

Host Your Ghosts

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Fig. 1. The Divination Phase Equipment in *Host Your Ghosts*

1 Program Notes

Host Your Ghosts is an interactive sound art installation that explores communal musicking through audience-provided statements, a repurposed Ouija board, and a custom-made motion tracking planchette interface. The piece's performance ecosystem uses machine learning tools to analyze spoken word recordings made by individual participants, building a series of descriptor-driven corpora. The planchette's movements across the Ouija board by groups of performers conjure musical material from a series of concatenative synthesizers and a multichannel speaker array, creating a community-driven sonic tapestry made from the "ghosts" of the unseen prior contributors.

At its core, *Host Your Ghosts* examines Ouija's multifaceted legacy which has seen it play the role of a collaborative mediation tool for those seeking to communicate with otherworldly forces, a taboo toy marketed to adventurous young

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adults, and even as the subject of fury for members of conservative religious movements during the Satanic Panic of the 1970s and 1980s [1]. The installation structure acknowledges these preconceived notions about the purpose and significance of Ouija boards and asks participants to explore how they connect to collaborative performance procedures.

2 Project Description

Host Your Ghosts features two distinct opportunities for participant interaction organized into phases: one occurring separate from the main installation space and designed to be experienced independently (known as the Statement Phase), and the other designed to bring people together to perform as a group in a colocated space (the Divination Phase). Participants can choose to experience the phases in any order that they please.

In the Statement Phase, individual users approach a station containing a microphone, an audio interface, and a laptop that displays a set of instructions encouraging them to record a spoken statement in response to the prompt “What Haunts You?” Once captured, these recordings are uploaded to a remote web server and transferred to a second computer housed in the Divination Phase space. Participants are informed that any statements recorded in this phase will be used to create sonic material elsewhere in the piece, and that recordings are deleted at the end of each performance. When they are finished recording, they are encouraged to leave the room and participate in the Divination Phase.

The Divination Phase is designed for group interaction and performance, taking place in a second, larger room containing a multichannel speaker array. Participants enter this new space to see a station containing a Ouija board and a custom-made motion tracking planchette interface in the middle of the array (with a second computer and audio interface hidden from sight). A placard asks participants to independently think to themselves about the things in their lives that haunt them before joining together to move the planchette across the board as they feel compelled.

The planchette’s movements trigger a series of concatenative synthesizers to play audio from multiple sample datasets, each of which are derived from the recordings collected in the Statement Phase. Building a sonic tapestry from the “ghosts” of the unseen prior contributors, the samples are processed with delays, resonators, and ring modulators to create a sound world that is both eerie and resonant where words emerge with varying degrees of intelligibility. Just as Ouija users in traditional contexts must actively interpret the visual “message” spelled out when the planchette stops at symbols and words on the board, participants in *Host Your Ghosts* are incentivized to create their own sense of meaning from the aural output. Sample volume, delay feedback, and the amount of ring modulation applied to each synthesizer vary according to the planchette’s direction and velocity, while the location of the planchette on the board both determines the samples that are played and that spatialization of those sounds throughout the speaker array. Depending upon which sample bank is triggered, participants hear sonic elements ranging from short, percussive sounds to complete words and phrases. Figure 2 shows a stage layout diagram along with information detailing participant performance/interaction scenarios, audio routing, and data transmission topologies in each phase of *Host Your Ghosts*.

