



Iris Melanoma Detection Using Image Processing

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ABSTRACT: Iris which is that the colored a part of the attention that surrounds pupil. By image process techniques diagnosis of iris tumor are going to be easier. This paper aims to develop a system that mechanically detects the abnormalities of tumor in iris. This system propose completely different image process techniques like image filtering, adding, canny edge detection and image fusion. These ways area unit employed in order to research and section tumor in iris.

KEYWORDS: Iris tumor, canny edge detection, image fusion

I. INTRODUCTION

The eye is structured as follows: the albuginea that is that the white part. The iris: the black a part of the attention excluding the pupil that is that the black half into the iris. Eye willcer can be outlined as Associate in Nursing lawless growth of abnormal cells. This may be created in or round the eye and so become a mass (tumor). A growth may be a mass of tissues shaped by Associate in nursing uncontrolled growth of cells. There area unit differing types of eye tumors, and every kind will have an effect on sure components of the attention. the attention growth is referred to as as ocular that is that the medical name of the attention. It is intraocular, means that within the attention or extra-ocular which suggests that it affects the surface a part of the attention. the foremost common forms of the intraocular iris tumors area unit the Cyst, Nevus, and malignant melanoma. The cyst may be a nonmalignant neoplasm that takes place within the stroma; the front of the iris, or within the iris pigment epithelium; the rear of the iris. Nevus may be a benign pigmented growth iris growth featured as yellow spots within the iris. It may be round the iris or at a lower place the membrane. mar incorporates a rare malignancy transformation into ocular melanoma; a cancer of the eye. The skin cancer may be a malignant neoplasm which will begin within the skin or within the lining of the attention. The skin cancer typically grows and develops within the tissues within the middle layer of the eyeball. This middle layer is termed the bodily structure and contains the iris. This iris growth has several signs and symptoms like the dark spots within the iris space, the modification in size or maybe the form of the pupil, and also the changes within the vision and alternative signs.

Since system is a picture process system that stimulates the human vision, thus it will sight the primary 2 signs that area unit the dark spots and also the modification within the size and form of the 3 discussed iris tumors. The projected system aims to automatically sight the growth into the iris region. this will be achieved by extracting the tumorous areas exploitation completely different image process techniques mentioned within the next sections. This paper is structured as follows: the primary section is AN introduction concerning the attention tumors and also the projected system. The second one could be a methodology of the system within which we offer flowcharts and figures that specify the system stages and also the methods used. within the subsections of the second half we have a tendency to make a case for each image process technique that's employed in the system. Section 3 is that the experimental results that show the system efficiency. The last section could be a conclusion concerning the developed approach.

II. ITDS METHODOLOGY

In this paper associate degree iris neoplasm detection system is developed. The system is enforced mistreatment Matlab programming language(Matlab 2013 package tools). ITDS is predicated on totally different image process techniques employed in order to stimulate the human visual review for sleuthing the iris neoplasm into a watch. the attention pictures (fig.1&2) are obtained from a public info out there on the web. the pictures are converted 1st to grayscale pictures, and so these pictures are filtered mistreatment median filter so as to reinforce their quality. The background image is extracted so as to be then subtracted from the initial one. Image adjustment is applied to the resulted image, so

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will increase its pixels intensity that clears that space that's then metameric within the next step, the sting detection mistreatment smart operator. when extracting the region of interest, the unwanted elements are removed mistreatment associate degree algorithmic program. The last technique is to superimpose the extracted ROI on the initial grayscale image mistreatment image fusion so as to mark the neoplasm region onto the original image. The flow chart below shows our projected system algorithmic program by setting in turn the tem algorithmic program by setting in turn the ways used. melanoma image undergoes all antecedently dis-cussed image process techniques so as for the tumorous area to be metameric and so to mark the region of interest on the initial grayscale image mistreatment image fusion.



