Mysterious Object Detection

(DSAA project)

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Abstract—*With concerns about terrorism and global security on the rise, it has become vital to have in place efficient threat detection systems that can detect and recognize potentially dangerous situations, and alert the authorities to take appropriate action. Of particular significance is the case of unattended objects in mass transit areas. This paper describes a general framework that recognizes the event of someone leaving a piece of baggage unattended in forbidden areas. Our approach involves the recognition of four sub-events that characterize the activity of interest. The traditional way to observe the places or to track the places is the CCTV cameras. In the current project of detecting abandoned object, the results are almost optimal and need more work in this area. This project discusses the proposed system for detecting abandoned object from Real time video. When an unaccompanied bag is detected, the system analyzes its history through subsequent frames, the system keeps a lookout for the object, whose presence in or disappearance from the scene defines the status of the bag, and decides the appropriate course of action.*

Keywords:MysteriousObject;BlobAnalysis;ForegroundImage; Regionof interest(ROI);Background image.

I. INTRODUCTION

Many video surveillance systems have been in operation for with the human controlled or monitored CCTV systems. Here the quality and the effectiveness of humans is not up to the mark.The available work is done by implementing some algorithms to reduce noise but it was not as impressive as the noise was still creating hurdle in getting the output. In this project work we use Blob analysis is used to obtain Region of Interest . About terrorism and global security on the rise, it has become vital to have in place efficient threat detection systems that can detect and recognize potentially dangerous situations, and alert the authorities to take appropriate action by raising alarm on right time. When an unaccompanied object is detected, the system analyzes its history to determine its most likely object position(s), where the position is defined as the location where the bag into the scene is left unattended. Through successive frames, the system keeps a lookout for the bag positions, whose presence in or disappearance from the scene defines the status of the bag, and decides the appropriate course of action. Automatic threat detection systems can assist security personnel by providing better situational awareness, enabling them to respond to critical situations more efficiently.

II. WHAT IS MYSTERIOUS OBJECT?

The detection of mysterious objects is more or less the detection of idle/inactive (stationary or non-moving) objects that remain stationary over a certain period of time. The period of time may be adjustable. In several types of images or frames idle objects should be detected. For example in complex near Elevator bag is left by some person. An unknown object is any object that is not a person or a vehicle. In general, unknown objects cannot move they are considered as stationary.

1. What should be detected?

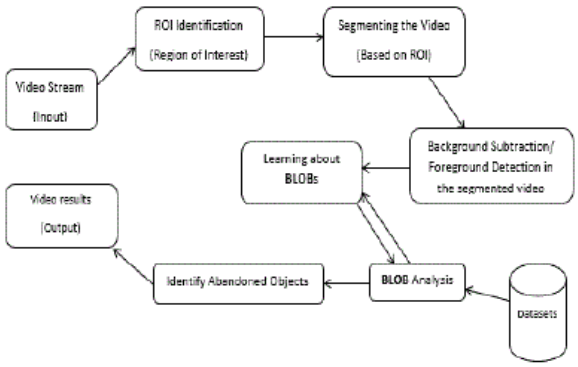
Whenever an unknown object appears in the scene and remains stationary for some amount of time person, an alarm needs to be generated.

III. PREVIOUS WORKS ON MYSTERIOUS OBJECT DETECTION

Even though there exist numerous of object detection algorithms in the literature, most of them follow a simple flow diagram, defined by Cheung and Kamath [5], passing through four major steps, which are (1) pre-processing (simple image processing tasks that change the raw input video into a format that can be processed by subsequent steps), (2) background modeling (also known as background maintenance), (3) foreground detection (also known as background subtraction) and (4) data validation (also referred to as post-processing, used to eliminate those pixels that do not correspond to actual moving objects).
Martiriggiano, Caroppo et al [6] a gradient-based method is applied to the static foreground regions to detect the type of the static regions as abandoned or removed objects. It does this by analysing the change in the amount of edge energy associated with the boundaries of the static foreground region between the current frame and the background

image. They proposed a motion detection system, based on background subtraction algorithm, able to classify static foreground regions as abandoned or removed objects. A template matching procedure is applied between the edge of the foreground region and the edge detected over the segmented image.

IV. METHOD



A. PRE PROCESSING

i. Contrast Enhancement

The first frame of the video is taken as the background. Then using contrast enhancement we improve the quality of low light video by normalizing the difference betweenthe maximum & minimum intensities, using **YCbCr** approach.This will give more accurate color information in a smaller amount of data than in the case of RGB.We perform YCbCr on the background and current frame.This data will be stored in the matrix form

ii.Noise Removal

The resultant binary matrix is all set for Noise Reduction. It reduces the white noise present in an input frame by smoothing the frame. After applying contrast enhancement we need to control the amount of noise that becomes visible in low light videos. It is needed to control the amount of noise that becomes visible in low light videos after applying contrast enhancement.

B.REGION OF INTEREST IDENTIFICATION

Region of interest is a selected subset of within a dataset identified for a particular purpose. Region of interest differs from one environment to another. Here ,the region of interest is the subset containing the background objects detected for the first time in the environment and to be considered as a static object pertained to the environment. In this proposed system ,the first frame of the environment detected by the camera is taken as the sample to detect the region of interest. The first frame detected is considered as a background subsystem from which individual static objects are detected and stored in the subsystem as region of interest. So region of interest follows two different phases. First, the system will detect the region of interest from the background system and then store it in a separate matrix.

