Sensillum : an improvisational approach to composition

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ABSTRACT
This study proposes new possibilities for interaction design pertaining to music piece creation. Specifically, the study created an environment wherein a wide range of users are able to easily experience new musical expressions via a combination of newly developed software and the Nintendo Wii Remote controller.

Keywords
Interactive systems, improvisation, gesture, composition

1. INTRODUCTION
Though music related research focusing on the interaction between people and computers is currently experiencing wide range development, the history of approaches wherein the creation of new musical expression is made possible via the active introduction of interaction design into the musical piece creation environment is short. Indeed, it is thought that this field is only beginning to develop in earnest. Therein, this study proposes an interaction design for music piece creation as a format wherein anyone can easily create music instead of a demonstration with a limited usage environment.

2. BACKGROUND
Currently, the Nintendo Wii Remote can be mentioned as an easily obtainable gesture controller. In addition to the buttons associated with contemporary game consoles, this controller also incorporates a vibrator and IR beam sensor as well as a three dimensional motion sensor, enabling rich information transmission and receiving in a cordless format. Though in this study this is used for the purpose of music creation, simply allotting the three dimensional motion sensor to an arbitrary sound parameter can be considered to largely limit the possibilities of music piece expression. Therein, sensitivity to the user's personal expression as relates to proficiency and trial and error just as in the case of a musical instrument is made possible, and the application "Sensillum" for music piece creation designed to incorporate high quality acoustic expression as available only in the computer format was developed. By combining this with the Wii Remote, a dynamic musical composition environment is made possible (Fig 1).

Figure 1. Sensillum system overview.

3. RELATED WORK
The research of this field can be found a lot of interesting works. Golan Levin's work [6] enhances the possibility of audiovisual expression. He is also examining the relationship between the interaction and the sound from various aspects. Thor Magnusson is pursuing the possibility of screen-based musical interfaces. The ixi software [7] suggests an advanced production process of the musical expression. He is also referring the relation between affordances and the musical expression.[8] This aspect will become more important in the future. These related works strongly influence my research activities.

4. DESIGN OF THE SENSILLUM
4.1 Overview
"Sensillum" is an application developed using Max/MSP/Jitter. It contains an interface similar to painting software, and acoustic operation and musical composition is conducted by plotting "elements" using the Wii Remote. The aka.wiiremote object developed by Masayuki Akamatsu is used for data transmission and receiving through the Wii Remote (Fig 2).
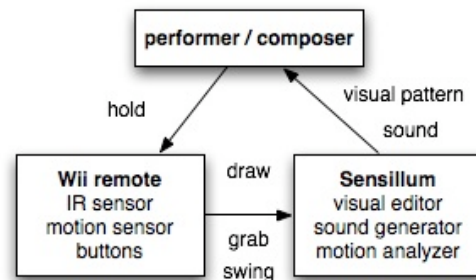

Figure 2. Flowchart of Sensillum

4.2 Arrangement of sound

The term "element" refers to an element which exists for the composition of music. Specifically, sound materials such as sound files, sine waves, and noise, sound effects such as reverb and delay, and basic sound synthesis elements such as Additive synthesis and Amplitude Modulation are available. And the combination of such elements allow the composition of music.

This application plots along the field via various methods similar to painting software. It can plot diverse line patterns by juxtaposing elements upon each other using the Wii Remote IR beam sensor. Because the painted "element" color, planar dimension, and location are used in acoustic synthesis parameter, in addition to being able to operate simply in terms of color and sound, the mixing of transitions such as blurring sensitive to the passage of time and complex transitions such as feedback via clear-cut operations is also possible. Thus, it can be said that this enables a dynamic acoustic operation making algorithm and improvisation compatible which was not possible in environments up to now (Fig 3).
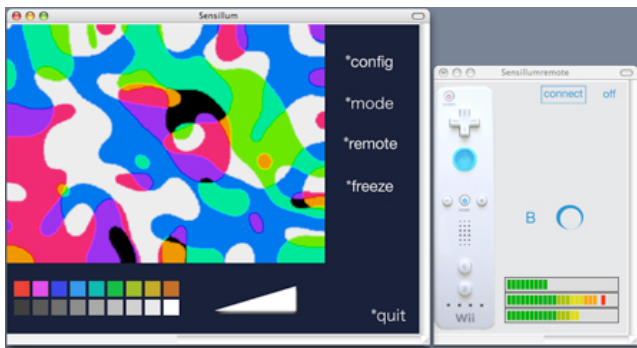

