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Extracting Moving Object without Losing Data by Matrix Mapping Algorithm

[1]Stalin Alex D and [2] Dr. Amitabh Wahi

[1]*Research Scholar, Faculty of Information and Communication Engg, Anna University, Chennai,Tamilnadu, India*
[2]*Professor, Dpt of Information Technology, Bannari Amman Institute of Technology, Sathiyamangalam, Tamilnadu, India.*

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ABSTRACT

In recent years, extracting the object from the motion picture is done only after converting the RGB (Red Green Blue) to grey scale image. Keeping the colour image as such and extracting the object is a complicating factor in image processing as the past analysis says, for a better result the RGB should be converted into greyscale. The background subtraction algorithm can solve this problem, but this algorithm is suitable for indoor only. The frame difference algorithm is suitable for indoor and outdoor but when we subtract the frame we lose some data. This problem can be solved by matrix mapping algorithm proposed in this paper. It describes about extracting the moving object from the video sequence without converting colour image into a grey scale image. So that the moving object can be extracted without losing data. Such methodology can be applied in Banking Sector, traffic monitoring system, and fault detection and also in various streams.

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INTRODUCTION

A colour image takes three bitty items of information for each pixel, a colour image of size M x N has an array of size MxNx3: a three dimensional array whose elements are all whole numbers in {0,1,…, 255} accompanying to 3 primary mathematical expression from which another expression is derived of colors such as Red, Green, Blue. Four types of images are RGB, Intensity, Binary and Indexed Images. A Colour image can be as of three band black and white image data, where each band of the data corresponds to a dissimilar colour.

Usually colour images are described as red, green, and blue or (RGB) images. Applying the 8-bit black and white standard as a model, the accompanying colour image would have 24 bits/pixel, for each colour band (red, green and blue) it must have 8bits. RGB colour type is characterized with in the sense that the 3 light beams are added together. To form a colour with RGB three colour illumination beams (Red, Green, Blue) must be overlain. Each of the three emit light is called a component of the colour. No light or zero amount of energy transmitted of each component is known as black colour. The full amount of energy transmitted of each component is to be known as the white colour.

When the strength of all the components are same, the result will be the effect of shade of black or white or gray it looks only on the intensity. When one of the components has the strongest intensity, then the colour is the chromaticity of its primary colors of red, green and blue. When two components have the same strongest intensity, then the colour is the chromaticity of its secondary colours of a shade of cyan, magenta or yellow. The standard RGB space is used in computer monitors, television, etc.

2. Video object segmentation algorithm:

Automatic image segmentation and object extraction play a very important role in content-based image secret writing, indexing, and retrieval. The low-level visual homogeneity like colour, texture, intensity, and so on for segmentation which don't cause linguistics objects directly as a result of a linguistics object will contain wholly totally different grey levels, colour, or texture. Images are first partitioned into a similarity-based region growing and edge detection procedures. The object seeds, which are the visceral and representative parts of related objects, area unit, then distinguished from these consistent image regions. A seeded region assortment procedure is employed for merging the adjacent regions of a determined object seed to offer a linguistic object in step with the sensory activity model of the thing. Automatic segmentation of images is a very active area of image analysis. By using more relating to the act of perceiving colour models such as HSV, CIE, more

Corresponding Author: Stalin Alex D, Research Scholar, Faculty of Information and Communication Engg, Anna University, Chennai,Tamilnadu, India.
E-mail: drstalinalex@gmail.com

reasonable segmentation results may be obtained. The most important problem in CBIR system is how images are represented internally, and we're working on finding the efficient solutions for this problem.

2.1 Background Subtraction Algorithms (BSA):

Objects are represented by groups of pixels. Proceeds Absolute difference between the current pixel and the modelled background pixel. RGB value of current frame pixels subtracts with that of background frames. Then the Mean of the absolute difference of red, green and blue values was found. If absolute difference is greater than the threshold, then the pixel is represented as foreground pixels else background pixels. Background subtraction may be a ordinarily used technique for motion segmentation in static scenes. It makes an attempt to sight the moving regions by subtracting the present image pixel-by-pixel from a previous background image that's created by mean pictures over time. The pixels where the difference is above the threshold value are classified as foreground image. The reference background is updated with new pictures over time to adapt to dynamic scene changes. It is to classify each pixel as a part of the foreground or the background. The main assumption for BSA is that a pixel temporal distribution of values will change significantly if it represents the background or the foreground. This could be on a very short time point. In such case, if a pixel presents too much variation it is considered as a part of an object.

In outdoor surroundings, they have to adapt to various levels of the degree of visibility of your surroundings at different daytimes, and handle inauspicious weather conditions such as fog or snow that modify the background. Changing shadow, cast by moving objects, should be removed so that consistent characteristic can be extracted from the objects in subsequent processing. More- over they have to grip the moving objects that merge with the background while remain too long at the same place. It can be applied in traffic monitoring, human detection, or gesture recognition, video surveillances. Compare various BSA for detecting moving objects in outdoor video sequences, to select, the more robust algorithm according to the cases encountered in intrusion detection. The approach varies from simple techniques such as frame differencing to more probabilistic modelling techniques.

2.2 Frame Difference Algorithm:

Moving objects can be extracted after Subtracting $i+5^{th}$ frame from i^{th} frame. Subtracting two consecutive frames may lead into false detection, particularly the objects are moving slowly. So ith and $i+5^{th}$ frame can be chosen. The main advantage of this algorithm is, it’s suitable for indoor as well as outdoor video. The main drawback is when subtract two frames we lose some data.