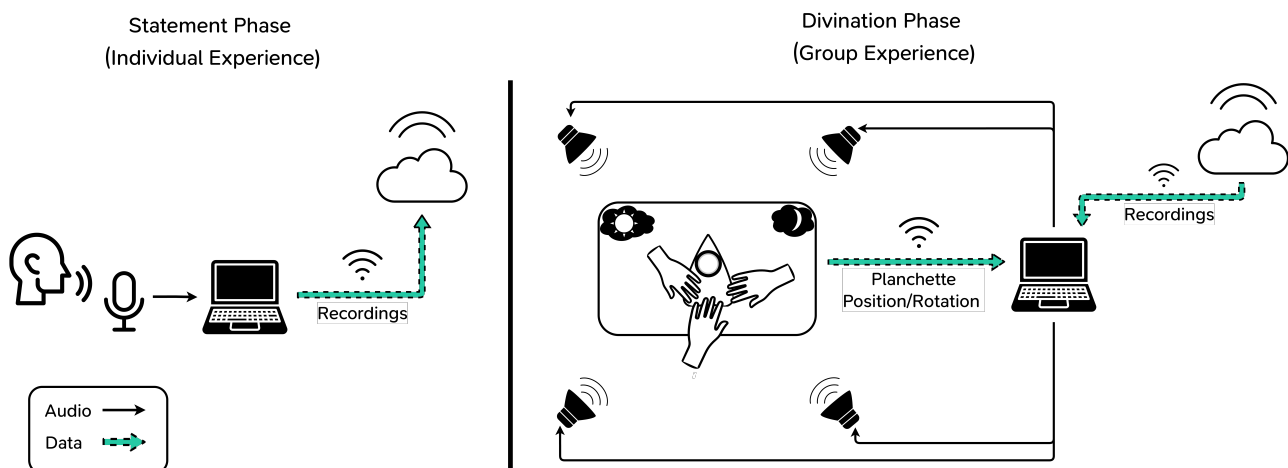


Fig. 2. A stage diagram that details participant performance/interaction scenarios, audio routing, and data transmission topologies in each phase of *Host Your Ghosts*

2.1 The System

In the Statement Phase, spoken contributions are recorded and stored by the Collector patch. Once captured, these recordings are uploaded to a remote web server and transferred to the main performance computer housed at the site of

the Divination Phase. The user interface of the Collector patch consists of a single toggle button which participants use to start and stop the recording process. The patch implements a noise gate and a ducker to help with isolating the text in each statement by minimizing ambient noise from around the performance space.

The computer stationed at the Divination Phase runs the Ouija patch, which serves as the multi-voice corpus-based concatenative synthesis (CBCS) engine communally performed by participants. Incorporating objects from the FluCoMa package [7, 8], the Ouija patch compiles the recordings transferred from the Collector patch and concatenates them into a single file. The file is analyzed with a Mel-frequency cepstral coefficients (MFCC) algorithm and sliced by onset changes representing 91 values related to spectral and volume differences, forming a starting corpus. This file is processed four times using different set of metrics for length and sensitivity, producing four separate sample datasets (with resulting samples ranging from a few milliseconds to several seconds in length) and distributing those samples across individual plotters. Each sample bank maps similar sounds together, resulting in some collections that consist entirely of short, percussive samples (e.g. vocal clicks or portions of syllables) and others where complete words or phrases could be heard. The output of each synthesizer is passed through an effects chain as described in Section 2.

Host Your Ghosts features a custom-built planchette as the communal performance interface for the CBCS engine, and its movements across the two dimensions of the Ouija board serve as a method of using a 2D space for exploring the sound space of each dataset [5]. We use an optical tracking odometry sensor breakout board and an accompanying library¹ that combines a PAA5160E1-Q-driven laser optical system with a 6-axis IMU and an STM32C011 microcontroller for high-speed sensor fusion. In addition to the optical flow sensor, our planchette interface includes a custom carrier board containing an ESP32-S3 microcontroller, a rechargeable LiPo battery, a slide switch for turning the planchette on and off, and a pushbutton. The planchette transmits its position data to the Ouija patch wirelessly over a local WiFi network using the Collab-Hub framework [4].

