Human Motion Detection In Static Background Using Background Subtraction Algorithm

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Abstract- Security is one among the major problems faced by the world today. Documents and confidential files should be kept with maximum security. In this developed world the attackers are also getting increased day by day so that high security systems are needed to prevent data loss. The human motion detection is the one of the major problem in the security system. For any of these systems to function, they require methods for detecting people from a given input image or a video using the background subtraction algorithm. From this we detect the moving human body from the background image in video sequences by using height width ratio. Human motion analysis concerns the detection, tracking and recognition of people from image sequences. The proposed method runs rapidly and fits for the concurrent detection. When a person leaves his/her house or office is always a concern with the increasing number of incidents of theft, robbery etc. At present many automated systems has been developed which informs the owner in a remote location about any intrusion or attempt to intrude/attack in the house. However, this proposed method develops an ANDROID application which interprets the message when a mobile device receives on possible intrusion and subsequently a reply (Short Message Service) SMS which triggers a security alarm/buzzer in the remote house or office making others aware of the possible intrusion.

Index Terms— Background image initialization, Moving object mining, Motion detection, Safety system.

I. INTRODUCTION

Human motion detection is the one of the challenging problem in the security system. Proposed method investigates the working of a background subtraction algorithm that will be used to extract moving foreground objects from a video. This video will be captured with a standard digital camera in a secure environment. The resulting video from the extraction process tracks the foreground object's movements. The objective of the system is to design and implement a cost effective, yet flexible and a powerful security system using Matlab and mobile application. The entire proposed method will combine moving objects and pre-recorded background imageries to create a video art work. Motion detection of human has a wide area of applications. We separate three types of motion related problems into motion detection which is usually used for security purpose, motion object detection and derivation of 3D object. The application for this field of research here is being very wide and broad. This proposed method is not fixed to some application area it can also be applied to applications in analysis areas and control area where human motion is to be classified to distinguish them from other object that cause motion. Providing input to virtual or augmented reality applications, we need an extra recognition of the human motion returned by the algorithms. The proposed method's focus would be based on the static camera and moving objects. The reason is simply because of the cost factors since we have only one camera and for simplicity of the algorithm stationary camera being used.

The purpose of the proposed method is to help new researchers learn and further research on their topic of interest. The main thing that addressed here in this module is, given a sequence of images, how can we detect motion or track a moving object? The proposed method is mainly answer this particular question addressed by providing a prototype to emulate or prove the algorithm or techniques that are available to perform motion detection by an input of images in a number of frames.

Security is one among the major problems faced by the world today. Documents and confidential files should keep with maximum security. In this developed world the attackers are also getting increased day by day so that high security systems are needed to prevent data loss. In order for any of these systems to function, different methods are used for detecting people from a given input image or a video using the background subtraction algorithm and controlling the secure place through the android system. The growing of human motion analysis is strongly motivated by recent developments in computer vision, the availability of low-cost hardware such as video cameras and variety of new promising application such as personal identification and visual surveillance. Providing input to virtual or augmented reality applications, we need extra recognition of the notified human motion returned by the algorithms. The proposed method's focus would be based on the static camera, moving objects.

In this paper, we propose a method for automatic human detection by using background subtraction and the controlling system by using the android application. This

paper is detailed as follows. Section ii reviews several published algorithms for motion detection. Section iii describes the proposed method for human motion detection. Section iv concludes this paper.

II. RELATED WORKS

NishuSingla [1] presents a replacement algorithmic rule for the detection of moving objects from a static background scene supported frame distinction. Detection of moving objects from a sequence of frames captured from a static camera is widely performed by frame distinction technique. The target of the approach is to find the moving objects from the distinction between the prevailing frame and also the frame of reference. The frame distinction technique is that the common technique of motion detection. This technique adopts pixel-based distinction to search out the moving object. The Frame differencing technique uses the two or three adjacent frame supported time series image to deduct and gets distinction pictures, its working is extremely the same as background subtraction when the subtraction of image it provides moving target data through the threshold value. This technique is easy and straight forward to implement, and additionally it's like the background subtraction. However this technique is extremely adaptive to dynamic scene changes; however, it generally fails in detection whole relevant pixels of some kinds of moving objects. Additional strategies need to be adopted in order to find stopped objects for the success of upper level are computationally complicated and can't be used period while not specialised hardware.

