

Suspicious Activity Detection In Video Surveillance System

#¹Sneha Wayal, #²Shraddha Gaikwad, #³Bhagyashree Wahule, #⁴Seema Jadhav,
#⁵Shradha Pimpodkar



¹snehawayal.comp@mmcoe.edu.in,
²shraddhagaikwad.comp@mmcoe.edu.in,
³wahulebhagyashree.comp@mmcoe.edu.in,
⁴seema.jadhav1994@gmail.com,
⁵shradhapimpodkar.comp@mmcoe.edu.in

#¹²³⁴⁵Department Of Computer Engineering,
Marathwada Mitra Mandal's College Of Engineering, Karvenagar, Pune.
Savitribai Phule University, Pune, India.

ABSTRACT

In recent years there is growing demand for video surveillance system. In order to increase their safety of their citizens or customers government as well as companies have started to equip their properties with CCTV cameras and other sensor systems. We present a frame work for video analysis technique to enable robust and real-time human activity detection and recognition. For detecting certain activities we are considering a scenario of railway station wherein following activities would be detected such as abandon object detection person doing illegal activities such as person smoking on the railway station, crossing or walking on the railway track, and automatically detect fire on the railway station. The consequence is that, instead of employing video surveillance mainly as an after-effect forensic tool, our aim is to provide digital network-based surveillance system to provide interactive, real-time and surveillance. This research proposes software tool for video analysis to enable robust and real-time object detection system. Proposed method deals with the image algorithms like BLOB and ORB. It also checks for the speed, accuracy and the security of the algorithm.

Keywords:- Video Processing, Abandon object detection, Activity detection, Foreground and Background Subtraction, BLOB algorithm, ORB algorithm.

I. INTRODUCTION

Now a days security at public place is very important issue. Video surveillance, more commonly called CCTV (closed-circuit-television), is an industry that is more than 30 years old and one that has had its share of technology changes. As in any other industry , end-user's ever-increasing demands on the products and solutions are driving the changes, and evolving technologies are helping to support them . Video surveillance is an effective tool for today's businesses large and small in security surveillance, production monitoring, and deterring predatory and purloining behaviors. In recent years there is a huge demand for visual surveillance system. Video surveillance is a process of identifying video sequences. Basically video surveillance activities have three types, which can be classified as manual, semi-autonomous or fully-autonomous. . The consequence is that, instead of employing video surveillance mainly as an "after-effect" forensic tool, it is now feasible to deploy digital, network-based surveillance systems to provide interactive, real-time monitoring and surveillance. In manual, video analysis is

completely done by humans where as in semi- autonomous video surveillance involves some form of video processing with human intervention. By fully autonomous system, only input is the video sequence provided by cameras. In such system there is no human intervention at all. System does both, low level and high level decision making tasks. There are variety of applications of video surveillance system. In our system we will detect different activities using video surveillance system. We are considering the scenario of any railway platform here. Our aim is to provide security application at the railway station which assists the corresponding authorities at the railway station By this way we reduce human efforts of monitoring. We are proposing system to detect fire, abandon object, Smoking person, and person crossing the railway platform with the help of surveillance cameras. By this system our aim is to provide real time activity detection system, which identify the illegal activities and prohibits the practice of doing illegal activities.

ARTICLE INFO

Article History

Received: 3rd May 2017

Received in revised form :

3rd May 2017

Accepted: 6th May 2017

Published online :

20th May 2017

The system provides the notification to the corresponding authorities on their hand held device like mobile phone by the SMS facility. So they can take the quick action over the illegal activities.

We demonstrate our techniques using real-world video data to detect and recognize behaviors at railway station. In particular, we are able to distinguish normal following behaviors from suspicious, and potentially dangerous, stalking behaviors, which can aid security surveillance.

II. RELATED WORK

Many researchers have given their contributions to research available and proposed techniques for the detection of different activities object detection, In this paper we are considering the scenario for detecting abandoned object detection on railway platform, A person walking or crossing the railway platform, fire detection & person smoking on the railway platform. Here, Video is captured through CCTV footage, Each frame is then separated and then processed .These frames are processed using BLOB and ORB algorithms. BLOB is used for feature and image matching. For smoke detection, Fire detection we are using BLOB algorithm, for person crossing railway platform, Abandoned object detection –BLOB and ORB algorithm is used. Techniques used are: - BLOB algorithm, ORB algorithm, Frame subtraction& bounding box method.

2.1 Comparison to closely related work

One such method is (MoG) ‘Mixture of Gaussian’ models [3] suits the system which has static and complex background this technique which is more accurate but has a larger time complexity. Here, a fast technique to extract moving objects from the background using ‘MoG’ model and ‘Haar wavelet’.

In other paper the techniques used are :-

2.1.1 Pre-Processing

First, the videos are separated as frames and preprocessing is mainly used to enhance the contrast of the image, removal of noise and for color conversion. The aim of pre-processing is an improvement of the image data that suppresses unwanted distortions or enhances some image features important for further processing. Four categories of pre-processing techniques are pixel brightness transformations, Geometric transformation, Local neighborhood of the processed pixel, Image restoration.

2.1.2 Eigen background Subtraction

Dimensionality of the space consisting of sample images is reduced with the help of Principal Component Analysis (PCA).For moving object segmentation an Eigen space model is represented Typeset sub-subheadings in medium face and capitalize the first letter of the first word only.

2.1.3 Temporal Differencing

Here Temporal differencing method is used in which the pixel-wise difference between two or three consecutive

frames is done to extract moving regions. It is an adaptive approach .It fails to extract all similar pixels of a foreground object whenever it was uniform texture.

