Speak More Slowly!
Developing better community awareness through localized reflective media systems
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Introduction

Recent advances in networking and communication technology have enmeshed us in a richly mediated and informative world, transforming the nature of our everyday interactions into a physical-digital hybrid experience. At the heart of this development is the lightning-fast transmission, reception and transformation of digital information. While previous generations encountered a ‘cult of speed’ owing to such diverse developments as the proliferation of the pocket-watch, the emergence of the automobile and the introduction of efficient factory floor time management, today our experience of continuous, rapid connectivity and communication is all-encompassing and prevalent (Kern, 2003). In this age of great rapidity, McLuhan's "global village" (McLuhan & Lapham, 1994) has become more of a "global living room”, with information of all forms dispersed to and retrieved in our homes on a constant basis. Our televisions, personal computers, and smart phones clamor for our attention, beckoning us with the opportunity for connection and interaction. While the rapidity of our communications may have enhanced our efficiency, it has also introduced a dense complexity to our everyday lives. As experts on human-machine interaction with the power to shape this increasingly important aspect of people's lives, designers have a unique opportunity and duty to analyze, understand and support the factors contributing to informational complexity.

It is hard to deny that our globalized networking benefits journalism, economics, science, politics, and other fields relying on rapid information transmission. However, the sheer quantity of data created worldwide and the rate of its generation is often too vast to easily grasp on either an individual or social level. For many people, the tremendous volume of information we interact with on a daily basis is reaching the point of saturation. In a *New York Times* survey, 30 percent of users under the age of 45 claimed that use of their electronic devices (smartphones, laptops, and related tools) made it harder to focus (Connelly, 2010). Other studies have further identified that people who must multitask heavily, switching rapidly between processing different sets of media or stimuli, perform poorly on tests examining the ability to focus deeply on one activity to the exclusion of others (Connelly, 2010).

Such complex advancements naturally spawn a variety of reactions. For example, the Inbox Zero project devotes itself entirely to identifying ways to reduce the amount of time spent reading and responding-to email, with a focus on maintaining a minimum number of emails in a user's inbox (Mann, 2010). Most of our mediated interactions today are what can be termed "fast." While a fast interaction is what designers have traditionally considered to be the ideal — efficient, taking minimal time to enable maximal interaction, in a way that does not engage the user any more than is necessary — the growing area of "slow design" suggests that there may be more than this to value in an interaction. Emphasizing more measured, contemplative interactions with objects and data, Slow Design proposes to develop richer user experiences. However, there is a fundamental aspect of Slow Design that has not, to date, been examined in significant detail: the ways in which slow design and slow technology can augment and enable social, cultural and community reflection, and as an extension, the ways in which slow technologies can enable personal reflection and self actualization within the context of the group. In this paper we discuss some of the challenging issues currently facing interface and interaction designers, propose how Slow Design principles may provide some potential solutions, and present our own prototype system to evaluate the impact of Slow Design on everyday user interaction.

Slow Movement

The origin of the term "Slow" in the "lifestyle" context began with the Slow Food movement, founded in 1989 as a reaction to "fast food and fast life" (“Slow Food International,” 2010). Perceiving an increasing lack of uniqueness in food culture, and decreasing interest in people's food choices and how they impacted the world, the founders of the movement began a mission to promote biodiversity in crops, the preservation of social and cultural connections made through food, and reflection on the consumer's place in the world. The key principles of the Slow Food movement — social and cultural relevance, personal and communal reflection, and "richness" or "depth" in favor of speed and quantity — have since been integrated into a number of other movements, ranging from urban planning to parenting. The movements are growing steadily; in 1999 the *World Institute of Slowness* was founded, and more recently in 2009, the inaugural issue of *Slow* magazine, dealing with all things "Slow", was published in Australia.

Some of the earliest technological interactive investigations that can be considered "Slow" were conducted by Weiser and Brown, who advanced the concept of Calm technology in 1995. They defined Calm technology as that which "engages both the *center* and the *periphery* of our attention, and in fact moves back and forth between the two" (Weiser & Brown, 1995) (emphasis original). Such technologies can help increase the depth and richness of our interactions by providing us with alternate, often metaphorical, ways of contemplating them. The authors present the example of a dangling string connected to a motor, which reads information from a network cable passing above; as traffic on the network increases, the string dances and shakes. With no pre-defined conceptual mapping for a bouncing string hanging from a ceiling, viewers must create their own, thus reflecting more deeply on the object's existence. Designers can use the natural proclivity of the human mind to see patterns and meaning where none is explicitly given to increase depth of interaction.

