Improving Iris Recognition Performance using Acquisition, Segmentation and Filter

Miss. Priti V. Dable1
(PG Scholar)
Comm (Electronics)
S.D.C.E. Selukate
Wardha, India
dable.priti@gmail.com

Prof. P .R. Lakhe2
Assistant Professor,
Department of E&C
S.D.C.E. Selukate
Wardha,
pravinlakhe@rediffmail.com

Mr. S. S. Kemekar3
Inox Air Product Ltd,
Instrumentation Engineer
Wardha

Abstract:- Biometric recognition became a vital part of our living. Human Iris has very unique pattern so we can used it for highly security purpose such as biometrics recognition. In this paper we are working on the parameter as image acquisition, image segmentation, feature extraction and prototype forming based on the Human Iris image for biometrics recognition. Proposed method not only removes noise but also detects the pupil and iris center accurately and localizes the iris and pupil region. For iris feature extraction purpose, 1D Gabor filter has been used. With this proposed detection model we can have a constant matching score which is our desired objective.

Keyword- *Image acquisition, iris normalization, iris sample, Hough transform, 1DGabor filter.*

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I. INTRODUCTION

In the modern age, security is always an important issue in any sectors like bank, international airport, internet based marketing accurate and reliable personal identification arrangement and biometrics have become an important technology for the security in the modern advanced world.

Humans as individuals, have unique characteristics, these characteristics can be used to identify persons. This is known as biometric detection. Iris is the part of the circle around eye pupil. Although iris has a relatively contracted region compared with entire area of the human body, iris has a very unique prototype, different in each individual and the prototype will remain stable.

In today's networked world, the need to keep the security of information is becoming both ever more important and ever more difficult. From time to time we hear about the crimes of computer break by hackers, credit card racket, government building. In most of these crimes, the criminals were taking benefit of a primary mistake in the straight access control systems: such as ID cards, keys, passwords, and PIN numbers. None of these means are really defining us. It goes without saying that if someone duplicates steals. Newly technology became available to allow verification of "true" individual identity.

This technology is based in a field called biometrics. Biometric make contact with controls are automatic methods of verifying the identity of a living person on the basis of several physiological characteristics, such as. Voice recognition, fingerprints, face recognition, handwriting, hand geometry the retina and the iris. Most of the presented methods have limited capabilities in recognizing quite complex features in realistic real world situations. Iris recognition has been contemplated as one of the most constant biometrics technologies in recent years.

II. BASIS OF THEORY

- Iris Eyes

Iris can provide as the basis for biometric systems. Each iris has a texture that is very unique and detailed to each person and remains stable for decades. The eye can not be changed through surgery without causing any damage to eyesight.

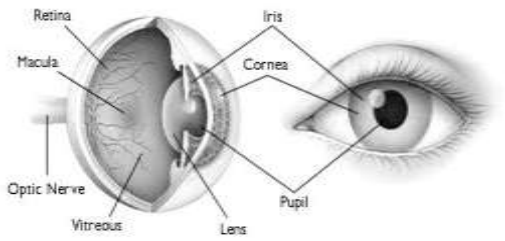


Fig 1. Anatomy of an eye and example of iris region

The advantages of using the iris for reliable identification system are as follows.

1. Iris patterns do not change with age.
2. Iris is insulated and shielded from the outside environment.
3. Simplicity and ease of implementation.
4. Speed- the process of matching the iris patterns is very fast.

III. RELATE WORK

Many researchers used various method for iris encoding and some of them reported that it has excellent performance of a diverse database of many images. All these algorithms are based on grey images, and color images was not used. A new algorithm has been proposed for locating the iris inner boundary and outer boundary by modifying the accessible algorithm so that the iris area can be segmented very easily with less detection of eyelids and

eyelash. Then for feature extraction 1D Gabor filter have been applied. But the encoded binary iris template that has been obtained gives better result than the previous research work.

