
Tangible Breath: an interactive meditation space

Annie Cheah

School of Information
University of California
110 South Hall, Berkeley, CA 94720
anniecheahsf@berkeley.edu

Abstract

This paper presents my design of a Human Computer Interaction (HCI) system for a “Tangible Breath.” Tangible Breath lends from the form of a traditional Buddhist altar used for the practice of meditation. The augmented altar will use “enhanced prayer beads” as a breath input device. The user’s breath rhythmicity that is received by the beads that a user will hold in their hands is processed and sent wirelessly to three separate ambient devices resting on the altar: a figure of the Buddha, “candles”, and fountain. Each device will display different feedback from a user’s breath signal as follows: expressive inward/outward motion of the Buddha belly, gentle lighted candle flickering, and the flow of water in a fountain.

Tangible Breath introduces the breather/user to a system that expressively reflects on the bioinput of their breath, bringing the rhythmic value it to either the

center of human attention or at the periphery of human perception, willfully and ad libitum. The user may want to kneel before the alter and breathe with religious intention or breathe with the beads while falling asleep to gently flickering candle light and the relaxing sounds of moving water.

The goal of Tangible Breath is to bring a focused consciousness on an essential human activity with a rewarding system of relaxing visual feedback.

This paper details the interactive system and its activity, discusses the implications for the health benefits of its use, and review related works and practices.

Keywords

Tangible User Interface, Meditation, Enhanced Prayer Beads, Ambient Systems, Augmented Altar

Introduction: conscious breath

Hiroshi Ishii explains that “we live between two realms: our physical environment and cyberspace.” [1] And I propose that another many of us may in addition to the

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CHI 2010, April 10–15, 2010, Atlanta, Georgia, USA.

ACM 978-1-60558-930-5/10/04.

two realms may live, very much like cyberspace, in a realm of the metaphysical. This is a realm that is sought occupation through various methods, including the practice of meditation.

Since antiquity, the act of meditation has been common component to many religious practices. Meditation does not just mean one thing or could be defined by one way of doing it. However, in many schools of thought on the matter, breathing is an important part of the practice. An intended specific stream of consciousness is also usually a key aspect of one's activity.

From my own curiosity and interest, I've explored different forms of meditation, and found that indeed breathing is a key component to a good meditative practice, and often an inward attention to one's breath is where to begin. In my investigation led by many different teachers and some self-proclaimed mystics, breathing is taught as part of a process of focused attention. It seemed as though any other aspect, which might be the repetition of a mantra, or specific idea, the reading of a text, the burning of incense, or the sounds of the forest, are all tools in the process of a relaxed consciousness diverted from the ordinary renderings of the mind. For me, meditation eventually only needed to be about the breath and finding a space away from the busy and chaotic sounds of the external world.

Scientific research has linked meditation to changes in neural and autonomic activity, heart, hormone, and metabolic rates and other bodily processes. [2] Benefits on an individual's level of stress and pain have also been shown to involve a practice of meditation. And

studies have also looked at the clinical effects meditation may serve on physical and psychological disorders.

Inspired by the rich aesthetic of the altars and other artifacts used in many Buddhist meditation practices, I wanted to play with the possibilities that physical computing could have to enhance a space that is already well associated with a traditional sense of meditation.

Augmented Altar Space

Tangible Breath uses the rich affordances provided by technology to enhance physical objects associated with a space and method of meditation to enhance the experience of meditation.

Each of components of the augmented system are described as follows:

Enhanced Prayer Beads

These special prayer beads resemble the traditional beads used in meditation. Like traditional prayer beads, they are held in the hand of the user during the meditation practice.

Prayer beads in some traditions are used to count the recitation of a mantra. They might also serve as a graceful reminder of a spiritual practice, can be worn by a user or serve as a device for stress relief, like Greek 'worry beads', allowing the hands something to touch.

The special quality of the enhanced beads included in the Tangible Breath system are that they embed a system of sensors that are to receive and track the

rhythm of a user's breath. The user will hold their hands in front of their face, like praying. [See **Fig. 1**]



Figure 1: Enhanced Prayer Beads Sketch

The information received is sent to give feedback to the ambient systems in the altar space that the paper will describe following this list of the technological components of the enhanced prayer beads:

- 1k Resistor
- Mini Unidirectional Microphone
- Arduino Microcontroller

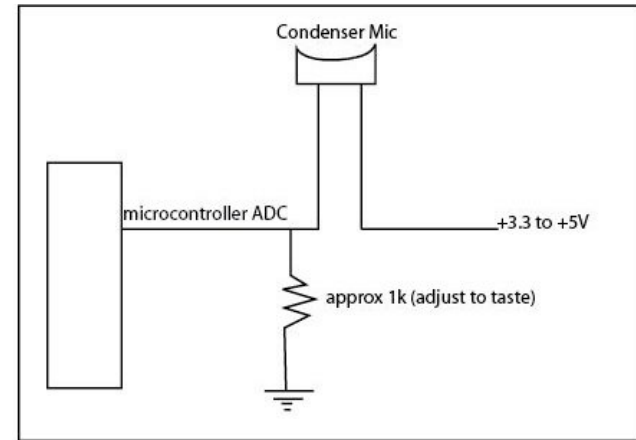


Figure 2: Simple breath/blowing Sensor Circuit [3]

An ideal implementation of a breathing sensor would prefer a wireless system with the capability of being seamlessly embedded within the beads allowing for an activity with desired movability.

Actuated Buddha

As resembling the inanimate sculptured figures of the Buddha that often rest at the top of many traditional Buddhist meditation altars, the Tangible Breath system will present a Buddha with actuated movement, following the rhythmic breath pattern of the user, sensed from the system of enhanced prayer beads.

