Silence, Murmurs and Applause:
Reflections on Expressions of Collections

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INTRODUCTION

To start out, I should say that my interest in this workshop comes from a very different perspective than, I suspect, those of the other applicants to the workshop. My hope is that there is enough in common that the difference in my goals and perspective will prove to be a source of fruitful discussion.

The area of commonality has to do with the issue of subtle expressivity. I am interested in means—particularly as manifested in visual and auditory portrayals—of conveying complex and subtle expressions. And much of my work draws upon studies—principally from sociology—of the ways in which people notice and interpret large arrays of subtle cues expressed by 'natural systems.' The area of difference is that I am *not* interested in human facial expression, *per se*, or in designing characters or robots to make them more expressive. Instead, I am interested in designing 'expressions' for complex social and computational systems, particularly multi-user systems within which large collections of people are active.

I define an "expression" as a large array of subtle cues that recipients are able to interpret holistically. A canonical example is, of course, human facial expression, produced by the reconfiguration of skin by large numbers of muscle groups, which serve (among other things) to portray emotional state (e.g. [1]). Although the facial muscles produce literally thousands of distinct configurations of the skin, people are quite good at mapping these complex configurations into a relatively small number (6 to 10) of basic emotional states. In addition, facial expressions may also represent blends of emotional states, as seen, for example, in the classic illustration of a dog's face exhibiting a mixture of the expressions of rage and fear. While researchers are divided as to whether emotions evolved for the *purpose* of communicating internal states, it is quite clear that people make use of expressions to infer internal emotional states and, as well, that people attempt to manage their own expressions to control the inferences of others (e.g. Goffman, 1959).

In my view, "expressions" are not limited to individual humans and animals,[1] but are—at least potentially—a feature of any complex social or technical system, particularly those that are used by, inhabited by, or otherwise include large numbers of people. That is:

> *Any complex social or technical system that provides an interpretable portrayal of its internal state by making the fine structure of its internal activities visible, may be said to have an expression.*

The sorts of complex systems whose "expressions" (and their interpretations by people) that I have tried to understand include groups of people in auditoriums, city streets and urban plazas. The sorts of systems for which I have attempted to design expressions (or, as I prefer it, expressive representations) include online classrooms, virtual auctions, and multi-room discussion environments.[2]

In the remainder of this position paper, I will do two things. I will elaborate on the concept of expressions as attributes of complex systems rather than of individuals, and then I will discuss my approach to designing expressions for such systems.

COLLECTIVE EXPRESSIONS

In his discussion of the ways in which people manage their expressions [4], Eving Goffman distinguishes between cues that are *given* (that is, that are used deliberately and solely to convey information), and cues that *given off* (that is, behavioral cues that are not produced primarily for communicative purposes, and may therefore be presumed to be inadvertently released). Thus, when I encounter a colleague at a conference, the words of my greeting (*given*) may express pleasure at the encounter, even as an involuntary grimace (*given off*) suggests that I feel otherwise. Of course, hopefully I am better at managing my expression than that, and so in spite of my feelings I will successfully enact a smile, thus *giving off* a feigned expression. In general, our expressiveness as individuals is an ongoing effort to control the 'face' we present to the world, the information we are *giving* undermined or reinforced by the expressions we *give off*.

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[1] Those who agree with Minsky's Society of Minds theory [7] might argue that even individual expressions are not the product of a single entity, but rather produced by a large set of cooperating and competing mental agencies.

[2] I am not the first to suggest that the notion of 'expression' is applicable to systems. For instance, Don Norman, in *Turn Signals are the Facial Expressions of Automobiles* [8], draws a parallel between human facial expressions and the function of automobile signals as a means of conveying real or feigned intent.

Figures 1, 2 and 3: The expression of state in physical systems

Awkward Silences and Standing Ovations

It is interesting, and not, I think, entirely coincidental, that Goffman [4] often relies on the metaphor of theatrical drama to illustrate his ideas. Just as an individual makes a concerted effort to control his expression and ensure that the information *given off* reinforces that which is *given*, so does the company of actors putting on a play make an effort—behind the scenes—to coherently depict a scene or situation to the audience.

More interestingly, the audience is similarly engaged. When the play is ready to begin, the house lights are lowered, and the audience responds, their collective murmur subsiding into silence, punctuated by the occasional cough. Similarly, when the play ends, the audience makes an attempt—each individual intentionally acting on his or her own—to *give* signs of their enthusiasm. Typically the result of this is applause, an individual's hand-claps quickly taken up by others, swelling into a uniform texture of sound. Occasionally, if the play is well received, one or a few individuals may stand up, perhaps leading the rest of the audience to stand as well. On the other hand, if the play is not so well received, a very different situation can result: the attempt at a standing ovation may fail, with a few scatted people standing as the rest remain seated; or worse, even applause may fail to catch on, with distinct isolated claps echoing loudly in the largely silent theatre.

These situations are uncomfortable, indeed, being the failure of an audience to express a collective response in a coherent fashion. All of theses cases—in the ways in which their blends of *given* information (individual claps, standing up) and *given off* information (the unanimity and synchrony of the audience's collective action that may be presumed to be spontaneous and uncontrolled) reflect the audience's reception (real or feigned) of the play—bear a very strong resemblance to the workings of individual facial expression.

Streets and Markets

While the case of an audience applauding (or not) in a theatre seems particularly apropos, it is easy to identify situations in which the activities of a collection of individuals—often generated without awareness of their collective impact—produce a global or holistic impression.

