

DESIGN AND IMPLIMENTATION OF OBJECT Detection in Video SURVEILLANCE INTELLIGENT ANALYZER

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Abstract — Video surveillance is recognized as an essential element to any retail operation's loss prevention program. A major weakness in loss prevention techniques today is the inability of analog video equipment to detect criminal behavior and alert personnel. Someone has to be constantly watching store monitors – or later search through hours of video to find a particular instance of theft. Poor video quality also hurts effectiveness. Video surveillance is the continuous advancements of image processing technology applications. Technology for detecting objects left unattended in consumer world such as shopping malls, airports, railways stations has resulted in successful commercialization, worldwide sales and the winning of international awards. However, as a consumer video application the need is now greater than ever for a surveillance system that is robustly and effectively automated. We propose an intelligent vision based analyzer for semantic analysis of objects left unattended relation with human behaviors from a monocular surveillance video, captured by a consumer camera through cluttered environments.

Keywords: — consumer video surveillance, intelligent analyzer, unattended object, multiple background model.

I. INTRODUCTION:

We propose a novel probabilistic approach for detecting and analyzing stationary objects driven visual events in video surveillance systems. This approach is based on a background modeling technique and an adaptive statistical sequential analysis method. For background modeling part, we use the concepts of periodic Markov chain theory producing a new background subtraction method in computer vision systems. We then develop an object classification algorithm which can not only classify the objects as stationary or dynamic but also eliminate the unnecessary examination tasks of the entire background regions.

Finally, introduces a sequential analysis model based on exponent running average measure to analyze object involved events such as whether it is either abandoned or very still person. In order to confirm our proposed method we present some experimental results tested on our own video sequences taken in international airports and some public areas in a big city. We have found that the results are very promising in terms of robustness and effectiveness

Consumer video camera surveillance with the continuous advancements of image processing technologies is emerging for consumer world of applications. Technology for detecting objects left unattended in consumer world such as shopping malls, airports, railways stations has resulted in successful commercialization, worldwide sales and the winning of international awards. However, as a consumer video application the need is now greater than ever for a surveillance system that is robustly and effectively automated. We propose an intelligent vision based analyzer for semantic analysis of objects left unattended

relation with human behaviors from a monocular surveillance video, captured by a consumer camera through cluttered environments. Our analyzer employs visual cues to robustly and efficiently detect unattended objects which are usually considered as potential security breach in public safety from terrorist explosive attacks.

Visual surveillance for human-behavior understanding has been investigated Worldwide as an active research topic [1]. In these systems, it should be a sufficiently high accuracy enabling a real-time performance. Thus, a prime goal of automated visual surveillance is to obtain a live description of what is happening in a monitored area and take appropriate action. Not always appreciated is that visual tasks people find straightforward can sometimes represent major challenges for the computer. The computational effort and complexity involved in simply “following” someone through an extended video sequence is enormous, and a truly robust and reliable tracker has yet to be developed. Compounding the problem is that usually public areas under surveillance often have fluctuating and variable lighting conditions, people are frequently occluded by other people or structures, and people may temporarily leave a monitored area, etc.

II. LITERATURE REVIEW:-

This paper [1], Many approaches have been attempted based on background subtraction were proposed [2] [8]. Such methods differ mainly in the type of background model and in the procedure used to update the model.

While in paper [2], a mixture of Gaussian distributions has been used for modeling the pixel intensities in [3], [4]. In [5] the authors proposed a simple background subtraction method based on logarithmic intensities of pixels. They claimed to have results that are superior to traditional difference algorithms and which make the problem of threshold selection less critical.

In [6] a prediction-based online method form modeling dynamic scenes is proposed. The approach seems to work well, although it needs a supervised training procedure for the background modeling, and requires hundreds of images without moving objects.

Adaptive Kernel density estimation is used in [7] for a motion-based back-ground subtraction algorithm, the detection of moving objects to handle complex background, but the computational costs is relatively high.

In [8] the spatial and temporal features, incorporated in a Bayesian framework, to characterize the background appearance at each pixel. Their method seems to work well in the presence of both static and dynamic backgrounds.

In paper [4], Although many researchers focus on the background subtraction, few papers can be found in the literature for foreground analysis [9],. Reference [10] analyzed the foreground as moving object, shadow, and ghost by combining the motion information. The computation cost is relatively expensive for real-time video surveillance systems because of the computation of optical flow.

In [10] they describe a background subtraction system to detect moving objects in a wide variety of conditions, and a second system to detect objects moving in front of moving back-grounds. In their work, a gradient-based method is applied to the static or ground regions to detect the type of the static regions as unattended or removed objects (ghosts). It does this by analyzing the change in the amount of edge energy associated with the boundaries of the static

III. PROPOSED WORK:-

The proposed system consists of three processing steps:

A) **Object extraction**:- Involving a new background subtraction algorithm based on combination of periodic background models with shadow removal and quick lighting change adaptation.

B) **Extracted objects** :- Classification as stationary or dynamic objects, and

C) **Classified objects** :- Investigation by using running average about the static foreground masks to calculate a confidence score for the decision making about event. We will use real-time consumer video surveillance system for public safety application in big cities [1] It is a multi-level event-analysis system which consists of three conceptual components, each being briefly explained below.

