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Multi-Layer Multi-Feature Background Subtraction Using Codebook Model Framework

Authors : Yun-Tao Zhang, Jong-Yeop Bae, Whoi-Yul Kim

Abstract : Background modeling and subtraction in video analysis has been widely proved to be an effective method for moving objects detection in many computer vision applications. Over the past years, a large number of approaches have been developed to tackle different types of challenges in this field. However, the dynamic background and illumination variations are two of the most frequently occurring issues in the practical situation. This paper presents a new two-layer model based on codebook algorithm incorporated with local binary pattern (LBP) texture measure, targeted for handling dynamic background and illumination variation problems. More specifically, the first layer is designed by block-based codebook combining with LBP histogram and mean values of RGB color channels. Because of the invariance of the LBP features with respect to monotonic gray-scale changes, this layer can produce block-wise detection results with considerable tolerance of illumination variations. The pixel-based codebook is employed to reinforce the precision from the outputs of the first layer which is to eliminate false positives further. As a result, the proposed approach can greatly promote the accuracy under the circumstances of dynamic background and illumination changes. Experimental results on several popular background subtraction datasets demonstrate a very competitive performance compared to previous models.

Keywords : background subtraction, codebook model, local binary pattern, dynamic background, illumination change
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