Abstract - In Currently, iris is holding crucial role for areas including website authentication , and criminal investigation and military in the control of restricted areas of frontier control(FC) and authentication given to employees for company resources access control(AC) and to support issues of financial grant or access ,many different fields. Iris recognition system (IRS) is treated as the most trustworthy and precise authentication system that exist. The essence of iris is for the most part the unique temperament existence of a person and due to its uniqueness, iris-based security are to be considered with very high performance with very low acceptance rate. The traditional authentication approaches consists of different number of problems. Biometrics is used as a tool for authentication to avoid the problems. Among the different existing biometric approaches, iris recognition is(IR) is mainly consists of thin with circular constitution controls the diameter, size of the pupil. In my approach implementation involves with new segmentation and normalization and so a new method of Iris recognition system has been suggested.

Keywords: Iris code, verification, normalization, segmentation

I. INTRODUCTION

Biometrics, which robotically uses the physiological or behavioral characteristic of people to recognize their identities, is one of the active techniques to stunned these problems. Biometrics is an area of automatic person identification depends on physiological and behavioral characteristics of individuals. A behavioral characteristic is more a reflection of an individual’s physiological characters includes gait, signature, speech patterns etc. The physiological characteristic is moderately stable physical specific like face, fingerprints, irises, signatures, voices etc. One of main advantages of using biometric systems is the fact that users no longer have to remember passwords or PIN numbers [Nabti M.et al,2008]. The objective this paper is to design a biometrics iris recognition system. Iris recognition systems (IR) detect people by analyzing patterns of their irises, which are claimed to be unique for every distinct, stable over long periods of time. The structure of irises is determined hereditarily and incase of only small details depend on external factors like as initial conditions of the embryo development. So it is highly unlikely for two irises to be formed in the equal matching. They are unique to people also stable with age. The difference even exists among identical twins, also between left, right eye of the same person.

Performance measures of a Biometric System

Performance of biometric systems is computed with respective the following error rates:

1. False Accept Rate (FAR): “The FAR involves the probability of a biometric system that function as incorrect identity of an individual, or may be unsuccessful towards the rejection of the fraud [Mak M and Thieme M,2003]. For the verification systems, this can be calculated as number of falsely accepted people count of all fake trails.

2. False Match Rate (FMR): The FAR involves the countable number of incorrect positive commonalities by the
algorithm mentioned for matching for mono blueprint comparison attempts” [Mak M and Thieme M, 2003].

3. False Reject Rate (FRR): “The FRR involves the chances for a biometric validating system to work incorrectly for identification of a genuine enrollee” [Mak M and Thieme M, 2003]. If the biometric validation system uses only single comparison trail for making an unique decision, then FNMR is equal to FRR.

4. False Non Match Rate (FNMR): “The FNMR involves the countable number of incorrect negative commonalities found using the algorithm mentioned for matching to the mono blueprint comparison attempts” [Mak M and Thieme M, 2003]. If the biometric validation system uses only single comparison trail for making an unique decision, then FNMR is equal to FRR.

Table 1: Comparison of iris recognition with other biometric modalities

<table>
<thead>
<tr>
<th>Biometrics</th>
<th>Universality</th>
<th>Universality</th>
<th>Uniqueness</th>
<th>Collectability</th>
<th>Performance</th>
<th>Acceptability</th>
</tr>
</thead>
<tbody>
<tr>
<td>Face</td>
<td>High</td>
<td>Low</td>
<td>High</td>
<td>Low</td>
<td>High</td>
<td>High</td>
</tr>
<tr>
<td>Fingerprint</td>
<td>Medium</td>
<td>High</td>
<td>Medium</td>
<td>High</td>
<td>Medium</td>
<td>Medium</td>
</tr>
<tr>
<td>Vascular</td>
<td>Medium</td>
<td>Medium</td>
<td>Medium</td>
<td>Medium</td>
<td>Medium</td>
<td>Medium</td>
</tr>
<tr>
<td>Iris</td>
<td>High</td>
<td>High</td>
<td>High</td>
<td>Low</td>
<td>Low</td>
<td>Low</td>
</tr>
<tr>
<td>Voice</td>
<td>Medium</td>
<td>Low</td>
<td>Medium</td>
<td>Low</td>
<td>High</td>
<td>High</td>
</tr>
<tr>
<td>DNA</td>
<td>High</td>
<td>High</td>
<td>Low</td>
<td>High</td>
<td>Low</td>
<td>Low</td>
</tr>
</tbody>
</table>

IRISRECOGNITION

The iris recognition technology captures and analyzes the distinctive options of iris within the human eye to perform identification. In 1936, specialist Frank Burch planned the conception of exploitation iris patterns as a way to acknowledge a personal, the concept found in investigating films, however it still remained fantasy and related opinions. The primary claim was that no 2 irises are identical was created by Dr. Leonard Flom and Dr. Aran Safir, each ophthalmologist in middle Nineteen Eighties. The claim was supported their clinical analysis that each iris is totally different and was seen to stay unchanged in clinical pictures. This claim created the human iris as an honest candidate for a biometric answer and once substantial analysis the patent of exploitation iris as a method for distinctive persons was awarded to them in 1987.

