International Journal of Engineering Technology Science and Research
IJETSR
www.ijetsr.com
ISSN 2394 – 3386
Volume 4, Issue 11
November 2017

Multiple Object Detection and Tracking Using Background Updating Model

Ankush Mahore,
MIT Academy of Engineering ,Alandi(D), Pune, India
Gitesh Bhumkar.
MIT Academy of Engineering ,Alandi(D), Pune, India
Smita Kulkarni
MIT Academy of Engineering ,Alandi(D), Pune, India

ABSTRACT.*The Multi-Object recognition and tracing have inclusive applications for of time-critical video analysis scenarios. Multi-object tracing can be accomplished by identifying objects of distinct frames and then associating recognitions of frames. Such a methodology can be made very strong to the special recognition. By divergence, a false -positive detection in a few frames will be ignored. However, when dealing with a various target problem, the connecting step results in a difficult to optimization tricky in the universe. In Object Detection and Tracking we have to detect the target object and track that object in successive frames of a video file. In this object detection and tracking is taking place using Gaussian Mixture model and Mathematical model.*

KEYWORDS*: **Object tracking, detection, background subtraction and updating, background remove.***

1 INTRODUCTION

Automatic visual detection, tracking down a variable number of objects is crucial tasks for a wide range of home, business, and industrial applications, such as security, surveillance, management of access points. Video surveillance is an active research topic in computer vision that tries to detect, recognize and track objects of a sequence of images and it also makes an attempt to understand and describe object behavior by replacing the aging old traditional method of monitoring cameras by human operators. Object detection includes detecting objects of the frame of a video arrangement. Each tracking technique requires an object detection appliance either in every frame or when the object first acts in the video. Object tracking is the procedure of detecting an object or many objects of time using a camera. The high powered computers, avail theability of high quality and inexpensive video cameras and the increasing needfor automated video analysis has generated a great deal of interest in object tracking algorithms. There are three key steps in video analysis, detection interesting moving objects, tracking down such objects of each and every frame toframe, and analysis of object tracks to recognize their behavior. A discriminativeframework of multiple object Detection and tracking algorithm was presented based on the combination of a novel per-pixel background model and a set of fore-ground models of object size, position, Centroid. The sampled video in uncompressed .avi format is taken as input. This video is changed into number of frames. The preprocessing operation is performed for removing the noise from the input video frames. A scene of object detection process can be usually represented with a model called background model. The background model is based on the Gaussian mixture(GM). Each pixel in the scene was explained as either background, belonging to a foreground object, or as noise. this operation is performing frame by frame. moving object detection and tracking down video for background subtraction and updating. In background detection block there is a subtraction of current frame from background frame. To post processing morphological closing operation is performed using this ellipse are getting fitted. In tracking process number of blobs are getting detected after this the data frame each blob is getting extracted from each frame, in that area, Centroid andthe bounding box is getting find out for the number of blobs from current frame and next frame. The minimum Euclidian distance is found out and Centroid between current frame and next frame is tracked.

2 LITERATURE SURVEY

The research conducted so far for object detection and tracking objects of video control system is discussed here. The set of challenges outlined above spanning several domains of research and the majority of relevant work will be reviewed. In this section, only the representative video control systems are discussed forbetter understanding of the fundamental concept. Tracking is the process of object of interest in a sequence of frames, from its first appearance to its last. The

