ATTENDANCE SYSTEM USING IRIS RECOGNITION

Orugba Kenneth Obokparo[1] and Imianvan Anthony[2]

Department of Computer Science, Faculty of Physical Sciences, University of Benin, Benin City.

Corresponding author: kenorugba77@gmail.com

ABSTRACT

Iris is one of the biometric systems of recognition. Its algorithms provides a high transparency in recognition of individuals. The Iris recognition takes class attendance and attendance of staffs in their working establishment by capturing the image using the iris sensitivity for a matching on the database. A model for attendance recording using Iris Recognition is presented in this paper. This is far better than the traditional/manual method of taking attendance in institutions which is full of mistakes and manipulations.

Keywords: Attendance system, Iris Recognition, Attendance Register.

INTRODUCTION

The use of Attendance System using Iris recognition in tertiary institutions nearly over the whole world is very important. There is a great priority assigned to Iris recognition in this modern day technology just like fingerprint recognition, security and facial recognition. The system helps to check efficiency and eliminate manipulation which is common in the manual system of taking attendance. Iris recognition deals with capturing, verifying, and extracting the human eyes. The key objective of iris recognition is to implement persistency and stability into the attendance system. PYTHON programming language is the development tool used and the focus will be only on the software for performing recognition. To properly capture the eye, the active camera will be used.

The system will be developed using deep learning model and machine learning search algorithm.

Related Works

The table below shows a summary of the literature works done by some writers on iris recognition

Table 1: Summary of Literature Works

S/N	Author/Year	Title	Method Adopted	Strengths	Research Gaps	Future work
1.	Weicheng et al (1997)	Iris Recognition: An Emerging Biometric Technology	Uses automatic Biometric Technology for identification and verification in taking attendance	The development of intelligent attendance system that has the potential to improve attendance tracking system	Lack of explicit of the specific methodology	Development and Implementation of Iris Recognition for attendance with higher accuracy
2.	Seifedine et al (2007)	A design and implementation of a wireless iris recognition attendance management system	Uses automatic iris recognition module and RF wireless module for transparency in iris recognition	The design and implementation of software on PC to improve sustainability and efficiency of attendance system	Lack details on how to capture iris which are in far distance such as 2metre	Adoption of new wireless technologies like GPRS to solve problem of bad quality transmission channel
3.	Seifedine et al(2010)	Wireless attendance management system based on Iris recognition	Uses automatic iris recognition module and RF wireless module to detect iris accurately	Development of a wireless based system which offer advantages of cost effectiveness and flexibility	Lack of details on methodology and validation of the system	Adoption of new wireless technologies like GPRS to solve problem of bad quality transmission channel
4.	Vanaja et al (2011)	Iris Biometric Recognition for Person Identification in Security	Uses Biometric Recognition method for accuracy and	The development of Iris biometric recognition to improve	Lack of detail discussion on how to capture iris	Development of algorithm which will focus on Robust Iris

		Systems	reliability in attendance taking	sustainability in attendance	images from far distance	recognition, even with gazing-way eyes or narrowed eyelids which solves all the security related problems
5.	R Hentati et al (2012)	Development of a New Algorithm for Iris Recognition	Uses c++ language and library open CV to develop algorithm for Iris Recognition	The development of intelligent algorithm which has the potential to improve efficiency in attendance system	The system only uses C++ language and library Open CV to develop the algorithm without comparing it with other programming languages	Development of recognition biometric such as gait, signature and extend algorithm for a multimedia biometric system
6.	Shrinivasrao et al (2012)	A Novel Approach for Iris Encryption	Uses barcodes generation algorithm for Iris recognition	Development of Iris Encryption approach for efficiency and transparency in attendance tracking	It solely depend on barcode generation algorithm	Development of other approach to ensure higher accuracy in iris recognition
7.	Nirali et al (2015)	A Survey on Iris Recognition for Authentication	Uses Segmentation based on the separation of quantities on modules	The development of authenticated Iris recognition that is dependable	Lacks details on how to capture Iris from long distance such as 2metre	Development of recognition algorithm that can operate on Iris Images acquired under