2.1.4 Background Subtraction

Whenever there is static background i.e. Fixed camera system, this technique is used. The object detected in the current image is subtracted pixel by pixel from a reference background image which is created by averaging images using first few frames.

2.1.5 Alarm Trigger

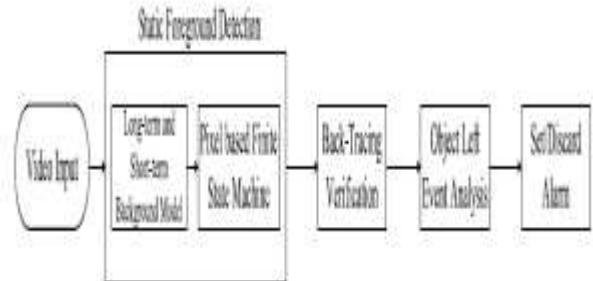
Alarm trigger module is the core of the video surveillance system, which mainly include the object identification and provide the signal to the user by triggering the alarm.

The techniques used in our paper are:-

BLOB:- A blob is represented as a pair consisting of one saddle point and one extreme point

ORB:- ORB is a mixture of FAST key point detector and BRIEF descriptor with ample no of changes to get efficient outcome performance wise. First it finds the key points, and then apply the Harris corner measure to find top N points among them.

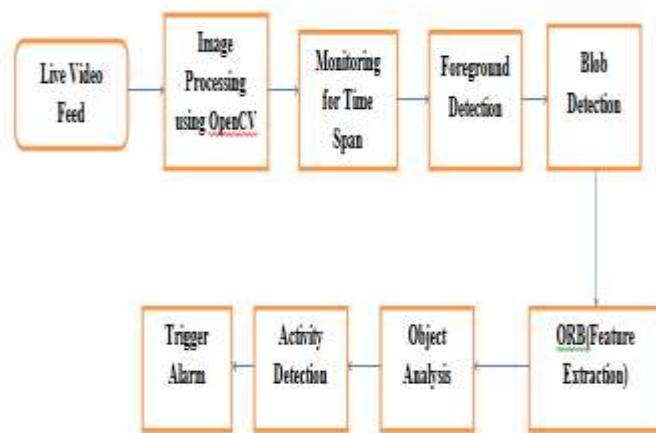
III. PROPOSED SYSTEM



The proposed system diagram.

In this paper, we are proposing a system in which there are different activities like abandoned object, fire, person smoking or crossing the railway platform are detected. We are using Blob and ORB algorithm for the object detection. Firstly Blob algorithm is applied which takes any object as input and converts it to greyscale image which consists of black and white pixels. Then the nearby pixels are connected to each other and after that clustering method is applied through which centroids are obtained and finally we are getting object which we want to detect. After this algorithm, frame subtraction is done with bounding box method. And finally ORB algorithm is applied for feature extraction. After the detection of the activity, user will get an alarm through SMS which indicate there is some hazardous object. So we have to be careful in that case. We are using OpenCV library for the implementation, As shown

in fig.1, At first a Video is given as input this is taken from the CCTV footage, From this video frames are extracted, each frame is considered for image processing, here the parameters such as time span is mainly considered .Then Foreground Detection is done. here, Background subtraction is done, only the main part which is required to be detected is considered. Next Blob detection is done it just consists of image matching, object matching, Feature based matching is done. On comparing the features matching is done. Then ORB that is The ORB algorithm consists of the FAST algorithm and the BRIEF algorithm it detects the feature point and determines the main aspect of the object. It can give accurate results even if there are no appropriate conditions. This is the latest Algorithm in this field. Our system has this characteristic that after the activity is detected from the CCTV footage an alarm is triggered as an aspect of security. It's information is given to the concerned authorities



IV. CONCLUSION

This system provides approach for detecting different activities using video surveillance with the quality output. Different activities include abandoned object detection, fire detection, smoking person detection and person crossing or walking on the platform. Correct activity detection is essential for accurate classification because if particular activity is not detected properly it cannot produce proper result. Thus the system will assist the corresponding authorities and reduces the manual work and saves much more time in monitoring. We provide the system which will gives the output with the alarm as well as SMS alert on the registered mobile numbers. Thus the system can prohibits the illegal activities which are going to happen on the railway station and also improves the security system. We have used different algorithms like background segmentation, blob detection, ORB for detecting different activities. By using these algorithms and OpenCV time complexity has been reduced and accuracy is increased.

V. FUTURE SCOPE

Still research is going on more results will be presented in the next study. We think that the complexity of activity detection systems will diminish in the future, as technology advances.

REFERENCES

- [1]. Kevin Lin, Shen-Chi Chen, Chu-Song Chen, Daw-Tung Lin, Senior Member,IEEE, and Yi-Ping Hung, "Abandoned Object Detection via Temporal Consistency Modeling and Back-Tracing Verification for Visual Surveillance", IEEE TRANSACTIONS ON INFORMATION FORENSICS AND SECURITY, VOL. 10, NO. 7, JULY 2015 1359
- [2] Kinjal A Joshi, Darshak G. Thakore, "Survey on Moving Object Detection and Tracking in Video Surveillance System", International Journal of Soft Computing and Engineering (IJSCCE) ISSN: 2231-2307, Volume-2, Issue-3, July 2012
- [3] Paresh M. Tank, Darshak G. Thakore "A Fast Moving Object Detection Technique In Video Surveillance System" (IJCSIT) International Journal of Computer Science and Information Technologies, ISSN :0975-9646 , Vol. 3 (2) , 2012,3787-3792-3787
- [4] M. Elhamod and M. D. Levine, "A real time semantics-based detection of suspicious activities in public scenes" in Proc. 9th Conf. CRV, Toronto, ON, Canada, 2012, pp. 268275