A. Preprocessing:-

The periodic background modeling along with stochastic likelihood image and moving object detection are implemented. Each image within the video covering an individual human body and static objects are segmented to extract the 'blobs' representing foreground objects. In this processing, the periodic concept based background with periods of Short Length (SL) and Long Length (LL) are automatically built and updated by temporal statistic analysis.

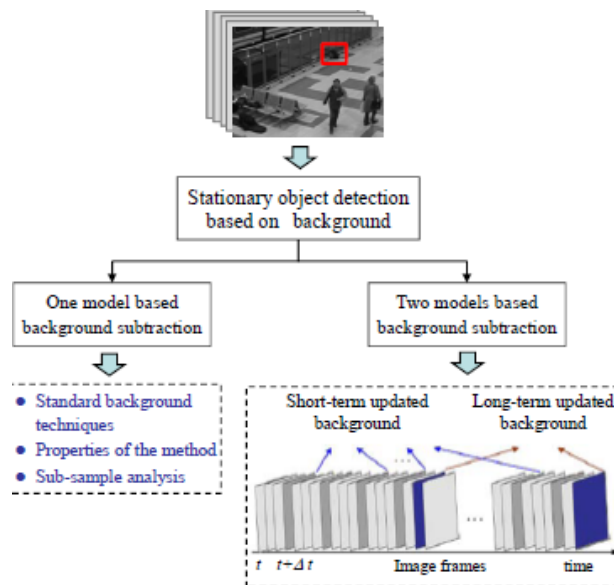


Fig.1. Stationary foreground detection methods based on background subtraction techniques.

The main motivation is that the recently changed pixels that stay static after they changed can be distinguished from the actual background pixels and the pixels corresponding to the moving regions by analyzing the intensity variance in different temporal scales. We employ the mixture of the periodic models along with Stochastically Varied (SV) likelihood image background and update them based on stable history maps and difference history maps. After motion detection, a shadow removing procedure is performed on each image in order to discard shadow points that, generally, deform the shape of the

moving objects. The intensity and texture information are integrated to remove shadows and to make the algorithm working for quick lighting changes.

B. Stationary Object Detection Processes:-

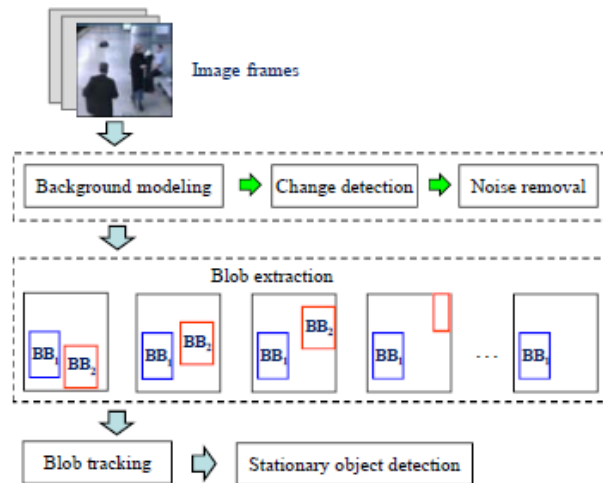


Fig. 2. Illustration of stationary object detection procedure.

A matching algorithm is employed to detect if the object is unattended long enough to trigger the alert. Moreover a mixture of multiple statistical models is used to analyze the foreground as moving objects, unattended objects, or removed objects (ghosts), and still person while detecting the backgrounds. Different thresholds are used to obtain the foreground mask (for moving objects) and the static region mask (for stationary objects)

C. Classifying Process for Object Type:

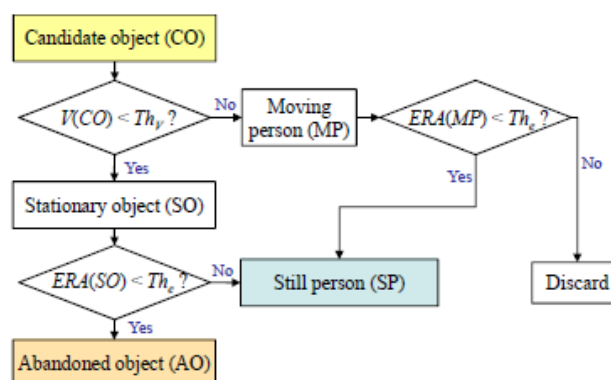


Fig. 3. Object classification of extracted foreground.

For the stationary region mask, a segmentation method is developed to detect the type of the static region, significantly outperforming previous techniques. Only those attended/removed objects that meet the user defined alert requirements will trigger the alerts. With the method proposed in this paper, our system can be more robust to illumination changes and dynamic background, and it can also work very well even if the images of the video are in low quality. In addition, the rule based classifier is used to distinguish the unattended object and the still-standing persons, which is a problem that is not solved in previous approaches

IV. CONCLUSION:-

We have presented a computationally efficient and robust method to detect abandoned object in public areas. This method uses three backgrounds that are learned by processing the input video at different frame rates. After the detection of foreground regions, a shadow re-moving algorithm has been implemented in order to clean the real shape of the detected objects. The object detection method works surprisingly well in crowded environments and can handle with illumination changes. It can also detect the very small abandoned objects contained in low quality videos. Due to its simplicity the computational effort is kept low and no training steps are required. Finally, we can discriminate effectively between abandoned or still person by using a simple rule-based algorithm. The reliability of the proposed framework is shown by the experimental tests performed in big public transportation areas.

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