Leeds University Electronic Studio: Studio Report

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Abstract

In this paper we present a list of recent studio acquisitions, and give descriptions of our hardware set-up. Brief summaries of current areas of computer-music research are discussed. Areas of interest include real-time pitch tracking, optical music score recognition, tonal analysis, non-linear dynamical systems as musical generators, and others. Also included are descriptions of practical applications of music software developed by members of our Computer Music Group.

1 Introduction

The studio of the Department of Music at Leeds University was established in 1987. With the increasing influence of technology in music, the studio has transformed from its humble beginnings, serving optional composition courses, into a mainstream educational resource, providing music technology courses at undergraduate as well as postgraduate levels.

In this time, the development of computer-music software has been steadily increasing in the department, leading today to direct collaboration between composers, programmers and researchers. This research activity has been encouraged by a large investment in electronic studio resources over the last few years and has led to the creation of the Leeds Computer Music Group which enables researchers from various disciplines to combine their specialties. The group currently consists of members of the Music Department, School of Computer Studies and the Department of Electronic and Electrical Engineering.

2 Studio Facilities

At present the studio is divided into two main working areas, one mainly used by undergraduate students and the other mainly used for teaching and postgraduate research students.

Studio One contains the SG Indy UNIX workstation, mainly used for running Csound and hard disk sound editing packages. The analogue and digital audio connections to the Indy are linked to a PC-based set-up with a Soundcraft Spirit mixing desk, ADAT digital multitrack, a variety of MIDI sound modules and effects processors and a Kurzweil K2000 keyboard. A Panasonic S-VHS player, recorder and edit controller are also connected to this system via the patchbay and both Cubase and the ADAT recorder can be synchronised with video using a SMPTE timecode generator. This studio also contains another PC with SAW hard disk editing software (with files transferable by FTP to/from the Indy workstation) and a recordable CD writer for audio or data file storage.

The second studio contains six PC-based musical workstations, each with at least one multitrack MIDI synthesizer, sound module, analogue multitracker, and effects processor. All of the PCs have Cubase Score MIDI sequencing software and "Coda Finale" music processing packages as well as departmentally developed software, such as the F-music: a fractal music generating program. One larger system is also located in this studio, which additionally includes an 18-2 channel mixing desk, 8-track analogue multitrack and a DAT recorder.

3 Software and Research

Details of some computer-music related software developed by members of the Leeds Computer Music Group are listed below.

3.1 F-Music

This software is designed for automatic music generation using a non-linear dynamical system.
3.2 Monophonic Pitch Tracker

This software tracks frequencies of digitised audio input and computes the pitch, in real-time [Cooper and Ng]. It has been successfully used in an electro-acoustic composition, Dance before the Lord' by Philip Wilby, to trigger musical events by tracking a list of pre-defined notes. The effectiveness of this software and F-Music was tested in live performances of the above work given in Gloucester Cathedral and in Monmouth, both of which events were recorded and broadcast by BBC radio.

3.3 Automated Computer Recognition of Music Scores

This research prototype is an automated computer recognition system for printed music scores [Ng et al., 1995]. It takes digitised music scores as input and translates them into machine-readable formats. Two by-products of this work are:

- Automatic Detection of Tonality
- ExpMIDI.

3.4 Automatic Detection of Tonality

As an extension of the above research (see 3.3) [Ng et al.], this software has been designed to detect the underlying tonality of a MIDI file.

3.5 ExpMIDI

ExpMIDI proposes an extension of the MIDI file format to allow the coding of components normally found in type-set musical scores [Cooper et al.].

3.6 TLTP guide to MIDI

This software is intended to provide a compendium of information about MIDI using text, diagrams, animation and musical examples.

3.7 The Virtual Studio: a Multimedia CBL Application

An introduction to the recording studio. The program aims to acquaint the user with the principles of studio design and the main principles of using mixing desks. The software, written by Paul O'Leary, has reached the finals of the European Academic Software Awards.
4 Studio Activities

The Electronic Studio at Leeds now has its own complete set of pages on the World Wide Web (http://www.leeds.ac.uk/music/Studio/ez.html), with sections covering Leeds Computer Music Group research, student projects and a complete equipment list. Information about studio activities can be constantly updated in this way. We also have an on-line version of the CSound manual, developed by Peter Nix in the department. More up-to-date information and better images of the studio software mentioned above can be found at the studio’s WWW site.

Undergraduate studio projects currently involve composing music using Cubase and MIDI equipment and then synchronising the results to images on S-VHS video. Other undergraduates have been involved in live recording projects, whereby concerts, for example, are recorded by the students, edited using the studio’s hard disk editing software, arranged and mastered onto recordable CD.

Postgraduate activities connected with the studio include various electro-acoustic composition projects, from stand-alone works for tape, to music for photographic and video installations arising from collaborations with visual artists. Postgraduate research is also much in evidence, and currently includes topics such as psychoacoustic research on the localisation of sound, and development of an intelligent graphical interface to CSound.

Future developments that are to be explored include real-time pitch tracking and hand-written manuscript recognition.

References