In the last decade, the idea of integrating the tenets of the slow movement with "Fast" technology has gained traction. In 2001 Hallnäs and Redström were, to our knowledge, the earliest users of the term "slow technology", referring specifically to computerized technology that promotes a slow interaction (Hallnäs & Redström, 2001). They correctly predicted the current ubiquity of computing power, and that its existence would require some form of slower interaction to be properly navigated. Their research focused on the creation of technologies for the promotion of "reflection and moments of mental rest", through two primary methods. First, through the use of systems that expose their functionality, encouraging people to reflect on the technology itself, and second, through technology in which "time is a central and explicit notion." Projects they describe leverage features such as a simple, un-exciting, almost sedate user interaction to prompt the user to question the role of the object.

The slow movements of central importance to designers today are the Slow Design and Slow Media initiatives. The concept of Slow Design centers around a set of principles proposed by Carolyn Strauss and Alastair Fuad-Luke with the aim of encouraging "social, cultural and environmental sustainability" (Strauss & Fuad-Luke, 2008). A key concept is recognizing that in Slow Design, the temporal slowness of the interaction is neither the end-goal, nor the only facet of the interaction. Rather, a slow interaction with a product can take advantage of interaction over a longer timescale to allow and encourage users to deepen their engagement with the artifact or service. In a notable difference from the Slow Food movement, slow movements in design and technology do not necessarily reject modern technologies simply because they are "fast". It would be unwise (and likely futile) to assume that the only way to deepen and enrich interaction would be through elimination of anything that is fast and efficient. Rather, as Jennifer Rauch writes on

the *Slow Media Blog*, "Slow Media are not a contradiction to the speed and simultaneousness of Twitter, Blogs or Social Networks but are an attitude and a way of making use of them" (Rauch, 2010).

Social, Cultural, and Community Reflection

The educational theorist John Dewey describes reflection as the examination of the basis for a belief — the questioning of the underlying structure of an action or an assumption (Dewey, 1910). Reflection is an important part of both individual and community interactions, providing a method for a person to evaluate the impact of their behavior and actions in detail. This is a crucial action for the mental health of individuals, and when conducted en masse, for the long-term health of the society we inhabit.

Trevor Hancock, founding member of the Canadian Green Party and co-creator of the Alliance for Healthy Cities, defines "social sustainability" as development that, among other things, "enhances...the physical, mental and social well-being of the population...promotes education, creativity and the development of human potential...[strengthens] our sense of connectedness to our history and environment...[and promotes] citizen participation and involvement." (Hancock, 2010). Slow Design principles have been previously utilized to spur social action and cultural reflection. Bissas and Hayashi present a unique combination of Slow Food and Slow Design, using designed objects and interactions to encourage reflection on the food's existence and impact. (Bissas & Hayashi, 2008). For instance, a zucchini with an MP3 player hidden inside allows users to plug in a set of headphones and hear the farm at work from the vegetable's perspective, placing them in that context. Community-reflection research, on the other hand, has generally focused more on increasing simple awareness of others. Hallnas and Redstrom present *Soniture,* or acoustic furniture, which collects and replays sounds in an environment over a long period of time, allowing listeners to begin to develop an understanding of the past history of an area through its aural signatures (Hallnäs & Redström, 2001). Merely being aware of others does not encourage reflection, though — in order to properly engage the user, it is critical that all aspects of the interaction be placed in a deeper context, or that the suggestion of such a context be planted.

Local Culture, Local Ideas

The Slow movement as a whole has always incorporated aspects of "local culture." In the Slow Food movement, this emphasizes the use of locally-grown produce and traditional recipes; to Slow Media proponents, this is taken to mean locally-produced media, relevant to the immediate community. The concept has until recently been somewhat troublesome to apply to Slow Design or Slow Technology, with the inherent dichotomy of using advanced materials and microelectronics on a small scale posing considerable problems. These issues could theoretically be solved through the use of small-scale do-it-yourself technologies. The central problem has been the barrier to entry into the world of digital flexibility and creativity. Though more and more aspects of our lives involve or even require connections to the information world, the opportunities for users to deeply modify their interactions with these digital data have been limited by both expense and training. Thus, in line with the Slow Design ideal of allowing users to create their own sets of meaning for a given interaction, there is an increasing effort to develop systems and methods in which users can easily build their own interactions with the system. The *Arduino* electronic prototyping platform (http://www.arduino.cc/) was designed as a framework to allow users with little or no electronics experience to begin creating their own electronic products, while the *Processing* environment (on which the *Arduino* programming language is based) serves a similar purpose for computer-based systems (Fry & Reas, 2010). Both of these popular systems are heavily utilized in educational, prototyping, artistic and do-it-yourself hobbyist circles.

