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A PATH FOR HORIZING YOUR INNOVATIVE WORK

EMBEDDED SYSTEM TO EXTRACT FEATURE BASED ON BIAS AND VARIANCE METHOD

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Abstract: There are number of technique to extract feature in video. Some of them are based on filters different types of neural and fuzzy relations recession etc. the bias & variance method has the relation that involve smoothing bandwidth parameter which is related to bias & variance by simple relation and both are inversely related to each other the method used by same author [12].To sequence the image in video. We are utilizing this simple relation point out the different feature in image under various condition and are trying to point out the different characteristics based on it to external the feature. In this method we calculate the motion of the objects in a video. It is based on the difference among the consecutive frames of the video. The difference is then analyzed on the basis of the gradient between the consecutive frames. The gradient of the difference is used to estimate the motion of objects in video.

Keywords: Motion detection, Frame differencing, Object detection, pixel method.

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INTRODUCTION

There is many techniques of Motion detection in video. Motion detection of object is an integral part of the video. Motion detection of Object has received wide interest from several research communities. It has broad applications in military spanning civilian, and scientific research domains. Examples include bio-imaging, security surveillance, battle field monitoring, and sub-sea video processing. and it also plays a important role in computer vision, Motion detection mechanism starts from the determination of reference image. The image is considered as the normal condition of a room. the subsequent image is compared with the reference images. The capturing process is carried out at regular intervals in accordance with the requirements of the system. there are three methods commonly which is used to detect a motion. Those are optical flow, background subtraction, and temporal differences. Background subtraction is performed by comparison of an image with the referenced image. This technique employs a static reference image[2][3][4].Study in [5][6][7][8] used the optical flow for motion detection. The application of optical flow required additional hardware to support the performances and for the monitoring systems. Method of the temporal differences is also known as frame differences. This method is performed by comparison of captured image frames. The studyby Kenchannavar et al. [9] develop the algorithm of frame and background subtraction differences by applying the concept of Sum of Absolute Difference (SAD). SAD is used to determine whether there is a movement within an image pair. Frame difference method uses techniques to choose which reference image is used for motion detection. That technique is known as template matching. Motion detection algorithm that integrates both temporal variance and background modeling to allow for a robust detection of moving objects.

2. Moving-Object Detection

The detection of the moving objects is the first stage of a typical surveillance system. Motion detection shows segmenting the regions pertaining to moving objects from the rest of the image. Subsequent processes such as behavior analysis and tracking are greatly dependent on the performance of this stage. Many algorithms are used to solve the problem of motion detection, which can be categorized into three main approaches: temporal thresholding as in [6],where the moving pixels are identified by thresholding the temporal difference between the frames; background subtraction where detection occurs by comparing the incoming frame with a background model of the scene that is built by modeling the pixel intensity either by a single Gaussian distribution [3] and optical flow approaches [7] that use characteristics of flow vectors of moving objects over time to detect moving regions in image sequences. We present a method based on combining both the temporal variance of the pixel intensities as temporal

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thresholding approach with background modeling to achieve a robust and accurate motion detection and to reduce false alarms.

3. Variance Based Motion Detection

In our system, we use the temporal variance as a parameter to detect moving areas in a stationary scenes as in [8] and [9]. The mean and variance of the intensity value at each pixel is calculated over a window of several previous frames and updated recursively for every new frame. This value of the variance is used directly afterward for the detection

of moving area. The use of temporal variance for

motion detection has some nice properties:

1. The variance of intensity at a certain pixel depends on both the duration of this change and the amplitude of changes so it is more robust to transient noises incurred by moving texture.

