Utilizing Everyday Artefacts for Content Sharing

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ABSTRACT. Emergence of web services like YouTube, Flickr etc. has transformed the way we share our lifestyles with family, friends and colleagues. The significance of these social contents can be enhanced if they are shared with the right person, at the right location and at the right time. Towards this vision, we present DroPicks, a tool for sharing social web contents utilizing augmented everyday artefacts used as digital data container. Our initial user evaluation shows DroPicks as a promising tool for our intended purpose. This poster summarizes the design and implementation of DroPicks.

1. Introduction

One of the direct implications of the convergence of ubiquitous technologies (like proliferation of wireless internet, short-range radio connectivity, high-end personal devices etc.) is the improvisation of peoples' social communication. Internet, E-mail, Short Message Service (SMS) and Instant Messaging (IM) are now an integral part of our lives through cell phones, PDAs, Internet terminals, and Laptops. In addition social Internet services like YouTube, Flickr etc. have provided us opportunities to share our digital lifestyles with our families, friends, colleagues and even with strangers in a new and fascinating way. Considering the light weight, the meaning and the utilization of social contents like photos, video clips or messages can be greatly enhanced if shared with the right person at the right time and at the right place. For instance: Sharing a funny video clip from YouTube in the coffee room's display in the office might have a greater impact for viewers than sending it through email to all colleagues. In this short paper, we present DroPicks, a tool aimed to provide this kind of contextual sharing facility.

The basic idea behind DroPicks is that social contents browsed on an internet terminals can be shared with others utilizing everyday artefacts. An interesting property of some of the everyday artefacts is their binding to a specific location. For example, a meeting room table or a refrigerator in the coffee room is a static and immobile object. In DroPicks this specific characteristic is exploited and static artefacts are used as digital containers to implicitly restrict content to a location. Users uses Internet terminals to browse contents and are able to share specific items (metadata, i.e. URL and description of the content) either by touching a designated artefact or directly sending over the air. Artefacts later provide ambient clues to the intended recipients for picking up those contents. In addition to social web contents, DroPicks can also be used to create location restricted personal reminders and for messaging purposes.

DroPicks has the advantages over direct communications like SMS, IM and E-Mail because of its contextual location-centric sharing characteristics. DroPicks also offers

the contents unobtrusively so that only interested people can view the contents thus not requiring immediate attention, which is not possible for direct communications (There is no way to block a specific SMS or an E-mail based on the content priority). We believe our approach is appropriate for that lightweight social content and message sharing. Our initial user evaluation shows DroPicks is quite promising, especially because of its intuitive utilization of location specific artefacts. However, there were mixed comments on its overall effectiveness over direct communications. In the next section we briefly introduce DroPicks design and implementation followed by the initial implications.

2 Design and Implementation

Figure 1 shows DroPicks in action where a user is sharing content in a coffee room by touching a public display and picking content from an augmented desk using his personal Internet terminal.

(a) (b)

Fig. 1. DroPicks in action: At the left user leaves something behind to a common area augmented display. In the next figure, he picks up content from his personal space.

Three design principles are followed in DroPicks. These are:
Simple interaction: To minimize user tasks, simplistic interaction is used. Users can touch an artefact or can send content directly over the air to share/pick contents.
Ambient feedback. Users are provided an audio clue while sharing and picking to indicate successful interactions. Artefacts are augmented with ambient glowing LEDs to indicate content availability.
Privacy enabled sharing of content. Content can be shared to a specific person or to a whole group. Only intended recipients are able to pick contents.

2.1 Implementation

Figure 2(a) shows the architecture of DroPicks that is composed of two Components:
1) Internet Terminals: We have chosen Nokia N770 Internet terminals, since they are primarily designed for web browsing and thus are suitable for wireless casual environments. Terminals are augmented with RFID tags to initiate the communication with artefacts.
2) Augmented Artefacts: Regular everyday artefacts that are static in nature are augmented with a Bluetooth enabled small micro PC, RFID reader and ambient

LEDs. In current version, a desk and a public display is augmented. Since they are immobile, they implicitly associate location with the content.

Artefact discovery and Group Management are done by our in-house lightweight groupware called GOA (Middleware for Group Oriented Applications. It uses Avahi [1], an open source software stack, to perform service and friend discovery in the network. GOA runs on both Internet terminals and artefact ends to provide the group communications, authentication etc.

