

Tangible Tube

Hilfi Alkaff
UC Berkeley
hilfia@eecs.berkeley.edu

Albert Tjoeng
UC Berkeley
albert_tjoeng@berkeley.edu

Victor Tjhia
UC Berkeley
victor.tjhia@berkeley.edu

ABSTRACT

Tangible Tube is a device that invites users to play in a completely unprecedented form of interactions. Instead of traditional devices such as keyboards, mouse, joysticks and wii remote controls that challenges users on how swift and fluent their fingers are, tube blower challenges users to play games using a tube that they will control with their mouth.

Author Keywords

put author keywords here

ACM Classification Keywords

H.5.2 Information Interfaces and Presentation: Miscellaneous—*Optional sub-category*

General Terms

See list of the limited ACM 16 terms in the instructions, see <http://www.sheridanprinting.com/sigchi/generalterms.htm>.

IMPLEMENTATION

The Tangible Tube system has two components; the tube itself and the screen. The tube is attached to an acrylic enclosure that houses a small Force-Sensing Resistor (FSR) and Inertial Measurement Units (IMU) that possesses 5 degree of freedom. The IMU captures the 3-dimensional motions of the tube and translate it into 2-dimensional movement in the screen. Additionally, it also records the angle in which the tube is rotated and how fast it is rotating. With the FSR integrated in the tube, how hard the user breathe into the tube is also captured. All of these informations will then be passed into arduino which will be read by a processing module.

We have developed two applications to demonstrate the interactivity of our Tangible Tube. The applications that we developed are written in processing since it provides a smooth interface with arduino while boasting numerous graphical functions. Developing applications that work with our Tangible Tube require minimal changes to an existing processing code since we have made the interface to the hardware to be very simple and generic.

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Painting

Our first application is a painting application program. In this application, the user will be able to paint by blowing into the tube and the harder the user blows, the thicker the color is. Changing the color of the paint is achieved by rotating the tube.

Shooting Game

Our second application is a game in which the user is required to pass through a set of levels by shooting down balloons that randomly appear in the screen. This is done by moving the pointer to where the balloons are and blow into the tube. To make the game more interesting, the user will only be able to shoot down a particular balloon if the color of the pointer matches the color of that balloon. Similar to the previous application, changing the color of the pointer is done by rotating the tube.

EVALUATION

In order to measure how successful Tangible Tube is, the same applications that we have developed to work with Tangible Tube are also developed with mouse and keyboard as input devices. After describing to our participants how Tangible Tube works, the participants then tried out the applications both with and mouse and keyboard and with Tangible Tube as the input device.

FUTURE WORK

In the future, we may explore on how well Tangible Tube works under group environment. For instance, in the shooting game that we developed, we could extend the game so that two people will compete to get a higher score or collaborate to shoot down a number of balloons under limited time. We believe that our Tangible Tube will be much more interactive if this is implemented.

Following up the previous point, making Tangible Tube wireless is essential to maximize the user experience. By having a wired system for our Tangible Tube, the users will be constrained at how long the wire connecting the tube to the computer is and could not move as freely when using the applications. Under group setting, this problem is exacerbated since multiple users could now collided with each other due to space constraints and this will definitely detriment the user experience.

Instead of utilizing computer screen as the output of our Tangible Tube, we believe that it will be best if it is displayed

on a standalone screen such as a television screen so that the Tangible Tube system will feel more natural to the user and not just "another computer application".

In the hardware side, we also need to smoothen the reading that we get from the accelerometers and gyroscopes

ACKNOWLEDGMENT

We would like to thank for their inputs on Tangible Tube.

REFERENCES