REAL-TIME VISUALIZATION OF MUSICAL EXPRESSION

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Background

This work is part of a research project that aims at developing a computer system for teaching students to play expressively – Feedback-learning of Musical Expressivity (Feel-Me). Part of the system is a tool for automatic extraction of acoustic cues that are considered important for the analysis of performance expression. These cues include duration, sound level, articulation, and vibrato. For example, staccato articulation may be typical of a happy performance, while legato articulation may be typical of a tender performance. It is important that music students are trained to control acoustic cues effectively to achieve different expressive performances.

Aims

Results from analyses of acoustic cues can be presented to the performer in a variety of ways, for example in term of graphs or tables representing mean values and deviation curves after a post-processing of the performance. This can be useful for a more analytical understanding of what the performer did. Here, the aim was instead to explore the possibility of providing real-time feedback about a performance (i.e., at the very instant the performer is playing) by using a graphical interface where acoustic cues are presented in an intuitive fashion.

Method

A graphical interface was developed that presents a three-dimensional object on a computer screen with continuously changing shape, size, position, and colour. Some of the acoustic cues were associated with the shape of the object, others with its position. For instance, articulation was associated with shape: staccato corresponded to an angular shape and legato to a rounded shape. The emotional expression resulting from the combination of cues was mapped in terms of the colour of the object (e.g., sadness/blue). To determine which colours were most suitable for respective emotion, two tests were run. In the first test, subjects rated how well each of 12 emotions corresponds to each of 8 colours. In the second test, subjects rated how well each of 8 colours corresponds to each of 12 music performances expressing different emotions.

Results

The graphical interface will be demonstrated during the oral presentation, along with findings from the colour experiments and a usability study that is currently underway.

Conclusions

The tool presented here provides real-time feedback regarding the expressive strategies used during a performance, and offers an interesting complement to traditional teaching strategies.