

HUMAN DETECTION USING SPEEDED-UP ROBUST FEATURES AND SUPPORT VECTOR MACHINE FROM AERIAL IMAGES

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Abstract— Human detection from an aerial image has attracted wide attention due to its vast area of application such as in surveillance, search and rescue operation, and for visual understanding of the image. Unlike object detection, human detection from an aerial image is a challenging classification problem because of different posture appearance of human in an image. More so, at high altitude human shape appear deformed. Different features selection and different algorithm have been proposed. Although effective, but limited due to, characteristic of human posture in an image. In order to address this problem, this research proposed a Speeded-Up Robust feature selection and SVM for human detection from an aerial image due to computational speed and robustness of the SURF feature. This approach would help in better human detection from aerial images irrespective of position and movement for either rescue or surveillance mission. Aerial images were acquired preprocess and segmented using Otsu segmentation. A database comprises of two hundred images was created; 70 percent (140 images) of it was used in training the classifier and 30 percent (60 images) for testing the classifier. Accuracy of 50%, specificity of 57.1%, sensitivity of 46.2% and precision of 66.7% was achieved. These results can be used for a better human detection from an aerial image irrespective of the position or movement.

Keywords— Human Detection, SURF Feature, SVM, Aerial Images and UAV

I. INTRODUCTION

Over the years, there have been increased use of unmanned aerial vehicle (UAV) for human detection for rescue operation, surveillance, delivery, forest fire monitoring and better understanding of human behaviour from an aerial image [1]. Human detection from an aerial image using unmanned aerial vehicles has attracted so much attention for

visual image understanding. Unlike other object detection, human detection has some characteristic and challenges. Human usually have a different posture, appearance in an image [2, 3]. Human detection from an aerial image is a challenging classification task because of the different appearance of human in an image, the background or variation of illumination, also at high altitude, human appear so tiny and deform. This characteristic of human form influence the choice of feature selection and algorithm for human detection or classification [2]. There have been several recognition algorithm and feature extraction for human recognition, such as [4-9] over the years, but they have been no suitable or better algorithm or feature selection for human detection for an aerial image capture using UAV [10].

In order to address the problem stated above, the this research proposed an algorithm for human detection from an aerial image using Speeded-up Robust Feature (SURF) and Support Vector Machine (SVM) for classification. This approach would help in better human detection from an aerial image irrespective of the position and movement, as the SURF feature is a local feature descriptor which is robust, scale invariant and less computational time compared to global features or other types of local features.

The remaining part of this paper is organized as follows: in section one, introduction human detection from an aerial image using UAV was discussed. In section two, feature extraction, human detection, human detection from an aerial image and SVM was discussed. The Methodology of the experiment was discussed in section three. The result of the research was discussed in section four, the conclusion of the