

Human and Moving Object Detection and Tracking Using Image Processing

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Abstract— Moving object detection and tracking is often the first step in applications such as video surveillance. The main aim of project moving object detection and tracking system with a static camera. We propose a general moving object detection and tracking based on vision system using image difference algorithm. This paper focuses on detection of moving objects in a scene for example moving people meeting each other, and tracking and detected people as long as they stay in the scene. This is done by image difference algorithm with MATLAB software.

Index Terms— vision System, moving object detection and tracking, image difference algorithm.

I. INTRODUCTION

Video surveillance of human activity usually requires people to be tracked. It is important to security purpose and traffic control which is also used to take necessary step for avoid undesired interaction. We present our system for single moving object detection and tracking using a static webcam mounted inside a building that monitors a typical open work area. Object tracking is central to any task related to vision systems. We present a vision system for moving people detection and tracking therefore taking video at no change of illumination area with particular background and in this background such people are moving.

In the process leading from an acquired image to the information about objects in it, two steps are particularly important: foreground segmentation and tracking. In this paper we present a simplified single object detection method based on image difference and a blob matching tracking algorithm that relies only on blob matching information without having to use statistical descriptions to model or predict motion characteristics using matlab software. One of the best software for image processing so we implemented algorithm on MATLAB.

A moving object detection and tracking system with a static camera. For that application we presented image difference algorithm which contain subtraction between reference image and no of image also morphological operation noise removal filter. This article is organized as follows. Section II gives related work on that topic and brief overview of the system, and detailed explanations for each stage in Section III. After the motivation for the research is given, the algorithm of the presented occlusion detection scheme is given in Sect. IV. In Sect. V, some simulation

results from the presented moving object detection algorithm. In sec VII describe conclusion of project.

II. RELATED WORK

In the present work the concepts of dynamic template matching and frame differencing have been used to implement a robust automated single object tracking system. In this implementation a monochrome industrial camera has been used to grab the video frames and track an object. Using frame differencing on frame-by-frame basis a moving object, if any, is detected with high accuracy and efficiency. Once the object has been detected it is tracked by employing an efficient Template Matching algorithm. The templates used for the matching purposes are generated dynamically. This ensures that any change in the pose of the object does not hinder the tracking procedure.

1. Take current image and previous image.
2. Take difference between them
3. Select Thresholding.
4. Difference of image is greater then threshold object is detected.
5. Generate template and take coordinate of template
6. (Template matching algorithm)
IF the template matching is successful
THEN IF the tracker has NOT detected motion of The object AND the detector has
THEN go to STEP 1 (get a new template)
ELSE go to STEP 5 (get the x, y Position)
ELSE go to STEP 1 (get a new template)
7. Obtain the position P(x, y) of the match and pass it on to the pan-tilt automation module for analysis.
8. Get the direction of horizontal and vertical movement of tracked object.
9. Else go to step 1.

III. OVERVIEW OF SYSTEM

The presented system contains vision system that can capture videos and other is image difference algorithm that can process for moving object detection and tracking.

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A. Vision System

For many vision-based systems, it is important to detect a moving object automatically [11] Image processing, analysis, and machine vision represent an exciting and dynamic part of cognitive and computer science. [8] Shown in Fig.1 Vision

System included high resolution camera and hardware card (supported to camera), camera is interface to pc. From vision system pc should installed frame grabber card which is support to camera and it should has fast processor for capturing frame with snapshot.

The system overview shown in fig2. The video captured from image acquisition system. Read all images or frame in matlab platform the first image is called background or reference image. All the no of images subtract to background then difference is greater than threshold the object is detected. For tracking side used region props command of matlab with properties of centroid, bounding box and area of white pixels. So the bounding box we tracked of moving object.

Fig.1 Vision System

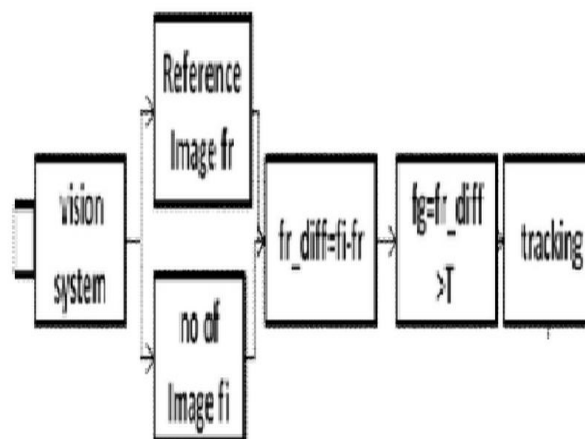


IV. IMAGE DIFFERENCE ALGORITHM

There are various techniques for moving object detection and tracking like optical flow, low change of illumination, segmentation background subtraction, frame difference etc. We formulated the problem in a sequential manner .I planned my work according to the following steps. I planned different step with different set of operation will take place at each step and the output of that step will be used as the input to the other step .Each step is in in charge of specific function which it will perform on each frame of the video sequence and the final result of that step will be used in the another step and each step will follow the same things. The last step will give the final output in the form of a video in a well-structured way. The formulation of step are defined as follows-

1. Take video from Vision System.
2. Read 1st image to avi read that is reference image
3. Read other image.
4. Take subtraction of them and set Thresholding.
5. Applied Gaussian filter for noise remove

Fig.2 System Overview



6. Applied morphological operation like dilation and Erosion for small noise removes
7. Fill holes in resulted image
8. Take label connected component with its properties like bounding box, centroid and area of all no.of object move in this scene.
9. For i=1: n % n is no of object move
 $A = (\text{length of object})$ Find $(L==1)$ % find white Pixel whose length is A
 If $(A > 100 \ \&\& \ A < 8000)$
 Then draw rectangle plot centroid of that Rectangle
 End
 End

V. SIMULATED IMAGE DIFFERENCE ALGORITHM

We have simulated image difference algorithm in MATLAB with different videos. The first video about man moving in particular area he will detect and tracked using the simulation of algorithm that result shown in fig2. We have done also simulated other video for multiple HUMANS are detected and Tracked that result shown in fig3.



