

Palimpsests on Public View: Annotating Community Content with Personal Devices

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ABSTRACT

This demonstration introduces UbiComp attendees to a system for content annotation and open-air, social blogging on interactive, publicly situated, digital poster boards using public and personal devices. We describe our motivation, a scenario of use, our prototype, and an outline of the demonstration.

Keywords

Annotation; comment; public bulletin boards; community content; social blogging

INTRODUCTION

palimpsest (*n*). “A manuscript, typically of papyrus or parchment that has been written on more than once, with the earlier writing incompletely erased and often legible.”

The system we propose to demonstrate allows people to annotate content on interactive, digital bulletin boards located in public places (Plasma Posters, Figure 1) using PDAs. We envisage this to be a mechanism by which community members can exchange and explore interests and ideas. By publishing such annotations in public places, linked to the content to which they refer, we create a visible “buzz” of “interest clusters”.

In this demonstration description, we first describe our digital, community, poster boards, and present user opinions related to commenting and annotating content published on those boards. We then describe our approach to enabling personal and public annotation of digital community content using public and personal devices. We present a scenario, outline our current prototype, and describe our demonstration at UbiComp 2003.

COMMUNITY CONTENT ON PUBLIC DISPLAY

Plasma Posters are large screen, interactive, digital, community bulletin boards that are located in public spaces [1]. Underlying the Plasma Posters is an information storage and distribution infrastructure called the Plasma Poster Network. We have had three Plasma Posters running in our lab for over a year, and two running in sister labs in Japan for 4 months.



Figure 1: Annotating a Plasma Poster posting using a PDA

Unlike digital advertisement boards (e.g. Adspace Network’s CoolSign boards), content that is posted to the Plasma Posters is either generated by community members and sent by email, or automatically selected from the company intranet. Content typically consists of URLs, text, images and short movies. A touch-screen overlay on the plasma displays enables interaction with content, including navigation and browsing of posted content and of hyperlinks within that content.

Usage logs, user surveys and interviews have revealed considerable interaction with content at the Plasma Posters, including printing and forwarding of content to oneself and to others from the Plasma Posters themselves [1]. Content authors have also been emailed with comments regarding their postings (e.g. Figure 2). These comments are persistent, conversational threads [3] between readers and authors of posted content. We have also observed the existence of threaded posts (an item that is sent in response to something previously posted). These threads and comments demonstrate the ways by which posted content becomes the nexus of conversation.



Figure 2: A comment on a community posting emailed to the author of that content. The email contains the comment and a URL to the original posting.

Given people's propensity to interact through and around content in this way, we are developing methods that make content annotation a more prominent feature of the Plasma Poster Network and the Plasma Posters themselves. Inspired by instances of PDA used for sharing comments in focused collaboration, meeting and educational situations (e.g. [5,10]) we have extended the Plasma Poster Network to support capture of posted content to personal devices such as PDAs, creation of annotations for that content on the PDA (with text, graphics, and audio), and reposting of the annotated content to the system, and thus to the Plasma Posters. There are precedents for assuming people will post personal content on situated, public displays from personal devices. Examples include the Progress Bar's Meshboard in London, UK where patrons can send images from cell phones [11], and the Appliance Studio's TxTBoard, where SMS text messages can be sent to public displays [13]. To date, however, these technologies do not support inline annotation of existing content. Further, these technologies so far have focused on what has been called "person-to-place" publishing. We wish to extend this notion to "person-to-place-to-people-to-person" content annotation, augmentation and publication.

ANNOTATION

Annotation involves marking of content where the original remains unchanged. Most examples of digital annotation deal with annotating textual documents, but some do include annotation of audio or video content. Most annotations are text-based or ink-based, although some are audio and pictorial.

We characterize annotation systems as falling broadly into 3 categories: 1. annotations for personal use; 2. collaborative annotations; and 3. public/social annotations. In the first category, the goals are typically to support active reading (e.g. [2,4,9]), to help with content retrieval (including summarization, search and classification), for new document retrieval and for content reuse in composition of new documents. In the second category,

collaborative annotation, the goal is usually to point someone else to interesting parts of a document (e.g. including text, video, voicemail, text-chat), as a method of activity coordination, as a method of ongoing note-sharing in a working situation, and for serendipitous sharing. Finally, social or public annotation is less team-directed than collaborative annotation, allowing people to leave comments for others to happen across. In the last case, most are Web-based (e.g. [5,7,10,14]).

Examples of current uses of public annotation can be found in several applications on the World Wide Web. The most common forms include newsgroups and Web-based discussion forums, bulletin-boards or "blogs". Most are designed to be accessed, contributed to and read by lone individuals from PCs. Our design challenges have been to design easy-to-use and appealing methods for such annotation from mobile devices, and to produce interfaces that effectively display those annotations in public fora.



