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Research Topic
Computer Accompaniment

Research Problem
Can we make a program which will provide accompaniment for a live performance?

Problem Statement

Given a known musical piece of several different parts, construct a program which will recognize a live performance of one of those parts and provide synchronized, real-time synthesized accompaniment of the other parts to the live performance.

Musical piece: a collection of sounds ordered in a way to produce a coherent whole.

Parts of a musical piece: a collection of sounds associated with a particular instrument, which is then, as a collection, associated with other collections of sounds associated with other instruments which, when performed together, produce a coherent whole.

Program: a software program with (in this context) hardware inputs and outputs for accepting and producing musical notes.

Real-time: computer processing which occurs at or about the same moment a stimulus is received.

Synthesized: computer-created.

Accompaniment: the performance of a part of a musical piece which is synchronized with the performance of another part of the same musical piece.

Live performance: the physical performance of a musical piece by a human being using a real musical instrument.

Problem Description

Prof. Dannenberg is involved in a number of different research efforts. The primary research effort he is currently working on is:

Computer Accompaniment

Can we make a computer actually identify a live performance of a musical piece, synchronize with the tone, pace, and errors made by that live performance, and play the pieces for the other instruments that accompany the instrument used for the live performance? It turns out we can, and impressively well; this research aims to see how well we can.

Computer Science Perspective

From the perspective of Computer Science, this research is all about opening up a new area of influence for our discipline. Music is traditionally an artistic (and thoroughly non-technical) field; by examining what the capabilities are of a computer to perform and understand music, not

only do we use the signal processing foundation already present within Computer Science, but we also influence yet another discipline and thus open entirely new fields of research. Also, real-time systems are necessary to perform this research, and some issues specific to the area of music may drive discoveries in this discipline.

Disciplines actively involved

Music; Computer Science; Signal Processing; Real-time Systems; Computerized Music Synthesis; Teaching.

Actively Involved Discipline: a discipline in which further research can result as a result of the successful completion of this research.

Description of Disciplines Involved

The other discipline being used in this research is Music. It breaks up into a number of different areas, such as synthesis of music via computers and teaching of music.

References

Presenter web page:

<http://www.cs.cmu.edu/~rbd/>

Computer Accompaniment

<http://www.cs.cmu.edu/~music/accomp/index.html>

By mnovakou

Updated mnovakou