

Generative Music Workshop

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Abstract—In this paper, we present our practice of Generative Music Workshop (2010-). This workshop is a series of events that reproduce past masterpieces of generative music. The aim of the workshop is historical re-examination of generative works to contribute to recent musical practices with mobile computing devices. We regard that the organization of sounds with environmental elements would be a significant for music application of mobile computer. With this view, this workshop reflects past experimental music/sound art works as one of the practices that is conscious of the relationship between generativity and environment. This paper depicts the diversity of the way to organize sounds in three works: Steve Reich’s *Pendulum music*, Alvin Lucier’s *Music on a long thin wire*, and Richard Lehman’s *Travelon Gamelon*.

Keywords; generative music, mobile computing, reproduction, experimental music, sound art

I. INTRODUCTION

In the summer of 2008, Norihisa Nagano, Nao Tokui and the authors started a project “Audible Realities.” The project explored the aural relationship between listeners and environments mediated by mobile computer through several iPhone application developments [1]. Through the practice, we gradually increased our interest in generative music, which is able to bridge listener and environments.

Brian Eno used the term of generative music in 1996 [2]. He mentioned Terry Riley’s *In C* (1964), Steve Reich’s *Its gonna rain* (1965) as classic generative works which automatically composed and played by a system or a set of rules. The artist makes a system and sets it in motion, then the system organizes sounds by itself. In the late 2008, Eno and Peter Chilvers developed iPhone generative music application *Bloom*. It generates ambient sound autonomously, and creates melodic patterns in reaction to the user’s tapping on the touch panel (<http://www.generativemusic.com/>). They described it as “You can play it, or you can watch it play itself.”

In the same year, another important iPhone generative music application, *RjDj* was also released. Different from *Bloom*, it reacts to environment through the sensors (<http://rjdj.me/>). It uses the microphone, touch panel and accelerometer to organize sounds. The production team of *RjDj* explained the concept as “reactive or augmented music.”

We were particularly interested in the later approach that is able to connect the listener to environment, and consider

that the iPhone could become the Walkman for generative music because of the mobility, programmability and default sensors. Based on these ideas, we planned a workshop that covers both theoretical and practical aspects of generative music.

II. CONCEPT OF GENERATIVE MUSIC WORKSHOP

Generative Music Workshop is a retrospective research that focuses on the organization of sound with environmental elements in generative music. The mobilization of computer has already been irreversible trend. Practitioners have been exploring the intersection of ubiquitous computing, portable audio technology, and NIME (New Interface for Musical Expression) [3] with interests in music and environment. Such interests have a long history from ancient Greek through acoustic ecology to recent mobile applications. In these practices, it is crucial to consider the way to employ environmental elements for organizing sound.

Generative Music Workshop attempts to investigate the history of experimental music and sound art that shows a connection between generatively and environment [4]. We select masterpieces of generative music that are concerned with diverse environmental elements in diverse ways and reproduce them with available materials by following their original instructions. We regard, that assembling components and sharing the same environment with a generative work, must be the most efficient way to know how it organizes sounds. Furthermore, the reproduction shows us the complexity and flexibility of masterpieces, of which their recordings and instructions could hardly inform us.

III. PRACTICE OF GENERATIVE MUSIC WORKSHOP

With a focus on the diversity of environmental elements for organizing sounds, we reproduced three masterpieces of generative music: Steve Reich’s *Pendulum music*, Alvin Lucier’s *Music on a long thin wire*, and Richard Lehman’s *Travelon Gamelon*.

