

Early Stage of All Disease Diagnosis Application Using Iris Image in Image Processing

S.Jeya Anusuya, M.Krishnamoorthy, Raadhika.T.K, Ramadevi, R,Sarulatha.M

Associate Professor, Department of Electronics and Communication Engineering, T.J.S Engineering College,
Peruvoyal, India

Assistant Professor, Department of Electronics and Communication Engineering, T.J.S Engineering College,
Peruvoyal, India

Student, Department of Electronics and Communication Engineering, T.J.S Engineering College, Peruvoyal, India

Student, Department of Electronics and Communication Engineering, T.J.S Engineering College, Peruvoyal, India

Student, Department of Electronics and Communication Engineering, T.J.S Engineering College, Peruvoyal, India

ABSTRACT: Iridology is the science that allows a health practitioner or non expert to learn the signs in the iris of the eye that is capable of indicating the presence of abnormalities in the body, including basic genetics, toxin deposition, dam circulation, and other weaknesses. Research on computerized iridology had been done before. This project presents a computerized iridology system for detecting abnormality conditions (all kinds of diseases) which is designed through several stages such as pre-processing, auto cropping, segmentation, feature extraction and classification using Algorithm. Our health abnormalities detection system gives contribution for the patient. This method also used for security purposes using Iris.This model transforms the number of iris templates in the probe into a homogenous iris template corresponding to the gallery sample. In addition, a weight map on the reliability of binary codes in the iris template can be derived from the model. The learnt iris template and weight map are jointly used in building a robust iris matcher against the variations of imaging sensors, capturing distance and subject conditions. Extensive experimental results of matching cross sensor, high-resolution vs low-resolution and, clear vs blurred iris images demonstrate the code-level approach can achieve the highest accuracy in compared to the existing pixel-level, feature level and score-level solutions.

I. EXISTING METHOD

In existing method, thresholding algorithm is used to detect the abnormalities in human body. It undergoes manual calculations. Many techniques are based on mathematical morphology, neural networks, and pattern recognition. It does not provide the accurate result. It is used to detect only the heart abnormalities of the body.

II. PROPOSED MODEL

Iris biometrics provides a reliable method for personal identification in most mission-critical applications. Great advancement in iris recognition can achieve extremely high accuracy of identity verification with uniform iris sensors, close imaging distance, and cooperative users. The probe and gallery iris images captured in controlled conditions are of high-quality and they facilitate effective matching. However, other applications are needed to extend iris recognition to less constrained scenarios. For example, iris at a distance and iris on the move systems have been developed for surveillance applications. Similarly, iris recognition modules are integrated into mobile devices. It is

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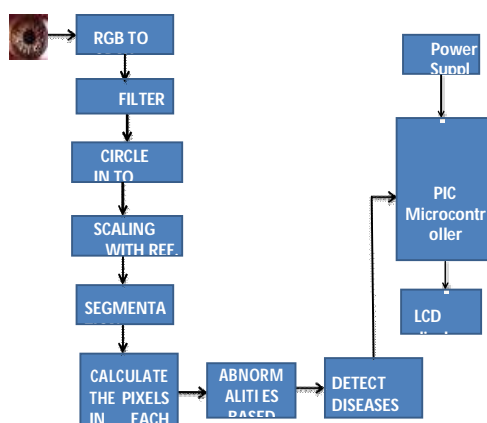
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possible to use different types of iris sensors to build a large-scale or wide-area identity management system. The significant differences amongst multiple types of iris sensors such as optical lens, illumination wavelength and image resolution determine the cross-sensor variations of iris texture patterns. Previous applications adopted the same type of iris sensors for homogeneous iris recognition.

III. PROPOSED SYSTEM

In our proposed method, we have used iris image to detect heart disease in human body. In order to make the process easier, RGB image will be converted into gray scale image which will be in one dimensional. Median filter is used to remove the noise. After preprocessing, thresholding will be done to extract the region of abnormal. By this system, we can detect the abnormalities of the human.