Participants perform the Ouija patch's CBCS engine by moving the planchette across the surface of the Ouija board. In the Ouija patch, we map the corpora datasets to virtual representations of locations on the physical board using Max's "node" object, placing four nodes (one to represent each sample dataset) at coordinates across the object's graphical user interface. Correspondence between the planchette's location on the physical board and the virtual node triggers the playback of samples from the corpora. This position data also sets the spatial location of samples triggered by the associated synthesizer(s); in the installation's default quadrophonic setup, landing at the outer edge of a virtual node assigns the sample to just one of the four speakers in the room, while landing at the center of a node pans the triggered sample to be spread across all speakers evenly. When the planchette passes locations where nodes overlap, multiple synthesizer voices are triggered and samples from each corresponding corpus are heard simultaneously and spatialized accordingly. Additionally, motion gestures such as the speed, velocity, and the rotational heading of the planchette generated by participants are mapped to the parameters of our synthesis engine's audio effects (see Figure 3). Participants are instructed to press a button mounted on the side of the planchette when they are finished performing which "resets" the Ouija patch manually, concatenating and reanalyzing the collection of participant recordings made in the Statement Phase as a new set of participants approach the board.

As seen in Figure 3, we've mapped these data streams to synthesis parameters in the Ouija patch in an effort to sonically reward users' natural inclinations for moving the planchette based on Ouija's embedded cultural scripts and entice them to explore both slow and rapid planchette movements.

2.2 Compositional Background

While it originated as a communal tool for divination, the modern production of Ouija boards by a board game manufacturer indicates the existence of an inherent game-like nature to its use. In her work "Spirited Play: Analyzing the Ouija Board's Gamification," game theorist Sara Evans comments on the cultural classification of Ouija as a board game and the mental conflict this produces when comparing its game-centric script to its supernatural-centric script [2].

Building on Evans' assessment we aimed to build our own sense of clashing scripts and purposes around use of the Ouija board, combining the "searching" and discovery-laden nature of the group musical performance in the Divination phase while also encouraging users through the text prompts to use experience the installation ecosystem as a novel mediation method for self-reflections on the notion of fear. The use of the word "haunts" instead of synonyms such as "scares" or "frightens" as in the inciting prompt in the Statement Phases was designed to broaden the subject matter that participants might feel comfortable speaking about and, in turn, deepen the meaning of the audio environment created during performances in the Divination Phase. Focusing on a hauntological approach, we intentionally give no definition of the word "haunts", and the ambiguity inherent in the term gives the speaker the freedom to choose which definition of

