AUTOMATED EXAMINATION ATTENDANCE USING BIOMETRIC FINGER PRINT

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CERTIFICATION

We the undersigned certify that this research titled "**AUTOMATED EXAMINATION ATTENDANCE USING BIOMETRIC FINGER PRINT**" was written by

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in the department of Computer Science. We also certify that it is adequate in scope and quality in partial fulfillment of the requirements for the award of the Higher National Diploma (HND) in Computer Science of Auchi polytechnic, Auchi.

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DEDICATION

This project work is dedicated to almighty (GOD) for his unfailing grace, mercy, understanding, good health, guidance and protection throughout our project work

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All thanks Our utmost gratitude goes to Almighty God who in his mercy and grace has protected and guided us through the course of our study.

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ABSTRACT

Improving security, flexibility, and, eliminate wasting time of checking student attendance has become main issue in the educational institutions. Unfortunately, in the literature there is no enough automatic attendance systems for this reason this study is become to propose an automated biometric fingerprint attendance system that can be used in exam halls to verify if a student has authentic proof to sit for an exam. This follows observations that were made which showed that a lot of students have to go through a long process so as to just obtain an examination slip which they can use to prove that they are eligible to sit for an exam. The developed system was tested by experts and they expressed satisfaction over the use and role played by the newly developed fingerprint recognition system. Observations made from the developed system also showed that the developed system is an improved, secure and costs effective attendance system that can be used to verify if students have authentically attendant lessons and if they are eligible to sit for an exam or not

CHAPTER ONE

INTRODUCTION

1.1 Background of the Study

Conventional security systems used either knowledge based methods (passwords or PIN), and token-based methods (passport, driver license, ID card) and all these are prone to fraud because PIN numbers could be forgotten or hacked and the tokens could be lost, duplicated or stolen. To address the need for robust, reliable, and full proof personal identification, authentication systems will necessarily require a biometric component (Lourde and Khosla, 2010)

Balogun (1999) defined examination as "the process through which students are evaluated or tested to find out the quality of knowledge they have acquired within a specified period". The need for an effective and reliable attendance system in any institution has become of paramount importance. It is generally recognized that examinations determine the extent to which educational objectives have been achieved as well as the extent to which educational institutions have served the needs of community and society (Shah, 2002). Examinations are not limited to measure educational or societal objectives and needs but incorporate in a way of coping with the educational system (Havens, 2002). (Rehmani, 2003) briefly described that 'examinations play a significant role in determining what goes on in the classroom in terms of what, and how teachers teach and students learn and can have impact on both teaching and learning'.

Attendance management of students in institution can be rigorous using the conventional method of paper sheets and old file system method. Every academic institution have standards concerning how attendance is to be confirmed for student in examination halls; that is why keeping the accurate record of attendance is very important.

The use of biometric technology in attendance management cannot be overemphasized. Biometric is the recognition of a person based on physiological or behavioural characteristics.

Many biometrics can be used for some specific systems but however the same; from literature it is known that biometrics is used for uniquely identifying and verifying objects. Every Nigerian university has the obligation to record and take student attendance during examination periods every semester. The accuracy of this record of attendance as important as it is have been marred by many challenges ranging from the cumbersome nature of the paper sheets used in recording, manipulation of the attendance record by impostors. (Shoewu, Makanjuola and Olatinwo, 2014)

The approach of using paper sheets and the old file system to confirm students has been in use for years. There are so many bottlenecks with the conventional method, one of such problem is the tracking and monitoring of student's time of attendance could be tedious, time consuming and as well prone to errors. As an alternative to traditional manual clocking process by students in examination, biometrics characteristics can be used for authenticating students. This research will focus on developing Fingerprint based Biometric Examination Attendance System. The fingerprint Biometrics is adopted in this research work for the fact it is one of the most successful applications of biometric technology. In the manual signing processes, where lecturer give a sheet of paper to student to write their names and signature as a form of confirming their presence for a particular examination session, errors in student attendance mostly occur in a situation where a student cannot easily trace his/her name to sign out against his/her name, instead they sign against a different name.

Biometric traits can either be behavioural or physiological. Behavioural characteristic is a reflection of an individual's psychological makeup, although physical traits, such as size and gender, have a major influence. Some of the examples of behavioural traits used to identify individuals include: Keystroke dynamics, and speech identification and/or verification. While physiological characteristic is relatively a stable human physical characteristic, such as a fingerprint, iris pattern, or blood vessel pattern on the back of the eye. This type of measurement

is unchanging and unalterable without significant duress. Examples includes facial recognition, fingerprints, hand geometry, Retinal Scan, DNA, Vascular patterns and iris recognition (Tripathi, 2011)

Despite all the highlighted benefits; biometric still has encouraging and obvious advantages which include; Accuracy and security (tokens such as papers, keys, magnetic stripe cards can be lost, stolen or duplicated; passwords could be shared. On other hand, biometric verification involves the physical presence of the user).Screening (in biometrics, users cannot assume multiple identities and thus it helps to screen the users). Non-repudiation (with other security models, perpetrators can deny committing a particular action. Biometrics completely eliminates the problem of repudiation). Universality (everyone has a biometric feature and it is thus universal to everybody). Environment friendly (it reduces paper and other resources requirement and does not cause any negative impact to the environment).

