Making Interactive Spaces Accessible

Peter Traunfeld and Shannon Duvall

ELON UNIVERSITY

Assistive Technology

Many children with cognitive disabilities are “sensory seeking;” in other words, they are motivated by visual, auditory, olfactory, and tactile stimuli. For such a child, meaningful interaction with his or her environment has been shown to promote areas of cognition such as attention, memory, and emotional regulation. “Interactive spaces” are places in which children receive enhanced sensory feedback from playing with their environment. Currently, these spaces exist only as exhibits in museums, such as the *Soundspace* at the Durham Museum of Life and Sciences.

Figure 1. Sounds that react to kids' movement at *Soundspace*

Motion Detection

Motion detection is used by *Soundspace* in order to create a totally immersive experience. However, the exhibit is not portable and it has only a limited range of applications. Furthermore, one must pay money each time to use it.

Figure 2. Catching sand with one's shadow at *SoundSpace.*

Primary Question

Can we build a software framework using existing motion detection hardware in order to create effective, inexpensive, portable, easy to use interactive spaces?

Kinect and Leap Motion

The Kinect and Leap are cheap motion detectors used for gaming (~100 USD and ~80 USD respectively). The Kinect tracks full-body movements and voice commands, whereas the Leap is for tracking one's hands in greater detail.

Figure 3. The Microsoft Kinect

Challenges

- Receiving accurate data from imperfect sensors
- Creating a interface that can be used by anyone
- Making the framework flexible and customizable
- Being effective for a variety of kids

References

Division for Early Childhood. (2014). *DEC recommended practices in early intervention/early childhood special education* 2014.

Durham Museum of Life and Science <http://lifeandscience.org/exhibits/>

Microsoft Kinect Wiki <http://en.wikipedia.org/wiki/Kinect>