Human Detection using Image Processing

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Abstract— Human sensing also called human detection or human presence detection. Human detection and tracking is one of the most popular area of video processing and the essential requirement of any surveillance system. In this paper we have used image segmentation technique for human detection. Performance enhancement of human detection based on visible light camera is limited, because of factors, such as non-uniform illumination, shadows and low external light in evening and night. Human sensing encompasses a range of technologies for detecting the presence of human body in an area of space, typically without the intentional participation of the detected person. Human detection is a new rising research area, involving pattern recognition, image processing, computer vision, human kinematics, artificial intelligence and machine learning and so on. In human detection face detection, head detection etc. involved. Head can be recognized by computer easily. The first feature selected by a robust and efficient human body human body detection system must be head features. Nowadays, the human body detection based on head feature is widely used in intelligent control, human computer dialog, predestrian detection, discater rescue and so on.

Key words: Human Detection, Tracking, Image Processing, Thermal Camera Image, Generation of Background Image

I. INTRODUCTION

Detection of moving object in an image sequences is crucial issue of moving video. Presence of ego motion is the very common difficulty in detection of human or object. We solve it by computing the dominant motion. Visual surveillance is a very active research area in computer vision. The use of this concept in surveillance for security, fight against terrorism and crime. The main task includes motion detection, object classification tracking activity. The detection of moving objects in video streams is the first relevant step of information extraction in many computer vision applications. The important information of move, location, speed and any desired information of target from the captured frames can be taken from the camera and can be transferred transferred to the analysis part of the system. Movement detection is one of these intelligent systems to which detect and tracks moving targets. There are different methods to detect moving objects but these methods having some limitations for real time application. Feature extraction is considered to be a key in many applications such as Biometrics, Facial recognition systems, video surveillance, Human human computer interface etc.

Therefore reliable face detection is required for the success of these applications. Face recognition systems are generally conceived as image processing systems that try to capture the identity behind the running video images and tag them with an identity to complete this process. Recognition of images are performed through a pair of pictures using pattern matching of images belonging to the same individual or performing face identification or recognition wherein it puts a label on an unknown face with respect to some training set . In this paper, we address how the same kind of detection and recognition can be utilized in campus surveillance. In modern day college or school premises, there is an increasingly high demand in the need of technology based monitoring. It creates a platform for an image processed detection to filter out unwanted and undesired individuals, by firing out warning messages to the user via an on-screen tagging that displays strangers and other unknown individuals as "Unknown" and helps in checking unauthorized individuals from gaining access to private data.

In computer vision, detecting motion and tracking of an object is catching more interest of researchers. Real time object tracking is becoming a challenging ingredient in analysis of video imagery which is important in efficient and robust object tracking. Most video processing applications require object tracking as it is the base operation for real-time implementations such as surveillance, monitoring and video compression. Also, object recognition and tracking are the key operations in most of the security systems. In various security related systems like military applications where very tight security is necessary, intrusion detection is very important. Intrusion detection is a task of detecting inappropriate or anomalous activity. Intrusion detection is a process of monitoring and analyzing the events to detect signs of security problems. Intrusion detection is the most essential part of the security infrastructure.

Intrusion detection system must reliably detect malicious activities. In order to have a good security or surveillance system, moving object recognition and tracking should be efficient. This paper reviews various attempts made to have better surveillance and security systems[3].

II. BLOCK DIAGRAM

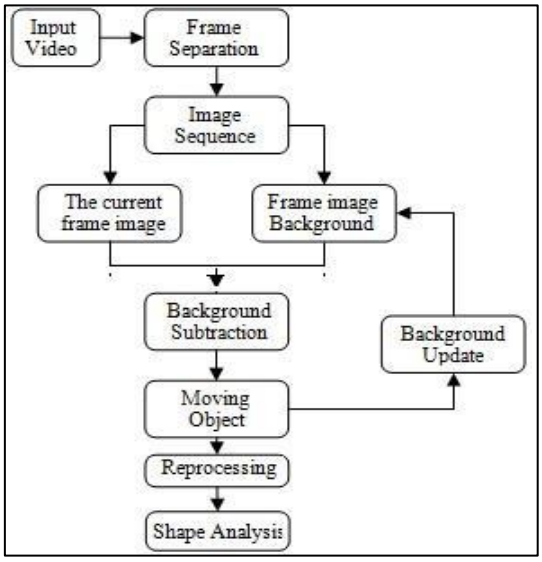

Fig. 1: Image Detection

- First we are taking one video file as input then we are going to convert video to "n number of frames" by using MATLAB and save the frames in any format with proper name. Here we do 30 frames of taken video. By subtracting background image from current image we get difference.
- Image before background subtraction we have to convert every current image from RGB to Grey scale.
- For this difference image we apply thresholding as follows Difference image>35=1 otherwise for dynamic thresholding, Difference image >100=1.
- After background subtraction we are going to update the current image by using loop Fn.
- Then we are applying the median filter for noise suppression. Using Morphological functions we track object. If the background image and current image is similar means no moving object detected or moving object detected. For more than one object we use different outbox of different colors to track them. In validation by comparing Ground Truth image with our output image we estimate the parameters like MSE, Entropy, Precision, PSNR etc.

III. WORKING

Background subtraction means we just subtract the current image and background image, and the current image is updated in each and every time, background image is constant. By using these technique we can easily find the moving object. For *ex*. background image pixel – current image pixel if the output is 0 means no moving object detected. If the output is 1 means moving object detected.