1.2 Statement of Problem

There is high rate of impersonation which emanates from examination malpractice; however some higher institutions of learning still uses the traditional pen and paper mode of recording students' attendance in the examination hall by passing various attendance sheets across to students to sign in and out of the examination hall; hence there exist voluminous use of paper and pen, distraction; out of excitement or pain and regret some people forget to sign out.

1.3 Aim and Objectives of the study

The aim of this project work is to develop an examination attendance system using fingerprint; hence the objectives go thus;

i. To help the curb the habit of examination malpractice

ii. To design examination system attendance using fingerprint trait to sign in and out.

1.4 Scope and Limitation`

The scope of the project is to develop Biometric Examination Attendance system that will help curb examination malpractice in Auchi polytechnic Auchi the project is developed as a web application. This system will be governed by the administrator or lecturer and thus covers only student study within the examination hall.

1.5 Significance of the Study

The findings of this study; the major benefits of using biometric which is more significant to this citadel of learning; Federal Polytechnic Auchi, is that it will curb the issues of impersonation (Security), adequate report can be generated, and students are compelled to be timely since the system will not accommodate any act of indiscipline in the line of timing. The following are the beneficiaries of the aforementioned benefits:

a. Students, this is because they will be timely, obedient and disciplined which will help in adequate concentration.

b. Lecturers, this is because report will be easily generated and orderliness shall be maintained.

1.6 Operational Definition of Terms

- **Examination:** a formal test of a person's knowledge or proficiency in a subject or skill.
- **Malpractice:** Immoral, Illegal, or Unethical professional conduct or neglect of professional duty.
- **Impersonation:** An act of pretending to be another person for the purpose of entertainment or fraud.
- **Biometric:** Biometrics Are body measurements and calculations related to human characteristics.

- **Authentication:** Authentication is used in computer science as a form of identification and access control. It is also used to identify individuals in groups that are under surveillance.

CHAPTER TWO

LITERATURE REVIEW

2.0 Over View of Examination

An exam is a formal test that you take to show your knowledge or ability in a particular subject, or to obtain a qualification.

2.1 History of Examination

Examination is regarded as the means of measuring and evaluating the level of knowledge or cognitive abilities of students within a specified period of time. An examination is seen as the instrument used for the assessment of individual knowledge and skills both in general and specific area of study (Adekunle, 2003). Examination has therefore become a process of assessing or determining the level of assimilation of the content of instruction given by the teacher. It is also the means by which the teacher or instructor can assess himself from the performance of the students (Omenu, 2015). Although, students' level of performance may not be the true reflection of their abilities, yet, examination still remains the best tool for objective measurement and evaluation.

Unfortunately, examinations at different levels have been bedeviled with various corrupt and sharp practices tagged examination malpractices. This is indeed a problem that requires urgent attention. According to Ijabadeniyi (2017), the forms of examination include written, oral (viva) and practical. Examination is of two major types namely:

1. Cognitive ability test that tries to find out the knowledge-content of the learner.

2. Non-cognitive test that tries to ascertain how learners think, reason and feel. This also ascertains learner's attitudes, values, preferences, interests, personal-social adjustments and other characteristics.

The significance of examination in whatever forms cannot be overemphasized. Examination gives room for the following:

- Promotion and Certification.
- Discovery of learning problems encountered by students.
- Ensures effectiveness on the part of teachers and learners.
- Useful for guidance and counselling.
- Inculcates spirit of hard work among learners.
- Ascertain the level of knowledge acquisition.

In spite of the laudable objectives of examination, malpractice seems to be an albatross bent on destroying the ideals of examination. Examination malpractice is an omnibus concept for all examination related offences thus making it cumbersome to define. According to Bruno and Ogidigbo (2012), examination malpractice is anything done by the examination candidate that is likely to render the assessment useless. Therefore, anything done by the stakeholders (not only the candidate) that will make the objectivity of the assessment jaundiced or tainted is regarded as examination malpractice.

In Nigeria, the Examination Malpractice Act, Cap E15 Laws of Federation of Nigeria, 2004 explains examination malpractice as any act of omission or commission by a person who in anticipation of, before during or after any examination fraudulently secure an unfair advantage for himself or any other person in such a manner that contravenes the rules and regulations to the

extent of undermining the validity, reliability, authenticity of the examination and ultimately the integrity of the certificate issued. From the above enactment, examination malpractice covers both the pre and post mindset of the stakeholder targeted at perpetrating fraud in the examination.

Some of the causes of examination malpractice include:

1. The nonchalant attitude of students to learning
2. Poor and unconducive learning environment.
3. Poor preparation for examination
4. Bad parental and peers influence
5. Recruitment of incompetent teachers.

The implication of examination malpractice is overwhelming with grave consequences on individuals, and society at large. The trend in examination malpractice will no doubt make a mockery of educational qualification and discredit institution of learning and the nation as a whole. The ripple effect is that the destiny of the populace and the nation will be placed in the hands of half-backed, incompetent individuals.

A country that has a high prevalence of examination malpractice stands to lose its international credibility. Certificates emanating from such a country will be treated with utmost suspicion and doubt. According to Onyechere (2004), the spate of malpractices in the health sector, auctioning and miscarriage of justice by the judiciary, mindless looting of the public treasury, electoral fraud, the regular collapse of buildings designed by “engineers” and “architects” and sale of fake drugs by pharmacists all have root in an educational system bedevilled by examination malpractice.