type of object and its description of the system depends on the application. During the time that it is present in the scene it may be occluded by other objects of interest or fixed obstacles to the scene. A tracking system should be able to predict the position of any occluded objects. Object tracking systems is typically geared towards industrial application where it is desired to monitor people or vehicles moving about an area. There are two district approaches to the tracking problem, top-down and another one is bottom-up. Top-down methods are goal oriented and the bulk of tracking systems is designed in this manner. These typically involve some sort of segmentation to locate region of interest, from which objects and features can be extracted for the tracking System. Bottom up responds to stimulus and have accord to observed changes. The top-down approach is the most popular method of developing surveillance system. System has a common structure consisting of a segmentation step, a detection step, and a tracking step. The Object Detection Tracking and Recognition for Smart Cameras [1] work on the detection and tracking, show that the presence of a ground plane demonstrated how 2-D appearance models and 3-D shape and texture models can be used for recognition of objects. A Multi-Sensor Fusion System for Moving Object Detection and Tracking in [2] are by using visions object class and shape information, our tracking system effectively switched between two motion models by using method Extended Karman Filter and using cameras and LIDAR has some problem small object not detected in properly. Moving Object Counting Using a Tripwire in H.265/HEVC Bit streams for Video surveillance in [3] are work on Car Entering Detection and Car Tracking stages are implemented using K-Shortest PathsOptimization paper is work on the k-shortest paths algorithm, which is very fast. This new approach is far simpler formally and algorithmically than existing techniques and lets us demonstrate excellent performance in multiple target problem. 'Multiple Object Tracking using K-Shortest Paths Optimization in [4] the k-shortest paths algorithm is used, which is efficiently work. This new approach is far simpler formally and algorithmically than existing techniques and lets us demonstrate excellent performance in multiple target problem.

3 BLOCK DIAGRAM

The input is in uncompressed .avi format. This video is converted into number of frames, then after resizing frame in [256 256] of JPEG format this frame applied pre-processing block in this block guessing low pass filter use to remove the noise background and foreground. This frame pass to the Background Subtraction The detection of interesting foreground object of a video sequence provides a classification of the pixels into either foreground or background. A scene of object detection process can be usually represented with a model called background model. Preprocessing step involves some simple image processing tasks, which change the raw input video sequence of a format that is used in subsequent steps. In the background modeling step, the new video frame can be used in the calculation and updating process of a background model. This model provides a statistical description of the entire background scene. In the foreground detection step, some pixels in given video frame, which are not explained enough by given background model are defined as a binary candidate foreground mask .The schematic for a generalobject detection and tracking system based on the recursive Background Subtraction is shown.

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ISSN 2394 – 3386
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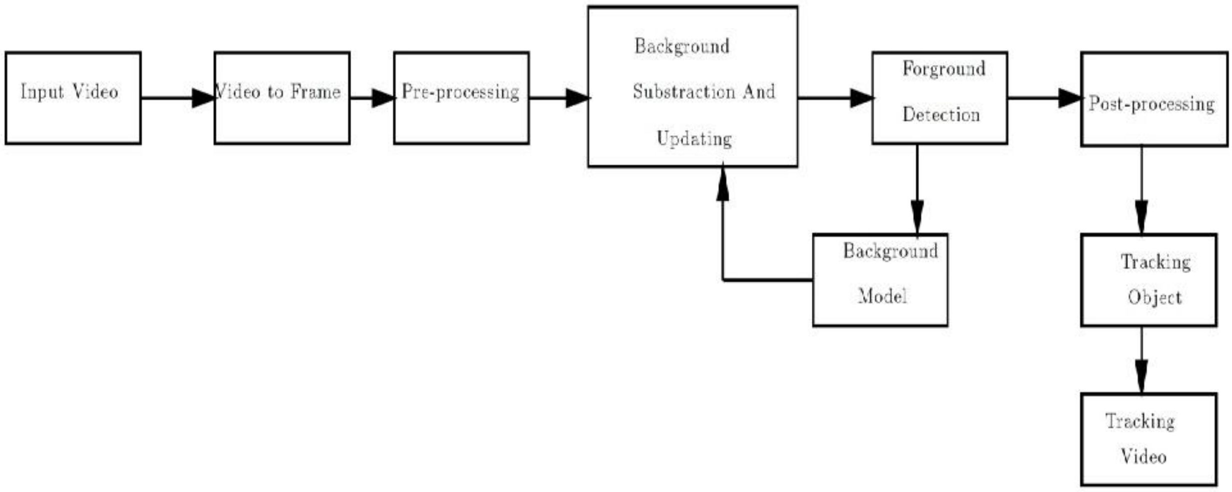

