Asian Journal of Computer Science and Technology
ISSN: 2249-0701 (P) Vol.5 No.1, 2016, pp.13-16

DOI: https://doi.org/10.51983/ajcst-2016.5.2.1770

Efficient Segmentation and Detection of Object in Complex and Crowded Scene

N.S Bindu[1] and H.S.Sheshadri[2]
[1]Dept. of E&C, Vidyavardhaka College of Engineering, Mysore, India
[2] Dept. of E&C, PES College of Engineering, Mandya, India
E-mail:bindu.ns5@gmail.com, hssheshadri@hotmail.com
(Received 7 July 2016; Revised 23 July 2016; Accepted 11 August 2016; Available online 18 August 2016)

***Abstract* - This paper intends to develop a technique to extract the moving object by using temporal differencing. Initially the stereo images are captured from vicon camera and the images are cropped as per the requirement. Next interested ROI is selected to extract the object is a particular scene. The noise that are present in the cropped images are removed with the help of filters. The objects are detected by considering height and occupancy of the object in a given scene. After obtaining the objects, morphological operations are applied and finally the objects are detected. It is applicable in verities of applications in real time.**
***Keywords:* Stereo vision, ROI, Noise artifacts, morphological operation, height map, occupancy map, object detection.**

I. INTRODUCTION

Extraction of dynamic body is a significant process in the video surveillance system, traffic monitoring, pedestrian tracking and also many other applications. In general, the vicon camera system provides pan, zooming functions and tilting function by revolving s 360 degrees corresponding to its axis. Since most of the scenes that is captured by these vicon camera is different from each frame, estimation of camera movement is necessary. While using a stationary camera, the input images can always be aligned to so call reference image. Three common techniques of segmentation towards motion are temporal differencing (TD), background subtraction (BS) and optical flow (OF). Out of all these techniques, the background subtraction is one of the standard method, particularly for situation where a static background is considered.

It senses moving pixels by means of taking difference in the pixel intensity among existing input image and also with the background image. It is one of the effective technique when the so called background image is aligned 100% to the existing current image [1]. The theory about temporal differencing is likely to be similar to that of background subtraction, where is takes the difference of the intensity among the two images i.e., reference [2]. In the temporal differencing, it make use of 2 or 3 successive frames in the video to extract dynamic objects. Compare to BS, it has very less efficiency when object tries to move slowly because it uses the preceding frame as the reference image. There might be some holes in objects that has been detected. Currently, there are few enhanced methods of the temporal differencing [3]. The methods based on optical flow uses the feature of a flow vectors about the dynamic objects in a video sequence over a time in order to detect these dynamic regions in the image sequence. In Optical flow approaches, it can be directly used to find and detect individualistically moving dynamic objects even in presence of the camera movement [4]. When using the vicon camera, the background subtraction technique seems to be not powerful method as it is needed to capture background frames in huge amount. It takes more time. Therefore, in this work temporal differencing approach is used since only single or multiple frames are taken as a reference. But it likewise senses dynamic object of the preceding image also. The main goal of this research is to basically extract the dynamic objects in a crowded scene. It also aims in overcoming the shadow problem as well as noise appearance and also in removal of artifacts in a detected image is explained further in proposed worked. The outline and contribution towards this work is explained in the upcoming sections.

II. RELATED WORKS

Various methods that exist in the literature for a dynamic object extraction. P. Spagnolo [5], used the method of temporal differencing since there exists a difficulty using the BS approach. They proposed the consistent foreground segmentation approach which combines the analysis of temporal image with the background image taken as reference. This method was adopted to background illumination changes. Murali and R. Girisha [6], developed a segmentation technique for a color video sequences in a real time along with background which was monostatic. A. Yamashita [7] developed an algorithm for the regions consisting of adherent noise and artifacts in reference image by investigative the distance and shapes of the particular regions that are existing in so called subtracted image. After this step they have merged these two images in order to remove the noise. S. Elena [8], proposed an approach to identify the shadows by using the concept and model of invariant color in a digitized image. The usage of these invariant features permits a very low complexity in the stage of classification of features. In [9, 10] the author has given a detailed information about the stereo matching algorithms. In [11] the author has explained the correlation based stereo matching algorithms and their performance. In [12] the author has explained about the effect of depth discontinuity in the disparity. In [13], an efficient framework for object stereo matching is studied. By making use of all of the above survey a new algorithm is developed to detect the

objects. A statistical review on various object detection methods were explained in detail in [14].

