

Master Thesis (equiv. "Diplomarbeit (DA)")



Title	Master Thesis in Multimedia Database Systems
Subject	Optimizations of the MPEG-4 SLS Implementation for Scalable Lossless Audio Coding
Background	<p>The research activity on new audio codec development has delivered many interesting solutions in recent times. Some of them are: MPEG-1 Layer 3 (known as MP3), MPEG-2 Part 7 Advanced Audio Coding (AAC), MPEG-4 Part 3 including functional extensions (e.g. tools) such as Low-Delay, Spectral Band Replication (SBR) etc. The undoubtful influence on that research had the IIS of the Fraunhofer Institute from Erlangen.</p> <p>The newest extension of AAC, MPEG-4 Scalable Lossless Coding (known as SLS) was recently presented at the 120th AES Convention. However, it was also found in another paper evaluating the SLS standard, that processing of Inverse Integer MDCT is almost constant regardless the audio content and takes the largest part of the overall processing time (usually more than 50%). Moreover, there are some lacks in the processing scalability contrary to the compression and quality scalability. Some suggestions of improving the current implementation are also proposed.</p> <p>Current ongoing R&D of IIS/FhI focuses on: 1. encapsulation of SLS in the integrated decoder, 2. SLS decoder optimization, 3. SLS encoder optimization, and 4. encoder encapsulation in the integrated encoder (after 3.). Steps 1. and 2. could be done in parallel.</p> <p>This work supports the RETAVIC project (http://www6.informatik.uni-erlangen.de/retavic/).</p> <p>Work done in cooperation with IIS at Fraunhofer Institute represented by Dipl.-Math. Ralf Geiger.</p>
Task	<p>The goal of this thesis is to provide optimized implementation of the SLS codec. The main work should focus on the integer MDCT calculations (forward and inverse? i.e. encoder and decoder?). Optionally, the entropy coding could be analyzed and optimized.</p> <p>The standard conformity is a requirement for the final source code. If some algorithmic optimizations contradicting the standard were found, they should be clearly described and proven (with evaluation).</p> <p>The development platform targets the PC application (covers MS Windows with MS Visual C/C++ or Linux with C/C++ on Emacs or KDevelop).</p>
Requirements	<p>natural language: fluent English (thesis written in English) programming language: C/C++ familiarity with MPEG-4 AAC and SLS is a huge advantage</p>
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