

Introduction to Video and Audio Compression Techniques

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NOTES



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Course Notes for SIGGRAPH '95

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Course Speakers

Perry R Cook
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Abstract

Still imagery, motion video, and high quality audio are being increasingly commonplace in today's computers. These data types, however, have extremely large data requirements, especially in the case of motion video. Due in part to storage limitations and in part to transmission bandwidth limitations, such data must generally be compressed in order to be stored or transmitted. This compression results in some degradation of image or audio quality, but careful use of compression techniques can maximize the compression ratio while minimize the perceptual loss in quality.

This course begins with an overview of compression and digital color, detailing some of the techniques the are common to many compression algorithms. Techniques are separated and analyzed independently. Following this introduction, significant detail is given on current and upcoming compression algorithms in audio and video compression, including JPEG, MPEG, wavelets, and vector quantization.

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Speaker Biographies

Andy Daniel

Andy Daniel received a BS in Computer and Systems Engineering from Rensselaer Polytechnic Institute in 1981 and a M.Eng. degree also from Rensselaer in 1982. He is currently Graphics Architect at Alliance Semiconductor, specializing in designing integrated circuits to bring high performance graphics to the personal computer market. Recently, he architected the ProMotion 3210, the first to combine graphics acceleration and motion video acceleration in a single DRAM-based controller. Previously, he was Engineering Manager at Western Digital, and project leader on the WD90C31, the industry's first DRAM-based graphics accelerator. Andy serves on the Board of Directors of VESA, the Video and Electronics Standards Association. He first organized this course at SIGGRAPH '94 in Orlando.

Perry R Cook

Perry Cook received a BA in music in 1985 from the University of Missouri at Kansas City Conservatory of Music, studying voice and electronic music. He received a BS in Electrical Engineering in 1986 from the University of Missouri Engineering School. He earned Masters and PhD degrees in Electrical Engineering from Stanford in 1990, researching computer music, vocal acoustics and synthesis, and controllers for real-time music synthesis at the Center for Computer Research in Music and Acoustics. He is currently Senior Research Associate and Technical Director at CCRMA, researching the computer simulation of musical instruments and the singing voice, controllers for real-time music synthesis and performance, and audio compression. He has consulted and worked in the areas of DSP, image compression, music synthesis, and speech processing for NeXT, Media Vision, and other companies. Perry first taught the audio section of this course at SIGGRAPH '94 in Orlando.

Doug Bailey

Doug Bailey received a Bachelor of Engineering with Honours from Birmingham University in Birmingham, England. He is currently Applications Engineering Manager for Integrated Information Technology in Santa Clara, California. Previously, Doug held design engineering positions with Marconi, Inmos, and LSI Logic. Doug taught the video conferencing segment of this course at SIGGRAPH '94 in Orlando.

Bjorn Jawerth

Bjorn Jawerth is currently the David W. Robinson Palmetto chair professor at the University of South Carolina. He has held professor positions at the Lund Institute of Technology and Washington University in St. Louis. He is one of the initiators of wavelet theory and has authored more than seventy papers on this subject. His research interests include data compression, CAD, and Numerical Partial Differential Equations. He is the founder and CTO of Summus, Ltd., a company focused on developing new compression technologies and products.

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Speaker Contact Information

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