**ABSTRACT**

*My research Project is to develop fingerprint biometrics systems that assist in the elimination of examination impersonation. Up till now, over 70% of institution examination board is not using fingerprint as mode of identification, this has resulted in people sitting for examinations for others who collect the result at the end. With the adoption of fingerprint, this will be eliminated identification will also be employed during collection of results and certificates. This target can be mainly decomposed into image pre-processing, feature extraction and feature match. For each sub-task, some classical and up-to-date methods in literatures are analyzed. Based on the analysis, an integrated solution for fingerprint recognition is developed for demonstration. My demonstration program is coded using Java SE for the program, some optimization at coding level and algorithm level are proposed to improve the performance of my fingerprint recognition system. These performance enhancements are shown by experiments conducted upon a variety of fingerprint images. Also, the experiments illustrate the key issues of fingerprint recognition that are consistent with what the available literatures say. Main objective is to eliminate any form impersonation during exam by employing a more secured means of fingerprint biometrics.*

**CHAPTER ONE**

**INTRODUCTION**

**1.1 BACKGROUND OF STUDY**

Formal examination can rightly be defined as the assessment of a person‘s Performance, when confronted with a series of questions, problems, or tasks set him, in order to ascertain the amount of knowledge that he has acquired, the extent to which he is able to utilize it, or the quality and effectiveness of the skills he has developed.

The Jesuits introduced written examination into their schools in the 16th century. The Definitive Ratio Argue Institution Studiorum of 1599, which was not revised until 1932, contains a code of rules for the conduct of school examinations, which were held annually, and determined whether or not children were promoted to a higher class. During the 19th century, formal written examinations became regular in universities, schools, and other educational institutions. Examinations were also increasingly employed for the selection of recruits to the civil service, and the professions, and to posts in industry and commence. Over the ages, standardized testing has been the most common methodology, yet the validity and credibility of the expanded range of contemporary assessment techniques have been called into question.

There are two types of systems that help automatically establish the identity of a person:

1. Authentication (verification) systems and
2. Identification systems.

In a verification system, a person desired to be identified submits an identity claim to the system, usually via a magnetic stripe card, login name, smart card, etc., and the system either rejects or accepts the submitted claim of identity (Am I who I claim I am?). In an identification system, the system establishes a subject‘s identity (or fails if the subject is not enrolled in the system data base) without the subject‘s having to claim an identity (Who am I?). The topic of this paper is channel towards the development of examination impersonation elimination system and this system would strictly do with the unique feature of identification by means of finger print. A verification system based on fingerprints, and the terms verification, authentication, and identification are used in a loose sense and synonymously.

Accurate automatic personal identification is becoming more and more important to the operation of our increasingly electronically interconnected information society. Traditional automatic personal identification technologies to verify the identity of a person, which use ―Something that you know,‖ such as a personal identification number (PIN), or ―something that you have,‖ such as an identification (ID) card, key, etc., are no longer considered reliable enough to satisfy the security requirements of electronic transactions or school management system. All of these techniques suffer from a common problem of inability to differentiate between an authorized person and an impostor who fraudulently acquires the access privilege of the authorized person.

Biometrics is a technology that (uniquely) identifies a person based on his physiological or behavioural characteristics. It relies on ―something that you are‖ to make personal identification and therefore can inherently differentiate between an authorized person and a fraudulent imposter. Although biometrics cannot be used to establish an absolute ―yes/no‖ personal identification like some of the traditional technologies, it can be used to achieve a ―positive identification‖ with a very high level of confidence, such as an error rate of 0.001%. Fingerprint technology using biometrics employ certain advantage of eradicating the problem of examination impersonation by allowing the measure of what you are to perform the security activities of student participation in the exams.

**1.2 OBJECTIVE OF THE STUDY**

The objective of this study is as follows

1. To create a system that is capable of tracking impersonators in the examination system using the methodology of finger print biometrics.
2. To reduce rate of corruption in the educational sector and increase the rate of self confidence on students.
3. To demonstrate the possibility of computer technology in the satisfaction of human needs and also enforce strict security measures that ensure unregistered students do not write exams for other registered students.