2. There is no need for background training period as this method can build the model with the existence of moving objects on the scene. The mean and variance for the intensity at each pixel(i,j) are recursively updated using a simple exponentially

decaying adaptive filter as follows:

$m(i, j, t) = am(i, j, t - 1) + (1 - \alpha)x(i, j, t)$

$m2(i, j, t) = \alpha m2(i, j, t - 1) + (1 - \alpha)x2(i, j, t)$

$\sigma 2(i, j, t) = m2(i, j, t) - m2(i, j, t)$ (1)

where: $x(i, j, t)$ is the intensity, $m(i, j, t)$ is the first moment, $m2(i, j, t)$ is the second moment and $\sigma 2(i, j, t)$ is the variance at pixel (i, j) at time t, α is the decay rate, that can be rewritten with respect to the filter window size N as:

$\alpha = \frac{N-1}{N}; N = \frac{1}{1-\alpha}$

The main problem with using the variance is that it takes a while for the variance to decay back to its original value after the change has ended. This problem causes the moving object to leave a trail behind it, consisting of pixels that were in motion in the proceeding frames. The variance decay rate can be controlled by changing the window size N, however, reducing this size will make the model too adaptive to any changes in the scene. To overcome this problem we propose using a simple There is different methods for detecting motion in video. This assignment attempted to compare and contrast two classes of motion detection algorithms: pixel based and histogram based.

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4. Pixel based methods for motion detection

A discrete image is a function of two variables that take values over a discrete set (an integer grid) **E.g.**: The intensity of a discretized 320 x 240 photographic image is 2D function *f (i, j)* of two integer-valued variables *i* and *j*. Thus, *f* can be represented as a 2D matrix *I*[320,240] A color image is usually represented with three matrices:

Red[320,240], Green[320,240], Blue[320,240]

In order to determine whether motion is occurring in the video, it is common to compare subsequent frames in a video sequence. The amount of change between each successive frame is used as an indicator of motion. By setting a threshold, one can determine where motion occurs if the amount of change between successive frames exceeds this threshold. Several pixel based methods were presented, each with their own unique strengths and weaknesses. In the formula below, the Euclidean distance is defined. Let f and g be two gray value image functions, then the Euclidean distance between two successive frames (f and g) is defined as follows:

$$d(f,g)=\sqrt{\sum_{i=1}^{n}\sum_{j=1}^{m}\left(f(i,j)-g(i,j)\right)^{2}}$$

$$e.g.:$$

$$d\left(\begin{pmatrix}4&3&7\\0&0&1\\9&5&5\end{pmatrix},\begin{pmatrix}5&3&5\\0&0&0\\8&5&1\end{pmatrix}\right)=\sqrt{1+4+1+1+16}=\sqrt{23}$$

Equation 1- Euclidean Distance

One can refine the formula above in order to get better precision in detecting motion in videos. Alternatives are presented below. In order to save computational time, one can use the "Manhattan" distance. Similar to the Euclidean distance but not requiring a square-root calculation, the Manhattan distance is favorable because of it low computational complexity.

5. Histogram based methods for motion detection

Histogram based methods are an alternative to using pixel-based methods. Whereas pixel based methods compare a specific pixel in one frame with a corresponding pixel in a successive frame, histogram based methods are location independent. A value is assigned to the histogram color signature of a frame based upon its color histogram. The explanation is that successive similar frames will contain approximately the same color information and similar

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frames will have a similar histogram. Please note that dissimilar frames "may" have similar histograms.

Let c be some image characteristics and h(a) its histogram for image a with k histogram bins.

$$hd1(a,b) = \sum_{i=1}^{k} | h_i(a) - h_i(b) |$$

$$hd2(a,b) = \sum_{i=1}^{k} (h_i(a) - h_i(b))^2$$

$$hds(a,b) = \sum_{i=1}^{k} \frac{(h_i(a) - h_i(b))^2}{\max(h_i(a), h_i(b))}$$

Equation 2- Histogram Based Methods

6.Wavelet based detection Of motion

The performance of the proposed wavelet based motion detection depends on the choice of fixed threshold value τ ,used in the outlier detection test. As τ increases, the number of false positives (FP) falls, but the number of false negatives(FN) rises. If τ decreases, the opposite happens - FP rises, but FN falls. To find a value of threshold τ that minimizes both types of error, we performed the following optimization step on several ground truth frames

The first term is called *Precision* and it effectively minimizes the number of false positives. The second term is called *Recall* and it effectively minimizes the number of false negatives. Weights *wp* and *wr* can be adjusted to make criterion biased towards detecting accurate object outline (less false

positives) or filling the internal holes in the detected moving objects (less false negatives). With *wp* = 2 and *wr* = 1, the obtained optimal threshold value is close to 10.