IV. BLOCK DIAGRAM



Iris in Medical field

One of the most popular alternative medicines is Iridology. It studies iris of eye to detect the condition of body organ, genetic strength and weakness. This method believes that patterns on the iris reflect body condition. Some European countries such as Germany, Switzerland, and Sweden has been known Iridology in quite a long time and more than 80 percent of Heilpraktiker (non-medical health practitioners) to practice this method. Iridology history began in 1800 when the Hungarian physician Ignaz iris observe changes in some patients who are recovering from illness. Then he became the first to create the Chart Iris. Dr. Bernard Jensen revised chart and is used internationally. According Iridology, certain areas of human iris represents a particular organ conditions. Combining iridology and image processing produce a computerized detection system health to the body through the iris. Several studies have been conducted to analyze the iris through a computer. Using Visual C # produces a high percentage in the detection of renal conditions. Using Bayes algorithm also produced high percentage to classify the liver abnormalities. To produce a high percentage of success is very dependent on the successful take appropriate iris image from the original image. Now, medical treatment using alternative ways are more popular. In USA and Europe, alternative medicines have been started earlier. In fact, patients in USA who use alternatives medicine are greater than modern medicine, but in Europe are more varieties. In Indonesia, there is a lot of alternative medicine. People still believe this method has the same result as modern way. In addition to the treatment which has proven effective, this examination cost is cheaper than medical treatment. One of the most popular alternative medicine is Iridology. It studies iris of eye to detect the condition of body organ, genetic strength and weakness. This method believes that patterns on the iris reflect body condition. In this study propose a new method that automatically cuts the iris image. This automated process is a series of image processing in order to obtain the iris image from the

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original image. The original image which is obtained through a digital camera will be processed using computerized order to get the image of the iris. So this research will be able to contribute in the detection of disorders of the heart through the iris of the eye. The produced application will help on giving people information about their heart condition. The users can regularly check without expend a lot. Pre- processing is important phase that impact on iris recognition. This phase will increase the quality of the original image and determine the success result of auto cropping. First step, the real image will be processed to remove noise that exist. Next step is sharpening to raise the quality of image. Then, the sharpened image will convert to black and white. The ratio of black and white will be observed using histogram. So, from it can be performed the automatic cuts to get the iris image.

Experiments

Algorithm:

The algorithm used in this paper is FCM for segmentation process and SVM for Feature extraction. There are 3 stages in this algorithm:

1. Gray conversion
2. Filter selection in noise reduction
3. Rectangular conversion
4. Threshold in segmentation
5. Binary conversion
6. No of Pixels calculation

V. PREPROCESSING

Preprocessing techniques

Preprocessing techniques are needed on colour, grey-level or binary document images containing text and/or graphics. In character recognition systems most of the applications use grey or binary images since processing colour images is computationally high. Such images may also contain non-uniform background and/or watermarks making it difficult to extract the document text from the image without performing some kind of preprocessing, therefore; the desired result from preprocessing is a binary image containing text only. Thus, to achieve this, several steps are needed, first, some image enhancement techniques to remove noise or correct the contrast in the image, second, thresholding to remove the background containing any scenes, watermarks and/or noise, third, page segmentation to separate graphics from text, fourth, character segmentation to separate characters from each other and, finally, morphological processing to enhance the characters in cases where thresholding and/or other preprocessing techniques eroded parts of the characters or added pixels to them. The above techniques present few of those which may be used in character recognition systems and in some applications; few or some of these techniques or others may be used at different stages of the OCR system. The rest of the chapter will present some of the techniques used during the preprocessing stage of a character recognition system.

Image enhancement techniques

Image enhancement improves the quality of images for human perception by removing noise, reducing blurring, increasing contrast and providing more detail. This section will provide some of the techniques used in image enhancement.

