today, three different guide systems are provided. One of which is the traditional tour guide, the other is the tape machine; and finally, the CD player. The traditional tour guide is done completely by manpower, suffering from high expenses on trainings and wages. The use of tape machines and CD players seems to be cheaper, but they are both bounded by the storage capacity. People who have used it would also notice that they are too big and too heavy to carry around. Not to mention that these means lack of the ability of interaction. Therefore, this inconvenience gives the motivation to develop a museum tour guide system based on the modern wireless technologies and hand-held devices such as Personal Digital Assistant (PDA). This research is to use mobile devices as personal museum expert such that people may visit exhibits freely while exposing themselves to a rich knowledge at the same time, as shown in Figure 1.

2. Developed Tour Guide System

In this section the system model is described, and the proposed tour guide system will be presented. First, the overall concept of the proposed system is introduced so to explain how people can benefit from it during a museum visit. Then the architecture of the system is explained to be applied to the usability. Finally, system functionalities are described for the whole view on the proposed tour guide system.

2.1. System overview

The proposed museum tour guide system is meant to be a museum-visiting assistant on mobile devices, as shown in Figure 2. Seeing every museum as virtual classrooms, we aim to make every visitors not just seeing the exhibits, but also knowing or learning about them without extra efforts. Characteristics of the proposed system in tour information supplement could be discussed in several aspects. (1) Independence of learning: The rich knowledge shown on the mobile device would give visitors good understandings on exhibits. (2) Active knowledge query and push: The exhibit is not just a simple "object" as visitors used to see as before. The ideas, knowledge and stories behind
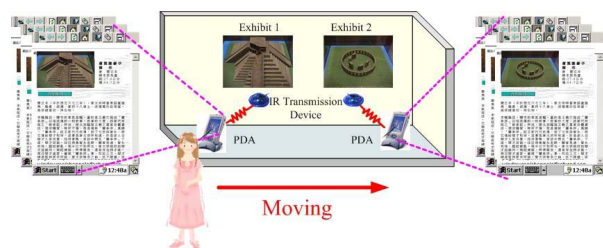

Figure 1. A context-aware tour guide

(a) Exhibit picture   (d) Video playback

Figure 2. Exhibit illustrations

the scenes are being automatically pushed to their screen without manual requests or searching commands. (3) Mobility of learning: To feel the freedom of learning, without any interference, visitors see whatever they want since they have the knowledge database on-hand. (4) Having fun with exhibits: The design of subjective tour guide gives different annotations on exhibits. Two exhibits that seemed irrelevant may be chained together because of a story behind them. With the indication provided by museum experts, visitors may find the museum a good storyteller instead of a place with cold exhibition halls.

2.2. Location service

The location service is required to identify user's position in the museum. The proposed system is a context-aware tour guide, which means it should be aware of the change of the user's environment. We use infrared signal transmitters at the front side of every exhibits to do the positioning, by letting them keep telling the tour agents inside the mobile devices their identify number. The tour agents then give this identify number to the location service so as to know where it is and what exhibit the user is looking at. Besides supporting user positioning, location service is also used to support queries on locations of other visitors.

Exhibit explanations are presented not only excellent in both pictures and literary compositions but also using multimedia clips to enrich the content and make deeper impression. The proposed system uses HyperText Markup Language (HTML) documents to arrange explanatory contents. After the tour agent knows where it is from the location service, it starts requesting the corresponding exhibit explanation pages from the web server and media server.

2.3. Unequal explanations

Visitors can see and hear exhibit information "unequally" according to their settings. A visitor may choose to read explanations in expert level and in English while the other would like to read in the public level and in Chinese. Moreover, there is a content management system for managers to maintain their content as long as exhibits are to change.

2.4. Mobile group learning

As mentioned above, another focus of the proposed system is to support mobile learning for both individual and group visitors. Mobile learning here is the core of proposed system, to create a knowledge community network and assist educational excursions. The proposed system is to set up a virtual environment that could do media communication between colleagues in the same community, and not necessarily in the museum together. The message server constructs the network for knowledge community. Users may interact with others synchronously or asynchronously.

2.5. Learning activities management

The learning activities management system is embedded with several collaborative activity modules for educational excursions. It helps teachers to set up group exercises and monitor on students' understandings. As a management system on learning, it also gives suggestions to users by analyzing how users could visit exhibits, and how they can participate in collaborative activities.

3. Conclusions

The nature of museum visit is learning new knowledge that people would not pay attention to or seldom do they get in touch with. Combining with the convenience human interface on PDAs, our work makes every exhibit vivid via comprehensive descriptions and multimedia display. Besides, the proposed system introduces the idea of collaborative learning that not only connects people together in a knowledge community, but also builds an environment to facilitate educational excursions.