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Moving body/object detection and tracking

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ABSTRACT

This paper describes a method of exactly tracking a moving body in video capture from camera. It also overcoe problem of blurring and noise. innitially moving body is exactly detected by its motion and then track it for exactly getting moving body. Method used is background subtraction and for object tracking we used colour feature specification for differantiate between objects. this method is effective for both indoor and outdoor videos.

Keywords:- moving body tracking, moving body detection, background subtraction, blurring

1. INTRODUCTION

There are several methods to find moving body such as optical flow technique in which its model is difficult to establish and it has poor performance against noise parameter. Second method is frame subtraction methods which is unable to drawing out or extract moving parts in video. Its output is not precise. In this process two continuous frames are taken and subtracted from each other that difference between frames can determine moving object but it gives limitations such as complete and accurate detection of body cannot be determine. In this paper we combine both techniques i.e. background subtraction technique and tracking (apply tag for moving body)

2.RELATED WORK

To find and track moving body are important parameters of video stream. First of all we have to develop a background model without any moving body then this model will be subtracted from present frame which results moving body detection. Background frame should be taken in real time to accurate extract moving body. After detection of moving body we can track it by providing tag. in this method we can determine parameters like accuracy, MSE ,PSNR, Entropy etc For exact tracking the body suitable technique of body detection should be used because motion of moving body can be affected by many practical parameters such as change of light, shadow etc. our method is suitable for both indoor and outdoor environment video.

3.METHODOLOGY

Developed algorithm consist three important steps.first of all we have to apply input video stream to the system, then moving body can be detected by background subtraction method and that object is then track exactly.

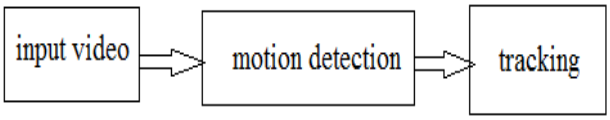


Figure.1 block diagram

To avoid problem like shadow, blurring etc which losses the data, hence we have used mean filter to overcome these problems.

1) Motion detection by the method of background subtraction

Basic concept behind this method is that a known background model is to be form without moving object, after that the background having moving body i.e. current frame will be subtracted from each other. In this war resultant difference can be detect moving body and by the use of mean filter it can remove shadow and blurring effect.

$$B(a, b) = \beta Bk+1(a, b)-(1-\beta) F(a, b)>T \quad (i)$$

Where $\beta = 0.004$.

F (a, b) = gray value of pixel in present frame. $\beta Bk + 1$= background value of present frame and next frame.T is threshold for removing shadow or noise depending on value applied.

4.FLOW CHART

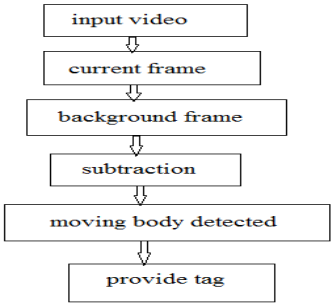


Figure.2. Flow chart of developed method.

Background subtraction is used in application like traffic monitoring system, people detection and tracking etc. first n video frames are used to train the background model to achieve a model which represents the variation in the background during this period. The frames (from n + 1 and so on) are each processed by the background subtraction module to produce a mask identified by comparing the incoming frame with the background model. Information from frames n + 1 and onwards are used to update the background model.

a)Tracking of moving body

Once moving body is detected then tracking of that body is performed. For that feature or color parameter of body can be extracted cluster to cluster. Each cluster having its own value. Color information can be match between present frame and previous frame. i. e. we have to segment motion block in such area i.e. hand, feet, head. etc. and these values of clusters of moving body can be store for further comparison. in short color information of present frame and previous frame is to be compared and according to that moving body can be track. To remove shadow and blurring we use filtering operation. After filtering operation some exact edges will be obtained but the region connected to moving body cannot get.i.e. Shadow will present their which may affect the accuracy of extraction .By adopting vertical and horizontal projection, we can detect the height of motion part .this can remove the effect of shadow. Tag is assign to moving body after finishing cluster comparison.