The provision of a legal framework to stem the tide of examination malpractice has led to the promulgation of various laws and penalties ranging from imprisonment to the option of fine or both. It is worthy to note that the offence of examination malpractice under the Act of the National Assembly or Law of the State is regarded as a felony and not a simple offence or misdemeanour (Ijabadeniyi, 2017). This shows the level of determination of the Nigerian government at all levels in combating the menace of examination malpractice. Examination Malpractices Act, Cap E15, Laws of Federation of Nigeria, 2004 identified offences that constitute examination malpractice, and also prescribes penalties for such offences ranging from 3-5 years imprisonment with or without the option of fine.

The offences as provided under Sections 1 to 12 of the Act include:

Section 1: Cheating (fraudulent trick or device or false pretense with intent to cheat, buy, sell or procures any question paper).

Penalty: Any person guilty of an offence under Section 1(1a-d) of the Act shall be liable on conviction.

1. If under 18 years of age to a fine of N100, 000 or jail term not exceeding three years or both.
2. If 18 years and above (principal, teacher, invigilator, supervisor, examiner, agent or employee of the examination body, such person is liable to a four-year jail term without the option of fine.

Section 2: Stealing (appropriates or takes a question paper and answer sheet or script of other candidates.

Penalty: Liable on conviction to a fine of N100, 000 or imprisonment not exceeding three years jail term or both.

Section 3: Impersonation (false representation as a candidate)

Penalty:

1. if Under 18 years of age, he/she is liable on conviction to a fine of N100,000 or imprisonment not exceeding three years jail term or both.
2. In the case of principal, teacher, invigilator, examiner and agent or employee of the examination body, such person is liable to a jail term of four years without the option of fine.
3. In any other case, three years jail term without the option of a fine.

Section 4: Disorderliness at Examination (leaving the examination hall to mix with any other person, with intent to cheat or secure unfair advantage).

Penalty: Fine not exceeding N50, 000 or jail term not exceeding three years or both. In addition, such candidate will not be allowed to re-enter the examination hall to continue with that examination. Where the offence has to do with a person unlawfully communicate any information to the candidate with intent to aid such candidate, he/she shall be liable on conviction to a fine of N100,000 or three years jail term or both for a person under 18 years. For others, it ranges from three to four years without the option of a fine.

Section 5: Disturbances at Examination (possession or uses of any offensive weapon or other material to incite other people to act in a disorderly manner for the purpose of disrupting the conduct of examination).

Penalty: If under 18years of age, he is liable on conviction to a fine of N100, 000 or jail term not exceeding three years or both. In another case, a jail term of four to five years without the option of a fine.

Section 6: Conduct at Examination (any act of misconduct or failure to obey any lawful order of the invigilator, supervisor or agent of the examination body).

Penalty: Liable on conviction to a fine not exceeding N50, 000 or jail term not exceeding three years or both.

Section 7: Obstruction of a supervisor, invigilator or agent of the examination body in the performance of his duty.

Penalty: If under 18 years of age, liable to a fine of N100, 000 or jail term of not exceeding three years or both. In other cases, imprisonment for a term of four to five years without the option of a fine.

Section 8: Forgery of Result slip or Certificate.

Penalty: If under 18 years of age, he is liable on conviction to a fine of N100, 000 or jail of three years or both. In other cases, imprisonment for a term of four to five years without the option of a fine.

Section 9: Breach of Duty (A person in charge of the conduct of an examination without reasonable cause, before, during or at any time thereafter fails or performs that duty fraudulently, negligently or perversely).

Penalty: Fine not exceeding N50, 000 or jail term not exceeding three years or both. If employed to mark examination papers, alters or tampers with scores, he is liable on conviction to a jail term of four-five years **without** the option of a fine.

Section 10: Conspiracy, Aiding etc.

Penalty: If under 18 years of age, he is liable to a fine of N100, 000 or a jail term not exceeding three years or both. In other cases, imprisonment for a term of four to five years without the option of a fine.

Section 11: This section talks about the conviction for an alternative offence. Where a person is charged for an attempt to commit an offence but there is evidence that establishes the commission of another full offence, the offender shall not be acquitted, but shall be convicted of the offence and punished accordingly.

Section 12: Deals with offences by corporate bodies. The director, secretary or other similar officers of the corporate body shall be deemed to have committed that offence and shall be liable and punished accordingly in line with the criminal liability of a corporate body.

Conclusively, there is an urgent need for effective implementation of the various measures and legislations so as to save the education sector from total collapse.

2.2 Concept of Biometric: Biometrics is*the measurement and statistical analysis of people's unique physical and behavioral characteristics.*

The 1800s witnessed significant developments in biometrics, including the introduction and the fall of the Bertillon system, the implementation of Henry's fingerprint Classification system, and the establishment of fingerprint databases.

2.3 REVIEW OF RELATED WORKS

- **Web Based Student Information Management** S.R.B haramagoudar et al., (2014) this paper assist in automating the existing manual system. It can be monitored and controlled remotely. This paper provides accurate information always. All years together gathered information can be saved and can be accessed at any time. The purpose is to design a college

website which contains upto date information of the college. That should improve efficiency of college record management.

❖ **Attendance Management System** G. Gangagowri et al., (2016) this system is used Way to SMS software. This software is used to send SMS easily to their parent's. This system can store their data about the students and those cares absent student details. It is an efficient method to store the attendance in the Web Site rather than wasting the paper. It also updates the student report directly on the server reducing the faculty's time on logging from the computer.