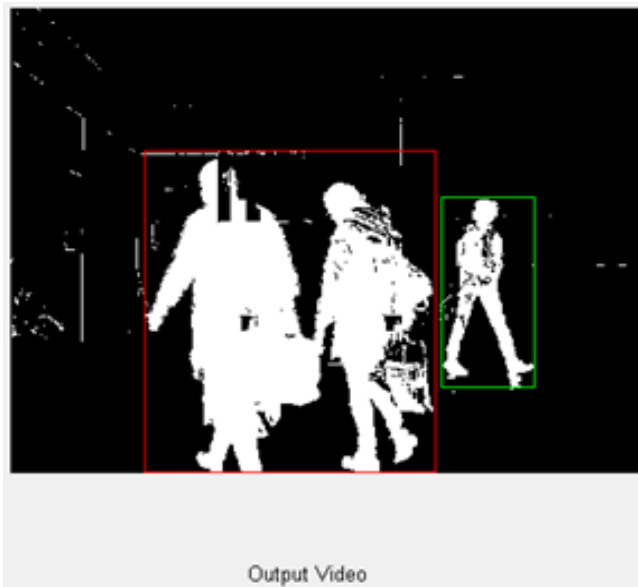
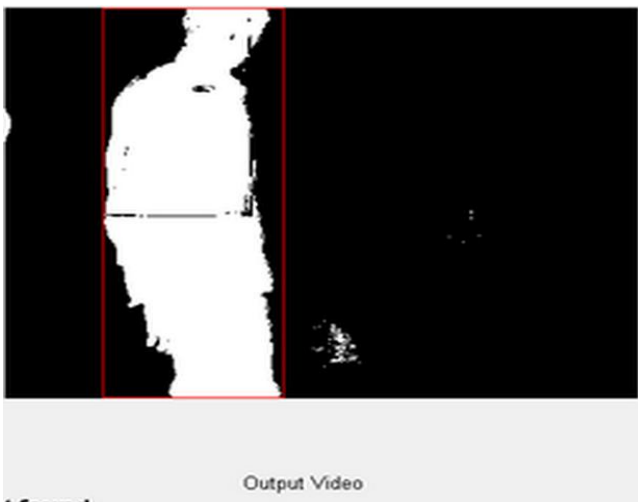
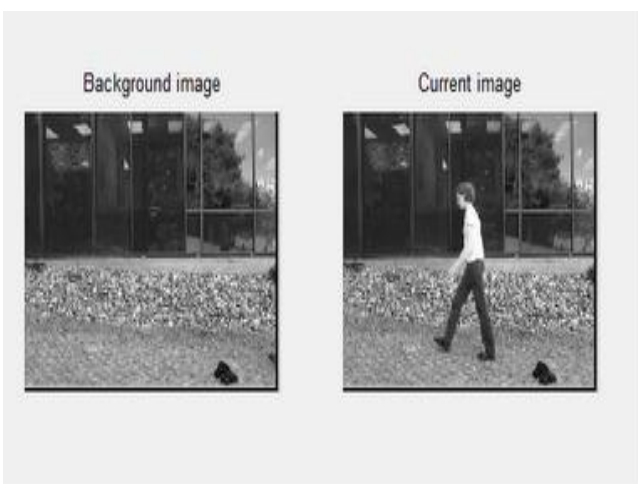


Figure (4)



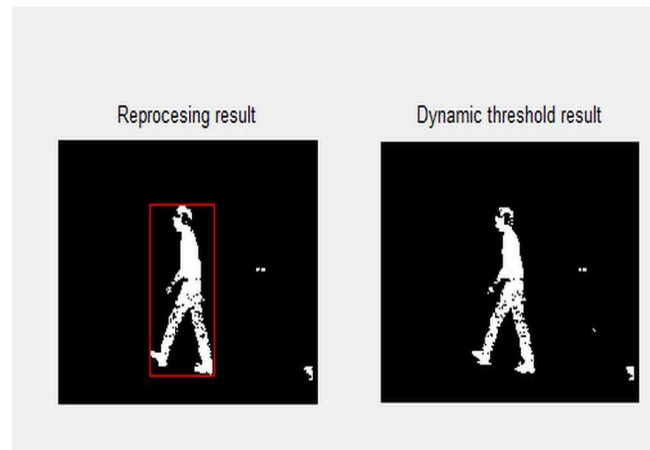
In fig (4) we have shown the **background image** which forms the base image for the difference algorithm and the **current image** which is being subtracted from the background image.

Figure (5)



The output of the subtraction is shown in figure (5) as a **difference image**, further fixed thresholding is applied this difference image and the output is given in **Fixed threshold result image**.

Figure (6)



In figure(6), dynamic threshold is applied to the process to remove noise, it is shown in **Dynamic threshold result**, By using tracking algorithm we track the moving object in a red block as shown in **Reprocessing result image**.

VI. CONCLUSIONS

We have presented and implemented of moving object detection and tracking with the help of image difference algorithm in matlab. By experimental result we got nice result compare to other research by using such types of noise removal filter and also such types of structure element for morphological operation.

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