Real Time Movement Detection for Human Recognition

Jidnyasa H. Vartak, Sujala H. Narvekar, Ujwala R. Vartak

Prof. K. Tejaswi (guide)

Information Technology Department, Mumbai University
Atharva College of Engineering, Malad, Mumbai, India.

vartakjidnyasa18@gmail.com
sujalanarvekar@gmail.com
ujwalavartak21@gmail.com
tejaswiorama@gmail.com

***Abstract*— Traditional video surveillance takes a huge amount of storage space. Recording everything captured by a surveillance camera consumes excessively the storage space and hence limits the duration of video that can be stored. In addition, recording everything makes it time-consuming for a human to review the stored video. All these disadvantages limit the effectiveness of traditional video surveillance. To solve these problems recording only video that contains import this project uses a robust motion detection algorithm for real time motion detection by considering and information, i.e., video that contains motion in the scene. This can be done with a web camera and a HOG algorithm that detects object and a motion detection algorithm which is based on SAD (Sum of Absolute Difference). The correlation method used to classify the object as human or nonhuman gives the same performance level as the existing methods.**

***Keywords*— Surveillance, Motion Detection, video, object detection, tracking, illumination change, HOG.**

I. INTRODUCTION

Traditional video surveillance takes a huge amount of storage space. Recording everything captured by a surveillance camera consumes excessively the disadvantages limit the effectiveness of traditional video surveillance. To solve these problems recording only video that contains important information, i.e., video that contains motion in the scene. This can be done with a web camera and a motion detection algorithm that detects motion and HOG (Histograms of oriented Gradients) of algorithm that detects object. When the lighting condition changes, it is difficult to distinguish real motion from lighting changes. So an algorithm is developed that robustly distinguishes motion from lighting changes by removing the mean from the frame difference signal. Once the motion is detected, the object in motion is classified as human or nonhuman. This project uses a robust motion detection algorithm for real time motion detection by considering illumination changes also. Will activate a warning system and capture the live streaming video. Continuous scene monitoring applications, such as ATM booths, parking lots or traffic monitoring systems, generate large volumes of data. Recording Real-time detection of moving objects is very important for video surveillance and archiving such volumes of data is a real problem, and one way to solve this is to reduce the size of the data stream right at the source. And then final output will be sending on mobile through email and message system.

II. RELATED WORK

Human Motion Detection System can be used in surveillance and security systems. The system that this project came up with will be useful for security in a fixed restriction area. Therefore, the background of the targeted area is assumed to be non-moving and considerations of sudden change in lightings are ignored as well. However, the considerations of other factors are taken into consideration. Basically, the initial plan was to use a technique called image segmentation to abstract the foreground image from the source image obtained and later processed to filter out noises or small images disturbance. To perform this, we would use Open Source Computer Vision Libraries [7] from Intel to obtain contours from the foreground image subtracted. We will map these contours' pixels with the original images' to 3 send raw data into the other module of the project performed by our partner on classifying the image frame obtained on whether it's a human motion or not. His module would return a percentage of recognition rates on whether the motion belongs to human or not. Based on a level on acceptable percentage that it is sure it's a human motion, the program would detects and displays the motion with a bounding box on the human which is in a different colour to other moving objects that caused motion as well since all moving objects are bounded by the rectangles. The program will record down the scene when the motion event occurs.

III. CLASSIFICATION TECHNIQUES

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A. Haarcascade classifier:

Haarcascade classifier (namely a *cascade of boosted classifiers working with haar-like features*) is trained with a few hundred sample views of a particular object (i.e., a face or a car), called positive examples, that are scaled to the same size (say, 20x20), and negative examples - arbitrary images of the same size.

B. HOG (Histograms of oriented Gradients):

HOG features can be calculated from window region, then, the trained classifier can determine the corresponding window region is a person or not. Classified results rely on two key points, one is the selection of feature vector, and it is a critical factor of right classification. The second key point is the design of classifier. [2]

C. Login Form designing:

The Login form is designed to provide authentication. If the login is successfully done, then it will switch to next form i.e. Option Form, where we have three options-

- Motion Detection Form
- Image List Form
- Exit

In Motion Detection Form, the motion caused, if any, is analyzed and thus the indications are given to the authenticated person. In the second option, all the images can be viewed wherein we can see what all changes have been done and by whom. Whereas, the third option is the way to exit an application.

D. Camera Interfacing:

This form contains the list box where the lists of all the camera devices connected to the software are displayed. By default the first camera is selected, but we can select any of the available devices from the listbox .After the device is selected, the camera is interfaced through coding part. Then there is a button 'Activate Motion Detection', through which we can select the mode of our working and the application is set on.

E. Image Capturing & storage:

Whenever any changes between the two corresponding images have been detected, the application starts capturing the images and they are stored into the folder using AVICAP32.dll class. At the same time, a wireless signal is transmitted to the receiver through .Wave file.

AVI Cap routes video and audio stream data from a captured window to a file named CAPTURE.AVI in the root directory of the current drive. AVI Cap window class provides applications with a message-based interface to access video and waveform-audio acquisition hardware and to control the process of streaming video capture to disk. AVI Cap window is efficient enough to control the process of streaming video capture to disk.