Fig. 1: Block Diagram

There are five steps preprocessing, Background Subtraction down updating, foreground detection, post-processing, and tracking down foreground mask. The preprocessing and Background Subtraction with updating. In post-processing step, some corrections are made on given binary image. In tracking with foreground mask step the tracking process is achieved by frame by frame compared information about moving object. In the background detection block there is subtraction of current frame of the back- ground is done. Through that we will get the exact foreground object detected. If there is any error in the foreground model then for that background frame updating operation is get performed. This output is then passed to the post processing block in that morphological opening operation is getting performed, in that blobs areget generated and the area isfind out and threshold value for detection of the blobs is decided .If the area value of the blob is less than a threshold then it is neglected and if the area value of the blob is greater than a threshold value it is considered as object of the frame. Then we find out area, centroid, and bounding box of that blob. This all data is getting stored frame by frame. Euclidian distance is found out of blobs of per frame, it is compared and stored. Minimum Euclidian distance is selected to track the object frame by frame. Finally we will get tracked output video.

4 RESULTSANDMETHODOLOGY

4.1 Frame difference method

Frame differencing is a pixel wise differencing between two or three consecutive frames in an image sequence to detect regions corresponding to moving object such as vehicles and balls. The threshold function regulates variation and governed by on the speed of object motion. It'shard to maintain the quality of segmentation, if the speed of the object changes significantly. Frame difference is very adaptive to dynamic environments, but very often hovels are developed inside moving objects. Videos are actually consisting of sequences of images, each of which called as a frame. For detecting moving objects of video control system, use of frame difference technique from the difference between the current frame and a next frame called as background image is shown. That method is known as frame difference method. Frame difference is the simplest moving object detection method which is based on determining the difference between

input frame intensities and background model by using pixel per pixel removing. In this case frame difference method is performed on the three successive frame, which are Ia,Ib,Id. In this Ia is background image frame, Ib Moving object frame, and the absolute difference image is shown as Id.

