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Smart Lab Detection for Diabetic Patient using Iris Image

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ABSTRACT*:* Iris image analysis for clinical diagnosis is one of the most efficient non-invasive diagnosis methods for determining health status of organs Correct and timely diagnosis is a critical, yet essential requirement of medical science. From the literature, it is found that modern technology also fails in lot of cases to diagnose disease correctly. The attempt is being made to explore the area of diagnosis from different perspectives .The approach used is a combination of ancestor's technology Iridodiagnosis with modern technology. Iridodiagnosis is an alternative branch of medical science, which can be used for diagnostic purposes the various algorithms are developed for image quality assessment, segmentation of iris, iris normalization and clinical feature classification for clinical diagnosis. The entire process shows classification accuracy of 90 ~ 92 percent between diabetic and non-diabetic subjects. This approach will be useful in the diagnosis fields, which are faster, user friendly and less time consuming.

KEYWORDS: Iridodiagnosis, iris, diabetic, SVM classification, feature extraction, retinopathy, and segmentation.

I.INTRODUCTION

Iridology is the branch of science that deals with the study of iris i.e. colored part of the eye. The Iris is the greenish-yellow area surrounding the transparent pupil (showing as black). The white outer area is the sclera; the central transparent part is the cornea. The main intention of irido diagnosis is to collect some information about underlying disease. As technology has developed, there are various methods present for the diagnosis, which are highly reliable and accurate. Irido-diagnosis is consists on empirical science, to look into the particular area of eye for systemic health condition of the specific organ of the body. [1]

Iridology is the diagnosis of medical conditions and “pre-disease states” through abnormalities of pigmentation in the iris. The location of abnormalities on the iris is associated with the location of the medical condition in the body. The iris of the eye is divided into 60 sectors; each sector is corresponding to an inner organ. The iris is associated via multiple nerve connections to the organs. Depending on the features of the iris, classification is done and diabetic is detected. Iridodiagnosis can also be used to detect Gall Bladder Disease in the patient’s iris [4].

II.LITERATURE SURVEY

[1] Prof. S. K. Bhatia, Priyanka Atole & et. al. in his paper discuss the design issue on Methodology for Detecting Diabetic Presence from Iris Image Analysis. In this paper proposing a new framework for Detection of Diabetic from Iris image. [2] Ms. Pragtee Bhagvan Tathe, Mrs. Dr. M. M. Patil in his paper discusses the design issue on Analysis of Health Condition based on Iris Image. In this paper the efficient technique for detection of diabetes has been introduced. It is normally based on the image processing technique on Iris images. [3] Jyoti Prasad, Divya Patel, Megha Jadhav, Prof. Rupali Deshmukh in his paper discusses the design issue on Iris Based Medical Analysis by Geometric Deformation Features. In this paper they proposed an iridology model that consists of the iris image pre-processing, texture feature analysis and disease classification.

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III.PROPOSED SYSTEM

The framework followed in this paper is illustrated in the fig (1).

