Sounds of a Community: An Interactive Sound Installation

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Abstract
Sounds of a Community (2001 - 2003), is a sound installation in which visitors explore multi-level relationships between traditional cultural identity, religious ritual and musical expression. The premise of this work is that technology can be a humanizing influence, encouraging people to cross boundaries between conventional and new musical aesthetics, traditional cultures and modern life, and religious and secular sensibilities. The installation is designed to be flexible, accessible, musically responsive, technologically subtle and emotionally compelling.

1 Introduction
This work consists of a series of sculptures, modeled upon traditional Jewish ritual objects. The sculptures function as interactive musical instruments (Rowe, 1993; Winkler, 1995), performance interfaces for software-based musical compositions. By using very simple gestures, suggestive of traditional prayer movements, visitors can shape the performance of musical compositions whose sounds and structure have been programmed in software. The sounds, prerecorded in a synagogue, are comprised of prayers and chants related to the ritual objects. The sound installation also includes two non-interactive elements, artistically designed listening stations, whose goal is to encourage visitors to attend closely to the musical qualities of sounds of familiar religious / cultural environments.

The interactive aspect of this work presents a vehicle for reflective expression, engaging participants to listen and respond. Body movements, such as forward and side bends, made while visitors wear prayer shawls, light a series of candles, shake a harvest ritual object in multiple directions, and move a pointer across the surface of a sacred text, become the mediating force in the shaping of sound. Physical gestures are given a “voice”, one that changes in response to the sounds shaped by means of gestures. For people familiar with Jewish religious practice, the sounds can reference traditional prayers and ritual observances, and encourage an exploration of prayer and ritual. For others, the sculptures offer an engaging opportunity for musical expression that draws upon physical gestures to shape and organize sounds.

2 The Interactive Sculptures
Sounds of a Community, includes eight installation elements: seven interactive sculptures and two listening stations. The sound sculptures include two wearable prayer shawls (eTallit1 and 2), an ornate book that is “played” with a pointer moved across the book's surface (eChant), a long, shakable stick on which special vegetation has been mounted (eHarvest), a candalabra whose lights can be tapped with a long match stick (eMenorah). The 2001 premiere of Sounds of a Community also included a small, navigable flooring unit (eFloor), whose software interface has subsequently been remapped to eTallit2. The sound sculptures are home-built with specialized hardware and software. Embedded sensor technologies are used to control real-time digital sound processing (Trueman and Cook, 1999). Special software interfaces track analyze, and process the sensor data and algorithmically create the sound processing.

The sensors used in Sounds of a Community include biaxial accelerometers (referred to below as tilt sensors; used in eTallit1 and 2 and eHarvest), piezo buttons (eMenorah and eFloor) and a computer graphic tablet (eChant), which track various forms of participant physical gestures, and send data to the computer. Mediating between the accelerometers and the computer are miniature single-board computers, Basic Stamp II microcontrollers. MIDI drum modules serve a parallel function for the piezo buttons. MIDI data from the sensors are mapped to a range of digital sound playing and processing parameters within software interfaces programmed with Max/MSP.

eTallit 1 and 2 are wearable interactive instruments with which one can create multi-layered sounds by swaying and bending the body while standing. They are identical in design; a traditional Jewish ritual head covering, a yarmulka, containing tilt sensors, has been placed at the midpoint of one edge of the shawl, allowing the eTallit to be worn comfortably over the head. An earlier design, in which the shawl was draped over the shoulders, proved to offer a less stable support for the sensor. The eTallit were constructed using custom-built Basic Stamp II hardware.
The composition performed while wearing eTallit1 draws upon two sound sources: a sequentially sung traditional prayer chanted by a single voice. Motion bending forward or back (vertical axis) initiates sound playback. Pauses in motion will stop the playback, which continues when motion starts again. The experience is akin to chanting while engaged in traditional prayer motions of older-style religious practice. Bending to the sides (horizontal axis) brings forth an additional layer of chanting. These sounds continually change in length, conditioned by how far, how fast, and in which direction one bends to the sides. Movement to the sides also controls how loud are the singing sounds initiated by forward and backwards bends. The combination of movements on both axes creates the performance.

