Augmenting Multi-Touch with Commodity Devices

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ABSTRACT
We describe two approaches to augment multi-touch user input with commodity devices (Kinect and wiiMote).

Categories and Subject Descriptors
D.2.2 [**Design Tools and Techniques**]: User Interface Interactions.

General Terms
Algorithms, Design, Human Factors.

Keywords
Multi-touch; 3D User Interfaces; Human-Computer Interaction.

1. INTRODUCTION
Seeking the development of efficient 3D user interfaces, we proposed augmenting multi-touch displays for 3D navigation with our current work in progress. Multi-touch interaction for 3D environments has been explored before for domain specific [1]. There have been many attempts to augment the multi-touch displays. For example, Z-Touch [5] captures a depth map to add the z-axis to the touch display. The Z-Touch has limitations and it is not a commodity device. Augmenting the touch with a force sensor has also been tried [3]. Our approach involves commodity devices to augment multi-touch. Other previous works have used mice and keyboard in surface displays and XBOX Kinect to augment touch [2,4].

2. PROPOSED APPROACH
We are using a desktop 3M Multi-Touch 22'' display, Microsoft Windows Kinect, and wiiMote with MotionPlus. We used the touch data, the Kinect depth stream, the wiiMote and Motion Plus accelerometer data (a_x, a_y, a_z) and the gyroscope data (roll and pitch only), as shown in Figure 1.

Our first attempt was to use the Kinect. The problem with the Kinect[6] is that when the user is close to the display, the depth stream becomes part of the background. We believe that using the Intel Perceptual Computing camera will yield better results. Our

second approach was to use the wiiMote with the Motion Plus to get extra sensory devices for the z-axis. While we know that the wiiMote is not ideal to combine with touch, the test allowed us to set us into the direction of augmenting with 9-axis Micro-Electro-Mechanical Systems (MEMS) attached to one or two hands in form of a watch. We can see that augmenting the touch with MEMS will yield a better interaction.

Figure 1. 3D Navigation Setup.

3. CONCLUSION
While it may be possible to find intuitive gestures for multi-touch displays, is the fusion of devices that may give a complete Natural User Interaction (NUIs).[1]

4. REFERENCES

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