A MULTIMEDIA ENVIRONMENT FOR COMPUTER MUSIC

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ABSTRACT: As the field of Computer Music is quite new, consequently there are relatively few non-specialised books for the inexperienced to read on the subject. The objective of this paper is to present and demonstrate a set of computer based self-learning materials in Computer Music on a Multimedia environment. The platform used is the 'Authorware Professional Multimedia package for the Macintosh.

1. Introduction

This paper demonstrates a set of computer based self-learning tutorials in Computer Music. These include a multimedia presentation of the history of computer music, the different techniques used, important points for creating a recording studio, musical examples and information on key-composers, as well as reviews of the most commonly used software and hardware systems.

2. Multimedia Tutorials

The platform used for this multimedia presentation is Authorware Professional package for the Macintosh. This multimedia package allows developers of computer-based training to create sophisticated applications by organizing and viewing how the application would respond to the interaction between the user and the system. It can facilitate the integration of text, pictures, video and sound, in order to implement a Multimedia presentation. It is an object-oriented authoring tool, which does not require scripts or a programming language, but allows a visual representation of logic by connecting together different applications. In the Authorware it is also possible to have a hierarchical structure with maps which makes visible the overall design of the application.

These self-learning materials were developed especially for use by students on the B.Sc. course in Electronic Imaging and Media Communications at the University of Bradford[1]. The course has been designed in response to the continual need for innovators who can work comfortably in both the creative arts and the engineering sciences. The set of the computer-based tutorials in Computer Music has been produced for the exact needs of the above course, but it can also be used by anyone who is interested in the field. The modules in which they are used are:

- Audio/Visual systems (1st Semester, 1st Year),
- Computer and Music (1st Semester, 3rd Year),
- Sound Processing (2nd Semester, 3rd Year).

In the application utilized at Bradford, there is a main menu where one may select any of the following different topics, all within the Computer Music field:

- History and development of Computer Music,
- Computer Music software and hardware packages,
- MIDI.

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- Studio Technology (equipment and architecture).
- Science in Composition, and
- Different musical styles.

Each one of the above categories is divided into different parts covering the following:

- History review: Key composers. From tonality to tonality;
- Compositional tools: Punched recording systems. Sequencers: Fractals and music;
- What is MIDI: Configuration and use. MIDI and Multimedia;
- Analog and digital recording: Special effects. Studio architecture;
- Evolution of musical science. Synthesis and algorithms. Electroacoustic composition;
- Musical examples of different styles.

In all the above sections, there are many musical examples taken from the work of different composers, and also there is a comprehensive explanation as to how different MIDI equipment works and what connections need to be made between the different systems (a short video is used for this purpose). In some cases parts of videos are used as examples (i.e. Jean Michel Jarre's concert in Houston), or as guidelines on different subjects (i.e. how you add special effects on sounds).

There are also tutorials based on Csound demonstrating examples on:

- Additive Synthesis;
- Harmonics and how different combinations can change the timbre of the sound,
- The theory of phase on sounds;
- Simulation of Instruments using Additive Synthesis;
- The effect of different Sampling Rates. Examples of Aliasing;
- Amplitude and Frequency Modulation;
- Subtractive synthesis and Filtering;
- Simulation of Vowel Sounds and Frequency Domain representation.

The above tutorials on Csound help the students understand some basic techniques for the creation of sounds and also what is important in the synthesis of all the different sounds obtainable from diverse musical instruments. They also learn about sampling, and what problems are created when it is not used properly, as well as the problems and the differences between instrumental sounds and spoken vowels and consonants.

4. Conclusion

All the previously mentioned self-learning tutorials help students to learn the basics of Computer Music, and also to start making their own simple examples. Then, they can easily use the different equipment that they find in a music laboratory without any difficulties or hesitation especially, if they have not been involved in this field previously.

5. Future

On the new version of this system, a set of exercises are under development which will allow the students to assess themselves on the level of understanding they gained by using the tutorials.

References