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AN EFFICIENT DETECTION APPROACH FOR VISUAL SURVEILLANCE SYSTEM USING MORPHOLOGY

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ABSTRACT: Now-a-days for an intelligent surveillance system, identification of an object from a video has attracted a great deal of interest. Some segmentation techniques are needed to perform to detect an object from a video. Two essential building block of smart surveillance system in real time application are object segmentation and object detection. This method is proposed on a multi object moving background based on morphological technique and cellular automata based segmentation. The video is preprocessed before segmentation. Motion segmentation is done to segment an object from a video. In this, a Morphological operation is proposed to remove unwanted object motion and enhance the segmentation result. This result is then used for object identification. Cellular automata based segmentation is performed to detect particular object from a video. This method can detect any object at any drastic change in illumination.

Keywords: Surveillance, Morphology, Cellular automata.

I. INTRODUCTION

Object tracking in real time application such as traffic monitoring, surveillance system becomes a critical task. Several methods are implemented for efficient tracking of the moving object. Object tracking can be defined as the process of segmenting an object of interest from a video scene and keeping track of its motion, orientation, occlusion etc., in order to extract useful information. Detection of moving objects in video streams is the first relevant step of information extraction in many computer vision applications, including traffic monitoring, automated remote video surveillance, and people tracking.

II RELATED WORK

Moving object detection from a video finds important application in many fields. Most previous works on moving object detection are reviewed. In [1], a fast video segmentation algorithm is proposed and it operates on four modes such as baseline mode, baseline mode, shadow cancellation mode, global motion compensation mode and adaptive threshold mode. With change detection and background registration techniques, this algorithm can give satisfying segmentation results with low computation load. Shadow cancellation mode can deal with light changing effect and shadow effect. Baseline mode can operate in still camera situation. Global motion compensation mode can deal with slight camera situation. Adaptive threshold mode can operate well in all the modes. The main drawback in this paper is switching of modes are done manually. Shadow cancellation cannot deal with strong light source. In paper [2], tracking an object is based on descriptors. It automatically tracks an object by using a compact piece of information about region and objects. In this shadow is

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tracked as a new object because no shadow cancellation technique is used. In [3], background registration; preprocessing is done by gradient filter. Benefits of gradient filter reduce if shadows appear in strong texture, some information will loss if object has weak edges. In [4], Adaptive filter algorithm is used. Main problem occurs due to background clutter. In [5], Differential earth mover distance algorithm is used in this large object motions cannot be handled well and occur local minima problem. In [6], color information is used for background subtraction and shadow detection. This method fails to adapt dynamic background situation. In [7], gradient descent optimization technique, Kalman filter is used for object detection. Segmentation result is inaccurate when the objects are in large motion. In the proposed method two techniques are used such as morphological technique which enhances the segmentation result. Cellular automata based segmentation is proposed to track a particular object from the video.

III.PROPOSED WORK

The aim of the work is to detect a moving object from a video. In the proposed method object tracking is done efficiently by using cellular automata based segmentation.

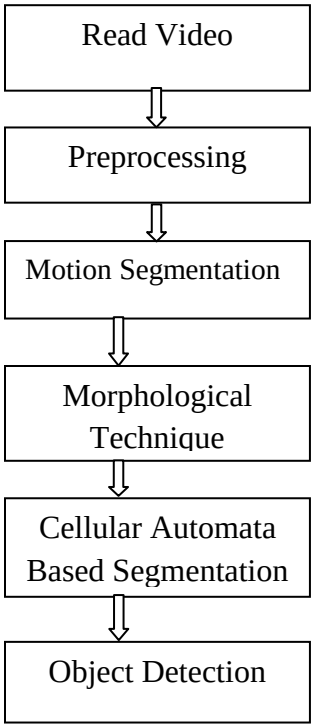

Fig. 1 Block Diagram of proposed model

Preprocessing: Preprocessing is a step done prior to segmentation to remove noise. In this the in- put video is remodeled for further operations in object tracking from a video sequence. In this method preprocessing is done by the method called Bicubic interpolation. It is a smoothening process. The input frames are enlarged to find some pixel values. If any Pixel value is missing then based on the adjacent pixel value it recovers the missing pixel value.