A. *Pendulum music*

Pendulum music (*Pendulum*) is a work for microphones, amplifiers, speakers, and performers. We have reproduced the work at Make Tokyo Meeting 05 (<http://jp.makezine.com/blog/2010/05/mtm05.html>) with three microphones and three powered speakers situated at the foyer of a building. Each microphone hanging from the ceiling is connected to the speaker situated upward on a floor. At the beginning of the performance, performers (us and

other participants) pulled back the microphones like a swing and released them at the same time. “Thus, a series of feedback pulses are heard which will either be all in unison or not depending on the gradually changing phase relations of the different mike pendulums.” as Reich wrote in the score [5]. Through the reproduction, we realized that what the feedback pulses depend on is not only the one-dimensional swing of pendulum, however because of the directivity of the components (i.e. microphones, tweeter and woofer of speakers), the slight shift of the relative position between speaker and microphone causes a definite change of timbre. As a result of these factors, the work never sounded the same any time we played it.

B. Music on a long thin wire

Music on a long thin wire (*Wire*) is a work for a wire, a sine wave oscillator, an amplifier, a magnet, two pickups and a stereo sound system [6]. We have reproduced the work at Interferenze Seeds Tokyo 2010 (<http://ist2010.jp/>) with a 5m thin metal wire fixed at a wooden chair and a bench by clamps and resonant bridges. The wire is vibrated by the interaction between magnetic field of the magnet and an alternative current from the oscillator through the amplifier. The stereo sound system situated on a wooden floor produced sound from pickups on the resonant bridges. Through the performance, people experienced “echo trains, noisy overdriving, rhythmic figures at low frequencies, phase-related time lags, simple and complex harmonic structures, larger self-generative cyclic patterns, stops and starts, and other audible and visible phenomena” as Lucier wrote in the score. What we found through this reproduction is the fascinate irregularity of this work. Sometimes people could affect the cyclic patterns by, for example, putting the hand in front of the speaker. Otherwise, the work seemed to change the pattern by itself as if it had ignored its environment.

C. Travelon Gamelon

Travelon Gamelon (*Gamelon*) is a work for bicycles with metal spokes [7]. We have reproduced the work at the ICC Kids Program 2010 “What Sounds Do We Hear” at the NTT InterCommunication Center (<http://www.ntticc.or.jp/Archive/2010/Kidsprogram2010>). Originally, the work assumes a group of bicycles with audio electronics on streets. However the exhibition had a regulation to present each work in a museum for kids (around over 3 age), therefore, we adapted the work with three different kids vehicles (bicycle, tricycle, and car) with piezo microphone and a powered speaker on various kinds of surface (e.g. artificial turf, textured paving block, wood panel) at the exhibition space. As a consequence, children made different sequence of sounds owing to their rides at the exhibition space, while their parents watched and listened to their activities. The sound of our gamelon was neither totally random nor completely out of control. Each floor panel had own sonic texture in relation to vehicles, and a certain sequence of different panels had a rhythmic pattern. The track of the vehicles tended to become roughly circular.

Therefore, it might be able to partly “compose” gamelon sounds by the arrangement of the panels.

IV. DISCUSSION

Through our practices, we become aware that each component of the generative works has a specific relationship with its environment and other components, which influenced the organization of sounds. The interrelationship between the components of *Pendulum* changed continuously during swinging, and gave richness and ephemerally to the rhythmic sounds. *Wire*'s tangled network between all components and the environment might produce the irregularity of sounds. In addition, the relationship could be controllable from outside to some extent. The shape of the floor seemed to guide the course of the vehicles of *Gamelon*. The way of swinging the microphones of *Pendulum* influenced the position between the components. The varied relationships of generative music between components and between components and environment are complex but not accidental. Therefore, it would be considerable to classify them as a basis of the taxonomy of generative music. Generative music works have often been characterized by the distinctive component; for example, pendulum, wire, or bicycle. The classification of the relationship could help us to find structural similarities or differences between generative works.

V. CONCLUSION

Although we reproduce three works by following the original instructions and images of past realizations instead of notation, replayed sounds never progress in the same way because of the specific relationship between components and environment. Such generativity of the relationship would be stressed by mobile computing. Unlike sound installation situated in a space, mobile computer is able to take generative music outside museum, gallery or any exhibition areospace. To update generative music application, future developers need to consider such expanded environments. We hope that our workshop would stimulate their ideas for next experiments.

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