❖ **Online Student Attendance System** P. N. Garad et al, (2017) in this project, we gave access to three users i.e. Admin, Student, Others. This project is based on client-server. Here, the serve is Tomcat and client is JSP. In this project teachers or the admin will be filling attendance and sending message to the student who is absent. They will have privilege to fill attendance form, update attendance form, send message to the guardian's account whose child is absent, also those attendance is less than 75%, and they also have privilege to send message to the students whose fees are pending. he staff can also view the message whenever they want and also can modify the details of students. Parents have privilege to view attendance and to view message sent by the teacher. Students also have their account with the privilege to view message sent by the subject teacher and to view the attendance Adekunle, (2003).

❖ **Web Based Coaching Institute Management** System Mayuri Kamble et al, (2017) "Coaching Institute Management System" software developed for an institute has been designed to achieve maximum efficiency and reduce the time taken to handle the storing activity. It is designed to replace an existing manual record system thereby reducing time taken for calculations and for storing data. The system is strong enough to withstand regressive daily operations under conditions where the database is maintained and cleared over a certain time of

span. The implementation of the system in the organization will considerably reduce data entry, time and also provide readily calculated reports.

❖ **Classroom Attendance Application**

Pranjul Khare et al, (2016) the scope of the project is the system on which the software is installed, i.e. the project is developed as an ANDROID application, and it will work for a particular institute. Android is a mobile operating system (OS) based on the Linux kernel and currently developed by Google with a user interface based on direct manipulation. RAD approaches to software development have put less emphasis on planning tasks and more emphasis on development. It has revealed that an online system for recording and reporting students 'attendances is indeed a needed application in order to make the process more efficient and time-saving where more than 70% of the sample group agreed to that matter.

❖ **Biometrics Bank Project** Diko Fatokun (Director, Banking and payment Department)

The central bank (CBN), in furtherance of its mandate to develop and enhance the security of the electronic payments system in Nigeria here by release the regulatory frame work for bank verification number BVN operations and watch list for the Nigeria financial system.

2.4 LITERATURE REVIEW TABLE

YEAR	AUTHOR(S)	OBJECTIVES	METHODOLOGY	FINDINGS	PROBLEMS
2017	Monica. C, Nithya. R, Prarthana. M, Sonika. S.V, Dr. M. Ramakrishna	Data of student has been computerized without using any manual effort.	The design is expressed in sufficient detail so as to enable all the developers to understand the underlying architecture of Attendance system.	The Existing system is a manual entry for the Admin and also Faculty. Here the attendance	The requirements for the Software to work are much (Java, Tomcat, PHP, Perl, MySQl, Apache Web Server) etc. A final version

				will be carried out in the hand written registers. Maintaining the records for the Faculty is a tedious job. The retrieval of the information is not as easy as the records are maintained in the registers.	was not made as of then.
2016	Anusha V Pai, Atul Krishna, Kshama P M, Menita Correa	Analyzed report of the pattern of student attendance and time management	This methodology contains three major phases, a.ka, attendance marking, attendance management and report generation. User authentication is one of the major factors in attendance monitoring system.	Data accuracy is maintained, within a short span of time	Unable to create final, precise representation of the knowledge and research-based theory available topic
2016	Abdoulrahmaine Mohammad, Mohammad Elmi Hassan, Muslim Musa,	Create a Window application to be used in place of old paper based user Employee Salary manage process	In this we study it capable of eliminating time wasted during manual collection of attendance and for the educational administration	The new system has been designed as per the user requirements so as to fulfill almost all them. -User friendly -Report Generation -Less paper work	Existing system requires lot of paper work. Loss of even a single register/record led to difficult situation because all the papers are needed to generate the reports.

2017	Shivani Jijankar, Anand Dhore, Arti Sanganwar, Kapil Chalkhure, Prof Vikramsingh R. Parihar	we have proposed a system which will not only make the entire process simple, but will also provide a well-structured and analyzed report of the pattern of student attendance and time management	In this we study it capable of eliminating time wasted during manual collection of attendance and for the educational administration	All the data is stored in the database. The Client accesses this data using internet. The database is accessed via Server and the application works in the browser.	It requires hardware for execution (RFID) which may lead to another cost

2.5 ATTENDANCE MANAGEMENT SYSTEM PROCESS

In the present system all work is done on paper. The whole session attendance is stored in register and at the of the session the reports are generated. We are not interested in generating report in the middle of the session or as per the requirement because it takes more time in calculation. At the end of session, the students who don't have 75% attendance get a notice.

To overcome the drawbacks of the existing system, the proposed system has been evolved. This project aims to reduce the paper work and saving time to generate accurate results from the student's attendance. The system provides with the best user interface. The efficient reports can be generated by using this proposed system.

- ✓ **Advantages of Proposed System**
  - It is trouble-free to use.
  - It is a relatively fast approach to enter attendance
  - Is highly reliable, approximate result from user
  - Best user Interface
  - Efficient reports

2.6 Types of Biometric: There Are Two Major Types Of Biometrics they includes

Physical Biometrics

With the help of special devices (scanners, sensors, and other readers), a person's biometric data is stored in a database. The system saves this information, such as a fingerprint, and converts it into digital data. Then, when the finger is placed back on the scanner, the system compares the new data with what is stored in its database. Finally, the system will either confirm the person's identity and grant them access if there is a match or decline the request if not.