**1.3 JUSTIFICATION**

The justification for the system is as follows:

1. To add more security measures to the examination processes using finger print biometrics.
2. To eliminate the possibility of an imposter appearing in an exam.

**1.4 STATEMENT OF PROBLEM**

The problems which are encountered in the previous system are:

1. Student impersonation
2. In secured authentication of students
3. Manual verification of student

**1.5 SCOPE OF THE STUDY**

The project scope defines the description of the work that is required in delivering the Examination Screening Verification system. The main aim of the study is to establish the effect of computerized Examination Screening Verification system on the education sector. This project based its focus on Nigeria institutions and aimed at implementing an Examination Screening Verification system to be used by indigenous institutions to help reduce the increasing rate of exam. The system will be able to generate attendance after examination; attendance carries both sign in and out, the system will grant the examiner access before the examination, keep accurate timing for examination and follow all examination timing rules and regulations, stop sign in 30mins into examination time, does not allow for time out until 45mins into examination.

**1.6 SIGNIFICANCES OF STUDY**

With the increasing rate of exam malpractices in the educational sectors the school management deserve to inculcate a tight security means to ensure that these activities of exam impersonators stop. The activities of these exam impersonators have seen the educational sector suffer some serious form corruption ranging from registered student, to examination supervisor. So it best for the educational body to strategies some certain security means to stop this aspect of corruption in the educational sector.

The system uses a finger prints biometrics this would help ensure that only registered student during registration with their finger prints are allowed into the examination hall. The system would contribute in the area of stopping any activity of corruption in the educational sector among students, and student to teachers. Hard work would be encouraged as every registered student knows he/she is going to write the exam by him or herself. The impersonation which has eating the educational system there by encouraging laziness among students would be eliminated and standard of student educational performance would be increased.

**1.7 DEFINITION OF TERMS/VARIABLES USED**

1. **DATABASE:** A collection of related information which can be stored and retrieved.
2. **EXAMINATION:** A measure for the test of knowledge.
3. **MALPRACTICES:** This refers to negligence or misconduct
4. **IMPERSONATION:** General process of acting on behalf of a client.
5. **IMPERSONATOR**: A performed skilled at copying the manner or expression of another mime.
6. **FINGER PRINT**: An impression on a surface of the curves formed by the ridges on a finger tip.
7. **BIOMETRICS:** Is the use of measurable, biological characteristics such as fingerprints, or iris patterns to identify a person to an electronic system.
8. **ELIMINATION:** To get rid of
9. **DESIGN**: Is a creative activity whose aim is to establish the multi faceted qualities of objects processes, service and their systems in whole life cycles.
10. **SECURITY ACCESS:** Permission granted to users base on their identification.
11. **AUTHENTICATION:** The process of identifying someone base on users name or password in security system.
12. **AUTHORIZATION:** Act of granting someone the permission to do or take something

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**CHAPTER TWO**

**LITERATURE REVIEW**

**2.1 Preamble**

Biometrics is the use of measurable, biological characteristics such as finger prints or iris patterns to identify a person to an electronic system. Once these measurements have been taken, they may then be used to authenticate an individual or user. This is done by comparing the sampled biometric against a template taken earlier. This process will be discussed in further detail below. Although biometrics is viewed as an emerging technology, in reality, their use has been documented throughout the history of mankind. In Egypt, thousands of years ago, it was common for individuals to use physical traits or characteristics such as scars, eye and hair color, height, etc., to identify individuals for business transactions. The Old Testament cites the use of a biometric in the Book of Judges 12:5-6. It states: ―Then said the men of Gilead unto him, Say now Shibboleth: and he said Sibboleth: for he could not frame to pronounce it right, then they took him and slew him at the passages of Jordan….‖ The Old Testament. In this example, the pronunciation of the individual was used to identify or authenticate who they were. His repercussions for failing the authentication test were quite a bit more drastic than simply not being granted access, but it was a biometric in use nonetheless.

