

# Iris Analysis for Health Diagnosis

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**Abstract:- Iris is a colored muscle present inside the eye which helps in controlling the amount of light entering the eye. It has a variety of special textural information, which does not get disturbed or tampered easily, making it a best-suited characteristic for biometric systems. Because of its specialty, commonality, reliability and stability, iris patterns serve a major role in several potential recognition or authentication applications. Iris has the potential to portray a person's health which can be interpreted by its patterns, shapes, rings, colors and pigmentation markings, fibers, structures, and changes in the pupil and iris. Taking the advantage of these features of iris we aim to predict the health abnormalities including the organ diseases like heart, liver, kidney, lung, etc.**

**Keywords:-** Iridology, Iris Classification and Segmentation, Tensor-Based Gradient, Multi-Orientations-Gabor Filter, Textural Features, SURF Features, Oriented Support Vector Machine.

## I. INTRODUCTION

After the brain, the Human Eye is the second most complex organ in our body. This muscle has a series of distinct characteristics such as lines, circles, holes, grooves, fibers and stains. A careful and close examination can help us to identify the person's past way of life and cause to diagnose the disease, so that with a change in the way of life in the first step, progression of a disease can be prevented and in the later stages it can be treated. Iridology is an alternative branch of natural medicine practice that performs diagnosis in iris by examining variations in fiber patterns, textures, and

color changes to determine patient healthy status[3]. Experts adopt their observations with the iris charts which divides it into many area. Physicians believe that each of these areas is related to a part of body and iris has the ability to show the change in the functioning of each part of the body. These symptoms reflect health issues in the past or prediction of health problems that may occur in the future for patient's specific disease.

In theory, the left eye corresponds to the left side of the body and the right eye with the right side of the body. In general, the upper body organs (brain, thyroid) are at the top of the iris and the lower body organs (kidneys) are at the bottom of the iris.

Iridology is considered as more of a diagnosis than a treatment. It is not a medical examination or an assured diagnosis of diseases. Rather, it aims to recognize:

- *Toxins locations*
- *Inflammation stages*
- *Weakness or Strength*
- *Health level*
- *Biochemical Deficiencies*

## II. TECHNOLOGIES USED

- *Operating System : Windows/Linux*
- *Development Tool : Python*
- *Computer/laptop*
- *Professional lens 10x option zoom 4.3mm - Video camera for high resolution of the image.*
- *Database : Excel*