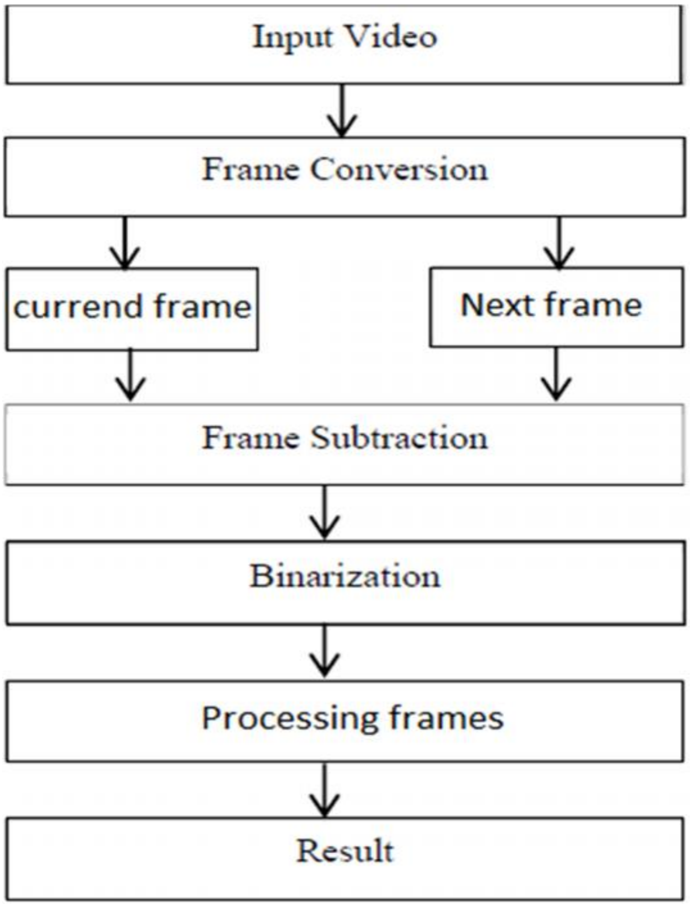

Fig. 2: Flow chart of frame processing

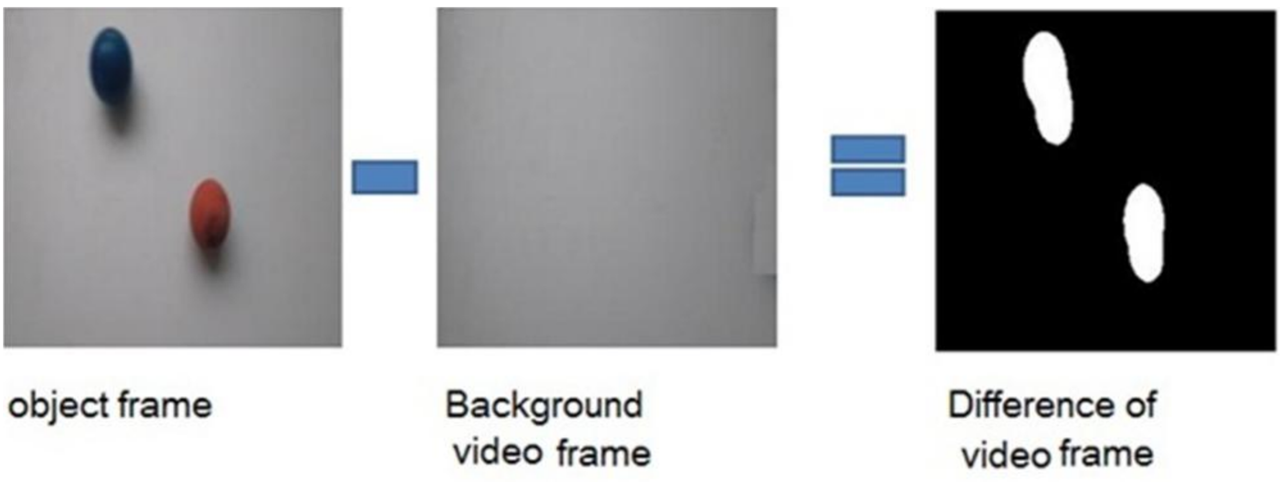

Fig. 3: Frame Difference

Id = |Ib - Ia| (1)

4.2 Gaussian Mixture Model

To implement an existing Gaussian mixture model based on background model to detect the moving objects. For detecting moving objects in video system the use the Gaussian mixture model, is essential this model has the color values of a particular pixel as a mixture of Gaussian. We have proposed; suggest a probabilistic approach using a mixture of Gaussian for identifying the back- ground and foreground objects. All the Gaussian weights are normalized after the update is performed. Gaussian low pass fillter is used to remove the Blurriness and shadow get smooth output.

$$H(u,v) = \frac{e^{-D^2}(u,v)}{2D^2} \quad (2)$$

Where D is the cut off frequency. When D(u,v)=Distance of the point(u,v),

H(u,v) it is filter response, the filter is down to 0.607 of the maximum value.

4.3 Background Model

Background model method is a technique using the difference between the current image and reference image to detect moving object. Process chart is shown as Figure 2. The threshold selection is very important to detect motion of object. After this moving object is get detected. The method formula is shown as

R(x; y) = A(x; y) - B(x; y) (3)

D(x; y) = 1(background)R(x; y) > T (4)

D(x; y) = 0targetR(x; y) < T (5)

Background image, which is updated during a particular period of time. These mechanism works well in the presence of fixed cameras. The problem with background subtraction is to automatically update the background from the incoming video frame and it should be able to overcome the following problems;

- Motion in the background: Non-stationary background regions, such as branches and leaves of trees, a flag waving in the wind, or owing water, should be identified as part of the background.

- Illumination changes: The background model should be able to adapt, togradual changes in illumination over a period of time.