Spatial image filtering operations

In image processing, filters are mainly used to suppress either the high frequencies in the image, i.e. smoothing the image, or the low frequencies, i.e. enhancing or detecting edges in the image. Image restoration and enhancement techniques are described in both the spatial domain and frequency domain, i.e. Fourier transforms. However, Fourier transforms require substantial computations, and in some cases are not worth the effort. Multiplication in the frequency domain corresponds to convolution in the time and the spatial domain. Using a small convolution mask, such as 3x3, and convolving this mask over an image is much easier and faster than performing Fourier transforms and multiplication; therefore, only spatial filtering techniques will be presented in this chapter. Images captured often

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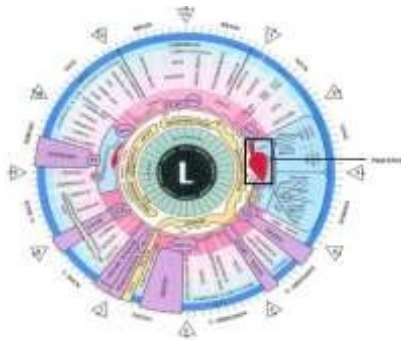
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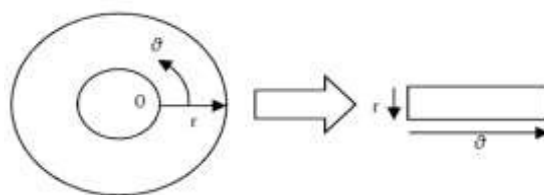
may be influenced by noise; however, the resulting images may not provide desired images for analysis. In addition, in images with acceptable quality, certain regions may need to be emphasized or highlighted. Spatial processing is classified into point processing and mask processing. Point processing involves the transformation of individual pixels independently of other pixels in the image. These simple operations are typically used to correct for defects in image acquisition hardware, for example to compensate for under/over exposed images. On the other hand, in mask processing, the pixel with its neighbourhood of pixels in a square or circle mask are involved in generating the pixel at (x, y) coordinates in the enhanced image.

Segmentation Method

Segmentation process consists of several steps. The first of all is input image conversion to chosen feature space, which may depends of used clustering method. In our case is input image converted from RGB color space to $L^*u^*v^*$ color space and L^* , u^* and v^* values are features respectively attributes for fuzzy c-means clustering method.



IRIS CHART



VI. CIRCULAR PLOT TO RECTANGULAR PLOT

Iris Cropping

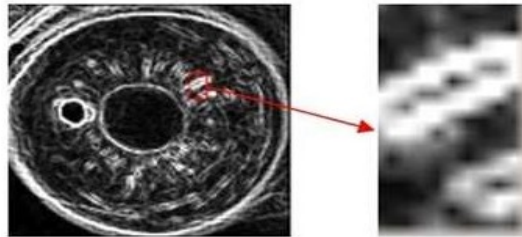
As previously described, the cropping process should be performed in order to obtain the iris image. This study is performing the binary and histogram method. Binary method converts the image into a binary image. Then, the cumulative distribution histogram of color or black and white vertically and horizontal are being calculated. By doing so, we can see which areas are predominantly black and predominantly white.

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IRIS RECOGNITION

Automated authentication is a prominent goal in computer vision for personal identification. The demand of automated personal identification system has been increased for sake of security. Due to various cyber-threats, there is a need for an identification system identifying humans without depending on what they possess or remember. Iris recognition is a popular biometric method among the various biometrics traits like fingerprints, hand-geometry, palm-geometry, face, iris, retina, voice, vascular or vein, gait, handwritten signatures, keystrokes, DNA and ear; because it has more accuracy, greater speed and simplicity as compared to other biometric traits.

