

Digital Message Sharing System in Public Places

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ABSTRACT

In this paper, we propose cPost-it, which allows users to share digital messages in public places by exploiting context such as the user's identity, location, and time. The cPost-it, consisting of the Client, Object, and Server, provides location based service (LBS) by retrieving embedded information from the real-world objects. Also, it provides the personalized information in the indoor environment according to the user's identity, location, time, etc. According to the subjective evaluations, the proposed cPost-it framework may play important roles in sharing information for the ubiquitous computing environment.

Keywords

Context-aware, Ubiquitous Computing, Personalized Service, Location based Service

INTRODUCTION

In general, it is inconvenient for users to share information in public places through the current information sharing system such as a whiteboard and post-it. For example, paper-based handwritten documents can be removed accidentally or be messily attached to an object. These problems have been relieved in part by NaviCam[1], CyberGuide[2], Guide[3], Cooltown[4], GeoNotes[5], comMotion[6], Stick-e Note[7], etc. by introducing digital messages (such as text, voice, picture, video, etc.) with a Personal Digital Assistant (PDA) according to the user's location. However, these systems mainly exploit location information to provide users with proper information, rather than considering various types of contexts.

In this paper, we propose cPost-it, which allows users to access digital messages with a PDA, i.e. augment or retrieve information of a real-world entity such as a place or object by exploiting the contexts such as user's identity, location, and time. The main features of the proposed cPost-it are as follows: At first, it provides a natural way to access augmented information related to a physical object through a short range wireless network such as IrDA. In addition, it allows users to retrieve personalized digital

messages when the users approach the object of interest, e.g. office, classroom, shopping mall, etc. It also helps users to access classified information by providing messages in a good order based on the context such as the users' profile.

CONTEXT-BASED INFORMATION SHARING SYSTEM

The cPost-it, as shown in Figure 1, consists of Object, Client, and Server. The cPost-it Object links the information to the real-world entity by providing the cPost-it Client with URL of the cPost-it Server through IrDA. Then, the cPost-it Client provides the user's context to the Server and gets the augmented information on the object through the PDA. The cPost-it Server manages the request from the Client and provides corresponding information according to the user's context.

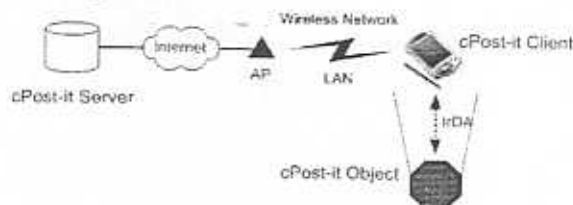


Figure 1: The concept of cPost-it

As shown in Figure 2, if the user with a cPost-it Client exists in the working area of a cPost-it Object, the Client receives URL of the cPost-it Server. When the Client connects to the Server, it transmits the user's identity, and current time as a user's context. Then, the Server generates the personalized digital message and transmits them to the Client immediately. The resulting information is in a good order according to the provided context. For handling the context, the cPost-it is implemented using the unified context-aware application model, what is called ubi-UCAM[8], which consists of ubiSensor and ubiService.

cPost-it Client

The cPost-it Client consists of the ubiSensor of ubi-UCAM [8] and (Web-based) user interface. The ubiSensor in the PDA receives the URL of a Server from an Object and then makes a connection between the Client and Server. After

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establishing the connection, it delivers the context to the Server. The interface transfers the user's identity to ubiSensor. The identity specifies the right of access to the shared information classified by the name of a user or group. Note that unspecified persons in public places belong to an "All" group. The resulting messages are provided in the form of Web.

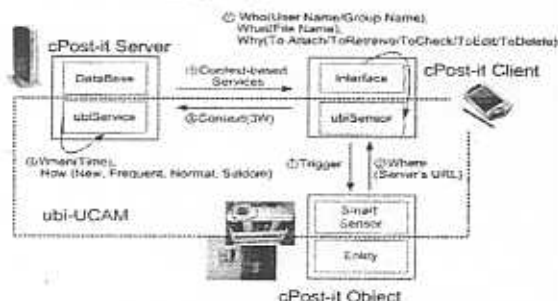


Figure 2: The Architecture of cPost-it

cPost-it Object

The cPost-it Object consists of a real-world entity and Smart Sensor. Anything can be used as the entity of the cPost-it Object which will be augmented with digital information. For example, the object can be a public place or an individual appliance such as door, TV, furniture, etc. The Smart Sensor, ubiSensor [8], is a device that includes a short range wireless networking module and a simple processing module to provide URL. It is bound with the entity. When a user triggers the signal of the IrDA within the working area of cPost-it Object, the Smart Sensor senses the signal and sends URL of the cPost-it Server to the Client.

cPost-it Server

The cPost-it Server consists of the database (DB) and Web-based ubiService [8]. The cPost-it Server manages the DB, the saved information of a cPost-it Object which is virtually connected to the cPost-it Server. To help ubiService generate context-based queries, it manages every digital message with additional information such as a file name, a right of accessing file, and the frequency of usage of each message in a day. The ubiService provides Web-based services such as adding, editing, removing the shared information according to the user's contexts from the cPost-it Client and the information of the DB.

PERSONALIZED INFORMATION SHARING

We used Compaq iPAQ H3130 and H3600 to implement the Smart Sensor of the cPost-it Object and the Client, respectively. The Server is implemented with MS-SQL2000 and the ubiService which is based on the Web server. As shown in Figure 3, when a user carrying cPost-it Client approaches the door (the cPost-it Object), the augmented information (personal notes, video manuals of appliances, public place notices, etc.) are retrieved on the

PDA according to the user's identity. Also, cPost-it provides a user with personalized information services such as classified messages by exploiting the user profile about the message of interest entities.

The cPost-it guarantees to keep the individual notes and to share personalized messages among just group members. Because all messages are categorized into three parts: 'Personal', 'Group', and 'All', it provides users in public places with proper messages according to the access right which the user will specify. As long as the user's access right is preserved, the private messages can be safely shared in public places. In addition, all services of cPost-it are protected by the security mechanism of a Web server.



Figure 3: Implemented cPost-it System

FUTURE WORK

To prove the usefulness of the proposed context-based information sharing system, we have experimented implemented cPost-it in ubiHome [9], a test-bed for ubiComp-enable home environment in KJIST U-VR Lab. Now, we are improving the system based on the evaluation such as users' satisfaction about context-based services and system faults. After the usability tests, we will release the results of the improved context-based information sharing system.

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