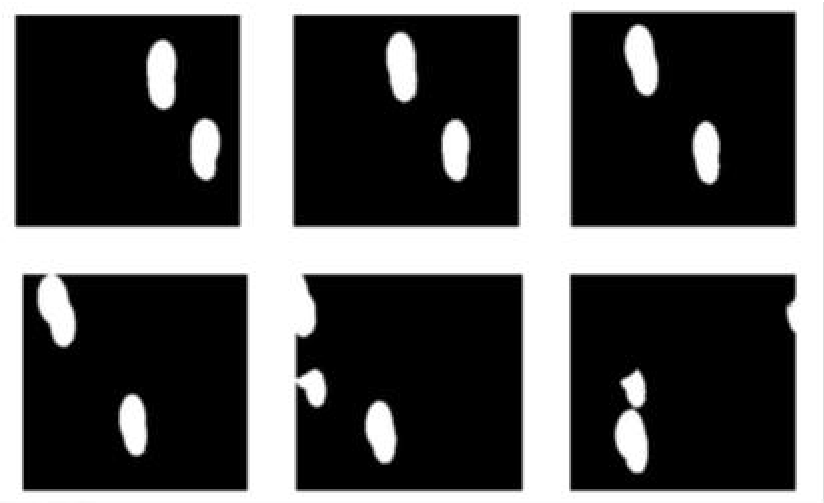

Fig. 4: Background Remove

International Journal of Engineering Technology Science and Research
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www.ijetsr.com
ISSN 2394 – 3386
Volume 4, Issue 11
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-Shadows: Shadows cast by moving object should be identified as part of the background and not foreground.

-Camouflage: Moving object should be detected even if pixel characteristic are similar to of the background.

-Bootstrapping: The background model should be able to maintain back ground even in the absence of training background (absence of foreground object).

4.4 Object Detection

The proposed approach addresses the fitting a set of ellipses to the output of the background subtraction algorithm, in such a way that each ellipse represents an independent object. On the other hand, a moving region of the foreground can be associated with two or more ellipses, which accounts for merged detections and also objects occlusions. The process of fitting ellipses to the foreground detectionis carried out by an algorithm. However, the algorithm has been modified to achieve, first one is to limit the number of ellipses per object of one, second one is to assist in the estimation of the ellipse parameters restricting their values according to a predetermined range of possible object sizes and orientations.Illustrates the process of ellipse fitting over the previous moving region detection. Tracking information about the moving objects is represented using a vector state notation by

xt = [xt,n|n = 1,…,No] (7)

Where n is the number of moving object at times steps.

Xt, n = [r; v; e]t; n(8)

The n componentcontains the object position, the velocity, and the elliptical bounding of an object, respectively.

