

Using Annotations for Information Sharing in a Networked Community

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INTRODUCTION

The interaction process between humans and published writings started a long time ago, and people have been making notes or providing written comments about the material that they have been reading ever since. These comments were then circulated and shared among their colleagues and were believed to have played an important part in the dissemination of knowledge (Tribble, 1997). With advances in computing technology, paper-based print is giving way to digital media as more printed documents now appear in an electronic format. These electronic copies of a document are likely to be read, possibly marked, and shared by a number of people. Therefore, a rise in knowledge and information sharing via electronic (*e-*) writings (in the form of annotations) should be anticipated as active reading and document sharing becomes a convenient activity. Thus, the focus of this article is on elaborating the basic concepts of information sharing among networked reader communities through markings made on electronic (*e-*) documents.

The theme of this article focuses on human-document interaction (HDI) in the cyber domain, and deems it to be an important topic within any networked and/or virtual organization. This importance can easily be justified by considering the fact that e-documents are now conveniently accessible in this digital era, can facilitate the user marking practices, and can then be easily shared among organizational groups or communities of users. While it may be impractical to mark paper documents in a traditional library, an e-document residing in a digital library (DL) can carry annotations as important adjuncts to the primary text (Marshall, 1997). Therefore, annotations or other types of markings may be placed on individual documents, either to serve a future use for the current owner of the document, or to enhance the understanding of subsequent users if the document is to be shared. Moreover, annotations made on paper documents are essentially private remarks but in a digital setting, these annotations may have the

potential of carrying the knowledge and information contained within them to the next reader (Marshall, 1998). Such markings then make a statement about the document, or some part of it at a certain point in time as they are the outcome of attentive reading of a text (Hanna, 1991), and are a visible trace of human attention (Marshall, 1997).

BACKGROUND

Marking Paper Documents

The tendency to place annotations on documents peaked in the period between 13th and 15th centuries (Slights, 1989; Tribble, 1997). Improvement in writing tools and sharing of documents were possible causes for this increase, and the result was an intentional or unintentional sharing of the additional information placed by the readers. However, the document marking practices declined when the mass production printing technologies improved in the mid-19th century, resulting in an increase of private book ownerships and consequently, less document sharing (Jackson, 2001).

When the readers do choose to annotate a document, their markings can appear in many different forms, and may vary considerably. For example, the 16th and 17th century books contained interlineations, marginalia, index words, summaries, brackets, cancellations, and fists (hands with pointing fingers, lacy cuffs at the wrist) inscribed in red ink (Stoddard, 1985). Other forms of markings can be incoherent scribbling, asterisks, question marks, exclamation marks, and so forth.

Marking Electronic Documents

The path to the creation of networked virtual communities was inadvertently initiated by computer programmers as they introduced annotating mechanisms to simplify reading of code written by other people (Tilley & Müller, 1991). Later on, Xerox's *Notecards* (Halasz,

1988) was the pioneering e-user hypermedia system that allowed annotations in the form of note cards to be attached to electronic document. Spurred by this, other hypertext systems followed and the emphasis at that time was on developing applications that support online collaborative authoring. For example, *InterNote* (Catlin, Bush, & Yankelovich, 1989), *Quilt* (Leland, Fish, & Kraut, 1988), and *CrystalWeb* (Peters & Neuss, 1995) used the hyperlinking concepts to focus on supporting annotation sharing in multi-user environments. The last application is noteworthy as it promoted the creation of a real networked organization by allowing synchronous editing by multiple authors maintaining communication with each other via the Internet.

Marking Web pages was the natural development to follow hypertext-marking research, as the Internet offered an ideal virtual collaborating environment. Initial Web-based collaborative systems took the shape of e-mailing and discussion groups, where users could post notes and replies in the context of a document, or a set of documents. Applications, such as Xerox's *Tapestry* (Goldberg, Nichols, Oki, & Terry, 1992), NCSA's *Mosaic*, *HyperNews*, *WDA*, and *Futplex* offered such facilities (Whittington, 1996). Cornell University's *CoNote* improved on the concept by providing a central communication forum for people whose work involved referring frequently to the same set of documents (Davis & Huttenlocher, 1995). Support for group marking and communications was added by Stanford University's *ComMentor* project (Röscheisen, Mogensen, & Winograd, 1995). This application targeted small communities of users and markings made by the members could be divided into public, private, or workgroup layers. Later systems came up with modified versions of the Web-based document annotating, mainly utilizing proxy servers. Some examples are that of *GroupWeb* (Greenberg & Roseman, 1996), *Yawas* (Denoue & Vignollet, 2000), *Multivalent Documents (MVD)* (Wilensky, 2000), *Annotea* (Kahan, Koivunen, 'Hommeaux, & Swick, 2001), and *WebAnn* (Brush, Barger, Grudin et al., 2002). The idea was that the content can be edited by any software to provide document annotating services to groups of networked users. However, lack of consumer interest meant that commercial applications either failed to materialize, or were not successful in attracting wide spread usage.

In the meantime, the Web page marking efforts shifted focus towards wikis ("Wikipedia," 2007) and blogs ("Engadget, 2007)"¹ instead of trying to place

in-text annotations within the Web pages. Overnight, community information sharing over the Internet became a reality. Collaborating groups rushed to setup their blogs and Websites facilitating and offering such facilities mushroomed. General interest and current affairs sites (for example, FreeRepublic.com ("Free republic", 2007), Fark.com ("Fark," 2007), news clips from Yahoo videos ("Yahoo! Video," 2007), etc.) now allow users located worldwide to signup and post comments about their content. Video posting and delivery sensation site, youtube.com ("YouTube," 2007), carries user submitted videos as well as comments by viewers. Though this trend does not follow the classic document annotating styles, networked communities are destined to use these approaches for information sharing till better in-text marking or in-video comment making and sharing techniques emerge.

Meanwhile, placing markings in-text or within the margins of a published document continue to develop along with the hypertext annotating applications. *Annotate* (Ginsburg & Kambil, 1999), and *Hyperwave* (Maurer, 1996) were some of the pioneering applications. Adobe Acrobat™ is now a commonly used application that can be used for marking published documents. Word processors, such as Microsoft's Word™, Sun's Star Office™, or groupware, such as Lotus Notes™, are the other common desktop applications that can be utilized to position markings within the document. Word processors do differ from Web pages and other published documents as they allow editing of the original text also in addition to simply placing markings. The role of such annotations in community information sharing is still underutilized, and confined mostly to the academia. The emergence of digital libraries is expected to change that because the document collections will be much more manageable and provision of annotation sharing facilities should prompt information sharing among community members from all walks of life.

Free-form digital ink annotations may also hold a key to the future of e-document markings as researchers try to emulate paper and produce a similar reading environment. This "active reading concept" allows users to mark up e-documents as if they were writing on a paper by attaching to a pen shaped stylus (input device) to a tablet computer. The ease of use is then expected to facilitate the sharing of ideas and information for readers in a networked virtual environment. Digitizing tablets and scanners predate this innovation, and a well

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