Not just the environment!
An audio-visual creation based on Japanese culture

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ABSTRACT

This work centers on the sonification of bodily gestures (etiquette, movements) in activities from Japanese culture: the Japanese tea ceremony; the globally popular martial art of karate; and ramen, a soupy noodle dish enjoyed by people all over the world. These three cultural features were represented in images and sounds using VIVE motion trackers™ and Max. Performers wore VR gloves and five motion trackers on their arms, legs, and head. Their motion was recorded by the motion trackers and video cameras simultaneously. In addition, sound was generated by Max based on the motion data.

In many ways, the music industry is in a difficult phase at present. However, music and culture will continue to exist regardless of the environment around us. It is important to protect tradition and culture while simultaneously creating something new for the future.

This piece was composed in 2020 during the COVID-19 pandemic and premiered at the TAMA music festival 2021 in Tokyo.

1. BIOSENSORS IN MUSIC

Recently, many musical pieces that are linked to biological sensors have been developed and performed in concerts. The piece by Alvin Lucie using EEG (electroencephalograph)[1] is one of the early musical works using biological sensors. We also developed a system for live-electronic music using EEG and performed with a cello and performers at a concert [2]. However, the question persists: what do we want to express using biosensors and how should we express it in the form of biosensor-based music? That may be one of the interesting points and motivations for which we compose biosensor music.

We developed a system for electronic music using motion trackers and Max, and composed a video based on human movement in Japanese cultures. The Japanese culture is considered to be one of the unique and distinctive cultures in the world, and every year many tourists visit Japan to see and experience it. The movement of hands, fingers, legs and so on in Japanese culture, including etiquette, are called “Sho-sa, 所作” in Japanese. In this work, we intended to express these “Sho-sa” using sound. Thus, our multimedia creation can be considered a kind of sonification.

2. EQUIPMENT AND METHODS

We used VIVE motion tracker[3], which is a virtual reality (VR) device, and NOITOM Hi5, a VR glove[4] (Fig. 1). We measured the movement of the performer’s body and transmitted the angles and distances of the motion acquired through the Unity program to Max. Next, we generated the electric sound using Max. Max generated sound in conjunction with fingers, hands, feet, waist, and head in real time. In this work, we related the motion of fingers, hands, and feet to the pitch transition and the effect of sound. Furthermore, the motion of head and waist was used for the background music.

Fig.1 Hi5 VR glove (left) and karate performer with VIVE trackers on head and hands.

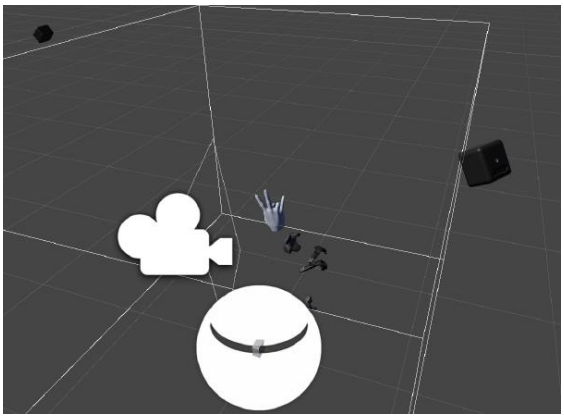

Fig. 2 Virtual space in Unity

The positions of fingers and other body parts obtained by Hi5 and VIVE were mapped in virtual space in Unity (Fig. 2). The position and velocity were calculated in Unity, and these data were sent to Max, and the pitch and modulation were calculated in Max patch (Fig. 3). The basic system for the transformation from physical movements to sound is as follows: the height of fingers and arms from the waist corresponds to the pitch height, the sound volume

depends on the velocity of the movement, and the distance of the arms from the waist is the magnitude of sound modulation (i.e., the changes in distance created instability of sound in the music).

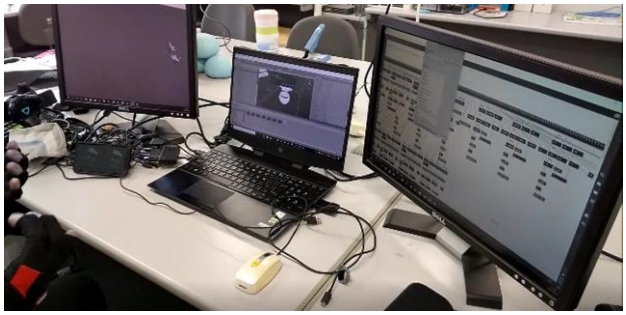

Fig. 3 System for motion tracking

3. SCENES IN THE VIDEO

This video consists of three sections (Figures 4–6 are stills from the video). The first section is Japanese tea ceremony “Sa-dou, 茶道”, which is a refined and elegant traditional practice. A teacher performed the sequence of Sa-dou while we recorded the motion, image, and the actual sounds heard in the Sho-sa of Sa-dou. Next, we edited these materials using a movie editor and obtained the output as a video file.

The second part is Enbu of karate. Enbu means a solo performance in martial arts. A karate expert performed this part in a studio in our university. We aimed to portray the aggressive movements by modulating the sound to make it loud and powerful.

The final part shows eating cup noodles. Instant cup ramen is now a popular food and food culture that has spread all over the world from Japan (the Japanese food company Nissin developed it in 1971). This section was performed by the developer of this system and co-author of this paper, Ohta. He is a university student and likes ramen.

Fig. 4. Sa-dou

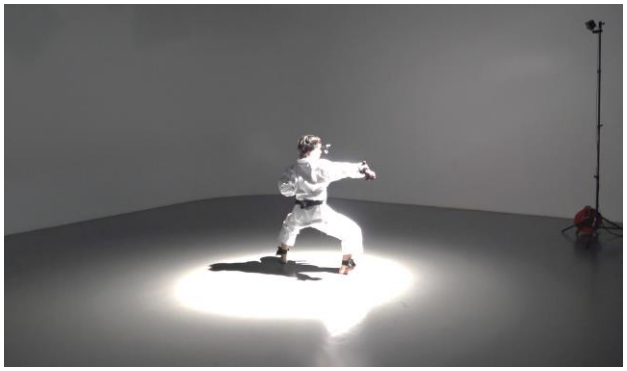

Fig. 5. Karate

Fig. 6. Eating cup noodles

4. REFERENCES

[1] A. Lucie, "Music For Solo Performer" (1965)

[2] H. Hirayama, M. Yokoyama, Multimedia improvisation with brain waves for cello, live electronics and image processing, 43rd International Computer Music Conference, ICMC, Shanghai, China, 2017.

[3] https://www.vive.com/

[4] https://www.noitom.com/hi5-vr-glove