The Chat Circles Series

Explorations in designing abstract graphical communication interfaces

We have been creating a series of graphical chat programs designed to foster social interaction and expressive communication. We started with a spare, minimalist interface and in subsequent programs have modified its fundamental features: background space, individual representation, movement implementation, communication channels, and history depiction. The resulting family of graphical chat programs share many interface features but differ significantly in their feel and function. This paper examines the variations among the interfaces and discusses their implications for social interaction.

KEYWORDS:
social communication, online chat, conversational interface

INTRODUCTION

Text-based chatting is becoming an increasingly popular form of communication. More immediate than email, less intrusive than the telephone, it allows people to stay in touch with friends and family throughout the day and to engage in casual communication with acquaintances and strangers on a wide variety of topics.

Yet purely textual interfaces have a number of problems as social venues. They have little visual appeal and do not provide stylistic cues about the tone and character of a particular site. It is difficult to determine who is present or to discern the patterns of behavior that give rise to one's impressions of an individual or a community. Participants have visceral presence only when they are speaking: this ignores the important role played by the listeners in a conversation and it forces the user who wishes to be seen to speak continuously.

A number of graphical chat programs have been developed to address these issues. Most employ representational graphics, with the users depicted as avatars, ranging from photographically realistic to absurdly cartoonish. These representational images convey strong social messages, often inadvertently. Seeing someone as a knockkneed purple dragon is likely to affect your impression of them, regardless of the fact that you know intellectually that they look nothing of the kind in real life. Even (or especially) with more realistic images the possibilities for misleading social messages is high. In the real world, our facial features and expressions are tightly and subtly coupled to our emotional state and intentions. In a mediated environment they are not, yet observers will still interpret the face as conveying important cues about one's character and emotions [4]. Furthermore, while we believe that expanding the communication channel to allow for greater expressiveness is an important goal, studies show that the gesturing and expressive capabilities of figurative avatars are seldom employed by non-novice users [15].

Abstract Graphical Chat environments

An abstract graphical chat environment can address the problems found in purely textual chats, while avoiding the pitfalls of representational graphics. A visible representation of each participant shows how populous the space is. "Lurkers" become listeners, transforming the pejoratively viewed set of people who read but do not write into a positively perceived audience. By making this representation

DIS2002, London. © Copyright 2002.
ACM-1-58113-515-7/02/0006...$5.00

Judith Donath*,
Fernanda Viégas**
MIT Media Laboratory

* judith@media.mit.edu
**fviegas@media.mit.edu

non-figurative, it can be designed to perform key social functions, such as conveying identity or indicating attention, without providing spurious and misleading expressions.

The big question is: how to design such an environment? Freed from the limitations of text chats and the conventions of representational graphics, an immense range of possible interfaces can be imagined. Somewhat surprisingly, there has been very little exploration of this design space. Hannes Wallnoefer created The Fog, which is a chat environment that uses space and color to show time and conversational groupings[1]. Tom Erickson and colleagues have created Babble [7], which features an abstract graphical interface element supplementing a persistent chat environment. The series of projects described in this paper form the most extensive exploration of the design of abstract graphical communication interfaces.

The Chat Circles series

The approach taken here has been to start with a carefully designed, minimalist environment (*Chat Circles*) and then to experiment with modifying its fundamental features. We believe that simplicity is an excellent starting point, but is not itself the ultimate design goal – which is to create environments that foster lively, engaged interaction. Features and detail should be added to the initial design only if they enrich the experience.

The design process described in this paper shows a series of projects evolving toward increasingly legible and engaging social environments. Like evolution in the real world, the designs fit into different niches: some are general purpose, easily accessible chat systems. Others add expressive functionality, but require more complex technologies. Still others are designed for specific types of interactions, e.g. interfaces for distance learning or remote game playing. Thus far, five project (*Chat Circles, Chat Circles II, Talking in Circles, Chatscape* and *TeleDirection*) have been developed, each sharing the same common foundation, but varying in specific design features and as a result differing significantly in their feel, purpose, and function.

Unfortunately, none of The Fog servers have been function for quite some time and there appear to be no publications about this work.

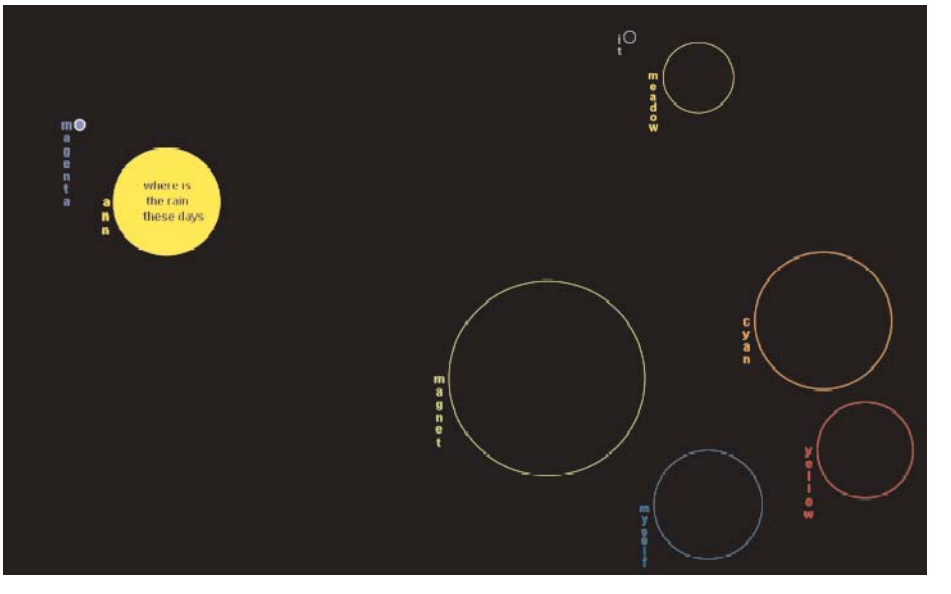
Key interface elements

The simple graphics and interactions of *Chat Circles* have been varied in several key areas:

