Using Group Interaction History in the Wild

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ABSTRACT

Inspired by theories of how professionals enter into a reflective conversation with their work materials, the research area of interaction history seeks to make use of the accumulated actions of many people in working with digital objects. Despite compelling system designs and empirical results in laboratory settings, group interaction histories have not been widely employed. I outline a series of research questions, plans and tools that will be among the first to investigate and evaluate the use of shared interaction history in the day-to-day work of individuals and groups.

Author Keywords
group interaction history, historical awareness

ACM Classification Keywords
H5.3. Group and Organization Interfaces.

General Terms
Human factors

INTRODUCTION

Hill and Hollan's original work on integrating *wear* [1] in digital documents has inspired much research. Wear is visualized traces of *interaction history* built up over time, which provides a rich view of the work that has been undertaken with a digital object such as a document or webpage. Interaction histories are accumulated not just from an individual, but from all those people who have worked with the digital object in the past. Since wear is visually integrated with the digital object, the viewer is provided with a summative *historical awareness* of what they and others have done with the artifact in the past.

Although interaction histories have a clear potential for improving several types of group tasks and have been the subject of several research projects, we still have little information about whether and how this technique works in real use. Without a better understanding of how interaction-history techniques really work in the wild, these techniques will remain on the fringes of interface design. To obtain this information, my research will carry out several studies of interaction-history techniques in real-world use. The aim will be to answer the following **research questions**:

Q1. How can interaction history fit into typical day-to-day work and web-browsing practices?

Q2. What are the challenges to incorporating different types of interaction history in real-world use?

Q3. What size/type/composition of group works best for shared interaction history?

Q4. Does interaction history allow users to reflect about digital objects in new ways, and if so, is it beneficial?

To answer our research questions we have identified several **steps** that will be undertaken:

1. *Taxonomy:* establish a taxonomy of interaction-history techniques;

2. *Framework:* development of an analytical framework for determining what factors in the real world will affect the use of interaction-history techniques;

3. *Scenarios:* identification of three scenarios of use that will be used for the evaluations;

4. *Techniques:* development of three novel interaction-history techniques for these three domains: WebWear, User-Defined-Groups Webpage Recommender, and Wikipedia Palimpsests;

5. *Methodologies:* determination of evaluation methodologies based on naturalistic observations, logging, interviews, and cultural probes;

6. *Study:* deployment and study of the techniques in the real world.

BACKGROUND

Research in capturing, analyzing, and using interaction histories are originally motivated by Schoen's theory of reflective practitioners [3]; investigating how the "reflective conversation with work materials" may be better supported and extended in the digital environment. The idea of wear in the digital world relates to the wear and patina that accumulate on objects in the physical world. The library book that falls open to the most often read passage or the bumper dented guard-rail that reminds us to slow down at the next bend in the road are widely-experienced examples of physical interaction histories that allow unplanned discoveries. Norman points out that history-rich objects actually acquire new affordances over time, allowing them to be interacted with in new ways [2]. In creating wear interfaces, Hill and Hollan intended to provide the possibility for shared digital objects to be worked with and understood in new ways.

Despite the compelling original motivations and many research projects for integrating interaction histories into digital objects, our desktops and application environments remain relatively bare of any indication of interaction history (other than a few examples such as changing the colour of visited web links). While evaluations have demonstrated the

performance gains facilitated by interaction history-based tools in laboratory settings, there is still little information about how users perceive the new affordances or how they might be used in the real world. I believe that it through actual use that we might learn the most about how people would use interaction history tools, allowing guidelines for their adoption to be identified.

RESEARCH TO DATE

To date, I am part way through a literature survey that will identify steps 1 (taxonomy) and 2 (framework), and will be based on reconciling previous CSCW frameworks in awareness with the field of interaction histories. Steps 3 (scenarios) and 4 (techniques), have been identified and are described below. Steps 5 and 6 have been partially addressed through the creation of a general purpose interaction logger. I have created the SaskWatch logger (saskwatch.usask.ca) as an add-on to the Firefox browser. The logger can work as a standalone application (for general interaction collection), and it also works as a component, which I will incorporate into the other tools I develop. The standalone logger has been in general use by more than 20 users for 3 months, and has captured over 9 million interaction events thus far. This initial round of logging will be combined with interviews, to investigate research question Q1 on identifying how interaction histories might fit into actual work.

PROPOSED RESEARCH

We have defined usage scenarios (step 3) and corresponding techniques (step 4) in terms of new tools designed to specifically address each of Q2 through Q4; however, we expect each tool to shed light on all of our research questions. This dissertation research seeks to study these tools in actual use, so we are planning a series of semi-structured interviews and preparing the deployment of each of our tools as part of a field study.

WebWear: Addressing Q2

We have already completed the Web Wear tool, which is a reinvention of the original read wear scrollbar [1] for displaying personal and group visitation histories on an augmented scrollbar. The scrollbar would be useful in a variety of information gathering, such as browsing for an answer on Yahoo! Answers. On such pages, the best answer to a specific question is buried in a longer list of possible answers. Through indicating where others have spent their time the user will likely be lead to the best answer. We foresee the largest hurdle to incorporating interaction history in the real world is related to the inherent mutability of digital objects on the Web; they are constantly changing. Therefore, this technique will allow us to investigate how interaction history can be displayed in a constantly changing environment, and how people can deal with this change.

User-Defined-Groups Recommender: Addressing Q3

Another important problem in being able to readily apply group interaction history is determining exactly whose history should be used. We will design a system that will make recommendations for entertainment-oriented webpages. The user will be able to easily add and remove the influence of others, used in making recommendations based on interaction history. Groups will be defined by selecting other users from categories such as "most similar to you", "friends", and "popular". This will allow us to explore how individuals decide to define groups based on the interaction histories of its group members.

Wikipedia Palimpsests: Addressing Q4

A palimpsest is a manuscript that has been reused, and as a result it shows the wear, markings and use of many authors. We wish to investigate the use of colours and textures to convey the edit, reading and dialogue that take place in creating Wikipedia articles. In our data logging thus far, we note that about 2.5% (~ 4600 visits) of all visits have been to Wikipedia, and so it is a frequently used site in information gathering and fact finding scenarios. However, beyond the text and images of articles are intricate histories of reading, editing, and discussion. This information is underused, partly because it is cumbersome to access and is external to the main articles – we have registered only 46 visits to the discussion and history pages of Wikipedia articles. The Wikipedia Palimpsests tool will allow exploration of what users will do - if anything - with readily available rich interaction histories surrounding the encyclopedia articles.

GOALS AND CONTRIBUTIONS

There is great potential for the use of group-based interaction history, as it contains crowd wisdom with little overhead. However, we must first learn fundamental details about how interaction history might be used in the wild. This dissertation research will provide new insights into the capture, analysis and deployment of the implicit intelligence in shared interaction histories.

BENEFITS OF ATTENDING CSCW DC

By February 2010, all steps up to the initial studies will be completed. While I have been fortunate enough to gain research experience in empirical approaches for evaluation, it will be crucial for the outcome of my dissertation research to have the correct evaluation methodologies in place; so, I am especially looking forward to receiving critiques on my planned experimental methodologies and study procedures from my peers and the panel. As a keen participant in group discussions, I am also looking forward to participating in dialogue about others' dissertation research.

ACKNOWLEDGMENTS

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