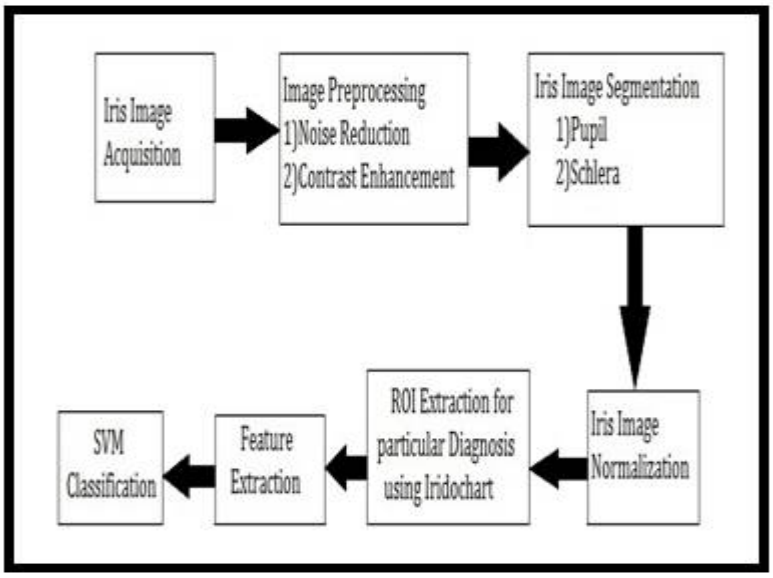

Fig 1: Block diagram of system

A. Elements of block diagram are as follows:

a) Eye Image Acquisition

Initially the eye image is captured with the help of certain cameras, and stored in the database which contains normal as well as abnormal results of iris. Captured eye image looks as shown in fig (2). [1]

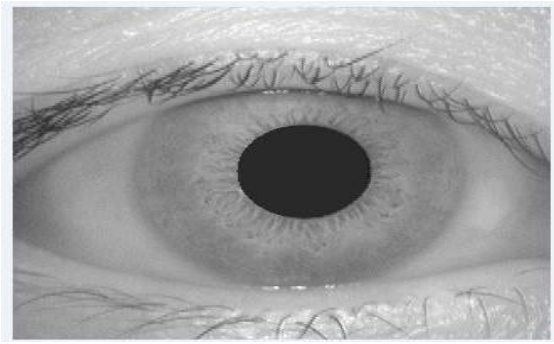

Fig. 2: Captured Eye Image

b) Image preprocessing

The preprocessing is done in order to reduce the presence of noise in the iris image and enhancement is done in order to manipulate an image so that the result is more suitable than the original. It makes the hidden features of an image more available for us. Enhancement is done for improving the details of an image. [1]

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c) Segmentation

Segmentation is done in order to find inner and outer boundries of the iris. By subtracting pupil from sclera, we will get the iris part of an eye [5]. Once the iris region is segmented from an eye, the next step is to transform the iris region into fixed dimentions. After subtraction, we will get the iris pattern into circular shape. [4]

d) Normalization

Normalization is done to convert circular iris pattern into rectangular shape as shown in fig (3).

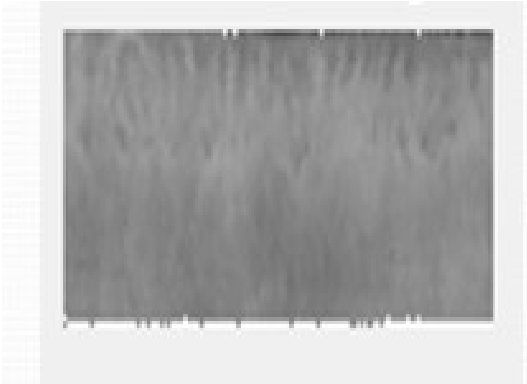

Fig. 3: Normalized Iris

e) ROI extraction

After normalization, the next step which comes into picture is ROI extraction. ROI extraction is nothing but cropping particular portion of normalized iris image according to "irido-chart" as shown in fig(4).[5]

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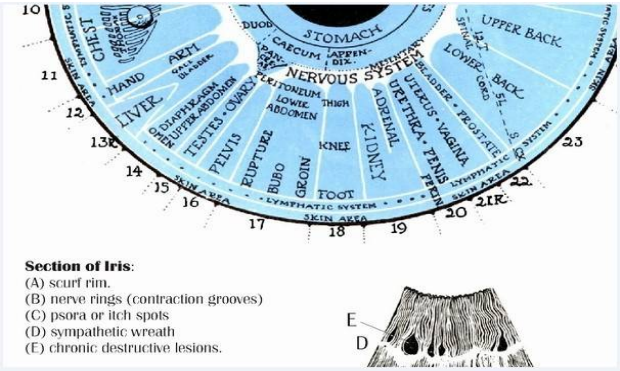

Fig. 4: Irido Chart

f) Feature Extraction

Once the region of interest is find out the various features of that region are carried out. Depending on that features value we can make two different set of normal & diabetes. The different features are as listed below