Fig. 1: Normal eye



Fig. 2: Eye with an iris tumour

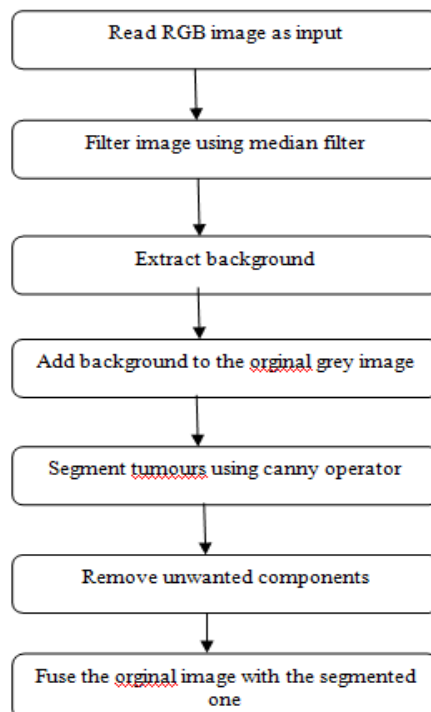


Fig. 3: Flowchart of the proposed algorithm

2.1 GRAY SCALE CONVERSION

The first step is to convert the RGB image to grayscale. This conversion is done using the luminosity method which relies on the contribution of each color of the three RGB colors. Using this method, the grayscale image is brighter since the colors are weighted according to their contribution in the RGB image not averagely [7].

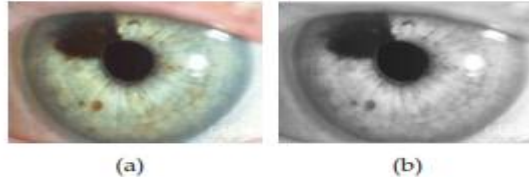


Fig. 4: (a) RGB image of an eye with iris tumor, (b) Grayscale converted image of (a).

2.2 Smoothing using median filtering

A smoothing filter is mainly used to reduce noise in an image. In a specific pixel, it takes into consideration the neighbor pixels to that studied pixel. The pixels are filtered out and the noise is reduced by taking the neighboring pixels into account. One of the most useful filters used for smoothing images is the median filter. This type of filters is used to reduce impulsive noise or the salt-and pepper in an image with preserving the useful features and image edges [7]. Median filtering is a linear process in which the output of the being processed pixel is found by calculating the median of a window of pixels that surrounds that studied pixel [7].

2.3 Background Extraction Morphological operations are used for extracting of background. Operations can be done by applying a structuring element to an input image, resulting in an output image of same size. Commonly used morphological operations are erosion and dilation.

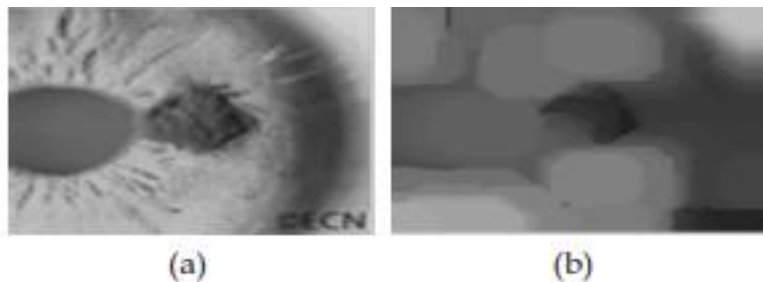


Fig. 5: (a) Original grayscale image of iris tumor (b) Removed background.

2.4 Adding images

This operation is adding the background image to the original image. It means that 2 images can be added to its first pixel to obtain second image, which will increase its pixel.

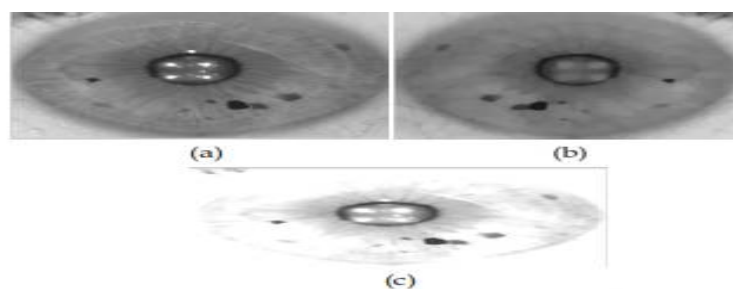


Fig. 6: (a) Original grayscale image, (b) Removed background, (c) Added image.

2.5 Image intensity adjustment

The images then undergo intensity adjustment in which the input image's intensities are mapped to a new range of in the output image. This can be done by setting the low and high input intensity values that should be mapped and the scale over which they should be mapped.

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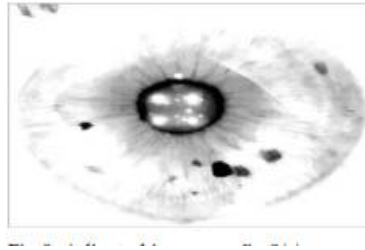


Fig. 7: Adjusted image of fig.8(c).

