A Social Proxy for Collective Search

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ABSTRACT
The paper is concerned with supporting synchronous collective search carried out online by distributed participants. It presents a user interface that uses a social proxy – a shared visualization that shows the presence and activities of participants – to support the collective search. It lays out a design rationale, discusses characteristics of a solution, and illustrates it with an example.

INTRODUCTION
In the face to face world we often carry out searches with others. In the example shown in Figure 1, a group works together to solve a wayfinding problem. They share information, correct one anothers' misunderstandings, and simultaneously explore alternatives.

This collective activity is facilitated by several factors. First, there is a map that serves as *a common representation* that all participants can see and to which all can point. Second, group members are *aware of others' presence and actions*: the participant on the right watches as the other two point to the map. Third, *the group can communicate among itself* via gestures, gazes and speech. Fourth, the group has a *mutual awareness* of the situation: the middle group member is aware that her pointing is visible to the two others; similarly, the other two are each aware that their actions are visible (or audible) to others.

Figure 1. A collective search in the face to face world.

There are at least four possible advantages to performing search (and other activities) collectively. The first is *efficiency*: the search may reach a satisfactory conclusion more quickly. Second, whether or not the search is more efficient, it may produce a *higher quality* result. Third, the result may be felt by the participants to be *more legitimate*: that is, because all participated in the process, all have in some sense bought into the results. Fourth, since the activity requires group interaction, it may be perceived as *more sociable and enjoyable*, and have side effects such as increasing group solidarity and feelings of affinity.

Of course, these advantages are *possible*, but by no means inevitable; the conditions under which they are most likely to be realized seems an important area of research. The aim of this paper is to discuss ways in which the presumed benefits of face to face search might be realized online, by distributed groups.

BACKGROUND
That online collective search by a distributed group is possible was demonstrated by Noburu Iwayama and his colleagues in the "Chat and Search" system [7]. They modified an instance of Internet Relay Chat (IRC) to support collective search. Basically, they implemented a bot that watched for a line of chat beginning with a special word, passed that text to a search engine, and then pasted a URL for the resulting page of search hits back into the IRC channel. The consequence was that all participants in the channel could see the queries issued and the resulting URL's for search hits. Iwayama et al. reported that (i) people used the functionality, and (ii) that various types of social behavior occurred. One example of such behavior was advice giving – for example, other participants would sometimes correct search queries by pointing out spelling errors[1] or offering better search terms. Another example was that sometimes onlookers simply gave their own responses to the query, potentially eliminating the need to actually look at the search results.

[1] Since many queries were composed by non-native English speakers to search the 'English' web, spelling correction was a valuable function.

Given that performing an online search 'in public' can give rise to potentially beneficial social behavior, the question arises of how to do it. While "Chat and Search" is an ingenious approach, it is quite basic. It seemed to me that it might be possible to design a system that revealed more of the activity that could occur as a group worked together to conduct a search. In pursing this approach, I drew on previous work on social translucence [4], and in particular the concept of social proxies [2, 3]

The basic idea of social translucence is that people pay attention to the presence and activities of those they are with, and they use the activity of others' to guide their own actions. Thus, the presence and activities of others helps an individual understand the norms governing the situation, and provides cues about what is possible and appropriate to do (thus, in a card game, participants can see whose turn it is to deal, and whose turn it is to make the next play, by watching the activity of those around them). There are two important corollaries. First, this *awareness is mutual*: everyone involved in the interaction is (typically) aware of everyone else, and that mutuality of awareness means that people can be held accountable for their actions (e.g, a player knows that just as he can see others, so they can see him, and thus may refrain from cheating). Second, *people have a sophisticated understanding of this mutuality* of awareness, including of its limits, and they use of this to structure their interactions (e.g., in our card game, a disturbance that momentarily attracts the attention of other participants may be seized on as an opportunity to cheat).

The concept of social translucence has been operationalized in online situations as social proxies, shared visualizations that show the presence and activities of participants in an online activity. Social proxies have been designed for a number of online situations (see [2, 3, 5, 6] for examples). In contrast to other styles of visualization, social proxies focus more on participants and task structure than on content, and are, by definition, visible to all participants – it is this the affords the mutuality of awareness the enables users to coordinate their activities.

A SOCIAL PROXY FOR COLLECTIVE SEARCH

The rest of this paper presents a design for a social proxy to support collective search. The design is not implemented, and is intended to provide gist for the workshop.

The basic idea is to create an environment from which users can issue search queries. Each new search query will essentially have its own chat room, and those who enter it will be able to chat with other searchers, view results, and create modifications to the root query. So far, this is very similar to what Iwayama et al [7] have done. However, rather doing this simply via textual means, instead the environment will contain social proxies that show the number of participants in each search, that reveal the manner and degree of their involvement, and that illustrate how elaborated each search is.

We will now walk through the design sketch.

1. The home page

Figure 2 shows a sketch of the collective search home page. This page gives an overview of the collective searches currently going on, and can be sorted on various criteria ranging from how many people are participating in a search to how many iterations it has been through. This is also the place where new collective searches can be started.

