

Ananda Jacobs
ISE 599
Paper review
February 26, 2004

Real-Time Tonal Pattern Extraction and Interactive 3D Visualization - Elaine Chew and Alexandre R.J. Francois

This paper presents the MuSA.RT system, a system for real-time music visualization and analysis. It is based on the Spiral Array model, a three-dimensional representation of tonal structures.

At first, the paper was not clear as to why one would want to develop a system for music visualization at all. It only stated in the introduction how novices or computers would “benefit greatly” from such a system, but why would visualization be necessary, other than for aesthetics? The introduction was also redundant at times, as when describing the Spiral Array model as a visualization/analytical tool that visualizes and analyzes.

However, aside from the issue of style, it did become clear as to why MuSA.RT might be useful. The authors mention that no other system involves real-time analysis of different types of incoming data. It is thus far the most complex and interdisciplinary attempt at integrating simultaneous streams of data: MIDI input, tonal analysis, gamepad control, and 3D graphics. Being able to conveniently see what is happening in a tonal music setting could provide an elegant way to analyze theory concepts in a classroom setting; it could also facilitate compositional processes, for instance if a composer wanted to explore the most fluid ways of modulating between keys. Since it is real-time, this would be a possibility.

The paper provided a good, concise justification of using the SAI system for MuSA.RT: it is a combination of “patterns that have been illustrated on designs in various contexts including real-time computer vision, interactive computer graphics and distributed collaborative games” (3.2). This apparently simplified the process of designing MuSA.RT. It was also helpful to read the Francois paper on SAI to gain further understanding of this justification.

I would like to know if the user would be able to pause the analysis, and in what formats the data can be saved. For instance, it might be useful to send the Spiral Array data into a chart summary of chords and key areas. This may seem like a step backwards, but it would be yet another way to intermix various representations of tonality. I would also like to know if the user can set how specific a level the analysis proceeds. Can it be every little hint of modulation, or perhaps just the larger picture? This question was partly addressed in section 5, as it seems there are different trajectories at work-the user can choose to show only the chord-tracking trajectory, for instance.

I also thought that it would be far more useful if the system could handle audio input, not just MIDI. As it stands, the system relies on the simplicity of MIDI (“on” versus “off”).

I especially liked the implementation of the auto-pilot function. This option finds the best view and camera angle so that the action is at the center of the screen. This allays the difficulties a user may find when trying to follow what’s going on.

Overall I found this paper to be thorough, and although the methods were fairly complex for my background, the goals and methodologies were for the most part clearly presented. It was interesting to see how a core idea like the Spiral Array model could be directly applied to a more

complex system like MuSA.RT. Such direct applications are encouraging, as there may be many more future uses for representational models under current investigation. I especially agreed with the proposition to integrate control of the memory decay, and to explore ways of using audio input. After reading the paper I would have liked to see a demonstration of MuSA.RT in practice, as it was hard to visualize the pace and overall feel of the system.