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PracticeSpace: A platform for real-time visual feedback in music instruction

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Background

Cheaper, more powerful technology has opened the door for the development of sophisticated music education platforms for use in conservatories. Real-time visual feedback has been shown to be an effective tool in singing instruction, but currently, there are no platforms for use in the instruction of other instruments.

Aims

We aim to develop a computer-based platform incorporating real-time visual feedback for training expressive musical performances. The platform will initially utilize instruments which produce MIDI data, and will eventually be expanded to incorporate audio analysis of non-MIDI instruments.

A short description of the activities

The initial platform was run on a PowerMac G5 using two flat-panel displays, two monitor speakers, and a MIDI drum machine with attached triggers. Playback and recording was handled using the Logic sequencer, while analysis of expressive information was done with Max/MSP. Visual feedback was presented with Macromedia Flash. The “teacher” selects or performs a desired passage, which triggers a display on the student’s screen in real-time. The display consists of a series of geometric shapes whose features are mapped onto the voice, timing, and velocity values of the passage, forming a coherent figure. Different expressive patterns lead to unique visual figures. When the passage has completed, the student attempts to imitate it. This triggers a second display pattern that is overlaid on the initial display. Discrepancies in expression between the instruction performance and the student’s performance lead to differences between the two display figures.

Implications

We feel that incorporating a visual feedback system into lessons may improve the effectiveness of music instruction. The feedback is synchronized with the musical events, and is more closely associated in time with the student’s sensory feedback, reinforcing it. Additionally, the display is directly related to the musical aspects of their performance (intensity, timing, etc.), as opposed to physical measurements (i.e, spectrograms, waveforms).

Specific value and meaning The platform will enable students to develop their expressive abilities with a variety of instruments. It also will enable self-instruction through libraries of precompiled materials, and can reduce the cost of instructor time for conservatories.

Key words: Music education, Music technology, Real-time visual feedback

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