7.Motion estimation method

The variation of motion vector in consecutive frame of any video is gentle, smooth, and slow [2,4]. The difference between images of the two consecutive frames is also likewise gentle, smooth and slow. Also if the frame rate is more than required minimum frame rate, frame error rate is seemed to be stationary process. We define the average local frame error as matrices corresponding to the difference between two consecutive video frames of size W×W as

$$E' = \frac{\sum_{K=1}^{N} E_K}{N}$$

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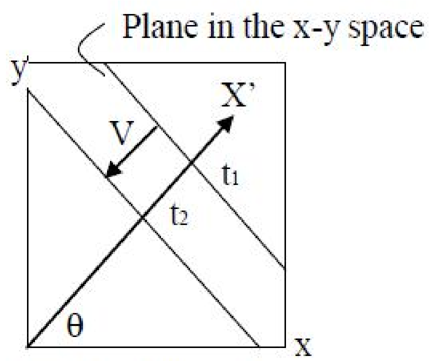
where E =SAD is the error matrix including the sum of absolute difference between the point in frame with zero error and the point with error. N is number of different error window with separate or overlap boundaries. M is the number of error frames in video.

Where E” represent the average local error windows surface in a frame. E” represents the average local error in a video.

8.Velocity of a moving object

The estimation of object feature parameter, 2-dimensional velocity, is based on geometrical analysis of the inclination and direction of the plane. The concept is shown as Figure 1 and Figure 2.



$$V = \Delta x' / \Delta t = \Delta x' / (t_2 - t_1)$$

Figure 1.Relation of x-y space and time

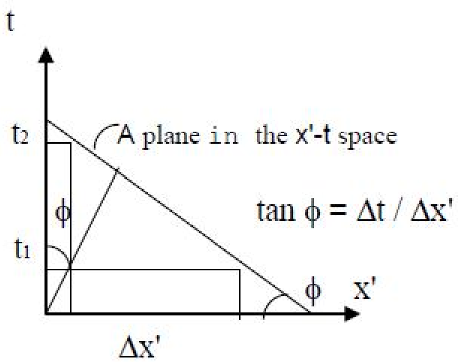


Figure 2. Relation of x'-t space

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If a plane moves as Figure 3 and Figure 4 indicated**,** relation **of** each parameter is shown as in Equation(7) and Equation(8).

$V=\frac{\Delta x'}{\Delta t} = \frac{\Delta t'}{t_2 - t_1}$

$\tan\emptyset - \frac{\Delta t}{\Delta x'}$

so intensity of plane velocity is given as

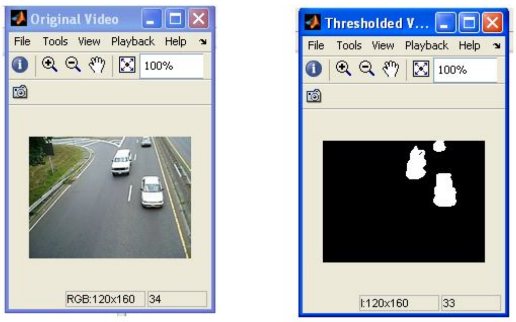
$V=\frac{1}{tan\emptyset}$

Therefore, it's velocity is given

$V=(V\cos\theta, V\sin\theta)$.

Experimental Result

In this paper we develop the bais and varience method for detection of the motion. In this paper matlab programming language is used is used to take the input from video.



Result

Conclusion

The aim of this project to develop a bais and variance method for feature extraction of the video. fast motion calculation of object based on frame error between consecutive video frames has been developed. The method workout with any video or real time data. It is useful to develop new interpolation and interfacing of video pixels and frames.

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