Figure 3. Sensillum software overview

Also, because icon implementation is executed as a sequencer, in addition to the acoustic operation of algorithms via line pattern, it is possible to build in sounds and phrases. This is not a static process as known in past developments, but instead a system allowing dynamic operation by operating in element units.

4.3 Gestural control and interaction

Next I would like to explain about the developments made possible by the combination of the three dimension motion sensor and buttons. For example, if, while pressing the button, movements are freely made such as swinging, punching, raising the hand over one's head, or quickly shaking, these movements are amassed as data expressing the user's own performance characteristics. These movements can then be used as gestures for the purpose of acoustic operation. Each gesture can then be allotted to modulation, effect, and synthesis used for the entire field. Because in addition to the gesture category, the size of the movement and combination of gestures also effect the outcome, in addition to easily enabling dramatic acoustic operation, the wide range of possibility native to impromptu performances using this application is also displayed. At the present, this application only responds to one controller operation. However, in the near future I want to broaden the range to handle multiple controllers and person-to-person interaction.

5. CONCLUSION

Performance has dominated as an essential component of the music composition process since the days before recorded history. And when new music is created, in many cases improvisation plays a large role. Continuing in this tradition, in this study I wish to retain the benefit of using computers while presenting the new possibilities of interaction via the incorporation of such activities into the act of musical composition.

6. REFERENCES

[1] Arcos, J. and Lopez de Mántaras, R. "An Interactive Case-Based Reasoning Approach for Generating Expressive Music". Applied Intelligence 14:1, pp. 115-129. Boston: Kluwer, 2001.

[2] Cadoz, C. "Instrumental Gesture and Musical Composition. " In Proceedings of the 1988 International Computer Music Conference. San Francisco, ICMA, pp. 1- 12.

[3] Choi, I. "Gestural Primitives and the context for computational processing in an interactive performance system. " Battier and Wanderley Op.Cit.

[4] Dobrian, C. and Koppelman, D. "The E in NIME: Musical Expression with New Computer Interfaces". Proceedings of the 2006 Conference on New Interfaces for Musical Expression (NIME06), Paris, France, 2006.

[5] Hunt, A. and Kirk, R. "Mapping Strategies for Musical Performance". Trends in Gestural Control of Music. Paris, IRCAM, 2000.

[6] Levin, G. and Lieberman, Z. "Sounds from Shapes: Audiovisual Performance with Hand Silhouette Contours in The Manual Input Sessions. " Proceedings of the 2005 Conference on New Interfaces for Musical Expression (NIME05), Vancouver, Canada, 2005.

[7] Magnusson, T. "ixi software: The Interface as Instrument" Proceedings of the 2005 Conference on New Interfaces for Musical Expression (NIME05), Vancouver, Canada, 2005.

[8] Magnusson, T. "Affordances and Constraints in Screen-Based Musical Instruments" in Proceedings of NordiCHI 2006. Oslo, Norway, 2006.

[9] Marrin, T. "Searching for Meaning in Gestural Data." In Battier and Wanderley, Op. Cit.

[10] Poepel, C. "On Interface Expressivity: A Player-Based Study". Proceedings of the 2005 Conference on New Interfaces for Musical Expression (NIME05), Vancouver, BC, Canada, 2005.

[11] Robert Huott. "An Interface for Precise Musical Control". Proceedings of the 2002 Conference on New Instruments for Musical Expression (NIME02), Dublin, Ireland, 2002.

[12] Wanderley, M. and Battier, M. (eds). "Trends in Gestural Control of Music. Paris". IRCAM, 2000.

[13] aka.objects. http://www.iamas.ac.jp/~aka/max/

[14] Max/MSP/Jitter. http:// www.cycling74.com