Drop★STAR: Support System of Musical Arrangement and Performance for Small Groups

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1. INTRODUCTION AND RELATED WORK
The purpose of this study is to make users enjoy musical performance like a band regardless of skill level on musical instruments. Other studies have focused on only beginners or only experts [1][5][4]. Very few attempts have been made at our purpose. Our system consists of miniature stage and dolls as players. When users move dolls on the stage, sound changes with corresponding dolls’ motion and position. If users play in concert, users enjoy not only instruments or music but also talking about the course of performance and practice process. Band members often practice with making conditioning in order to make their songs better. If users use this system, they discuss the mood and flow of their music, practice their timing to play under their policy, keep a good balance between instruments and contrive ways to move their dolls. And they will show off their playing prowess. In the process, users are able to experience performance like a band. We call this system Drop★STAR (Dolls Rhythmic Pop Stars).

2. CONCEPT
Our system provides opportunities to make music with interaction. Usually, if a person would like to co-found a band with him or her, they are required a certain level of skills on instruments. We support to enjoy the process of band rehearsal regardless of skills on instruments. In our system, users move the dolls on the stage of not a virtual environment on the screen but a real space. Because users operate them with bodily movement, they are able to enjoy collaborative performance with five senses. Moreover, the dolls as the input devices enable beginners to perform. At the same time, it enables users to get band feeling. We consider the elements of band feeling as follows.
(a) Users have the meeting and the rehearsal.
(b) Users listen to the overlapping sounds.
(c) Users perform on the stage.

We explain the way for supporting (a) and (b). We can say with fair certainly that playing the musical instruments with seeing a score is performance. However, to sum up my band experience and my friends’, we think it’s fair to say as follows. Band members talk about their music. Band performance includes the process of composition or arrangement of making music. Our research supports band feeling realized on the basis of collaborative work rather than band feeling realized on the basis of superiority complex of playing the musical instruments in public. In our system, there are files for a piece of music for every musical instrument. These files are reproduced at the same time (cf. Figure 1). During playing, users switch the sounds by operating the input device. Users are able to enjoy listening to the overlapping sounds. We explain the way for supporting (c). We use the dolls as the substitutes for users. Players in the real world tend to play as following: A rhythm player plays near the drummer, A person who plays lively moves actively, and so forth. When users operate the dolls, if the change of sound corresponds to these movements, it is possible to have feeling of being on the stage through the operation of the dolls. A doll has a person’s movement as metaphor. We imaged “A doll as a player” as a substitute. In addition, when users obtain and operates the dolls, it’s preferable that a doll’s size, weight and touch are comfortable for users. When users lose their hold of the dolls, it’s preferable that the dolls stand still. That is why we introduced the dolls in Figure 3. These dolls are friendly for users. Familiarity brings the game sense. It is likely that the game sense enable beginners to participate in the band performance.

3. SYSTEM OVERVIEW
The architecture is shown as Figure 2. Five dolls are on the transparent acrylic board (W: 75cm, L: 50cm) like a stage. The square markers are put on the bottom of the dolls. The system recognized the motion and position of dolls with markers and play music. Marker tracking is done by ARToolKit library [2].

Figure 1: An example of changing synchronous music for musical performance.

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Each one of the dolls is assigned a different instrument. And we set following rules. We think simplicity of the operation is more important than faithful reproduction of the band performance. In our system, downstage is called main area, the other side is called backing area. In main area, sub melody flows if a face of a doll is turned to other players except the drummer. Main melody flows if it doesn’t turn them. In backing area, base melody flows if a face of a doll is turned to the drummer. Backing melody flows if it doesn’t turn it. The more violently users move the dolls, the more lively music comes from speakers. Users move dolls as shown in Figure 3. When users leave dolls from the stage, marker can be recognized until about 3cm.

4. EVALUATION AND DISCUSSION

Easiness: Excellent results. 90% of the total could do this task easily from the start. A few people answered that our system need musical background; a certain level of rhythm with others even if they didn’t see the others (cf. [3]). This act also gave subjects a real sense of moving the dolls getting on the rhythm with others even if they didn’t see the others (cf. Figure 3). It follows from this that it is likely that subjects found entertainment in moving the dolls.

Moving the dolls was common enjoyment. In Group A, some people kept time to the music aloud with other members; "1,2,3,4,5,6,7,8". This process was the process that each other tries to have a common problem and match the rhythm actively and induced sense of unity[3]. This act also gave subjects a real sense of moving the dolls getting on the rhythm with others even if they didn’t see the others (cf. Figure 3). It follows from this that it is likely that subjects found entertainment in moving the dolls.

Because the appearance of a doll was similar to their common friend. Group A disputed the name of him during the experiment. Subjects brought up the image of another one not only from the dolls’ appearance but also from the dolls’ feature. Using the nameless dolls liquidized their sensibility and roused their imagination. In this experiment, there was especially no appearance the above-mentioned excluding group A. However, to sum up total tens of subjects’ appearance in the demonstration and the like, we remembered they talked about the appearance of the dolls. And we noticed that it broke through the ice and was opportunity of their sympathy and utterance. This interaction effect was outside the scope of the assumption.

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7. REFERENCES