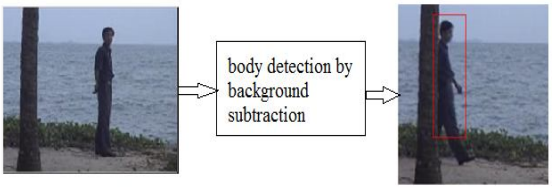


Image 1. Body detection by background subtraction.

5.EXPERIMENT AND RESULTS

Here we use camera for outdoor environment video images and we calculate number of parameters such as accuracy, MSE, PSNR, Entropy etc

1.Input video

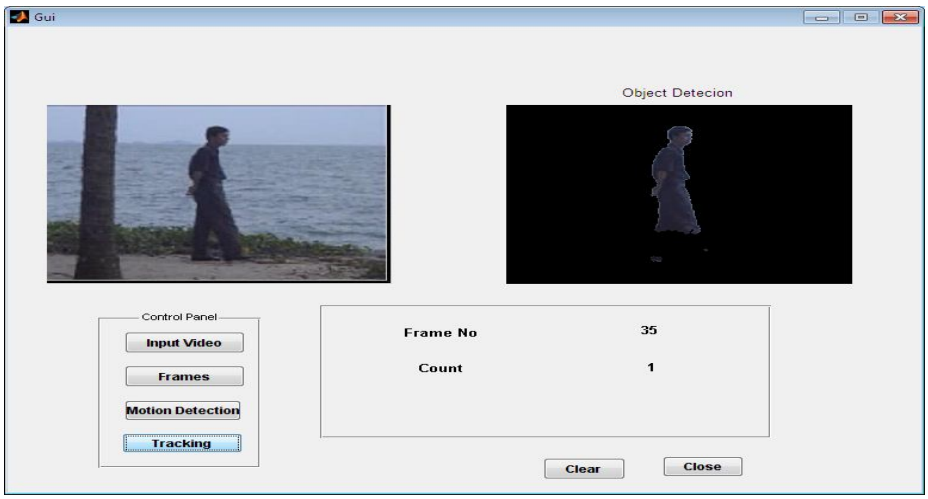


Image.2. Input video

2.Moving body Detection

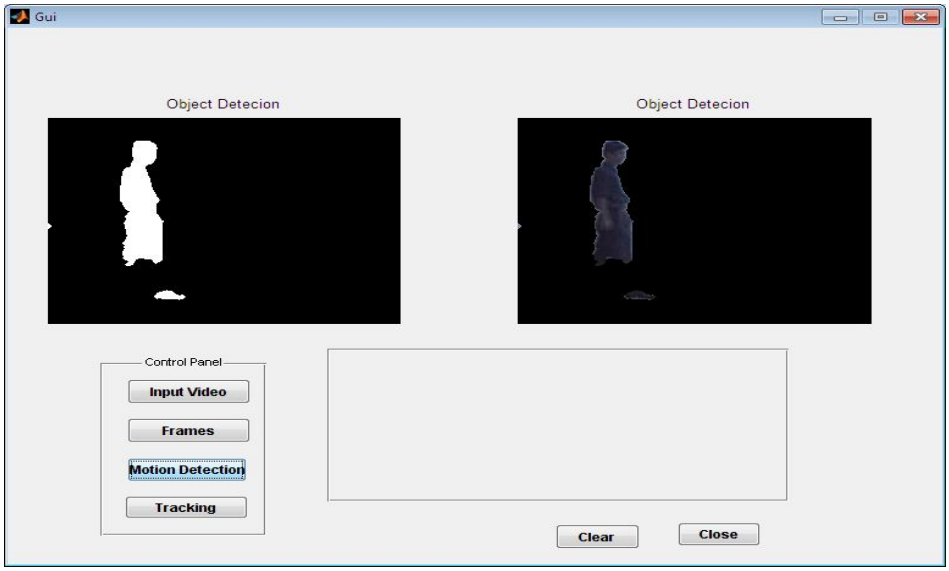


Image.3. Moving body detection.

