

329-Jan-85 1857 TVR@SU-A1.ARPA
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The following is a summary of conversations held on Thu Jan 24 between Bill Spencer, Vice-President and Manager of XEROX PARC, Bernard Mont-Reynaud, Research Associate at CCRMA, and Robert Poor, technical coordinator at CCRMA.

Before the summary proper comes a bit of background history. Ideas regarding possible cooperative action between XEROX and CCRMA (the Center for Research in Computer Music and Acoustics at Stanford) have been exchanged since the spring of 1984. The technical areas under discussion include:

- a workbench for the analysis of acoustic signals,
- tools for editing and printing of musical scores, and
- tools for reasoning about abstract representations of music.

Both XEROX and CCRMA have accumulated expertise in these areas, although with a different emphasis. In particular, work done at XEROX in each of these three areas seems to be quite independent of the work done in other areas. By contrast, the progress of CCRMA's NSF-funded project in machine transcription of performed music is dependent upon integrating tools from all three areas. XEROX 1108's, with the INTERLISP-D and fast floating-point arithmetic available from LISP, seem ideally suited for this research. Conversely, the transcription system, together with its ramifications at the level of sound analysis/synthesis and musical score editing/printing, should provide a striking demonstration of the capabilities of the 1108's.

In the latter part of December 1984, two 1108s were delivered to CCRMA, on an extended loan basis. This should allow the NSF project to continue its progress, and give CCRMA time to seek equipment grants towards purchases. The general understanding is that XEROX makes certain hardware and software available to CCRMA, while CCRMA makes available to XEROX any software that it develops in the D machine environment. More specific legal agreements need to be worked out.

This was background history, now comes the meeting of Jan 24. Following greetings and warm-ups, Bernard Mont-Reynaud reports on recent events:

- Lisp and D-machine instruction:
 - a hands-on workshop was held in the Dandelion room at CSLI, and attended by 12 CCRMA people; further sessions were held at CCRMA.
- increasing supply to face increasing demands:
 - two Dandelions are now rented from CSLI
- generally, the CCRMA-CSLI relations are increasing bandwidth. For example, CSLI's Thursday seminar of Feb 7 will be a presentation/demo of the transcription project, on CCRMA grounds.
- CCRMA is gearing up for transporting software from the SAIL world to the INTERLISP world. The bulk of this task can be done automatically, in two steps. The first step (now almost completed) runs under SAIL, and converts SAIL programs to 'Prefix SAIL', an intermediate language which has LISP-like appearance but retains SAIL semantics. The output of the first phase is transferred to D machines using the net. The second step (not yet implemented) will run in LISP and convert Prefix SAIL to Lisp. Further manual editing may be required whenever there is no good mapping of SAIL constructs to INTERLISP constructs, but this should be only for handling exceptional situations, not the bulk of the code.

The status of the three areas of the project (acoustic analysis, musical analysis, and musical score editing/printing) were then reviewed, in order to identify the needed actions.

In the acoustic analysis area, the goal is to expand XEROX's speech workbench both by adding signal processing functions, such as the 'constant-Q FFT' method, and by modifying the user interface and the programmer's interface. As was discussed in earlier meetings involving XSI staff (notably Steve Purcell),

CCRMA staff, and linguist Henri Thomson from Edinborough, the idea is that tools currently available at XEROX will be made available to CCRMA, which will in return make available any extensions it develops. Software exchanges between CCRMA and other laboratories outside XEROX that share an interest in the development of an acoustic analysis workbench, such as CSLI and Edinborough, will be handled primarily through XSIS, acting as a clearinghouse for software developments.

All that is needed to get this process started is a legal clearance, whereby (say) Steve Purcell would feel free to hand over a copy of the audio workbench software, and related tools, to the CCRMA group.

In the musical analysis area, the plan is to convert the current SAIL software to the INTERLISP environment, and then extending it by taking advantage of the more powerful environment. This can benefit from access to INTERLISP tools in user libraries, but otherwise draws almost exclusively on CCRMA resources.

In the area of music score manipulation, it is important to see that sophisticated editing (such as provided by Mockingbird) is NOT critical to the research effort in the transcription project. Access to music printing is critical. This can be achieved in the immediate future by:

- (a) a simple facility for printing from a note list to the screen (from which hard copies can be obtained on a printer server -- these are 'working' copies rather than the publishing quality copies)
- (b) an interface to Leland Smith's MS program to produce high-quality output.

Later, it will become important to have high-quality music printing within the D machine environment, but the needs of the project are well served temporarily by using the F4 environment (b) for the occasional publication-quality needs. More critical to the research at this point is the 'quick-and-dirty' score display facility ((a) above).

In building such a facility, the project could save much time by having access to the sources of the Mockingbird software, if only to use some of the simpler parts of it, such as the definition of musical fonts. However, it seems important to guard against a possible misinterpretation of CCRMA's intentions here. The NSF project has NO intention to finish the reimplementation of Mockingbird (Mesa) in the INTERLISP and Loops environment. The latter project, which is dear to John Maxwell's heart, cannot be addressed by the NSF group, especially as the goal is to develop a product.

From the above, and after discussion with Bill Spencer, the following action items emerged.

Printer:

Rob Poor will contact Bill Winfield regarding the loan of a laser printer to CCRMA, which Bill Spencer has, in principle, approved.

Legal clearances:

Steve Purcell and Bernard Mont-Reynaud will work together on preparing notes to XSIS, PARC and the LA distribution office that Bill Spencer may then sign. The purpose of the LA letter is to grant CCRMA a no-fee software license agreement, which will give CCRMA access to the standard releases of software. The purpose of the letters to XSIS and PARC is to grant access to special software packages that are available from them only. The list of these special packages will be prepared by Mont-Reynaud and Purcell jointly. It is presumed that it will include the speech workbench with the underlying signal processing and graphics tools, the IDL package for scientific data display, and the sources of the partial reimplementation of Mockingbird in INTERLISP.

A XEROX lawyer will also be contacted to help check the nature of these agreements between CCRMA and XEROX, especially with respect to CCRMA's obligations regarding the non-dissemination of confidential information, and to help write them up in proper form.

The above summary was written by Bernard Mont-Reynaud. It should be reviewed by Bill Spencer before one may assume that XEROX's intentions have been correctly

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represented. However, since Bill is out of town for two weeks, it might be possible to start work on some of the action items before his return, such as preparing the letters that need Bill's signature.