Figure 3: The Plasma Poster Interface, the posting represented on a PDA with the commenting facility visible, and the Plasma Poster display with the created annotation visible. The notes along the right edge of the Plasma Poster are all annotations that have been created by community members from their PCs, PDAs, or the "scribble" interface at the Plasma Poster itself.

ANNOTATING COMMUNITY CONTENT: A Scenario

Before detailing the technical aspects of our demonstration, we present a scenario of the system in use.

While listening to a talk on a new shared note taking application, Jane, a conference attendee overhears someone near her talking about how they have just implanted a tracking device in their dog. She opens her laptop and does a quick Google search on "rfid dogs" and e-mails the first link she finds to the address of a nearby Plasma Poster, giving the posting the title "Is rover going robo?" Another attendee, Jason, passing by the Plasma Poster in the lobby nearby notices the post, and wants to add that such tracking

devices are highly controversial as their safety has not been fully proven. He presses the “comment” button on the display and uses the scribble pad to attach an annotation (“not my dog!”) to the display, adding a pointer to a URL to a Web site where the tags are discussed more critically. Later, another attendee, Jeffrey, who has just been to a talk on ambient displays sees same posting. He approaches the display with his PDA and presses the “grab posting” button, and downloads the current posting to his PDA using the wifi connection. After he sees that his PDA has opened a web page showing the content from the posting and the comment left by Jason, he wanders off to another talk, sketching a response along the way.

Later, other attendees gather around the display and begin talking about the post. They read the comment left by Jason and look through the site he recommended, and conversation begins to focus on where exactly they implant the tags. After scouring the article, they locate the paragraph that describes where the implants are positioned (“usually in the fleshy area of the neck...”). One of the folks near the display uses a gesture to highlight that paragraph and attaches an annotation to that region (“where they implant it...”). When they are about to leave the lobby area, they notice another annotation posted to the display, added remotely by Jeffrey. They open the annotation and find that it is an animated sketch of an orb getting darker and lighter. They then press the audio play icon next to the sketch and hear the author’s description of the animation (“an ambient display that gets brighter as your dog gets farther away”). This spawns a whole new discussion amongst those present, with some arguing that the proposed design is ridiculous while others make the case that while simplistic it may have merit. Later, Jane is passing by the Plasma Poster and sees all the annotations that have been posted over her original content. She is amused to discover her post has caused so much response and debate, forwards the recommended URL to her home email so she can read it later.

System implementation and architecture

The Plasma Poster Network is a client-server system that has been designed to make it easy for content creators to distribute information to their community (Figure 4). Server components provide the collection and hosting infrastructure. The Plasma Poster server consists of a relational database (e.g., MySQL from MySQL AB) and Java servlets and Java Server Pages (JSPs) that run in a standard Web server (e.g., Tomcat from the Apache Software Foundation). Client components provide a variety of content displays and interaction mechanisms. For example, posting of information to the Plasma Poster Network is primarily through e-mail. A PosterShow Visual Basic application provides a cyclic view of posted content suitable for display and navigation on a Plasma Poster client platform (e.g., large plasma display or personal computer).

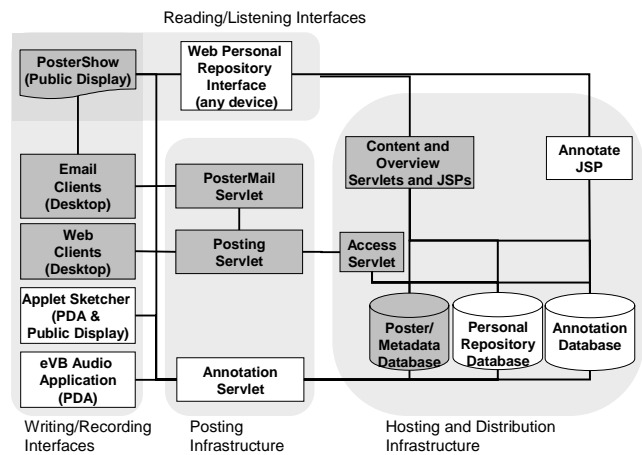


Figure 4. The Plasma Poster Network Architecture, with Annotation components shown in white

Additions to the Plasma Poster Network make it easy for readers of previously posted content to create and distribute annotations on that content. The arrangement of technology we demonstrate here extends previous systems for access to publicly shared content through personal devices [5] by bringing together an infrastructure and range of client applications that support a collage of devices (public and personal), working across multiple media types, and focusing on associating annotations with community posted content, where annotations may be immediately introduced into the system or where sufficient contextual information is stored on a personal device to allow offline annotation to be made and later uploaded into the system. On the server side, the Annotation Servlet accepts annotations on posted content from both sketch-based and audio annotation clients. Upon receiving annotation data, the servlet interacts with system databases to associate annotations to content. A

