From: Hindawi Marketing Department [mailto:mkt@hindawi.com]
Sent: Sunday, May 29, 2005 3:38 AM
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Subject: FW: RE: Book review

Dear All,

Please find attached a review article, recently composed on "High-Fidelity Multichannel Audio Coding" it has been authored by Vladimir Botchev, DSP software engineer and will be published on the Analog Dialogue Magazine later this year. I am considering posting quotations from the article on the Amazon web page of the book as well as our web site for promoting it and increasing its sales volume. However, we will be able to do that once it gets published on the AD Magazine. Please let me know if you have any comments regarding that.

Thanks and best regards,

Tamer Khafaga
Head of Marketing Department
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Review for the book: High Fidelity Multichannel Audio Coding, Dai Tracy Yang, Chris Kyriakakis, C. Jay Kuo, Hindawi Publishing Corp. 2004, ISBN 977-5945-08-9

When it comes to media data compression, one can find a considerable amount of books on static and motion video compression and speech compression, but only two(both recently published) books entirely devoted to high performance audio compression. This one and the Introduction to Digital Audi Coding and Standards by Marina Bosi. Both books proceed in I would say equivalent manner in presenting the topic of audio coding. However the present one could be termed more advanced. Also the technical explanations are noticeably better at times, for example on the topics on quantization and lossless coding(Huffman and arithmetic), even though some topics like Temporal noise shaping are less detailed than in Bosi's book.

The book begins with an introduction to digital audio coding, some basic signal processing operations and a short multichannel audio primer. Chapter 2 presents in a very approachable manner the topic of quantization. Considered are scalar and vector quantizations and also bit allocation basic concepts. Chapter 3 presents lossless coding techniques, such as Huffman and adaptive Huffman encoding, arithmetic coding and a variant of the arithmetic coding(the authors term it a successor) called QM coder. The codec procedures are presented with much details and snippets of pseudo-code. Chapter 4, while not a substitute for Zwicker book, provides a concise introduction to what makes hi fidelity audio coding at all possible, human hearing and psychoacoustics. Chapter five is on the important topic perceptual quality assessment. Similar chapters exist in other books as well, such as Digital Signal Processing applications for Audio and Electroacoustics, but here the material can be read as more of a recipe than theoretical considerations. The next two chapters deal with MPEG audio coding tools. They are not substitute reading for the standards, but give enough background to feel more comfortably when working with the standard. The material introduced in chapter 8 and detailed in subsequent chapters is not part of a standard, and eventually could be skipped by practitioners. However it provides a detailed overview of coding enhancements and gives clues on where audio coding research might be headed(something partially lacking in Bosi's book). Chapter 9 teaches how interchannel redundancies can be removed using an adaptive Karhunen-Loeve transform. Chapter 10 focuses on the performance of the adaptive Kahunen-Loeve transform and quantization issues. Chapter 11 introduces the concept of scalable bit stream for audio coding, not unlike some video compression schemes, e.g. the EZW method. Chapter 12 talks about error resiliency in audio codec design. Personally I have never been able to fully appreciate this particular topic in audio, since it seems that a Reed-Solomon codec with interleaving and perhaps preceded by a Viterbi/Turbo codec is almost the best one can get as demonstrated by the use of these principles in the harsh environment of DSL.

In conclusion for audio engineers this is a book to consider even if some may already have adopted the earlier book by Dr. Bosi.