Hyperscore: A Freehand Drawing Interface for Music Composition

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Abstract

Hyperscore is a graphical computer-assisted composition system intended for users of all musical backgrounds. It presents a unique interface which takes input in the form of freehand drawing, allowing users to compose pieces of music by literally sketching them out.

1 Introduction

How can a computer help a human being to compose music, especially if the person has no prior musical training? This problem can be viewed as a spectrum of tasks ranging from the development of musical algorithms for automating the compositional process to the design of an appropriate interface for humans to interact with the machine. Hyperscore is a software tool that attempts to address both of these issues.

Hyperscore is a graphical environment that facilitates composition through the intelligent mapping of musical features to graphical abstractions. It provides a visual metaphor for what is happening structurally in the music as opposed to displaying musical events in functional notation or as a set of parameters to tweak, as is often the case with other graphical composition systems. The interface presents an innovative way to treat musical material as fundamentally contrapuntal and also provides a novel way to depict harmonic changes.

2 Exposition

There are numerous examples of past and current graphical computer-assisted composition systems. Many of them are designed for or by professional musicians to program or manipulate musical functions and sound output. One example is Iannis Xenakis' UPIC, a system that enables users to draw a time-frequency score consisting of lines, curves and points [Lohner 1986]. David Zicarelli's *OvalTune* is a program that allows users to create sounds and visual images simultaneously by painting with a mouse. Other systems accessible to musically untrained users can be fun to play with (SimTunes [Iwai 1996], MetaSynth [Wenger 2001], Music Sketch Pads [Subotnik 1999], to name a few) but are not designed to aid the user in traditional composition.

Hyperscore is a Windows application written in C++ with DirectX. It presents an expansive, zoom-able canvas where any number of musical motifs and scores can be created. Musical motifs are created by clicking on a grid to add notes, which can be of any length. Blank spaces are interpreted as rests. The user chooses a color to map to each motif. A piece is composed by selecting different-colored pens and drawing with them into a sketch window. Every time a line of a certain color is drawn, the motif mapped to that color is added to the piece. Changing qualitative aspects of the lines such as texture and shape alter different musical parameters.

The automated harmonization feature enables users to create harmonic progressions by shaping a central line in the sketch window.

The computer chooses relevant chords based on the shape and local texture of the line. For example, an "up" section indicates an increase in tension, so the chords mapped to that region sound unresolved. Jagged regions create modulations or key changes.
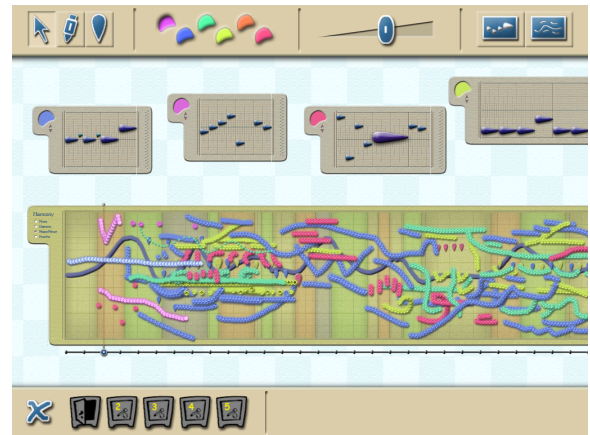

Figure 1: A screen shot of Hyperscore

3 Conclusion

Future improvements need to be made in order to allow direct editing capability at the individual note level as well more precise control of the automated harmonization. However, the current version of Hyperscore has worked very well with musically untrained users. Children have used it extensively to compose short pieces for string orchestra. These pieces have been performed by symphony orchestras in Europe [Farbood 2000] as part of Tod Machover's *Toy Symphony* project [Machover 2003].

References

FARBOOD, M., 2000. Hyperscore piece composed by children. http://web.media.mit.edu/~ mary/etech_hyperscore/.

FARBOOD, M. 2001. *Hyperscore: A New Approach to Interactive, Computer-Generated Music*. Master's thesis, MIT.

IWAI, T., 1996. http://www.iamas.ac.jp/~ iwai/simtunes/.

LOHNER, H. 1986. The UPIC System: A User's Report. *Computer Music Journal 10*, 4, 42–49.

MACHOVER, T., 2003. http://www.toysymphony.net.

SUBOTNIK, M., 1999. Musical Sketch Pads online activity. http://www.creatingmusic.com/mmm.

WENGER, E., 2001. Metasynth. http://www.uisoftware.com/.

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