link to the posted content is stored along with the annotation's media type, a link to the posting author (defaulting to "anonymous" when user information is not available), and the onscreen location of the annotation interface at the time the annotation was authored. Furthermore, to support conversation across multiple annotations, the servlet can specify that a particular annotation is a reply to a previously posted one and that a set of annotations are related and should be shown simultaneously, allowing multimodal annotations. The Annotation servlet also interacts with a personal repository database to store postings of interest to individual users for their personal perusal at a later time. Stored content can include a complete posting, parts of a posting, annotations or any combination of these. Also on the server side, the Annotate JSP allows client applications access to the data in the annotation and personal repository databases. Client side support for annotations on personal devices includes a sketching tool and an audio-recording tool. The sketching tool is implemented as a Java applet and allows users to draw responses to comments. Users first specify a posting to annotate using an interface served by the Annotation JSP. Once a user has selected a posting, the sketch applet allows use of the PDA stylus to input simple annotations. The audio annotation tool is implemented as an embedded Visual Basic application and allows users to record a brief comment using the device's built-in microphone. Comments are uploaded to the Annotation Servlet using the wifi enabled PDA.

The Annotate JSP provides client side interfaces for annotations on public displays. The JSP dynamically displays annotation icons next to postings their associated postings. In this way users may scroll through and open annotations using simple gestures. Users may also sketch annotations on the public display using a version of the sketching tool for that device. Also on the client side, a Web-based interface allows users to manage their personal content repository. Users can review postings and associated annotations that they have collected from public displays or store new content to post at a later time. This interface thus allows users working away from the display a way to see annotations to postings in which they have expressed interest.

DEMONSTRATION FOR UBICOMP

Before the conference, select members of the UbiComp community will be asked to register with our system and to post some content for public display. Four PDAs will be available at the conference itself to enable attendees to interact with posted content.

We will support content posting, capture and annotation from laptops, PDAs, and PCs. We will support, for example, a laptop user in the conference's internet connection area who wishes to post the web site of a nearby restaurant that he enjoys as well as plate suggestions and other comments. Similarly, we will support users who, for

example, take and upload photos of a demonstration in-progress. We will support viewing and annotating content both at the public display itself as well as via personal devices. For example, a person using the public display can leave a sketch or audio response to the posted restaurant suggestion. A PDA user, meanwhile, can press a button on her display that captures the content of the posting and all of its annotations to her PDA. She could then walk over to the demo to witness it herself and attach her comments to the posting. We will also support targeted annotation of specific parts of content. For example, a user of a public display may use a gesture to select and attach annotations to a specific region of text.

Instead of posting the annotation directly to the display, the user might want to take another picture and perhaps make comments about both pictures collectively. In this way she has appropriated publicly posted, social content into a novel piece of content that is once again personal. She could then repost this new content to the display to again transfer the content to another domain of ownership. In future work we intend to explore how users conceptualize such transfers of ownership.

REFERENCES

1. Churchill, E.F., Nelson, L. and Denoue, L. Multimedia Fliers: Information Sharing With Digital Community Bulletin Boards. Proc. Communities and Technologies 2003, September 2003, Kluwer Academic Publishers.
2. Denoue, L. and Vignollet, L. An Annotation Tool for Web Browsers and its applications to information retrieval , RIAO2000, Paris, France, 2000, p. 180-195.
3. Erickson, T. Persistent Conversation, Introduction to Special Issue of JCMC 4 (4) June 1999.
4. Golovchinsky, G. Emphasis on the Relevant: Free-form Digital Ink as a Mechanism for Relevance Feedback, Proceedings de ACM SIGIR'98, Melbourne, Australia, 1998.
5. Greenberg, S. and Boyle, M. (1998) Moving Between Personal Devices and Public Displays. *Workshop on Handheld CSCW*, CSCW, November 14, 1998.
6. Gronbaek, K., Sloth, L. and Orbaek P., WebWise: Browser and Proxy support for open hypermedia structuring mechanisms on the WWW, International World Wide Web Conference, Toronto, Canada, 1999, p. 253-267.
7. Hanna, R. Annotation as Social Practice. In S. Barney (Ed.) *Annotation and Its Texts*. New York, Oxford: Oxford University Press, 1991.
8. IMARKUP, <http://www.imarkup.com>, 1999.
9. Marshall, C.C., Price, M.N., Golovchinsky, G. and Schilit, B. Collaborating over Portable Reading Appliances , *Personal Technologies*, vol 3, n 1, 1999.

10. Myers, B. A., Stiel, H., and Gargiulo, R. 1998. Collaboration using multiple PDAs connected to a PC. In Proc CSCW '98, ACM Press, pp. 285–294, 1998.
11. Progress Bar Meshboard
<http://news.bbc.co.uk/2/hi/technology/2861749.stm>.
12. THIRDVOICE, <http://www.thirdvoice.com> , 1999.
13. Appliance Studio's TxtBoard
<http://www.appliancestudio.com/sectors/smartsigns/txtboard.htm>.
14. Yee K.P. The CritLink Mediator,
<http://www.crit.org/critlink.html>.