¹https://github.com/sparkfun/SparkFun_Qwiic_OTOS_Arduino_Library

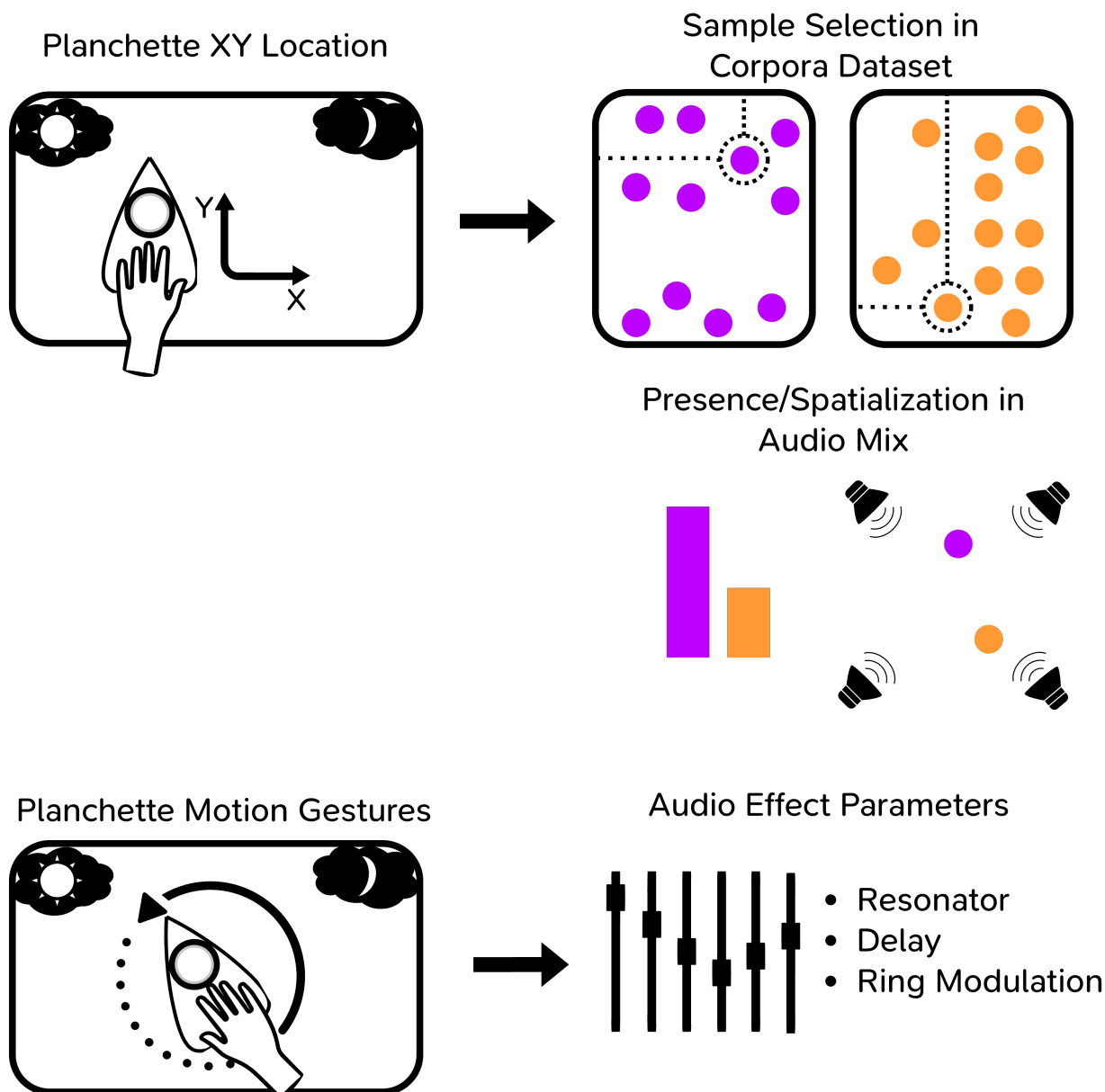


Fig. 3. Mapping of the planchette interface positions and motion gestures

the term they'd prefer to talk about, ranging from supernatural subjects of fear like monsters, ghosts, and unexplained phenomena to real-world concerns or lingering anxieties [3, 6].

3 Technical Notes

We request 2 spaces. One will serve as a recording “booth,” for the Statement Phase, and the other will be the installation space for the Divination Phase. The spaces may be close together but do not have to be. Ideally participants will record themselves in the booth before interacting with the installation but it is not necessary. Internet access is ideal for both spaces, but we can also work to set up a wireless local area network if necessary.

3.1 Statement Phase Space

A small, set-off space with a booth-like feel, large enough for a table for laptop and interface and a microphone on an upright stand. If a separate room is not available, it could be created with noise baffles. The booth should be a sonically calm area with a minimum of background noise. Some ambient noise is acceptable, but ideally there will be no music or