- Environment: what demarcates the space? What is there to do besides chat?
- Communication channel: how do the participants communicate with each other?
- Individual representation: what do the participants look like? Is there a particular meaning to one's appearance?
- History: is the conversation permanent or ephemeral? How can one see bygone interactions?
- Movement: how do the user's move in the space?
- Context: what is the purpose of the site? Our goal in writing this paper is not only to describe the projects, but also to examine how varying these interface elements makes each a distinctive space. We start with a description of the initial project, *Chat Circles,* and then discuss each of the four subsequent designs, using each one as a contextual basis for

Below
Figure 1: The original Chat Circles interface. The local user's circle is bordered in white (in this image, it is a user called "magenta", with the blue circle). Everyone is speaking, except for "it" (in green). Only "ann" is inside of magenta's hearing range.

Right
Figure 2: Chat Circles history interface. Each vertical line represents a user. The horizontal bars represent posting, with hollow bars standing for messages posted outside the local user's hearing range. The text of postings, shown as solid bars, can be retrieved by mouse-over.



1 Unfortunately, none of The Fog servers have been function for quite some time and there appear to be no publications about this work.

examining one or more of these interface elements.

The Foundation: Chat Circles

Chat Circles [16] is the original project in this family and each of the pieces we will be discussing derives from it. Our goal was to build a chat interface that would enhance social interaction by intuitively structuring the conversation, giving the user a better sense of the other participants, and depicting the activity in the virtual space. Our solution, *Chat Circles*, uses simple 2D graphics (see Figure 1). Each user is represented by a colored circle with his or her name alongside it. The user's words appear in this circle, which brightens and grows to accommodate the message, then slowly fades and shrinks. In a world in which one's self-presentation is composed almost entirely of text it is important that the participants be able to keep track of who said what in order to form a coherent impression of each other. In text interfaces, entries stream past in the order received making it difficult to maintain a sense of the individual participants. *Chat Circles'* colored circles, although a very simple representation, provide a nexus for each user's comments, thus greatly helping to establish their individual identities.

Color and the accompanying names help to distinguish among the participants. They also contribute to the atmosphere of the chat space: the vertically written names alongside the circles create a subtly humanoid form and the multiple hues add visual vibrancy.

The movement on a *Chat Circles* screen is meaningful. Circles grow and shrink as people converse, and the participants move from one area to another in order to participate in different discussions.

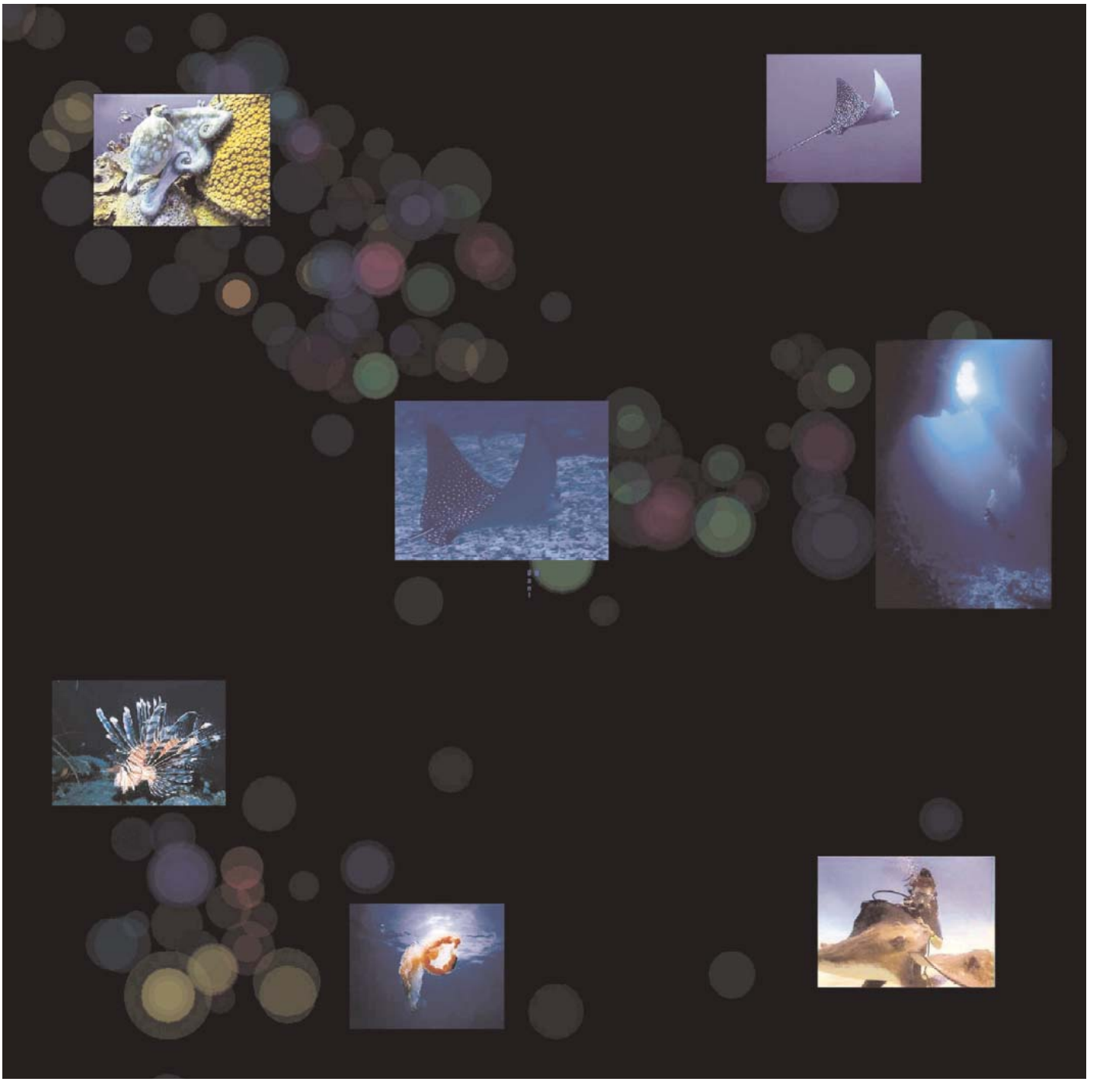
Chat Circles introduced the notion of "hearing range" – one sees nearby participants as solid, text-filled circles, but those who are further away appear only as hollow circles. These distant circles are still seen growing and shrinking, but their content cannot be read. The hearing range feature encourages *Chat Circles'* users to make use of the space in a socially meaningful way.

