FAST ENCODING METHOD FOR IMAGE VECTOR QUANTIZATION BY USING PARTIAL SUM CONCEPT IN WALSH DOMAIN (WedAmPO3)

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Abstract :

In a framework of image vector quantization (VQ), the encoding speed is a key issue for its practical applications. To speed up the VQ encoding process, it is benificial to use lower dimensional features of k−dimensional vectors (k−D) first to check the difference between the input vector and a candidate codeword so as to reject a lot of unlikely codewords. As the features of a k−D vector in spatial domain, sum (1−D) and partial sums (2−D) are already proved to be very effective for codeword rejections in the previous works. However, because the energy of image vectors or codewords distributes almost equivalently at each dimension in spatial domain, the search efficiency through using sum and patial sums in spatial domain is still not very high. By exploiting the energy compaction property of Walsh transform, this paper proposes to use partial sum concept in Walsh domain instead of spatial domain to improve search efficiency further. Unlike to compute two partial sums over the first half of [1, k/2] dimensions of a vector and the second half of [k/2+1, k] dimensions in spatial domain, partial sums are computed over [1, KWal/2] and [KWal/2+1, KWal] dimensions (KWal<<k) of the transformed vector in Walsh domain.
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In this way, the rejection power by using partial sums in Walsh domain can be enhanced obviously. Experimental results confirmed that the proposed method in Walsh domain can reduce the computational cost obviously compared to the previous works in spatial domain.

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