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MATLAB BASED INTELLIGENT VIDEO SURVEILLANCE SYSTEM

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Abstract— *Due to increase in criminal and terrorist activities, general social problems, providing the security to citizens, private places, public places has become more important. Therefore watch for 24*7 is required in area of automatic monitoring. The video surveillance system does this job as accurately as possible. The video surveillance system described here is interfacing of camera and alarm system with the computer. Here the video is taken from camera and the unwanted entities are identified using MATLAB and their actions are tracked and human is recognized using the database. In the paper we studied the different phases of the system with their detail explanations. By using the image background subtraction and Thresholding the blob is detected with the motion estimation. And using the Processed Histogram based face recognition algorithm the human feature extraction and human recognition is done by matching the features or histograms. And the final output is displayed on monitor and the alarm is raised.*

Keywords *- video surveillance, Background subtraction, feature extraction, human detection, ORL database*

I. INTRODUCTION

Security, Surveillance, General identity verification, Criminal justice systems, Image database investigations, Smart Card applications are important issues in today's world. The recent acts of terrorism require urgent need for efficient surveillance. Now a day surveillance systems use digital video recording (DVR) cameras which play host to multiple channels and the major drawbacks with this model is that it requires continuous manual monitoring and cost of manual labour. It is virtually impossible to search through recordings for important events in the past since that would require a playback of the entire duration of video footage. Hence, there is a need for an automated system for video surveillance which can detect unusual activities on its own.

The objective is to identify and track a moving object within a video sequence and recognize the presence of humans and track them. It is also desirable that the machine be able to adapt its response to cues even when specific commands are not present. This will make the machine "INTELLIGENT." And also interpret the motion of the object or human moving in video that is motion estimation of human moving in surveillance area.

The main tasks of human recognition are document control, access control and database retrieval. The document control is the verification of a human by comparison his/her actual camera image with a document image. Access control is the most investigated task such systems compare the portrait of a tested person with photos of people who have access permissions to joint used object. The database retrieval task arises when it is necessary to determine name and other information about a person. Because of great difference between the tasks there is not a universal approach or algorithm for face recognition.

II. LITERATURE REVIEW

This describes the general information about human detection and tracking system and gives the information about related work and the summary of related work.

The 1GSS, (1960-1980) were based on analog sub systems for image acquisition, transmission and processing. The drawbacks like requiring high bandwidth and retrieval of events due to large number of video tape requirements and difficult online event detection which only depended on human operators with limited attention span. The 2GSS, (1980-2000) were used both analog and digital sub systems to resolve some drawbacks of its predecessors. Most of the work during 2GSS is focused on real-time event detection. Third generation surveillance systems (3GSS), (2000-till now) provide end-to-end digital systems in which the Image acquisition and processing at the sensor level and communication through mobile and fixed heterogeneous broadband networks and image storage at the central servers benefit from low cost digital infrastructure. The ultimate goal of 3GSS is to allow video data to be used for online alarm generation to assist human operators and for offline inspection effectively.[1-2]

The history about image processing and remote monitoring and we will see the past few years, significant research carried out for developing intelligent human machine interaction (HMI). Natural language understanding, knowledge databases, sophisticated tools for reasoning have all contributed towards the goal of designing machines that behave more human like. A truly intelligent machine should be able to extract information from the environment that it is

embedded in, without the need for any external agent to supply this information. The key aspect to interact in a human inhabited environment is the ability of a machine to recognize humans and their activities.

CCTV was first utilized by the US Military in the 1940s for the testing of the V2 missile in order to safely monitor the tests. Siemens AG at Test Stand VII in Peenemunde, Germany (1942), for observing the launch of V-2 rockets first Video Surveillance System was installed. Outside government special facilities, it was developed initially as a means of increasing security in banks. In 1960s, officials in the UK began installing CCTV systems in public places. In 1970s and 1980s led to several larger trial programs later that decade. In 1996, government spending on CCTV technology accounted for three quarters of the crime prevention budget in the UK. In 1969 the first CCTV system set up in a public building was in the New York City Municipal building and spread to other cities and was soon widely implemented. In the 1970s and 80s, CCTV use became more common in establishments prone to security threats, like banks, stores, gas stations. In 1993 after the terrorist attack Security cameras were installed in the World Trade Center as a preventative. By mid-90s, ATMs across the country were commonly equipped with CCTV cameras, and many retail stores. Today in Britain, CCTV cameras monitor road, sidewalk, squares in city centres, rail stations and buses, as well as in other businesses.

