The Whimsichord: a Wearable Interactive Sonic Installation

David Meckin
Queen Mary University of London

Di Mainstone
QMedia Artist in Residence
Queen Mary University of London

Richard Shed
Richard Shed Studio

Nick Bryan-Kinns
Queen Mary University of London

ABSTRACT

We present the Whimsichord, a modular wearable performance and installation system designed to explore the relationship between physical movement, sound and narrative. As an interactive sound spectacle, the Whimsichord showcases 6 physically transformable body-sculptures through choreographed performance and installation. We propose that using a tethered, resistive tangible interface, participants will be able to link their physical movements to corresponding sound events during their interactions with the system. The piece was developed through co-creative workshops and uses character narrative as a constraint underpinning the interaction and sound design.

ACM Classification Keywords

H5.m. Information interfaces and presentation (e.g., HCI): Miscellaneous.

INTRODUCTION

The Whimsichord is a wearable interactive musical installation that reacts to the movement and touch of users. We propose the term 'Movician' to describe this hybrid act of composition and choreography. The Whimsichord comprises of striking spring-like modules that are connected to a series of fixed landing pads via retractable chords. Each component can be plucked from its landing pad and attached to the Movician in a myriad of ways. The soft sculptures are specially designed around the body to seamlessly grip to the Movician as they traverse space and interact with the piece to produce sound. As Movicians connect to the modules they will draw elegant lines from the surrounding architecture onto to the body. These strings can be twanged to produce sound, and each participant will become a human string instrument.

RELATED WORK

The primary device for physical sensing used in the Whimsichord is a bespoke draw wire encoder, or string potentiometer. This type of interface as a means of interacting with wearable digital systems has been previously explored on a number of occasions. Most notably Vickers [9] used such a system to achieve tethered head tracking for the Sorcerer's Apprentice: Head Mounted Display and Wand. More recently, Blasko et al [1] prototyped a system using a retractable string to interact with an embedded wearable wrist device. Other examples include Koch & Witt [4] detailing their chest worn string device and Sharlin & Sousa [7] who used a string encoder to sense height in their 3D Tractus drawing system.

Computer games controllers have become a source for technologies that can be re-appropriated for sonic expression. The Gametrak [3] is a pertinent example relating to the work presented here as it uses similar sensing technologies. This has been amply hacked, mapped and re-used in a number of different ways by Freed et al [2] to produce sonic events. The same input device has also been used by Yann Seznec in the One Pig project by Matthew Herbert as the Sty-Harp [6].

WHIMSICHORD

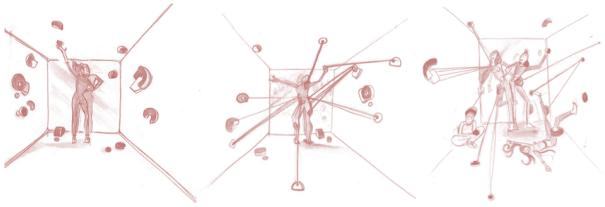

Figure 1. Whimsichord

The Whimsichord comprises of six discrete modules located at fixed positions in an installation space. Fundamental features of the design include its immediate responsiveness, durability and accessibility. We propose that by interacting with a tethered, wearable interface that possesses inherent resistive properties, participants can transparently link their physical actions to particular sound events. This is because the resistance within the interface engenders fine motor control in addition to tactile and kinetic feedback providing information to the somatosensory modalities of touch and proprioception. In a performance or installation context the Whimsichord can be used by both a single Movician, or collaboratively to generate and explore a responsive soundscape. Each module of the Whimsichord has an individual sound

DIS 2012, June 11-15, 2012, Newcastle, UK.

character that has been developed through a series of co-creative workshops with trained Movicians Hollie Miller and Hannah Buckley. This constraint has been imposed to explore the use of narrative mapping as a tool for improvised movement and sound.

Landing Pads

The wall mounted part of the modules consist of a wooden box housing a retractable string. The box has mount points on the back which allow it to be fixed to a wall where there are appropriate fittings for hanging. Additionally, another attachment can be added to the box that comprises of a collection of magnets that enable the module to be attached to inanimate metal objects within the installation space.

The string mechanism itself can be extended up to 5 metres in length. Attached to the spool of the mechanism is an optical rotary encoder that records the rotational position of the spool, from which the current extension and movement of the cord can be measured.

Body Modules

The body mounted modules are coiled shapes of various sizes that were also developed during the co-creative workshops. Their bespoke wood, foam and polypropylene forms possess a spring-like structure that enables them to attach to the body without the need for extra connecting apparatus such as clips, harnesses or magnets. This fulfills one of the key design criteria relating to the accessibility of the system as the modules can be attached to many different parts of the body, thus translating varying movements into sound. Embedded within the body mounted modules are various sensing and communication apparatus that are employed to record their dynamically changing physical properties.

Sound and Interaction Design

The sound mapping and generation is achieved via a combination of bespoke and proprietary software run on a central computer. Character narratives were employed as means to develop the sound and interaction design. Di Mainstone's previous work has explored the use of character narrative in various forms and it became the framework with which to underpin the mapping of the Whimsichord. The use of constraint when designing digital music systems has been advocated by Magnusson [5], particularly when mapping user input to sonic output. These characters were developed in the series of Movician workshops. One of the key elements of the sound and interaction design is the simple and immediate link between physical action and sound event. The basic principle is that if the cord is in motion (being extended or in the process of retraction) the system produces sound. If the cord is not moving, no sound is generated. The speed at which the cord moves is proportional to the amplitude of the sound. The distortion of form and orientation of the body modules are then used to explore the state space of each of the individual sonic character narratives. The intention is that more abstract sound processes can be engaged with through such a tangible interaction, where the more fundamental characteristics of the sonic event such as timing, duration and volume are directly mapped to the inherent properties of the resistive interface.

CONCLUSION AND FUTURE DIRECTIONS

We have presented the Whimsichord, a modular system designed to explore the relationship between movement, sound and narrative, for implementation in both installation and performance contexts. The future of the Whimsichord involves further performances and testing in a variety of locations to ensure the robustness and flexibility of the modules. There will also be a study qualitatively assessing Movicians' understandings of the character narratives and how the connection between perception and action is created and manipulated within the piece. Finally the planned extension to the project is to explore the use of cross-mapping of physical data between the modules on their respective sonic outputs. This could provide further insight into whether the preservation of the physical action to sonic event link could be extended to promote new forms of collaborative sound generation.

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