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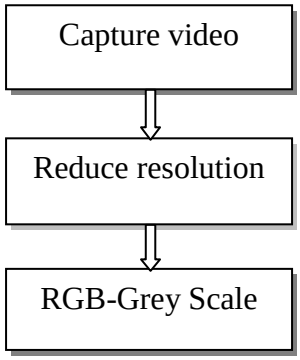

Fig. 2 Preprocessing

Resolution is reduced from the input video in order to reduce complexity in further operations. RGB is converted to grey scale value. Preprocessing is done to provide the required data for motion segmentation. It removes noises in the original input video. In preprocessing, first the image is resized by using Bicubic interpolation method. Interpolation is the process used to estimate an image value at a location in between image pixels. Image resizing enlarges an image; the output image contains more pixels than the original image. The image resize function uses interpolation to determine the values for the additional pixels. After resizing, the RGB image is converted into gray scale by eliminating the hue and saturation information. Bicubic interpolation is an extension of cubic interpolation for interpolating data points on a two dimensional regular grid. The interpolated surface is smoother than corresponding surfaces obtained by bilinear interpolation

Method for segmentation: Motion segmentation is mainly done to obtain motion vectors. In this method optical flow measurement is done to denote the object motion in a video. Optical flow method is based on gradient of intensity for this purpose RGB value is converted to gray scale values. It is an iterative method and it uses Taylor series expansion. Block matching algorithm is used for accurate motion detection. Segmentation algorithm is to change detect- ion in a video. Moving object region is separated from other part of the schene by the motion information. By using optical flow method, object motion regions are extracted in the first frame, and closed initial counters near the boundaries of object regions are constructed. In the first frame, we apply optical flow to detect motion regions whose boundaries are used as the initial counters. The optical flow for each pixel is represented by (u, v), where u and v are the optical flow velocity vector components in the x and y directions respectively. For a pixel whose optical flow magnitude is less than a threshold its optical flow is set to (0, 0), it is assigned as background. A rectangle shape is moved over the image and its size is changed to detect the motion region.

Initial Object Mask: Initial Object Mask is created to denote the foreground object. In this a rectangular shape is moved over the object, which specifies the moving object. Due to camera noise and irregular object motion there exists some noise region in the initial object mask.

IV MORPHOLOGICAL OPERATION

Morphological operation is done to remove noise regions and to filter out smaller regions. This method is used to enhance the segmentation result. In this two operations were performed they are opening and closing. Morphology is a tool for extracting image components that are useful in the representation and description of the region shape, such as boundaries, skeletons etc. This technique is used for both pre and post processing. Opening operation generally smoothes the contour of an object and eliminate thin protrusions. In opening operation extra added pixel is removed. Morphology is formulated in terms of set theory. Sets represent object in an image; for instance, the set of all white pixels in a binary image is a complete

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morphological description of an image. In binary images, the sets are members of the 2D integer space. Where each element of a set is a 2D vector whose coordinate are the (x, y) coordinates of a white pixel in the image. Erosion shrinks object and is used to remove image components. Closing operation is done to eliminate small holes and filling gaps in the contour. In simple it is done to fill holes in the background region.

Cellular Automata: A cellular automata consists of a regular grid of cells, each in one of a finite number of states, such as on and off. The grid can be in any finite number of dimensions. For each cell, a set of cells called its neighborhood is defined relative to the specified cell. An initial state (time t=0) is selected by assigning a state for each cell. A new generation is created (advancing t by 1), according to some fixed rule that determines the new state of each cell in terms of the current state of the cell and the states of the cells in its neighborhood. Typically, the rule for updating the state of cells is the same for each cell and does not change over time, and is applied to the whole grid simultaneously, though exceptions are known, such as the stochastic cellular automata and asynchronous automata.

V RESULT AND DISCUSSION

The proposed system is to track a moving object from a video. It operates in multi object moving background situations. Object tracking find its important application in many such as traffic monitoring, people detection, surveillance system etc.

