Exhibition proposal

The theme is "Can we feel,see and touch a sound?"

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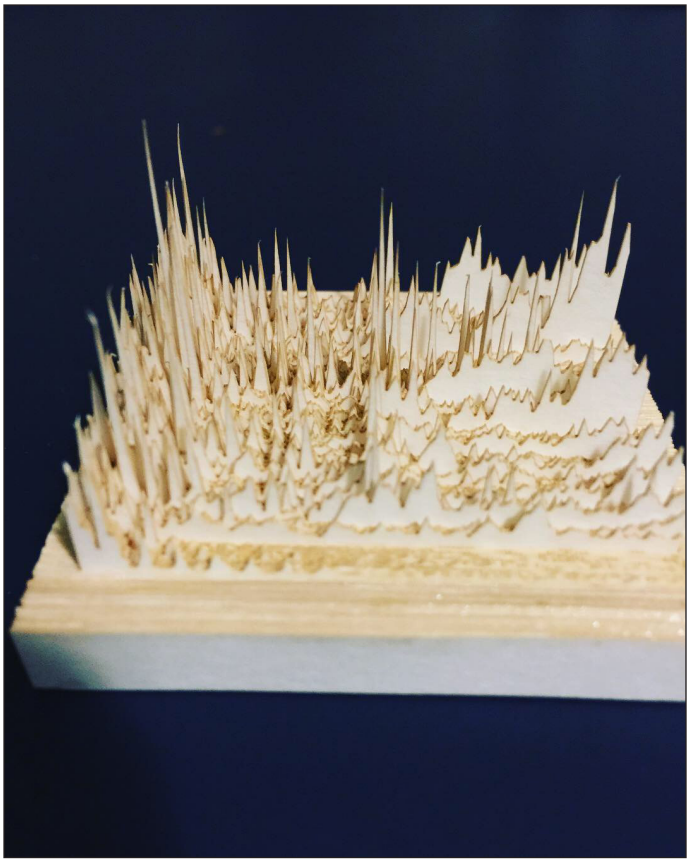
The sound is the one of most sensory information for us to recognize what's going on the outside world. This audible information is mainly focused on our ears to perceive it. Hence, My question is that what happen if we could feel,see and touch this invisible energy. I mean how can our brain interpret the sound if the sound transformed into other medium. Does it help to listen to a sound? or it interrupts to enjoy listen to a sound? In order to do that, I made a s/w program which analysis any sound file into height map then I used Maya to construct the 3D sculpture of the height map which is originally the data of sound. After that, I used 3D printer to print this 3D model into the actual physical object for the whole song. Finally I also made an audio player system to play the original sound of the 3D sculpture. In order to do that, I used Arduino board, RF-ID reader and music player board. Before I explain the technical method how to make it, I would like to discuss how we perceive the sound and the visual information.

How does our brain perceive a sound? We can hear a sound because our ears convert the vibration of the wave energy. This vibrating information is converted huge amount of electrical signals and it travels through our neuron, These vast signals are interpreted by our brain which is the central processor of the human body. Then here is a question, how does our brain distinguish a sound? The answer is about our memory. It sounds strange but it's true, once our brain receives some electrical signals, after that our brain immediately searches a piece of information from our memory to figure it out what is the sound exactly. Or if the sound is never heared before then still our brain trying to give us the answer from our memory. Because as human our brain doesn't like to be in an ambiguous state. This is the one of core tactic how we survive for a long time. For example, ancients, they had to distinguish whether the sound is predator or friends. Hence, every single time when we hear a sound it means that there is a tremendous calculation in our brain. Then why we couldn't feel that our brain is working busily? Because of all the activities is automatically done by our subconsciousness, it seems kind of autopilot.

How can we see? our eyes are one of the most sophisticated organs in the human body. Unlike audible information, the visual information is much complex and faster. I mean the speed compared to the of sound. Our eyes consisted of many parts. For example, as we well know cornea, iris, lens, and retina etc. The light passes through the cornea the clear, dome-shaped surface that covers the front of the eye. The cornea bends – or refracts – this incoming light. The iris, the colored part of the eye, regulates the size of the pupil, the opening that controls the amount of light that enters the eye. Behind the pupil is the lens, a clear part of the eye that further focuses light, or an image, onto the retina. The retina is a thin, delicate, photosensitive tissue that contains the special “photoreceptor” cells that convert light into electrical signals. These electrical signals are processed further and then travel from the retina of the eye to the brain through the optic nerve, a bundle of about one million nerve fibers. We “see” with our brains; our eyes collect visual information and begin this complex process. Same as to hear, our brain is looking for information from our memory which is match with what we seeing. Then we perceive that "I'm seeing".

