Using Virtual Environment Technology to Present a Digital Sound Library

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Digital sound libraries of today can be difficult to navigate. For example, sampling keyboards often display only the currently selected sound, and it is not easy to know the adjacent sounds or how to find desired ones. Large libraries stored on compact disc may be arranged in an alphabetical file structure, documented by descriptions that do not represent their sounds well. These digital sound libraries are often difficult to scan and audition easily because they are not organized according to sonic qualities. The user does not browse the database directly, but via its text representation. The user must audition sounds one at a time, must remember previous sounds when comparing the current one, and has little sense of the total available selection. These difficulties can detract from the spontaneity and creativity of the user.

An ideal digital sound library would be *intuitive*, to let the user concentrate on the artistic application of the sounds; *visual*, to reinforce the identity of and the relationship between sounds; *three-dimensional*, to employ one's natural three-dimensional perceptual and organizational abilities; *of considerable size*, to present a large number of sounds nearly simultaneously; and *flexible*, to have no constraints on the content of its database, and to be able to adapt to each user's preferences.

This research describes a prototype of this ideal sound library, the Audio Browser. It was created in a virtual environment because virtual reality technology is well designed to meet these ideals of intuition and flexibility: it gives the sensation of being immersed inside the sound library, it gives the ability to move around its elements to hear them from different perspectives, and it shows how the database is organized and how to find elements of it at a glance.

The Audio Browser runs on a network of an SGI Iris, a Macintosh with a SampleCell card, and a PC with a Convolvotron. The sound library comprises about 80 samples from the SampleCell CD-ROM arranged in a two-dimensional tree organized by musical instrument type. They appear as about twenty groups of instruments, with lines linking each instrument entity to its child and parent nodes, spread across a plane in front of the user. (The structure of the layout can be changed by altering the database; it is not necessary to change the controlling program.) The user interacts with the Audio Browser via a hand-held "wand," movement and position sensors, and stereo eyephones and earphones. A user can browse by following the visual links between groups, traveling from an auditioned sound to a related sound or group of sounds. If the user

moves to a new group of sounds or presses the selection button, the closest objects are sounded and change color.

Future research could enhance the advantages of a virtual sound library navigation tool. The selection and browsing tools shown here could be adapted for use as performance tools: one could load sounds directly into MIDI instruments and compositions. One could also develop new sounds by grabbing, combining, and manipulating existing ones. With an ideal digital sound library and navigation tools for it, music will more easily be able to be composed or performed using large databases of sound samples. This work demonstrates that such a tool is not far away from today's capabilities.

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