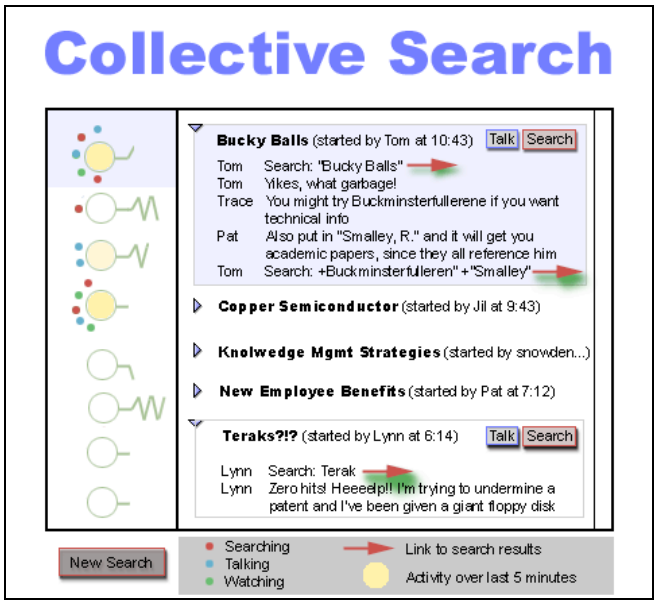

Figure 2. The Collective Search Overview

The left column contains thumbnails of search proxies that depict various characteristics of the searches. The small colored dots around the periphery of the circle indicate how many people are currently involved in the search; highlighting in the large circle indicates whether chat is happening; and the number of angles in the line at the right side of the proxy show how many times the query has been re-issued. The right column contains chats associated with each search: each chat can be expanded or collapsed, and contains controls for chatting about and participating in that particular search. The idea here is to give a sense of where the action is in terms of the people, chat and querying.

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2. Creating a new collective search

Now let's take a close look at a search proxy. To begin with, a user named Tim will create a new search by clicking on the "New Search" button in the lower left of Figure 2, and entering his search query, "Install Cocoon on Websphere." Figure 3 shows the result of this, with the social proxy for Tim's Search on the left, and a chat window (which contains Tim's initial query) on the right.

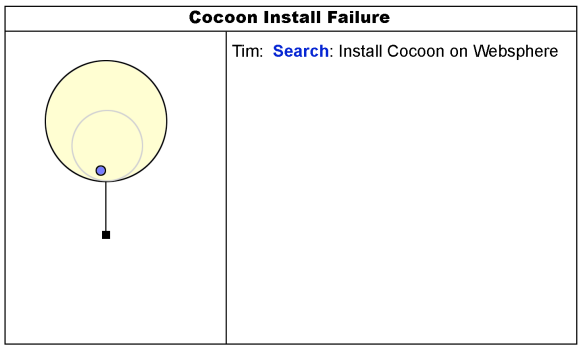

Figure 3. The start of a search.

The social proxy consists of a large circle that represents the search activity; the small dot within it represents Tim; and the line and square dot at the bottom represent the query Tim typed in the chat window (the line beginning with "Search: ") and the results of that query (which Tim would see if he clicked on the square dot).

3. Red joins the search

Once Tim created the new search, a thumbnail of its proxy appeared in the overview window we saw in Figure 2. That enabled another user, whom we will call Red, to notice it. As Red is interested in the query, he joins the search (Figure 4).

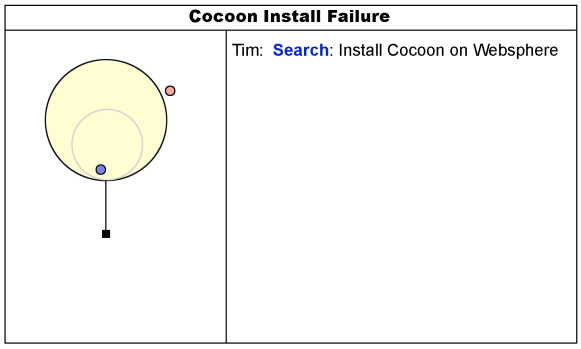

Figure 4. Red joins the search.

As a consequence, Red now appears in the search proxy as the red dot – since he hasn't done anything in the search yet, Red is shown on the periphery of the circle. (As we shall see, as participants become more involved in the search – chatting, entering queries, and inspecting results – their dots will move further into the proxy.)

4. Tim notices Red, reports on the results, and they chat

Seeing that someone is now watching, Tim – who has just inspected (in another window, not shown) the results of his first query – reports back: "No good! Over 700 hits…" Red offers a suggestion in the chat, and Tim tries it out.

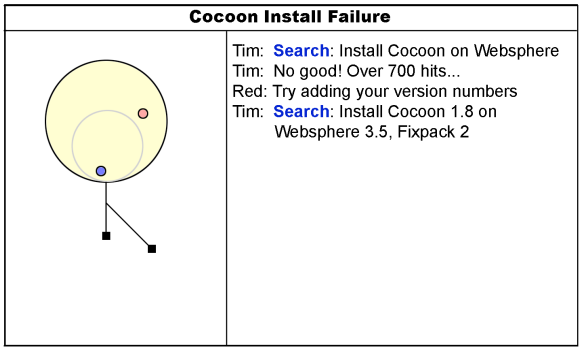

Figure 5. Red suggests a change, and Tim revises the query.