**III. WORKING**

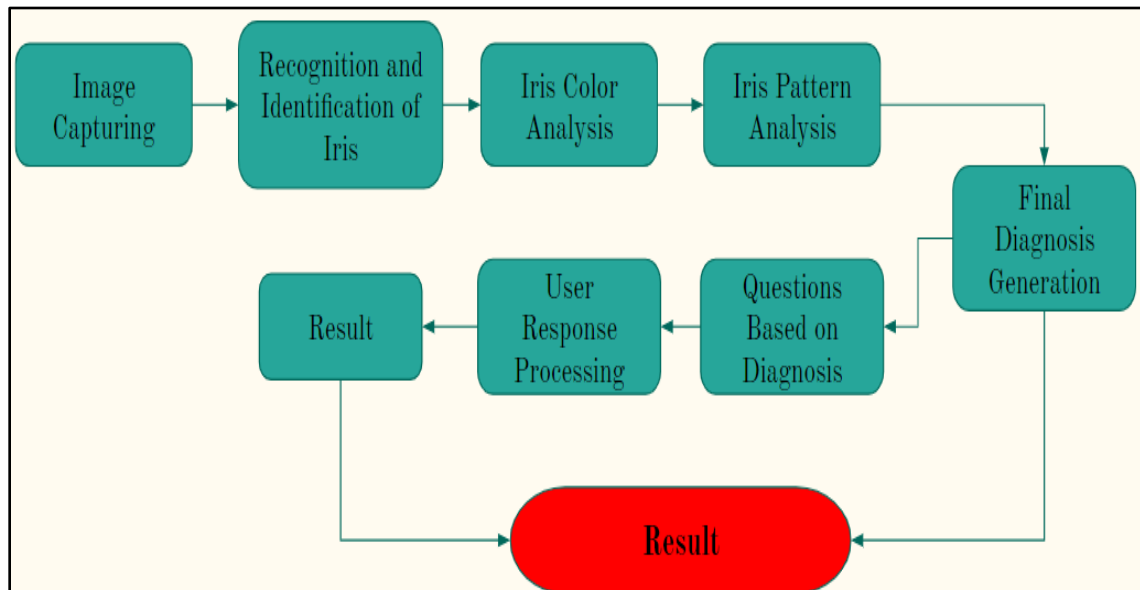


Fig 1:- Architecture

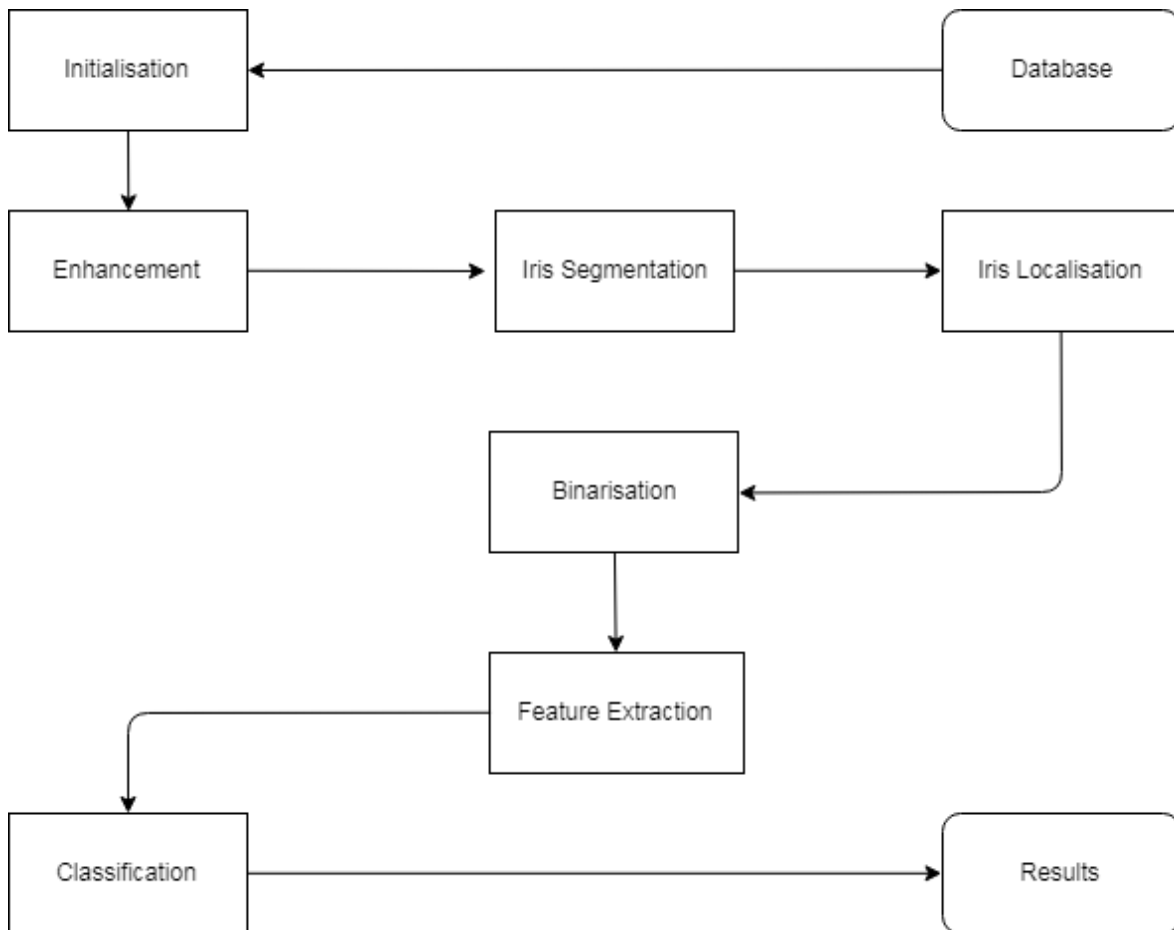


Fig 2:- System Design

**IV. INITIALIZATION AND PREPROCESSING**

The step involves experiment setup and image acquisition. The image acquisition will be implemented by using any normal 16+megapixel lens camera with 10mm zoom capacity with clear focus.

