

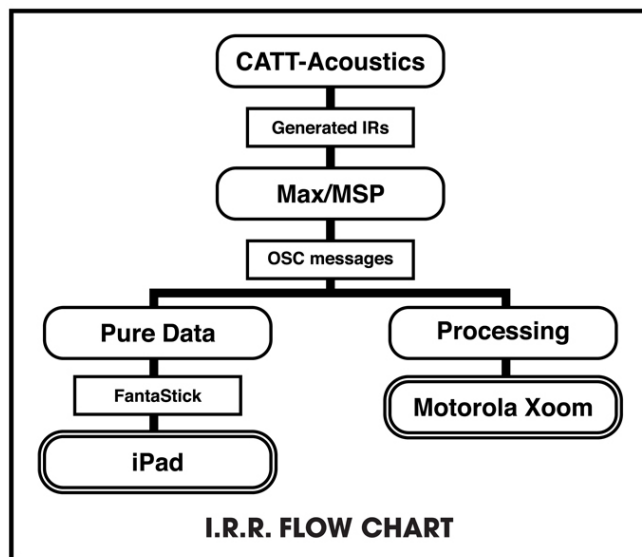
Convention Paper 8577

MULTI-TOUCH ROOM EXPANSION CONTROLLER FOR REAL-TIME ACOUSTIC GESTURES

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INTRODUCTION

I.R.R. (Interactive Room Response) is an application that provides real-time high accuracy room acoustics simulation. Using a multi-touch interface, the user can easily manipulate the dimensions of a virtual space while hearing the room's acoustics change in real-time. The system relies on high accuracy room impulse responses from CATT-Acoustic and real-time audio processing through Max/MSP. Such an interface has the capability to create a more realistic effect without compromising flexibility of use.



DELAY-BASED REVERB

Standard delay-based reverb systems offer control over parameters such as early reflections, diffusion, reverb time, and sometimes EQ. Adjustments of those parameters produce a sonic result that is perceptually correlated to the size of the modeled room.

CONVOLUTION REVERB

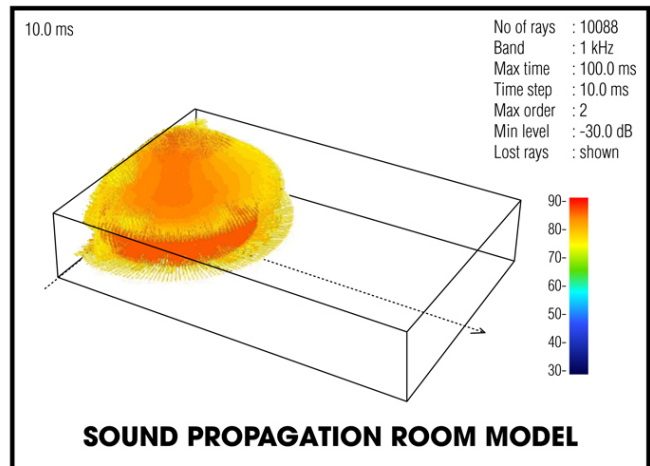
Convolution reverb systems recreate the reverberant behavior unique to a real acoustic space, but do not allow for manipulation of the resulting audio outcome, as they rely on pre-captured impulse responses of halls, rooms, etc. While convolution reverbs allow for a more accurate representation of an auditory space, delay-based units provide a more efficient parametrization for dynamic control of the synthetic reverberation effect.

ACOUSTIC MODELING

Acoustic modeling describes the process of using physical or computational models to predict the propagation of sound in a given environment. Through techniques such as ray-tracing and image modeling, an accurate impulse response of a space can virtually be created.

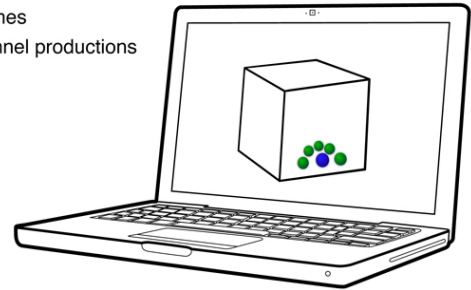
I.R.R.

The I.R.R. system was developed as a prototype for controlling reverberation in a mixing environment. Through the use of a variety of technologies, I.R.R. allows the audio engineer to manipulate the size of a virtual room in which audio sources have been placed. A precomputed library of over 500 binaural impulse responses was generated to be selected from for convolution. This can be done in real-time, allowing for highly accurate acoustic gestures.



APPLICATIONS

- Sound design for film and related media
- Sound and art installations
- Performance
- Architectural acoustic demonstrations
- Education
- Video games
- Multi-channel productions



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