A fingerprint in its narrow sense is an impression left by the friction ridges of a human [finger](https://en.wikipedia.org/wiki/Finger)Scientific Working Group on Friction Ridges Analysis an Technology (SWGFAST; 2012). Fingerprints are easily deposited on suitable surfaces (such as glass or metal or polished stone) by the natural secretions of sweat from the eccrine glands that are present in epidermal ridges. These are sometimes referred to as "Chanced Impressions.

In a wider use of the term, fingerprints are the traces of an impression from the friction ridges of any part of a human or other primatehand. A print from sole of the foot can also leave an impression of friction ridges.

According to Olsen, Robert D. Sr (1972) deliberate impressions of fingerprints may be formed by ink or other substances transferred from the peaks of friction ridges on the skin to a relatively smooth surface such as a fingerprint card. Fingerprint records normally contain impressions from the pad on the last joint of fingers and thumbs, although fingerprint cards also typically record portions of lower joint areas of the fingers.

According to Bhanoo, Sindya N. (2015) human fingerprints are detailed, nearly unique, difficult to alter, and durable over the life of an individual, making them suitable as long-term markers of human identity. They may be employed by police or other authorities to identify individuals who wish to conceal their identity. or to identify people who are incapacitated or deceased and thus unable to identify themselves, as in the aftermath of a natural disaster .Fingerprint analysis, in use t he early 20th century, has led to many crimes being solved. This means that many criminals consider gloves essential. In 2015, the identity of gender by use of a fingerprint test has been reported.

**2.2 Review of General Text**

It involves taking the measured characteristic and trying to find a match in a database containing records of people and their characteristic. This method requires a large amount of processing power and solutions, if the database is very large. It is often used in determining the identity of a suspect from crime scene information. The primary function of fingerprint automation and verification system is to eliminate crime and avoid impersonation. One of the most recent innovation uses of fingerprint verification is being employed by the Nigerian Independent National Electoral Commission (INEC), which used the technology to weed out duplicated voter card registration. During the last voter card registration, some people registered several times under different names so they vote more than once. Conventional methods have not been very successful at catching these people. Using the fingerprint authentication and verification system to search through facial images in the voter database for duplicate at the time of registration, new images are compared to the records already on the file to catch those who attempt to register under different names. The technology was successfully used in the last general election. Biometric systems using fingerprint have the best performance since the False Reject Rate( FRR )and False Acceptance Rate( FAR) rates are very low for these identifiers*(Jain, A.K.; Uludag, U., “Hiding biometric data”, Pattern Analysis and Machine Intelligence, IEEE Transactions. On, Volume: 25, Issue: 11, Nov. 2003).*

**2.3 Historical Background**

Security began thousands of years ago. Until recent decades, it has been the story of what might be called classic Security system i.e. methods of safeguarding and protecting one’s life or property e.g. encryption that use pen and paper, or perhaps simple mechanical aids. In the early 20th century, the invention of complex mechanical and electromechanical machines, such as the Enigma rotor machine, provided more sophisticated and efficient means of encryption; and the subsequent introduction of electronics and computing has allowed elaborate schemes of still greater complexity, most of which are entirely unsuited to pen and paper (Helen, 1939).

Since the use of the computer is so wide in life and privacy of students and staff security is very important, an important concept to note is fingerprint biometric based system is one of the best security measures and can be incorporated into systems that participate in database system.

**2.4 Concept of Fingerprint Automation and Verification System**

Fingerprint recognition or fingerprint authentication refers to the automated method of verifying a match between two human fingerprints. Fingerprints are one of many forms of biometrics used to identify individuals and verify their identity. Using a fingerprint based identification system can simplify user interactionwithin a secured environment. A single fingerprint scan for verification against a known template replaces the need to remember passwords or authorization codes which makes it easier for users accessing the system requiring user authentication. Fingerprint applications require a user interface to capture the image; this image is then compared against a known sample. A verification type system that only compares the individual against a single sample greatly reduces the time required over a database system. This will focus on a verification based system to simplify the overall design. Fingerprint automation system should be implemented by the department of Computer Science of Kaduna polytechnic because of its functionality. This policy applies to all permanent and fixed term, full time and part time students that need security. This fingerprint biometric base security system is aimed at ensuring security in the School environment and also reducing the rate of examination malpractice and impersonation by carrying fingerprint-based database activities. To check various insecurity challenges in different forms ranging from; restriction of unauthorized access in to the department. This new system grants the department of the record of how many studentsare registered and qualified to sit for examination, total record of users which include time of entry and time of departure. The fingerprints remain in the database of the department. When a student of Polytechnic leaves or graduates, records are being kept for future references. This is to help prevent unauthorized access**.**

