Fused Structure and Texture (FST) Features for Improved Pedestrian Detection

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Abstract : In this paper, we present a pedestrian detection descriptor called Fused Structure and Texture (FST) features based on the combination of the local phase information with the texture features. Since the phase of the signal conveys more structural information than the magnitude, the phase congruency concept is used to capture the structural features. On the other hand, the Center-Symmetric Local Binary Pattern (CSLBP) approach is used to capture the texture information of the image. The dimension less quantity of the phase congruency and the robustness of the CSLBP operator on the flat images, as well as the blur and illumination changes, lead the proposed descriptor to be more robust and less sensitive to the light variations. The proposed descriptor can be formed by extracting the phase congruency and the CSLBP values of each pixel of the image with respect to its neighborhood. The histogram of the oriented phase and the histogram of the CSLBP values for the local regions in the image are computed and concatenated to construct the FST descriptor. Several experiments were conducted on INRIA and the low resolution DaimlerChrysler datasets to evaluate the detection performance of the pedestrian detection system that is based on the FST descriptor. A linear Support Vector Machine (SVM) is used to train the pedestrian classifier. These experiments showed that the proposed FST descriptor has better detection performance over a set of state of the art feature extraction methodologies.