0. abstract

The paper describes the recent founding of a new computer music facility at the Conservatory in Utrecht, Netherlands, called Centrum voor Muziek en Informatica.

The center was founded in cooperation with and supported by several commercial companies, both computer manufacturers and electronic music instrument companies. Much attention is paid to the training of musicians, composers, music engineers, etc., inside as well as outside the conservatory in the application of modern technology to music.

Moreover, several applied research programs have been developed and will be implemented in one or two years.

1. introduction

1.1 a brief history of electronic and computer music at the Utrecht Conservatory

In 1970, Dutch composer and teacher Ton Bruyere founded the Electronic Music Studio at the Utrecht Conservatory. This studio was and still is, focused on the production of electro-acoustic tape music. Through the years the studio has functioned as the main facility for students in Electronic Composition and attracted students from abroad as well. Although a small computer system and digital FM instrument were introduced in 1984, it remains a predominantly analog studio.

1.2 the founding of the Centrum voor Muziek en Informatica

By the end of 1984, an enormous reorganization of the whole field of what could be translated as the "higher professional education" started to take place in the Netherlands. As one of the results, five arts education institutes in the Utrecht region recently formed one institute, the Hogeschool voor de Kunsten Utrecht, with some 2500 students the largest in its kind.

The new institute is developing a much more open policy towards the outside world and recognizes the necessity to monitor new developments in society as a steering force in the development of educational programs.

Instead of just following the developments it will establish an advanced position in the application of modern technology in arts education by starting research and development and specialized courses. An enormous problem however, is the lack of adequate financial support by the government; actually budgets have been heavily cut in recent years which tasks for an innovative way of fundraising. Fortunately, many Dutch companies (or Dutch branches of foreign companies) have supported the CMI so far on the basis of a long term relationship and profit for both sides. This cooperation with the industry and a close relation with the future working field of the students, guarantees a good "product-market" combination.

2. general goals

The main idea is to bring the benefits of new technology to as many people as possible, not just to a relatively small group of people interested in electronic and computer music. The CMI will be at an open center that organizes courses for musicians and composers as well as at other people that make their money in the music business.
This way the CMI serves as a service facility
for the whole conservatory community as well
as music professionals outside.

The goals are to establish:
1. a computer music laboratory, equipped with
a large amount of synthesizers, computers,
studio equipment, recording equipment,
software, etc.
2. a development program for educational software
3. an electronics laboratory for the
development of special equipment,
instruments and interfaces
4. development programs in cooperation with
industry
5. a group that will develop a curriculum
concerning the application of (computer)
technology to music education
6. a group that will develop courses for people
in industry and at other educational
institutes, with regard to the application
of new technology.

Similar plans have been developed at the Visual
Arts and Theater faculties of the Hogeschool
voor de Kunsten Utrecht as well.

3. projects
existing and proposed

3.1 computer music laboratory
A laboratory has been equipped with a number of
microcomputers (Apple Macintosh and
Yamaha CX-5), synthesizers (mainly Yamaha,
and Roland), sampling equipment (Ensoniq,
Roland and Akai), and all kinds of MIDI
peripherals such as sequencers, drum
computers, delay, harmonizer, reverb, etc.

This lab is used intensively by students and
teachers of several departments, including
composition, music teacher training and light
music. Main areas of application are
arrangement, synthesis, sound analysis,
musical "test-editing" and music production.

3.2 MIDI piano laboratory
A second laboratory has been equipped
especially for the transcription of piano playing
in sheet music. The system, which was
assembled from commercially available
components, is comprised of a Fazioli grand
piano with MIDI output, a microcomputer with
program for multitrack MIDI recording, data
conversion and common music notation. The
system outputs to a high quality laser printer,
which results in camera ready sheet music.
Music that was recorded or entered by
computer keyboard and mouse, may be edited,
transposed and even played back by means of
one or more synthesizers. Parts of an orchestral
score may be copied automatically from the
master score by the system and printed out on
copier paper.

3.3 functional programming
languages & Music
A strong interest exists at the conservatory in
the application of LOGO and LISP for music
education. Several commercial LOGO's are
being adapted to make them suitable for
realtime output. Peter Desain and Henkjan
Honing developed "composing microworlds"
(implemented on Apple II and Yamaha CX-5
computers), which are described in a paper to
be presented at the ICMC 86 (Desain and
Honing 1986). Moreover a research project has
started to extend a portable LOGO, pLOGO
developed at the LOGO-Center Nijmegen,
with special primitives for handling musical
objects.

Paul Zerg is currently working on programs for
a composing workshop for students, using LISP
with MIDI drivers developed at ICMC.

3.4 computer aided music
instruction
As commercially available computer assisted
software programs do not satisfy the needs of
the conservatory, a development program is being
implemented by Hans Timmermans. Much
attention is addressed to the sound quality
and musical relevance of the presented material,
Ease of input (by voice and music keyboard),
the user interface and the analysis of the user
response.

3.5 hardware and software
development of special devices for
musical applications

The carillon is a typical Dutch and Flemish
instrument. In the Netherlands alone, more than
300 carillons exist and the own manufacturers
in the Netherlands control around 75 % of the
world market. Many carillons are often fitted in
church towers) are being played by one carillon player, who will also take care of the automatic tunes played by a mechanism connected to the clockwork. These mechanisms employ a dedicated microcomputer with music in EPROM. Until now, the carillon players have no means to deliver their music in electronic form to the carillon manufacturer and new music can only be "programmed" by playing it on a special keyboard at the factory. This is a very undesirable situation, as it severely limits the musical possibilities of the carillon. CMI has proposed a project (to IBM) to solve these problems by developing special hardware and software for carillon players and the carillon manufacturer. At the same time, FM algorithms are being developed by Ernst Bonis to simulate bell sounds of the carillon, thus making it possible for the carillon player to check his or her programmed music before sending it to the manufacturer for burning into an EPROM. Moreover, this simulation will be used in a new experimental rehearsal software for the carillons (for both students at the Nederlandse Beiaard School as well as professional carillon players) as a better means to study new music.

Another project is the development of the FORTH MIDI controller. This universal building block consists of a single chip microcomputer with FORTH kernel, a MIDI interface and a number of IO lines and optional peripherals that can be used in a flexible way depending on the actual application. The unit is a further development of a design made earlier at STEIM (Vataviz, 1985).

3.6 artificial intelligence (AI) & music

A small group of composers and AI experts (including Paul Berg and Peter Deainment of CMI and Prof. Henk Van den Bergh of the AI lab at the Vrije Universiteit Brussel) are in the process of developing a cooperation on AI and Music.

4. future plans

In the near future CMI will expand the existing laboratories and establish a professional quality multitrack recording studio. Within a year we hope to start an AI laboratory as well as the start of a high speed backbone network for telecommunications and file-serving. UNIX development workstations will be installed and connected to the backbone as well. One of the future projects will be the development of a Musicians Digital Signal Workstation in cooperation with IBM.

5. conclusions

In less than a year investigations on the application of computer technology to arts education have been done, plans formulated, several laboratories equipped with advanced, high quality equipment, a large number of development projects on both education, hardware and software development started and a great deal of these plans were implemented in actual education. By presenting realistic plans and offering a close cooperation with industry we managed to realize a great deal of these plans on an extremely low budget.

6. acknowledgements

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7. references
