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Analysis of Video Streaming based on Canny Edge Detection Algorithm

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ABSTARCT : In this paper, an improved canny edge detection algorithm is represented to obtain moving and robust edges. Compared with ordinary Canny method, there are four improvements to reduce computation time and ensure detection accuracy. Firstly, 2-D Gaussian filter is decomposed into two independent 1-D filters, i.e. row filter and column filter, which allows calculate image gradient in parallel way. As a result, computation time is reduced highly. Secondly the method uses two thresholds, to detect strong and weak edges, and includes the weak edges in the output only if they are connected to strong edges. Detection is a well developed field on its own within image processing. The main features can be extracted from the edges of an image which significantly reduce the amount of data to be processed while preserving the important structural properties of an image In this paper which is based on the experimental result shows a new approach to image processing from video footage using edge detection and morphological image processing. We have proposed a new idea of acquiring processed image for detecting an inflamed with the help of canny edge detection will be more efficient and easier. Our results have shown an excellent accuracy percentage Accuracy 97.618 % Sensitivity 98% Specificity 98% Time 0.86 sec Walking Speed 2.12 sec.

Keywords: edge detection, Image restoration, Canny Edge, Image resolution, Contour, Gaussian filter

I. INTRODUCTION

Edge detection is the concept for a set of mathematical methods whose aim is to identify the points in a digital image at which the image brightness changes sharply or, more formally, has discontinuities. Edges typically occur on the boundary between 2 regions [2]. Edge is defined as the boundary pixels that connect two separate regions [3] with changing image amplitude attributes such as different constant luminance and tristimulus values in an image. Edge detection is a well developed field on its own within image processing. The main features can be extracted from the edges of an image which significantly reduce the amount of data to be processed while preserving the important structural properties of an image [12][1]. The example of an original image. Video moving target detection is one of the basic problems of intelligent video processing [1-2]. It provides support for the following target classification, behaviour understanding and soon, and it is widely Used in the military and social security fields. In traditional moving target detection methods, three frames difference method [3] is easy to operate, and has good real-time performance, it could extract the target by differencing the consecutive two frames, but in this process, it could be a hole phenomenon [4,16] on condition that the gray value is closely of consecutive frames in the same location. Especially when some parts of the target are not move, the difference results would be edge absence heavily, in this case, the morphological filling operation is not work well on obtaining a whole target. Image after edge detection are shown in Fig.1 respectively below

Fig. 1. Edge detection.

Use line features to detect text objects in videos. First, an improved canny detector with two phase thresholding is performed to compute edges in the image. All edge lines are expressed as lists using an 8-connected component algorithm and the non-text lines are eliminated by geometric constraints. Then, height, area, centre position, and edge density are extracted from the bounding box of each line in the list to form a line vector graph.

By grouping all the neighbouring lines together based on the line vector graph using the 8-connected component algorithm again, the image is divided into several isolated regions with closely distributed lines. After removing non-text regions by distribution and number of edges and region aspect ratio, the final text regions are extracted. By combining this method with the temporal redundancy of video [8][9][3][13].

Edge-Based Approaches: Edges are a reliable feature of text regardless of colour/intensity, layout, orientations, etc. Edge strength, density and the orientation variance are three distinguishing characteristics of text embedded in images, which can be used as main features for detecting text. Edge-based text extraction algorithm is general-purpose method, which can quickly and effectively localize and extract the text from both document and indoor/ outdoor images. Text tends to have complex shapes and high contrast with the background. The algorithms in this category reaching this by looking for edges in the image. Alignment, size, and orientation features of the edges are used to discriminate text regions from other "edge" portions of an image. Edge detection is the process of localizing pixel intensity transitions. The edge detection has been used by object recognition, target tracking, segmentation, and etc. Therefore, the edge detection is one of the most important parts of image processing and video processing analysis of various video image edge detection methods [4, 10].

