

Contents

1	Introduction	1
1.1	The H.264/AVC Standard in Glance	2
1.1.1	The H.264/AVC Naming Convention	3
1.1.2	The H.264/AVC Coding Profiles	4
1.1.3	The Scope of the H.264/AVC Standard	4
1.1.4	The H.264/AVC Prediction Based Compression Technique	5
1.1.5	The Intra Prediction in H.264/AVC Standard Baseline Profile	7
1.1.6	The H.264/AVC Intra Prediction Modes in Baseline Profile	8
1.1.7	H.264/AVC Intra Spatial Extrapolation	10
1.1.8	The H.264/AVC Integer DCT and Quantization	11
1.1.9	The H.264/AVC Entropy Encoding and Reconstructing	12
1.2	Problem Statement	13
1.3	Contributions and Results	14
2	Conventional Transcoder	17
2.1	The MPEG-2 to H.264/AVC Conventional Cascaded Transcoding	17
2.2	The MPEG-2 versus H.264/AVC Video Standards	21
3	Efficient MPEG-2 to H.264/AVC Transcoding	23
3.1	Introduction	23
3.2	Kim's Enhanced MPEG-2 to H.264/AVC Transcoding Algorithm	26
3.2.1	Kim's Intra Prediction Mode Decision Algorithm	26
3.2.2	Kim's Intra Luma 16×16 Direction Prediction Algorithm	28
3.2.3	Kim's Intra Luma 4×4 Direction Prediction Algorithm	28

3.2.4	Kim's Intra Chroma 8×8 Direction Prediction Algorithm	29
3.3	Yoo's Enhanced MPEG-2 to H.264/AVC Transcoding Algorithm.	30
4	Real-time MPEG-2 to H.264/AVC Transcoding.	35
4.1	Introduction	35
4.2	High-Throughput MPEG-2 to H.264/AVC Transcoding Algorithm.	38
4.2.1	The Intra Mode Decision Phase	38
4.2.2	The Intra Direction Prediction Phase	40
4.3	Experimental Results of the Proposed Transcoding Solution.	42
4.4	Conclusion	46
5	Full-Search Free Intra Predication for H.264 Decoder	47
5.1	Introduction	48
5.2	The Full-Search Free (FSF) Intra Prediction Algorithm	52
5.3	The FSF Intra Prediction Complexity Analysis	59
5.4	The FSF Intra Prediction Software Implementation	60
5.5	Efficient FSF Intra Prediction Hardware Architecture	63
5.6	The FSF Intra Prediction Hardware Implementation	68
5.6.1	The Virtex-5 FPGA Prototyping for FSF Intra Prediction.	69
5.6.2	The 45 nm ASIC Implementation for FSF Intra Prediction.	71
5.7	Conclusion	75
	Appendix A: Benchmarks	77
	References	83

Real-Time Heterogeneous Video Transcoding for
Low-Power Applications

Elarabi, T.; Abdelgawad, A.; Bayoumi, M.

2014, XII, 84 p. 73 illus., 44 illus. in color., Hardcover

ISBN: 978-3-319-06070-5