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REVIEW PAPER ON VIDEO IMAGE ENHANCEMENT AND OBJECT TRACKING IN LOW RESOLUTION

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Abstract: To develop the real world computer vision system automatic detection of moving objects in video images is very important the automatic detection of moving objects in monitoring system needs efficient algorithm. The simple background subtraction i.e. subtract current image from background but it can't detect the difference when brightness difference between background and moving objects is small. The other approach as color based subtraction technique but the costs are very high and have problem in stability. Here a method is proposed to detect moving objects using difference of two consecutive frames. The objective is to provide software that can be used on a pc for performing tracking long with video enhancement using bilinear interpolation. This project is able to track moving objects and it is structured as different blocks work together. Initially the contrast of the extracted frames of the video sequence and spatial resolution are enhanced. The position of object is now marked manually. The results provide both the accuracy and processing speed are very promising.

Keywords: Object detection, Object representation, Tracking Object, Shape tracking, motion estimation

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INTRODUCTION

Detection of moving objects in video images is one of the most important and fundamental technologies to develop the real world computer vision systems, such as video monitoring system, intrusion surveillance, intelligent-highway system etc. Traditionally the most important task of monitoring safety is based on human visual observation, which is a hard work for watchmen. Therefore, the automatic detection of moving objects is required in the monitoring system that can help a human operator even if it cannot completely replace the human's presence. To facilitate a monitoring system efficient algorithm for detecting moving objects in video images need to be used. The gradual illumination changes sudden changes in illumination and other scene parameters alter the appearance of the background.

In region-based approaches, the user initially defines the video object. Video sequences are then segmented using a segmentation tool like the watershed transformation. The segmented regions in consecutive frames are established and this enables tracking of the video object in subsequent frames.

Video segmentation is needed to enable subsequent processing operations on video shots such as video indexing, or tracking of selected video information, semantic representation After segmentation into shots, video indexing can be performed to facilitate a compact representation of information in each video shot, to be used for later retrieval.

II. LITERATURE REVIEW

This section describes related search on the development of object tacking under the various conditions.

karthik Hariharakrishnan*, Dan Schonfeld*, Philippe Raffy**, Fathy Yassa***Multimedia Communications Lab, UIC, IL60607 "Object Tracking Using Adaptive Block Matching" [1]. The object tracking algorithm introduced by an author provide the object contour using motion vector information. Tracking is achieved by specisl knowledge of object boundary using motion vectors followed by contour update using occlusions/disocclusion detection. An adaptive block-based approach has been used for estimating motion between the frames. An effective modulation scheme is used to control the gap between frames used for object tracking.

Kalpesh R. Jadav, M. A. Lokhandwala, and A. P. Gharge proposed "Vision based moving object detection and tracking" [2]. To detect and track the moving object is often the first step in applications such as video surveillance. A moving object detection and tracking system with a static camera has been developed to estimate velocity, distance parameters. In general a

moving object detection and tracking is based on vision system using image difference algorithm with matlab software. Author could calculate distance, frame per time, velocity .In this paper author estimate the position of moving people and velocity also. It describes an algorithm to estimate Moving object velocity using image processing technique from the camera calibration parameters and matlab software.

Arnab Roy, Sanket Shinde and Kyoung-Don Kang proposed "An Approach for Efficient Real Time Moving Object Detection" [3]. Author implemented his approach using a low resolution webcam in a commodity laptop with no special hardware for high speed image processing. He compared the performance of his approaches to the well-known background modeling technique. his approach reduce the average delay for moving object detection by up to 45.5% and decrease the memory consumption by up to approximately 14%, while supporting equally accurate detection.

Purandhar Reddy proposed "Object Tracking Based on Pattern Matching" [4]. Author proposed an algorithm for object reorganization and tracking in video pictures which is based on edge detection, object extraction and pattern matching. Using edge detection results of successive frames, author exploit pattern matching in a simple feature space for tracking of the objects. Consequently, the proposed algorithm can be applied to single as well as multiple moving objects and still objects even in the case of a moving camera.

Dr. M. Hemalatha and S. Kavitha proposed "A System for Dissecting the Video for Tracing Multiple Humans in Multifaceted Situation" [5]. Author propose a new method to recognize walking using motion template and temporal integration in which Segmenting and tracking multiple humans is a challenging problem in complex situations in which extended occlusion, shadow and/or reflection exists. Author proposed two stages, segmentation (detection) and tracking. Human hypotheses are created by shape analysis of the foreground blobs using a human like model. The segmented human hypotheses are tracked with a Kalman filter with explicit handling of occlusion. Hypotheses are verified while they are tracked for the first second or so. The verification is done by speed of human walk recognition using an articulated human walking model.

Michalis K. Titsias proposed "Matlab toolbox for learning object models from video" [6]. Matlab toolbox provides information for using it for learning layered object models from a video which is publically available. The theoretical foundations of the algorithm used in the software can be found. A complete description of the algorithm can be also found. The toolbox consists of a set

of matlab functions. To run this software you need to have installed a recent version of matlab together with the image processing toolbox.

Bhavana C. Bendale and Anil R. Karwankar proposed "Moving Object Tracking in Video Using MATLAB" [7]. A method praposed for tracking moving objects from a sequence of video frame. Also this method is implemented by using optical flow (Horn- Schunck) in matlab simulink. It has a variety of application, some of which are: HMI (human macchin interaction), security for surveillance system, communication and video compression, watch reality, traffic control system, medical imaging(MRI) and video editing porpose.