Additionally, the availability of online development tools and in particular, API (application programming interface) services are expanding opportunities for casual users to more directly interact and engage with online content. Twitter, for instance, provides an API structure through which users can create their own programs that interact with the "cloud" of information stored on the Twitter servers. By granting users access to the raw data, service providers can allow users to analyze and represent the data as they see fit, in ways that can lend both insight and meaning.

In our research, we developed a slow media system that leverages the Twitter service. The data presented by Twitter on their website takes the form of a long list of chronologically ordered posts. While this presentation schema is truly effective in determining the order in which posts were made, there is no direct indication of connectivity between users, which posts are part of which conversations or the relationship of one post to another. Metrics about overall "tweeting" are available, but they are rather superficial in nature (statistics and rankings), containing little meaningful data. In studies conducted while developing our system, it was determined that the majority of users chose to avoid the Twitter website outright, interacting instead with the data through third-party programs and alternate interfaces. We therefore designed our Kiteviz application as a Twitter based interface emphasizing slow interactions and metaphorical communication.

Design & Implementation of 'KiteViz'

KiteViz is a system designed to evaluate the effectiveness of slow interactions within a small, co-located community. It uses metaphorical imagery (Weiser & Brown, 1995), an emphasis on temporality (Hallnäs & Redström, 2001), and a limited amount of obvious information (Hallnäs &

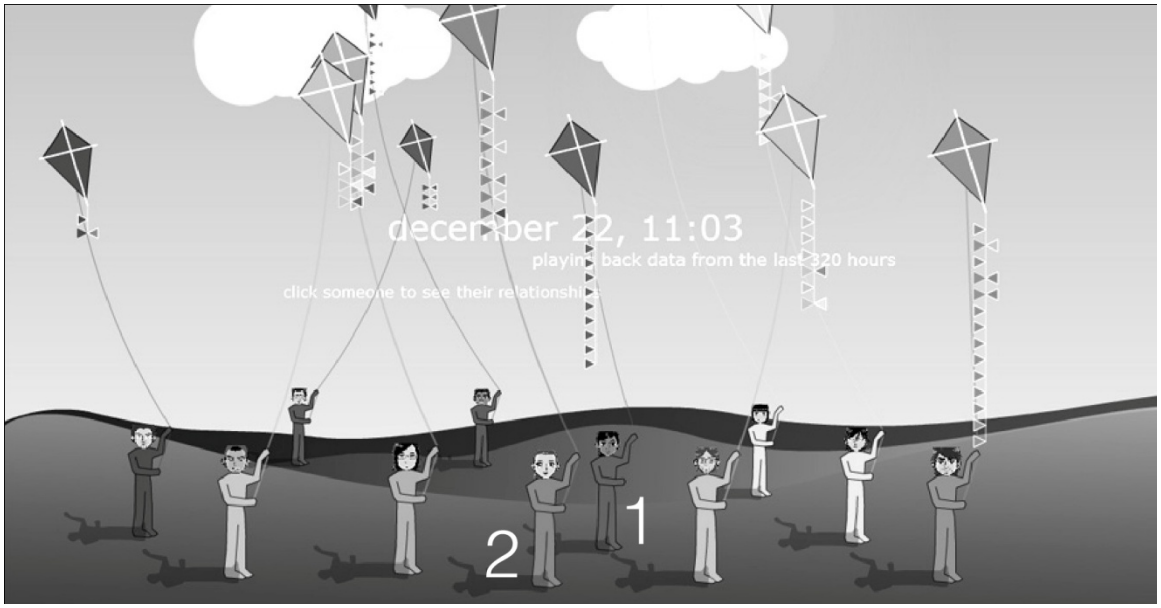

Figure 1: Each character in the Kiteviz visual display represents a user in the system. The long chains of flags on each kite tail indicate the historical level of activity for each user (e.g. user labeled "1"), while different colored flags (e.g. user labeled "2") indicate conversational exchanges between users. Numerical labels are not part of the actual display.

Redström, 2001) to enhance and encourage community interactions. The system is designed for small groups of users (N <= 20) who either work or live in a common area, and communicate to varying degrees using Twitter, though the system is adaptable to many different forms of communication (email, SMS, Facebook, etc.). For testing purposes, the system was evaluated

with a group of co-located graduate students and professors in a university research lab. Most of the users evaluated for the study were prior Twitter users, using it anywhere from a few times a month to several times a day, for varying communication purposes.