II. IMPLEMENTATION OF CANNY EDGE

All video in this work are produced by this implementation. A few things should be noted that the (source) image and the thresholds can be chosen arbitrarily. Only a smoothing filter with a standard deviation is supported. The implementation uses the "correct" Euclidean measure for the edge strengths. The different filters cannot be applied to edge pixels. This causes the output image to be 8 pixels smaller in each direction. However, our implementation uses the iterative approach. First all weak edges are scanned for neighbour edges and joined into groups. At the same time it is marked which groups are adjacent. Then all of these markings are examined to determine which groups of weak edges are 6 connected to strong edges (directly or indirectly). All weak edges that are connected to strong edges are marked as strong edges themselves. The rest of the weak edges are suppressed.

III. RESULT AND ANALSYIS

The flow chart of proposed model. It shows how the algorithm is set up. After taking frames from video footage we have done pre-processing in where we have converted the RGB image into Gray image. Then we use median filtering for removing the noise and have done image binarization for edge detection. After pre processing the images we find the edges of the images by canny edge detection and we have done morphological image processing where used close method, erode method and hole filling method. At the end we create a window for the interested region.

Pre Processing: Pre-processing is done to clear out distortion from an image or increase some particular feature of that image for further use. Here both the input and output is intensity images. Pre-processing literally means that after applying one particular algorithm on an image the output that we get run through another algorithm and the desired result in an enhanced version of that image. There are certain methods of pre-processing image. Such as

- Pixel brightness,
- Image restoration,
- Image resolution
- Median Filtering

Pixels: Each of the pixels that represent an image stored inside a computer has a *pixel value* which describes how bright that pixel is, and/or what colour it should be. In the simplest case of binary images, the pixel value is a 1-bit number indicating either foreground or background. For a greyscale images, the pixel value is a single number that represents the brightness of the pixel. The most common *pixel format* is the *byte image*, where this number is stored as an 8-bit integer giving a range of possible values from 0 to 255. Typically zero is taken to be black, and 255 is taken to be white. Values in between make up the different shades of gray [15, 7].

Image Restoration: It is the operation of taking a corrupt/noisy image and estimating the clean, original image. Corruption may come in many forms such as motion blur, noise and camera mis-focus [1]. Image restoration is performed by reversing the process that blurred the image and such is performed by imaging a point source and use the point source image, which is called the Point Spread Function (PSF) to restore the image information lost to the blurring process. Image restoration is different from image enhancement in that the latter is designed to emphasize features of the image that make the image more pleasing to the observer, but not necessarily to produce realistic data from a scientific point of view. Image enhancement techniques (like contrast stretching or de-blurring by a nearest neighbour procedure) provided by imaging packages use no *a priori* model of the process that created the image.

Image Resolution: Refers to the number of pixels in an image. Resolution is sometimes identified by the width and height of the image as well as the total number of pixels in the image., an image that is 2048 pixels wide and 1536 pixels high (2048 × 1536) contains (multiply) 3,145,728 pixels.

Median Filtering: The previous processing done to the image can suppress isolated out-of-range noise, but the side effect is that it also blurs sudden changes such as line features, sharp edges, and other image details all corresponding to high spatial frequencies. The median filter is an effective method that can, recognize out-of-range isolated noise from legitimate image features such as edges and lines. Specifically, the median filter replaces a pixel by the median, instead of the average. So we considered a group of non linear filters that has a output of linear combination in a particular image of the inflamed appendicitis.

If we assume that the white noise with signal of linear constant is used to minimize the mean square error. There is a number of algorithm that exist to help doing the median filtering with lowest complexity value of O (n^2). Impulse noise reduction algorithms can be classified in to two classes: linear and nonlinear algorithms. Many image de-noising algorithms for correcting the images corrupted by impulse noise. In a linear technique, the noise reduction method is applied linearly to all the pixels in the input image without checking for the corrupted pixels, whereas in non-linear methods corrupted and no corrupted pixels are determined first then the reduction techniques are applied for correcting the corrupted pixels only.