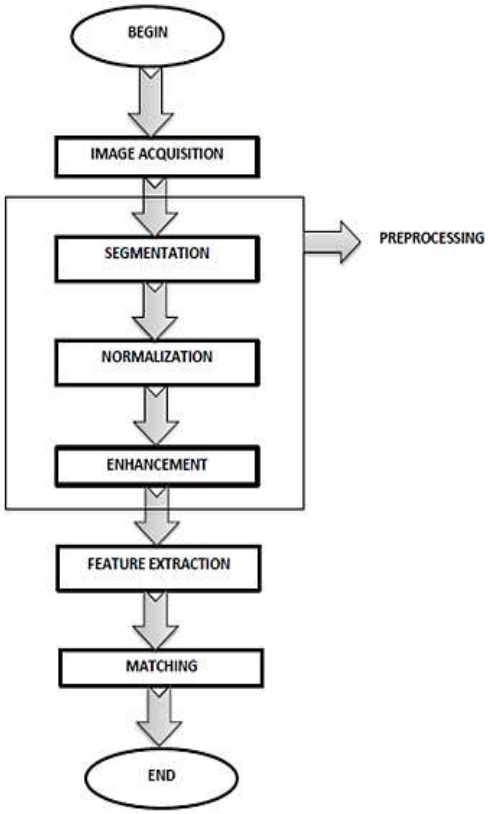


Fig 2. Iris recognition system

IV. PROPOSED METHODOLOGY

The proposed methodology to design an efficient iris reorganization system is as follows:

- Selecting the input image in the form of eye image
- Segmenting the iris for separating iris image from its eye image.

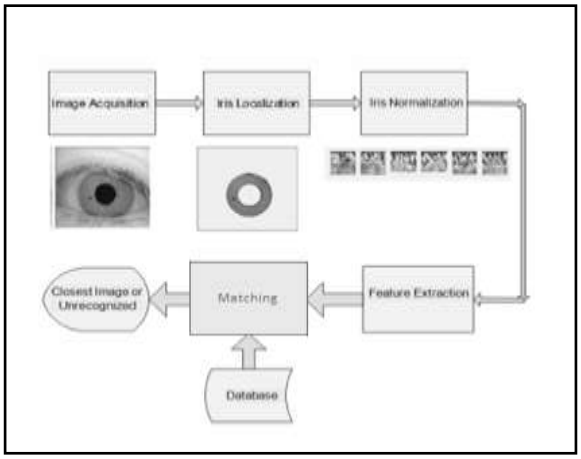


Fig 3: Flowchart of iris recognition system

- Normalizing the iris for getting iris image which is easier to be manipulated.
- Extracting the features using Gabor transform.
- Recognizing using Hamming distance calculation.

A. Image acquisition

In an image acquisition process taking a good and clear image with the help of digital camera with good resolution. Here the CASIA iris image database of different versions have been used for performing our tasks because images of this database do not contain specular reflections.

B. Iris localization

The reason of iris localization is to localize the eye image that corresponds to an iris. In iris region, there are two boundary i.e. outer and inner boundary. Circular Hough Transform is used to detect the inner and outer iris boundary. Firstly, an edge map is generated using Canny edge detector.

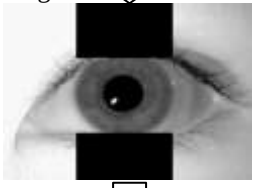
C. Iris normalization

After successfully segmenting the iris region, the normalization process will produce iris regions with constant dimensions. The irises captured from the different people have different sizes. The volume of the irises from the same eye may change due to clarification variations, distance from the camera, in normalization process avoid these factor**.**

V. EXPERIMENTAL RESULT

Fig 4(a) shows the input eye images that are taken from the iris CASIA database. After taking the eye image (normally Gray level image can be used) it is necessary to find out the appropriate centre of that eye. Fig 4(b) indicates the inner boundary collarette region detection and circular Hough transform operation to find out the centre coordinates of iris as well as pupil regions respectively. Fig 4(c) shows the Iris segmentation process and gives the exact iris region in input eye image.

(a) Input image



(b) Iris boundary Localization

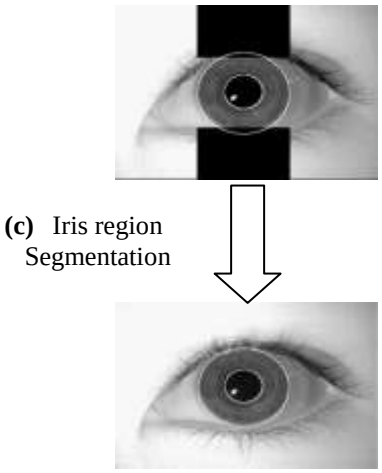


Fig 4 .Illustration of Iris segmentation and normalization process

VI. CONCUSION

In this paper work on iris image acquisition, iris image pre-processing. The numbers of researchers have worked on Iris recognition using different Filter. The proposed scheme not only immune the existence of noisy details but also able of determining the iris and pupil boundary accurately and also increase the recognition rate with superior accuracy.

VII. ACKNOWLEDGMENT

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