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TRACKING THE MOVING OBJECT AND MORPHOLOGICAL RECONSTRUCTION OF VIDEO SEQUENCES BY USING GRADIENT AND HSV PROCESS

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ABSTRACT:

In the sphere has seen several advances, however the solutions have restrictions like the objects should be moving, the background should be easy, and therefore the image resolution should be high. This paper aims to develop an efficient methodology for removing of shadows during a low resolution image with difficult scenes conjointly. and that we planned Associate in Nursing correct rule to stop moving shadows from being misclassified as a part of moving objects in video target segmentation during this paper. Firstly, moving objects were achieved through background subtraction victimization morphological method. Then, moving shadows were eliminated by a shadow detection rule. Finally, we tend to perform a morphological reconstruction rule to recover the foreground distorted when shadow removal method and conjointly we'll represent the mapping for pursuit the actual moving object. The experimental results evidenced its validity and accuracy in numerous mounted outside video scenes.

Keywords: shadow removal; HSV color space; morphological reconstruction; video segmentation, mapping.

1. INTRODUCTION:

Background Subtraction is often employed in the fields of video police work, optical motion capture and transmission application wherever it must be the primary step to find the moving objects within the scene. The essential plan is to classify the pixels as background or foreground by morphological method. Background Subtraction may be a powerful mechanism for detective work modification in a very sequence of pictures for instance, if we tend to have a applied math model of the scene, associate degree intrusive object may be detected by recognizing the components of the image that do not match the model. Characteristic moving objects from a video sequence may be a elementary and significant task in several computer-vision applications. a typical approach is to perform Background Subtraction, that identifies moving objects from the portion of a video frame that differs considerably from a background model. There are several challenges in developing a decent Background Subtraction rule. First, it should be strong against changes in illumination. Second, it ought to avoid detective work non-stationary background objects like moving leaves, rain, snow, and shadows forged by moving objects. Finally, its internal background model ought to react quickly to changes in background like beginning and stopping of vehicles. Detecting moving objects in video sequences is extremely necessary in visual police work. Once the video pictures are captured with a hard and fast camera, background subtraction may be a usually used technique to phase moving objects. The foreground objects are known if they dissent considerably from the background [1]. However, the detective work results of moving objects are typically beneath the influence of forged shadows. The existence of cast-shadows would modification the form and size of the moving objects. As a result of the shadows typically move on the moving objects in order that they will cause false classification, which may cause varied unwanted behaviour like object form distortion and object merging. For these reasons, it's vital to find and phase forged shadows so as to explain moving object properly in visual police work and observance systems.

R. Cucchiara et al. [2] projected Sakbot system that may be a strong and economical detection technique supported applied mathematics and knowledge-based and use HSV color data for shadow suppression. This technique is capable to subsume luminousness condition changes. The background detection is performed by victimization completely different Techniques [3]. Shadows are often divided into self-shadows and solid shadows [4], and that we solely concern moving cast-shadows. in keeping with recent literatures introduced, moving shadow detection are often classified into 2 strategies supported models and properties severally. The model technique supposes that the shapes of the objects and therefore the property of the sunshine square measure best-known initial, therefore it's unpractical to figure the shadows' form and placement [5, 6]. The strategy supported properties uses some representative characters to spot shadows like color, texture and gradient. in keeping with the color property, Elgamma distinguishes the background and foreground in RGB color area [7, 8].

In this paper, we have a tendency to project a shadow removal technique supported color and gradient data, getting to solve the matter that the moving objects detection square measure sometimes underneath the influence of cast-shadows. In addition, so as to induce AN integral foreground segmentation image, a morphology reconstruction formula is utilized to recover the foreground distorted by shadow removal.

2. EXTRACTING THE FOREGROUND

In visual police investigation systems, moving objects extraction is that the commencement in video process. we tend to gift a sturdy and automatic segmentation approach supported the background subtraction.