3.Tracking the body

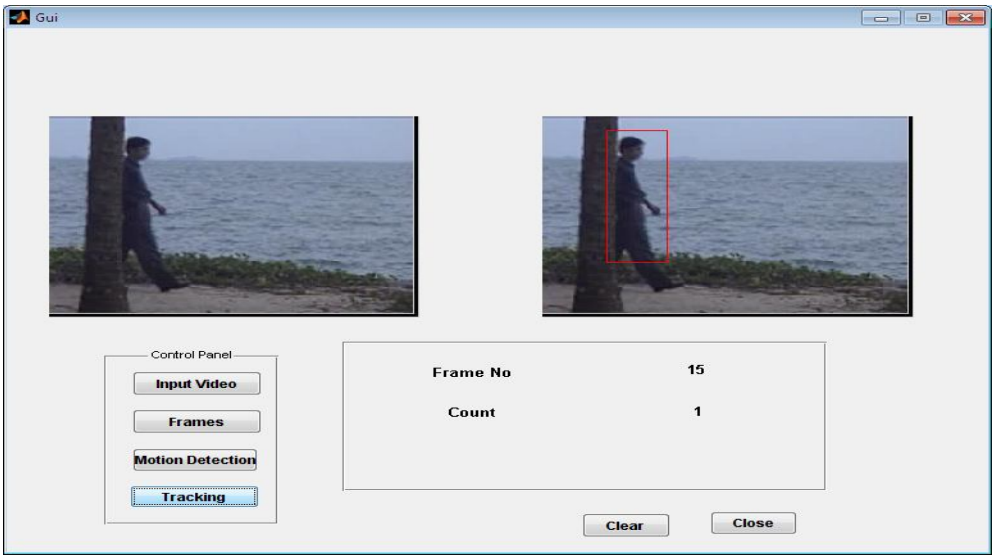


Image.3. Tracking the body.

4.Parameters Evaluation

a.Velocity: The velocity of object is depend on distance travelled by body and frame rate

Velocity = Distance travelled by body/ Frame rate

b.Sensitivity: Tp./(Tp + Fn)

Where, Tp = True Positive: Object pixels correctly classified as object.

c.Correlation Coefficient: It is used to find the similarity between two different images with their intensities. It will be described by, Cor_coef = [sum (sum (u1.*u2))] / [sqrt (sum (sum (u1.*u1))*sum (sum (u2.*u2)))];

Where, u1 = F1 – mean of F1, u2 = F2 – mean of F2. F1 – Obtained result and F2 – Ground truth.

Fn = False negative: Object pixels incorrectly classified as background.

Table.1: No. of frames, duration and file size

Sl. no	Input video	No. Of frames	Duration	File size
1	inp1.avi	31	2 sec	181 kb
2	inp2.avi	287	19 sec	558 kb

T**able.2.** Entropy and Correlation coefficient

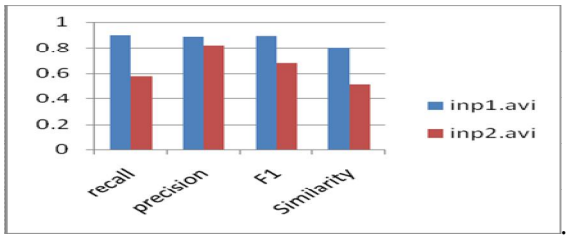
Sl. no.	input video	Entropy	correlation coefficient
1	inp1.avi	0.2959	0.8861
2	inp2.avi	0.1554	0.68

Table.3. Mean square error

Sl. no.	input video	MSE
1	inp1.avi	0.0112
2	inp2.avi	0.0175

Table.4. PSNR

Sl. no.	input video	PSNR
1	inp1.avi	67.6386
2	inp2.avi	65.6886



Bar-chart.1. shows recall, precision, F1 and similarity

6.CONCLUSIONS

This paper implement a real time method having accuracy in detecting and tracking moving body. the combination of background subtraction and tracking.i.e.tagging to moving body which result exact determination of moving object in video stream of indoor also outdoor environment.

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