

In many applications computer graphics is closely related to music and sound. Action on the screen in the form of images, movies and 3D objects usually triggers sounds and is often accompanied by music. A common problem in creating animations is how to tie computer graphics, music and sounds together. Only few applications and tools exist which aid animators and filmmakers in dealing with this task.

Undoubtedly one of the most important standards for music software and hardware is MIDI (Musical Instruments Digital Interface). MIDI enables synthesizers, sequencers, rhythm machines and computers to be interconnected through a standard interface. The specification defines a data format to exchange music data such as Note On, Note Off, Change Instrument between music hardware. Standard MIDI File (SMF) is a common file format defined in the specification to record, save and play back this recorded musical data. It is widely used on all platforms in a large variety of different applications like music software, games, entertainment, cell phones and websites.

During this project I would like to study how MIDI data can be used to trigger animations. Either MIDI data from a Standard MIDI File or interactively recorded musical data (e.g. from a MIDI keyboard) could be used for this purpose. I intend to write a generic toolkit which enables a programmer to read MIDI events from a file or MIDI device, then classify these events and tie these classes of events to actions in an animation.

Applications of this tool kit range from simple visualizations of the played back music to complex animations, such as a model of saxophone player who moves his fingers according to the correct fingerings of the played piece of music.

A first prototype could trigger a simple visualization of MIDI data read from a MIDI file or keyboard using OpenGL. If it is not too complex, I would like to write a plug-in for Maya which uses this toolkit and enables the user to trigger more complex animation actions defined in Maya.

For the realization of the toolkit I plan to use C++ since this is the most widely used programming language in computer graphics and allows easy connection to APIs like OpenGL, DirectX/DirectSound/DirectMusic and the Maya developer toolkit. The reason why I want to develop a plug-in for Maya is that is the most widely used professional animation software and allows the toolkit to be used in a sophisticated context and in further research.