A Novel VLSI Linear Array for 2-D DCT/IDCT

宋志雲,黃海,謝曜式
Electronics Engineering
Engineering
ysdaniel@chu.edu.tw

Abstract

This paper proposed an efficient one-dimensional N-point discrete cosine and inverse discrete cosine transform(DCT/IDCT) architectures using sub-band decomposition algorithm. Based on the row-column decomposition technique, the two-dimensional (2-D) N by N DCT/IDCT architecture with succesive 1-D DCT/IDCT processors and one transpose memory is proposeed. The orthonormal property of DCT/IDCT transformation matrices is fully used to simplify the harsware complexities $O(5N/8)$ and $O(3N/8)$ for DCT and IDCT, respectively, and hardware complexity $O(3N/8)$ for both DCT and IDCT are fully pipelined and scable for variable-length 2-D DCT/IDCT computation.

Keyword：2-D DCT/IDCT, sub-band Decomposition algorithm, linear array, orthonormal matrix, VLSI