Detection and Analysis of Moving Object in Video Surveillance

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Abstract: This paper aims to scrutinize and explore the video object detection task in computer vision applications. Computer vision is a key technology used in law enforcement and security applications. Here a comprehensive study of the video object detection task in real time is given.
Keywords: Recognition, Surveillance, Moving Object Detection, Background Subtraction.

I. INTRODUCTION

Video surveillance is a region that tries to identify and track objects over a series of images and is helpful for analyzing and describing object performance. A process of locating an object in the frame of a video is known as object detection and involves in identifying the objects in the frame after the first one appears. Video analysis involves following steps, the detection of interesting moving objects, the analysis of their tracks, and the recognition of their behaviour.

A process utilized for processing a video frame is image processing. To identify the objects that are invisible in the video is main aim of image processing. The goal of image processing is to visualize the objects that are invisible to the human eye. It is possible to detect and evade certain objects by analysing human motion, thus detecting the motions of human using the background image in a video sequence. It's another function is detection, tracking and recognition of human behavior along with some objects which are in motion from video frame. A vital aspect of computer vision study is the learning of human movement through video. The increasing interest in human motion analysis is strongly provoked by recent improvements in computer vision the accessibility of low cost hardware such as video cameras and a range of new talented applications such as personal identification and visual surveillances. The target of motion detection is to recognize the movements of objects in two images. It can also contribute to the detection of the same object.

However, the present research work -is based on the following assumptions:

- A well fixed camera –stability is key if you want to isolate motion.
- Stable light, no flickering
- Contrasting background
- High camera frame rate and resolution

Using this method, we can get the full movement information and better detect the moving objects. The background subtraction method is to use the difference between the current image and the background image for detecting moving objects with an easy but accurate algorithm. In the frame subtraction method, moving objects are detected by calculating the difference between two consecutive images Any motion detection system based on background subtraction needs to handle a number of critical situations such as:

- Image noise, due to a poor quality image source.
- Gradual variations of the lighting

conditions in the scene.

- Small movements of non-static objects such as tree branches and bushes blowing in the wind.
- Shadow regions are projected by foreground objects and are detected as moving objects.

The main aim of the present research is to develop an algorithm that can spot moving object at positive distance for object tracking applications. The rest of the paper has been organized as follows: literature survey is given in section 2, detection of moving object is given in section 3, results are given in section 4, and the paper is concluded in section 5.

II. LITERATURE REVIEW

In this paper the movements of human in a video is identified by using the Global GIST feature. As stated above, the identification of human movement is an exigent part and is best skilled on large datasets. The dataset involves two or more people at a time. The Gist feature is useful at identifying elastic human movements. The future work is to identify the clash and non-clash between two people or many people and indicating a gag as aggression on the meticulous clash video.

The article presents the perception of accelerating computing tasks in an advanced video surveillance system and the implementation of background production and segmentation of moving objects module in a reconfigurable device. This type of processing, requires minimum FPGA resources, and can be offloaded to a computer's CPU, whose processing power can be used for further image analysis. Further, the results demonstrate that the use of colour images, can improve the performance of the separation of moving objects.

In another article, in a surveillance video, a novel combination of Adaptive Background Modelling and Histogram of Oriented Gradients was presented for tracking and detecting human motion. The system used a Histogram of Oriented Gradients based approach for generation of feature vectors The Human Detection for Surveillance (HDS) system was formulated, which could successfully organize a given image as Human or Non-Human in nature. The integrated system was successfully tested on a number of sample videos containing various moving entities. The feature vectors were secret into the suitable categories using a Support Vector Machine. We experienced the integrated system on a number of sample videos that enclosed stirring objects. We analyzed the system's performance and recognized a few key issues to judge when implementing it.

This paper gives a framework for the assessment of the object recognition algorithms in surveillance applications.

In this research, moving objects are located by using the technique of motion recognition, which comprises of frame difference method and morphological operations. The obvious support of the work is to study the frame difference method and to determine its various problems.