3. *Matrix Mapping Algorithm:*

The goal of this paper is to extract the moving object from the video sequence. The input video should be converted into frames, then the frames are converted into images.

The next step is to smooth out some random noise. Use a median filter to fulfil this task. Median filter is better than other low pass filter. It replaces the value of the original value of the pixel is included in the computation of the median. This filter provides noise reduction capabilities with less blurring than linear smoothing filters of similar size.

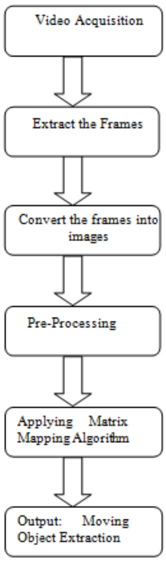

Fig. 3.1: Architecture Diagram.

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After removing the nose, frame difference algorithm should be performed.

Fig. 3.2: Input image 1.

Fig. 3.3: Input Image 2.

Fig 3.2 is the first input image, Fig 3.3 is the second input image, when we subtract input 1 from input2 we will get the below output.

Fig 3.4:

In Fig 3.4 the moving object extracted successfully with losing lots of data.

R: 0 G: 0 B: 0	R: 0 G: 0 B: 0	R: 0 G: 0 B: 0	R: 0 G: 0 B: 0	R: 0 G: 0 B: 0	R: 24 G: 21 B: 20	R: 22 G: 20 B: 16	R: 20 G: 18 B: 14	R: 62 G: 63 B: 57
R: 0 G: 0 B: 0	R: 0 G: 0 B: 0	R: 0 G: 0 B: 0	R: 0 G: 0 B: 0	R: 0 G: 0 B: 0	R: 5 G: 3 B: 0	R: 0 G: 0 B: 0	R: 21 G: 17 B: 14	R: 82 G: 81 B: 77
R: 0 G: 0 B: 0	R: 54 G: 57 B: 62	R: 60 G: 64 B: 67	R: 42 G: 42 B: 42	R: 44 G: 43 B: 43	R: 71 G: 67 B: 66	R: 61 G: 55 B: 55	R: 81 G: 76 B: 71	R:119 G:117 B:111
R: 0 G: 0 B: 0	R: 93 G: 97 B:100	R:153 G:152 B:155	R: 88 G: 87 B: 87	R: 69 G: 65 B: 64	R:104 G: 98 B: 98	R:132 G:124 B:125	R:108 G:100 B: 96	R: 88 G: 83 B: 77
R: 0 G: 0 B: 0	R: 15 G: 19 B: 22	R: 43 G: 42 B: 45	R: 54 G: 50 B: 51	R: 53 G: 45 B: 46	R: 87 G: 78 B: 76	R:121 G:109 B:106	R: 61 G: 50 B: 46	R: 66 G: 59 B: 53
R: 0 G: 0 B: 0	R: 0 G: 0 B: 0	R: 34 G: 31 B: 32	R: 79 G: 73 B: 73	R: 74 G: 64 B: 63	R: 44 G: 32 B: 29	R: 48 G: 35 B: 31	R: 35 G: 20 B: 17	R: 60 G: 49 B: 42
R: 0 G: 0 B: 0	R: 0 G: 0 B: 0	R: 19 G: 14 B: 16	R: 32 G: 24 B: 22	R: 39 G: 30 B: 27	R: 23 G: 13 B: 8	R: 40 G: 28 B: 22	R: 60 G: 45 B: 39	R: 74 G: 61 B: 52

Fig. 3.5: Pixel Values.

In fig 3.5 every pixel loses its data. For an example, pix, 3^{rd} row, 2nd column is having the 54,57,62 RGB values. We got these values after subtracting ip1-ip2, but the original values are 120,127,125. So we lose more than 50% values from every pixel, on the whole we lose huge amounts of data.

But in the Matrix mapping algorithm, we won't lose any data. After applying the frame difference algorithm we will get the Fig output as an output image. In this image every pixel having the value 0 except the moving object.

In this algorithm, first convert the video frames into images, these images which are used for processing. In processing, first pre processing should be performed. The noised will be removed after finishing the preprocessing step. Then the two images namely f_i and f_{i+5} will be taken and perform the subtraction. The output image Out_{fs} will contain the moving object. The rest of the pixel values become zero. This image contains moving objects with losing some data.

The next and final step is applying the matrix mapping algorithm. Here, first create one empty matrix whose row and column size should be equal to either f_1, f_{1+5} or output image. Secondly the mapping operation should be performed. Here, identify the pixel whose values is zero in $Out_{fs.}$ And also the position of those pixels can be identified easily. These zeros will be placed in the empty matrix. Next the non zero cell and its location value should be identified, now either f_i or f_{i+5} can be acted as a reference image. Non zero pixel position identified from the $Out_{fs.}$ Get the pixel values from the reference image which are in the identified location and it should be placed in the empty matrix. Now the exact moving object will be extracted without losing any data.

RESULTS AND CONCLUSION

Background suggestion method as the name propose is a process of separating the foreground objects from the background in the sequence of video frames. Background subtractions are widely used for detecting moving objects from a still camera. It is not fixed but must adapt to a condition of spiritual awareness changes such as sudden, small changes etc. The fundamental logic of detective work moving objects from the distinction between the present and the previous frame, known as moving object image and this technique is taught as frame distinction technique. The colour image is taken to extract the object and so there won't be any loss in the information, whereas if grey scale is used then some part of information would be lost.

The above result obtained after obtaining matrix mapping algorithm. It's clearly noted that without losing any data the moving object extracted.

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