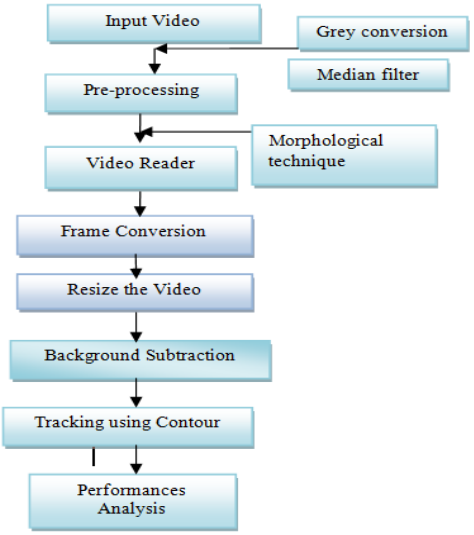

Fig. 2. Proposed flow Diagram.

Other methods that use local neighbourhood of the processed pixel.

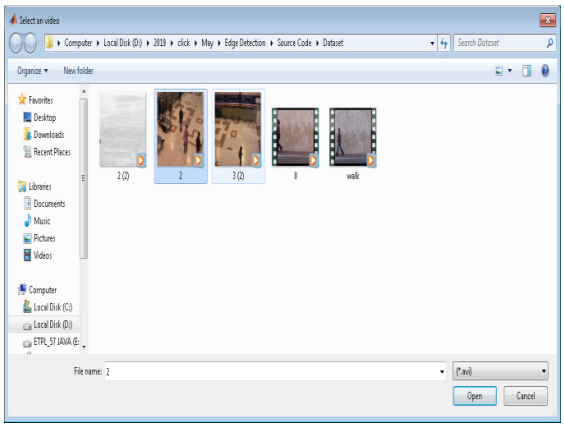

Fig. 3. Video data set.

Mage pre-processing is aimed to correct certain degradation in the image; such as correcting brightness due to the low light where the image was taken, quality improvement needed if the device has not been able to do that and for that knowledge about the acquisition device is needed.

Some of the above picture pre-processing has been used here in our proposal and they are: RGB to Greyscale, Median filtering and image linearization. Image pre-processing methods use the considerable redundancy in an image.

Fig. 4. Original video data set.

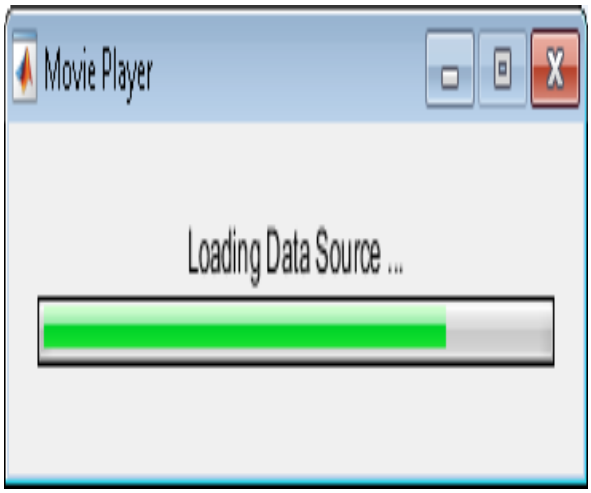

Fig. 5. Loading video data set.

