

CAMBIENCE: A Video-Driven Sonic Ecology for Media Spaces

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ABSTRACT

Cambience is a sonic media space that maps video to audio in an abstract but meaningful way, delivering visual awareness cues without the visual distraction. The video demonstrates how Cambience accomplishes this.

Categories and Subject Descriptors

I.4.0 [General]: Image Processing Software.

General Terms

Algorithms, Human Factors.

Keywords

Cambience, Sonic Ecologies, Abstract Media Spaces, Video Awareness, Ambient Sound.

1. INTRODUCTION

Much of our interaction with desktop computers relies on our visual perception, so it is no wonder that continuous awareness information in a visual form can steal our attention from other tasks.

Many authors have described a need for software that better uses our peripheral perception as a channel for non-critical but relevant information, e.g., [2,3,4], and agree that sound provides useful affordances toward this goal.

Cambience is a program created to explore the potential of mapping continuous visual cues to audio. It creates a shared video media space where people contribute elements that drive a personalized soundscape, which then creates a sonic media space.

Although it is not intended to completely replace the viewing of another's video image, Cambience reduces the need for a person to continuously scan it for changes. By altering the playback of continuous ambient sounds, Cambience provides its listeners with basic ambient information about the nature of the visual change, only salient sound changes attracts their attention to the video.

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2. REGIONS AND MOTION

Many computer users have webcams positioned to capture a view of themselves when they are sitting at their desks. This view not only captures the usual 'head shot', but other areas of potential interest to others, such as doorways, hallways, bookshelves, windows, and the work areas of colleagues.

Instead of monitoring the webcam view as a whole, Cambience users draw *Regions* to partition the webcam image into areas that they and others can monitor (top of Figure 1). Each region can be given a name and description to identify its purpose.

Cambience then detects visual changes in these regions by frame-differencing, where RGB pixel values that exceed a particular threshold are interpreted as areas of motion. Motion is measured for each region to produce the following motion metrics: over-all motion, center-X and center-Y positions, and center-X and center-Y velocities.

The video shows how regions are drawn over the webcam image, and how the outputs of each region are affected by motion.

