

# Chimecloud

## An Evocative, Responsive Sound Installation

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### ABSTRACT

The Chimecloud is an evocative and responsive sound and visual installation aiming to motivate users to actively take part in the creation of soundscapes using their body and movements in interaction with the space surrounding them. Transforming nature's principles, where the wind is a key element creating natural soundscapes, the Chimecloud is using this as a metaphor, to make people's presence and movement matter and bring the space to life.

### Categories and Subject Descriptors

J.5 [Arts and Humanities]: Media Arts—*sound installation, kinect, arduino*;

I.5.5 [Implementation]: Interactive systems;

I.5.5 [Applications]: Computer Vision

### General Terms

Design, Experimentation

### Keywords

Chimecloud, interactive space, responsive environment, art installation, sound installation, Kinect, tracking, Arduino, openFrameworks, windchime

## 1. INTRODUCTION

Initiated during a project-course at the Chalmers University of Technology and conducted in collaboration with the municipality of Lundby this project aimed to explore new interactive ideas and solutions to equip and constitute a "Kulturhus" being developed for the area of Backaplan, Gothenburg. The aim was to incorporate the actual space, the people affected and the idea of a common place - be it virtual or physical - into the considerations.

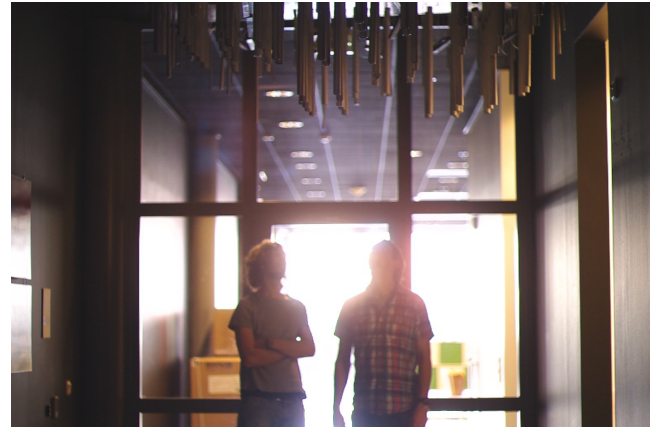


Figure 1: Two visitors interacting with the Chimecloud.

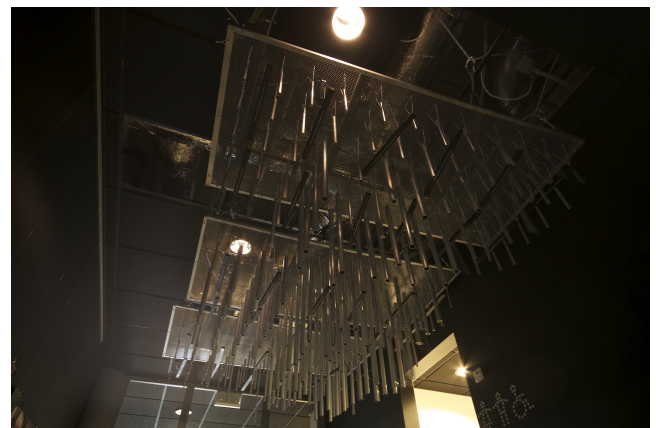


Figure 2: The installation from below.

## 2. PROBLEM - IDENTIFICATION AND IDEATION PROCESS

Focusing on the Kulturhus as a common place, where everybody is welcome and everybody's contribution is appreciated, our initial thoughts aimed to make the presence of people matter. How can the physical space be enriched to become a people-shaped place? Not the actual manifestation of the "Kulturhus" in form of a building is it what constitutes a place where culture comes alive, it is the impact - and the lingering influence - of people.

Additionally culture oftentimes is an act of collaboration and a dedicated place dealing with culture should emphasize and support this aspect. Therefore many of the ideas elicited during early brainstorm-session tried to incorporate this thoughts:

The "Tracing Floor" was the first seriously considered draft: Whenever a visitor enters the public spaces of the Kulturhus his or her movements get traced by an interactive floor installation. The speed of movement and other parameters - like direction and step pattern - might have influence the appearance of the trace. But not only the traces of the people are drawn to the floor, the system also "traces ahead". It can guide the visitor to ongoing exhibitions in the Kulturhus - by leading him the way, or it can connect two people walking on the installation at the same time by drawing a line between them which might motivate them to interact. Postponing this idea due to budget reasons and feasibility difficulties, we shifted our focus to a more physical and analog approach the follow-up idea - "Sound Wall" - emphasizes the idea of "unintentional creation". A wall equipped with chimes (or similar "instruments") is triggered depending on the position of a person moving by. A sound-piece is generated based on the movement and presence of people. But the loss of a spatial dimension and some major interaction-issues (e.g.: How to deal with two persons in front of the installation?) challenged our iterative process moreover. Finally combining some ideas from the latter approach with keyaspects from the first one brought up our final idea: The Chimecloud.

