Pedestrian Detection by Using Weighted Channel Features with Hierarchical Region Reduction

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Abstract

Pedestrian detection in real time to avoid collision for unmanned vehicles is an interesting and challenging problem in computer vision. This paper proposes a new pedestrian detection method by using an appearance-based multi-channel features. The method involves only the monocular environment since most cameras have only a single lens. A pedestrian is represented by the combination of channel features partly weighted according to the clearly visual appearance and occlusion. Handling partial occlusion is carried out by constructing a hierarchical region reduction structure. A full pedestrian image is disintegrated into several horizontal and vertical regions. Each region captures the outstanding appearance of pedestrian's body. The features extracted from all regions are hierarchically combined to perform the concurrent detection of pedestrian's occurrence. The experiment yielded good results using standard benchmark dataset. The performance evaluations on miss rate, average false positive per image, and the trade-off between running time and performance show that the proposed detection framework is a reasonable option for real world applications.