III. PROPOSED SYSTEM

A. *General Block Diagram*

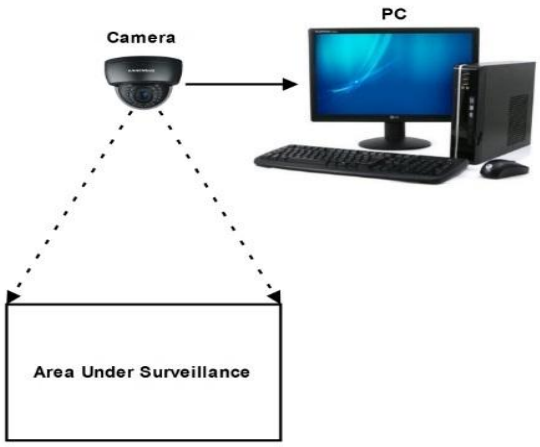

Fig.1 Block Diagram

Cameras are literally the eyes of a video surveillance system and cameras should be deployed in critical areas to capture relevant video. Cameras are almost always connected to video management systems for the purpose of recording and managing access to video. Camera is interfaced with machine with MATALB software for the analysis and operation on video for human detection and tracking and then motion estimation.

B. *General Flowchart of System*

1) Camera Interface

Cameras should be deployed in critical areas to capture relevant video. Computer and camera are interfaced and here webcam is used.

2) Frame Extraction

Frames are extracted from video input. The video must be divided into sequence of images which are further processed. The speed at which a video must be divided into images depends on the implementation of individuals. From we can say that, mostly 20-30 frames are taken per second which are sent to the next phases.

3) Image Enhancement

In that we will enhance the different features of images we get for example its intensity, contrast, saturation for different image processing. Low pass-filters a grayscale image that has been degraded by constant power additive noise. It uses a pixel wise adaptive Wiener method based on statistics estimated from a local neighbourhood of each pixel.

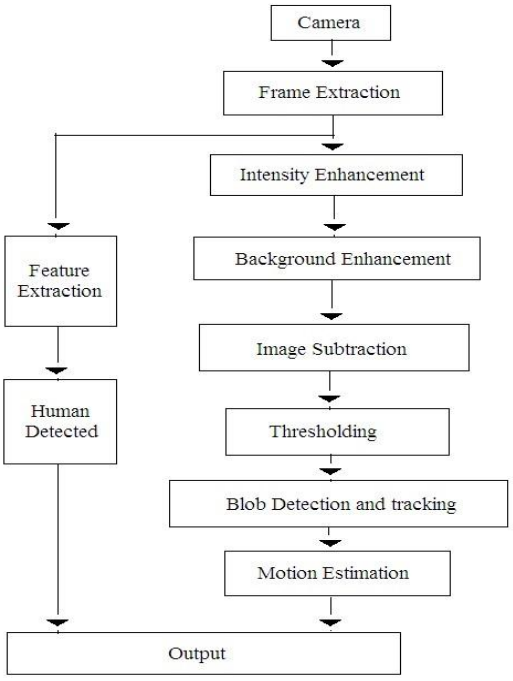

Fig.2 General Flowchart of System

4) Background image subtraction and feature extraction and detection

The Background subtraction approach is mostly used when the background is static. The principle of this method is to use a model of the background and compare the current image with a reference. The foreground objects present in the scene are detected. It attempts to detect moving regions in an image by differencing between current image and a reference background image in a pixel-by-pixel fashion. We will use the static background for the image subtraction which will give us the human we have to track. This step detects objects of interest as they move about the scene. The object detection process is independently applied to all the static cameras present in the scene. For human recognition is feature extraction and representation where the important characteristics of image frames are extracted and represented in a systematically way as features. [6,7]

5) Thresholding

The most common method for static camera segmentation is background subtraction. The background model contains only the stationary background scene without any foreground object, and any image change is assumed to be caused only by moving objects therefore the foreground object can be obtained by subtracting the current image of the background image, followed by a magnitude thresholding to obtain the segmentation mask often contains rough and fractional foreground object(s) and usually requires some post-processing, such as closing and opening morphological operations.

6) Tracking

Human tracking means deriving a correspondence of the object detected in one frame with the object detected in the next frame. If a correspondence is found than we can say that the object found in the previous and the current frame is the same and it can be marked with the same colour rectangle as the previous object was marked with. Few features of the object detected in the previous frame are stored and the features are then matched with the object detected in the current frame. If they match, then the object detected in the current and the previous frame are said to be the same. Features can be colour, orientation, speed, posture, speed, intensity or any other information that can be obtained from a pixel.[4]

7) Motion Estimation

By using the Voting-Based Motion Estimation for Real-Time Video Transmission.[3]

8) Face Recognition

Recognizing objects from large image database the histogram based methods have proved simplicity and usefulness. For training, grayscale images are used in that firstly, frequency of every gray-level is computed and stored in vectors.

Secondly, mean of consecutive nine frequencies from the stored vectors is calculated and are stored in another vectors used in testing phase. Which is used for calculating the absolute differences among the mean of trained images and the test image and the finally the minimum difference found identifies the matched class with test image.

