A study on interactive media art which responds to sound signals
Centered around the production case study

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Abstract: An interactive media art piece “Goldfish”, produced using an input element of sound. The goldfish is subjected to external sound signals throughout its growth period. The piece presents the result of the goldfish’s growth and appearance deteriorating when it stops receiving the sound elements at the usually expected time.

Keyword: Interactive Media Art, Sound Visualization, Sustainable Design

1. Introduction
1-1. Background on the study
Existing interactive media art have used limited input installations computers with mouse and keyboard to be used as communication tools, and have shown technological tendencies for their subject matters. The focus was on the act itself rather than the validity of the act. What we need is design which proposes questions.

All existing content is influenced by context. The current world is shifting from an economic era to an informational era. This suggests a change in paradigm. Our society is changing from an era that simply seeks physical substance to an era that seeks the quality of cultural life. This lends itself to an environment where there are many opportunities to think deeply. A sustainable society within a limited environment means economic growth within nature’s self-sustaining territory. Moreover, manmade artificial environment is made reusable. As this happens, manmade artificial environments must be prevented from destroying the natural environment. From this perspective, the focus is put on the elements of interactive media art input that can be utilized in a sustainable territory, and sound, which is a reusable element in manmade environments.

2. Production of the piece
2-1. Environment and a sustainable society
2-1-1. The concept of the environment
It is necessary to explore the term ‘environment’ in order to study the concept of the environment. In the Chinese language, it means ‘surrounding regions or territory’, or ‘all matters and conditions that surround a person’s life’. In the English language, it conjures up an image of a surrounding circle or a ring. The concept of the environment can be divided into four large categories. 1) Spatial Environment 2) Objective Environment 3) Human-centric Environment 4) Structural Environment. Environment is a concept that at its minimum needs a subject and an object in order to be established.

This piece suggests the expansiveness of installations of input elements within interactive media art and the societal questions around the theme. It also provides an opportunity to approach in a constructive manner, interactive media art that does not destroy nature that can move the human mind.

Fundamentally, humans are the subjects. And all of the surrounding external items in existence are the objects. <Picture 2-1> is a description of all the elements that make up the environment.

[Picture 2-1] The organizational elements of the environment

Environment (Subject formation) – Natural Environment, Artificial Environment (Physical Artificial Environment, Non-physical Artificial Environment)
Environment (Visibility) – Physical Environment, Non-physical Environment

2-1-2. Problem of the Environment
As can be seen on <Picture 2-1>, from the perspective of subject formation, there is the natural environment and artificial environment. The problem of the environment lies in the natural environment. Since the natural environment is not something that can be created by humans and is finite, it is perceived as a problem for humans. Drying up of resources, pollution, and destruction are part of the perceived problems.

2-1-3. Sustainable Society
Sustainability means all of the natural elements of the environment, such as trees and animals can exist continually without being threatened for such existence. Humans cannot exist without the environment. In the post-industrial society, humans are both the violators as well as victims. While industrial society brought about much economic development, nature has been destroyed.
This result has turned back around on humans themselves. What needs to be done to make a sustainable environment is to use the natural environment in a sustainable way and to reuse manmade artificial environment.

2-1-4. Interactive Media Art for a sustainable society
Sound is chosen as the input element from the perspective of sustainable interactive media art. Two methods for a sustainable society: 1) Use of sustainable natural environment 2) Reusing manmade artificial environment. In other words, natural sound can be seen as a sustainable natural environment resource while artificial sound can be seen as a reusable resource.

2-1-5. The theme, subject matter, and story of the piece
The proposed subject matter is a goldfish. Goldfish are born as eggs and gradually transform. 5 days into being an egg, the length of the body is about 7mm and 2 weeks later it is 13mm long, and 15mm long after 3 weeks. At this stage the shape of the tail can be identified. At 4 weeks, it grows to 20 mm in length and form of the body can be visible. At around 90 days, it grows to 40mm and color begins to change. The color stops changing at around 100 days. It reveals its full shape at around 130 days.

Sound is an element that sustains the goldfish. Goldfish grows through sound signals, becomes ill through sound signals, and recovers through sound signals. And it repeats the cycle of life and death according to the law of nature.

2-1-6. The expression of the piece
The graphic visualization of the goldfish utilizes vector graphics. This is due to the concern over the size and condition of the piece for offline display after production. As can be seen in <Picture 3-1>, a basic vector goldfish is created. In order to express the goldfish in its ill stage, motives are borrowed from HR Giger’s graphic work. HR Giger’s work often show skull and bones transform into genitalia or mechanical parts, or vice versa, to show the unified symbolism between violence, suffering, and death.

2-1-7. Inputting sound signals through Flash MX actionscript
Macromedia Inc. introduced Flash MX based on vector techniques, which allows for real-time input of sound signals through its actionscript language. The content below is the script code for the Flash MX actionscript.

<table>
<thead>
<tr>
<th>Example 2-1</th>
<th>Sound Signal Input Flash MX actionscript</th>
</tr>
</thead>
<tbody>
<tr>
<td>Use</td>
<td>Microphone.get([index:Number]) : Microphone</td>
</tr>
<tr>
<td>Example</td>
<td>this.createEmptyMovieClip(&quot;sound_mc&quot;); this getNextHighestDpth(); System SETTINGS (2); var active_mic:Microphone = Microphone.get(); sound_mc.attachAudio(active_mic);</td>
</tr>
</tbody>
</table>

3. Conclusion
Nature rules over humans. All contents are influenced by contexts. Technological progress influences societal areas. This also goes for the territory of interactive media art. This study proposes the expansive possibility of interactive media art input installations and ‘green’ design themes. This allows for design which puts forth questions and the possibility of a new kind of interactive media art.

4. References
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HR Giger. GR Giger ARh+. Taschen GimbH 2001