
About This Issue

In this issue's first article, Nils Peters, Georgios Marentakis, and Stephen McAdams analyze responses to a questionnaire on composers' and sonic artists' use of technologies for positioning sounds in space and for controlling spatial properties of sound. Underlying the survey was a desire to understand how audio engineers might develop software and hardware solutions that fulfill composers' needs better than current tools do. Among other points, the authors' conclusions stress the need for making spatialization tools easy to use, integrating them into common compositional environments, extending bus architectures to more than eight channels, supporting the emulation of a venue's acoustics in the studio, and accommodating real-world loudspeaker setups.

The next two articles represent spillover from the Fall 2010 issue, which was a special issue on human-computer interaction (HCI), guest-edited by Michael Gurevich. Sile O'Modhrain's article proposes a framework for evaluating a digital musical instrument (DMI). She emphasizes the presence of multiple stakeholders in the design and evaluation of a DMI: performers, audiences, composers, instrument builders, component manufacturers, and perhaps customers. These

multiple perspectives give rise to multiple methodological approaches to evaluation. The article explains some HCI terms: guidelines, principles, models, frameworks, and taxonomies; it then outlines how different stakeholders evaluate a DMI and what their goals are for such an evaluation.

As any musician knows, playing a traditional musical instrument involves control that is far more sophisticated than that offered by the simple devices most often studied in the field of HCI: the computer keyboard and mouse. In many musical instruments, haptic response is crucial for informing the player about the state of the device. The article by R. Brent Gillespie et al. describes system-identification experiments whose purpose was to characterize the feel of the grand-piano action. These experiments, which employed a mechanized replacement for a human finger, considered both the finger-key impedance and the changing contact conditions within the piano. The authors' ultimate objective was to create a simple but realistic model of the piano action for real-time haptic rendering through a motorized synthesizer keyboard.

The remaining articles cover topics not necessarily related to HCI. Continuing in the general subject

area of piano models, the article by Gustavo Colmenares et al. elucidates the data-storage format of a medium from a century ago: piano rolls. These were perforated paper scrolls containing music to be rendered automatically by a player piano. Specifically, the authors' software models the rolls for a reproducing piano, which was a type of player piano with sufficiently sophisticated control of dynamics and pedaling to permit the reproduction of human performances of classical music. The article explains in detail how one can preserve the data from aging reproducing-piano rolls by mapping the patterns of perforations in the roll to Musical Instrument Digital Interface (MIDI) messages. These MIDI data can, of course, be stored in a file and later played back on a software or hardware MIDI synthesizer, or, for maximum realism, a MIDI-controlled acoustic piano such as a Yamaha Disklavier.

Recent articles in these pages (see the Summer and Fall 2010 issues, for example) have examined the technology of networked musical performance. Network latency poses the primary challenge for performing with other geographically dispersed musicians over the Internet. In the present issue, Peter Driessen and colleagues present an experimental study of what happens to musicians'

Front cover. These two illustrations from the article by R. Brent Gillespie et al. show the authors' model of four kinematic configurations of the piano action (top) and the apparatus for the authors' system-identification experiments (bottom).

Back cover. The top illustration, from the survey article on spatialization by Nils Peters, Georgios Marentakis, and Stephen McAdams, plots composers' awareness of various spatialization tools against how frequently they use those sorts of tools. The bottom figure, from the same article, summarizes how important various spatialization requirements are to composers and how satisfied they are with current technologies for meeting those requirements.

tempo when they are performing via a network. (Here, the musicians performed by clapping notated rhythmic patterns.) The study's experimental conditions constrained the simulated network delay to a value that was constant during a performance, whereas a real-world Internet performance would exhibit time-varying delay, or jitter. The authors found that the tempo variations matched the predictions of models of two oscillators with time-delayed coupling. For delays that were much shorter than one beat, the average tempo in beats per minute decreased by approximately half the tempo times the delay in seconds.

This issue's final article, by Freya Bailes and Roger Dean, serves as a companion to the authors' earlier

CMJ article on the perception of speechlike sounds. (See the Spring 2009 issue: Vol. 33, No. 1.) In the present article, the authors investigate sounds that are derived from, or emulative of, singing rather than speech. The motivation is to learn whether the use of singing as source material (which might then be heavily processed) in computer music results in the perceptual clustering of the manipulated sounds with the source sounds and with other sung sounds. The authors' experimental results indicate that such clustering does occur. Furthermore, the degree to which a sound is perceived as deriving from singing is positively correlated with its perceived affective arousal.

The Reviews section of this issue includes two CD reviews and two

book reviews. The CDs consist of a collection of works for viola and electronics, mostly by composers associated with the University of Washington, and a two-disc set of electronic music by the 20th-century Dutch composer Henk Badings. The first of the books, a 600-page Oxford University Press anthology on computer music, in certain ways recalls the shorter *Cambridge Companion to Electronic Music*, reviewed in these pages a year and a half ago. The other book is a new volume in the Polychrome Portraits series from the Groupe de Recherches Musicales (GRM), each of which profiles a major figure in computer and electroacoustic music—in this installment, composer Denis Smalley.