This paper analyzes video surveillance systems and shows how human watch is being replaced by constant video recording devices. Future augmentation may include alerting the user by sending multimedia SMS, by email or by capturing video and streaming it online. In this paper we have proposed a system that can classify in three steps detection, tracking and action analysis. Morphological procedure and feature extraction method is used for detection of human being. The study shows that the method has good performance and efficiency.

To detect a moving person from a video is a difficult task. So, a detector is built for a moving person in videos with shifting

cameras and backgrounds examining various alternative moving object coding methods [6] and signifying the oriented histograms of differential optical flow that present the best outcome.

In another paper, they have analyzed moving object detection techniques, frame difference and the approximate median method [7]. The frame differentiating has been adopted for the position frame and the step length. They have recommended the moving object detection and object tracking by using the customized frame distinction method. In the surveillance system for video captured by single camera is measured for the space under the observation. In this method experiment on almost ten videos is done and the results are quite satisfactory. For object detection & tracking, the background subtraction method is used for framing the moving object from its background [7] which requires following steps:

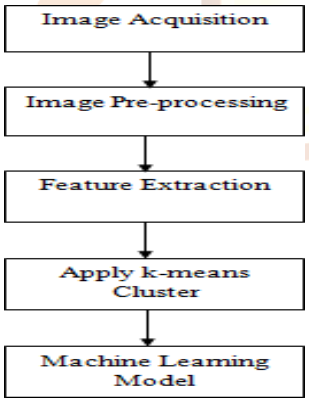
a) Reference frame selection (RFS): Here, the initial frame is selected as the reference frame.

b) Step Length: Next, appropriate step length has been selected on the basis of experimental results.

c) Removing Noise: Then, noise which is affecting the accuracy and performance of the system, it has to be removed.

d) Rise alert: After tracking the object the recorded sound will be generated for alert. Below image is the example of

Fig.1



these above steps.

Histograms of Oriented Gradients of Variable-Size Blocks, which are commonly used to capture significant human characteristics, are used.
Using a feature selection technique, it selects the appropriate set of blocks from a large collection of possible blocks. To substantially minimize computing time, it uses an integral image representation and a rejection cascade.

The system can handle 5 to 30 frames per second, depending on the density with which it scans the image.

III. METHODOLOGY

In image processing it can be broadly defined as the action of retrieving an image from some source, usually a hardware-based source, so it can be approved through whatever processes need to happen afterward. Performing image acquisition in image processing is always the first step in the workflow succession because, without an image, no meting out is possible. If the hardware is not accurately configured and allied, then visual artifacts can be produced that can obscure the image processing. One of the forms of image acquisition in image processing is known as real-time image attainment. This usually involves retrieving images from a source that is automatically capturing images. Real-time image acquisition creates a stream of files that can be automatically processed, queued for later work, or stitched into a single media format.

Pre-processing of images: Image processing occurs when a mathematical pro cedure is applied to an image, a set of images, or a video, such as a photograph or video frame, it may produce either an image or a video, the output of image processing may be either an image or a set of characteristics or parameters related to the

image [1]. The majority of image processing techniques involve splitting a picture into discrete colour planes and treating them as two-dimensional signals using typical signal processing techniques.

Feature Extraction is a dimensionality reduction approach that uses dense feature vectors to represent appealing portions of an image. When working with huge images when a reduced feature representation is necessary to accurately characterise them, this approach is practical.

K-MEANS: The fundamental step of k-means clustering is simple. First, we calculate K clusters and determine the ir centroid or center.
There is no limitation to the number of init ial centroids or the number of First K objects. If the number of clusters is not equal to the number of data points, the data points are assigned to the centroid of the cluster. Whenever there are more data than cluster s, we calculate the distance between each data and all centroid and find the minimum distance. This data will belong to the cluster that has the smallest distance. In this project, a picture will be taken from any output device, such as a camera, and a pre-processing method will be applied to that picture to collect features for use in the cluster.

IV. CONCLUSION

In this paper detection and analysis of video surveillance is done. Firstly Literature survey was conducted during the research and several related works by many researchers were discussed, including paper about moving object detection, human object detection, and surveillance. Finally, methodology and model is proposed.

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