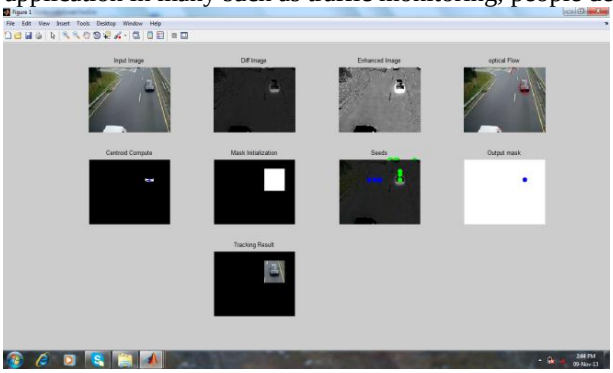

Fig. 3 Tracking Result

Moving object detection from a video has attracted a great deal of interest. This proposed method operates well in any drastic change in illumination. Object detection is done using morphological technique and cellular automata. Morphological technique will improve segmentation result by using two operations such as opening and closing. Segmentation result is efficient by using morphological technique. A cellular automaton is to track a particular object from the video. This method can handle object with large motion. It is an efficient method to track object from a multi object moving background. The performance analyses are done to this work by various parameters such as frame rate, accuracy, delay etc.

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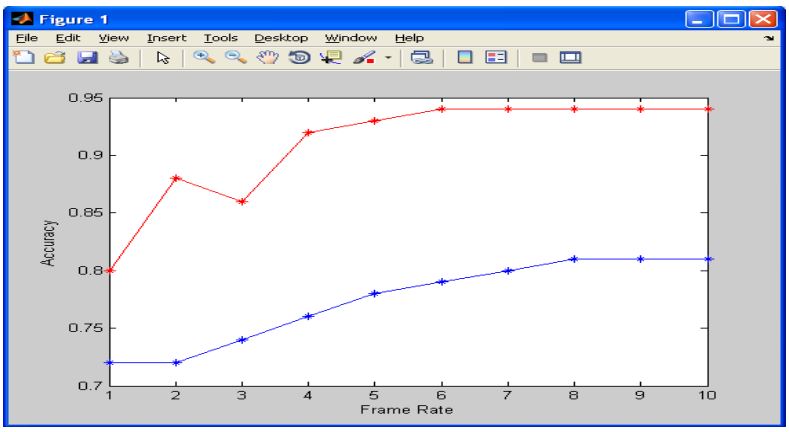

Fig. 4 Graph for frame rate and accuracy

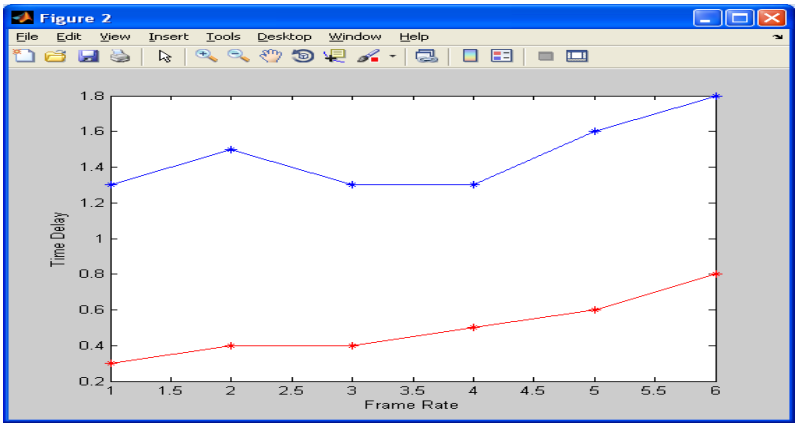

Fig. 5 Graph for frame rate and Time delay

Video is a continuous moving of frames so it is must to calculate the frame rate. This plot shows the variation of frame rate verses time delay and accuracy. Time delay is the important factor that affects the performance in any system. In this paper accuracy is enhanced and delay is reduced. Frame rate, also known as frame frequency and frames per second (FPS), is the frequency (rate) at which an imaging device produces unique consecutive images called frames.

VI CONCLUSION AND FUTURE WORK

Video object segmentation and tracking framework for smart cameras in visual surveillance network was proposed. This method of object tracking reduces computational complexity and enhanced segmentation result is obtained. The proposed method can track object at any drastic change in illumination. In real time application object tracking is an important task. With the improved technique we should perform some operation to track object with less complex and high tracking performance. The proposed method track object in less time and it can detect object that are partially occluded. In future it can be extended with other technique such as wavelet transform, Genetic algorithm.

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BIOGRAPHY

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