III. PROPOSED APPROACH

The proposed approach for an efficient object segmentation and tracking is explained in detail in the below diagram. The proposed approach for segmenting and detecting an object from the video is shown in Figure.1. Initially the stereo images taken from Vicon camera are considered. The images are then cropped with a resolution of 380 x 460 images size. Once the images are cropped in a video sequence, it is then required to find the ROI or a VOI in an image. In almost all the images there will be a presence of unwanted noise in an images which is to be removed. These noises are removed using a morphological operations. Once the images are free from noise the corresponding connecting bandwidth is found in the given image. Here while detecting an object one should also take consider the height and occupancy of the object in a given sequence of image. Taking objects of the size which is greater than the 4050 pixel is considered in order to find the largest objects. After finding the object, the holes are filled and mask are generated. Finally these mask are connected based on the connected component concept and objects are detected.

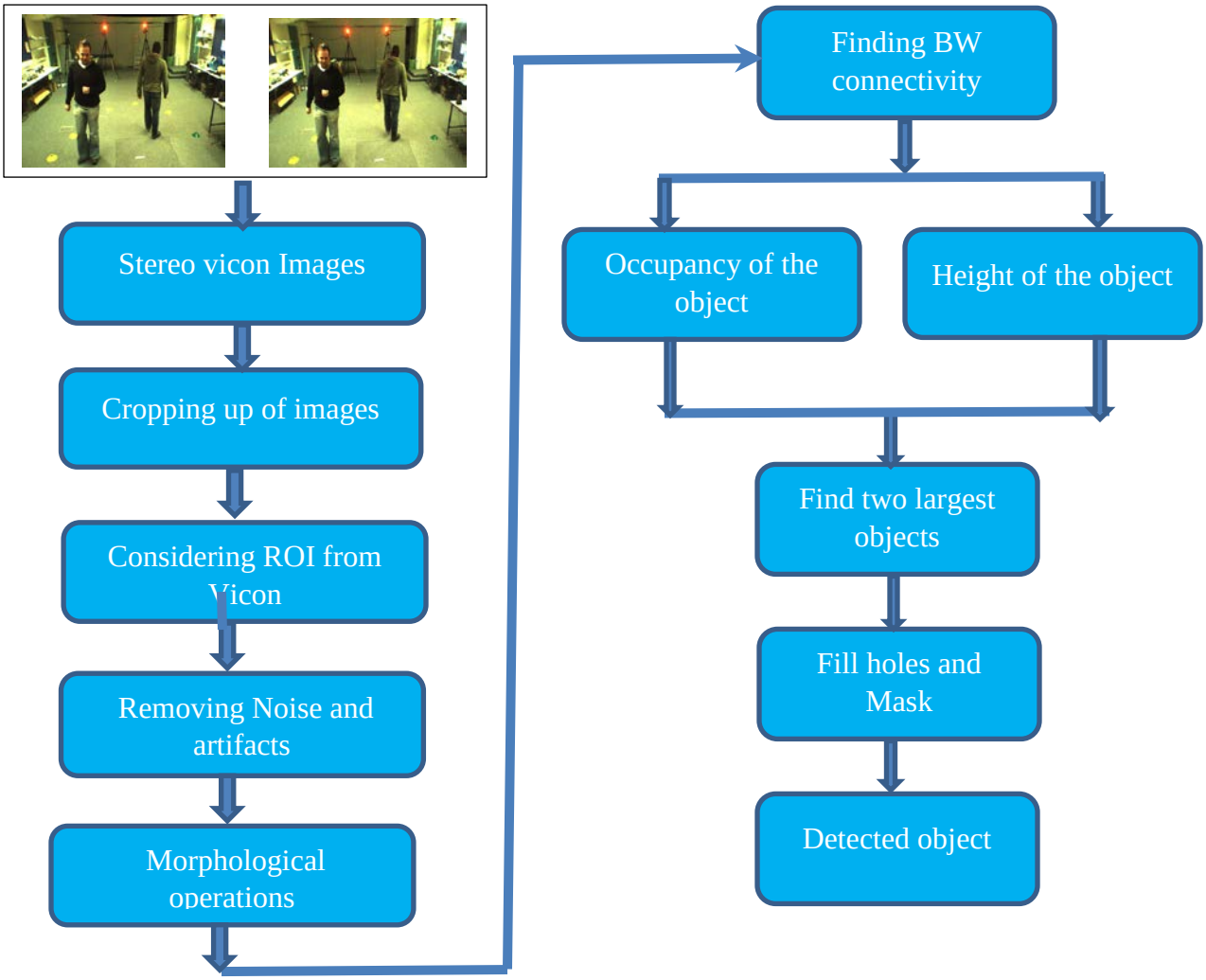

Fig.1Proposed approach for object detection

IV. RESULTS AND DISCUSSION

In order to estimate the accuracy and efficiency of the developed and proposed approach, it is evaluated using MATLAB with a 4GB RAM, Pentium processor. The images are taken from Vicon system which will be shown below. Figure 2 shows the detection results.