Design

KiteViz (fig. 1) is an interactive Twitter visualization interface depicting informal communication dynamics between workplace collaborators. The application is built using Adobe Flex, runs in Adobe AIR and accesses the open Twitter API for its raw data. General data on the group's Tweeting dynamics is gathered from Twitter using a Ruby server application, with additional analysis performed for example, to calculate relationship strengths between user pairs. The application is displayed on a large screen in a common workgroup area.

The digital system uses a kite flying metaphor to depict users, their microblogging activities and the interactions between group members. Kite flying has a rich and diverse cultural history; over the centuries, kites have been used for communicating messages, scientific explorations, transportation and competitive sports. The application attracts observation and encourages interaction by playing back group tweeting activity over the previous week using a playfully analog communication metaphor. The passage of time is depicted using visual environmental cues such as changing background sky color and the progression of the sun and moon across the sky. Users are represented as color-coded kite-holding avatars that strongly resemble each

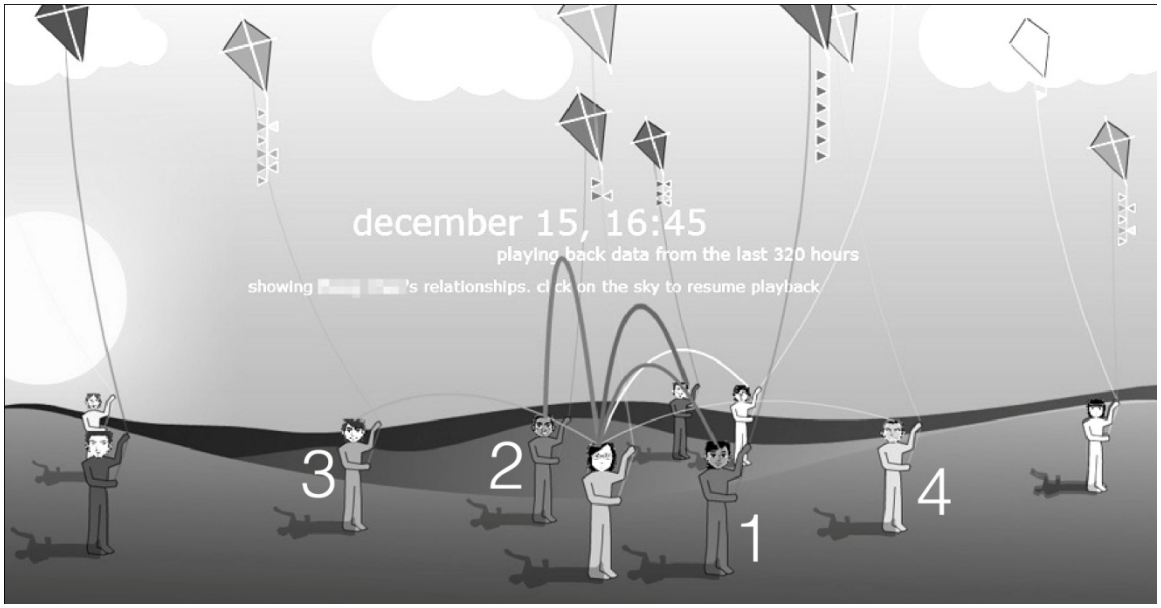

Figure 2: The KiteViz visualization displaying relationships for a user. The central user is selected, and connections are displayed to the others. The users labeled "1" and "2" have the closest relationship, while "3" and 4" have the weakest. The users around the periphery with no lines drawn to the center have no connection (no direct replies to the central user)

participant's real-world physical appearance. Individual 'tweets' appear as flags on a user's kite tail, while color-coded replies from other users are shown down along the 'conversational' tail. By observing the displayed environment and how "active" the users' kites are, the relative amount of individual and interactive group activity at different times can be understood. Each "Tweet day" takes approximately 30 seconds to play back; when the playback reaches the present, it resets to one week earlier and repeats indefinitely.

The KiteViz display is also interactive. Clicking on a kite-holding user slides that user to the center of the screen, and shuffles the others around it according to their relationship to the central character (figure 2). Characters with a higher *relationship score* (calculated by the number of back-and-forth interactions between a given pair of users) will be placed closer together, so the selected user's closest associates will be displayed as an "inner circle", while users with whom they have a more peripheral Twitter relationship will be pushed to the outside. Colored lines of varying thicknesses are also drawn between users, where a thicker line indicates a stronger relationship, to help clarify positions that may be ambiguous.

