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Movement detection in video data and its translation into MIDI signals.

Abstract of a master's thesis at the University of Miami

Thesis supervised by Professor Stephen Murrell.

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This thesis addresses the topic of motion detection in a sequence of video frames, and how to map the gained information into MIDI signals to generate sounds. Qualities of a moving object like velocity, size, coordinates etc. can be mapped into values for pitch and volume of a note.

Based on existing devices like the Theremin or the Video Harp, the primary goal of this work is to make music or sounds with body movements. Being a dancer gets a new dimension of expression. A dancer also acts as a composer now.

The framework of the algorithm can be decomposed into three independent problems. Motion sensing, processing of the information and dispatching to a sound device. This is done by an analysis of individual video frames against a static background and extracting the interesting parameters. These are then passed through the translator, a software module, which can be programmed with an interpreted scripting language. The output of the translator are MIDI signals which are sent to a Soundblaster card or synthesizer where they control events like note on/off, sound selection or pitch bend.