
Night Beats: Listening To Heartbeat Of Nature

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Abstract

Night Beats is an audio-visual installation, intended to explore how individuals interact with particular natural environment. It makes the subject feel the breath of a natural object and tighter connection with other kinds of living things.

The installation consists of small luminous globes string throughout a tree and electronically connected to a glowing heart-shaped device hanging from a single branch. A small stool enables visitors to interact with the heart directly by hearing its beat. When a visitor presses it against his/her ear bone, the embedded bone conduction transducer vibrates and transmits heartbeat sounds to his/her head.

As the globes pulsate in consonance with this beat, visitors come to have their own immersive experience surrounded by beating lights and nature in the place, hearing the delicate heartbeat sounds of the tree.

Author Keywords

Digitally mediated engagement with environment;
Embedded Computing; Immersive Experience Design

ACM Classification Keywords

H.5.5. Sound and Music Computing :Modeling.

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Figure 1. A visitor hearing heartbeat and breath sounds from an embedded bone conduction transducer through her ear bone.

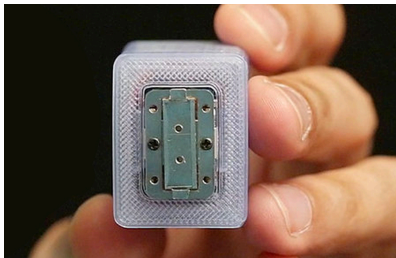


Figure 2. 3D printed bone conduction transducer box housing

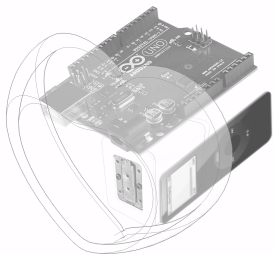


Figure 3. Assembly of embedded parts: Arduino(microcontroller), iPod Mini(sound source), bone conduction transducer(speaker/transmitter)

Message: Tighter Connection Between Human And Environment

Night Beats aims to provide visitors with an experience to feel closer to outdoor natural elements(e.g. trees). On one level, by emphasizing the very life of the tree, *Night Beats* encourages seeing a tighter connection between subject and environment.

On the other hand, by appealing to these distinct senses - sight and hearing, the installation piece creates an immersive experience, one in which the relationship between human and non-human object begins to break down and space itself emerges as the center of aesthetic experience.

Case Study: Touched Echo

I studied an appropriate application of bone conduction to sound-visual based installation, in purpose of creating memorable immersive experience. 'Touched echo'(2008) is an art installation and silent memorial using bone conduction to take people back to the Dresden Bombing of 1945. It is located at the Brühlische Terrasse, a 500-meter terrace, which is a place of silent contemplation rather than a monumental memorial. By leaning onto the railing of the terrace with the elbows placed on the railing and the hands covering the ears, visitors are able to hear sounds, transported from the railing via bone conduction [1].

Without standing in this exact position, it is not possible to hear the sounds. The position, which is necessary to hear the noises, resemble people covering their ears to protect them from the deafening noises of the dropped bombs as many did during the actual bombing.

In this case, bone conduction allows this art installation to have a minimal medial intervention in public space and to engage visitors with the given spatial context in a more reasonable way - shutting their ears away from the noise, emphasizing the narrative behind.

Technical Description

Ear bone conduction transducer drowns out the voices in the person's head. When current is pulsed through the coil, the magnetic field causes a piece of metal to expand and contract - if pressed against a flat surface or cavity it turns it into a speaker [2]. In case of *Night Beats*, the transducer is pressed up against the outer ear bone to turn the skull into a speaker cavity. This special setting creates the feeling that the breathing sounds and synchronized lights come from the tree.

Communication through bone conduction is also a feasible alternative to air conduction reception and transmission and provides benefits to the user that an air conduction system cannot provide [3]. On the contrast to air pathway, bone conduction pathway only allows one direct listener to hear the sound, and nobody else can hear so that it makes a tightened and personalized interactive experience for visitors.

Arduino microcontroller which has pre-programmed code activates the breathing lights that engage visitors in an installation setup. It also controls the speed of changing lights to be synchronized with that of heartbeat/breath sounds.

Conclusion

Night Beats is an integrated installation that explores the unconventional way to interact with a natural element by hearing its heartbeat and breathing sounds.

This sound represents the most universal feature of living creatures, so that it creates a special setting to let visitors feel a closer relationship with their natural surroundings.

As visitors put their ear on 3D printed heart-shape device, they come to hear the heartbeat sounds of the tree through their ear bone and have immersive experience surrounded by personalized acoustic and visual setup for a moment.



Figure 4. A visitor focusing on delicate heartbeat and breath sounds from the installed device

References

- [1] Touched Echo, Atlas Obscura
<http://www.atlasobscura.com/places/touched-echo>
- [2] Bone Conductor Transducer with Wires – 8 Ohm 1 Watt – Product Description.
<http://www.adafruit.com/products/1674>

[3] Paula, H., Tomasz R.L. Bone Conduction: Anatomy, Physiology, and Communication. *Army Research Laboratory* (2007), Abstract.