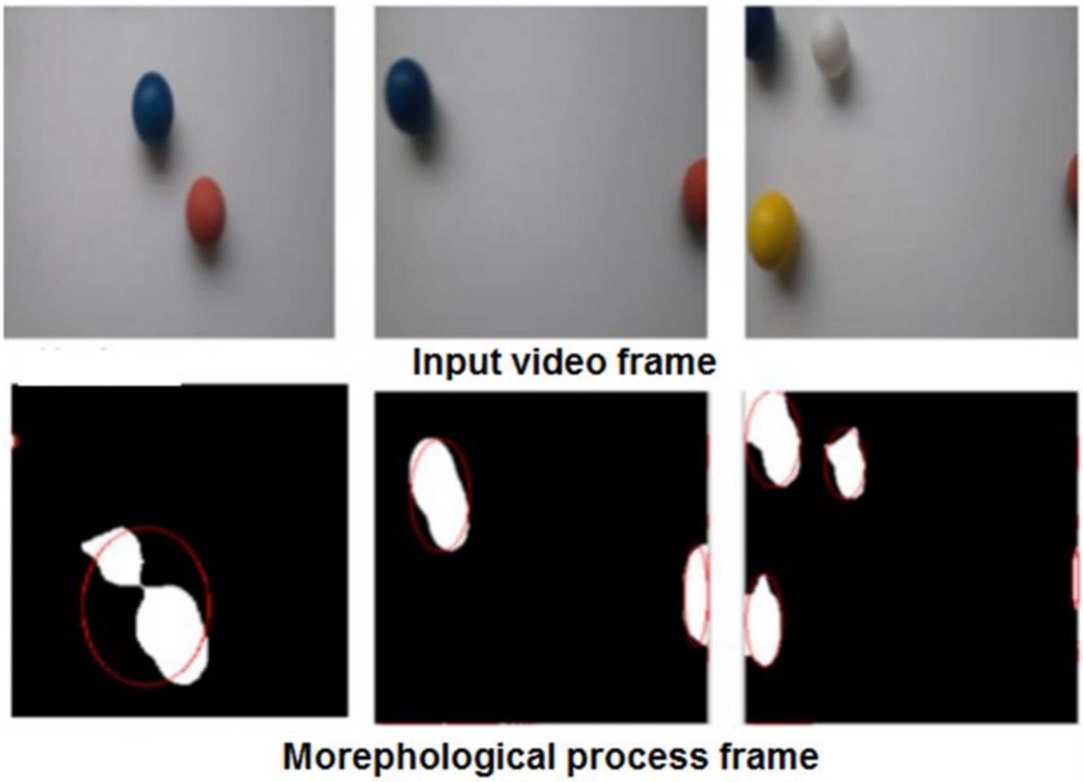
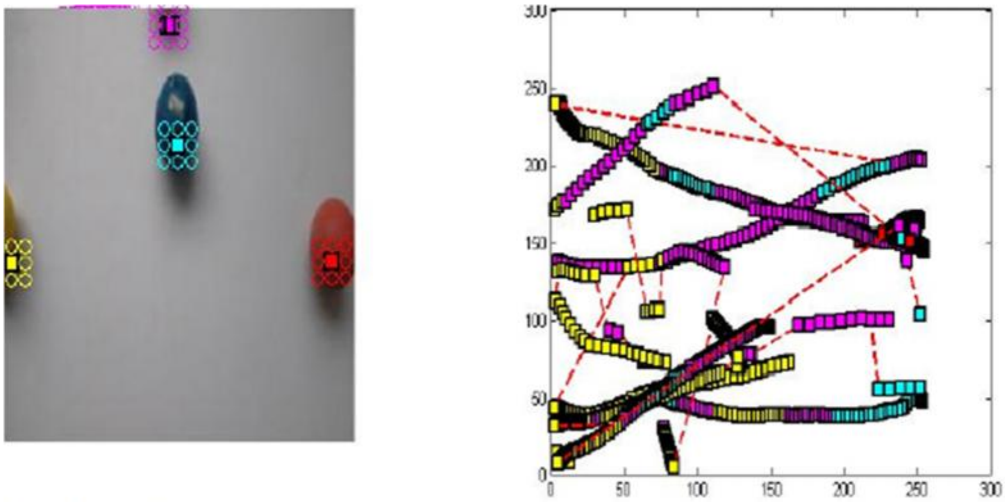


Fig. 5: Morphological Process frame

4.5 Object Tracking



Tracking Object

Tracking Frames

Fig. 6: Tracking of Frames

After the object detection is achieved, the problem of establishing a communication in Fig.6 between object masks in consecutive frames should arise.Obtaining the correct track information is crucial to following actions, such as object detection and activity recognition. In the post processing block in that morphological opening operation is getting performed, in that blobs are get generated and the area of that is funded out and threshold value for detection of the blobs is decided (i.e 100).If the area value of the blob is less than a threshold then it is neglected and if the area value of the blob is greater than a threshold value it is considered as object of the frame. Then we found out area, centroid, and bounding box of that blob. This all data is getting stored frame by frame. Euclidian distance is found out of blobs of per frame, it is compared and stored. That stored data is compared frame by frame and found out minimum Euclidiandistance is selected to track the object frame by frame. Finally we will get trackedoutput video.

5 CONCLUSIONS

A visual detection and tracking framework has been proposed for surveillance and counting applications. In addition, it has been especially designed to enter in the consumer electronics market, meeting the following requirements: of the shelf equipment, easy installation and configuration, and unsupervised working conditions. This is achieved by the combination of a moving detection algorithm that can handle split and merged detections, and the use of a tracking method that can handle multimode distributions, false detections, and missing detections. The proposed algorithm has been compared with another approach, also oriented to consumer electronics, proving its superior performance.

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