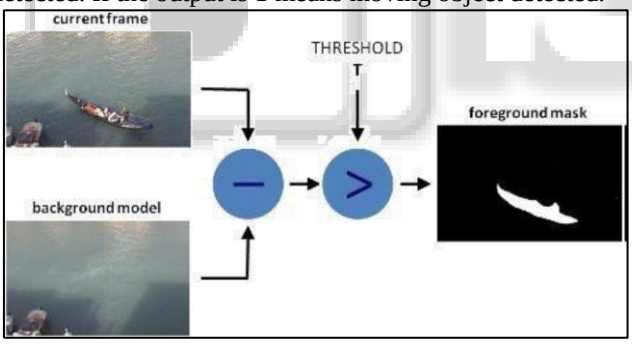

Fig. 2.1: Background Subtraction

Fig. 2.2: Backgroung Subtraction Image

A background subtraction approach usually considers three main issues:

1) Background representation
2) Background updating
3) Background initialization

A. Background Image Initialization

There are many methods to get initial background image. Time average method cannot deal with image shadow problems. While the method of taking the median from continuous multi frame can resolve this problem simply and effectively. So the median method is selected for background initialization.

B. Background Update

For the background model can better adapt to light changes the background needs to be updated in real time, so as to accurately extract the moving object. The camera is fixed; the background model can remain relatively stable in the long period of time. At this stage we can effectively avoid the unexpected phenomenon of the background, such as the sudden appearance of something in the background which is not included in the original background. Moreover by the update of pixel gray value of the background, the impact brought by light, weather and other changes in the external environment can be effectively adapted.

C. Moving Object Extraction

To extract moving object dynamic threshold method is suitable by using dynamically changed threshold values according to lighting changes of the two images .This method effectively suppressed the effect of light changes.

IV. REPROCESSING:

As the complexity of the background, the difference image obtained contains the motion region, additionally it also contains large number of noise. Therefore, noise needs to be removed. After the median filter, in addition the motion region, includes not only body parts, but also may include moving cars, flying birds, flowing clouds and swaying trees and other nobody parts. Morphological methods are used for further processing. Firstly, corrosion operation is taken too effectively to filter out non-human activity areas. Secondly, using the expansion operation to filter out most of the non-body motion regions while preserving the s hape of human motion without injury. After expansion and corrosion operations, some isolated spots of the image and some interference of small pieces are eliminated, and we get more accurate human motion region.

V. EXTRACTION OF MOVING HUMAN BODY

After median filtering and morphological operations, some accurate edge regions will be got, but the region belongs to the moving human body could not be determined. Also it is seen that while moving object appears shadow will also appear in some region of scene. It will affect to accuracy of moving object detection. By using vertical and horizontal projection to detect the height of motion region. This will help to eliminate the impact of the shadow up to certain degree. Human body detection is to identify the corresponding part of part of human from the moving region. But the extract moving region may correspond to different moving objects, such as pedestrians, vehicles and other such birds, floating clouds, the Swaying tree and other moving objects. Hence we use the shape features of motion regions to further determine

whether the moving object is a human being. Judging criteria are as follows:

1) The object area is larger than the set threshold.
2) The aspect ratio of the object region should conform to the set ratio. If these two conditions are met, the moving object is the moving human body, or is not a human body.

VI. ADVANCED METHOD USED FOR MOVEMENT DETECTION

This paper describes system for human detection, tracking and motion Analysis. The system is an automated video surveillance system for detecting and monitoring people in both indoor and outdoor environments. Detection and tracking are achieved through several steps: First, we design a robust, adaptive background model that can deal with lightning changes, long term changes in the scene and objects occlusions. This model is used to get foreground pixels using the background subtraction method. Afterwards, noise cleaning and object detection are applied, followed by human modeling to recognize and monitor human activity in the scene such as human walking or running.

Techniques Used:

1) Motion Detection
2) Tracking
3) Human Model
4) Surveillance
5) Motion Analysis
6) Image Processing

A. Motion Detection

Motion detection is basically the process of comparing sequential images and determining whether the difference between them represent motion. Motion detection is usually a software based monitoring algorithm which, when it detects motions will signal the surveillance camera to being capturing the event also called activity detection. An advanced motion detection surveillance system can analyze the type of motion to see if it warrants an alarm.

Fig: Detect a face to track

B. Track the Face

The face can be track by the use of feature.

In face tracking includes:

- Face Frame Object
- Face Frame Result Object
- Face Frame Data
- Bounding Box Data
- Point Data
- Face Rotation Quaternion
- Face Properties
- Data Base Files

Fig. 3: Face Tracking

C. Human Model

There is a large collection of literature on human modeling. Most models employ part based representation to the handle articulation. They vary widely in their level of detail. At one extreme are methods that crudely model the body as a collection of articulated planar patches.

VII. ADVANTAGES

1) Can detect object without a background image.
2) It gives high number of algorithms to be used with input data.
3) We can avoid some processing problems such as creating noise and signal distortion during signal processing.
4) Obtained by adaptively determining the thresholds and parameters for detection considering background information.
5) Correct image density and contrast.
   Image can be available in any desired formats like black and white, negative image.

VIII. LIMITATIONS

1) Requires significant processing time to detect the human area in the entire image by scanning.
2) Initial cost is high depending upon the system used.

IX. FUTURE SCOPE

Image Processing has already begun to move our world. Future work will be directed towards achieving the following issues: Object classifications, Better understanding of human motion not only vehicle, including segmentation and tracking of articulated body parts.

X. CONCLUSION

In this paper we have proposed an automatic multiple human detection and tracking technique using Haar Iike features and a simple particle filter. The human detector can easily be

trained using the Haar-like features extracted from the training samples consisting of the images of the humans and the background. The operation of the proposed technique is fully automatic and does not require any operator intervention unlike other methods. The proposed system is based on the modeling of the structure of the scene. The quality of the detection is improved when the background is highly texture .Therefore in our future works we will use this modeling method in our object tracking system for tracking rigid and non –rigid movement object.

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