

Driftwood: Redefining Sound Sculpture Controllers

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ABSTRACT

The Driftwood is a maneuverable sculpture that is both an instrument and a controller. Tactilely, it is a micro-terrain one can explore with the hands as with the ears. Closed circuit sensors, moving wooden parts and Piezo microphones are discussed in the design phase alongside background and musical implementation concepts. Electronics and nature converge in this instrument harmoniously referencing our technological growth, changing world and environment. When engaging with the sonic sculpture, silent objects become audible and rest-wood is venerated. It is revealed to the musician interacting with Driftwood that our actions intervene directly with issues relating to sustainability and the amount of value we place on the world in which we live.

Author Keywords

Driftwood, Copper, Circuits, Tactile, Sonic Sculpture.

1. INTRODUCTION

Explorations in the studies of sound objects, reduced listening and acousmatic listening is a recurring theme in literature. "Schaefer emphasized how acousmatic listening, which we shall define further on as a situation wherein one hears the sound without seeing it's cause can modify our listening [1]." Re-contextualizing this modification of listening and interaction within the form of an instrument can lead to creative innovations.

2. HISTORY

The history of sound sculptures is an exemplary one. The futuristic creations of Luigi Rusollo are sculptural instruments [2]. Derivative of this, A Martin Messier and Nicolas Bernier blur the instrument/controller lines by incorporating components of acoustic and electronic features into large amplified machines. John Cage's *Child of Tree* utilizes a found objects (e.g. cacti) as instruments. Cage's instruments were inspired by James Joyce's *Finnegans Wake* [3], where "infantina Isobel" is celebrated as "neath of the whitethorn, child of tree, like some lost happy leaf, like blowing flower stilled [4]" Other recent works to combine natural touch interfaces with technology include J. Toenjes' "Natural materials on stage: custom controllers for aesthetic effect and J. Bowers and A. Haas' "Hybrid resonant assemblages: rethinking instruments, touch and performance in new interfaces for musical expression." The named instruments bear similarities to Driftwood, encompassing aspects of music making through tangible interaction.

3. BACKGROUND

As with Cage's piece, The Driftwood is derivative from literature inspired by the Norse mythology of the early humans Ask and Embla being formed by Odin out of sea-swept logs [5]. Driftwood found in the ocean stems from pieces of fallen trees, masts of ships, bows of decaying fishing boats and floorboards from windswept beach shanties. Reeling in these pieces of wood from their passive state and

animating them through sonification allows the fluxus-like disorder to become audibly arranged. The wood becomes something animate and alive through technology, interaction and improvisation.

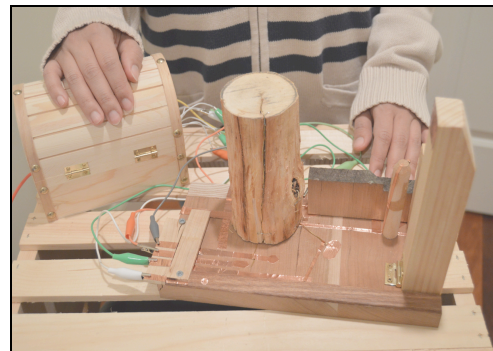


Figure 1 Driftwood Instrument Performance Arrangement

4. DESIGN

Structure

The Driftwood is composed of "drifting" wood from different sources. Therefore, the term 'driftwood' in this domain refers to any wood cast aside into desolation. Driftwood is composed of pieces cast into the wasteland of the scrapheap at the woodshop, relating to the context of a luthier's life Dartmouth and days spent in the woodworking woodshop. To allow for optimal playability, pieces of walnut, pine, spruce and oak were lightly sanded and positioned on a baseboard with copper and hinges. Once contextualized, each piece represented a different part of a ship: mast, keel, beam, bowsprit, rudder and deck [6]. Identifying these forms allows for differentiation and object-personification when scoring for an instrument of this kind.

4.1 Electronic Mechanisms

Driftwood uses a circuit board that has an AT Mega 32 u4 micro controller.



Figure 2 Driftwood Circuit Board

It is running Arduino Leonardo firmware and employs Human Interface Device (HID) to interact with any computer. Closed switches sensed on input pins are able to dispatch information on movements of the mouse and keyboard. Max patches and Key-



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mapping software (often used in cognitive experiments) can easily be recruited to store sounds which are activated by closing a particular circuit. Copper tape pathways across the board are modulated by several hinged wooden components which close circuits and initiate sounds. These sounds are generated either from organic amplified contact with the structure itself or from activating the copper circuits using the moving parts or hands as a conductive bridge. While the controller component is electronically configured, a piezo microphone on the underside of the baseplate provides amplification of the structure itself. This is the instrument component of the Driftwood.