A.A. Shafie, Fadhlan Hafiz and M. H. Ali [2] presents an optical flow methodology is employed to detect human motion in static historical past. Optical glide gives an outline of movement, may be a treasured contribution to image interpretation despite the fact that no quantitative parameters are obtained from motion analysis.

Motion form recognition is primarily based on the subsequent records:

a) Translation at constant distance is delineated as a fixed of parallel movement vectors.
b) Translation intensive paperwork a set of vectors having a common recognition of enlargement.
c) Rotation at regular distance consequences in a set of concentric motion vector.
d) Rotation perpendicular to the view axis paperwork one or more units of vectors starting from instantly line segments. Actual dedication of rotation axes and translation trajectories may be computed, however with a significant boom in issue of analysis. Optical waft evaluation does now not result in motion trajectories instead, greater widespread motion properties are detected that could notably boom the reliability of complex dynamic picture evaluation. Optical float computation is based totally on assumptions:

1. The discovered brightness of any item factor is steady through the years.
2. Near points within the photograph aircraft flow in a comparable way.

The optical glide technique makes use of the motion goal of the vector traits which modified with time to stumble on motion region in image sequences. It offers better performance below the transferring digital camera, however this set of rules is very complex and complicated computation and additionally it needs unique hardware aid, so it's far hard to satisfy the necessities of real-time video processing. Optical float can arise from the relative movement of gadgets and the viewer so it can deliver essential records about the spatial association of the gadgets viewed and the rate of trade of this association. Discontinuities inside the optical float can help in segmenting photographs in to areas that correspond to exceptional gadgets.

Fan-Chieh Cheng and Shanq-Jang Ruan [3] proposes a motion detection method to extract moving objects using the Cauchy distribution with the proposed high-quality background model.

1) A self-adaptive background matching framework is proposed to select suitable background candidates of background model generation.
2) This conditional Cauchy distribution method is applied to extract moving objects of the video sequence.

Based on both qualitative and quantitative evaluations, experiments will verify that the proposed model is more efficient than other state-of-the-art methods in terms of motion detection in a wide range of real video sequences. It determines the suitable background regions where each pixel of the image is checked by the temporal matching method in the proposed background model at each frame. Subtracting the generated background model from each of the input frames and we can obtain the absolute differential values. This method attains the most satisfactory outcome based on the qualitative evaluation and quantitative measurement. It can also be easily implemented in embedded systems with the limited resources. The main disadvantage is for the indoor environments, the accuracy of the detection rate may be decreased when the moving object is slowing down or stopping.

III. PROPOSED SYSTEM

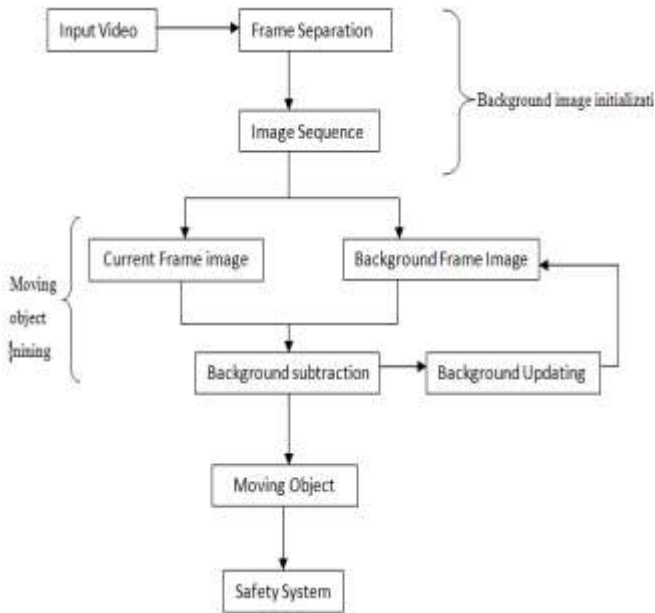In this work, the steps involved in the proposed methodology are shown in fig.1.