Conversations are spatially bounded – people who are near each other share a discussion, and should they see someone else they wish to greet across the screen, they must move towards them to do so. Although the cost of doing so is not at all high, it does provide a subtle commitment to one's ongoing discussion, and a sense of leave-taking when one chooses to join a different group. It also makes it possible to deliberately ignore someone. In a text chat if someone is bothersome (or just boring), one cannot simply walk away (or politely excuse oneself) from them as one might do in real life, and there is no way to stop their words from appearing. Even in graphical chats, while one might move one's avatar away, such motion has no effect on the visibility of the text. In *Chat Circles*, not only can one leave a dull or distressing discussion, one's departure is visible to others, thus enabling basic social sanctions

We decided that the ability to review the discussion's history should be included in *Chat Circles*. Discussions in *Chat Circles'* conversation interface are ephemeral, with messages fading and disappearing after several seconds, similar to the temporal nature of real world spoken discussions. However, online text chats often allow participants to scroll back to view the history of the discussion. This is quite useful, especially since people frequently use online chats while also doing other things, both on the screen and off line.

Unlike an audible conversation, which one can peripherally monitor even if one's primary attention is elsewhere, a written conversation requires one's full visual attention and it is easy to miss significant statements and changes of topic while momentarily distracted.

Chat Circles history interface is a separate screen that shows a timeline form all the chat entries since one logged in and allows one to read any of those that were made within one's hearing range (see Figure 2). It presents the viewer with a simple visual representation of conversation over time where activity patterns become quickly observable. By displaying time on a vertical axis and users' postings as horizontal bars, we are able to create a simple two-dimensional snapshot of the conversation history within the room (see Figure 2). Looking at the history interface, one can



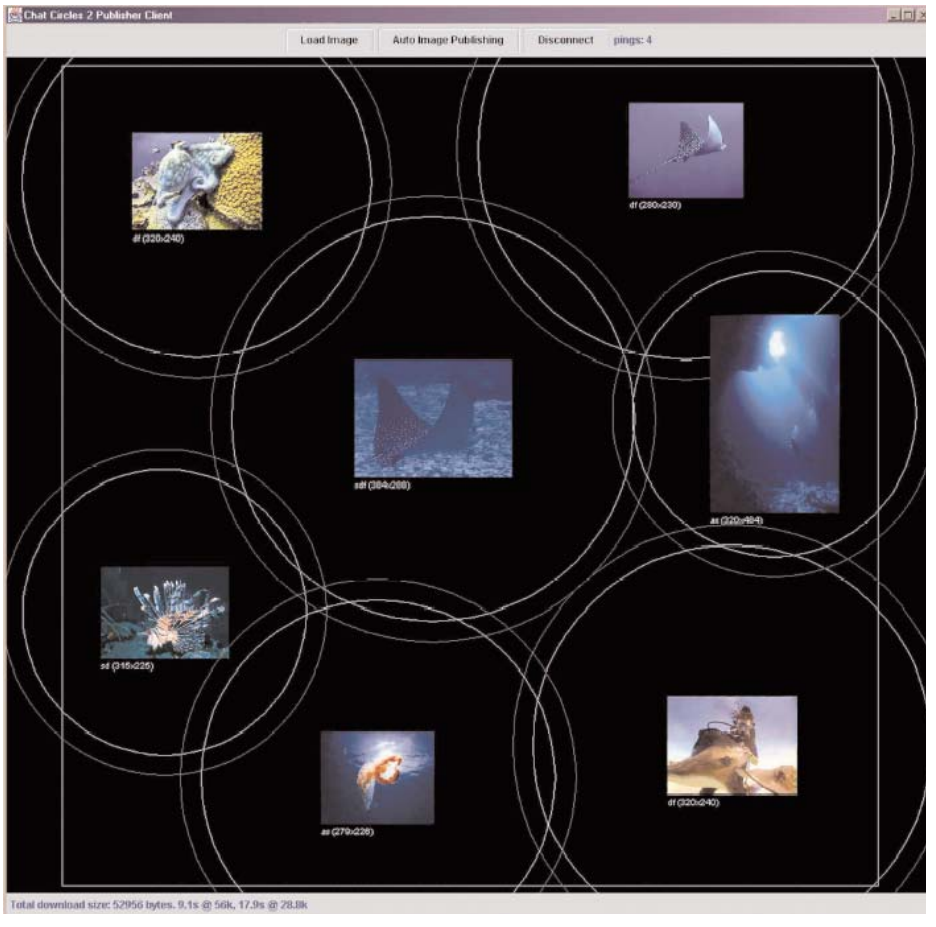
immediately spot certain communication patterns within the room: who talks a lot, who is mostly quiet, moments of quiet and periods of intense messaging. One can mouse over a horizontal bar and see the content of posting. The history interface maintains the hearing range boundaries. Messages that were posted outside the local user's hearing range are shown as hollow bars, consistent with the hollow circles in the chat interface. The user only has access to the messages that were posted within their hearing range: mouseovers reveal the text of only those postings that one had been privy to in the main spatial interface.

Chat Circles' minimalist approach has attracted a number of fans, including ID Magazine, which gave it a bronze medal in their Interactive Design. For us, the spareness of this interface was a foundation to be built upon. Colored circles are not the ultimate representation of the human form, typed text is a slow and constrained communication channel, a blank black background provides little context for conversation. In subsequent projects we experimented with enriching these and other key design areas; the next section introduces these areas.

