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A Novel Approach to Detect Pedestrian from Still Images Using Random Subspace Method

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Abstract

Pedestrian detection from still images is a terribly troublesome task. Human detection is the crucial part within the systems of humanistic image reclamation, visual scrutiny, pedestrian detection, and posture recognition, home automation, robot sensing. Detecting humans is a stimulating task due to major difficulties scrolling back from the wide variability of the target, like the form, wear or pose; and thereafter the external factors, like situation, illumination, and partial occlusions. This paper detects the humans using Random Subspace Method (RSM). The detection process is only in the still images no motion information is used. By using random subspace method detects the pedestrians. To implement these using mainly three types of datasets PobleSec, INRIA and Daimler Multicue dataset, additionally used linear SVM for classification.

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*Keywords:*Occlusion; Ensemble Classifier; Support Vector Machines; GLCM; DCT; DWT; Random Subspace Method;

1. Introduction

Pedestrian detection system is a vital and important task in computer vision. Computer vision is a field that includes methods for procuring, processing, scrutinizing, and understanding images. Pedestrian recognition is one among the foremost difficult issues within the field of computer vision. Pedestrian detection is an essential and vital task in any intelligent video surveillance system. Pedestrian detection is an on-going research area in computer vision in recent years [2]. Numerous approaches have been proposed. Depending on the movement and distance from the camera, there are mainly two methods that are used to detect pedestrians on image motion analysis and texture analysis respectively. Occlusion is the process that there is something want to see, but can't, due to some

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property of sensor setup or some event. For example, in human tracking system the occlusion occurs if a human that tracking is unseen (occluded) by another object. Suppose two persons walking past one another, or an automotive that drives underneath a bridge. During this case once an object disappears and reappears once more [3].

Pedestrians ought to be recognized in extremely dynamic scenes since each pedestrian and camera area unit in motion that obscures pursuit and movement analysis. Motion analysis is employed in computer vision, image process, high-speed photography and machine vision. Texture analysis denotes to the characterization of regions in an image by their texture content. Holistic detection means object is considered as a whole and process it [7]. Part-based detection is part of the object is takes and process it separately and finally combined each parts. Patch-based detecting process, extracted local features are used to match against the codebook entries, and every match casts one vote for the pedestrian hypotheses detection process as patch wise. Motion-based detection selects the moved objects [20].

Detecting pedestrians in an image has tested to be a difficult task for several researchers as a result of the wide variability in diagnoses. Posture, clothing, size, background, and weather all are impactful on the presence of an image. The presence of pedestrians exhibits terribly high inconsistency since they wear totally different garments, carry totally different objects, and have a substantial vary of sizes particularly in terms of height[4][15]. Pedestrians should be recognised in outdoor urban circumstances, i.e., they have to be detected within the context of a encumbered background, urban areas are more multifaceted than highways under a wide range of illumination, and weather circumstances that vary the quality of the sensed information e.g., shadows and distinction within the colour spectrum[16]. Additionally pedestrians may be part occluded by common urban components, like parked vehicles or street furnishings. Furthermore, pedestrians seem at totally different view angles [8].

Most of the previous efforts in pedestrian classification assume full visibility of pedestrians in the scene. Component-based approaches which represent a pedestrian as an ensemble of parts can only alleviate this problem to some extent without prior knowledge. The key to successful detection of partially occluded pedestrians is additional information about which body parts are occluded. Background subtraction techniques usually find the foreground object from the image and then classify it into categories like human, animal, vehicle etc., based on shape, colour, or motion or other features. The direct detection methods the relative positions or geometric distances of various body parts are common to all humans, although the pixel values may vary because of the clothes or the illumination. The technique uses a structure known as the distance map. These techniques used part based method.

The proposed method mainly focused on holistic method, i.e., object is considered as a whole. The major benefits of the proposed approach is generic, it can be applicable to any class of objects. The second benefit is that the random subspace classifiers are trained in the original space, no further feature extraction is required. Next benefit is that the detection is done on monocular intensity images, unlike other methods for which stereo and motion information are mandatory and during training, we only require a subset of images with and without partial occlusion; other detection methods require delineation of the occluded area. Traffic monitoring is a key issue to be addressed in day-to-day's life. The major applications are in driver assistant systems, video surveillance system. The intelligent vehicle reduces the number of accidents between pedestrians and vehicles.

The primary objective of the proposed system is to detect the pedestrians from still images using Random Subspace Method. The Random Subspace Method (RSM) is used for handling occlusion. RSM is a good learning method. This method has various advantages over the other methods. It does not require manual labelling of body parts, and also it does not require additional data like stereo and motion. The main advantage of this method is that it can be extended to other object classes too. In this method the window is described by a block based feature vector which includes the features of all the blocks. The resulting feature vector is evaluated by the holistic classifier. If the result from the holistic classifier is not clear, then the occlusion inference process is applied. In the occlusion inference process, for each block a discrete label is obtained which determines whether it is part of the pedestrian or background. Then segmentation is applied to remove the spurious response and to obtain a spatially coherent region. After segmentation only the blocks which are having the same property are grouped together. If they are not having the same features their features are distributed everywhere depending upon the upper bound of the features.

To detect the human from still images first of all convert the image into blocks. In this method the window is described by a block based feature vector which includes the features of all the blocks. The resulting feature vector is evaluated by the holistic classifier. Then extract features using texture analysis by using the Random subspace method to select the features [9]. The linear SVM was used as the base classifier. The random subspace method is