1. Mean
2. Entropy
3. Standard Deviation
4. Smoothness
5. Kurtosis
6. Variance
7. Homogeneity

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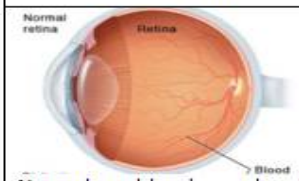
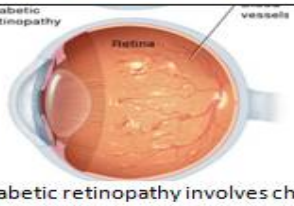
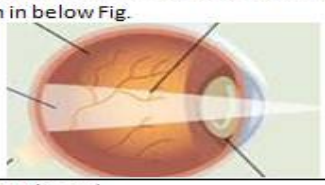
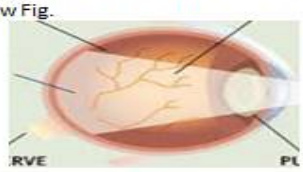
g) SVM classification

SVM is relatively new method of classification and it expands very quickly. SVM use in medicine: SVMs are helpful in text and hypertext categorization as their application can significantly reduce the need for labeled training instances in both the standard inductive and transductive settings. SVMs can be used to solve various real world problems.

IV. COMPARATIVE ANALYSIS

For detection of diabetic retinopathy disease there are some techniques used by authors and also some authors discussed about the preprocessing of fundus images, most of the papers used the green channel for preprocessing because green channel shows the high intensity range as compare to red, green and blue respectively. And also for detection of lesions used morphological open function, morphological close, morphological remove, morphological Skeletonization are used. For performing the image processing techniques authors used some fundus databases like STARE, DRIVE, DIARETDB0, DIARETDB1, Messidor and own database is used. STARE, DRIVE, DIARETDB0, DIARETDB1, Messidor are online database for fundus images with normal and lesions. The following table shows the difference between normal eye and abnormal eye.

NORMAL EYE	ABNORM EYE (Diabetic Patient Eye)
 Normal eye blood vessel as shown in above Fig.	 Diabetic retinopathy involves changes to retinal blood vessel that can cause them to bleed or leak fluid, distorting vision as shown in above Fig.
A ray of light in portion of retina that can be seen through undilated pupil is narrow as shown in below Fig. 	A ray of light in portion of retina that can be seen through dilated pupil is broad as shown in below Fig. 
Vision is cleared	Vision is blured
Paired color vision	Unpaired color vision
Continues vision	Fluctuating vision

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V. FLOWCHART

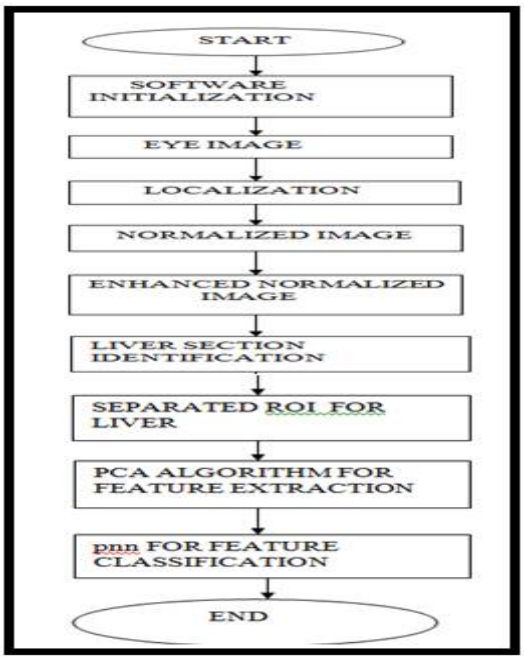

Fig 5: Flowchart of System

VI. APPLICATIONS

- As per diagnosis done using iris image the further treatment of the patient can be done in early stage of diabetes.
- Eye sight can be saved with proper treatment & medicine prescribed.
- It analyzes iris and eye images for the purpose of medical diagnostic.
- It classifies the image based on different diseases.
- It processes the IRIS and eye images for early detection of diseases.