Chat Circles II

Chat Circles II (see Figure 3) is a major revision of the original Chat Circles interface. It introduced three new elements: images in the background, action traces and a map of the entire space.

The background pictures in *Chat Circles II* can be of anything – from famous paintings to provocative questions, from scholarly research results to celebrity pix. One *Chat Circles II* server uses a continuously



Left & immediately above
Figure 3: Chat Circles II: as users speak or move, their circles leave semi-transparent traces in the chatroom. These marks slowly fade over the course of several hours. Chat Circles II also added background images. The image on the left is a snapshot of what the system administrator sees; that is why there is not hearing range; the view includes all pictures and all traces in the room.

Top
Figure 4: Picture publishing interface in Chat Circles II. As the administrator posts pictures in the chatroom, she has control over the size of the viewing range for each picture, which is represented as a circle around each image.

updated selection of images from Yahoo's most emailed pictures list [5]. The images introduce topics for conversation, helping to define the space as a social environment. The rules of discourse are likely to be different in a space defined by, for example, a picture of hip-hop stars than they are in one featuring news footage of a recent tragedy. The pictures give the visitors a reason to explore the environment. They have a visibility range similar to the chatter's hearing range: far away pictures are seen only as outlines, which fade in as the user approaches. Thus, conversations influenced by the contents of a particular picture will usually occur on or near it, and users who wish to see all the images must move throughout the space to do so.

Adding images gives the administrator of the server the ability to create a particular character and ambiance in the chat space. A publishing client was developed to make it easy to reconfigure the space, including changing and arranging the images and adjusting their visibility range (see Figure 4).

Chat Circles II also introduces action traces. The original *Chat Circles* history mode is good for reviewing past dialogs. However, it exists as a separate mode, devoid of the motion and activity that characterize the main interface. Action traces show where participants have been and the places where they have spoken. As they move in the chatroom, they leave a trace that fades after a period of time (see Figure 3). Places where they have typed a message show the outline of the expanded circle (no text is kept). The users' movements and conversations color the space, making all activity into an expressionist sketch.

Both *Chat Circles* and *Chat Circles II* show only a portion of the full screen at any time. We found that while the large space was interesting to explore (especially once images were added), it was also disorienting. We added a miniature map of the full environment to provide users with an overview of space, including where the other users were. Whenever a user talks, their dot in the map blinks, conveying activity. The overview makes the entire space a lot more comprehensible and allows "hot spots" of activities to be easily identified.

Interface element: The Environment

In the real world, we are surrounded by activity. The weather, other passersby, store windows, etc. create a common context and provide topics for conversation for the people sharing a space. When the people are strangers to each other, a richly textured environment is especially important. Outside events serve as icebreakers; e.g., in a sports bar, the TV showing a game allows strangers to talk to each other, commenting on the action.

In the original *Chat Circles*, the background was blank. Entering this space could be lonely and disorienting. If no one else was there, one simply wandered around a vast black field. Even if others were present, the empty space provided neither context nor catalysts for conversation: the users' words and actions (such as moving their circle about the screen, dancing with it, etc.) were the entire content of the site. This worked best when many people were present, enough to create a vibrant environment on their own; but failed when the site was sparsely populated.

The environment can provide common ground for the participants. The presence of outside content in *Chat Circles II*

provides an external interest. It can be used to bring together people who share an interest (e.g. celebrity pictures can gather a fan club) or to motivate conversation among strangers. As we shall see in the following sections, *Talking in Circles* and *TeleDirection* each provide an increasingly compelling environment.

Talking in Circles has audio booths that are similar to the pictures in *Chat Circles II*, but which exist in the temporal domain, thus providing an ongoing source of information and entertainment. *TeleDirection* replaces the black background entirely with a live video image and a context that actively engages the participants with the action within it; here, the environment becomes the primary focus of the interface.

Interface element: History

In the real world, circumstance determines how ephemeral our actions are. Our footsteps disappear from the sidewalk, but remain for days in deep snow, and for years in wet concrete. Our words disappear as soon as they are uttered (unless we are being recorded). Online, history is a design option: we can make a chat as transient as the spoken word or archive it for posterity.

The history interface in the original *Chat Circles* is one approach to rendering the past activities of a chat group. It was designed to be primarily utilitarian, an alternative interface that would provide historical context for the ongoing conversation while allowing one to add new text input. One can not move about in this interface nor see the movements of others, either current or past: in exchange for the loss of spatial data, it provides a cohesive view of each individual's contributions.

The action traces implemented with *Chat Circles II* represent a very different approach to history, spatial rather than individual, impressionistic rather than factual. These traces are marked out in the main interface where they show how the different areas have been traverse. The use of transparency gives the effect of transforming the temporal dimension into depth. Here, the goal was to give a richness and patina to the space, rather than providing access to its archive. *Chat Circles II* gives users a sense of how the space has been used through the traces left in the chatroom. This graphical 'wear' of the space is of social significance whenever one attempts to build mediated spaces that foster rich social interactions. Understanding how a social space has been used – how popular the place is, where people gather to carry out conversations and with whom – changes our perception of the space and gives us more cues as to what kind of place this might be.

Maintaining the history of a chat raises issues of temporal privacy. With conversations, both online and off, the assumption is that the audience is bounded in both time and space: anyone who is here now can hear it, and others cannot. Archiving a conversation leaves it open to a much broader audience over time. One's expectations about the lifespan of one's words affect how careful one may choose to be: If I think that my comments are going to be available to posterity, I will be far more circumspect in what I say. *Chat Circles* addressed this problem by maintaining the initial conversational boundaries – it is an archive of the words you were presumed to have read, but may have missed.