**2.5 Identification and Classification of Individual Fingerprints**

According to Ashbaugh, David R. (2013) fingerprint identification, known as dactyloscopy, or hand print identification, is the process of comparing two instances of friction ridge skin impressions, from human fingers , even the palm of the hand or sole of the foot , to determine whether these impressions could have come from the same individual. The flexibility of friction ridge skin means that no two finger or palm prints are ever exactly alike in every detail; even two impressions recorded immediately after each other from the same hand may be slightly different. Fingerprint identification, also referred to as individualization, involves an expert, or an [expert computer system](https://en.wikipedia.org/wiki/Expert_system) operating under [threshold scoring](https://en.wikipedia.org/wiki/Adaptive_thresholding) rules, determining whether two friction ridge impressions are likely to have originated from the same finger or palm (or toe or sole).

An intentional recording of friction ridges is usually made with black printer's [ink](https://en.wikipedia.org/wiki/Ink) rolled across a contrasting white background, typically a white card. Friction ridges can also be recorded digitally, usually on a glass plate, using a technique called [Live Scan](https://en.wikipedia.org/wiki/Live_Scan). A "latent print" is the chance recording of friction ridges deposited on the surface of an object or a wall. Latent prints are invisible to the naked eye, whereas "patent prints" or "plastic prints" are viewable with the unaided eye. Latent prints are often fragmentary and require the use of chemical methods, [powder](https://en.wikipedia.org/wiki/Fingerprint_powder), or alternative light sources in order to be made clear. Sometimes an ordinary bright flashlight will make a latent print visible.

When friction ridges come into contact with a surface that will take a print, material that is on the friction ridges such as [perspiration](https://en.wikipedia.org/wiki/Perspiration), oil, grease, ink or blood, will be transferred to the surface. Factors which affect the quality of friction ridge impressions are numerous. Pliability of the skin, deposition pressure, slippage, the material from which the surface is made, the roughness of the surface and the substance deposited are just some of the various factors which can cause a latent print to appear differently from any known recording of the same friction ridges. Indeed, the conditions surrounding every instance of friction ridge deposition are unique and never duplicated. For these reasons, fingerprint examiners are required to undergo extensive training. The scientific study of fingerprints is called [dermatoglyphics](https://en.wikipedia.org/wiki/Dermatoglyphics).

Therefore the major classifications of fingerprint are as follow;