## 3. THE CHIMECLOUD

The Chimecloud is an interactive multimodal installation, which borrows the idea of a classical windchime. In a windchime, the wind triggers the movement of the tubes, creating different sounds, depending on the length, thickness and material of the tubes. The Chimecloud instead is triggered by the presence and movement of people.

The installation consists of clusters of differently tuned tubes hanging from the ceiling above the visitors' heads. The different lengths and diameters of the tubes create a cloud-like shape. Each of these clusters is tuned to a certain note, and a person passing under it, will only trigger the tubes above its head.

As a person walks slowly beneath the installation, the soundscape gets created by single notes, if he or she walks faster, the sound will resemble to chords. Every movement will create an instant visual and acoustic feedback by the moving tubes. Visitors can collaborate creating soundscapes together, as the installation is able to track the movement of many people simultaneously.

## 4. TECHNICAL IMPLEMENTATION

To sense the presence of people, a Microsoft Kinect is attached to the ceiling next to the Installation. It allows us to get the depth information for every image coordinate in the camera image. This 3D imagemap of the area beneath the Chimecloud gets projected on a 2D grayscale image, on which we are using a blob-detection algorithm. The tracked blobs then get projected on a 6x6 grid.

Thirtysix servo motors move the wooden "strikers", which in return hit the tubes. By adjusting the speed of the servo movement, it is possible to create sounds in differing intensities and tonal characteristics. We used 36 servos to trigger the same amount of clusters (Figure 3), each one consisting of 6 tubes (216 tubes in total). An Arduino connects these 36 servos to a computer on which the tracking software is run. They communicate with each other over serial commands. The tubes are tuned in the pentatonic G-major scale, using 4 different octaves (G4 till G8). The lengths of the tubes have been determined with Lee Hite's Windchime calculator (<http://home.fuse.net/engineering/chimes.htm>) and their frequencies have been measured with an electronic tuner.

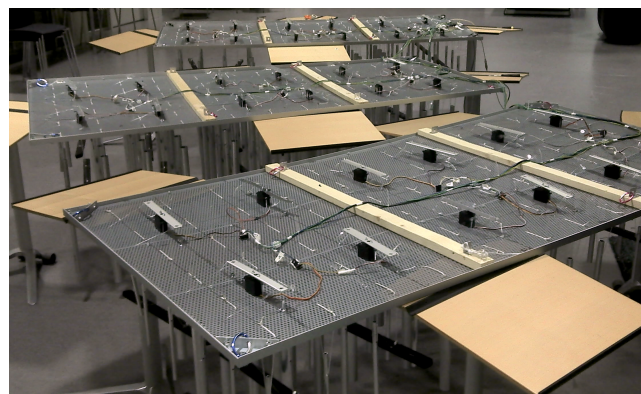


Figure 3: 36 Servos placed on top were used as actuators.

## 5. CONTEXT AND USERS

As the intention of this project is to incorporate everybody in the shaping of a common place we do not restrict it to a certain usergroup. Furthermore we explicitly have not done any specific user-testing. It is the purpose of the Chimecloud to provide a platform for experimental interaction. During the first installation we observed various kinds of interaction arising: from expressive dances, to analytical sound-triggering to contemplating strolling. As a side-project this installation might augment the work of performance-artists.

In general every visitor of the Kulturhus should have the chance to access and experience the installation and to experiment with it. The placement should be preferable in a central area with some passing foot traffic. The entrance-area of the final Kulturhus might be an appropriate place of issue. If possible every guest should be exposed to the installation when visiting the Kulturhus. Whether by his or her intention or by accident. Despite its affording appearance the function of the Chimecloud does not have to be specifically promoted. To prevent people of getting annoyed

a possibility to bypass the installation should be given.

## 6. DISCUSSION

The installation can be analyzed on two different levels: first starting from its actual "role" in relation to the problem and then discussing about its semiotic and metaphoric value.