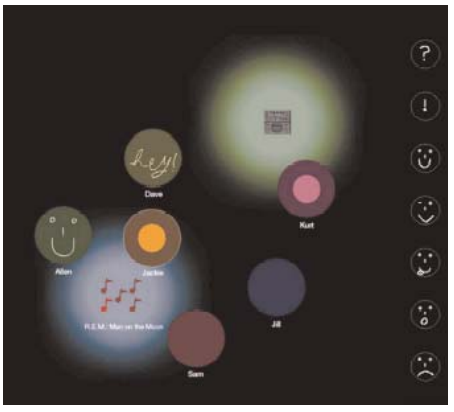
Talking in Circles

Talking in Circles [13, 14] is an interface for online speech communication based on the *Chat Circles* model. The auditory channel is given a visual interface based on *Chat Circles'* minimalist approach. Colored circles again represent the users. Here, the dynamics of the circle represent vocal rhythms: a bright inner circle appears whenever one is speaking and grows and shrinks with the instantaneous volume of one's voice[2]. By making spoken rhythms visible, it becomes possible to easily distinguish between speakers – a task that is quite difficult in an audio-only multi-person conference.

Talking in Circles also maintains the hearing range concept and this feature is especially striking in the audio domain. Sounds grow softer as one goes further away from them. Users who are wholly out of range are denoted with a hollow circle. People can thus have private side conversations by simply moving off to a corner together. The sense of being in a true "space" is quite strong as one moves among different sounds and conversations.

With communication removed from the visual to the aural channel, the user's circle

2 The redesign of the circle to be of a single size with a growing and shrinking core was done to make the users' presence more uniform; the name was moved from vertical to horizontal to promote readability. These changes were not wholly successful: the appearance of the interface is less lively and appealing. It would certainly be possible to implement Talking in Circles with the original representation.



Left
Figure 5: Talking in Circles: audio volume is mapped to inner circle size on user's circle.

Top
Figure 6: Talking in Circles interface. Users are shown here as they assemble around two sound booths: one that is playing a song (mp3 file) and another one that is streaming a news broadcast. Two users are shown talking: Jackie and Kurt.

became free for other uses. We made it so that the user could doodle in their circle, [2] The redesign of the circle to be of a single size with a growing and shrinking core was done to make the users' presence more uniform; the name was moved from vertical to horizontal to promote readability. These changes were not wholly successful: the appearance of the interface is less lively and appealing. It would certainly be possible to implement *Talking in Circles* with the original representation. making ephemeral drawings that would fade after a short time. These doodles could convey backchannel communication that is difficult the audio only world. For instance, one could use symbols (e.g. "?" "!" etc.) to indicate doubt, surprise, etc. at what someone was saying without interrupting them. Furthermore, the doodles could be a way of conveying personality. The person who ceaselessly scribbles funny characters will give off a different impression than the one whose circle remains untouched.

As in *Chat Circles II,* the environment in *Talking in Circles* is demarcated by areas of different content. Here, instead of pictures, there are listening stations (see Figure 6). A colored area marks spaces where an audio feed – music, news, etc. – could be heard. These are shown as soft-edged shapes, for in their center the audio is loudest and the depiction most saturated, with both sound and saturation fading toward the edges. In addition to motivating exploration and providing topics for conversation, these listening stations gave the visitors something to do in the absence of others – or between conversations. By providing an ongoing flow of interesting activity, the sound booths allow the inevitable lulls in conversation to be comfortable. Furthermore, the booths help draw more users into the space. In a blank environment, the user who arrives and finds no one else present soon leaves, making it difficult, unless the site is very heavily trafficked, to gather a critical mass of users. By providing a passive activity, the booths could draw people to the site for longer periods of time. We have not yet tested the effect of different types of audio, but presumably the social function of, say, a news broadcast would be quite different from a music station, both in how they stimulate conversation, and whether they compete with or support it.

Interface element: Communication channel

Talking in Circles extends the *Chat Circles* model by changing the communication channel to speech and, to a lesser degree, gestural sketching.

Typed text is a problematic communication medium, especially for synchronous conversation (it has many advantages for asynchronous communication, e.g. the ability to edit one's contributions). Can the *Chat Circles* design be utilized with a richer medium? This is addressed in *Talking in Circles.*

As Chalfonte et al [1] have noted, speech tends to be used more "socially" for a variety of reasons, key among which are that it is cognitively easier to produce and provides a great range of intonations and other prosodic effects for modifying and shading one's meaning. By bringing the subtlety of speech to this family of online chats, Talking in Circles significantly changes the accessibility[3] and sociability of the interface.

These interfaces exist on a continuum between speech and writing: the ephemeral duration and hearing range makes *Chat Circles'* written words more speech-like, while the visual interface makes *Talking in Circle's* speech more text-like

Interface element: Movement and dynamics

A scene filled with movement appears to be alive. One of the main contributions of this project is that when there are people present, the screen is indeed filled with movement, and not just random activity, but meaningful movement, derived from the behaviors of the participants.

In *Chat Circles*, one's typing (or in *Talking in Circles,* one's speech) creates a visual rhythm as the circle grows and shrinks. This rhythm is observed even in circles outside of the "hearing" range, for the outlines grow and shrink appropriately. Liveliness – are many people typing quickly

3 It is worth noting, however, that the technology to do real-time multi-user audio conferencing over the Internet is nowhere near as ubiquitous as the technology to do textual chat. The Chat Circles system has attracted users from all over the world, casually dropping in to explore the environment; Talking in Circles demonstrations have been limited to computers within the same high-speed network.