III. PROPOSED TECHNIQUES

Detection of moving objects in video images is one of the most important and fundamental technologies to develop the real world computer vision systems, such as video monitoring system with intelligent surveillance and intrusion surveillance etc. Mostly the important task of monitoring safety is based on human visual observation, which is a hard work for watchmen. Therefore, the automatic detection of moving objects is required in the monitoring system that can help a human operator, even it is not possible to replace the human's presence in system. To facilitate a monitoring system, efficient algorithms for detecting moving objects in video images need to be used.

Motion	**Model**	**Object**	**Model**
Estimation	**Fnizializaiion**	**Tracking**	**Updazuig**

Motion	***I Region***
Segmentation	***Merging***

Moving Object Detection ***Moving Object Tracking***

Fig 3.1 General Model for object detection and tracking

The usual method for detecting moving objects is simple background subtraction that is to subtract current image from background image. However, there find a gradual illumination changes, sudden changes in illumination and other scene parameters alter the appearance of

the background. Simple background subtraction is susceptible to these changes. And when the brightness difference between moving objects and the background is less than actual, it cannot detect the difference. In order to resolve these problems, some algorithms such as color based subtraction technique and the technique based on optical flows have been proposed. But the computational costs of these methods are very high and have problem in stability. The other commonly used method for moving objects detection is frame difference. Moving objects are detected from the difference of two consecutive frames. This approach uses the motion to distinguish moving objects from the background. So it is more efficient than the previous approaches. Frame difference approach is robust to environmental changes, however, unable to detect motionless objects .Currently, all the systems using frame difference approach to detect moving objects, in which, the subtraction is done pixel-wise in luminance on the whole image, even though the object moves in relatively local range. In fact, instead of processing a whole image, only the neighborhood area around the moving object needs to be processed. So computation time can be reduced. In this, a real-time algorithm for detecting moving objects in the image sequence is proposed, which integrates the region-based frame difference with adjusted background Subtraction. In our system, images are captured with a stationary camera. The region-based frame difference is used to extract the moving objects and the adjusted background subtraction is used to get the motionless foreground objects in the scene. The experiment results demonstrate that both the accuracy and processing speed are very promising. Furthermore, the algorithm is robust to the changes of lighting condition and camera noise.

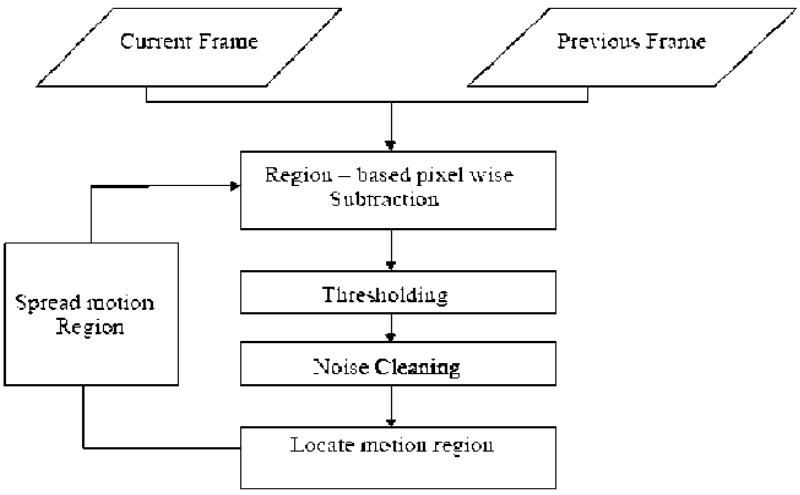

Fig 3.2 Block Diagram showing Object Tracking Algorithm

The process sequence of the algorithm is shown in Fig. The algorithm is based on a region-based frame difference motion detection technique and adjusted background subtraction. The purpose is to indicate the position of moving object in a video frame. By utilizing the region-based frame difference, it detects motion in the scene, and furthermore, it determines the position of moving regions. A good detection and location algorithm should be able to detect and track the suspicious objects even when they stop. So by utilizing the adjusted background subtraction, the algorithm can also detect motionless foreground objects in the scene. By using the algorithm, the moving and still objects in video images can all be detected and located.

3.1 Region-based Frame Difference

The first process of the proposed algorithm is the detection of moving objects. Frame difference technique is used, which is simple and still powerful enough, to discriminate between moving and non-moving objects. The frame difference method is simply finding the absolute difference between two consecutive frames of images. In stream video sequences, the frame rate is more than one frame per second. Thus, if there is any object that is in motion, it will have a slight position change and the maximum change will occur at the edges of the image since the discontinuity points are there. Suppose that the intensity of a pixel at location (x, y) and time f is represented by f (x, y, t). Then the difference of two consecutive frames can be represented as.

$$D(x,y,t) = f(x,y,t) - f(x,y,t+1)$$

The noise occurring in D (x, y, t) is removed by convolving it with gaussian low pass filter. Since noise is made up of high frequency components, so most of noise is removed by this filter. After that thresholding is done that means selecting maximum value pixel out of all pixels and making it 1, rest are made 0. In this way coordinates of point that is one are found out and hence object is located. After that region of interest is marked around that point and in next iteration it is expected that object will be located within that region here we assumed motion of object is smooth and not abrupt. Therefore the coordinates of object within region of interest are taken as center for marking region of interest for anther iteration. This procedure continues and with each consecutive iteration the object is always tracked.

IV. CONCLUSION

In our paper, Moving object tracking is a necessary task in video monitoring and motion estimation applications. Object detecting and tracking of a image has a huge range of applications in vision-based control, computer vision such as human-computer interfaces,

augmented reality, and robotics in industries and medical imaging. Additionally, it provides input to higher level vision tasks, such as image reconstruction and representation. It also plays an important role in video compression and surveillance database such as content-based indexing and retrieval in image detection.

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