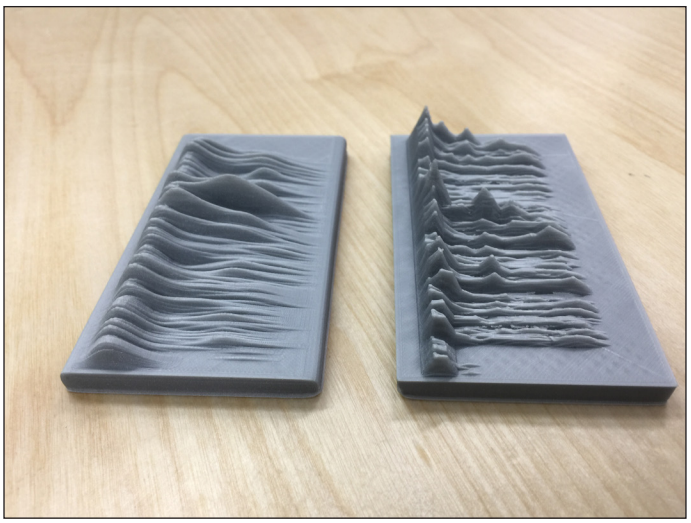
Experiment #1, with this kind of study, I designed some experiment which is to make a sound into a physical 3D object. First I made s/w which export height map of sound(FFT analysis) then I used Maya to construct a 3D model, finally, I used some paper to assembled it like below.



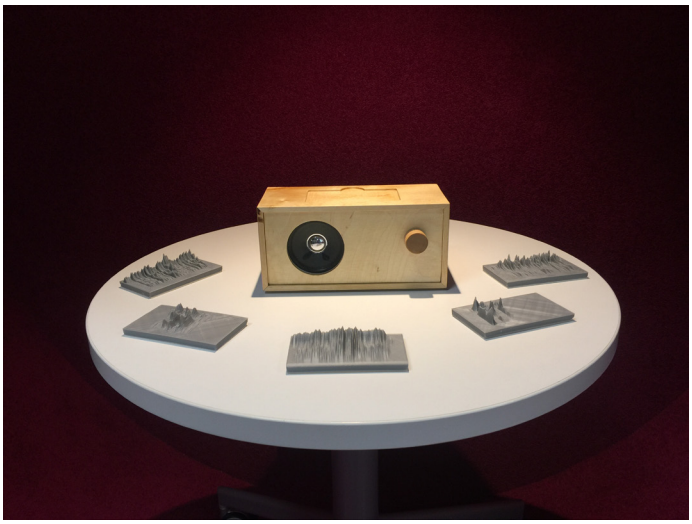
3D sculpture of song called "English man in Newyork"

As you see, I converted the song into a 3D sculpture which contains the frequency and time data. The result looks good as formative. However, I asked some people what is their perception of this 3D sculpture. There were few different answers, most people asked me what is this? when I answer to them then they understand it came out from a song. Another thing that I found from people is that is about continuity. I mean that as you see the sculpture, it has very sharp terrain and it is hard to find the continuity between frame to frame. When people see this sculpture they said it is a bit difficult to find a relationship between frames. Because We need continuous visual information to recognize it, despite continual fluctuations of the retinal image we perceive a stable world in which objects have continuity. We can identify objects across a sequence of changing images. We can find objects with the specific features we are looking for, and we can also distinguish and scrutinize objects we have not seen before. Hence, what I found from experiment #1 is that about we have a tendency to expect a continuity status.

Experiment #2. Hence, I designed these two different 3D sculpture of each song. One is less continuity and another has more continuity. You can find what is differences between these two objects below. As you see, the left object has more continuity compared to the right one. I showed and asked people about these two different objects. The most answer is that they rather think the left one is more beautiful and meaning full. Yes, it is true that the continuity is one of the important information for our visual perception. Then the next question people asked me a lot is about what is the original song of these objects? Even they see the 3D sculpture of some songs, they still want to know the song that is the source of the 3D sculpture. So, I wanted to continue to develop this project. Hence, I made a small and simple audio player which is designed for playing the original song of the 3D sculpture when people put it on the top of the audio like below.



3D sculpture of two different songs



3D sculpture of songs and human voices with its player.

Basically, the player detects each RFID tag of sculptures then it plays the original sound. Same as usual, I showed this system people and make them use it. After for a while, I asked people about

there impression with this system and most people were already have experienced with my previous experiments. The answers were having a common area that is they were satisfied with listening to its original sound. And some people told me that this kind of new experience make them feel better to enjoy to listen to music.

With this project, I found that it gives people new experience when audible and visual information supply at the same time. Future more, I would like to improve this project more to find out how our perception is related to mixed sensory data. Also, I will start to project a tangible audible system which I expect give people another way to listen to a sound.