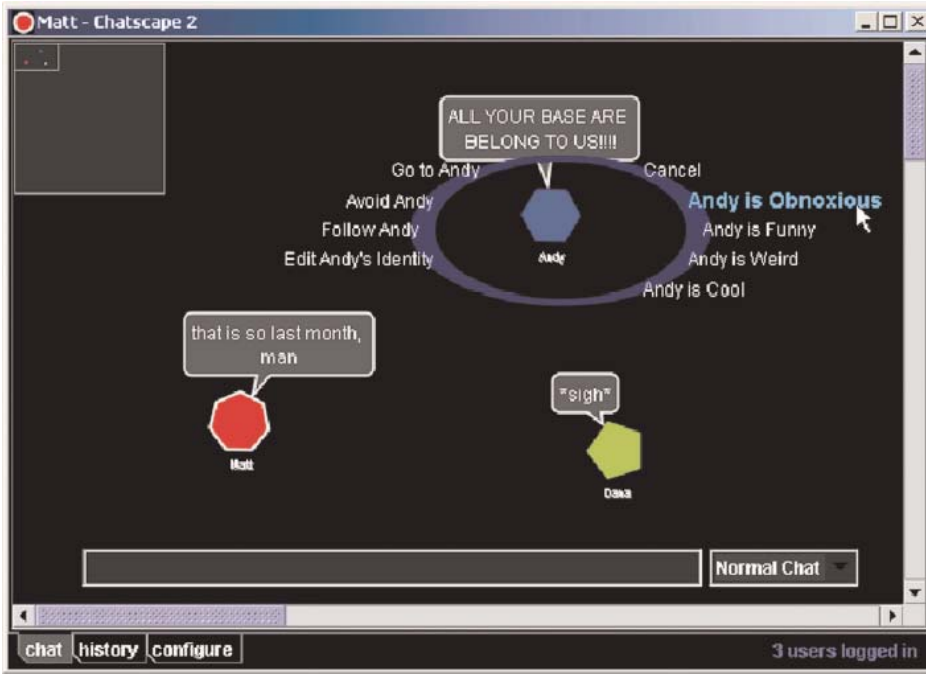
or are the circles mostly minimized and empty? – is the feature of a conversation most noticeable to the observer. These abstract graphical interfaces encourage expressive movement. This has been most apparent in *Chat Circles*, which has the most minimalist interface. Participants dance around each other, groups of people have tried forming dances, conga lines, etc. Many users tend to move about frequently, in what might be a virtual equivalent of gesture (or of fidgeting).

It is worth noting, however, that the technology to do real-time multi-user audio conferencing over the Internet is nowhere near as ubiquitous as the technology to do textual chat. The Chat Circles system has attracted users from all over the world, casually dropping in to explore the environment; Talking in Circles demonstrations have been limited to computers within the same high-speed network.

Movement is social. One can move closer to or further away from others, and it can be friendly or aggressive. In the physical world, we have strong, culturally determined impressions of what level of proximity is appropriate to what degree of familiarity [9].

Too great a distance seems cold and unfriendly while standing too close seems aggressively threatening. Many users of *Chat Circles* and related systems do seem to be aware of the social implications of proximity, sometimes getting closer to another to “speak” directly to them, other times chasing or running from another. (This is in keeping with the quantitative studies of behavior in other graphical chat spaces [11].) The design of the interface, particularly the user of a hearing range, encourages this awareness.

The projects vary subtly in the implementation of the interaction between closely located figures that affects how movement is perceived and used. In *Chat Circles*, for instance, users can overlay each other’s circles (an action that in many graphical chat spaces is considered rudely aggressive). In *Talking in Circles*, however, users cannot pass through each other – they form a solid boundary. To pass by someone you must go around them. This seemingly simple change in how the circles interact leads to deeper questions about



the degree to which one is perceived to be a physical entity on the screen. For instance, in *Talking in Circles* a group could surround someone (though it would take quite a bit of coordination) and prevent them from moving. One can easily imagine taking this further, so that the circles could push each other around etc. Movement thus becomes not only a form of selfexpression, but also a medium of direct communication.

Chatscape

Chatscape introduces behavioral representations [10]. Users can program simple behaviors in their icon (which can be simple geometric shapes as well as circles).

Actions change the icon’s appearance, driven by both the user’s preferences and the judgments of other participants (see Figure 7).

Here the users have a slightly greater range of initial shape choices – in addition to choosing a color, they can choose how many sides their basic shape will have and their rotation. More interestingly, these are modified in the course of interactions. For instance, a user can choose to have a high or low level of affinity blending and those with a high level of this trait slowly transform their appearance to match that of other users they are near. So, if two people, one red, one blue, are conversing and each has set their affinity blend to high, the blue one would turn redder and the red one bluer, until they were both purple; once they part, they slowly return to their initial color. Although this is obviously a very simplistic model of how we imitate each other in real life conversations we were interested in seeing how effective being able to set such behaviors would be in a chat environment.

For instance, in a large conversation if most people have set affinity to high, but a few did not, the former will blend in with each other, and the latter will stand out as independent iconoclasts.

Chatscape users can modify each other’s appearance by labeling them with characteristics such as “funny” or “obnoxious”, etc (see Figure 7). A label of “obnoxious”, for instance, temporarily makes one’s shape more angular and spiky. This is an initial step in exploring a graphical version of reputation systems. In the real world, we have many ways of conveying our opinions of each other, and the subtleties of our gaze, gestures, and speech helps us indicate to each other who we approve of, who we think is foolish, etc. In the absence of these linguistic and embodied indicators, several online systems (e.g. Ebay) have moved to a more direct reputation model, in which other people’s stated opinion of you is a displayed as a major part of your identity. *Chatscape’s* trait labels are more ephemeral, meant to denote a passing opinion rather than a longterm assessment;

Left
Figure 7: ChatScape interface. The local user, Matt, is indicating he thinks Andy is obnoxious. The circular menu appears only on Matt's screen. The change in Andy's shape as a result of this assessment (he'll be more spiky and angular for a period of time) will appear on all.

Top
Figure 8: TeleActor wearing gear: head-mounted gear, microphone, chest display and arm display.

in this way they are more like our everyday gestures of interpersonal assessment.

Chatscape has automated movement. One can request to follow or to avoid another user, and one's location on the screen will then be determined by algorithms that seek to satisfy these constraints. The user can also set different "walking" styles for the movement of the icon across the screen. Here, motion is an expression of higher-level social intentions. The user can at any time overrule the algorithm and move the icon directly; it will, however, subsequently start to readjust in accordance with the requested constraints.

