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Poster - Water Surface As Music Controller (for $8)

Abstract

This project stems from a desire to touch sound. The surface of water can be a mesmerising thing– always changing, yet strangely calming and familiar.

The poster presents an overview of using this physical event as an indirect way of controlling certain parameters of sound, thereby creating a musical interface and an instrument out of the water itself. This can be done without any major expense.

Recently, a work for solo water surface has been successfully performed at a local Adelaide experimental electronic music concert. The interface has also been used during another concert in a duet with a GameBoy Advance SP (Nintendo, 2003) and the synthesis / sequencer program Nanoloop 2.01 (Wittchow, 2005).

Introduction

Points of interest raised throughout the poster include hardware creation and setup; the purpose and implementation of software; issues, setbacks, solutions and shortcomings; how it can be played; and further development.

The hardware used to capture information from the water surface is both very simple to build and low in cost. A slightly modified laser is pointed diagonally through a clear vessel in which water is held. The laser is aimed so that it hits the water surface as well as the ground on the other side of the vessel, where a receiver is placed. The receiver can be constructed from either a solar panel or a light dependent resistor connected to an 'AA' type battery. This receiver is connected to a computer's analog to digital audio converter. Thus, the amount that the laser is *changing* position on the receiver as a result of movement on the water surface can be measured digitally as *changes* in an audio stream. The data received is not in the form of absolute values, but more closely resembles delta value data. The total cost for the laser and receiver can be as low as approximately AU$8, depending on the way the user wishes to implement the interface.

A patch built using *Max/MSP* (Cycling 74) is used to analyse the incoming audio stream (that represents movement on the water surface) and manipulate sound using it. This process works on multiple levels. The first and most direct use of the signal is through the amplitude modulation of a source sound (examples of signals modulated during concert performances include sine waves and a *Gameboy Advance SP* running *Nanoloop 2.01*). Furthermore, changes in energy are averaged over three to ten second periods, and then mapped to sine tone frequency, delay time and feedback parameters. This adds a further level of complexity.

A number of hardware issues were encountered, and appropriate solutions found. Problems included: issues of battery use versus mains power (so that the interface can be used for any period of time) and the issue of voltage amount versus finding a nominal operating level.

This interface does have a number of setbacks, such as resource consumption (an audio analog to digital converter is required and engaged for operation) and upper tolerance limits (there is a level of surface movement after which no more meaningful data can be obtained).

Despite these shortcomings, the interface has been quite successful in terms of use, musical output and expression.

References

Nintendo, 2003.
http://www.gameboy.com/brighter/. (1st June 2006).
Wittchow, O. 2005.
http://www.nanoloop.com/20.html. (1st June 2006).
Cycling 74.
http://www.cycling74.com/products/maxmsp (1st June 2006).