F. *Motion Detection:*

The basic working of motion detection module is comparison between two images.

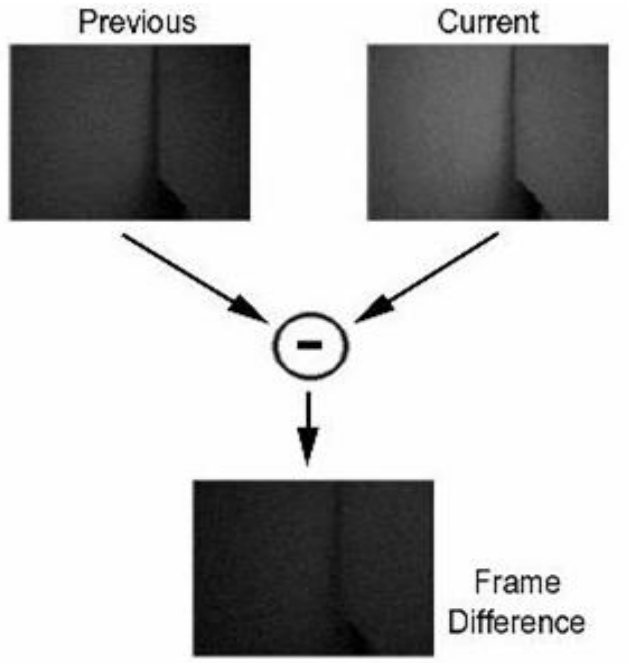

Fig: F. Comparison between two images.

The first image is the one when we activate the application and the second image is of the second instant of time. When the application recognizes any changes between two corresponding images, it calls the next module i.e. Image capturing, and if not, it keeps monitoring again.

G. *Hardware Interfacing:*

When the software will detect any movement or changes in the image, it will send a signal (hex value) to LPT port. A transmitter will be connected to the LPT port of the PC. The transmitter will transmit the signal to the receiver and it will play the buzzer at the receiver's end. Then the further actions will be taken by user.

H. System Overview:

Capturing the live video feed through a web cam: To detect motion first monitored and kept under surveillance have to be captured. This is done by using a web cam which continuously provides a sequence of video frames in a particular speed of FPS (frames per second). [4]

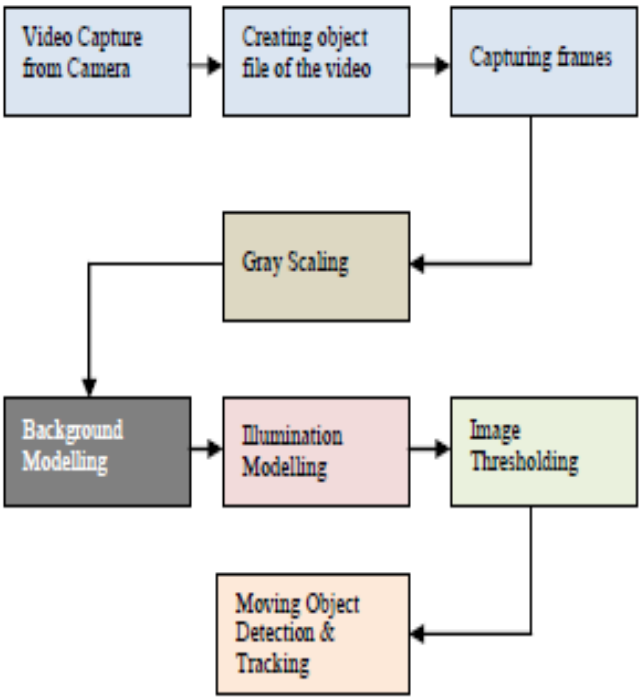

Fig: H. Block Diagram of System Overview

- Comparing the current frames captured with previous frames to detect motion: For checking whether any motion is present in the live video feed, the live video frames being provided by the web cam must be compared with each other by using motion detection algorithms block based SAD.
- Storing the frames on the memory if motion is detected: If motion is being detected, it is required to store such motion so that the user can view it in the near future. This also helps the user in providing a legal proof of some inappropriate activity since a video coverage can be used as a proof in the court of law.
- Human or Nonhuman recognition: Image processing is done on captured frames and object is identified as human or non human.

Indicating through SMS and alarm when the motion is detected: Once motion has been detected in the live stream, the software will activate a warning system and capture the live streaming video and creates an active alert by sending message to the cell phone. [4]

IV. CONCLUSION

The algorithm is going to implement in VB.net program. The size of the input video image is 352×288 pixels and the sample rate is 30 frames per second. In this project, a methodology is developed to detect the motion in a live streaming video and once motion has been detected in the live-stream, the software will activate a warning system and capture the live streaming video frames only in which motion is detected. So this reduces the total number of video frames to record. This saves the storage space required in the hard disk.

In future this can be done for real time systems and system can be developed to recognize human activities. Also once the object is classified as human or nonhuman, exact identification of nonhuman (whether it is a cat, dog, bike etc) can be done and face recognition of human can be done.

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