This automation sets up a different relationship between icon and user. Rather than being simply a passive token, the moving icon is more of an agent, acting for but also in dialog with the user.

Chatscape introduces simple behavioral elements, each of which has a social component. The affinity setting allows one's appearance to reflect the surrounding population and the follow/avoid behavior renders kinetics based on interpersonal preferences. The labeling option is particularly interesting, for it has little precedence in real world activity, especially in its ephemeral version.

Interface element: Individual representation

A minimalist graphical approach to the representation of individuals is fundamental to these interfaces. Our initial goal in designing *Chat Circles* was to create a system that identified the user with a unique and neutral visual symbol, i.e. a colored circle.

A common complaint about traditional text chats has been that, with everyone's words scrolling sequentially, it is difficult to form a coherent sense of a person's overall statements. By spatially uniting the individuals' utterances we hoped to provide the users with a better sense of each other's identity. Yet we also wished to avoid the pitfalls of representational graphics: faces and figures that convey, wittingly or not, a strong social message that becomes the overriding impression of the person. By using a nonrepresentational image, our intent was for the participants to form impressions based on words and interactions.

Yet, while the minimalist colored circle succeeded at finding a middle ground between disembodiment and cartoonish representation, we quickly came to see it as a starting point rather than a solution. People watching is a prime social activity, but not in a world in which all passersby are disguised in nearly identical, unadorned costumes. In a visual environment, a meaningful representation of personal identity is important.

ChatScape added socially based dynamic elements to the basic representation. Most work on individual representation, e.g. traditional avatar systems, focuses primarily on self-expression. Here, we were interested in exploring more socially negotiated depictions. The mimicry of the affinity function and the exaggerated features created by labeling are clearly preliminary experiments, but nonetheless ones that raise interesting questions about the context of a representation and the ownership of one's online persona.

Tele-direction

TeleDirection [6] changes the context of the interaction from a virtual chat space to a live mediated environment in which the users are directing the actions of human agent (the TeleActor). Here, the background is a video window showing the TeleActor's current viewpoint. The users suggest goals for the TeleActor by typing them in this window. They also vote on the goals, by placing their icon near their preferred goal. Votes are counted at frequent intervals, with the winning goal sent to the TeleActor to carry out. Users can also chat with each other (see Figure 9). While the main focus of this work has been the development of the TeleActor gear (see Figure 8) and interface features peculiar to this system, looking at how the design concepts explored elsewhere in this family of interfaces can be applied to a taskoriented environment provides a useful fresh perspective.

In *TeleDirection*, the environment is the main focus. A single live video window shows the world from the TeleActor's perspective. The users are deeply engaged with this video, for the TeleActor is an agent acting under their guidance and their primary activity is setting goals for the TeleActor and voting upon them. Chatting with each other appears to be a

subordinate activity; however, it is actually quite important in making the *TeleDirection* process a collaborative rather than purely competitive experience.

TeleDirection introduces the notion of demarcated spaces in which the rules of interaction change from space to space. On the video image, the user's words function as goals, and moving over a goal constitutes a vote; outside of the video window, words are conversation amongst the users.

Interface element: Context

TeleDirection provides a clear context for the interactions. The users are assembled in the virtual space to direct the TeleActor. They may have competing goals, but do share an overall purpose. Interaction among the users is primarily about the ongoing events; it is made even more focused by the frequent votes. The conversational rhythm has the urgency of an action game rather than the languor of a meandering chat.

The other interfaces in this series do not posit an inherent context, though it is certainly possible to use them for a set purpose. *Talking in Circles* is useful in any context that a conference call would be. *Chat Circles II* is also be a good medium (with simpler technological requirements) for a group discussion, particularly if the background images could provide focus. An art history class, for example, could use it to discuss a set of paintings. The basic interface is deliberately neutral, adaptable to many types of discussion.

As we continue work on *TeleDirection*, one area we are investigating is how the interface can be adapted to promote specific types of interaction for particular contexts. For instance, our initial design, posited as a performance piece, had few sanctions for setting mischievous (if not malicious) goals and our TeleActor was requested to do such things as "sit under the table and bark like a dog" or "eat something off that person's plate". We are now working on a design where the TeleActor is a news reporter and we would like the TeleDirectors to take their role as remote journalists seriously. To do this we are, among other things, revisiting some of the issues of graphically representing reputation that were raised in *Chatscape*.

FUTURE WORK

Work in this area is still continuing. There are numerous ideas for interface modifications and for entirely new, but related projects. Here are just a few of the directions and ideas we would like to see implemented.

