



e-ISSN: 2319-8753 | p-ISSN: 2347-6710

IJRSET

International Journal of Innovative Research in
SCIENCE | ENGINEERING | TECHNOLOGY

INTERNATIONAL JOURNAL OF INNOVATIVE RESEARCH


IN SCIENCE | ENGINEERING | TECHNOLOGY

Volume 12, Issue 5, May 2023

ISSN INTERNATIONAL
STANDARD
SERIAL
NUMBER
INDIA

Impact Factor: 8.423

 9940 572 462

 6381 907 438

 ijrset@gmail.com

 www.ijrset.com

Design and Implementation of Iris Recognition Based Attendance Monitoring System

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ABSTRACT: The attendance of students is an issue for every educational institution in the world because it affects their overall performance. It takes a lot of time to call out names of students or have them sign papers to take attendance in the traditional manner. One answer to this issue is a biometric-based attendance system, which can automatically record students' attendance by detecting their iris. Due to the inner properties of the iris, such as uniqueness, immovability, and time invariance, it is thought that iris recognition is one of the most trustworthy, accurate, and effective biometric identification systems. The purpose of this paper is to build and put into practise an iris recognition-based attendance management system with the most modern features at a reasonable cost. Regarding a significant number of developing countries' financial predicament. The study is divided into two sections: hardware and software. The hardware component is in charge of taking pictures and starting the necessary programmes, while the software component is in charge of accusation, processing, iris localization, modifying, matching, and storing data as well as sending the attendance report to a predetermined email address. The ARDUINO programme is then used by the system to detect, compute, store, and send the results.

KEYWORDS: Biometric; Iris Recognition; Radius Calculation; ARDUINO; Authentication.

I. INTRODUCTION

People in the modern world are dealing with a variety of issues, and phoney identities are one of the biggest ones [1]. Biometric technologies are becoming more and more common as we head towards the digital future. One of the most effective biometric-based attendance management solutions is iris recognition. The current technique for managing attendance takes a lot of time because students' names need to be called and papers need to be signed. Having a paper copy of the attendance record has the additional drawback of maybe losing the attendance sheet [2]. A biometric-based automated attendance management system that uses fingerprints as a form of identification has been proposed. Iris pattern recognition is a solid alternative method for people recognition that is particularly good when searching huge databases without producing any false matches [3]. Iris recognition is a reliable method of identification because of its stability and uniqueness. Because no two irises are alike—even those of the same person's left and right eyes—it is growing in popularity. Irises are also stable since they are fully developed by the time a person is ten months old and remain the same throughout their lifetime, unlike other identifying characteristics that can alter as we mature [4]. The inclusion of 240 iris reference points for matching increases the iris recognition technology's accuracy. A mechanism to identify a person by their iris pattern was first developed by ophthalmologist Frank Burch in 1936, and the concept first appeared in the James Bond movie [5]. This concept was patented in 1987 by two other ophthalmologists, Aran Safir and Leonard Flom. In 1989, these two doctors requested that John Daugman develop algorithms for iris recognition. Iris extraction technology offers remarkable high-dimensional data that explains why iris recognition-based identification systems are so popular [6, 7]. The iris, which sits between the cornea and lens, is a circular diaphragm that has been punctured by the pupil. The iris regulates how much light can pass through the pupil, a circular aperture area. The iris diameter, which is roughly 12mm in diameter, can range from 10% to 80% of the pupil size [8]. Instead of signing an attendance sheet, each person's iris pattern will be used, and once a match is made, they will be registered. The suggested method employs the camera to record live

images of a person's iris, and then stores this data in a database.. The proposed system calculates the radius of iris using Gray-coding algorithm in ARDUINO data analyzing software. The system also uses ARDUINO to match the radius of each person with the previous stored value and finally send the attendance report to the predefined Email address without human intervention.

II. RELATED WORK

Since biometrics technologies are the only means of guaranteeing a person's presence, many corporate enterprises will rely on them in the future. The suggested system offers iris recognition-based biometrics, in which photos of people are captured by webcams and sent to computers for processing and storage for later uses. The fundamental iris recognition system diagram. The photographs are kept in databases and used for authentication by comparison with subsequent images of the subject. After capturing and storing of images, The data will store in Excel Sheet, is used for iris image acquisitions, iris localization, iris adjustments, iris checking, iris extraction, iris matching, data storing, authentication and to send E-mail. After capturing the image only iris need to localize from the whole image. Iris can be localized from the eye blink sensor.