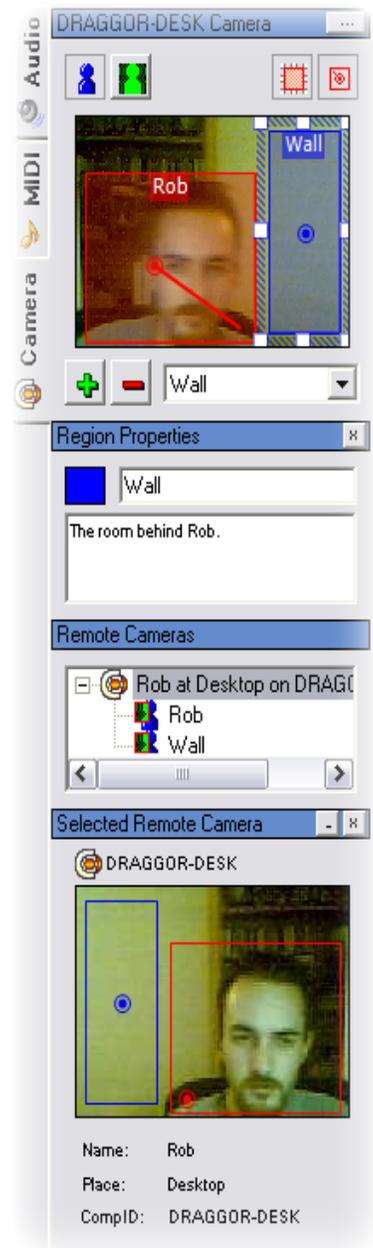


Figure 1. Camera Module

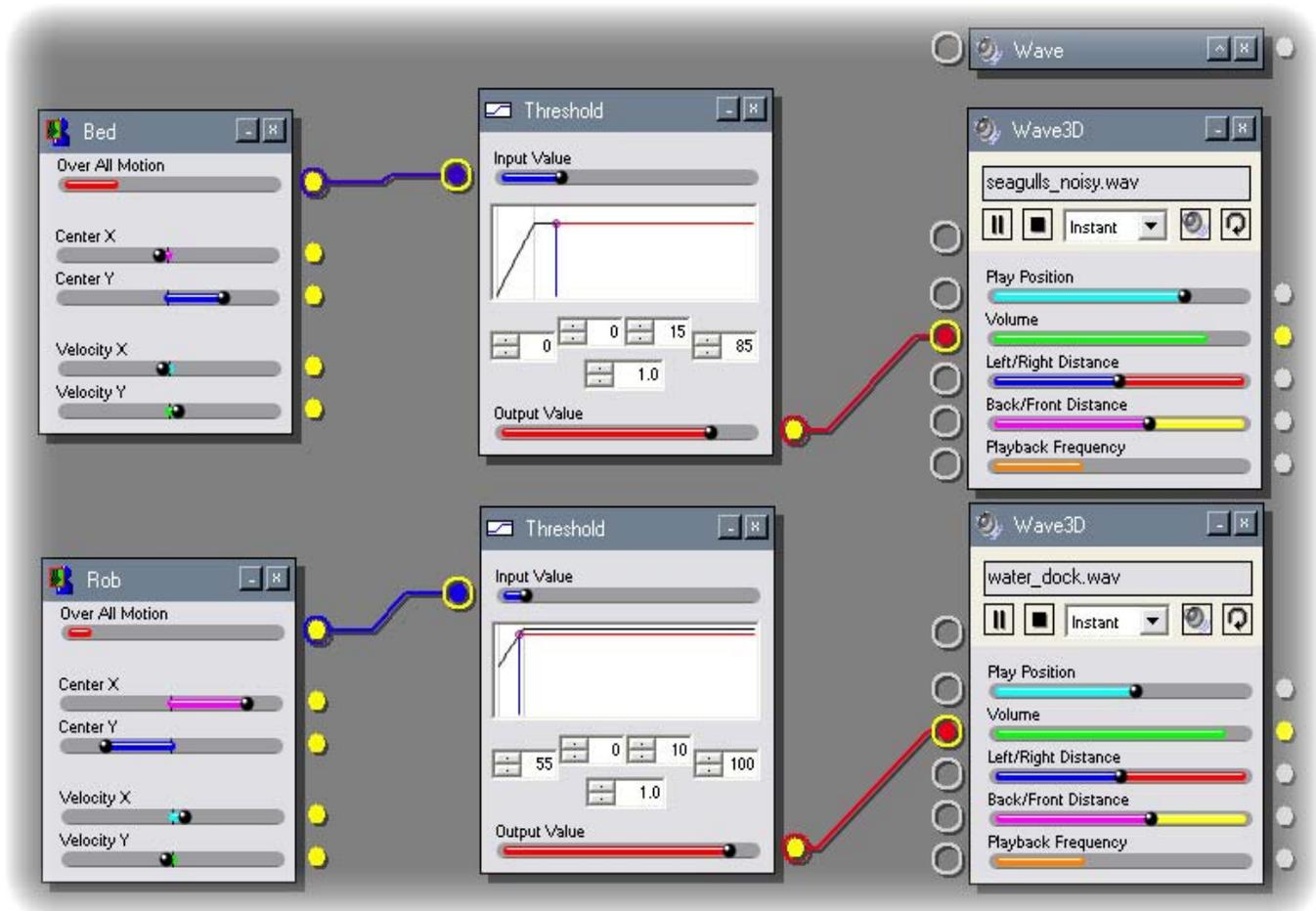


Figure 2. An Ocean Shore Sonic Ecology with Region Items (left) and Audio Items (right)

3. VIDEO TO AUDIO

Next, Cambience provides a visual programming editor (Figure 2), where one can create a customized mapping between the motion metrics from a region and a particular sound's playback properties. Several playback properties of sound can be altered: playback position, volume, frequency, and 3D effects by adjusting the sound's left/right distance and front/back distance.

People use this editor to create a *Sonic Ecology* [1]. Several sounds play in unison as a soundscape, where they do not conflict with or occlude one another. The idea is that the ecology as a whole provides overall awareness of distant happenings, while changes in individual sounds can convey particular meanings based on the region and motion metric that sound is monitoring.

While many sounds can be mixed, we recommend natural ambient sounds, e.g., those that comprise a forest or an ocean soundscape. These sounds are soothing; they live at the periphery of our attention when they are not changing dramatically, but are easily noticed when interesting changes occur. In essence, people use their own skills to manage their desired level of awareness. [2]

The video demonstrates Cambience in action. It shows how people can link a wind sound to motion within a region. It also shows the composition of a more complex ocean shore sonic

ecology (Figure 2) with the sound of waves, seagulls, and docked boats.

4. ACKNOWLEDGMENTS

Special thanks to Carman Neustaedter, Gregor McEwan, and Steve Polyak for appearing in the video. Funding is partially provided by the NSERC NECTAR Research Networks grant and its industrial sponsors Smart Technologies and Microsoft Inc.

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