Figure 5 shows the state of the search proxy. On the right, is the chat just described. On the left, the search proxy has changed in two ways. First, as a consequence of his chat comment, Red's dot has moved into the circle, signifying his greater involvement in the search. Second, when Tim issued the second version of his query, the line at the bottom of the search proxy has grown a new branch, signifying that there is now a second version of the query.

5. Tim gets better results, and others join the search

Tim reports back on the results – the modified query is much more successful. At the same time, three others have shown up, attracted by the signs of activity in the overview window (Figure 2). One of them, Jil, joins in the chat…

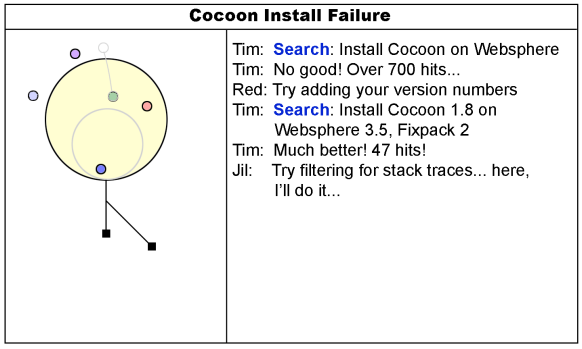

Figure 6. More people join the search, and one joins the chat.

Figure 6 shows the results of this activity. Three new dots depict the three newcomers, and one of them – Jil's dot (green) – moved into the circle when she chatted. We can see that the search is attracting more people, and that some of them are getting more involved.

6. Jil executes another iteration of the query

Jil decides to go ahead and revise the query herself, which she can do just by copying it, modifying it, and pasting it back into the chat.

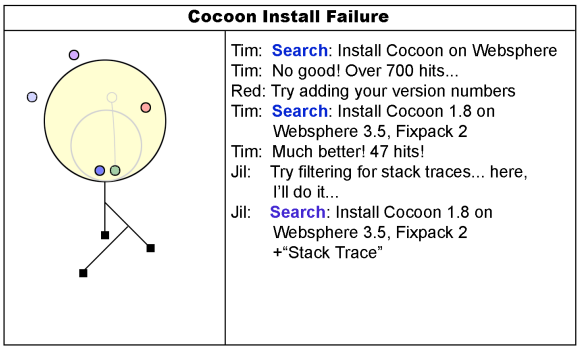

Figure 7. Jil executes a third iteration of the query.

In Figure 7 we see that the representation of the query at the bottom of the proxy has grown a new branch, indicating that it has been iterated on for a third time. In addition, Jil's dot has moved into the lower portion of the circle, indicating that she too is one of the people driving the search.

7. The view from the collective search home page

This is enough to give a sense of how the search proxy works. As people join the search, the proxy reflects their presence, and their degrees of involvement (whether they are just watching, chatting, or issuing queries). And of course this activity is reflected in the thumbnails of the search proxies in the overview window.

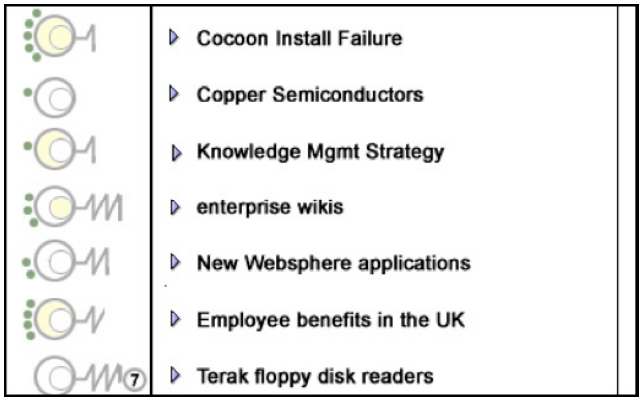

Figure 8. The overview window with its proxy thumbnails; the top one shows a thumbnail of the proxy for Tim's search.

Thus, at the top of the list in Figure 8, we see the thumbnail of the proxy for Tim's search. We can see at a glance that there are five people involved in the search (if only watching it), that chat has happened recently, and the search has been through three iterations. Making this activity visible may serve to attract new participants.

CLOSING REMARKS

While the account laid out here is entirely fictional, we have, in other contexts, demonstrated that social proxies can be understood and used in various online activities. Systems like Babble [6] and Loops [5] indicate their use in supporting persistent chat, and the social proxy in the IBM Enhanced Audio Conferencing Meeting window [1] illustrates how other functionality can be attached to social proxies, and used to enhance both collective and private social activity in teleconferences. We suspect that proxies for collective searches could likewise support interesting forms of emergent behavior.

ACKNOWLEDGMENTS

The initial inspiration for this work came from a publication by Noburu Iwayama and colleagues [7].

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