We are adept, particularly in situations with which we are familiar, at judging the state and level of activity of the system at a glance (figures 1, 2 and 3, above). And it is not simply that these 'expressions' of collective activity support us in our instrumental activities, enabling us to decide whether we have arrived too late, have arrived at a good time to accomplish a task efficiently, or are in for a wait. Rather, the expressions of systems affect how we feel about them: we take in a streetscape, noticing that it is lively and interesting; we are attracted to markets filled with people and a sustained murmur of conversation (figure 4). As Jane Jacobs argues, in writing about the effect of activity (or its absence) on a street, the impressions conveyed by mundane activity can have more profound and longer-reaching effects:

> The sum of such casual, public contact at a local level—most of it fortuitous, most of it associated with errands, all of it metered by the person concerned and not thrust upon him by anyone—is a feeling for the public identity of the people [of the neighborhood], a web of public respect and trust, and a resource in time of personal or neighborhood need. ([5], p. 57)

Similarly, Kevin Lynch, an urban designer, wrote:

> …a distinctive and legible environment not only offers security but also heightens the potential depth and intensity of human experience. … Potentially, the city is in itself the powerful symbol of a complex society. If visually well set forth, it can also have strong expressive meaning. ([6], p. 5)

There is more to be said about the roles of collective expressions, but space requires us to move on.

Figure 4: A lively market.

DESIGNING COLLECTIVE EXPRESIONS

Recently, I've been involved in designing multi-user systems that provide public visualizations of the activities of participants. We call the sort of visualizations we design, social proxies, and suggest that—by revealing the fine structure of individuals' activities within the system in a form which can be readily taken in— social proxies can play a variety of roles in supporting public behavior in the system. In this paper, we discuss two examples[3] in which the aim is to convey a feeling for the overall state of the system.

Social proxies are minimalist graphical representations that typically consist of a geometric background figure that depicts 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. Let's look at two examples.

Auctions

In the physical world of face to face interaction, auctions are social events. A crowd gathers, inspects the items being offered, and participates in a public bidding process. Participants not only look at what is being auctioned—they also observe who is interested in what, and who bids for what; and they are conscious that their own actions and gazes are watched by others. That is, people not only bid *for* items, they also bid *against* other participants. All this contributes to making auctions intensely social and dramatic experiences, as well as enabling them to function as social mechanisms for computing the value of items, asserting the social or professional status of the bidders, and, of course, actually carrying out transactions.

However, when we look at online auctions, the social cues that make their face-to-face counterparts such rich and engaging experiences have vanished. The social proxy shown in figure 5 is an attempt to restore some of these cues. The large circle represents the auction 'room,' the center circle a clock, and each dot a participant. People who look at information about the to-be-auctoned itme are shown around the outside of the circle; when they place bids, their dots move into the circle. Thus, the auction proxy shows how many have shown interest, how many have bid, and how much time remains. Also, a dot is shown in color if the user has recently hit the web page: thus, the proxy also indicates how many people are 'present' and thus, perhaps, are
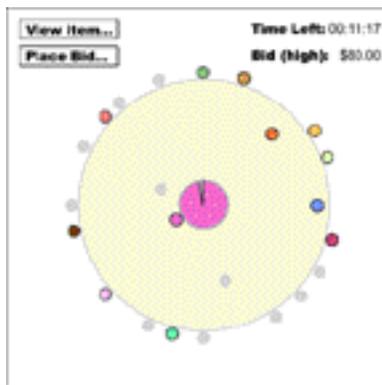
Figure 5. An auction proxy

candidates for entering the bidding at the last minute. This visualization expresses some of the drama that characterizes face-to-face auctions.

Lectures

Imagine an on-line talk or lecture delivered as part of a conference call and accessed by people using screen phones. The Lecture proxy, shown in figure 6, assumes that we have some way of identifying who has spoken. The background figure represents the lecture 'room;' dots represent people; and the positions of the dots reflect how much they've spoken during the last five minutes. If the lecture is going as it 'ought'—with the lecturer speaking and the audience being quiet—the dots in the proxy assume a very regular pattern. However, if a person interrupts with a question or a comment, his or her dot will move a bit to the left, and if the interruptions continue, that person becomes, quite literally, 'out of line' (as shown in figure 5). If multiple people interrupt, their dots move forward as well, imparting a 'raggedness' or incoherence to the visual image that is not unlike that experienced when an audience fails to enthusiastically applaud for a play.
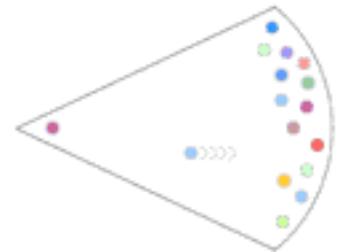
Figure 6: The lecture proxy

Because the proxy is seen by everyone, everyone knows (and knows that everyone knows) what is happening: it makes the state of the system public. How the group makes use of this information is up to it: making the fact that people are interrupting the lecture public may act to encourage the return to the norms of the lecture interaction, or it may encourage more people to interrupt. A social proxy is a means of expressing the system's state, not a means of control, and it dictates a response no more (and no less), than an expression of surprise on someone's face requires a particular sort of response.

Summary

I've argued that expressions are not simply phenomena produced by individual actors, but that they may also be seen as the products of the actions of a large collection of people. Both individual and collective expressions consist of a large number of subtle cues, both reflect internal characteristics of the actor(s) as they shift dynamically over time, and both can be used as a grounds for holistic interpretations about the state of the system. This approach to designing social proxies, or "expressions" for complex systems has been deliberately minimalist: we believe that our use of large number of simple shapes to represent the activities of a system's components aids the viewer in generalizing or holistically interpreting the state of the system. A more detailed discussion of this approach to designing visualizations may be found in [3].

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[3] These examples, and some of the accompanying text, is taken from Erickson, et al. [3].

References

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