C.VIDEO SEGMENTATION

Video Segmentation aims at modulating the surveillance video at various levels for the ease of processing the video. In common, Videos can be segmented at various levels such as Scenes, Shots and Frames. Frame is the least of segmentation possible , where each frame contains only the static objects. In this proposed system frames are taken into consideration for detecting the objects and shots for parallel processing using Blob analysis. First the video is segmented into various forms of scenes, shots and frames. Here the video is modulated as shots. Shots are the set of frames independent of each other . Shot boundaries are detected by comparing the frames that are independent of each other. Every shot consists of several frames. Each frame consist of several information such as background model, foreground objects .Each frame processing is done in two different phases. Background Subtraction and Foreground Extraction.

D. BACKGROUND SUBRACTION AND FOREGORUND DETECTION

Background Subtraction involves comparing the sample frame with the already stored subset of background objects from the region of interest. The common background objects are extracted by detecting the object boundaries using edge detection scheme. Edge detection scheme refers differentiating the scales of an object based on the pixel configurations such as color, sharpness of the color. The background objects detected by comparing them ,is masked from the frame of interest .Then it is subtracted from the frame by eliminating it from the sample frame. Following these steps ,the Foreground objects are extracted from the sample frame. Foreground objects are extracted by detecting its object boundary and separated from the sample. These are the foreground objects detected in the new frame are considered to be objects unclassified. These steps are followed for all the frames in the shot and each foreground object is stored.All these objects are used for building a new foreground model.

E. BLOB ANALYSIS AND TRACKING

Blob analysis is the technique used for object tracking. BLOB (Binary Large Object) . A BLOB is a region of a video in which some aspects of the objects are constant or changes within a prescribed range .All the points in a blob can be considered in some sense to be similar to each other .Blob

analysis involves various steps such as Extracting the object from the foreground model, refining the object from the space according to noise removal schemes and object enhancement. Shadows are detected and removed from the object. The object detected from the foreground is statistically analyzed according to their shape, size and edge. Then these objects are tracked at different frame levels and checked whether the object is being static for more than specific frame levels, then the object is qualified as static object.

F. MYSTERIOUS OBJECT ANALYSIS

Now we compare the foreground images with background image and then we increment the hit count of a static object and if the hit count crosses a threshold value it is labeled as a mysterious object and then we raise an alarm indicating mysterious object and alert the security personnel.

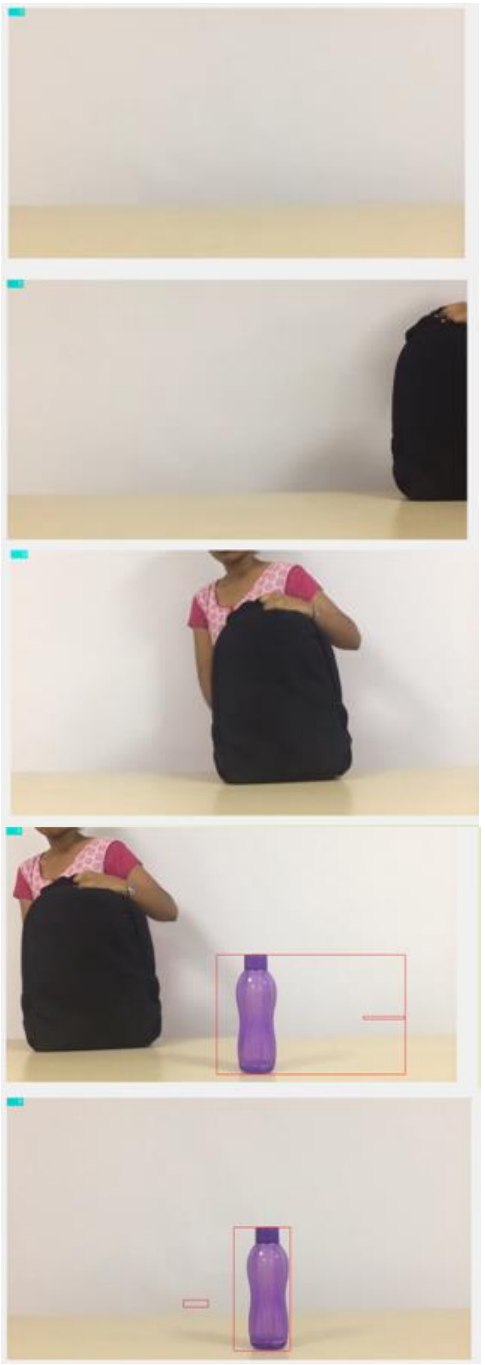
V. EXPERIMENTAL RESULTS

1)Detecting more than one object.

In this video we first insert a bottle and it is detected.

Later after some time we add one more bottle into the Frame and then two bottles will be detected. From this it is clear that it works for more than one object.

2)Detecting stationary objects and leaving moving objects.



In this video there is a casual moving object (bag) for example a passenger carrying his bag then that can't be termed as mysterious object, this particular situation is clearly explained in this video since, the output mysterious object is only the bottle but not the bag and it is shown in the above sequence of frames.

VI.CONCLUSION AND FUTURE WORK

We presented a project which detects mysterious object for real-time video surveillance .This paper presented an abandoned and removed object detection system for recorded videos, based on a background segmentation scheme. Blob analysis is done on the segmented background. Detection results show that the system can handle small variations in lighting conditions and also number of people in the scene. The system can work with any video format and resolution, however scaling is done to improve the effectiveness of the algorithm in real time. In addition, the system is simple and computationally less intensive as it avoids the use of expensive filters while achieving better detection results.
As a future work, efforts can be put in a direction to remove limitation given by static thresholds and try to find the owner of the mysterious object.

VII. REFERENCES

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