Graphical Representations for Group Music Improvisation

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Abstract. A tool to support remote group music improvisation is demonstrated. The tool employs a novel graphical user interface whose design is informed by analysis of features of human interaction in group improvisation.

1 Introduction

Creativity and collaboration are fundamental forms of human activity. It is argued that during creative moments in collaboration, participants become *mutually engaged* with each other – at that moment the participants are highly focused and push at the boundaries of their shared understandings of experience and expectation. It is at these points that participants experience the positive feelings of creativity, conventions emerge, and ultimately social constructions develop which shape the way we perceive and act in the world. Such a view emphasizes the importance of mutual engagement in collaboration – collaboration does not require mutual engagement *per se*, but mutually engaging collaborations are more emotionally charged and rewarding, change the way we act, and provide more impetuous to create together again.

Little is known about mutual engagement - this demonstration takes a pragmatic start point by exploring the role of graphical representations in creative collaborations as exemplified by group music improvisation.

2 Group Music Improvisation Tool Design Features

Several projects have investigated support for remote group music improvisation *e.g.* WebDrum I and II [3], MetaTone [5], and FMOL [4]. The key problem encountered with such approaches is how to support an activity which is usually co-present, and richly multimodal. This demonstration explores these areas further by considering how the features of co-present human interaction can be supported through appropriate use of graphical representations.

Small informal studies of three group music improvisation tools (WebDrum I, WebDrum II, MetaTone) reported elsewhere [1] identified the following user interface features which effect human interaction and are used to inform the

demonstration's design: localisation within the artefact being produced; mutual awareness of actions; mutual modifiability; shared and consistent representation. In addition, the following design features are explored in the proposed demonstration: non-score based representation of music; persistence of action – representing past contributions to the improvisation as well as the current state of the improvisation.

3 Daisyphone

Daisyphone is a development of GUDar which is reported elsewhere [2]. The underlying system principles are similar to other group music improvisation tools such as WebDrum - a central server holds a series of notes which are shared between networked clients. In this way several people collaborate on a series of notes which are continually looping at their local machine. Contributions made by users are sent to the central server and are then broadcast to other participants.

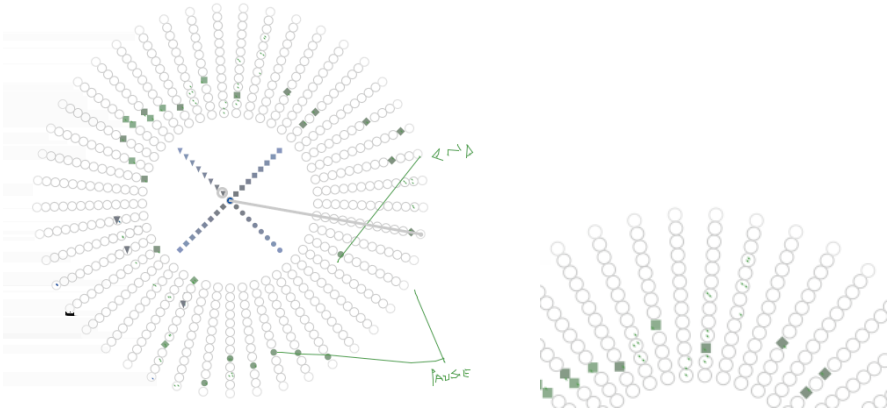

Fig. 1. a) Daisyphone user interface **b**) Temporal aspects of Daisyphone

The daisyphone interface illustrated in figure 1a provides a circular representation of notes (blobs) in a loop. As the rotating 'arm' passes over a blob it is played, different kinds of blobs indicate different instruments, the intensity of colour indicates volume, distance from centre indicates pitch, and colour indicates who contributed it. Users can modify their own notes and those contributed by others by clicking on the appropriate blob. Clicking on an already filled blob removes that note. Annotation is continuous whenever the mouse button is held down.

The graphical representation of activity in Daisyphone's interface provides for mutual awareness of action – notes appear when they are created by participants, and in that participant's colour. It also supports mutual modifiability as participants can change each others' contributions. Moreover, it provides a graphical representation which is shared and consistent as each participant sees the same user interface except for the coloured cross of notes in the centre which represents the user's personal note selector. Finally, localization in the interface is supported graphical annotation as illustrated by the indications of pause and start in figure 1a.

A common feature of novice musicians' use of looping music systems is the tendency to create pieces which do not flow from the last note of the loop to the first note. This may be due to the representation of the loop as a horizontal sequence of notes giving no visual representation of the looping nature of the music. Daisyphone's circular design provides a novel graphical representation of music which reinforces its looping nature whilst retaining the ability to express pitch, volume, and sequence.

In Daisyphone, pressing the mouse button always graphically annotates the graphical representation. Figure 1b illustrates how this continuous and persistent nature of annotation provides a graphical representation of previous action. In the figure there are 10 notes contributed by the same user – 7 square shaped, and 3 diamond shaped. It is possible to recover some of the process which may be associated with the development of this sequence of notes by examining the 'click' annotations of the blank blobs *i.e.* where the user set and unset notes. There appears to have been some activity in four of the columns of blobs. In particular, one of the square notes to the centre of the figure has several click annotations which may indicate that the user tried out different pitches for the note before they settled on the current one. Similarly, in the blank columns they appeared to have tried different notes in these positions and then opted to leave them blank. It is argued that this form of annotation provides a flexible and unintrusive representation of previous action.

The demonstration involves two wirelessly networked tablet PCs running daisyphone, and provides participants with a chance to experience the use of novel graphical representations in joint music improvisation.

4 Summary

The tool to be demonstrated aims to support group music improvisation through appropriate use of graphical representation informed by analysis of features of human interaction in group improvisation. In particular, the tool supports: localization within the artefact, mutual awareness of actions, mutual modifiability and consistent representation. Additionally it provides a novel representation of music and provides some representation of action over time.

References

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