1. **Exemplar:** Exemlar prints or a known print is the name given to fingerprints deliberately collected from a subject, whether for purposes of enrollment in a system or when under arrest for a suspected criminal offense. During criminal arrests, a set of exemplar prints will normally include one print taken from each finger that has been rolled from one edge of the nail to the other, plain impressions of each of the four fingers of each hand, and plain impressions of each thumb. Exemplar prints can be collected using [Live Scan](https://en.wikipedia.org/wiki/Live_Scan) or by using ink on paper cards.
2. **Latent:** Although the word latent means hidden or invisible, in modern usage for [forensic science](https://en.wikipedia.org/wiki/Forensic_science) the term latent prints means any chance or accidental impression left by friction ridge skin on a surface, regardless of whether it is visible or invisible at the time of deposition. Electronic, chemical and physical processing techniques permit visualization of invisible latent print residues whether they are from natural sweat on the skin or from a contaminant such as motor oil, blood, ink, paint or some other form of dirt. The different types of fingerprint patterns, such as arch, loop and whorl, will be described below. Latent prints may exhibit only a small portion of the surface of a finger and this may be smudged, distorted, overlapped by other prints from the same or from different individuals, or any or all of these in combination. For this reason, latent prints usually present an "inevitable source of error in making comparisons", as they generally "contain less clarity, less content, and less undistorted information than a fingerprint taken under controlled conditions, and much, much less detail compared to the actual patterns of ridges and grooves of a finger." (Zabell, Sandy; 2012)
3. **Patent:** Patent prints are chance friction ridge impressions which are obvious to the human eye and which have been caused by the transfer of foreign material from a finger onto a surface. Some obvious examples would be impressions from flour and wet clay. Because they are already visible and have no need of enhancement they are generally photographed rather than being lifted in the way that latent prints are. An attempt to preserve the actual print is always made for later presentation in court, and there are many techniques used to do this. Patent prints can be left on a surface by materials such as ink, dirt, or blood.
4. **Plastic:** A plastic print is a friction ridge impression left in a material that retains the shape of the ridge detail. Although very few criminals would be careless enough to leave their prints in a lump of wet clay, this would make a perfect plastic print (Johnson, P. Lee (1973). Commonly encountered examples are melted candle wax, putty removed from the perimeter of window panes and thick grease deposits on car parts. Such prints are already visible and need no enhancement, but investigators must not overlook the potential that invisible latent prints deposited by accomplices may also be on such surfaces. After photographically recording such prints, attempts should be made to develop other non-plastic impressions deposited from sweat or other contaminants.
5. **Electronic Recording:** There has been a newspaper report of a man selling stolen watches sending images of them on a [mobile phone](https://en.wikipedia.org/wiki/Mobile_phone), and those images included parts of his hands in enough detail for police to be able to identify fingerprint patterns ([Manchester Evening News](https://en.wikipedia.org/wiki/Manchester_Evening_News); 2010). Recent studies found that the improving cameras with increasing resolution of smartphones might have a high impact on users’ security: The back-facing camera of a device can be used to capture an image of the user’s index finger, which on smartphones using biometric means of authentication is often used to authenticate a user against the smartphone (Fiebig, Tobias; et al; 2014).

At the 31st [Chaos Communication Congress](https://en.wikipedia.org/wiki/Chaos_Communication_Congress), hardware hacker starbug presented how [DSLRs](https://en.wikipedia.org/wiki/Digital_single-lens_reflex_camera) with high resolution and equipped with a [long focus lens](https://en.wikipedia.org/wiki/Long_focus_lens) can be used to capture images of hands, or more specifically, fingers in order to use them for spoosfing (Krissler, Jan; 2015).

**CHAPTER THREE**

**RESEARCH METHODOLOGY**

* 1. **Preamble**

Analysis is a dedicated study of the various operations performed by a system and their relationships with the previously existing system and also with the inside and outside of the system with a view to understanding the possible problems and ease of design of a new system or it feasibility and viability.

* 1. **Method of Data Collection**

A well-developed research design can provide a device not only to focus on the work of the investigator but also to provide a means of communication to other logic and reasoning from that is to be conducted. A thorough investigation of the current system was made in order to obtain detailed fact about the application area to be re-designed. Investigation also covered looking at the functional requirement of the present system and finding out whether the requirements and objective of the present system are being achieved. In the investigation proper, several methods of data collection were employed which includes interviewing of office representatives and direct observation. These methods were adopted to ensure the validity of data collected and relevance of the result after processing the data:

**Documentation:** it is a form of secondary research technique, which demands the research going to the library or organization based resources centers (offline and online) to search for pieces of information relating to the problem at hand. This instrument involved gathering information from secondary sources such as newspapers, magazines, textbooks, and past projects and any relevant sources.

**Interview:** this is a technique used for collecting information from respondents in a personal contact or in a conversational mode, one on one. It is used when a researcher wants to obtain reliable and valid information in the verbal responses from respondents in order to confirm or reject hypothesis and to gather relevant information.

* 1. **System modeling**

This software is designed to ensure that the high rate of examination malpractice is eliminated through replacement of the traditional method of exams processes like issuing of examination cards which is tedious and involves a lot of processes with the fingerprint automated and verification system and also to provide security. The patterns of fingerprints are collected with the use of a biometric scanner, the images are collected with the web camera which are attached to the name, reg. no, department, gender, level and semester of examination. A first time user walks to the system provided by the department at the entrance of the examination hall, wipes his fingerprint computerization takes place within the system and automatically the face of the student appears with all the details of the student if registered and if the fingerprint is not registered in the database, I gives an error message.