					visible or near infrared illumination
8.	Hafiz et al (2023)	Iris detection for attendance monitoring in educational institutes amidst a pandemic: A machine learning approach	Uses a machine learning approach as the methodology	Development of Iris detection for proper monitoring of attendance in higher institutions	It uses only machine learning approach without making reference to other approach	Development of a more accurate system to properly document and monitor defaulters in examination
9.	Kuldeep et al (2024)	Design and Implementation of efficient automatic attendance record system based on facial recognition technique	Uses modern and innovative method for attendance monitoring using an open CV	The development of fastest and more efficient methods to take attendance	It does not provide any methodology for far distance images	Development of more modern method of taking attendance
10.	Aparna et al (2024)	Data Anonymization on Biometric Security Using Iris Recognition Technology	Uses Biometric Technology method for reliable attendance system	Ability to stand the test of time and surgery cannot also modify the characteristics and pattern of the iris	It uses only biometric technology without comparing other approach	Development of more accurate biometric technology to stand the test of time
11.	Wickramaarachchi et al (2024)	An effective Iris Biometric privacy protection scheme with renewability	Uses Biometric Technology approach for sustainability in attendance	Ensure privacy of each individuals Iris by distorting iris feature information	It uses only biometric technology without comparing it with other	Development of more secure approach for iris privacy

		system		approach	

METHODOLOGY

According to Figure 1 below, Iris recognition requires several approaches and algorithms.

Image Capturing: The camera is placed at a certain distance to photograph staff/students entering offices or courses.
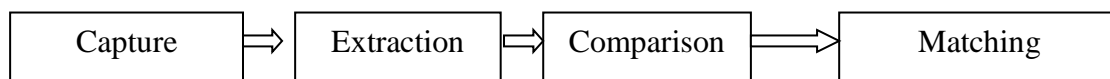
Feature extraction reveals iris recognition system. Features are used to get it. We employ codes to compare templates to accurately identify students.

Capture	$\Rightarrow$	Extraction	$\Rightarrow$	Comparison	$\Rightarrow$	Matching

Fig 1: Overview of recognition system

How Iris Recognition Works.

Below are the four steps on how iris recognition works

First is segmentation, then normalization, feature extraction, then matching.

Iris recognition uses the pupil's ring-shaped region for biometric identification. Each worker or student's iris pattern is identified and compared. One or both eye video images are analyzed mathematically for pattern detection. For facility attendance records, iris recognition is superior to other biometric approaches.

The most important part of any analysis. Much of the analysis includes gathering and storing data for utilization. The researchers visited University of Benin lecturers in Benin City for attendance statistics. Traditional/manual system facts detection methods are below.

Facial learning search method creates quick face recognition model.

Flowchart for Student Registration

The flowchart for student registration below is a diagrammatic representation of how a new student who has not been registered in the database is freshly registered. The camera capture the student iris, frames it, processes it, and encode the student's name and ID using a deep learning model and entered them in the data base for future recognition by the system. The flowchart describes how the iris is captured, frame, process and encode.
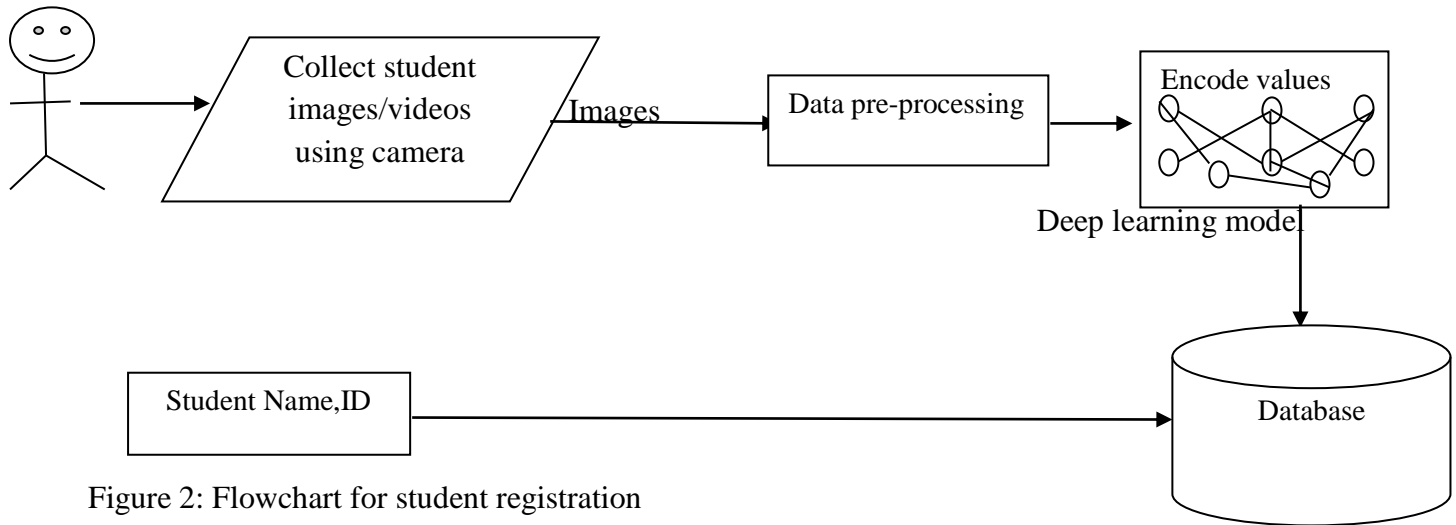
Figure 2: Flowchart for student registration