The main point of the project, in fact, is to force the user to interact in a double way with the place becoming a constant part of it. The user, while stepping underneath the structure, cannot avoid to trigger the loud chimes, strongly modifying the environment status. In relation to what was stated in the problem description section, this forced interaction literally "wakes up" the user from his state of guest to a new state of "actor" taking him back to the actual context he is placed in. In the other way around, the second part of the interaction consists in a clear feedback that the place "gives" to the user while detecting his presence. In this way the environment starts a communication process between itself and the actors where feedbacks are exchanged with each other.

As most of the art's dialectic is focused on the concept of abstraction from reality, our job is focused on bringing the people back to the most tangible aspect of it: the physical place. One of the main reason why people feel like guests in a place is the absence of a precise task for them to accomplish because it is usually what makes someone's actively living a place compared to just visiting it. Our lifestyle most of the time requires us to be focused on different tasks that become the main point of our activities. In this context, places lose their relevance becoming just part of the background of our life. The culture house, as we perceived it, should be a place where the usual life's dynamics stop in order to shift the focus on something no more related to tasks. That is why it is really important to sort of physically "shake" the people from their task-oriented "sleep"-condition and make them observe the space around them. In fact, being located on the ceiling, the Chimecloud lets the people move their head to look up spreading their view angle to the whole environment. This action of "spreading our view angle" can be considered, in a way, as representing the general concept of "culture": a sort of augmenting and rising our perception possibilities to different levels of analysis and observation of the world around us. On this level, we can also relate this observation widening to the actual chance of making new connections. Exactly as culture allows to connect to other realities that otherwise can just be ignored, the users, by being forced to observe the environment, are just inclined to connect between each other. The installation, providing the possibility to interact with multiple people at the same time, is also aimed to enhance this connection aspect as a main part of the interaction with the environment.

As said in the beginning, the installation can be analyzed also from a second level of focus: the meaning. As an art piece, in fact, it has a strong metaphoric value in itself that based on a parallelism with nature, represents the concept of culture through the place's aliveness.

We can think of a natural environment like a forest or an ocean to be "alive" starting from the assumption that the interaction between it and the natural elements make it "move" and "sound" and continuously shape itself. In a forest, for example, the wind moves the trees and their leaves produce sounds that cannot be easily recognized and classified and

sometimes it is even too feeble to being felt. In many traditions and different eras, in fact, the wind was related to a "spirit" or a "presence" related to an idea of the nature as an alive entity. A windchime has the exact purpose to "detect" the wind, so a sort of "lifeblood" of the nature and transform it to a tangible sound output.

Following the parallelism, the installation represents a huge windchime that detects the main element that make an artificial environment, like a building, alive: the people. In our case, the people are the wind and their presence. And even if they are few and quick, they are detected by the chimes that turn it into a tangible movement and sound feedback. The movement of the chimes, beside being the sound's source, is supporting the metaphor of the natural environment where sounds are directly related to physical movements. Finally, the Chimecloud reflects the place's liveliness that can be also related to the concept of culture as something "alive", made by the people and their interaction.

## 7. CONCLUSION AND OUTLOOK

The reactions concerning the Chimecloud were almost all positive. Many people started smiling, dancing, moving their arms as soon as they realized that they were actually triggered the sounds. Different interactions patterns, we noticed, ranged from dancing, waving, jumping back and forth, running under the cloud or figuring out specific spots or movement patterns which just sounded good. Most of the people looked up to the ceiling, observing the movement they triggered, watching the tubes swing and vibrate. Some people got a bit shocked, when they entered the space unprepared, since the installation can be quite loud on the highest intensity level.

We placed our installation in a small hallway. People had to pass there frequently, without being able to avoid the installation. On the other hand, we also noticed that it can get annoying, if you cannot avoid passing under it. The Chimecloud forces everyone who enters the installation space to participate. That is part of its concept. Our suggestion would be, to put it in a prominent place, where random people pass through and can discover it, but not in a place where people cannot avoid it.

We also thought about implementing some other interaction patterns. Some Ideas are:

- change the intensity depending on the speed of movements,
- allowing the arms and hands to trigger the cloud as well,
- using some gestures to control the cloud more precisely
- replay the sounds people created with a delay, so you will get a ghost-like presence of the peoples passing before.

After all, the Chimecloud turned out to be an installation with a lot of interaction possibilities. It was really engaging for most of the people and you could spend quite some time with it. Even really busy people, were taking a break to play, talk and enjoy it. The place turned alive.

You can find a video of the installation under this url: <http://vimeo.com/53239679>. On request the Chimecloud is available for exhibition.