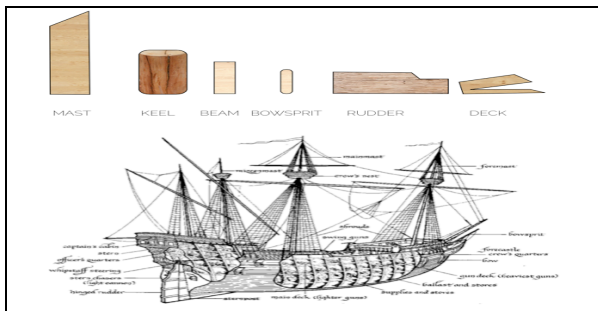


Figure 3 Components of Driftwood Compared To A Ship

5. MUSICAL APPLICATIONS

Despite having numerous predecessors, the Driftwood is unique in its versatility and novel method of architectural/visual scoring. The microphone in the base amplifies specific tones in real-time; however, combined with software such as Max MSP, these tones can be filtered. Sound sources triggered by electrical connectivity can be selected to the preference of the musician or parameters of the composition. A musician can edit a wav file, splice it into samples and designate various fragments to the six moving components of the Driftwood. The six components can also occupy chord spaces (similar to a 5-chord Zither) and have been used in live performance to accompany other musicians and vocalists. As presented in the accompanying video, the Driftwood can also be a solo instrument. Driftwood has a unique visual scoring system. Composers have the freedom to use the depicted shapes derived from the six wooden components to compose music architecturally. When drawn out, these form-based architectural scores can easily guide a performer through the music. The score can also be arranged in a detached format seen in the Amphidrome score for Driftwood (fig 4) and played from left to right.

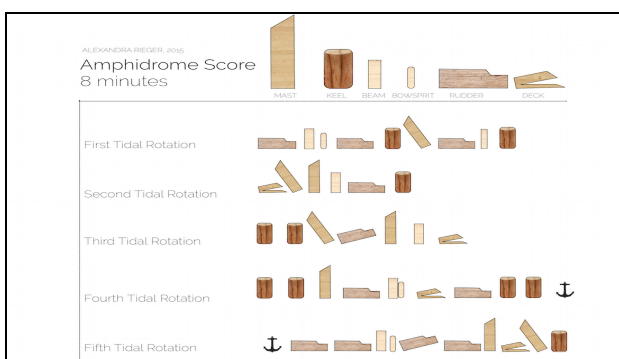


Figure 4 Amphidrome: Visual Score For Driftwood

Musicians who have interacted with the Driftwood comment that the arrangement of tangible shapes are a fascinating source of inspiration when improvising. The visual scoring system promotes fluidity between visual and sonic art. The portions of the brain which enable hearing and sound processing are vastly interconnected and far-

reaching, thus, music induces specific and multi-sensory affects in humans. FMRI studies have shown that “music relays multi-modal information capable of transferring visual, motor and auditory content to an information plexus in the brain, the fronto-temporo-parietal regions [7].” The Driftwood probes these synesthesia-like concepts as it engages multiple sensory and creative disciplines simultaneously. Composers can use the shapes to build a song while simultaneously hearing the newly created sonic realm.

6. CONCLUSION

This instrument has the potential of being translated into further editions. The newest variation is the Driftwood: Kindling. Driftwood: Kindling uses the same technological applications as the original, however the forrest-gathered pieces of wood are completely removable and capable of being repositioned within a “sonic fire”. Euphonious sound arises from that which most overlook.

The Driftwood is a cross modal instrument that fuses nature with technology to pay homage to both myth and tradition. Science continues to make strides in understanding the importance of multi-modal musical interactions in our lives, the Driftwood is the artistic answer to these concepts. The amplification of the wood alongside the electronic controller component illustrates ideas of our interaction with nature. In a changing world of oil spills, greenhouse gas emissions and deforestation, the sound of nature is drowned out by airplanes, traffic and electronics. Driftwood seeks to harmonize the natural with the electronic as a symbol of the collaborative approach we need to adopt in saving our natural resources. It is easy to forget the importance of trees when they are merely driftwood, kindling or paper. The Driftwood reinstalls a position of virtue to that which is easily discarded. It brings together nature and technology, bridges gaps between philosophy and modernity, fuses ideas of instrument and controller, reinterpreting the division between sound and object.



Figure 5 Driftwood: Kindling

7. REFERENCES

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