Flowchart for student inference

Figure 3.0 below is a flowchart which explain the student inference i.e the collection of the full images of staff/students using a camera, processing the data, transmitting them using a deep learning model, and comparing the information/particulars using ML techniques to confirm the name and ID entered and registered in the database system to keep records.
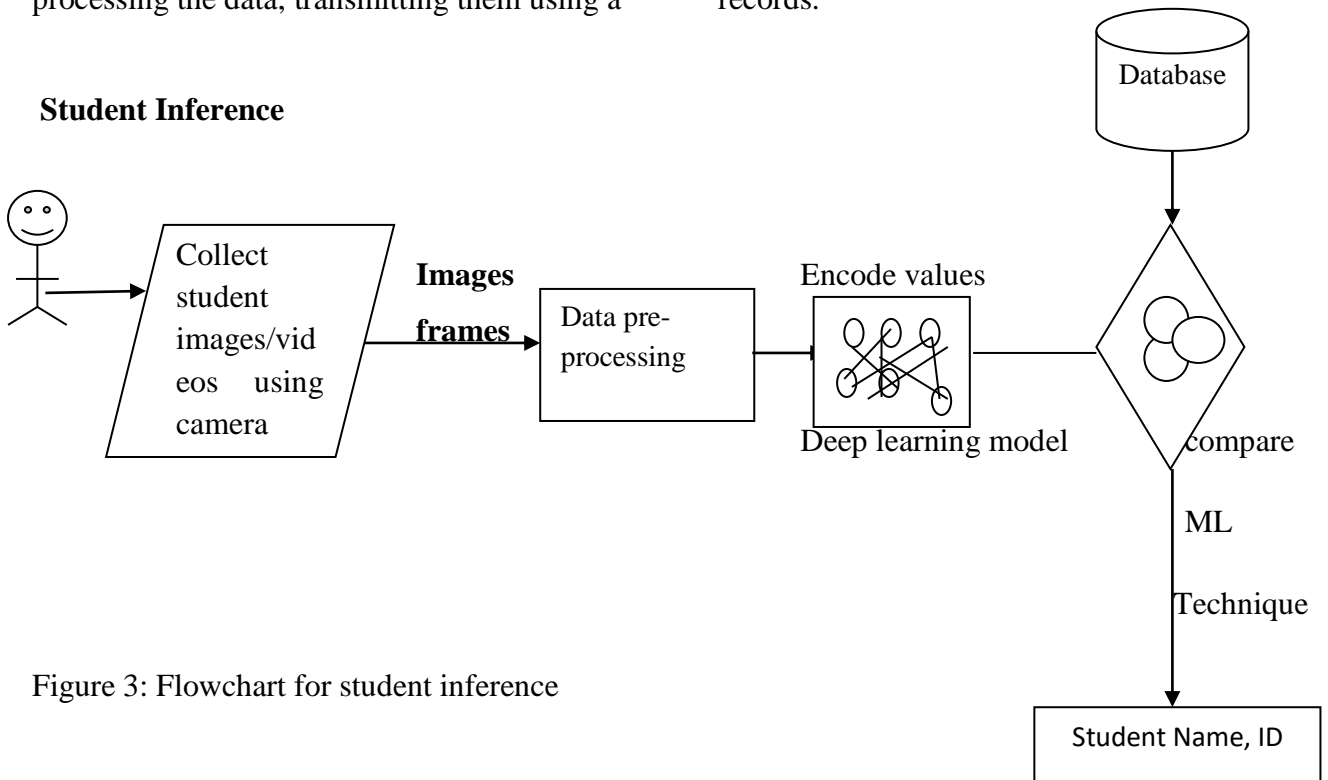
Student Inference

