

# Security System using Iris as Biometrics

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**Abstract**-Security systems have realized the value of biometrics for two basic purposes: to verify or identify users. There are many places where only authorized people can enter and in that situation in order to identify the person who is entering into the restricted areas like R& D, Bank Lockers etc. is needed to identify and permit the person. If this is performed manually by security guards, it will be hectic to identify each person which would be time consuming and errors may occur. To avoid these problems we are proposing a security system based on iris recognition which will recognize the person Iris recognition is a biometric system for access control that uses the most unique characteristic of the human body, the iris employed in automated border crossings, national ID systems, etc. The proposed system will provide information of recognized person on LCD & thus controlling the access of the people into the restricted area.

## INTRODUCTION

Biometrics is considered as one of the most effective method when it comes to security. The term biometrics is derived from the Greek words Bio & Metric. It relates to the measurement (metric) of characteristics of a living (Bio) thing in order to identify a person. It is an automated technique of recognizing a person based on his physical attributes which includes face, fingerprint, hand geometry, handwriting, iris, retinal, vein, and voice. With an increasing importance of security, there is a need to guaranty that only authenticated users have access to the restricted areas like bank, R&D etc. The latest menaces of security have led to the increased awareness of biometric technologies.

Biometric identification provides a valid alternative to traditional authentication mechanisms such as ID cards, passwords and signature to avoid most of the disadvantages of these methods, it is possible to identify an individual based on who they are rather than what they possess or what they remember. Various biometric techniques that deal with automated methods of recognizing a person are face, fingerprints, hand geometry, iris, retinal, and vein. The human Iris is an internal organ of the eye, protected by

the eyelid, cornea. The two eyes of one person have independent and uncorrelated iris patterns, and they develop during gestation without genetic specification. This leads to the fact that the iris as a biometrics or iris recognition system has a null probability of an intruder entering in the system is null i.e. false acceptance rate is nearly null. Generally, there are five major processes for a particular iris recognition system, they are: iris segmentation, iris normalization, feature encoding, template matching & human identification.

The aim of the project is to develop a high level security system in restricted areas with the help of iris recognition system and integrating this iris recognition system with microcontroller to display the information of recognized person using Liquid Crystal Display (LCD) and to control the access of the person. Security system using iris as biometric will mainly identify each person with no error and will reduce the time consumed by security guards for identifying person and will also avoid the errors occurred while identifying each person in restricted areas.

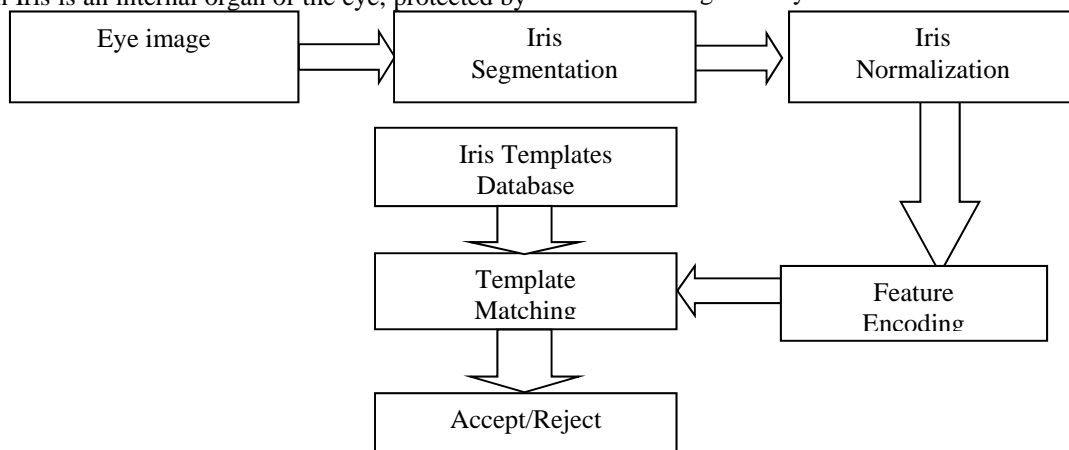
## METHODOLOGY

Security has become a serious issue in areas like airports banks, R&D dept etc where the person entering in the area has to provide his identity. If this identification is performed manually it will be time consuming & too hectic and errors may occur. The system is to be designed to avoid the access of unauthorized person in restricted areas.

Security System using iris as biometrics works in following two major steps.

1. Iris recognition system to recognize the person.
2. Iris recognition system integrated with microcontroller & LCD.

The iris recognition system is as shown below.



