DRAW SOUND: Create a Playground with Inkling for Kids

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Abstract: Draw Sound is an application model that is consisted of automatic control instrument, drawing system and Inkling. In the scenario, Inkling is an input device and electronic instrument is the output to create the sound. Drawing system is a server that is responsible to send and receive signals from input and output. User can create their sound-control interface by drawing. In addition, kids can play the instrument with their drawing.

1. Concept

How to create a playground for kids with technology application is the problem for this creation. Nowadays the exist interaction modes with technology devices almost are touch and wave. However, it is not suitable way to play for kids who are in the growth stage. Kids need more traditional training when they are playing. For example, they are learning color recognition and developing the aesthetics when they are drawing. They are training for the ability of body movement and construction when they are playing with Legos. Therefore, we attempt to find a way to combine the daily behavior with technology when kids are playing at home. We set up a playground where kids can draw and play with sound at the same time.

2. Application

Draw Sound is consisted of an automatic control instrument, a server with drawing system and an Inkling device. In the scenario, Inkling is the input device to send the position data to the server when user is drawing on the paper **Figure 1**. And the electronic instrument is the output device that played through programming and controlled by Arduino **Figure 2**. We place numerous electromagnets on the Glockenspiel to create the sound during the interaction process.

There is a drawing system on the server that is responsible to send and receive signals from input and output **Figure 3**. We use processing as development software to record the drawing path **Figure 4**. Then this drawing system will convert the path into a closed curve. Each closed curve can form a block of color. The color is determined by random. And the colors represent the pitch

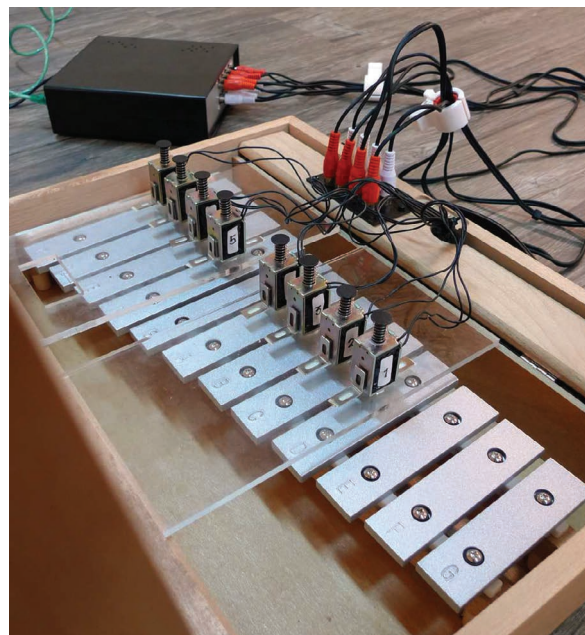**Fig. 1** Input Device Inkling by WACOM.

Fig. 2 Output Device Automatic Control Instrument.

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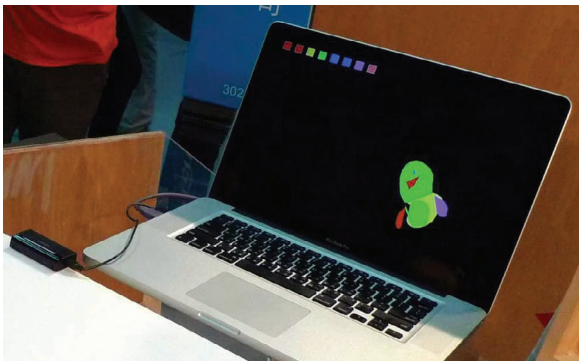a)   rainage@arch.nctu.edu.tw
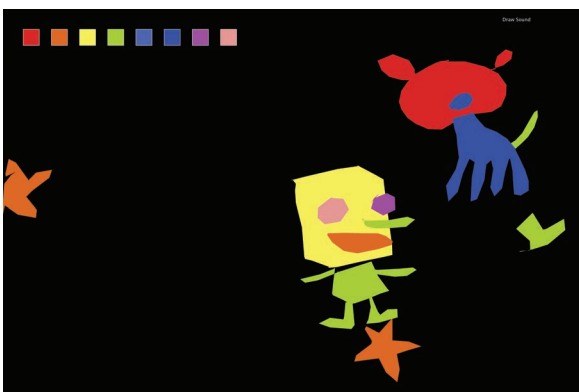b)   marychin@mutienliao.tw

Fig. 3 Computation Server.

Fig. 4 System Recognizes Drawing to Pattern and Define the Pitch of Each Pattern.

that is played by automatic control instrument.

3. Live Demo

3.1 Live Demo in the Taiwan Designers Week

The first live demo show is during the Taiwan Designers Week in September 2012 **Figure 5**. Visitors can see the whole application process to understand how it works. Most of the children are immersive into their imaginational space quickly in the beginning because of the traditional way - the use of paper with the pen. They dont need additional learning to understand the interaction rules or tools. In the field they are drawing like at home.

The most obvious difference between kids and adults is that kids paintings have dream and story **Figure 6**. Normally, the painting cannot speak. So kids will talk to themselves to play the role that they are drawing. They feel magic power when the

Fig. 5 System Recognizes Drawing to Pattern and Define the Pitch of Each Pattern.
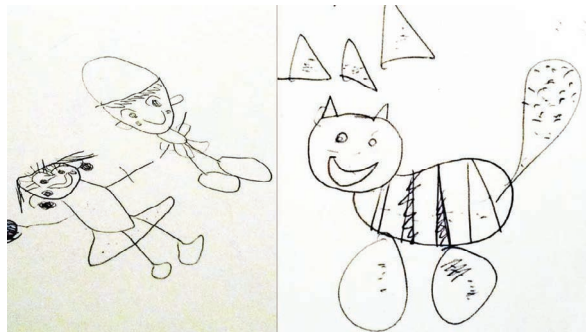

Fig. 6 System Recognizes Drawing to Pattern and Define the Pitch of Each Pattern.

Fig. 7 System Recognizes Drawing to Pattern and Define the Pitch of Each Pattern.

sound can be heard during the drawing process. They will try several times to confirm the sound where is came from. Finally, they understand the complete rules through playing. After that, the kids begin considering to play the sound in the process of drawing **Figure 7**.

3.2 3.2 Live Demo for INTERACTION 2013 in Japan

In the next year, we plan to propose more mature demonstration. It includes advanced drawing system on the color selection and pattern record. And a composing system can convert the rhythm into a painting. The sound is not only a serious of pitch but also could be a piece of song.

In the first version, there is a problem that the sense area of Inkling is too small to draw. User needs to check the screen of the server when they are drawing. We want to simplify our devices of application in the next stage. Therefore, we will attempt to let the server keep behind. And we will design a specific sketchbook for Inkling-used to solve the problem of sensing area. User can interact more freely.