* + 1. **Use Case Diagram**

Each use case describes the typical scenario for which the user uses the system. You have already read descriptions of the security identity card systems use case in the introduction; the list of steps require to perform each transaction type are registration, automation, verification. But figure 3.0 show the use case diagram for the system. The two sticks figure represent the actors, which defines the roles that an external entity - such as person or another system – plays when interacting with the system. For our fingerprint automation and verification systems, the actors are the administrator and user. Our requirement document supplies the actors – system users should be able to view the interface where to wipe the finger and theadministrator should be able to view the first page and able to login to view the main menu and interact with the system.

I

**INTERACTIVE FINGERPRINT**

**RECOGNITION SYSTEM**

**USER**

**USER ADMIN**

**Figure 3.1:** Use case diagram

* + 1. **SYSTEM FLOW CHART**

START

STUDENT IS GRANTED ACCESS INTO THE CENTRE

STUDENTS LOGS IN WTH HIS/HER FINGERPRINT USING THE FINGRPRINT MODULE

IS ACCESS GRANTED

DISPLAY STUDENTS INFORMATION AND THE COURSE TO BE WRITTEN

GIVES STUDENTS ACCESS TO THE PORTAL

END

NO

YES

**Figure 3.2:** Flow Chart of the Process

* + 1. **Class Diagram**

Class diagram in the Unified Modeling Language (UML) is a type of static structure diagram that describes the structure of a system by showing the system’s classes, their attributes, operations (or methods), and the relationship among them.

LOGIN PAGE

USERNAME: STRING

PASSWORD: STRING

+ LOGIN()

+ CLOSE ( )

**STUDENTS REGISTRATION**

**-IMAGE: PICTURE**

**-FIRST NAME: STRING**

**-OTHER NAME: STRING**

**-REG. NO.: STRING**

**-SEX: STRING**

**-LEVEL: STRING**

**-SEMESTER: STRING**

**-DEPARTMENT: STRING**

**-SCHOOL: STRING**

**-SECTION: STRING**

**+SAVE: ( )**

**+EDIT: ( )**

**+UPDATE: ( )**

**+CLOSE: ( )**

**COMFIRMATION PAGE**

**USERNAME: STRING**

**PASSWORD: STRING**

**+ LOGIN ()**

**+ CLOSE ()**

**Figure 3.3:** Class diagram

* 1. **Database Design**

**PROJECT REPORTS**

**FINGERPRINT DATA**

**DATABASE**

**DISPLAY MODE**

**PREPARATION**

**INPUT DATA MODE**

**Figure 3.4:** Database design diagram

* 1. **Output design**

This declares and show the result obtained from the input specified. The output product by the automated system depends on the input. Below is the output specification.

* + 1. **Administration Table Output**

**Table 3.1**

|  |  |
| --- | --- |
| **FIELD NAME** | **OUTPUT** |
| USERNAME | XXXXXXX |
| PASSWORD | XXXXXXX |

* + 1. **Output Design**

**Table 3.2:** Examination card

|  |  |
| --- | --- |
| **FIELD NAME** | **OUTPUT** |
| SCHOOL/FACULTY  CURRENT SEMESTER  CURRENT SECTION  FIRST NAME  OTHER NAME  SURNAME  REG NO  LEVEL  DEPARTMENT  SEX  IMAGE | XXXXXXXXX  XXXXXXXXX  XXXXXXXXX  XXXXXXXXX  XXXXXXXXX  XXXXXXXXX  XXXXXXXXX  XXXXXXXXX  XXXXXXXXX  XXXXXXXXX  PICTURE |

* 1. **Input and use interface design**

Input specification is the logical presentation of how data is stored in the computer’s memory. The input specification used in this project work presented below:

