Inhabited Models: Supporting Coherent Behavior in Online Systems

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Abstract. A principal focus of user modeling has been on modeling individuals, the aim being to support the design of interactive systems that can fluidly adapt to their users' needs. In this talk I shift the focus from interactions between a human and a computer, to interactions amongst people that are mediated by a digital system. My interest has to do with how to design online systems that can support the blend of flexibility and coherence that characterizes face to face interaction. I describe my approach, which involves creating shared visualizations of people and their activities in online situations such as chats, presentations, and auctions. This kind of visualization -- which serves as a sort of inhabited model of an activity -- plays a number of roles in supporting group interaction that is both flexible and coherent.

1 Coherent Behavior

Think about the last time you attended the theatre. When the play is ready to begin, the doors are closed, the house lights are lowered, and the audience responds, their collective murmur subsiding into silence, punctuated by the occasional cough. When the play ends, the audience makes an effort -- each individual acting on his or her own -- to give signs of their enthusiasm. Typically the result is applause, in which an individual's hand claps are rapidly taken up by others, swelling into a uniform texture of sound. This is a simple example of a pervasive phenomenon: groups of people -- even when the individual members do not know one another -- are remarkably good at behaving coherently as a group. Of course, this is not happening in a vacuum. Theatres are carefully designed to support performances and the events that surround them; effects like lighting are used not just to enhance the play, but to provide cues to the audience about when the performance begins and ends. To produce coherent behavior, the audience makes use of its knowledge of the situation, cues from the environment, and its members' mutual awareness of one another's action.

Our daily life is rife with examples. We queue up, in a more or less orderly manner, at the ticket window. We wait for the traffic signal to change, or, if there is a break in the traffic and enough willing 'conspirators', we may cross *en mass* against the light. Of course, behaving coherently does not necessarily mean that everyone does the same thing. Pedestrians passing through Victoria Station at rush hour do a remarkable job of avoiding one another: a glance, a slight alteration in direction or gait, and collision is averted, time after time after time. In more ordered circumstances such as meetings, groups orchestrate their behavior: someone waits for a turn to talk, judges how his or her words are being received, and shifts course depending on the audience's reaction. And in most cases we do all of this with the greatest of ease. None of this is a surprise: these skills are basic aspect of being social creatures, and

examples pervade the work of sociologists (e.g. [3]), anthropologists (e.g. [5]), and other scholars (e.g. [4]).

2 Coherent Behavior in Online Systems

However, when our interactions are mediated by digital systems, things that were easy in face to face situations become more difficult. When we use instant messaging, email or even telephony, many of the cues that we effortlessly use to coordinate our face to face behavior are absent. Conversational practices that are simple in face to face situations -- such as taking turns when talking, or 'going around the room' with one person speaking after another -- become awkward and cumbersome in a conference call. Other practices, such as an audience's spontaneous applause at the end of an excellent performance, become difficult or impossible.

The problem is not only that digital mediation makes it difficult for us to coordinate behavior as we wish; there is a subtler problem. To see this, let's return to our example of an audience applauding. We are back in theater: the house lights have come up, the cast has come out on the stage to take their bows, and the audience is applauding with vigor. As the applause continues, one or two people stand up, and they are rapidly joined by more and more, giving rise to a standing ovation. Now let us suppose that there is a member of the audience who is less enthusiastic about the performance and doesn't believe it should receive a standing ovation. Nevertheless, in spite of this reluctance, he or she may well be even more reluctant to be seen to be the only one *not* standing. In fact, there is an almost palpable pressure to join with rest of the audience in giving a standing ovation. What this example demonstrates is that the cues and mutual visibility that structure our face to face behavior do not just make it easier to do what we want to do, but also encourage us to do that which we may not be inclined to do: wait in the queue, wait for the traffic signal, or stand, applauding politely if not enthusiastically. This pressure to conform, to join with others in producing a coherent collective outcome, is absent or greatly weakened in digitally mediated situations.

In summary, in online environments where collective behavior is mediated by digital systems, group interaction loses much of the grace and unity that characterizes its face to face counterpart. As an interaction designer, I am interested in remedying this situation.

3 Social Proxies as Inhabited Model

My approach to this problem is to design visualizations of the activities of participants in an online system. These visualizations, which I call Òsocial proxies,Ó function by depicting the fine structure of individuals' activities relative to an implicit model of the activity the system is intended to support. Social proxies typically contain representations of the participants in the activity, and thus are, in a sense, inhabited. Because the proxies are made visible to all users of the system, they can be used as a shared resource, and serve as a common ground from which individuals can draw inferences about various aspects of the system's state.

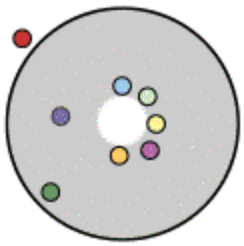

Fig. 1. A social proxy for Babble: the circle depicts a chat room, and dots depict the users

Fig. 1 shows a simple example, implemented in a multi-user, persistent chat system called ÒBabbleÓ [1]. The Babble social proxy depicts the current chat room as a large circle, and participants as small colored dots; dots shown inside the circle are in the chat room being viewed. Thus, the social proxy in Fig. 1 depicts eight people logged into Babble, seven of whom are in the same room. Dots move to the circle's inner core when their users type or are otherwise active, and slowly drift to the periphery of the circle over the course of about 20 minutes of idleness. Thus, of the seven participants in the chat room, five have been active very recently, one has been idle for about 10 minutes, and the last has been idle for 20 minutes.

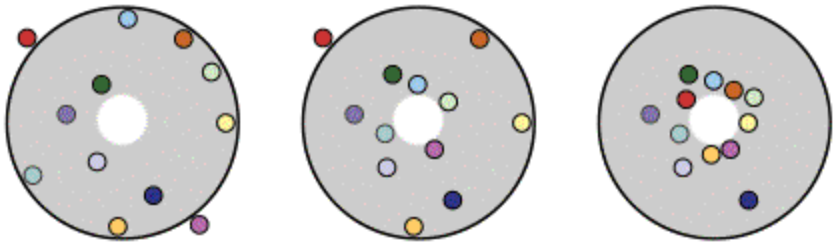

Fig. 2. Three states of the Babble proxy with increasingly focused degrees of activity

Although this social proxy is very simple, it allows users of the system to get a sense of how many people are in the same room, and how many of those are active in the chat. Typically, a cluster of dots at the center of the circle indicates that 'something is going on.' The experience, to a Babble user, is somewhat similar to walking down a street and noticing a crowd: it provokes curiosity and (often) a desire to see what's going on. Because the Babble system can be minimized so that only the proxy is visible (while Babble users are involved in other computer-based activities), a cluster of dots in the proxy often can pull other people back into Babble, causing their idle, side-lined dots to move into the center forming a 'crowd.' Fig. 2 shows three states of the Babble proxy, showing an increase in focus as more and more people become active in the chat space.

More generally, social proxies consist of a geometric background figure that serves as a sort of model of a particular activity or situation, and small colored dots that represent participants. Movements of the dots relative to the background figure provide information about the individual activities of the participants, and express the overall state of the system. Often the movements and groupings of the dots are analogous to the ways in which participants in the corresponding face to face activity would move and position their bodies, in the same way in which the clustering of the dots in the Babble proxy represent a crowd gathering. Although minimal, this approach turns out to be remarkably powerful, and provides ways of supporting online activities ranging from conference calls to auctions [2].

References

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