Abstract

Mohamed A Shaheen

fast variable padding motion estimation using smart zero motion prejudgment technique for pixelfrequency domains

motion estimation (me) plays an important role in modern video coders since it consumes approximately 60–80% of the entire encoder’s computations. in this paper, three novel techniques are proposed to effectively speed up the me process. first, a smart prediction technique for effectively deciding an initial search center is proposed. second, a zero motion prejudgment technique is proposed to accurately decide whether the pre-estimated isc can be considered as a best match motion vector (mv)consequently save the required computations for the mv refinement process. finally, a variable padding pixels me technique is proposed to adaptively determine the number of padding pixels required for the search window for more computational cost savings. the three techniques are combinedapplied to the block-based me for a superior computational complexity savings in the me process. the performance of the proposed techniques is tested in both the pixel domain methe frequency domain me in terms of their quantitative visual quality (peak signal-to-noise ratio, psnr), their computational complexity,their bit rate. experimental results demonstrate that the proposed fast me technique is able to achieve approximately a 99.4% reduction in me time compared to the conventional full search block-based me (fssbb-me) with negligible degradation in both the psnrthe bit rate. additionally, the experimental results prove the effectiveness of the proposed techniques if they are combined with any block based me technique such as the fast extended diamond enhanced predictive zonal search. experimental results also demonstrate that there is at least an additional savings of 72% in me time using the conventional discrete cosine transform phase correlation me (dct-pc-me) in the frequency domain compared to the conventional fsbb-me technique in pixel domain. compared to the conventional dct-pc-me, applying the proposed novel techniques to the dct-pc-me saves up to 89% in me time.