* + 1. **Administration Table**

**Table 3.3:** Retrieved password

|  |  |  |  |
| --- | --- | --- | --- |
| **FIELD NAME** | **DATA TYPE** | **LENGTH** | **DESCRIPTION** |
| USERNAME | STRING | 10 | Username |
| PASSWORD | STRING | 15 | Access Code |

**Primary key:** password

* + 1. **System Input Specification**

**Table 3.4:** Student registration

|  |  |  |  |
| --- | --- | --- | --- |
| **FIELD NAME** | **DATA TYPE** | **LENGHT** | **FIELD DESCRIBTION** |
| SCHOOL/FACULTY SEMESTER  SECTION  NATIONALITY  RELIGION  FIRST NAME  OTHER NAME  SURNAME  REG NO  LEVEL  DEPARTMENT  SEX  STATE OF ORIGIN  DATE OF BIRTH  LOCAL GOVT  MARITAL STATUS  EMAIL  MOBILE NUMBER  IMAGE  FINGERPRINT | STRING  STRING  INTEGER  STRING  STRING  STRING  STRING  STRING  INTEGER  INTEGER  STRING  STRING  STRING  INTEGER  STRING  STRING  STRING  INTEGER  BYTE  BYTE | 50  50  10  10  10  15  15  15  10  5  50  10  10  15  15  10  30  15  250  15 | STUDENTS FACULTY  CURRENT SEMESTER  CURRENT SECTION  STUDENTS NATIONALITY  STUDENTS RELIGION  STUDENTS FIRST NAME  STUDENTS OTHER NAME  STUDENTS SURNAME  STUDENTS REG. NO.  CURRENT LEVEL  STUDENTS DEPARTMENT  STUDENTS SEX  STUDENTS STATE  STUDENTSDATE OF BIRTH  STUDENTS LGA  STUDENTS STATUS  STUDENTS EMAIL  STUDENTS PHONE NO.  STUDENT PASPORT  STUDENTS FINGERPRINT |

**Primary key**: Reg. no.

**Table 3.5:** Course registration

|  |  |  |  |
| --- | --- | --- | --- |
| **Field name** | **Data type** | **Length** | **Field description** |
| Coursecode  Coursetitle  Unit  Level  Starttime  Hours  Endtime  Date | String  String  Integer  Integer  Time  Time  Time  Date | 6  20  2  3  12  12  12  10 | Course code  Course title  Unit  Level  Start time  Hours  End time  Date |

**Primary key**: course code

* 1. **SYSTEM REQUIREMENT**
     1. **Hardware Requirement**

Below are the hardware devices that will be needed for the system:

1. A personal Computer ( Intel Core13 2GhMnz or Higher)
2. 17 Visual Display Unit ( SVGA)
3. Minimum RAM requirement should be 1GB
4. Minimum 60GB HDD
5. Printers
6. [U.are.U@4000BReader](mailto:U.are.U@4000BReader) (fingerprint scanner/reader)
   * 1. **Software Requirement**
7. Minimum of Window 7 or higher (Remote stand-alone system)
8. JDK 8 or JRE 8 or above
9. MySQL database
10. Pass Fingerprints Installer
11. Fingerprint SDK 2009 installer
    1. **CHOICE OF PROGRAMING LANGUAGE**

The programming language used to design and implement this project is Java SE 8. Why I used this particular programming language and version is due to the following reasons:

1. **Ease of Use**: Application programmers can focus on their domain object model and leave the details of persistence (field-to-field storage of objects) to the Java implementations.
2. **Portability**: Applications written with Java can be run on multiple implementations without recompiling.
3. **Database independence:** Applications written in Java are independent of the underlying database. Java supports many kind of transactional data stores including relational and object databases, XML, flat files, MS Access and others.
4. **High Performance:** Application programmers delegate the details of persistence to Java implementation, which can optimize data access patterns for optional performance.
5. **Popularity:** Java is so popular so, there are many good resources (Books, web sites and more) that can help you learn the language. You can find the answers to your programming problems much more easily than other programming language.