In this step, the diagnostic interface (application interface) designed by python (wxpython) was activated to enable interaction to the diagnosis system. For the sake of keeping the position of iris responding to the heart’s impulses fixed, the camera will be kept fixed on the Tripod stand while focusing on the eye [2]. In our study we used another useful method, the Circular Hough Transform (CHT). The CHT is a standard computer vision algorithm that can be used to determine the geometrical parameters for a simple circle, present in an image. The main advantage of the Hough transform technique is its tolerance for gaps in feature boundary descriptions and its robustness to noise. Once the boundaries of the iris are identified correctly and its surface is extracted, the analysis of the iris surface can be done [4].

Initial filtering processing will be performed on the acquired image. The main reasons for this process are to take charge of the challenges emerging during image acquisition, in particular, the variation of intensity and illumination, poor contrast, and the effect of object motion.

The next process is for the restoration of the image from blurring that may be caused by heard motion. We will employ median filter for the removal of spike/impulsive noises that appear as a dark pixel in the bright region and bright in the dark region of iris.

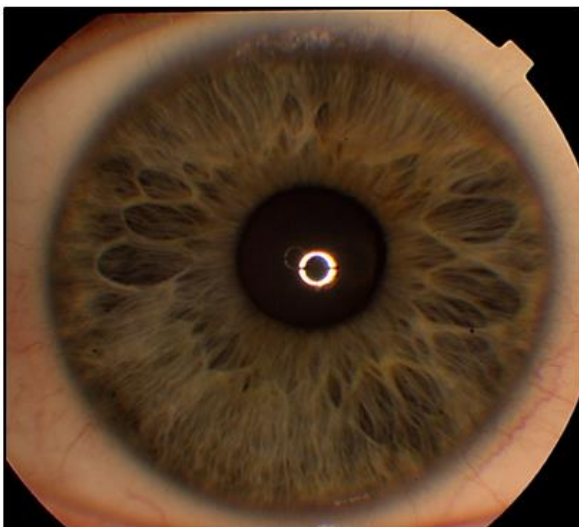


Fig 3

**V. IRIS SEGMENTATION AND ROI LOCALIZATION**

The preprocessed image will then subject to the iris segmentation process. The process isolates iris portion from the rest part of the eye by computing the inner and outer boundaries of the iris [3].

After a successful segmentation, we introduce two approaches user interactive approach and a radial sector division for localization of the iris region responsible for heart impulse responses. User interactive approach suited for experimental purpose where the region of iris responsible for torso and lower back was cropped. The region of interest is extracted with respect to the Bernard Jensen Chart for Iridology shown below. This chart is used to derive any abnormalities in other body parts as well Example : The radial sector division is divided iris into 2 equal sectors, and the method maps the location at 2:30-3:30 in iris chart to degree measures of 15° anti-clockwise 15° clockwise. The third layer was estimated to be between the arc of 27 and arc of 47 r. Given below is the obtained segment of iris which is required to extract features after each algorithm is implemented starting from enhancement to using gabor filter to obtain the resulting image.