VII. EXPERIMENTAL RESULTS

For clinical feature analysis, improvement is necessary for extraction of deep layer features. For feature extraction various kinds of image enhancement methods like arithmetic operation, histogram equalization, and adaptive histogram equalization have been applied. The detection of diabetes using Iridology includes image acquisition, pre-processing, segmentation, Iris region, Normalization, Feature extraction, Classification. The results shown in fig are up to region of interest extraction for particular diagnosis using iridochart.

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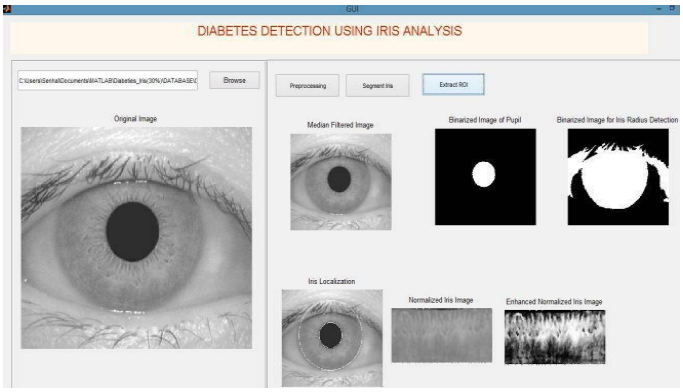

Fig. 6: Simulation of result

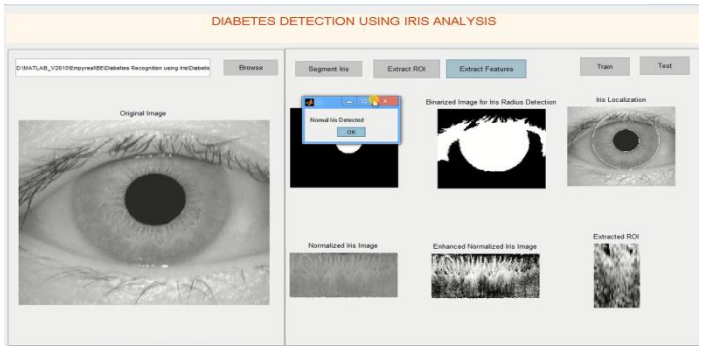

Fig. 7: Normal iris detected

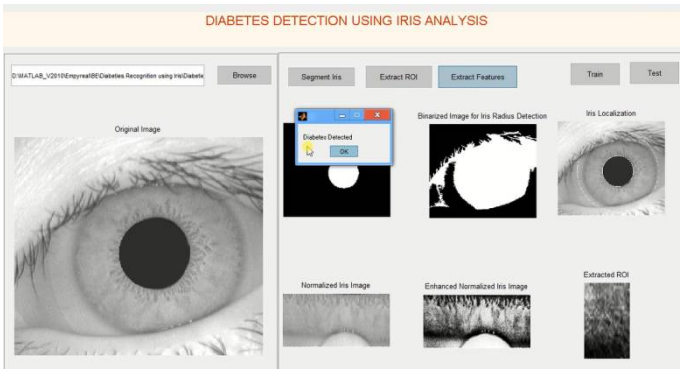

Fig. 7: Diabetes detected

VIII. CONCLUSION

We conclude that there is a simple and non-invasive method to detect diabetic in body and iris recognition is not only mainly for biometric identification but it can also be used as a mean to detect diabetic or maybe diagnose any diseases as iridology claimed it is supposed to be. For clinical feature analysis, enhancement is essential for extraction of deep layer features. For feature extraction various image enhancement methods like arithmetic operation, histogram equalization, and adaptive histogram equalization have been applied. The approach used is a combination of ancestor's technology. Iridodiagnosis is an alternative branch of medical science, which can be used for diagnostic purposes. This approach will be useful in the diagnosis field which is faster, user friendly and less time consuming.

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