Behavioral Biometrics

Behavioral biometrics is a recognition system that identifies a person based on dynamic or behavioral characteristics. These characteristics may include handwriting and signature dynamics, voice and speech rhythms, gesture recognition, electronic device usage characteristics through typing speed, the way a person holds a smartphone or tablet, and even the way they walk. This type is also known as passive biometrics, as it doesn't require a user's active participation to proceed with the authentication process.

These dynamic authentication methods are based on the characteristics of a person's behavior. They evaluate a person's unique behavior and subconscious movements in the process of reproducing any action.

Voice recognition is a technology that combines both physical and behavioral biometrics as it analyzes dynamic and static characteristics of human voice at the same time.

2.7 Concept of Finger Print: A fingerprint is an impression left by the friction ridges of a human finger. The recovery of partial fingerprints from a crime scene is an important method of forensic science. Moisture and grease on a finger result in fingerprints on surfaces such as glass or metal.

2.8 An Over View Of Finger Print: Fingerprint recognition is a type of physical biometrics. For this authentication method, a fingerprint scanner is used to authenticate data.

Even with the variety of biometric systems, we can simply divide them into three types that work in three different ways: converting a fingerprint into a digital code with an optical sensor, saving conversion using a linear thermal sensor, and converting a fingerprint with a capacitive authentication sensor. Despite this variety, the only difference for the end-user is which manipulations are to be performed with the scanner, i.e., applying their finger (optical and capacitive) or guiding it through a sensor (thermal).

Advantages of Fingerprint Scanning:

- Fingerprints are unique identifiers specific to the individual.
- Most people are familiar with this authentication method.
- No need to remember complex passwords.
- Fingerprint scanners are relatively cheap and can even be bought on Amazon.

Disadvantages of Fingerprint Scanning:

- Injuries, temporary or permanent, can interfere with scans.
- It is a technology that can be bypassed with methods that copy and replicate fingerprints. It's hard to copy one's fingerprint, but it's not impossible.
- It can be bypassed by using someone else's finger while they are asleep or unconscious.

Voice Recognition

Voice is a feature as inherent to each person as their fingerprints or face. The fact that so many companies worldwide use phones for communication offers an excellent opportunity for the use

of this biometric authentication method. Moreover, voice recognition is very convenient for users and requires minimum effort on their side.

Voice biometric authentication technology is widely used in several areas directly related to processing users' voices, such as in call centers. Adoption of this biometric technology allows for speeding up of the service, making the work of agents easier, and helping them become more efficient. This technology can have many different use cases such as security systems, credit card verification, forensic analysis, and teleconferencing, etc. In larger projects, especially when the need to protect confidential information is great, voice identification can be applied with another authentication method such as fingerprint scanning.

Advantages of Voice Recognition:

- No need to remember and then use a password while being authenticated.
- Voice is a natural way of communication and interaction between people.
- It saves time for both users and agents, especially when using passive voice biometrics.
- The voice is a unique feature that is extremely hard to falsify.
- It’s a widely used method that is familiar to users.

Disadvantages of Voice Recognition:

- Users may not understand how their data is stored and have privacy-related concerns.
- Noisy places may prevent successful authentication.
- Severe respiratory illness may decrease the success rate of authentication.

Facial Recognition

Facial recognition is the automatic localization of a human face in an image or video. If necessary, facial recognition technology can be used to confirm a person's identity based on the

available data - an image of someone’s face stored in a database as mathematical code. Interest in this technology is high because this method can be applied in videoconferencing.

Advantages of Facial Recognition:

- Requires little interaction with the device.
- It is widely used and people are used to this type of technology.
- Highly effective when combined with other biometric methods.
- No need to memorize complex passwords.

Disadvantages of Facial Recognition:

- Lighting changes can affect the system's performance.
- Facial expressions may change the system's perception of the face.
- The use of facial accessories may make it difficult to recognize the user.
- It may cause embarrassment for some users to have to look at their phone often to unlock it.

Gap to fill

The review shows that examination malpractice can be curtailed if proper implementation of attendance system using biometric finger print is done.

However, the Biometric identity verification will help to confirm the identity of students through unique traits or characteristics (e.g a face) against a confirmed identity document. This help to prevent students from taking unauthorized action on behalf of a person.

CHAPTER THREE

SYSTEM ANALYSIS AND DESIGN

3.1 System Analysis

This proposed system introduces a new automatic attendance management system, which integrates fingerprint authentication into the process of attendance management for student examination. It is made up of two processes namely; enrolment and authentication.

During enrolment, the biometrics of the user is captured and the minutiae data are extracted and stored in a database as a template for the subject along with the user's ID.

The objective of the enrolment module is to admit a student using his/her id and fingerprints into a database after feature extraction. These features form a template that is used to determine the identity of the student before he or she is allowed to enter any examination hall, formulating the process of authentication. The enrolment process is carried out by an administrator of the attendance management system. During authentication, the biometrics of the student is captured again and the extracted features are compared with the ones already existing in the database to determine a match if there is a match then the student is allowed access to the examination hall.

After a successful match, attendance is marked against the user's id used in matching the templates. The work utilized a fingerprint reader as the input to acquire images, developed program that has fingerprint recognition and identification system as well as database to store user's information. The database comprises the fingerprint templates and other bio-data of the users together with the attendance records made by the users. Figure 1 shows the architecture of the proposed attendance management system.

3.2 Method Of Data Gathering

The following methods of data collection were used.

Interviewing

Some Information Technology experts and students were interviewed and data was gathering the use of Biometric for verification.

