Video Surveillance System for Handling Suspicious Object

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Abstract: Nowadays, security of society is major issues for concern. Public place should remain secured in order to maintain peace in society. Image capturing capability has contributed to the popularity of image data. CCTV is one of the important part in image capturing devices. We are using image processing technique through CCTV to implement this application. If person is found with some suspicious activity, this activity is captured by CCTV, hence alert is generated. If some suspicious thing is remain untouched for particular time period which decided by system, then it will generate notification and alert to authority. Hence, we proposed video retrieval systems using images or videos as the inputs. In this paper, we propose method to retrieve video retrieval of a desired object through the inputs as appearance. We firmly believe that such a framework could serve as the foundation for behaviour analysis used in many surveillance systems so that accidents can be avoided.

Keywords: Abandoned luggage detection, abandoned object detection, object detection and tracking.

1. INTRODUCTION

The Rise of Various kinds of Anti Social Activities such as theft, bomb attacks, other terrorist attacks has actually led to the need for Video Surveillance systems. Suspicious behaviour detection is one of the paramount goals in surveillance systems along with abandoned object detection. These Systems help in monitoring and alerting about the environment upon various threats at any point of time. In recent the past there are lot of research that has being done in field of abandoned object detection system for the video surveillance systems with proper human controlled or CCTV systems. First, video input is given which is Pre processed using image processing technique. We consider two aspects for this application. We proposed change detection algorithm which is used to capture change in the activity of human. This algorithm will reconstruct an image which retains the pixel values of the pixels which is the part of the foreground change and removing the pixels which is a part of the background image. Another aspect is activity analysis is also done which include detection set of pixels .It represents behaviour of human being which is tracked for any sort of anomalies.

2. LITERATURE SURVEY

1] Yuan-Hao Lai and Chuan-Kai Yang, Member, IEEE, "Video Object Retrieval by Trajectory and Appearance", VOL. 25, NO. 6, JUNE 2015

Here, this paper proposes a video retrieval system that is based on trajectory and appearance. To increase the success rate, all the videos in the database are pre-processed to identify potential moving objects, and their associated motion trajectories.

To ease the understanding of a video, the preidentified trajectories are clustered and displayed through a few representative ones. Similarly, objects found in advance are presented as well to allow the search for similar ones from the same or different videos.

2] Divya J, "Automatic Video Based Surveillance System for Abnormal Behavior Detection", Index Copernicus Value (2013)

In this paper, Automatic real time Video Based Surveillance system for abnormal behavior is proposed, based on background subtraction, mean shift algorithm and Thresholding. Further, the abnormal activity is detected using Mean-shift algorithm by finding the centroid and velocity. A benefit of this method is that it is time efficient, and it works well in artificial light environment as well.

3] Panqu Wang, Yan Zhang Department of Electronic Engineering, Fudan University," Suspicious Object Recognition Method in Video Stream Based on Visual Attention",2008

A frequency-domain bottom-up attention method- 4-Channel PFT in acquiring saliency maps from video sequence, then applying IOR process to obtain interested area for object recognition, finally searching for the suspicious target in the video stream. The bottom-up and top-down attention is used respectively in finding salient areas and object recognition.

4] Reena Kumari Behera, Pallavi Kharade, Suresh Yerva, Pranali Dhane, Ankita Jain, and Krishnan Kutty," Multi-Camera Based Surveillance System",2011

An intelligent real-time surveillance system that can help in increasing the efficiency of the system. In order to cover a large area, more numbers of cameras are installed that leads to more number of videos that are to be monitored simultaneously.

Our approach

We proposed effective method to detect suspicious thing according to human activity. We proposed an approach for detecting abandoned object in surveillance videos. Here, two main concepts are considered, auspicious change is noted down. It is carried using change detection algorithm. Second important concept is activity analysis. According to activity of user, change is noted. According to changes, conclusion is made. Once an object is detected, tracking is required to estimate its trajectory in the image plane. If person found with suspicious activity then it is informed to authority.

3. PROPOSED SYSTEM

1. System introduction

Change detection is a basic module of any surveillance system. The detected changes can be considered as foreground objects by modelling the background. Generally, background subtraction and its variants are used to extract the foreground objects from the video stream taken from a stationary camera [1, 2]. However, detecting the foreground objects becomes hard when the background includes variations due to light, shadows and insignificant periodic changes of background objects (e.g. swaying trees).

2. System module

The system contains following modules:

I. Background segmentation-

In this module we are processing a live feed of the camera in which if we detect any abandoned object then the system set it as a background object for further processing.