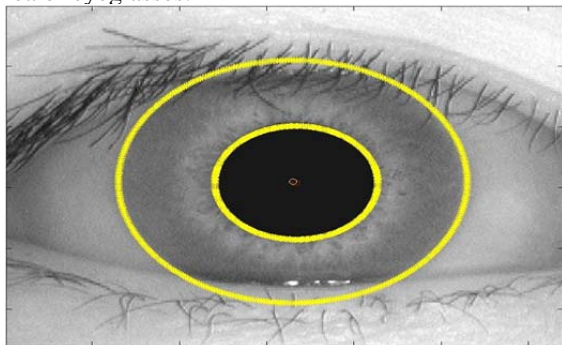
**Fig. 1 Block diagram of Iris recognition system**

The iris recognition system is basically a five steps process as follows.

1. Iris segmentation
2. Iris normalization
3. Feature Encoding
4. Template Matching
5. Accept/Reject Decision

**1. Iris Segmentation:**

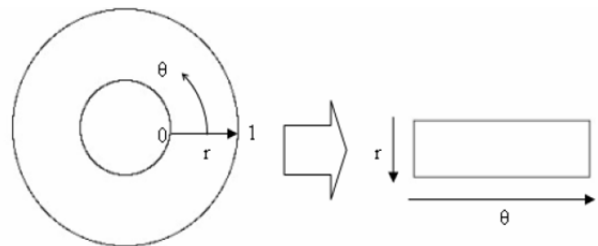
- Captured eye image will act as an input for this stage. It deals with segmenting the iris part from an eye image.
- Iris segmentation consists of iris inner and outer boundaries localization, detection of upper and lower eyelids, and detection/removal of reflections from the cornea or eyeglasses.



**Fig 2: Iris Segmentation**

**2. Iris normalization:**

Iris normalization is remapping the segmented iris region to the fixed-size rectangular image by mapping the extracted iris region into a normalized coordinate system.



**Fig 3: Iris Normalization**

**3. Feature Encoding:**

In the feature encoding step, a template representing iris pattern information is created using Gabor filter or Log-Gabor filter.

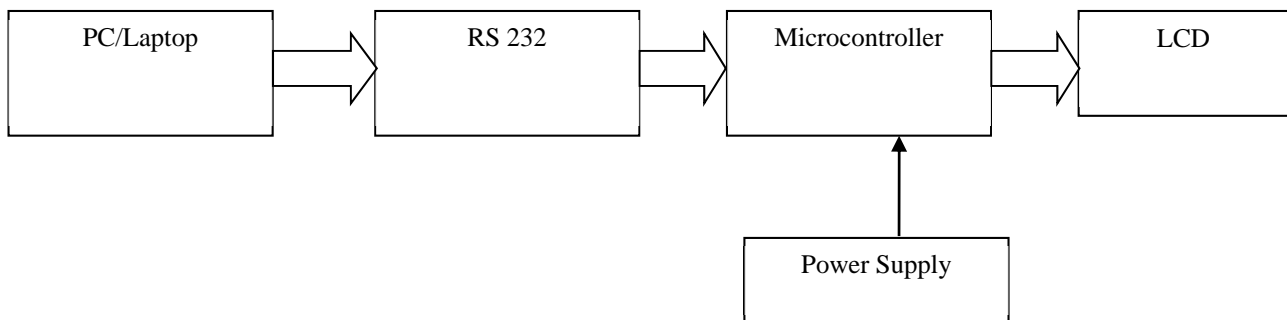
**4. Matching:**

The goal of matching is to evaluate the similarity of two iris representations. Created templates are compared using the Hamming distance or Euclidean distance

**5. Accept/Reject Decision:**

In this step, if templates are matched with each other, then human identification will be accepted otherwise it will be rejected.

The iris recognition system integrated with microcontroller is as shown in figure 4.



**Fig 4: Block Diagram of Iris based security system using microcontroller**

The block diagram consists of the following blocks.

- Personal computer/Laptop
- RS 232 - Serial communication
- Micro controller
- Power Supply
- LCD - (Liquid crystal display)

**Personal computer/Laptop:**

The personal computer /Laptop will contain the iris recognition data of the persons which will be given to microcontroller via serial interface RS232.

**RS 232 - Serial communication:**

It is used for serial communication between personal computer and microcontroller.

**Microcontroller:**

The microcontroller will receive the serial data from PC & will control the system.

**Power supply:**

The DC power supply requirement for the system will depend on selection of microcontroller.

**Liquid Crystal Display (LCD):**

LCD is used to display the status of the persons.

If comparison is true then micro controller will switch on the relay. If the person is recognized then the microcontroller will display "ACCESS IS VALID". If some other person tries to enter, the micro controller checks with database & if it is wrong it displays in the LCD as "ACCESS DENIED".

### CONCLUSION

“Security system using iris as biometrics” will be able to prevent the access of unauthorized persons in the restricted areas by displaying the information of recognized person on Liquid Crystal Display & it will also provide error free recognition of the persons.

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