



A novel hybrid image fusion method based on integer lifting wavelet and discrete cosine transformer for visual sensor networks

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Abstract

In recent years, multimedia data is most used in the world such as image, audio, video and text. For reducing the great amount of generated data and for obtaining the better sensing performance, several researches have been focused on multimedia data fusion (MDF). The main objective of image fusion techniques in the visual sensor networks (VSNs) is to combine multiple images of the same scene captured by different cameras and with various focused regions into a single informative image. In this paper, we propose an efficient hybrid image fusion method which is suitable for VSNs based on the integer lifting wavelet transform (ILWT) and the discrete cosine transformer (DCT). The suggested fusion algorithm consists of two steps. Firstly, the approximate coefficients (low frequencies) generated by the ILWT are fused by selecting the variance as an activity level measure in the DCT domain. Secondly, the detail coefficients (high frequencies) are fused by taking the optimum weighted average based on the correlation between coefficients in ILWT domain. Due to the integer operations in ILWT domain, the proposed method overcomes the loss of information, computational complexity, time and energy consumption and memory space. Extensive experiments are performed to demonstrate the outperforming of the proposed method compared qualitatively and quantitatively with some literature image fusion techniques.

Keywords Image fusion · Visual sensor network · Integer lifting wavelet transform · Discrete cosine transformer

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