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Abstract
Vector Quantization (VQ) is an efficient technique for data quantization. It is widely used in various applications such as multimedia, high definition television, teleconferencing systems, image data based management, speech compression, and image as well as video compression in the past few years.

In this paper, we present a lossless index-coding algorithm, named as dynamic tree-coding scheme (DTCS), for image vector quantization. Because the image block is highly related to its adjacent blocks in the same image (spatial relation), the vector-quantized index of a block is highly related to those of its adjacent blocks. The bitrate required for coding the VQ indexes can be reduced by removing the spatial redundancy. The computation complexity of the DTCS is quite low and its memory requirement is small. Hence, it is easily implemented by VLSI and very suitable for real-time applications. An efficient VLSI architecture for DTCS is designed and implemented with FPGA chip. It is synthesized with the standard-cell from TSMC's 0.35-um cell library. The chip areas are about 1771.9um×1765.9um and 1769.9um×1765.9um for the encoder and the decoder respectively. It can achieve about 83 Mega indexes/sec encoding/decoding rate.
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