FIG.1 The Proposed Methodology

The proposed method contains four sections. They are:

- ❖ Background image initialization
- ❖ Moving object mining
- ❖ Motion detection
- ❖ Safety alarm

a) Background image initalization

In this section room is under the surveillance of camera. A camera is fitted in the room. The camera captures and stores the current backgrounds. This is how the image is captured and background image initialization is done. Background image initialization is done using first frame of the video.

b) Moving object mining

Background Subtraction algorithm is used for moving object mining. This technique involves subtracting an image that contains the object, with the background image. The area of the image where there is a significant difference within these images indicates the location of the moving objects. These objects, separated from the background image by using threshold technique. After the background image $B(l,m)$ is obtained, subtract the background image $B(l,m)$ from the current frame $Fk(l,m)$. If the pixel difference is greater than threshold value , then determines that the pixels appear in the moving object, otherwise, as the background . The moving object can be detected after threshold operation.
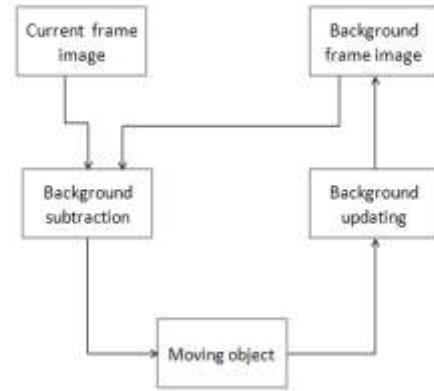

Fig.2 Moving object mining

c) Motion decteion

By the application of background subtraction algorithm, accurate edge regions could be attained. But the region belongs to the moving human body cannot be determined. By analyzing the features motion detection can be done by using the cascade algorithm. Cascade begins with reading the input image. Sum of pixels is found out and is converted into integral image. Selection window along the image is shifted and sum of black and white regions is calculated. Then the motion detection can be detected by using cascade classifier, is trained by using the different images. Based on trained set we can detect the motion.

d) Safety alarm

When the moving object is detected, an alert message is send to the android application. Through that the active mobile application we can control the secure place by generating safety alarm and we can trap the attacker by door locking.
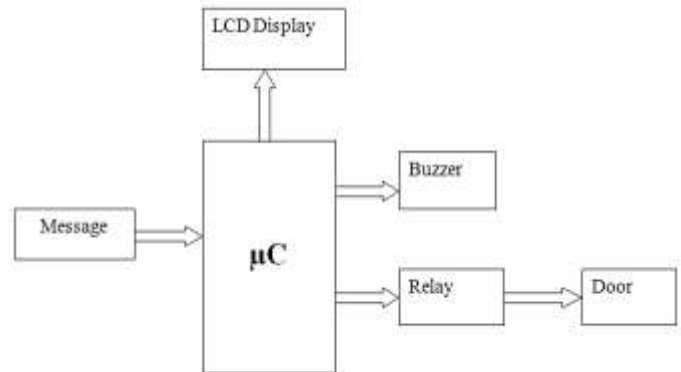

Fig.3 Safety alarm

IV. CONCLUSION

In this, we propose a secure environment for human motion detection that can be able to extract the complete picture of moving human body. Human motion analysis concerns with the detection of people from image sequences involving humans. Our proposed method of moving object detection will help us to find the moving object perfectly and accurately in the approved manner. To minimize the problems approaching in moving object detection, we use background subtraction technique. It is used to detect moving object. Cascade classifier is used to detect the human from the moving object. The proposed method is able to extract the complete and accurate picture of moving human body in low cost.

ACKNOWLEDGMENT

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