Within the detection of shadows the foreground objects area unit quite common, manufacturing undesirable consequences. for instance, shadows connect completely different individuals walking in a very cluster, generating one object (typically known as blob) as output of background subtraction. In such case, it's tougher to isolate and track everyone within the cluster. Background subtraction may be a common technique to section out the interested objects during a frame. this method involves subtracting a picture that contains the article, with the previous background image that has no foreground objects of interest. The world of the image plane wherever there's a big distinction at intervals these pictures indicates the constituent location of the moving objects [9]. These objects, that square measure pictured by teams of constituent, square measure then separated from the background image by mistreatment threshold technique.

The first B distributions accounting for a proportion T of the determined information square measure outlined as background. We have a tendency to set T = zero.8 here as in:

For the non-background constituent, we have a tendency to calculate the distinction between this constituent in current image and in background model. Solely the constituent with the distinction over the brink ten is tagged as foreground constituent.

PROPOSED METHOD:

3. SHADOW DETECTION

Usually the foreground consists of moving objects, forged shadows and speckle noises. That the shadow removal methodology ought to use. Once the foreground object known, every foreground pixels are checked whether or not they are a part of a shadow or the article. This method is critical, since; shadow of the number of the background object might get combined with the foreground object. This causes the article pursuit task as an advanced task. The rationale that the shadow removal methodology supported model is merely applied to some Special scenes with giant and complicated computations, we have a tendency to selected the shadow removal methodology base on properties of Colour data and gradient data.

Shadow Detection in HSV space

HSV color space matches people's visual feeling better than RGB color space and other color spaces; additionally the luminance and chrominance variety can be detected more effectively in HSV color space, especially in the outdoor scenes. For these reasons, HSV color space is chosen to distinguish luminance (V) from chrominance (H and S colour space).

$$SP_m(x,y)=\begin{cases}1, & if \quad T_{V1}<\dfrac{I_m^V(x,y)}{B_m^V(x,y)}<T_{V2} \quad and \\ & \left|I_m^h(x,y)-B_m^h(x,y)\right|<T_h \quad and \\ & \left|I_m^V(x,y)-B_m^V(x,y)\right|<T_S \\ 0, & else\end{cases}$$

It is based on the simple idea that, shadows change the brightness of the background, but do not really affect the chrominance and saturation in HSV .The pixels are confirmed as shadows when the result of both the two conditions corroborates. A given pixel can be removed as shadow according to above equation.

Where I_m and B_m are the current and background images respectively. T_{V_1}, T_{V_2}, T_h and T_S are all parameters to be chosen accordingto experiments and experience. T_h and T_S are the differences between cast-shadow and background on chrominance and saturation respectively. T_{V_1} and T_{V_2} are parameters about the threshold of luminance. T_{V_1} can prevent some background speckle noises from misclassifying as shadows, and T_{V_1} includes some practical shadow characters such as the intensity of the sunlight. The more intensive the sunlight is the small value T_{V_1} is. Generally, T_{V_1} and T_{V_2} are met: $0 < T_{V_1} < T_{V_2} < 1$.

B. Shadow Detection in Gradient

The moving object may be removed as shadows if we solely use the property supported color, if the gradient may be accepted, the foreground may be detected a lot of effectively. in a very video closed-circuit television, vehicles and other people perpetually have plentiful texture data. Almost like the color-based shadow removal technique, a texture distortion live will discover doable foreground shadow pixels. The gradient of constituent S could be a two-dimensional vector, and might be expressed as:

$$\mathbf{V_t(s) = (V_x,V_y)}$$

Where its first partial derivatives are defined as:

$$V_x = \nabla_x I(s,t)$$

And

$$V_y = \nabla_y I(s,t)$$

In which V_x and V_y can be got by sober operators.

These operators take into account the horizontal and vertical edge, that is straightforward however will well gift gradient feature.

Our approach is to induce the gradient image of moving foreground and therefore the relevant background. Gradient data of moving foreground includes gradient of moving objects and moving shadows, whereas Gradient data of relevant background includes gradient of background solely. In step with the higher than analysis, the distinction of the 2 gradient pictures can reserve a lot of gradient data at the moving vehicles areas and take away most of the shadow gradient at shadow region.