Observation

The methods of data collection enable the researchers to witness a firsthand operation of the old system or manual system.

3.2 Analysis of the Existing System

The existing system which is the paper based method of taking attendance during examination is usually characterized with enormous.

3.3 Problem of the Existing System

i) Student signing against someone else's space

ii) Attendance sheet could be endanger if it get in touch with water or sweat

iii) There is a 60 to 70% if examination impersonations as supervisors are not familiar with the faces of the entire students in a class.

3.4 Analysis of the New System

The new system will remove all the errors mentioned above

3.5 Advantages of the New System

1) There won't be any column for student to sign in and out of the examination as the system is computerized with the help of a fingerprint scanner there by removing the error of a student signing against someone else's space.

2) All paper works will be eradicated completely.

3) The records of the examination are save as everything will be done electronically.

3.6 Disadvantages of the New System

i) There is a lack of flexibility to identify the person in case of a cut or wound or when fingerprints are smudged with dirt or grease. Fingerprint sensors are sensitive, which works in their favor if the fingers are clean.

ii) Fingerprint attendance systems are entirely dependent on hardware and peripherals. It is often expensive to scale these systems as you will need to install hardware at every location.

iii Fingerprint attendance systems have high error rates under extreme cold or heat. As they depend on hardware, deploying them to locations where the climate is harsh or changes rapidly poses a challenge.

3.7 System Architecture

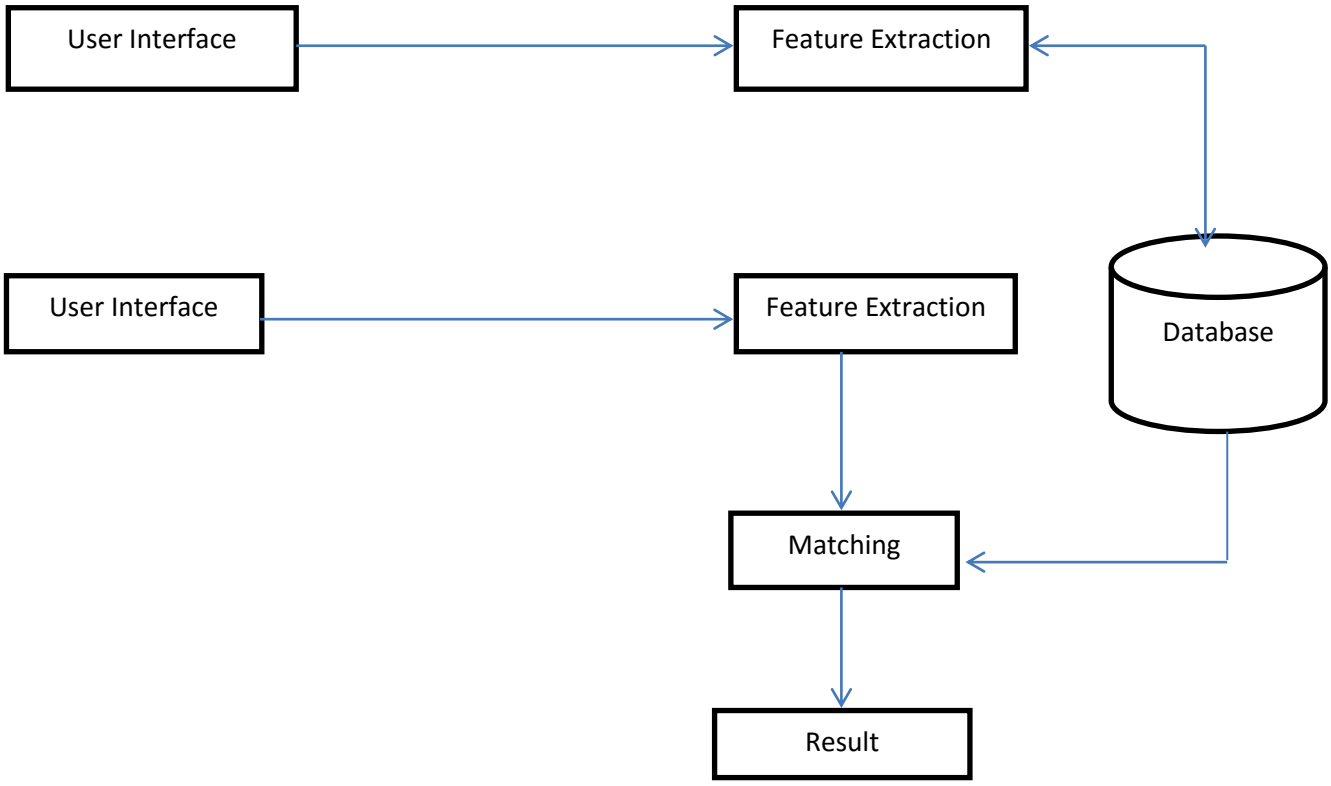


Fig 1.0 System Architecture Diagram of the proposed system

The design of the fingerprint-based examination attendance management system is made up of the following:

i Enrolment module

ii Authentication Module

iii System database.

3.8 Enrolment Module

The task of enrollment module is to enroll users and their fingerprints into the system database. During enrolment, the fingerprint and other bio-data of the user is captured and the unique features are extracted from the fingerprint image and stored in a database as a template for the subject along with the user's ID. Staff bio data to be captured includes: employee number, surname, other names, sex, position, staff type, phone number, email, department and passport photograph. Student bio data includes: matriculation number, surname, other-names, sex, department, level, studentship, phone number and passport photograph. To improve the quality of a captured image during enrolment/registration, two image samples per fingerprint used are captured for a higher degree of accuracy.