Figure 3: Flowchart for student inference

Flowchart diagram on Iris Recognition model

Figure 4.0 below shows a flow chart diagram for iris recognition, where the system captures the student/lecturer's iris using a camera, displays the collected features, and saves the details in a database. The system functionalities include capturing of the student image i.e the iris, extracting and storage.
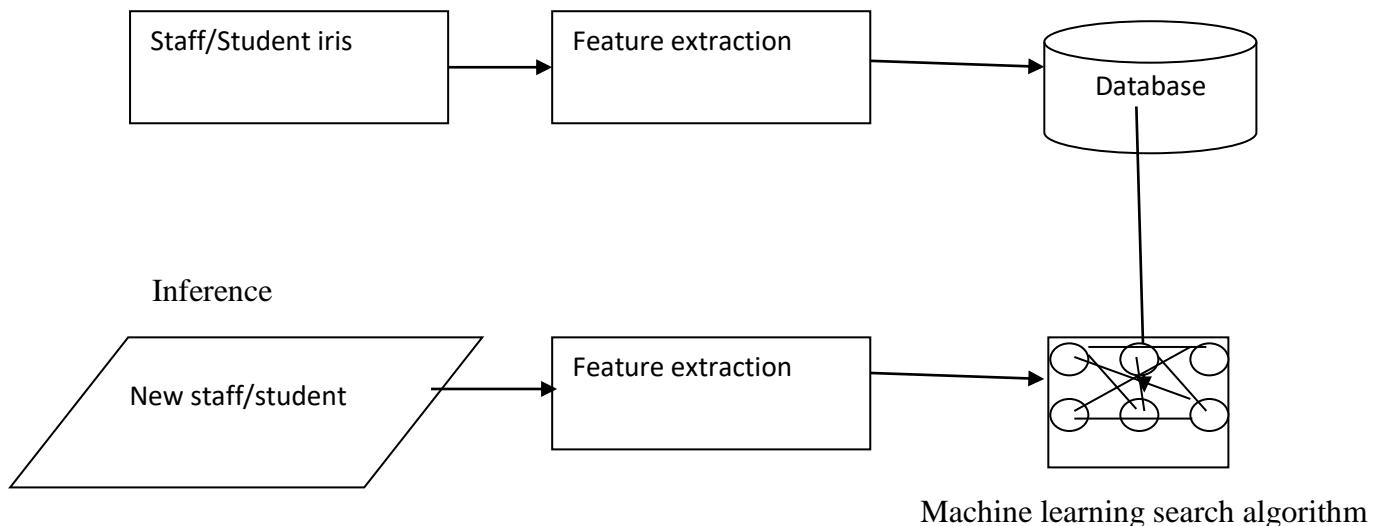

Figure 4: Flowchart diagram on Iris recognition model

Store Data

The system saves staff/student data in Redis database cloud architecture.

Study Population/Respondent

The study's population is covered in the office, especially by the head of the establishment or university lecturers, who need the system most to track staff/student attendance.

Research Tool

Data were collected using various methods. To learn about the manual system, researchers will interview. For input transparency, instructors and students were interviewed.

Interview

In this oral questionnaire, the researcher collected information from the interviewee through one-on-one discussion. The researchers interviewed higher education instructors and personnel to learn how the manual system is used.

Web Surfing

Researchers use the internet to find extra study-related material. Internet browsing is

the fastest way to obtain valuable data, which helps researchers achieve their goals.

Library Technique

Researchers use books, theses, and other useful and special sources in the library to meet all requirements. The researchers will use this strategy to gather system advancement data.

Registration Form Page

This is the registration window, which allows users to enter their first and last names and choose between student and lecturer roles. Students and lecturers click submit to enter their iris/faces into the database.
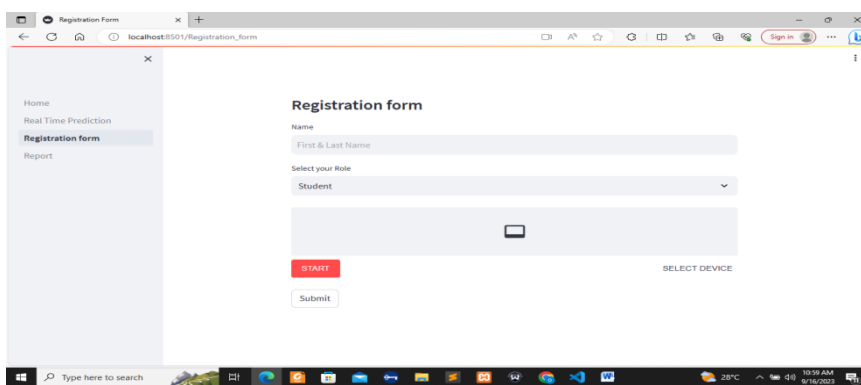

