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Autore	Acharya Tinku
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Coding; 2.2 Huffman Coding; 2.2.1 Limitations of Huffman Coding; 2.2.2 Modified Huffman Coding; 2.3 Arithmetic Coding; 2.3.1 Encoding Algorithm; 2.3.2 Decoding Algorithm; 2.4 Binary Arithmetic Coding; 2.4.1 Implementation with Integer Mathematics; 2.4.2 The QM-Coder; 2.5 Ziv-Lempel Coding; 2.5.1 The LZ77 Algorithm; 2.5.2 The LZ78 Algorithm; 2.5.3 The LZW Algorithm; 2.6 Summary; References; 3 JPEG: Still Image Compression Standard; 3.1 Introduction; 3.2 The JPEG Lossless Coding Algorithm; 3.3 Baseline JPEG Compression; 3.3.1 Color Space Conversion; 3.3.2 Source Image Data Arrangement; 3.3.3 The Baseline Compression Algorithm; 3.3.4 Discrete Cosine Transform; 3.3.5 Coding the DCT Coefficients; 3.3.6 Decompression Process in Baseline JPEG; 3.4 Progressive DCT-based Mode; 3.5 Hierarchical Mode; 3.6 Summary; References; 4 Introduction to Discrete Wavelet Transform; 4.1 Introduction; 4.2 Wavelet Transforms; 4.2.1 Discrete Wavelet Transforms; 4.2.2 Concept of Multiresolution Analysis; 4.2.3 Implementation by Filters and the Pyramid Algorithm; 4.3 Extension to Two-Dimensional Signals; 4.4 Lifting Implementation of the Discrete Wavelet Transform; 4.4.1 Finite Impulse Response Filter and Z-transform; 4.4.2 Euclidean Algorithm for Laurent Polynomials; 4.4.3 Perfect Reconstruction and Polyphase Representation of Filters; 4.4.4 Lifting; 4.4.5 Data Dependency Diagram for Lifting Computation; 4.5 Why Do We Care About Lifting?; 4.6 Summary; References; 5 VLSI Architectures for Discrete Wavelet Transforms; 5.1 Introduction; 5.2 A VLSI Architecture for the Convolution Approach; 5.2.1 Mapping the DWT in a Semi-Systolic Architecture; 5.2.2 Mapping the Inverse DWT in a Semi-Systolic Architecture; 5.2.3 Unified Architecture for DWT and Inverse DWT; 5.3 VLSI Architectures for Lifting-based DWT; 5.3.1 Mapping the Data Dependency Diagram in Pipeline Architectures; 5.3.2 Enhanced Pipeline Architecture by Folding; 5.3.3 Flipping Architecture; 5.3.4 A Register Allocation Scheme for Lifting; 5.3.5 A Recursive Architecture for Lifting; 5.3.6 A DSP-Type Architecture for Lifting; 5.3.7 A Generalized and Highly Programmable Architecture for Lifting

Sommario/riassunto

JPEG2000 Standard for Image Compression presents readers with the basic background to this multimedia compression technique and prepares the reader for a detailed understanding of the JPEG2000 standard, using both the underlying theory and the principles behind the algorithms of the JPEG2000 standard for scalable image compression. It introduces the VLSI architectures and algorithms for implementation of the JPEG2000 standard in hardware (not available in the current literature), an important technology for a number of image processing applications and devices such as digital camera, color fax