When the fingerprint images and the user name of a person to be enrolled are fed to the enrollment module, a minutiae extraction algorithm is first applied to the fingerprint images and the minutiae patterns (features) are extracted. These features form a template that is used to determine the identity of the user, formulating the process of authentication. The enrolment process is carried out by an administrator of the attendance management system. The enrolment and registration phase is an administrative phase. The user fingerprint as well as other bio-data is stored for the first time into the database for registration. The courses, practicals, tests, lecturers

and exams are also registered at this phase. All data and information required for the proper recording of attendance are enrolled in this module.

3.9 Authentication Module

The task of the authentication module is to validate the identity of the person who intends to access the system. The person to be authenticated indicates his/her identity and places his/her finger on the fingerprint scanner. The fingerprint images captured is enhanced and thinned at the image processing stage, and at feature extraction stage, the biometric template is extracted. It is then fed to a matching algorithm, which matches it against the person's biometric template stored in the system database to establish the identity. During authentication, for staff attendance, a staff supply his/her department and name, then places his/her finger over the fingerprint reader, the fingerprint recognition unit compares the fingerprint features with those stored in the database, after a successful match, the staff's employee number is sent to the database alongside the time of making such an attendance and update the status (either present/absent) of user's attendance for the day. Staff attendance is captured twice a day for both arrival and departure time. For student attendance, the lecturer (or a designated personnel as the case may be) selects his/her department, level, course code, attendance type (for example lecture, practicalsetc) and the attendance ID, then the student places his/her fingerprint on the fingerprint reader; the fingerprint recognition unit compares the fingerprint features with those stored in the database, after a successful match, the student's matriculation number is sent to the database alongside the time of making such attendance and update the status (either present/absent) of student's attendance for the class. Student attendance is captured only once for each attendance type.

Fingerprint matching approaches includes minutiae-based matching, ridge-based matching and the correlation matching approaches. However, it is believed that minutiae-based matching

approach, upon which this work is based facilitates the design of a robust, simple, and fast verification algorithm while maintaining a small template.

3.10 System Design

System design is the process of defining the elements of a system such as the architecture, modules and components, the different interfaces of those components and the data that goes through that system. It is meant to satisfy specific needs and requirements of a business or organization through the engineering of a coherent and well-running system.

3.11 Input Design

Input Design is the process of converting a user-oriented description of the input into a computer-based system. This design is important to avoid errors in the data input process and show the correct direction to the management for getting correct information from the computerized system.

Student Registration

Student Name

Student mat number

Level

Department

Fingerprint

Login

Student mat number

Fingerprint

3.12 Database Design

The database design of this project is represented in the table bellow

Table 3.1 Student registration table

Field name	Data type	Field size
Student	varchar	55
Matriculation	varchar	55
Level	varchar	55
Department	varcahr	55
Passport	varchar	55
Date Time	varchar	55
Fingerprint	varchar	55

Table 3.2 Student authentication table

Field Name	Data type	Field size
username	varchar	55
Fingerprint	varchar	55
sing in	Datetime	6
Sign out	Date time	6

CHAPTER FOUR

IMPLEMENTATION AND TESTING

4.1 Introduction

This chapter describes and shows how this standalone system was designed, tested and implemented using the appropriate necessary programming languages, tools and technology.

4.2 Implementation

System or Software Implementation is the conversion of the System Requirements into an executable and working system.

4.3 System Requirement

System requirement are those requirement that ensures optimal utilization of the system that is to be implemented. For effective and smooth running of the proposed system, the following software and hardware requirement must be met;

4.3.1 Hardware Requirement

The hardware requirements are:

i. A computer system with reasonable and sizable hard disk space.
ii. A colored printer
iii. Finger print device

4.3.2 Software Requirement

i. Microsoft windows operating system (Windows 2000, Windows XP, Windows 2007 or Windows 2010).
ii. Microsoft Visual Basic, Microsoft Access

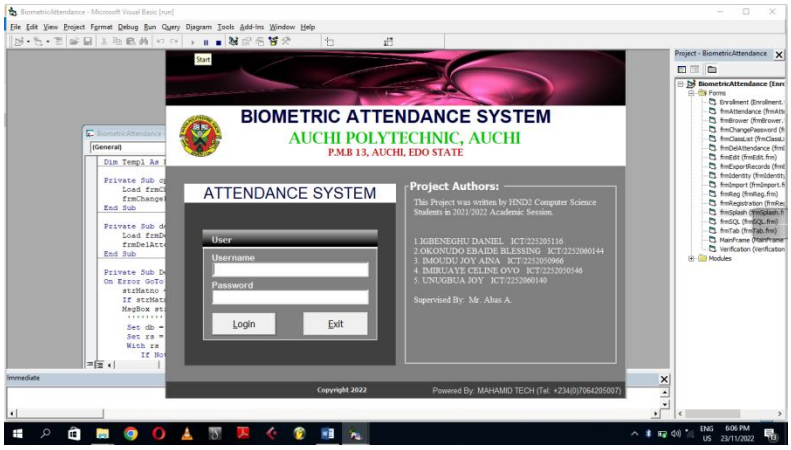
4.4 Implementation Choices

The Student Examination Attendance Management System works as Desktop application system. It was implemented using Microsoft Visual Basic , Digital Personal Fingerprint Scanner was used for finger print capturing and Microsoft Access was used for the database.