In model of biometrics, most familiar two validation methods were used namely verification and identification. The functions of Biometric recognition system style is major to the design of pattern recognition system. The structure of the system accuracy depends on error rates i.e. chance of accepting an intruder (False accept rate) and option of rejecting a certified user. A biometric system’s accuracy is set by merging the degrees of values set by false acceptance and also rejection values. The iris authentication error rates are obtainable in the below table.2

Table 2. The iris verification error rates

<table>
<thead>
<tr>
<th>Explanation</th>
<th>False Reject</th>
<th>False Accept</th>
<th>FTE</th>
<th>FTA</th>
</tr>
</thead>
<tbody>
<tr>
<td>Two different iris images are falsely matched</td>
<td>2.0%</td>
<td>0.5%</td>
<td>0.0%</td>
<td></td>
</tr>
<tr>
<td>Two images of the same iris fail to match</td>
<td>0.0%</td>
<td>2.0%</td>
<td>0.5%</td>
<td></td>
</tr>
</tbody>
</table>

The history of iris recognition motivations back to mid 19th-century as soon as the French physician, Alphonse Bertillon, deliberate the use of eye color as an identifier [2]. However, it is thought that the foremost knowledge of using iris patterns for identification, It was first familiarized by an eye surgeon called by his name Frank Burch, in 1936.

In year of 1987, two ophthalmologists, known as Flom and Safir, patented this idea and projected it to scientist Daugman, who is a professor at Harvard University, in the direction of studying the opportunity of emerging an iris recognition algorithm. After long years of experiments of scientific resolutions, the scientist so called Daugman was predicted and developed a great summarize about the iris recognition system and published the results in 1993. After few years, the publication of the Primary algorithm by Daugman, other researchers advanced with new iris recognition algorithms. Systems presented by Wildes et al. Boles, Boashash together and Tisse et al., Zhu et al., Lim et al., Noh et al., Ma et al are the scientist who designed the familiar and good performance algorithms so far developed. Among these algorithms, the works done by Lim et al. and Noh et al. are also commercialized.

The algorithms established by Wildes and Boles are appropriate for verification applications because the normalization of irises is performed in the matching process and would be very time consuming in identification applications.

1.1 Objectives

The main objectives of present project work is to

i. Study and Propose and implement iris recognition system to overcome the difficulties of existing system.

ii. Analyze the results obtained by the proposed iris recognition system.
II. PROPOSED METHOD OF IMPLEMENTATION

1. Image Acquisition
An acquisition of an iris image is the first step for any iris recognition system. Due to small size of an iris, approximately 11 mm in diameter, makes the iris acquisition difficult. Image acquisitions has a vital role in the iris recognition. For the present project work, CASIA database has been taken into account for pattern matching and with the help of a normal camera images was captured, also these acquired images were saved in bitmap format. The database of 2240 images is acquired from 224 different users and made available freely to the researchers and resolution of images is 320 x 240 pixels.

2. Segmentation Method-I
Failure of the segmentation may be due to the fact that slight contrast occurs between the iris regions and pupil so method of canny edge detection was not good to find the appropriate edges.

Steps:
1) Take the input image of the eye.
2) Let the inner pupil and external area are treated as two circles that is circle with an inner circle with same center.
3) The radius of inner circle be ‘r’ and outer circle be ‘r1’ from the same center c.
4) Now consider the sectors for inner and external circle.
5) Clearly the angle is known and it is 45° for both the circles.
6) Now we will calculate the area of sectors using formula:
   \[ A = \frac{\pi \theta r^2}{360} \]
   7) for inner circle \[ A_1 = \frac{\pi \theta r^1}{360} \]
   Outer circle \[ A_2 = \frac{\pi \theta r^1}{360} \]
8) Now add the areas A1 and A2 that gives whole sector area
9) Then we compare this area A with the area available in the database if matches then user is authorized.
10) Otherwise repeat the process once again for validation.

3. Normalization : Method-II
Steps-1: The circle form of pupil is converted into rectangle with \( \theta \) and r being the parameters.
Steps-1: Draw two diagonals from each corner perpendicular to each other.
Steps-3: By using Pythagoras’ theorem we will calculate the length of the diagonal.
Steps-4: Half of the length of the diagonal would be the point of intersection i.e; \( \sqrt{r^2 + \theta^2} / 2 \)
Steps-5: Find the point of intersection of the diagonal.

![Diagram of steps-5](image-url)

The novel iris templates by taking the useful bits into consideration. So while calculating the distance using the Hamming formulae the bits in the true region of iris that corresponds to 0° bits in noise masks are taken into consideration.

The experimental outcomes shown above indicates that the accuracy or performance of this proposed method of implementation has a FRR of 5.27% and FAR of 4.78%.

**Conclusion:**

In my work I have explained about the Iris recognition system is an emerging approach in the vicinities of the unique recognition of personnel and it is measured as one of the most novel ways in the area of biometrics. The current research involves Iris Recognition with efficient authentication and also focused on the various challenges that has been occurred and various opportunities that would be present in IR System. We identified that the explored approach is more efficient compared to implemented approaches viz. Masek’s method for the considered dataset. It this proposed approach takes sensible totality of time to perform iris segmentation and recognition accuracy is will be reasonable. In the future work it may be require to test the influence on accuracy of the proposed approach over a large dataset and to develop huge vigorous iris recognition system suitable for real life applications.

**REFERENCES**