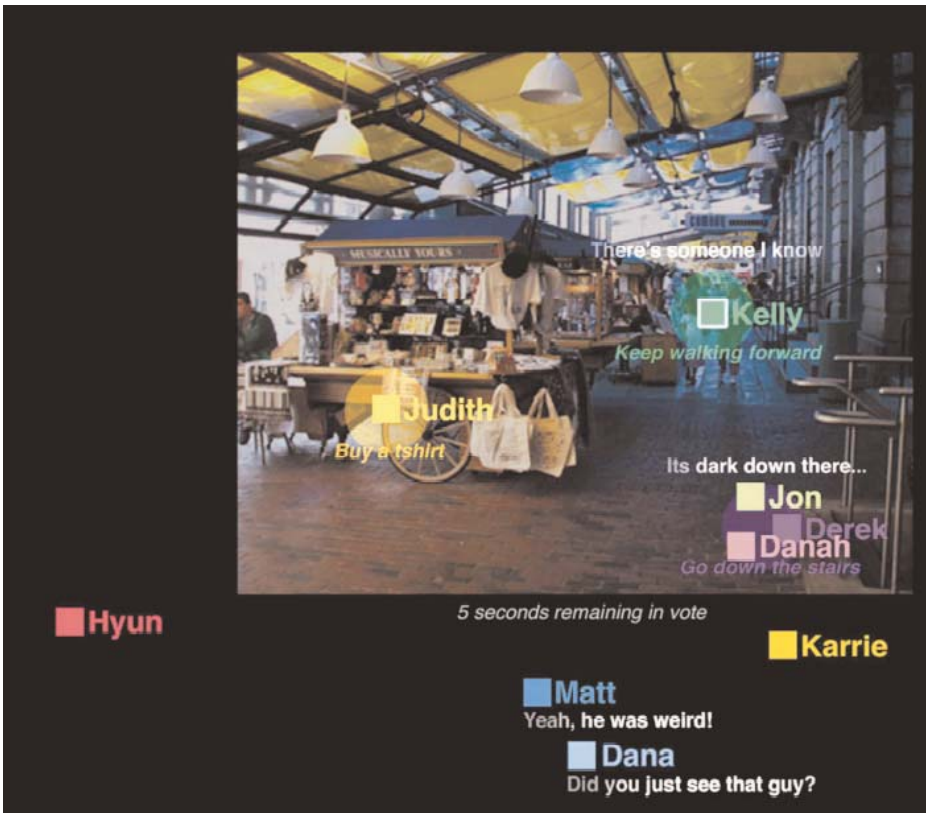
We are interested in the design of a virtual space that has areas that are differentiated by the rules and algorithms that govern behavior in the space. *Chat Circles'* blank background was replaced in subsequent projects with informative and entertaining material. Yet while these images or sounds can draw and hold people's attention and help them initiate conversations, they do not change the rules of the space. One could create ephemeral regions, where none of the words entered by anyone would be archived; one could create anonymous regions, where the participants' identities would be hidden; one could create podiums, where all of what one said would be heard by all, no matter how far.

Another interesting challenge is the design of a visual history interface for speech. *Chat Circles'* history maintains a sense of the conversational rhythm while providing access to the actual texts. Can this interface be modified to access an archive of spoken words? What would need to be changed? How useful would the visual patterns be in navigating a large audio archive?

CONCLUSION

This paper discussed the experience of designing, implementing and deploying a family of graphical chat programs intended to foster rich, engaging environments for sociable communication online. Our method has been to start with a minimalist foundation and explore the design space of variations on this foundation. We have identified a set of key interface elements and it is through variations in the use of these elements that we have created the projects described here, in response to perceived needs within the current graphical interfaces.

We believe that the use of simple, abstract representations of the self and of the environment is a very fertile ground for communication interface explorations, one that provides an important alternative to the more realistic approaches of most current systems.



Left
Fig. 9: The video window shows the TeleActors current viewpoint. Text written on the video window is a goal and the colored halo around it is the area where one can click to vote for that goal. Text written outside the window is commentary. Goals are cleared at the end of a vote; commentary fades over time.

ACKNOWLEDGMENTS

We would like to thank Matt Lee, who developed much of the code underlying *Chat Circles* and subsequent projects, who wrote SMGserver, making it possible to quickly develop new interfaces and who designed and implemented *ChatScape*; Roy Rodenstein, who designed and implemented *Talking in Circles*; Dana Spiegel, who along with Matt, built the *TeleDirection* interface. We would also like to thank the principals of LoTek Architecture who pushed the development of Chat Circles until it became Chat Circles II and Ken Goldberg and colleagues at UC Berkeley who have been our collaborators in developing TeleDirection.

REFERENCES

1. Arnheim, Rudolf. Visual Thinking. CA: University of California Press, 1969.
2. Bradner, E., Kellogg, W, & Erickson, T. The Adoption and Use of Babble: A Field Study of Chat in the Workplace. The Proceedings of the European Computer Supported Cooperative Work (ECSCW '99) conference.
3. Chalfonte, Barbara, Fish, Robert S., Kraut, Robert E. Expressive Richness: A Comparison of Speech and Text As Media for Revision. In Proceedings of CHI '91, ACM, May 1991.
4. Donath, Judith. Mediated Faces. In Proceedings of the 4th International Conference, CI 2001, Warwick, UK, August 6-9, 2001
5. Yahoo! News. Most emailed content. http://news.yahoo.com/h/mt/?u
6. Donath, J., Spiegel, D., Lee, M. Dobson, M. and Goldberg, K. Collaborative Teledirecting. In Proceedings of CHI '01, CHI 2001, Seattle, Washington, 31 March-5 April, 2001.
7. Erickson, T. Smith, D. N., Kellogg, W. A., Laff, M. R., Richards, J. T., and Bradner, E. "Socially Translucent Systems: Social Proxies, Persistent Conversation, and the Design of 'Babble.'" In Human Factors in Computing Systems: The Proceedings of CHI '99. ACM Press, 1999
8. Gombrich, E.H. 1999. The pleasures of boredom. In The Uses of Images: Studies in the Social Function of Art and Visual Communication. London: Phaidon.
9. Hall, E.T. 1992. The Hidden Dimension. New York: Doubleday.
10. Lee, M. ChatScape. Thesis. Available at: http://smg.media.mit.edu/papers/mattlee/Chatscape-2001-MattLee.pdf
11. Ong, W. J. (1982). Orality and Literacy Technologizing of the Word. New York: Methuen & Co.
12. The Palace. http://www.thepalace.com/
13. Rodenstein, R. M.S. Thesis, MIT Media Laboratory. Talking in Circles: Representing place and situation in an online social environment. 2000.
14. Rodenstein, R. and Donath, J. Talking in Circles. In Proceedings of CHI '00, CHI 2000, The Hague, The Netherlands, April 1-6, 2000.
15. Smith, M., Farnum, S., and Drucker, S. The social life of small graphical chat spaces. In Proceedings of CHI '00, CHI 2000, The Hague, The Netherlands, April 1-6, 2000.
16. Viegas, F. and Donath, J. Chat Circles, in Proceedings of CHI '99 (Pittsburgh PA, May 1995), ACM Press, 9-16.
17. Whyte, William H. City: Rediscovering the Center. NY: Doubleday, 1988.