In keeping with slow principles, the nature of the KiteViz system does not attempt to explain exactly what is occurring in the display, or its mapping to the real world. Users are instead encouraged to develop their own idea of the connections in the system. The entirely graphical display, punctuated by moments of action with no immediately obvious cause, acts as an attractor to draw users in. Once users are engaged, the regular animations and clockwork-like sun and moon motion imply that there is an underlying structure, and make the temporal nature of the system clear (as recommended by Halllnas and Redstrom). However, with no clear explanation given, the user must creatively develop meaning themselves. The lack of scores or numbers helps to allay any overtly "fast" reactionary interactions.

Evaluation

The KiteViz system was installed on a large-screen display in a common area in the research lab where the group under study was situated. In this position, it was viewable by all members of the research group, as well as passersby in the area. Two studies were conducted with the KiteViz system - a survey based user study with the participating research group and a heuristic evaluation of the system visual design by a small group of experts. The heuristic evaluation technique used was based on Mankoff et al, who demonstrated its utility in identifying problems and potentials with an ambient display (Mankoff et al., 2003).

In the user study, subjects suggested that the display did a better job of displaying relationships between users than the existing options; the only way of doing so for most users was through extrapolation, by observing "reply" posts between users and estimating how "close" those users were. They also indicated that the display was intriguing and drew their attention: they were able to discern that there was an underlying mechanic governing both the creation of flags and the patterns of characters, but they were initially mystified as to what it might be. With further study, they determined that it had something to do with the closeness of connection between two people, and then became fascinated by examining the different relationships within the community. The deeper interaction with the system and engagement with the results is created through the user's exploration, which in turn is encouraged by the abstract and presentation of the information.

The heuristic study relied on the skills of expert users to locate both strengths and shortcomings of the interface itself. Experts completing the heuristic evaluation indicated that there was a strong perceived match between the system and the real world, and that the system was both

consistently and intuitively mapped to the real-world actions. Expert users also indicated that although they were not represented among the users in the display, they became engrossed in the patterns and came to want more information from the system. After some observation of the connections between users, for instance, one user indicated that she had become interested in the directionality of the conversations, such as determining who had started talking to whom.

Future Directions

Our ongoing work continues to examine slow interactions in a variety of ways and at different levels of scale. In some cases, slow interactions may even be an unexpected benefit of existing systems, if they are designed to promote reflection. *Taskville* is one of the systems under development in our Reflective Living research group that is designed to enhance group cohesion and inject an element of fun in the completion of mundane tasks by structuring them within a competitive city-building game. The record of tasks completed by each user becomes visible in the structure of a digital city over a long period of time; users can see how many tasks they and other members of their group complete, at what hours they are working, and how time consuming each task is. In post-study interviews, some users stated that observing their actions piece by piece over many days gave them a new perspective on their work and home lives. Some made comparisons to other members of the group, believing that they had less of a workethic than others while others expressed concern that it made them feel as though they worked too much.

Future work aims to expand the concepts evaluated in *KiteViz* and *Taskville* to larger communities, up to and including an urban population in a major city in the United States. While research on small groups is valuable as a pilot study, the most valuable and relevant data to designers can be obtained through the study of the general public, in a highly dynamic common environment. Our early results are promising, suggesting that slow, metaphorical interactions can successfully engage users and encourage them to reflect more deeply. Moving forward, we will examine how this reflection can be further leveraged to improve the integration of Slow Design principles and Fast technologies into everyday life.

Conclusions

The mediated and informative richness of our world today is increasingly transforming the nature of our daily interactions into a physical-digital hybrid experience. The vast quantity of information we interact with on a daily basis is for many, reaching a point of critical saturation. Interactions that take place on a deeper, more contemplate level — *slow interactions* — hold the promise of improving the quality of our encounters with technology by allowing us the time and opportunity to mindfully reflect on the interaction's greater context.

In this paper we presented the *Kiteviz* prototype system, intended to evaluate the advantages that a slow interaction can have over a traditional "fast" interface. Results have indicated that users found the system to be effective at conveying information that could not be easily displayed in other manners, and that the nature of the slow interaction revealing insight over time can both encourage reflection and engage the viewer more effectively. Ongoing research and future work aim to more broadly examine the effectiveness of Slow Design principles in larger technologically mediated communities and contexts.

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