2.6 Segmentation using canny edge detection

Segmentation is the process of partitioning the image into different and many regions. This process can be done using different methods. The most common method for segmentation is the edge detection using canny operator. The latter is an algorithm used for detecting range of edges in an image. It detects the intensity discontinuities and finds boundaries of objects in an image by classifying pixels into edges. A pixel is classified as pixel if the gradient magnitude of it is greater than those of its both neighbors on the left and right sides .

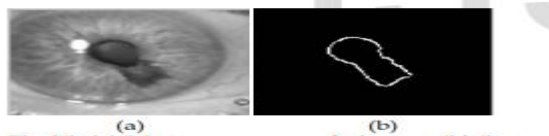


Fig. 8: (a) Iris tumor grayscale image, (b) Segmented tumor using canny edge detection.

2.7 Removing unwanted components

The images then undergo an operation called as area opening. This technique is used to remove the un-wanted components into an image using a matlab function “bwareaopen”. This technique is to remove from a binary image all the connected components (objects) that have pixels lower than a set value . After applying this technique we could get a result image showing the segmented region of interest (tumor region).

2.8 Image fusion

For the purpose of superimposing the extracted region of interest on to original gray scale image, technique called image fusion is used. Image fusion can be categorized in to three categories pixel level, feature level and decision level. In this system pixel level fusion is used.

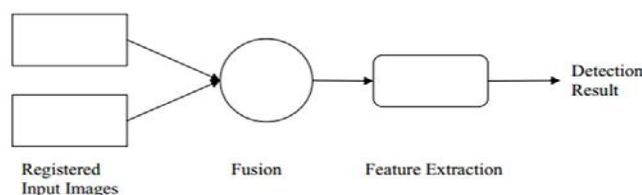


Fig. 9: Pixel level image fusion

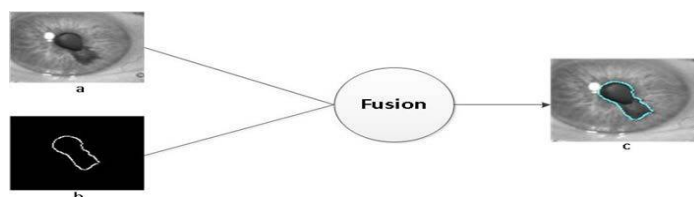


Fig. 10: Image fusion (a) original image, (b) segmented tumor, (c) Fused image

2.9 Experimental results

The proposed iris tumor detection system was implemented using 2.8 GHz PC with 4 GB of RAM, Windows 7 OS and Matlab 2013 software tools. The system has been tested using 100 RGB images of iris tumors (melanoma, cyst, and nevus) and normal irises obtained from the online database: Miles Research [5]. The images are of size 431*688, however; they are directly converted to grayscale images of size 250*250. The experimental tests of the suggested system show efficient and successful results for the detection and segmentation of the tumor regions in an affected iris image. The images consist of 70 tumorous images (with tumor) and 30 normal images (without a tumor). The overall detection ratio is 98.5 % which is a sufficient result for such detection system.

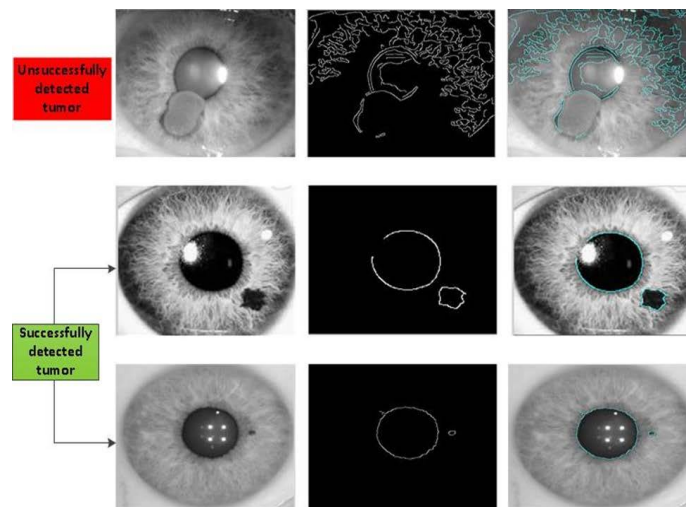


Fig. 11: Images of some successfully and unsuccessfully segmented tumors.

2.10 Conclusion

This paper presented a novel approach for the detection of iris tumor using segmentation and image fusion techniques. The developed system read the infected iris image, process it and marks the tumorous region including pupil for the affected images. The system has been tested for both normal and abnormal images. Experimental results prove that this proposed system is effective and can be implemented in to real life applications.

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