4.5 Sample Interfaces

Welcome page: this is the first page that will pop up when the application is loaded.

Login: The admin, Lecturer will insert his username and password in the provided spaces and click on the LOGIN button (Figure 4.1).



Enrolment Module: this module helps to take student information and store it to the database.

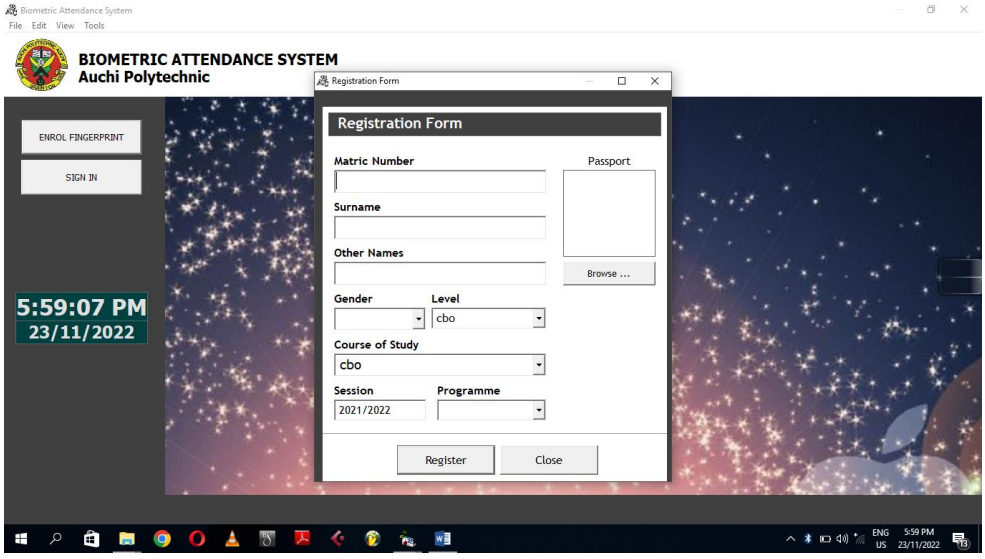
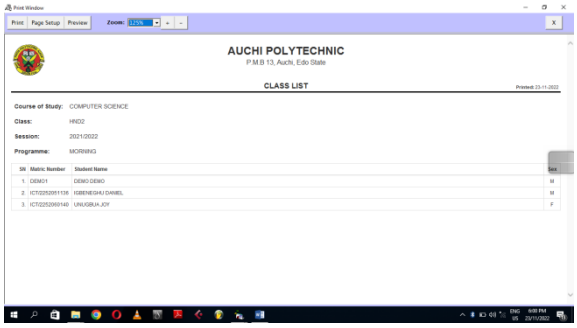


Fig 4.2 create Student Profile

Student Attendance Module



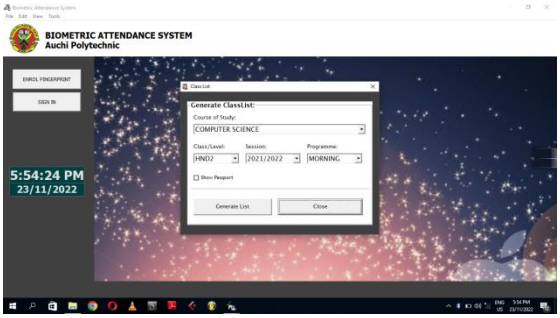


Fig. 4.3 Student attendance Module

4.6 System Testing

System testing is to check each step of the program to make sure that the designed software is working properly. The system was tested by inserting the admin username and password, then registering some people where the system excellently saved their information in the database, and it was saved successfully. Then a check attendance of student to confirm the process.

4.6. 1 Unit Testing

The software interface and program unit functionalities of the system are tested to check how each is working.

Unit testing is a software testing method by which individual units of source code—sets of one or more computer program modules together with associated control data, usage procedures, and operating procedures—are tested to determine whether they are fit for use.

4.6.2 Integration Testing

Integration testing is the next phase in system testing. The links interactions between Microsoft Access or one activity and another were tested and everything was working well.

CHAPTER FIVE

CONCLUSION AND RECOMMENDATIONS

5.1 Conclusion

The main aim of this study was to develop an automated fingerprint attendance recognition system that can be used in exam halls to verify if a student has authentic proof to sit for an exam. As a result, it can be concluded that traditional attendance systems are no longer effective since they involve a lot of manual activities and process as well as a lot of paperwork. Conclusions can also be made that the major challenges that are affecting the use and development of new fingerprint systems are costs and the need to have trained personnel who can manage the system. In reference to other attendance recognition systems, the newly developed system can be said to offer a lot of benefits which include among others, ability to combat fraudulent activities, solve the problem of student disruptions during exams, reduce costs, improve effectiveness and efficiency in recording student attendance and performance information. However, conclusions can also be made that though the proposed fingerprint recognition system is effective and offers a lot of benefits, also it should noted that the system may fail to read when one suffers an injury.

5.2 Recommendations

Based on the above conclusions, recommendations can therefore be made that;

The biometric system should be improved on to avoid system fail and delay

A student should have two different fingerprints from his two hands linked to the database so as to curb problems that arise when a student has been injured.

To improve the performance and the time consuming of the system, Python or any other fast platform can be used

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