Graph-Sono – Hand Drawing Sound -

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Introduction

Sonograph technology is for transforming sound into visual wave shape. This Graph-Sono system achieves the opposite way of Sonograph. It converts visual data to sound wave data using scanning technology for physical hand drawing lines on paper. It generates a cycle of sound wave data, wave data to control envelope of sound and wave data to control pitch. In computer music field, some researches for converting visual data to sound data are presented so far. Raster Scanning (Woon Seung Yeo, 2006), Monalisa (Kazuhiro Jo and Norihisa Nagano, 2007) are based on the technique of scanning RGB color data of jpeg files and remapping them to sound output. These also works as bi-directional. However in this work, I suggest another way of visual to sound conversion system which has the intuitively controllable interface for regarding connectivity of physical drawing and sound.

Graph-Sono rules

Graph-Sono focuses on abstracting outline of "Wave shape" hand drawing line not RGB color information. After capturing a drawing picture as matrix data including RGB+alpha channels data, it is filtered and adjusted the contrast to turn lines to black color cells. It is remapped position data of each black color cells to X-Y axis 2D data. (Figure.1) This 2D data is directly used for making a cycle of sound signal output.

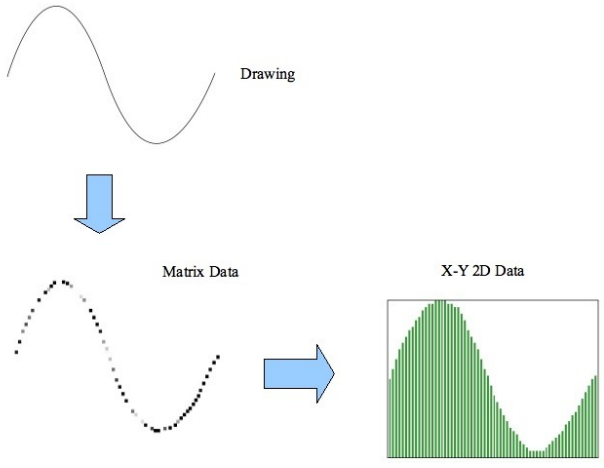

Figure 1.: Converting Data format

Graph-Sono system

Max5 programming environment running on Apple macbook makes Graph-Sono possible.(Figure.2) External video camera is set above the paper to capture hand drawing line on it. The video camera is connected to Apple Macbook with firewire cable(IEEE1394). (Figure.3)

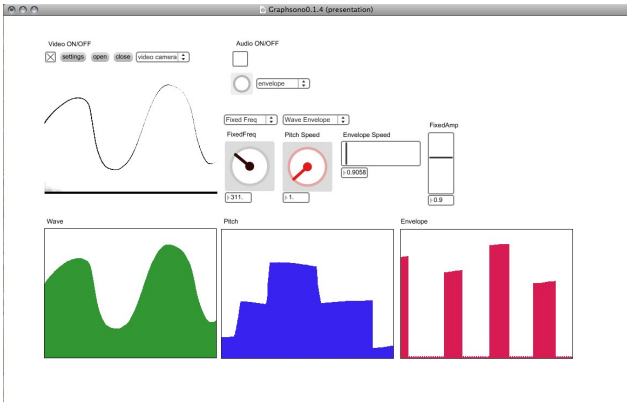

Figure 2:Graph-Sono

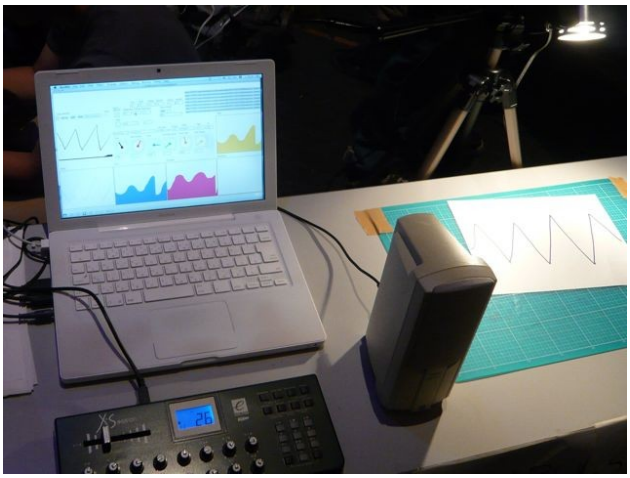

Figure 3.: Setup

For the interaction, users draw a thick line on the paper spontaneously by a felt-tip pen. After taking a snapshot through the video camera, the sound just as you draw is generated and comes out from loud speakers. For example, if you draw sine wave shaped line Graph-

Sono generates sine-wave sound. If the drawing is triangle shape, triangle wave sound comes out. Graph-Sono detects the outline of any shapes and reconstruct X-Y axis data from it. Therefore users can intuitively understand the relationship between hand drawing visuals by physical motion and generated sound. Users can register up to 3 wave shapes and use each of them for controlling different factors, designing periodical sound wave shape as mentioned, the pitch shifting and the amplitude transition. They make the variety of sound context possible. Setting and capturing drawings in opposite way makes different context of sound.In this Graph-Sono, any users who draw a line can create original sound waves as many as the numbers of stocked drawings. It is also possible to reuse the other lines drawn by the other users so many users can collaborate over drawings to make a sound. (Figure.4) Setting and capturing drawings in opposite way makes different context of sound.

Reference

Woon Seung Yeo and Jonathan Berger, Raster Scanning: A New Approach to Image Sonification, Sound Visualization, Sound Analysis And Synthesis, Proceedings of the International Computer Music Conference, New Orleans, LA, USA, 2006.

Norihisa Nagano and Kazuhiro Jo, Monalisa:"see the sound, hear the image", Proceedings of 8th International Conference New Interfaces for Musical Expression, Genova, Italy, 2008.