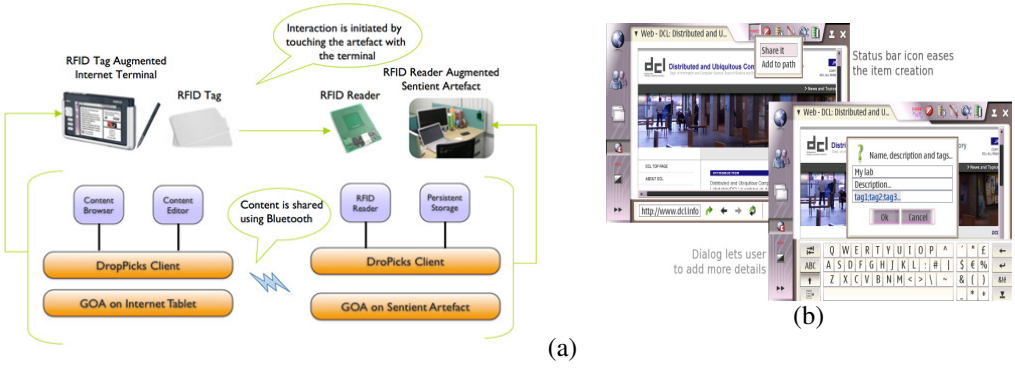

Fig. 2. (a) Architecture of DroPicks. GOA handles group management and RFID is utilized for initiating the communication (b) User Interfaces for Creating Content Items.

Interaction. For sharing content browsed in the Internet terminal a simple interface is provided in DroPicks that run in the terminal end. An extra status bar icon is used for launching a pop up dialog to create a droppable content item from current web page as shown in Figure 2(b). Once content item is created it can be shared either by touching a DroPicks enabled artefact with the terminal or directly sending it to the artefact from the terminal over the air. As mentioned above, RFID technology provides the interface for tangible interaction. Content are transferred between artefact and terminal using Bluetooth channel. DroPicks enabled artefacts provide ambient clue using glowing LEDs to indicate availability of contents. Only intended recipients can pick the content. GOA handles this by taking care of identification of users, handshaking, and the distribution of content to only appropriate receivers.

Content. A content item is a lightweight data object that carries metadata with it. The only mandatory part of an item is intended recipient specification; either whole group of a single member of a group. An item can contain also URL(s), human readable name, a free description and some tags, i.e. keywords describing its content. Also, a content item can be a personal schedule. Content of this type is handled slightly differently at the artefact end. The recipient of this type of content is the sender itself thus only delivered to the sender based on the time of the schedule.

In the next section, we look at the informal user evaluation and some generic issues of DroPicks.

3. Implication

We performed an informal user trial with 10 participants aging from 25 to 29, all of them technical students and thus capable of understanding new technologies and systems and providing valid feedback. After introducing and demonstrating DroPicks,

we let the users create and share contents freely. The overall concept seemed to be hard to understand as many participants did not see the differences between DroPicks and direct communication methods like e-mail of SMS clearly. Three participants mentioned that without functionalities that instant messaging has, it might be obscure and useless. A number of other use cases were suggested instead, e.g. picking whole audio files from a colleague's computer. On the positive side, enabling location restriction, privacy in public spaces and avoiding paper were mentioned. Also, the ability to control content reception was appreciated. Furthermore, they considered free-of-cost is also a factor that will attract users to try DroPicks.

Some of the ideas of DroPicks have been researched before. NuggetMine [2] is very similar to our concept of sharing metadata among group members. They provide a visual interface centered on desktops to share and browse small self-contained information among the group members utilizing a central server. DroPicks supports mobility and is independent of any centralized repository. In addition DroPicks' background appearance makes it more suitable for social contents. Forget-me-not [3] and Place-Its [4] are two of the earlier efforts to support location aware personal reminders. Stick-e Notes [5] project is perhaps the closest to our approach of tagging artefacts with digital notes as it explored the post-it metaphor as digital world rather than real world using GPS enabled PDA. DroPicks differs from these by being independent of any location-sensing infrastructure and utilizing only augmented artefacts for associating content with location, thus eliminating e.g. the need for GPS. However, DroPicks only works in Indoor facility unlike the above systems where coverage is broader. We are currently working to provide support to share content over the air from outdoors. Another aspect that we are investigating is the expressiveness of an artefact, i.e. how an artefact can be understood to have such storage features by the end users? We hope to share our findings in near future.

In DroPicks we have augmented everyday objects as digital container to support content sharing. Fixed static artefacts provide us straightforward location restriction, thus allowing targeting the content to a certain social context and avoiding many negative aspects of traditional systems, such as physical post its, mass posting etc. DroPicks improves the interaction with everyday environment and collaboration among its users. The studies we performed on the system are promising and show lots of interesting development possibilities. There are still several issues that we hope to address when developing the next version of DroPicks.

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