The inward/outward movement of a Buddha's belly will match the motion of a user's breathing.

The Buddha will therefore serve as a direct representation of the rate at which a user is breathing, providing a visual feedback portraying the life force of the user.

Essentially, a Buddha comes to life with the participation of the user in the Tangible Breath system. The Buddha breathes with the user.

Technological components used to prototype an actuated figure will include:

- Servo Motor
- Microcontroller

Actuated Fountain

As an ambient device included on the augmented altar space, a fountain will rest below the Buddha, and revolve water as the Tangible Breath system is in use. The water fountain will work off the same signaling from the enhanced prayer beads as the actuated Buddha.

When the user is using the enhanced beads, a signal for the fountain to turn on will be sent out through a wireless connection.

The flowing fountain will be used as an ambient background tool to create relaxing atmospheric noise that can aid in the act of meditation.

Also the water acts as a metaphor for breath itself, since the process of breathing is one that enables a biological release of water.

Actuated Candles

As a final detail in the augmented altar space, a set of "candles" will be lighted and flicker as the Tangible Breath system is in use. When a user is breathing into the enhanced beads, a signal will be sent to the votives, signaling the switching on of the illuminated "candles".

The motion of the flickering candles might also reflect the rhythmic value of the user's breath as sensed from the enhanced beads.

The ambient device will function, like the fountain, as a background tool to promote relaxation ideal for the practice of meditation in the periphery of human attention.

The gentle flickering lights and sounds of the water streaming from the fountain might present the user with a lovely way to fall asleep.

"Candles" will include:

- LED lights

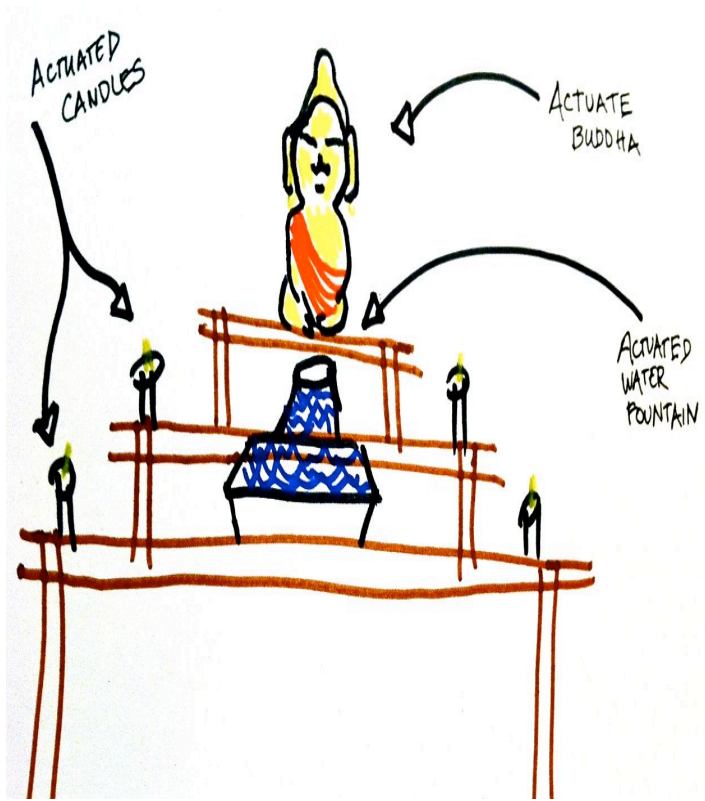


Figure 3: Actuated Altar Sketch



Figure 4: Prototype for the Augmented Altar Space

Related Work

As I was developing the prototype for the interactive meditation space, I played with idea of a different yet related iteration of a HCI breathing system.

The Breathing Buddy is a system that would function in the same way as the interactive meditation space by using the an input device that senses a user's breath to control the output of an actuated figure. The system thought of here would eliminate the altar and break down the system to simply the interaction between a user's breath, as sensed from a respiration sensor belt, and an actuated doll that might provide simultaneous motion and light feedback.

The intent of the simplified abstraction of the interactive meditation space would be to provide an activity for children to practice breath control.

The doll might exist in a clinical setting as a tool to calm the breathing of an asthmatic or similarly effected child.

The reduction of the system to a doll is intended to allow for an activity more relatable to children who are used to playing with dolls and simple figures as such.

The feedback, which might include both motion and lights, would be intended to provide a system of breath analysis that could encourage a process of learning. Colors could be used as a sort of code symbolizing irregularities in the breath, which may turn the doll

blue in the face, whereas a calm, slow, happy breath may turn the cheeks of the doll into a cheerful rosy color.



Figure 4: Model for an actuated Breathing Buddy

Breath Easy: Model and control of simulated respiration for animation

Designed by students at the University of California Riverside, is a system that creates an anatomically inspired model of a human torso for the visual simulation of respiration.

A combination of rigid and deformable parts is used to achieve optimal life-like motion. [4]

Physically-Based Model for Simulating the Human Trunk Respiration Movements [5]

Conclusion

The initial prototype of the Tangible Breath system was only a superficial representation. A step further in the implementation of the Tangible Breath system would include a working model of the Enhanced Prayer Beads, which would provide the information to control the actuated ambient systems in the augmented altar space to make a complete and meaningful interaction. However, the current system, as concept and in theory may have the potential for an interesting use of HCI.

Acknowledgements

I'd like to thank Kimiko Ryokai, Niranjan Krishnamurthi, and Daniela Rosner for their inspiring ideas, exceptional support and critical feedback.

Citations

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