Visitors have observed that eTallit1 simulated some of the conditions of prayer settings, but allowed them to reflect on the nature of this experience because they were not using their own voices and because of the unusual way that familiar prayer movements were translated into sound projection. To a person familiar with Jewish religious practice, the movements that trigger eTallit1 are familiar and natural, although the musical results are novel. Indeed, some visitors experience their body movements as a form of prayer, while some others move in ways akin to dance performance and others yet select movements geared exclusively to shaping the sound compositionally.

eTallit2, like eTallit1, is worn over the head, while translating physical movement into the performance of a musical composition. While wearing eTallit2, the visitor leans forward and to the sides at varying angles, temporary freezing in place to hold one of nine postures. The postures, which may be discovered intuitively and without prior instruction, include a combination of one of three levels and one of three directions. The levels include standing erect, bending halfway to the floor and bending all of the way to the floor. The three directions include facing forward or back (vertical axis) initiates sound playback. The experience is akin to chanting while engaged in traditional prayer motions of older-style religious practice. Bending to the sides (horizontal axis) brings forth an additional layer of chanting. These sounds continually change in length, conditioned by how far, how fast, and in which direction one bends to the sides. Movement to the sides also controls how loud are the singing sounds initiated by forward and backwards bends. The combination of movements on both axes creates the performance.

The visitor begins a musical phrase by touching one of the words printed in black. When the visitor lifts the pointer away from the surface, the sounds stop. When the pointer is moved across certain sections of the text, the call and response sounds are digitally processed in ways that abstract the singing voices and alter how the nature and size of the group are perceived [primarily granulation, which creates sound clouds, and delays, which has the effect of multiplying and overlapping the sounds]. Various layers of these sounds (solo and collective) are embedded in different sections of the image, to be selected by the visitor. Solo chanting of the biblical text is enacted when the visitor presses the pointer more heavily against the book’s surface. Both sets of sounds can be performed simultaneously.

The movement of the pointer is reminiscent of the technique by which a liturgical singer of biblical text [“Torah reader”] follows the text while reading. A visitor to the 2001 premiere showing noted that “(eChant) allowed me to use familiar ritual movements to escape ... into a personal sound space ...”
\textbf{eHarvest} is a stick-shaped interactive ritual object, playable as a musical instrument. It is modeled upon a traditional Jewish \textit{lulav} and \textit{etrog}, ritual objects central to the celebration of the autumn harvest festival. Unlike the traditional ritual objects, which are made of organic plant materials, eHarvest is constructed largely from wooden dowels and paper mache.

![Figure 2. eHarvest.](image)

Like candle four, candles five and six generate random sequences of the phrases, this time sung by a male voice, each reflecting a greater degree of randomness. Candle seven adds an adult female voice, also algorithmically replayed. Up to seven candles can be performed simultaneously, allowing complex polyphony. The fugal qualities of the performance continually change, depending upon which candle is being tapped, and by the material generated by each respective algorithm in the interactive software.

\section{Listening Stations}

A second goal of \textit{Sounds of a Community} is to engage participants in a heightened awareness of the sound environment around them. It is my goal to heighten awareness of sound within ritual and prayer settings, where such awareness is often limited.

The electroacoustic soundscape composition (Schryer, 1998), 'Woodstock Soundscape' was composed using multilayered sounds, previously recorded on site, including elements from religious services, schoolchildren, people singing or in conversation. It may be heard within custom built 'sound pillows'. The pillows are comfortable cushions within which headphones are embedded. Visitors, lying on the floor, place their heads upon (and slightly within) the pillows. Some sections of the work focus on particular groupings of sounds that are literal depictions of events that occur in a synagogue; others are more abstract.