Figure 5: Registration form page

Report page

By pressing refresh, student/lecturer information is displayed as registered in the database (Figure 6.0). Name and role of every

registered student/teacher in data and logs. This also shows when students and teachers enter and leave class lectures. The above interface makes it easy to track manual student/lecturer mistakes and modifications.
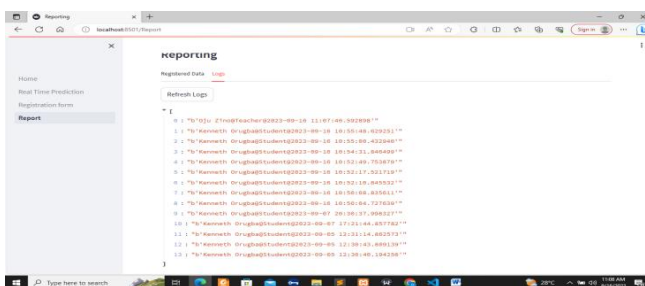

Figure 6: Report page

Advantages of Iris Recognition

It is important that the workers or students must be physically present. This simply removes mistakes from the system.

The Iris pattern has persistency and stability.

Iris recognition has a high level of dependency and transparency

Limitation of Iris Recognition

Challenges in obtaining images from distances that are beyond one or two meters far away.

Lack of trained personnel's who have high experience in the field of using iris recognition system.

Difficulty in capturing iris of blind individuals.

CONCLUSION

This study uses biometrics for iris/face recognition attendance. The design methodology shown in this article is cheaper and more transparent for taking student/lecturer attendance to avoid errors and manipulation.

REFERENCES

1. MojtabaNaja and SedighehGhofrani, "Iris Recognition Based on Using Ridgelet and CurveletTransform'', International Journal of Signal Processing, June, 2011.

2. Woo Suk Yang 1, "Implementation of an Identication System Using Iris Recognition", International Journal of Security and Its Applications, Vol.7, No.4, July, 2013.

3. Aparna D. K. M. Malarkodi, LakshmanaprakashS., Priya R. L., Ajay Nair. Chapter 10. "Data Anonymization on Biometric Security using Iris Recognition Technology".

4. Bowyer. K.W, K. Hollingsworth, and P.J. Flynn, "Image Understanding for Iris Biometrics: A Survey" .Computer Vision and Image Understanding vol 110, No 2, pp281-307, 2008.

5. Amena Khatun, AKM Fazlul Haque, Sabbir Ahmed, Mohammed Mahfujur Rahman. *2015 International Conference on Electrical Engineering and Information Communication Technology (ICEEICT), 1-6, 2015.* "Design and implementation of Iris recognition based attendance management system".

6. Daugman J.G.(1993). "High Confidence Visual recognition of persons by a test of statistical independence". IEEE transactions on pattern analysis and machine intelligence 15(11), 1148-1161.

7. Llingsworth.K.P, BowyerK.W, and Flynn.P.J "Image Averaging for Improved Iris Recognition", Proc. Third Int'l Conference. Advances in Biometrics 2009.

8. John Daugman, "New Methods in Iris Recognition" .IEEE transaction on System, man and Cybernetics/PART B: Cybernetics, Vol 37 No 5 October 2007.

9. KadrySeifedine, Small Mohamad. *Scientific Research and essays 5(12), pp1428-1435, 2010.* "Wireless attendance management system based on Iris recognition".

10. Kalka.N.D, Zuo.J, Schmid N.A and Cukic.B, "Image Quality Assessment for Iris Biometric "Proc. SPIE ConfBiometricTechnology for Human Identification,P.6202, 2006.

11. Kennedy Okokpuje.O, Etinosa Noma-Osaghae Olatunji, J. Okesolacc, Samuel N. John. *2017 International conference on Computational Science and computational intelligence (CSCI), 563-567, 2017.* " Design and implementation of a student attendance system using Iris biometric recognition".

12. Kuldeep Singh Rathore, Abhishek Pandey, Arya Gupta, Divyanshu Srivastava, Kartik Agrawal, Saurabh Srivastava (2024). "Design and Implementation of efficient automatic attendance record system based on facial recognition technique".

13. Richard P. Wildes, "Iris Recognition; An Emerging Biometric Technology", Proceeding of IEEE. Vol85 No 9, September 1997.

14. Schmid.N.A, Ketkar.M.V, Singh.H, and Cukic.B, "Performance Analysis of Iris Based Identification System at the Matching Score Level" .IEEE Trans Information Forensics and Security, Vol1, No2, pp 154-168, June 2006.