II. Change detection

Suspicious change is observed. Such change is noted down. Alert is generated the notification is sent to authority.

III. Tracking-

In this module the systems focus on area which select in detection and track the persons which are close to that abandoned object.

IV. Alarm and Display –

In this module if person does not come back within that specified time period then alarm event get triggered and this shows that abandoned object detected.

System features
- This system recognizes Suspicious Activity at public places.

- The system will work in real time.
- The CCTV operator should modify region of interest.
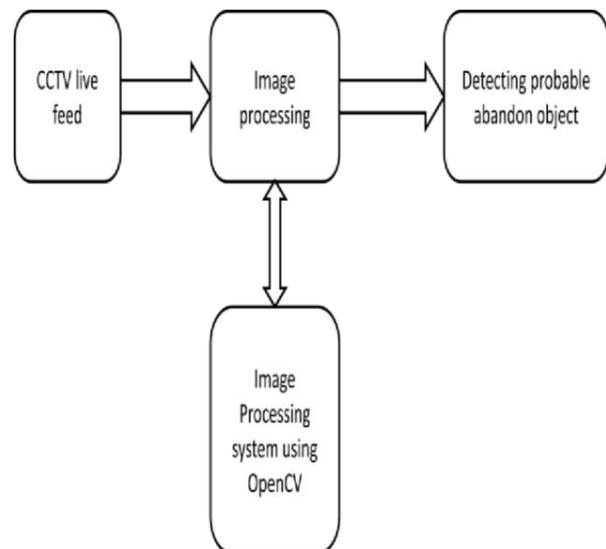- Activity is tracked under occlusion more accurately.

Block diagram:-

Diagram of video surveillance for detecting suspicious thing

Algorithm to be used:-

1) LBPH :

Local Binary Patterns (LBP) is a texture descriptor that can be also used to represent faces, since a face image can be seen as a composition of micro-texture-patterns. Briefly, the procedure consists of dividing a facial image in several regions where the LBP features are extracted and concatenated into a feature vector that will be later used as facial descriptor.

Texture Descriptor:

The LBP originally appeared as a generic texture descriptor. The operator assigns a label to each pixel of an image by thresholding a 3x3 neighborhood with the centre pixel value and considering the result as a binary number. In different publications, the circular 0 and 1 resulting values are read either clockwise or counter clockwise. In this research, the binary result will be obtained by reading the values clockwise, starting from the top left neighbour.

2) Haar-cascade

Haar-cascade is an object detection algorithm used to locate faces, pedestrians, objects and facial expressions in an image (Kumar R. & Bindu A.; 2006), and mainly used for face detection. In Haar-cascade, the system is provided with several numbers of positive images (like faces of different persons at different backgrounds) and negative images (images that are not faces but can be anything else like chair, table, wall, etc.), and the feature selection is done along with the classifier training using Adaboost and Integral images.

Features used by Haar-cascade

In general, three kinds of features are used in which the value of a two rectangular features is the difference sum of the pixels within two rectangular regions. These regions have same shape and size and are horizontally or vertically adjacent as shown in Fig 1. Where as in the three rectangular features are computed by taking the sum of two outside rectangles and then subtracted with the sum in a center rectangle. Moreover, in the four rectangles feature computes the difference between diagonal pairs of rectangles.

Mathematical model:-

Let _S' be the | Abandon Object detectionas the final set
 S = {…………}
 Identify the inputs as I
 S = {V}
 V = {V1, V2, V3, V4 …| _V'given video captured from camera}
 Identify the outputs as O
 S = {AR, DO}
DO= {DO1, DO2, DO3 …| _DO'given Detected object}
 AR = {AR1, AR2, AR3 … | _AR'gives the alert report}
Identify the functions as _F'
S = {…
 F = {F1 (), F2(), F3(), F4(), F5(), F6(), F7()}
 F1 (V) = Capture video from camera
F2 (V) = divide it into frame.
F3 (V) = image processing.
 F4 (V) = detect object
 F5 (V) = analysis and monitoring for particular time.
F6 (V) =generate alert
F7 (V)=Send alert report to the system

4. CONCLUSION

We believe our work has great potentials in applying to many other engineering fields such as video surveillance and safety guard. It is necessary to test the model into many other complicated scenes. The principle of defining suspicious can be more delicate, as the model has high potential to be extended.

5. FUTURE SCOPE

We are planning to extend our project for public purpose. We will develop system which will directly notify to police system.

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