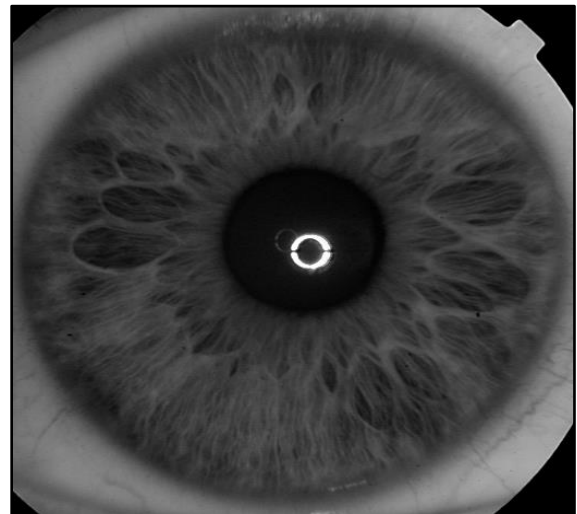


Fig 4



Fig 5

**VI. ENHANCEMENT**

For the sake of improving the image quality and clarity of the desired features, various enhancement techniques are implemented because of which contrast features as well as the textural features are improved, also the patterns of the image are enhanced[3].



Fig 6

**VII. FEATURE EXTRACTION**

The feature extraction technique is used to detect circles in an image. This process will be used to detect the desired abnormalities in the iris that relate to the specific body organ. The aberrancies can be anything like dark spots, color changes, broken tissues, etc. These kind of features are extracted to deduce the specific ailment in a human body.

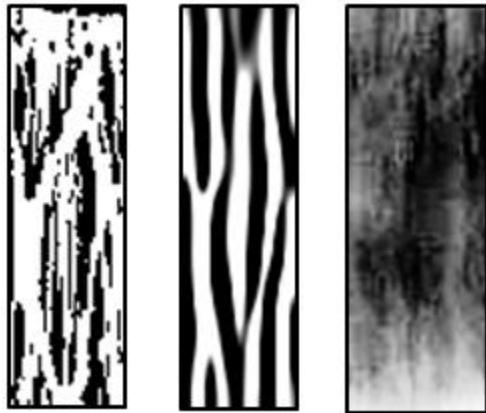


Fig 7

**VIII. CLASSIFICATION**

We apply support vector machine (SVM) oriented methods for classification of the features containing encrypted information about benign and malignant abnormalities of iris. The results from each classification method was compared to one another for the purpose of deducing the classifier with better classification performance. The classification is performed with respect to the Bernard Jensen Iridology Chart mentioned below.[5]

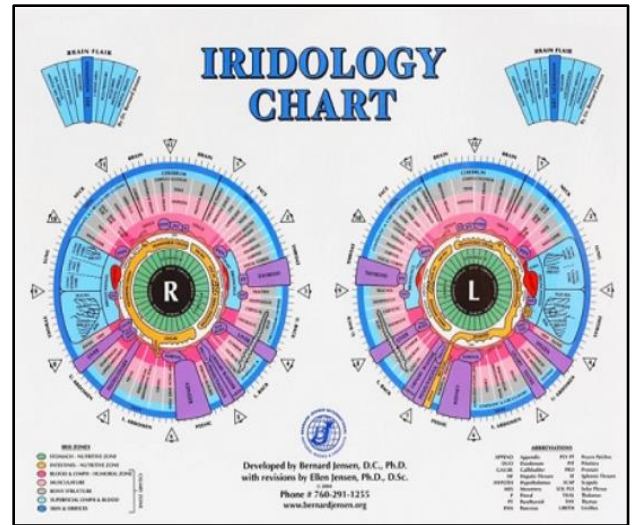


Fig 8

**IX. CONCLUSION**

The system being proposed for health diagnosis through iridology by neural network can be used for cases such as prevention as well as rapid diagnosis of specific health abnormalities. Detecting the health issues through iris is one of the reliable and accessible methods in the health area and the accuracy of this method will increase using the stable and accurate equipment in imaging. In short, the iridology chart has been constructed onto eye images automatically with precise accuracy and quick time performance. Over the years, there have always been researches and investigations that have been conducted over recent decades as a contribution to iridology to improve human health because iridology is a non-invasive, simple, and painless method that can be used to access the health condition of every organ in a human body. Future works will be on improvising the accuracy and performance so that it can be implemented on smartphones. Fast localization methods were chosen for this purpose.

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