USC IMSC

A NATIONAL SCIENCE FOUNDATION ENGINEERING RESEARCH CENTER

MuSA.RT Op.2

music on the spiral array . real-time

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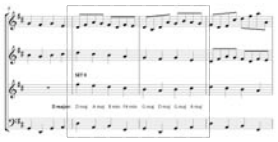
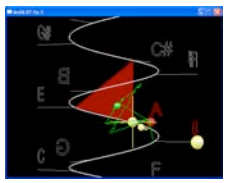


Research goal | **a collaborative research project integrating real-time music processing and content-based graphical rendering in interactive immersive environments**

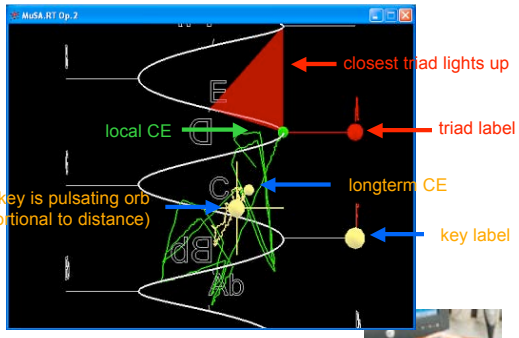
GROUND BASS CHORD PATTERN



Pachelbel's Canon in D

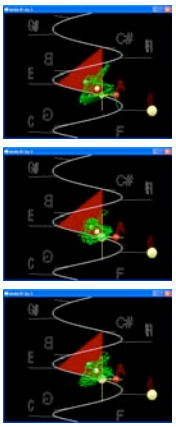
research approach

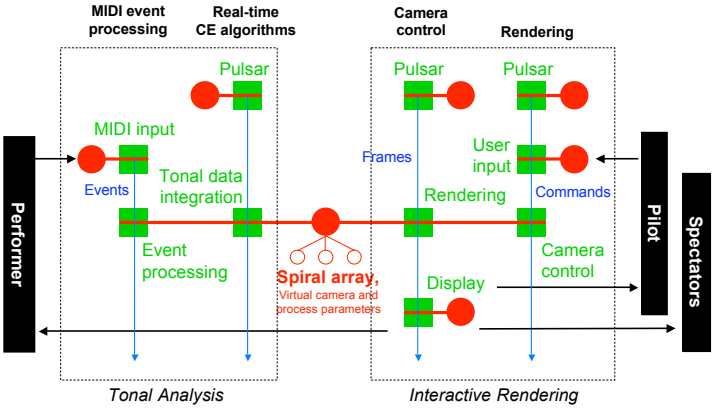
We use the **Spiral Array** model to quantify, analyze and visualize tonal patterns. The Spiral Array model [Chew 2000] is a geometric model for tonality rooted in the theory and perception of music. It has been shown to be an effective tool for assigning context-appropriate pitch spellings to MIDI numbers [Chew & Chen 2003, 2005], for chord tracking [Chew 2000] and for key-finding [Chew 2001]. The picture to the right illustrate the rendering of the Spiral Array's analytical structures.



We designed the MuSA.RT system using the **SAI** architectural style, and implemented the MuSA.RT Opus 1 and 2 prototypes using the open source Modular Flow Scheduling Middleware (MFSM, mfsm.SourceForge.net). The system consists of four independent data streams defined by the composition of well-studied architectural patterns [Francois 2003].

TRAJECTORIES





accomplishments

MuSA.RT is part of a collection of papers on tonal visualization submitted to ACM Computers in Entertainment for a special issue on music (2005).

Numerous demonstrations, including one at the ACM Multimedia conference, held in Berkeley, CA in November 2003 [Chew & Francois 2003]. The picture to the right shows the demonstration setup. Live input from a MIDI keyboard is analyzed and rendered in the Spiral Array space in real-time. The 2-hour demonstration received excellent reviews.

plans

- Exploring the use of MuSA.RT in similarity assessment.
- Integrate feedback and learning algorithms in MuSA.RT Opus 3.

Role in IMSC | **an experiment in complex, cross-disciplinary multi-modal real-time system integration that serves as a model for larger scale integration experiments**