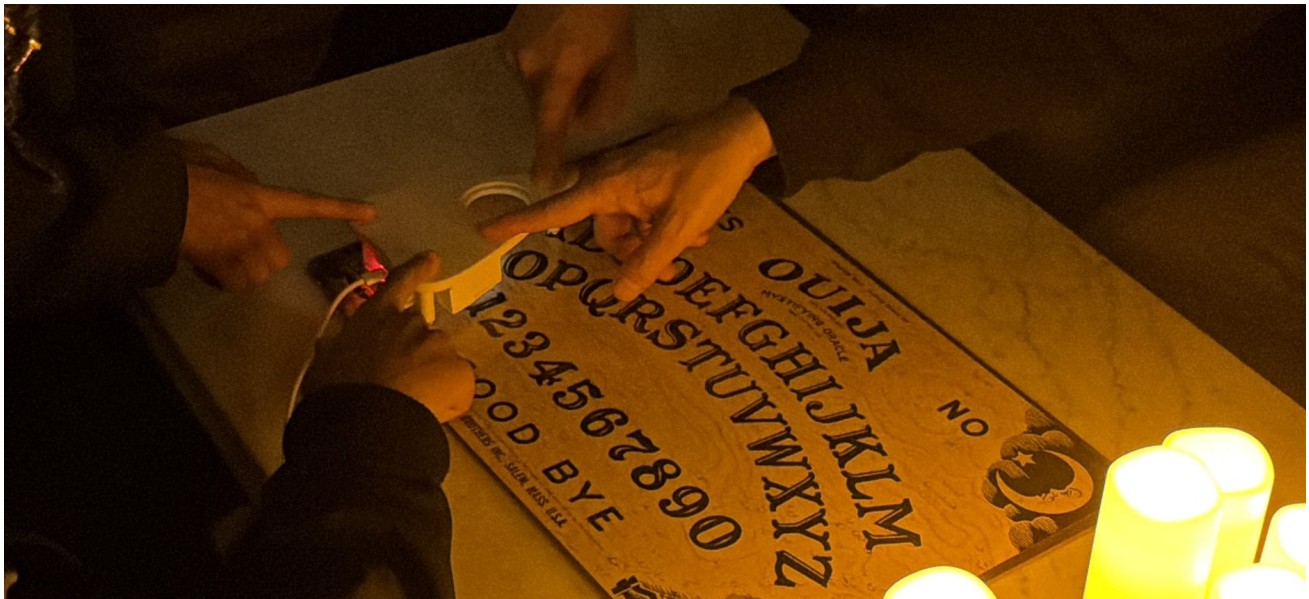


Fig. 4. A group of participants moving the motion tracking planchette in the Divination Phase

Table 1. A List of Equipment for *Host Your Ghosts*. See Figure 3 for a stage diagram.

Equipment name	Artist to provide	NIME to provide
Statement phase - Recording booth		
Laptop	x	
Audio interface	x	
Microphone and mic cable	x	
Mic stand		x
Small table for laptop and interface		x
Chair		x
Divination phase - Installation		
Ouija board and motion-tracking planchette interface	x	
Table/plinth: minimum 60 cm x 60 cm		x
4 chairs around table		x
4-channel output audio interface	X	
4 speakers, speaker stands (if needed) and associated cables		x
Laptop	x	
WiFi Router	x	

loud background noise. It could be in a closet, hallway, under stairs, or in a quiet corner. We are currently testing a web browser version of this collection method that will be ready by the NIME2026 conference date a stand alone space for this part of the installation is not available.

3.2 Divination Phase Space

A room of approximately 5-10 m² or larger with 4 speakers in quad formation around the edges. In the center of the space is a Ouija board on a table, with a custom-made planchette. Participants sit around the table together and place their hands on the planchette to begin triggering the sound spatialization. The table and chairs may be normal office equipment, or be more of a “parlor” setting with a coffee table surrounded by arm chairs. Some ambient noise is fine but there should be a minimum of music bleed from other installations. The room itself may be more or less sonically active. If necessary, we can render a real-time binaural stereo version of our work and provide headphones and headphone splitters for group participants in this phase.

4 Media Links

- Video: <https://youtu.be/X-cTcdhSIPw>

5 Ethical Standards

This project adheres with the NIME ethical standards. All users of the NIME documented in this project interacted with it voluntarily as audience attendees of public art performances. Participants were made aware that the recordings of their statements spoken as part of the installation's Statement Phase would be used to form the sound design heard in the Divination Phase before they choose whether or not to participate. All audio recordings collected during the airings of installation discussed in this paper were deleted following the end of the performance and were not shared or used for other purposes. Participants attending the premiere performance of the installation were made aware that pictures and video documentation were being collected throughout the event before they chose to participate.

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