IV. EXPERIMENTAL RESULTS

Experimental results show that the video is taken for further processing as shown in figure 3. (i.e. In our demo from the Webcam of laptop).

Fig. 3 Video Input From Camera with 320*240 resolution

In figure 4 the background image is set then converted to HSV colour model after blurring of input frame then subtracted by background frame by giving threshold and blob is detected.

Then after that by getting the input image and by matching the features of that image to database image can detects the human or can identify the person as shown in the figure 5.

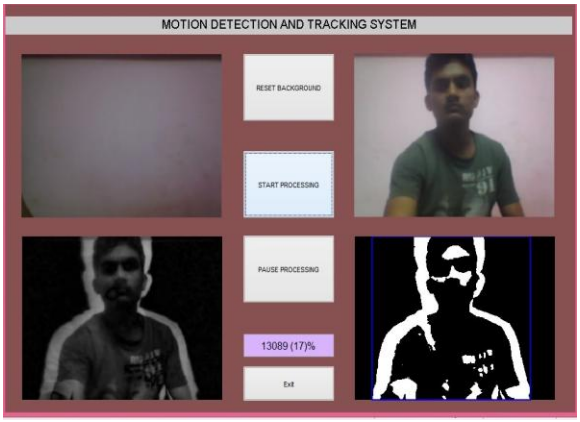

Fig. 4 Human is detected (i.e Blob is detected)

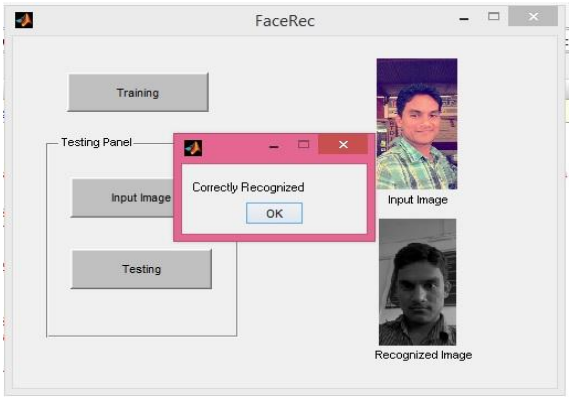

Fig. 5 Human detection is done by processed histogram algorithm

V. CONCLUSION

Blob analysis is done on the segmented background and a dynamic tracking algorithm is devised for tracking the blobs even under occlusion. The system is simple and computationally less intensive as it avoids the use of expensive filters while achieving better detection results. Recognizing objects from large image databases, histogram based methods proved simplicity and usefulness.

It can be modified to differentiate different class objects in real time video and considered static background; in future it can be enhanced for changing/non-static background and can improve the face or human detection algorithm.

REFERENCES

[1] Helly Patel, Mahesh P. Wankhade, Human Tracking in Video Surveillance. In International Journal of Emerging Technology and Advanced Engineering, ISSN 2250-2459, , December 2011, Volume 1, Issue 2

[2] Ling Shao, Simon Jones, And Xuelong Li, Efficient Search And Localization Of Human Actions In Video Databases. IEEE Transactions On Circuits And Systems For Video Technology, Vol. 24, No. 3, March 2014

[3] Feng-Li Lian, Yi-Chun Lin, Chien-Ting Kuo, and Jong-Hann Jean, Voting-Based Motion Estimation for Real-Time Video Transmission in Networked Mobile Camera Systems. IEEE Transactions On Industrial Informatics, Vol. 9, No. 1, February 2013

[4] Wren, C.R.,Azarbayejani, A., Darrell, T., Pentland, A.P. Pfinder: Real-time tracking of the human body. IEEE Trans Pattern Anal. Mach. Intell. 1997, 19, 780–785.

[5] Cucchiara, R.; Grana, C.; Piccardi, M.; Prati, A. Detecting moving objects, ghosts, and shadows in video streams. IEEE Trans. Pattern Anal. Mach. Intell. 2003, 25, 1337–1342.

[6] Seki, M.; Fujiwara, H.; Sumi, K. A Robust Background Subtraction Method for Changing Background. In Proceedings of Fifth IEEE Workshop on Applications of Computer Vision, Palm Springs, CA, USA, 4–6 December 2000; pp. 207–213.

[7] Piccardi, M. Background Subtraction Techniques: A Review. In Proceedings of IEEE International Conference on Systems, Man and Cybernetics, The Hague, The Netherlands, 10–13 October 2004; Volume 4, pp. 3099–3104.

[8] Kumari, S.; Mitra, S.K. Human Action Recognition Using DFT. In Proceedings of the third IEEE National Conference on Computer Vision, Pattern Recognition, Image Processing and Graphics (NCVPRIPG), Hubli, India, 15–17 December 2011; pp. 239–242.

