Hindawi Publishing Corporation
EURASIP Journal on Advances in Signal Processing
Volume 2010, Article ID 459654, 2 pages
doi:10.1155/2010/459654

Editorial

Digital Audio Effects

Augusto Sarti (EURASIP Member),[1] Udo Zoelzer,[2] Xavier Serra,[3] Mark Sandler,[4] and Simon Godsill (EURASIP Member)[5]

[1] *Dipartimento di Elettronica e Informazione (DEI), Politecnico di Milano, Milano, Italy*
[2] *Department of Signal Processing and Communications, Helmut-Schmidt-University—University of Federal Armed Forces Hamburg, Germany*
[3] *Music Technology Group, Department of Information and Communication Technologies & Audiovisual Institute, Universitat Pompeu Fabra, Barcelona, Spain*
[4] *Centre for Digital Music (C4DM), School of Electronic Engineering and Computer Science, Queen Mary University of London, UK*
[5] *Department of Engineering, University of Cambridge, UK*

Correspondence should be addressed to Augusto Sarti, sarti@elet.polimi.it

Received 31 December 2010; Accepted 31 December 2010

Digital audio effects usually refer to all those algorithms that are used for improving or enhancing sounds in any step of a processing chain of music production, from generation to rendering. Today these algorithms are widely used in professional or home music production studios, electronic or virtual musical instruments, and all kinds of consumer devices, including videogame consoles, portable audio players, smartphones, or appliances. Motivated by this expansion trend, in the past few years the range of research topics that have fallen within the digital audio effects realm has broadened to accommodate new topics and applications, from space-time processing to human-machine interaction.

All the technologies and the research topics that are behind such topics are today addressed by the International Digital Audio Effects Conference (DAFx), which has become a reference gathering for researchers working in the audio field. In the many editions of the DAFx conference, we have witnessed a proliferation of new and emerging methodologies for digital audio effects at many levels of abstraction, from signal level to symbol level. Some of the contributions to this special issue, in fact, are linked to works presented in this conference and seem to capture this transformational trend.

Two contributions of this special issue deal with aspects of sound synthesis. Synthetic sound generation is an important aspect of sound effects, whose importance has recently grown beyond the boundaries of musical sound synthesis. While virtual environments are becoming more and more part of our everyday life, the sonification of acoustic events in such environments is, in fact, still an open problem. The first contribution of the series, by C. Picard et al., addresses exactly this issue and provides analysis tools for determining the parameters of modal sound synthesis. The second contribution, by J. Pakarinen, offers a different set of analysis tools for parameter estimation, this time devoted to a hot topic in the DAFx community, which is that of virtual analog processing, with particular reference to the nonlinearities that characterize the reference analog systems that are being emulated. The third contribution, by A. Novak et al., allows us to take a different look at nonlinearities, this time with reference to audio effects for music production.

Digital audio effects are also part of the music production processing chain, which includes preprocessing, editing and mixing. The paper, by Terrell et al., is concerned with the noise gate, a specific type of digital effect, important for the capturing drum performances and dealing with bleeds from secondary sources. Another classical type of effects widely used in music production is time/pitch scaling. This effect is addressed in the contribution authored by E. Azarov et al. The paper by E. Perez et al. again addresses music production aspects, as it proposes a solution for automatic panning effects in music mixing.

Sound rendering and, particularly, spatial rendering are progressively gaining more and more importance in the research community of DAFx. In this line of work is the paper authored by F. Antonacci et al. which introduces a seminal

work on geometric wavefield decomposition which accounts for propagation phenomena such as diffusion and diffraction and serves as a computational engine for both wavefield rendering and binaural rendering. Still in the area of binaural rendering are the two contributions to this special issue, the first of which is by L. Wang et al., which addresses the long-debated problem of cross-talk cancellation. This paper is followed by that of M. Cobos et al., which proposes a method that allows us to avoid using a dummy head in binaural recording sessions.

This special issue also includes two papers that deal with high-level processing of musical content, which can be used for a variety of applications, from music information retrieval to digital audio effects. The former, by A. Barbancho et al., is concerned with piano chords detection based on parallel interference cancellation methods. The latter, by Itoyama et al., and Okuno, tackles a query-by-example technique based on source separation and remixing.

Augusto Sarti
Udo Zoelzer
Xavier Serra
Mark Sandler
Simon Godsill