Iris recognition is a method of identifying people based on unique patterns within the ring-shaped region surrounding the pupil of the eye. The iris usually has a brown, blue, gray, or greenish color, with complex patterns that are visible upon close inspection. Because it makes use of a biological characteristic, iris recognition is considered a form of biometric verification. In order for iris recognition to provide accurate and dependable results, the subject must be within a few meters of the camera. Some control mechanisms must be implemented to ensure that the captured image is a real face, not a high-quality photograph. The ambient lighting must not produce reflections from the cornea (the shiny outer surface of the eyeball) that obscure any part of the iris. The subject must remain stationary, or nearly stationary, with respect to the camera, and must not be hostile to the process. Certain types of contact lenses and glasses can obscure the iris pattern. The iris is the colored ring of muscle that opens and shuts the pupil of the eye like a camera shutter. The colored pattern of our irises is determined genetically when we're in the womb but not fully formed until we're aged about two. It comes from a pigment called melanin. More melanin gives you browner eyes and less produces bluer eyes. Although we talk about people having "blue eyes," "green eyes," "brown eyes," or whatever, in reality the color and pattern of people's eyes is extremely complex and completely unique: the patterns of one person's two eyes are quite different from each other and even genetically identical twins have different iris patterns.

MATLAB

MATLAB is a high-performance language for technical computing. It integrates computation, visualization, and programming in an easy-to-use environment where problems and solutions are expressed in familiar mathematical notation. Digital image processing techniques help in manipulation of the digital images by using computers. The three general phases that all types of data have to undergo while using digital technique are pre-processing, enhancement, and display, information extraction.

It includes:

- Image display and printing
- Image editing and manipulation
- Image enhancement
- Feature detection
- Image compression

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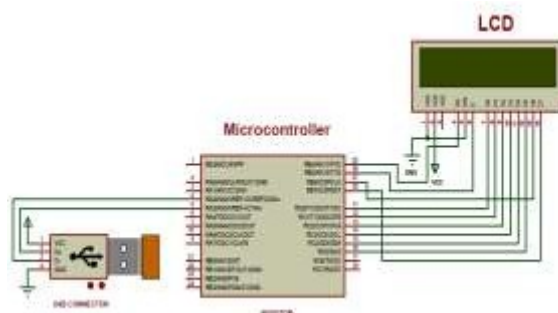
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IMAGE ENHANCEMENT

Image enhancement is the modification of image by changing the pixel brightness values to improve its visual impact. Image enhancement involves a collection of techniques that are used to improve the visual appearance of an image, or to convert the image to a form which is better suited for human or machine interpretation. Enhancement algorithms are generally interactive and application dependent. Some of the enhancement techniques are:

- Contrast Stretching
- Noise Filtering
- Histogram modification

Interfacing Pic controller with lcd



VII. CONCLUSION

Iridology is one of the most popular treatments. To perform iridology and computation process needs a good cropping of iris image. This research proposed a method of cutting the iris part automatically. The image is taken from Mugi Barokah clinical. With those approaches can produce three results of cutting, success, scant, and fail. This application has the higher percentage of success result than the others result. To get successful cutting, the lighting should be appropriate and focused towards the iris. In addition, the distance of the image captured should be noted back. If the iris image data of good quality, the lighting is right, then the result will be accurate and cutting slices high degree of accuracy. However, if the result of improper cutting slices, it will affect the less precise segmentation region as well, and the results can't correct classification. A novel method for iris segmentation has been proposed. A new pressure force was designed and integrated with the GVF active contour to allow the contour to expand or shrink, which in turn helps to achieve robust iris segmentation. The proposed iris segmentation process consists of two models: pupil segmentation and iris segmentation. For pupil segmentation, two schemes were proposed to determine the approximate parameters of the pupil in the iris images which are captured under visible and NIR light. These parameters were then used to set the initial mask for the active contour. Initializing the active contour near the desired object boundary helps not only to reduce the execution time by minimizing the number of iterations, but also achieves robust segmentation as the search region is limited by the desired object. On the other hand, for iris segmentation, the line Hough transform was employed for eyelid detection. Hence, if the eyelid is closed or covering the pupil, the contour will shrink from the initial mask which is set to be larger than the iris. In contrast, if the eyelid is not close to the pupil, the contour will expand from the initial mask which is set outside the pupil boundary. The proposed scheme is robust in finding the exact iris boundary and isolating the eyelids of the iris images. Moreover, noncircular iris normalization helped to effectively unwrap the segmented iris. Therefore, instead of representing the iris and the pupil in terms of circles, the obtained boundaries from the active contour are used.



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