Wu Wei

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ABSTRACT

Interactive media is typically based on the idea of change. One creates a stimulus for the computer, which then gives a response. Changing the computer's response is determined by modifying its input.

Wu Wei is the fundamental Taoist principle meaning "without action." When applied to an interactive artwork, this concept creates an oxymoron. Here, the intention is to act without acting. *Wu Wei* is both a non-interactive and interactive installation that uses computer vision as its control device. This piece is designed to question a participant's conceptions about interactive art, the pace of 21st century life, and digital media.

Categories and Subject Descriptors

I.3.3 [**Computer Graphics**]: Picture/Image Generation – *display algorithms.* I.6.8 [**Simulation and Modeling**]: Types of Simulation – *Animation, Continuous, Visual.* J.5 [**Computer Applications**]: Arts and Humanities – *Fine arts.*

General Terms

Measurement, Documentation, Design, Experimentation, Human Factors, and Theory.

Keywords

Interactive, Chinese, Taoism, action, meditation, non-action, invisible, scroll.

1. ARTISTIC MOTIVATION

1.1 Interaction

Interactive artworks are a dialog between viewer and artwork. Typically this communication tends to be one-sided. The participant performs an action and the computer replies with a response. This mental conditioning is a natural extension of the humans' everyday electronic interface experience. For example: a television responds to button pushing, a stove responds to knob turning, and a computer responds to mouse clicking. In the majority of these instances, the response is generated as quickly as the stimulus. *Wu Wei* responds and speaks to the participants at a much slower pace, asking them to be meditative and patient in return. This context enables the investigation of the lower bounds of the cognitive threshold

Figure 1. *Wu Wei* **invites participants to sit on the bench.**

of interaction. How long can the delay between the action and the response still be considered interactive communication?

1.2 Cultural Tendencies

Parallel to that thought, a reflection of "speed culture" bubbles to the surface. The slowness of *Wu Wei's* speed is contradictory to our "hurry up and wait" society. We are a culture expecting immediate gratification. When the 2003 northeast American blackout occurred, we were re-acquainted with stillness and patience. *Wu Wei* encourages participants to practice patience, stillness, and meditation.

1.3 Perception

Wu Wei retains the timelessness enjoyed with traditional artwork. Nearly all of the technical equipment is hidden out of the participant's view. This immediately sets the stage of perception for a different experience. This absence of technical artifice contributes to artistic intent and overall immersion. When the technology is not apparent, the participant becomes less concerned with the method. Focus is directed to the content.

1.4 Twitch Gaming

Wu Wei overcomes a common stigmatization associated with digital work. Too often an interactive work becomes a game of figuring out the gimmick that makes it interesting or accessible. When the "action to payoff" connection is non-existent, then video gaming constructs become ineffective. If a first person shooting game contained no ammunition, then the structure of winning would change. In that situation, could a player win at all? *Wu Wei* is a simulation without closure, setting up circumstances foreign to the viewer. The attributes move the artwork beyond its anticipated role.

1.5 Conclusion

Inversion of interaction, reduction of speed, subversion of gaming metaphors, and invisibility of technology all contribute to the breakdown of neo-luddite fears associated with non-intuitive interface (i.e. programming a VCR). Further,

these components of the work help to bridge gaps between traditional and media artists. When anxiety of technology performance is erased, then true contemplation and conceptual interpretation can take place.

Wu Wei advances the primarily unexplored area of non-active interaction. Further research in this field of work will elevate interactive media to a finer art form.

2. RELATED WORK

Camille Utterback's interactive works *Liquid Time* and *Crossing* both exhibit sliced reconstructions of time by body movement [9]. These works are similar to *Wu Wei* because they linearly build time in forward and reverse based on body presence. While Utterback's works responds swiftly, *Wu Wei* maintains its adherence to slow contemplation.

Daniel Rozin's *Wooden Mirror*, *Trash Mirror*, and *Shiny Balls Mirror* rely on inherent interactions that humans have with mirrors [7]. This dependence on pre-built knowledge allows the viewer to not feel self-conscious about performing correctly, and greatly reduces the learning time. *Wu Wei* also depends on experiential knowledge: sitting and waiting.

Scott Snibbe's *Screen Series* requires human presence to activate the interaction, which otherwise remains dormant [7]. This approach ensures a minimum level of engagement with a genuinely interested guest. *Wu Wei* employs this concept by welcoming the viewer with the empty bench.

Tiffany Holmes's *Your Face is Safe With Me* and Natalie Bookchin's *Intruder* subverts video game paradigms of scoring and winning [3][2]. Even though *Your Face is Safe with Me* doesn't allow guest interaction and *Intruder* requires guest interaction, they both question some similar themes. *Wu Wei* also challenges interactive art works to rise above the video game style action and payoff reward system.

3. TECHNICAL DETAILS

3.1 Interaction

To experience this work, a person or people must enter the installation space and sit on the bench. The longer they sit relatively motionless on the bench; they continue to experience the narrative. Each element, image, sound, or animation of the scene fades in at an approximate pace of 30 seconds each. If the participants leave, then the visual and audio disappear. If they move for any reason, including trying to speed up the process by attempting to interact, then the visual and audio disappear. The participants are unable to determine when they have reached a conclusion of the work because of the continually random nature of the animation and audio.

3.2 Construction

All imagery excluding the clouds, leaves, and birds were scanned from a 16th century Taoist painting. The image was separated into layers and rendered as textured OpenGL quads. The rolling clouds are created from scratch in Photoshop then rendered as textured OpenGL quads in a sprite particle system. The floating leaves are OpenGL disks comprised of five particle systems that obey a slowly shifting wind vector. The birds are OpenGL lines that appear as a flocking behavior with a random series of goals to reach. The last goal in each series places the birds back off-screen. The sounds come from stock recordings. The undulating water was created with a linear vertex animation and a system of bounds to prevent vertex overlap or collision.

3.3 Equipment

An Apple computer uses a firewire web camera, mounted to the ceiling, to view the area around the bench. A projector, also hung from the ceiling, displays the image on the scroll. Two speakers are mounted high and out of sight to provide the audio for the artwork. The accompanying cabinet is only necessary to hide the computer when an out of sight location isn't available.
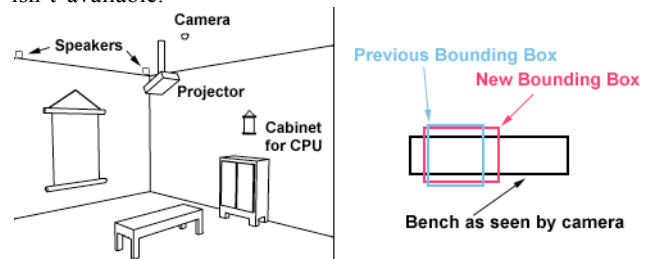

Figure 2. Left: Illustration of Space. Right: Visualized vision tracking explanation.

3.4 Vision Tracking

The web camera grabs video into memory at 20 frames per second. Individual pixels are compared, using color, to their corresponding location on a reference image of an empty bench. The computer compares these pixels in a grid pattern on and near the bench. When a person or people are found, a bounding box is constructed around them. Each box is compared and replaced by the next video frame's box. If the difference in box sizes is smaller than a predetermined constant, then the simulation continues, otherwise it reverses. If no one is found, the simulation also reverses.

4. REFERENCES

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