Thunderwire: A Field Study of an Audio-Only Media Space

In this paper, the authors cite their reason for engaging in their research and for writing the paper was that they wished to explore the potential of using an audio-only media space for collaboration. In order to do this, the authors created Thunderwire. Thunderwire is, as one might expect (considering the intent and goal of the authors of this paper), an audio-only media space. Other than simply transmitting multiple streams of audio data from multiple different sources (thus allowing for ‘mass’ communication), Thunderwire also has an ‘on’ light that indicates whether or not the device is on and off, listen-only, and on modes. To test how well Thunderwire functioned as a collaborative space, the authors tested nine different people for a total of two months. Most of these nine engaged in video editing/analysis, and most had also worked with each other during a summer before the experiment. After the conclusion of the tests, the authors found that two of the users were main users, three others used Thunderwire often, and two more hardly ever used the audio-only media. Additionally, the authors found that, while speech often had a high level of interaction, very little of the actual speech pertained to work and that it usually was quite informal. Ultimately, after analyzing the results of their tests, the authors found Thunderwire to be useful, but that it requires to alter their behavior in order to accommodate for the peculiarities of the audio-only medium.

While an audio-only system may, because it allows for faster-than-typing communication and also leaves one’s hands free so that they may type or use the mouse, be useful in some situation, it seems that the system is simply too simple to provide any sort of ‘superior’ collaboration. For example, if two individuals were wanting to collaborate on a code-based program, it would be unnecessarily complicated for one individual to tell the other where in the project he would like his partner to look. He would have to specify folder, file, line number, and approximate character number. However, if the two people were using a system that incorporated video as well as audio, it would (or at least potentially could, depending on the implementation of the video) be possible for one person to simply open a window containing the desired file and move a cursor to the desired location. This seems much more practical than using a complicated series of vocal instructions.

As a means for casual interaction, however, the interface seems to be at least somewhat ideal. Informal communication tends to revolve around topics as opposed to actual things that must be observed visually in order to be understood (although if conversation were revolving about, say, a picture, it would be nice to have a way to transmit that picture to others involved in the conversation). Thus, while not being able to see line-of-sight may be somewhat problematic, Thunderwire’s ability for ‘mass’ communication and also lightweight nature of Thunderwire makes it ideal for simple conversation circles.
**In Situ Visualization**

Rather than discuss any sort of in depth research topics or make any profound remarks concerning the advancement of information display through visualization, this paper discusses how visualization, and more specifically audio visualization, can be used as a tool for creating more artistically-oriented things. To relay this idea of visualization as art, the authors presented three examples of projects that they had done that utilized this concept. The first of these three projects was called Hidden Worlds. In Hidden Worlds, participants would sit around a large, circular table. Onto this table, colored, tube-like images would spout from the approximate of a projection of the user’s mouth down onto the tabletop whenever that user would talk. While sitting around this table, participants would wear a special headset that allows them to see these tube-like images in three dimensions and translated up a bit, resulting in a visual display that made it seems as if these tube-like images would actually emerge from a participant’s mouth when he spoke. The second visualization that the authors discussed was RE:MARK. RE:MARK, which was meant to be a companion to Hidden Worlds, would, whenever a participant uttered a sound, do its best to translate the sound into a string of predetermined phonemes. Once created, this string of phonemes, which would apparently be emanating from the mouth (or at least a shadow of the mouth) of the participant, would be projected onto a display. The last of the visualizations, Messa di Voce, was a bit more advanced than the other two. In Messa di Voce, a singer would stand in front of a projection screen. As the singer sings her part, the projection behind her would display images corresponding to her singing based on things such as pitch and volume. Because Messa di Voce uses position tracking and orientation tracking, it can keep track of the position of a singer’s mouth, thus allowing the visualization to display the sound visualizations in such a way that they appear to be coming from the singer’s mouth. Additionally, some of the visualizations in Messa di Voce are interactive, meaning that, while singing, a singer could touch different parts of the visualization to play back sections of a song she had just sung.

While the visualizations presented in this paper are not terribly insightful and do not relay any significant amount of information, I nevertheless found them quite intriguing. The ideas of displaying audio visualizations in a way such that they appear to be coming from the actual source of the sound seems like a sound one, as is altering a visualization according to differences in pitch, tone, and volume. These alterations, although they here do little more than help to make the visualization more aesthetically pleasing, could be incorporated into other visualization that, because of their immediately apparent and intuitive nature, would allow for the often-desired ‘instantly understood’ quality.

Additionally, while the focus of more utilitarian visualizations may be on the logical display of information as opposed to beauty, it never hurts to have an attractive visualization. Beauty can both draw the eye and also encourage exploration and experimentation, both of which are (usually, if not always) desired be the creators of a visualization.

**Seeing More: Visualizing Audio Cues**

This paper is about the audio visualization Conversation Clock. Because in face-to-face conversation, nothing (usually) is stored or written down so that the history of the conversation can be easily viewed,
much of what has been said, how it has been said, and who did the saying is forgotten. In order to mitigate the extend of this loss of information, the authors created the visualization Conversation Clock. Conversation Clock is a visualization that is meant to be projected onto a round table around which four participants would sit and converse. As the participants engage in conversation, and audio receiver records such data as who is speaking when and how loud that person was speaking at the time. Using this information, Conversation Clock creates a visualization of concentric quasi-circles to represent the history of the conversation. The outermost of these circles represents the current point in the conversation while the circles closer to the center of the table represent more historically distant periods of the conversation. The perimeter of each of the concentric circles is made up of a series of bars of varying height and color. The height of the bar represents the volume of speech at that moment in the conversation, and the color of the bar indicates who the speaker was at that point in time. In order to account for the possibility (inevitability) of interruption and backchannels, Conversation Clock will, in the event that two people talk simultaneously, draw two colors in a single bar. This helps to reveal, among other things, the flow and also the tempo of the conversation. Additionally, Conversation Clock runs in real time, meaning that participants can, while they are speaking, observe the history and structure of their conversation.

I find the ideas behind Conversation Clock to be quite interesting. Indicating the identity of the speaker through color is a very good idea, for it allows one to, at a quick glance, see who, if anyone, is dominating the conversation. Similarly, it allows one to see easily which participants are in fact participating in the conversation and which ones are simply observing. Additionally, since the concentric rings of Conversation Clock are broken up into small time segments (each of which is represented by its own bar), one can very easily discern the length of a turn for this specific conversation. This can lead to further insights about the conversation itself and also about face-to-face communication itself. For example if one were to see that one color had many, very long turns and everyone else in the ‘conversation’ had many short turns, one might suspect that the conversation in face was more of a lecture.

Additionally, I think that the real-time aspect of the Conversation Clock is one of the most important features. It allows people to see the roles that they and their conversation mates are playing in the conversation mates. After seeing their level of contribution to the conversation in such an irrefutable manner, the participants would often adjust their contributions in such a way to achieve a better balance among all participants. While they were not told to strictly do so, they often did it anyways. This is quite revealing about a person’s need to conform to social norms when his action is made visible to his neighbors.