Fig.2 First row indicates the original image, Second row shows the segmented object and Third row shows the detected object.

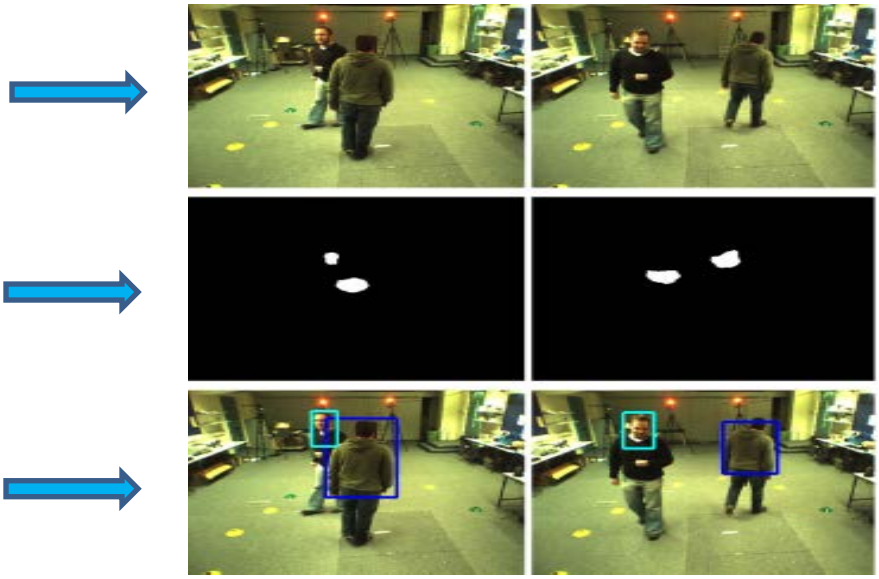

Fig.3 First row indicates the original image, Second row shows the segmented object and Third row shows the detected object.

As in the Figure.2, the First row indicates the data set that is taken from the vicon system. The second row indicates the segmented images and finally third row indicates the detected objects from the proposed approach. One can say from the above results that the objects are clearly identified and it is detected efficiently. Figure.3. gives the detail about the segmented and detected object using the proposed approach. First row indicates the data set that is taken from the vicon system. The second row indicates the segmented images and finally third row indicates the detected objects from the proposed approach. One can say from the above results that the objects are clearly identified and it is detected efficiently.

V.CONCLUSION

This paper has proposed a technique to extract moving object. Temporal differencing is used to extract. Initially the stereo images are taken from vicon system. The proposed technique begins with discovery and finding the appropriate

difference between the current and previous images. The proposed work in this paper outperforms well in complex environment. The proposed algorithm is good in handling occlusion, illumination compensation, pose and orientation. The objects are clearly identified and it is detected efficiently from the developed approach or the technique.

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