\textbf{eSabbathTable} is a listening station cast in the form of a Sabbath dinner table. Resting upon the table are sculptures based upon traditional ritual objects and foods: a pair of candlesticks, a kiddush cup (wine goblet), a dinner plate, a hallah (braided bread), and flower vase. Embedded within each object is a speaker through which one may listen to early 20\textsuperscript{th} century family history narratives. Visitors to eSabbath Table have commented upon the humorous juxtaposition of unusual narratives with the experience of placing food and table items against their ears.

![Figure 4. listening to an eSabbathTable object.](image)
4 Discussion

Identity is a term that refers to a sense of belonging. A major way by which people affirm their connection to a culture is to enact the symbols, values and core beliefs of that culture (Kaplan, 1934, 1967). In an age of increasingly porous concepts of personal identity, the very concept of cultural belonging is rapidly changing. People voluntarily don and doff religious, political and even racial identification. Nonetheless, religious ritual, having been transmitted within families and communities for thousands of years, remains one of the few enduring and traditionally moored anchors of identity. Many Jews, for instance, even those who are alienated from Jewish religiosity as adults, retain easily accessible and often warm childhood memories of rituals. It is for these reasons that I selected religious ritual as a reference point for identity exploration in Sounds of a Community.

Religious ritual often involves the use or manipulation of ritual objects (Marett, 1909). There is a close relationship between ritual objects and the sung or spoken element (Hoffman, 1999). The most obvious example relevant to Sounds of a Community is the garment (tallit, or prayer shawl) that Jewish worshippers often wear when praying. In this case, the wearing of the shawl establishes the context, if not an aid, for prayer. When reading biblical text (Torah) in a liturgical setting, the one who chants follows the written text by use of a pointer (yad) held in one hand. Not merely a place keeper, the pointer has, over time, become inseparable from the reading of the text. This connection contributes to the embedded meaning connecting the sounds and Torah pointer of eChant. A third model is represented by eHarvest. In an actual ritual setting, the shaking of the lulav and etrog, are preceded by prayers that establish a context for the manipulation of the objects. Additional recitations accompany the carrying and shaking of the objects. What unites these three examples is the integral relationship between ritual object and verbal utterance.

Many visitors who grew up familiar with Jewish ritual practice, but for whom it is not a regular part of their current life, often found that the sculptures evoked childhood memories of experiences in Jewish religious settings. This was true even for people who reported negative cognitive ideas about those experiences. Some visitors to eTallit 2 / eFloor and eChant found themselves thinking about times when their own voices have been part of a collective sound cloud. Questions noted by visitors to eChant included: “Where am I am situated within the group? Am I among the massed singing voices? Am I the singing leader who chants the “call”? What does it mean to stand outside of the group and direct the collective singing, as I move the pointer? What does it mean to lead or to join in with the group, while engaged in prayer? What do these distinctions mean?”

The interactive nature of this installation proved compelling to visitors. The accessibility of the sculptures as musical instruments --- for all ages of people --- has been an important element in its success. Visitors required less than five minutes to gain competence with each of the sculptures, yet found that their interest could be sustained for an extended period of time, in some cases seeking return visits. It is important that sound installations for a general audience need to balance easy access, degree of gestural responsiveness and richness of sound possibilities.

The interactive nature of this particular sound installation suggests that ritual objects, often viewed as reflecting conservative values, may be viewed as malleable source of personal, if not artistic, expression. In this installation, sculptural design seeks a middle path as a creative expression of traditional models. The physical appearance and the sounds that they enact reflect ancient collective Jewish traditions, yet engage distinctly contemporary musical ideas. Religious ideas have been removed from their original context. Visitors have asked: “is the work about religious ritual or musical performance?” Indeed, it addresses both.

References


Note: Many thanks to Curtis Bahn for his assistance with this project. Quick time video clips, mp3 samples and other documentation may be found on the web at: http://www.albany.edu/~gluckr/projects.html (2003).