“KODAMA” — mischievous echoes —

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ABSTRACT
I created "KODAMA" to demonstrate my sensation of solidified human voices in conversation. “KODAMA” is an interactive installation. The “KODAMA” are tree fairies that live in the forest who listen to human voices and mimic their sounds. They are visually depicted as bubbles or pockets of air that move around a projection of the forest. Their movement on screen is controlled by the movement of the audience detected by motion sensors. The audience’s voices are captured and re-played by the “KODAMA”.

Categories and Subject Descriptors

General Terms
Measurement, Design, Reliability, Languages, and Human Factors.

Keywords
Interactive, Human voice, Presence, Perceptible, Tree fairy, echo.

1. ARTISTIC MOTIVATION
1.1 Introduction
People easily forget the voice that mediates the content of a conversation, an invisible and transitory media. Yet I often have the feeling that voices are tactile and occupy a certain space that I want to artistically represent as various volumes or solid shapes.

I created "KODAMA" to demonstrate my sensation of human voices in conversation as solidified forms.

This work enables me to demonstrate to an audience the existence of "voice" as a physical object and how it floats through space.

1.2 Formal Considerations
The shape of the “KODAMA”, a bubble, is intended to represent the voice being encapsulated by the surrounding air. The soft and changing shape of a bubble suggests the fluctuating flow of air currents.

1.3 Interaction / Image
"KODAMA" are tree fairies that can't be seen by human eyes. They live in the forest listening quietly to your voice. "KODAMA" collect human voices and trap them in a bubble of air. They hide themselves in surprise when they feel a person's presence. When "KODAMA" don't sense any humans they start to play with the voices that have been left in the forest. If they do notice someone they hide themselves with the "voices" and wait to collect new "voices".

1.4 Cultural Tradition
In Japanese "KODAMA" has two meanings, it means both tree fairy and echo. In olden times people believed the tree fairy lived in the forest, and it was thought that the echo was a form of mischief that the "KODAMA" caused. People thought that they could not be seen with human eyes. It is thought that many Japanese people still believe in the existence of the "KODAMA".

1.4 Perception
All of the technical equipment necessary to run the piece is hidden out of view from the participant. When the technology is not apparent, then the participant becomes less concerned with the method and their focus is directed onto the content.

2. RELATED WORK
Messa di Voce, by Tmem, Blonk and La Barbara [4] is concerned with the poetic implications of making the human
voice visible. Like *Messa di Voce* "KODAMA" explores the use of phonesthesiology or phonetic symbolism where the sounds of words are represented as textures and shapes. Another example of a voice being given a physical form is the *Augmented Reality Project* [3] where one person’s voice is felt as vibrations in the seat of the listener.

Nishijima’s "REmain InLight" [2] captures analog radio waves in public spaces and releases them in an installation room. In a similar way "KODAMA" captures audio signals and releases them in an enclosed environment.

"Tangible Bits" by the Tangible Media [1] group attempt to give physical form to digital information. Although "KODAMA" doesn’t use digital information in the same way it does attempt to give physical form to a medium that is invisible to the human eye.

3. TECHNICAL DETAILS

2.1 System Description
In "KODAMA" an image of the forest is projected onto the screen in the middle of the room. When an audience member moves in the installation space they trigger the “echoes” which are images generated by a program and move around the forest. The audience’s voices are captured and replayed when there is no one in the room.

2.2 Construction
When the voices are replayed the 3D image and the sound disappears into the screen like it is inhaled by the forest. If the sensor perceives movement in the room, then new voices can be recorded. When the voices are generated, the voices are recorded with the microphone and they are stored in the computer. If the sensor doesn’t detect movement in the room after a while, a number of voices are played at the same time, and the image that corresponds to it changes by the 3D filters. The voices and 3D image disappears again when movement is detected.

2.3 Equipment

![Illustration of the space. (side elevational view)](image)

Infrared sensors (infrared rays human movement / pyroelectricity sensor) detect movement in the room, their analogue input is converted into digital information through an ADIF box and processed by a Max/MSP program on the first PC. The audience’s voices are recorded with a microphone into the Max/MSP program. The voices are played back out of the speakers. The Max/MSP program sends the processed data to the 2nd computer which changes the image of the bubbles in real time and projects the image onto the rear projection screen. The bubbles were made with the 3D modeling software LightWave. The "Bubble" forms are organic form and my interpretation of what the voice might look like. The animation was programmed with DirectX. It is processed with some 3D filters that distort the background of the forest in real time. A microphone mounted high, out of sight and at the center of the space that comes up when the person stands in front of the screen. Two loudspeakers are arranged right and left at the back of the screen (out of sight).

2.4 Conclusions / Future work
This work draws its existence by making the “voice” visible. A sound effect to direct a picture, where one sense is felt by another. The audience is able to empathize with a fantastic view of the world by listening to their own voices placed in another context.

To develop a greater feeling of immersion in an interactive environment the artist has to test these ideas with audiences of different ages and cultural backgrounds. It also requires an ever greater complexity of collaboration. To implement such diverse sensory experiences with qualitative audience feedback needs a team of talented people and takes interactive work beyond the realm of the traditional artist working alone on their ideas.

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5. REFERENCES