III. METHODOLOGY

Since biometrics technologies are the only means of guaranteeing a person's presence, many corporate enterprises will rely on them in the future [9]. The suggested system offers iris recognition-based biometrics, in which photos of people are captured by webcams and sent to computers for processing and storage for later uses. Figure 1 shows the fundamental iris recognition system diagram. The photographs are kept in databases and used for authentication by comparison with subsequent images of the subject. The notification is sent to the administrative computer if the next image matches the one that was previously stored; else, the previous process will be repeated.

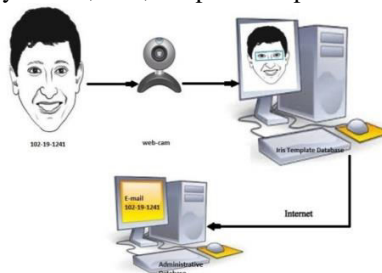


Figure 1: Basic diagram of hardware processing of iris recognition of attendance management system.

After capturing and storing of images, The data will store in Excel Sheet, is used for iris image acquisitions, iris localization, iris adjustments, iris checking, iris extraction, iris matching, data storing, authentication and to send E-mail. After capturing the image only iris need to localize from the whole image. Iris can be localized from the eye blink sensor. Eye blinking sensor extracts the appropriate images of eyes to get an accurate value that will be stored in the database for authentication. The device uses different parameters for counting the blinks such as for one count one person and for two counts second person. If given counts are not in appropriate position then the calculation will not be held and it will require again input images or reject the program. Only eye part is extracted from snap short by eye blinking sensor which uses some parameters such as position, line. Iris matching process is a comparing coding system that takes images and compare with the store database. If this process match then the attendance will transmit or it will required the same process again.

The calculated results and the collected data are saved in the computer's designated drive. When data are required, the data are called for comparison. The process of granting access to a system for security purposes based on an individual's identity is known as authentication. It guarantees who is the appropriate party or who has access rights. However, a person's identification must first be saved in a database, and when that person's image is provided, the input images will be compared to the stored images. If this procedure matches, it moves on to the following steps, which are depicted in the flow chart (figure 3).

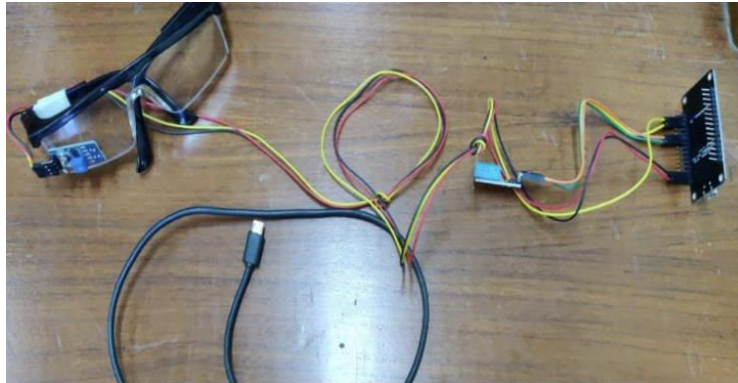
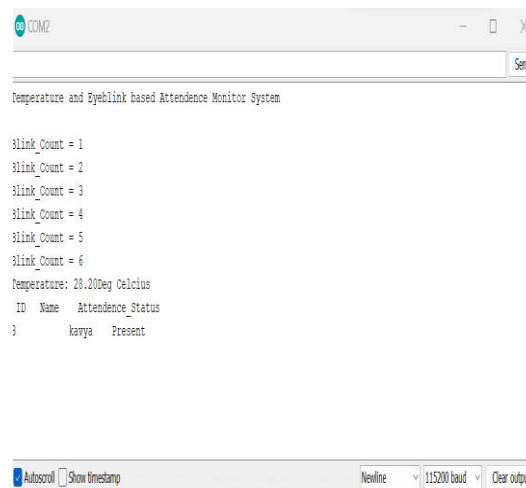


Figure 6: Spectacles with eye blinking sensor.



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COM2
Send
Temperature and Eyelink based Attendance Monitor System

Blink_Count = 1
Blink_Count = 2
Blink_Count = 3
Blink_Count = 4
Blink_Count = 5
Blink_Count = 6
Temperature: 28.20Deg Celcius
ID Name Attendance_Status
3 karya Present

Autoscroll Show timestamp
Newline 115200 baud Clear output
```

Figure 7: Results for the attendance in the real time window.

V. CONCLUSION

We have implemented an real time attendance monitoring system from an iris recognition. Our algorithm successfully detects the blink of the eye from the sensors which consists of blink count and marks the attendance to the respective student. We have applied our algorithm on detecting the iris of each individual and found that it successfully detect the student and marked their attendance.

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