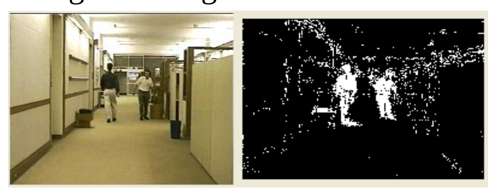
FOREGROUND RECONSTRUCTION

Mathematical morphology reconstruction uses the "marker" image to rebuild the foreground in a "mask" image.

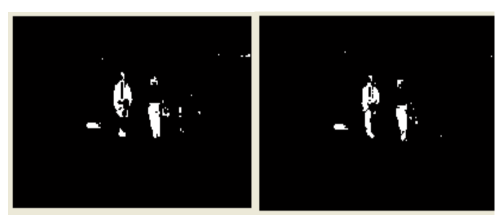
In Fig.1, Fig.2and Fig.3, The "marker" images (c1, c2, c3) are binary images where a pixel is set at "1" when it corresponds to a foreground, not cast shadow pixel. On the other hand, the "mask" images (b1, b2, b3) are also binary images where a "1" pixel can correspond to a foreground pixel, or cast shadow pixel, or speckle noise.

Result of Color and Gradient Shadow Removal

According to the higher than algorithms, shadow removal method could be a vital step for the foreground segmentation. The pixels are classified as shadows on condition that they glad with each the colour data and also the gradient data. The 2 algorithms are in a very relation of intersection. However, the cast-shadow removal could be a harmful method. The pixels are going to be incorrectly known if the foreground objects having similar colours to the shadowy background regions. Similarly, the foreground regions having similar textures to the corresponding background might also be misclassified.



(a1) (b1)

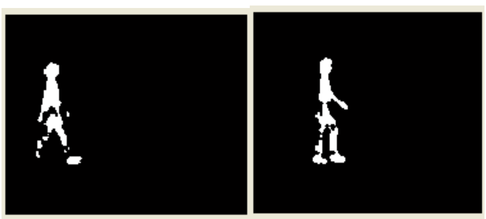


(c1) (d1)

Figure1: Experimental results in scene1: (a1) the original images; (b1) the"mask" image of foreground segment; (c1) the "masker" image after shadow removing; (d1) the final reconstructed foreground.

Due to these reasons, original object shapes are likely distorted. Morphological theory can be employed to reconstruct the foreground distorted after colour and gradient shadow removal.

(a2) (b2)



(c2) (d2)

Figure2: Experimental results in scene2: (a2) the original images; (b2) the "mask" image of foreground segment; (c2) the "masker" image after shadow removing; (d2) the final reconstructed foreground.

Mapping:

To track the particular person from particular frame we have to use mapping operator. The results are shown below in figure 4 and 5. we have to subtract the original frame with background frame for the mapping process.

(a3**)** **(**b3**)**

Figure4: Experimental results in scene1: (a3) the original images; (b3) mapped image.

(a4**)** **(**b4**)**

Figure5: Experimental results in scene2: (a4) the original images; (b4) mapped image.

TRACKING

For tracking the particular person in the video first we have to calculate all the properties of the video that includes Area, Centroid, and Bounding Box, these three are the main properties to track the particular moving object. In fig 6 we have shown the tracking process.

Fig 6: tracking of the persons

4. CONCLUSION:

In this paper, we've got planned A correct rule, which might get integral foreground ends up in several outside scenes. The experiments prove that our methodology is straightforward and effective. We have a tendency to need to worry concerning the orientation of the daylight, or modeling the objects either. Our methodology is strong to the gradual variation of the daylight. However, there is a unit still some disadvantages and it cannot resolve the matter well like the fast modification of the illumination, and also the additional advanced background. Thus a way to improve the tactic of shadow elimination is a motivating future direction that we'll try and analysis. Moreover, our future work will specialize in the topic concerning behavior identification of the moving objects.

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