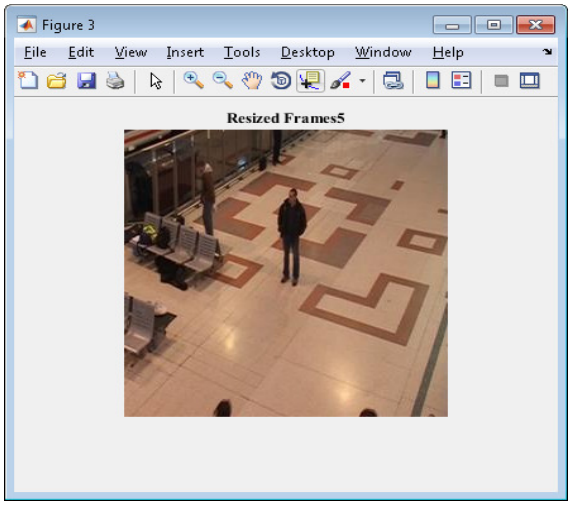

Fig. 6. Input video (b) Gray image (25th frame).

TV cameras or some other high definition video cameras have automatic system that helps to work under unstable illumination condition. Laparoscopic video capturing camera cannot have that due to limitation of being used inside the human body and that is why pre-processing is needed to be done on the images produced by it. After dilation we erode the resulting image. In erosion perform vector subtraction of set elements. After eroding the image we get thinner edge as we perform subtraction methods between the region and its neighbour value. Thus we get more precious image of the region we are working on. After second time erosion we get the below images then mapped the images to RGB images.

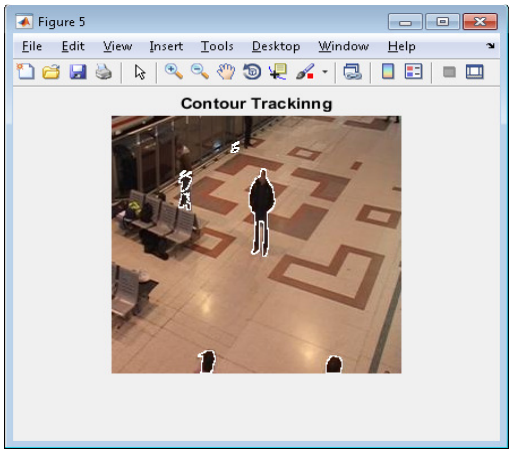

Fig. 7. Edge extractions.

Binarization is the process of converting a pixel image into binary image. It is the basis of segmentation. After converting the image that we got from the Laparoscopic footage to gray scale a threshold is applied. This applied threshold can be fixed or be depending on clustering algorithm.

Table 1: Comparison Table.

	Existing Method [1]	**Proposed Method**			
Parameters	**Video 1**	**Video 1**	**2**	**3**	**4**
Accuracy (%)	-	97.618 %	97.617	97.6	97
Sensitivity (%)	-	98%	98	98	98
Specificity (%)	-	98%	98	98	98
Time(sec.)	0.8741	1.20 sec	0.4975	0.9231	0.93
Walking Speed(sec.)	2.1794	2.655 sec	6.43	3.3974	3.44

A wrong selection of threshold value may misinterpret the background pixel and can classify it as object and vice versa, resulting in overall degradation of whole surgical performance. Binarization is mainly needed for the recognition of the object and in this case it is the inflamed appendicitis.

The part of the abdomen where the surgery will take place will have many layers and surrounding objects. We had to differentiate the appendicitis from them. Finding the depth and exact position of it.

IV. CONCLUSIONS

In this paper based on the experimental result shows a new approach to image processing from video footage using edge detection and morphological image processing. We have proposed a new idea of acquiring processed image for detecting an inflamed with the help of canny edge detection will be more efficient and easier. Our results have shown an excellent accuracy percentage Accuracy 97.618 % Sensitivity 98% Specificity 98% Time 0.86 sec Walking Speed 2.12 sec. In this work of pre-processing so that we can achieve good visualization and interpretation of an image. In our work we have suggested the use of Gaussian filter which filters the image and checks the problem of over-segmentation. We selected a marker as a seed point to segment the image with respect to back ground and fore ground of an image. The seed evolves into a curve using the active contour technique. And the work was successful with accurate identification of the background and the foreground of the image. The work can be extended by selecting the seed automatically taking some characteristics of image into consideration like shape, size, texture, etc.

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