**CHAPTER FOUR**

**SYSTEM IMPLEMENTATION AND EVALUATION**

**4.1 Preamble**

This chapter discusses the design and development of fingerprint identification and verification System to the department so as to avoid unauthorized access, impersonation lateness to examination centers and putting a check on examination malpractice. The application used in the department also gives room for adequate security through the use of fingerprint, in order not to give access to unauthorized users, processing convenience, efficient in terms of operation, speed to produce very accurate and consistent result.

The designed system get to increase efficiency of data captured, storage, manipulation and presentation of the application. The new system is designed with a user friendly mode that supports modification or addition of other features at any given time.

The design to the system includes:

- Output Design

- Input Design

- File design

- Procedure Design

**4.2 System Testing and Evaluation**

System testing steps that unify the whole process file of design that link every module together and produce the desired output in the new system.

The system techniques is the putting into effect the intension depicted in the design stage. The design stage state what should be or ought to be done while the implementation does it. Arrangement should be for personnel that will handle the system programming coding and operation of the new system installed. The program implementation is basically the programming, testing and changing over from host system to new system.

This is the stage of the project where the theoretical design is turned into a working system. At this stage, it is considered to be the most crucial stage in achieving a successful new system as in giving users confidence that the new system will work and be effective. The implementation stage is a system product in its own right, it involved careful planning investigation of the current system and it constraints on implementation design method to achieve the changeover, training of staff in the changeover procedure and the evaluation of change over procedure.

**4.3 System Conversion Plan**

Different method can be adopted to change an old system to a new one such as direct, parallel, pilot, phase etc. Among this operation, parallel method will be used where both the existing and proposed system are run side by side using the same input data and then the output data is been compared, after having fully debugged the proposed system, then the existing system is gradually phased out, while computerized system take over, which has criteria of processing data in speed, accuracy and urgency to conduct and control students are noted.

**4.4 System Installation**

The installation of the new system follows immediately after design. The process should generate specification that will be employed and used to develop an information system that solves the problems defined during the system analysis.

When structuring a system, it is important that the system design techniques and procedures be it hardware or software should be independent. This allows implementation to take place using whatever hardware or software which turns how to be the most effective in supporting information structure.

The installation of the system is the stages of system development that determine what the new system will be done and how it will do it. It is concerned co-ordination of the procedure and effective utilization of the equipment provided in order to make sure that goals are achieved. These bring in confidence of the management in the installation plan and it also ensures uninterrupted operation during the implementation period.

**4.4.1 User Manual (Operational Manual)**

Documentation enables the user to be familiar with the procedure involved in running the program. It specifies how the newly designed system is documented for user reference in case there is any need for improvement or modification.

The manual contain the detail description of the program which can assist the user for the efficiently use of the new system.

**CHAPTER FIVE**

**SUMMARY, CONCLUSION AND RECOMMENDATIONS**

**5.1 Summary**

This project can be summarized under the achievements and the problems encountered. The major achievement of this project is the successful development of fingerprint identification and verification system that will help in conducting students for examination without delay and orderliness is achieved at the end of each paper.

Quite a lot of problems were encountered in the course of developing this system. One of such problems is the unavailability of human expert for the provision of enough information for building of the system.

**5.2 Conclusion**

For the success of the system, the department should be given the necessary support and maximum co-operation from the management and the staffs working with the existing system. The human expert will feed the developers with all the needed information for the fingerprint system. Computerization is to make life easier for both administrators and students involved in the process.

Hence, the researcher can confidently say based on the result got that the problems of department of mathematics, statistics and computer science department of Kaduna polytechnic for conducting examination are:

1. Manual conduction of examination which is tedious and time consuming.

2. Examination malpractice due to Impersonation

3. Lateness to examination centers

4. Lack of proper conduction of student at examination centers.

Furthermore, it is true that the school management sets up various monitoring groups and panels to check malpractices and deal with people involved. The impacts of these groups are being felt in the conduction and control of malpractices in the entire institution.

* 1. **Recommendations**

Having successfully identifies some of the major problems facing the the conduction of student during examinations, of the department of mathematics, statistics and computer science, I obliged to make the following recommendations:

1. Students should be adequately and properly registered for exams.

2. Courses in which students are to sit for examination for should be registered each.

3. Time in and time out for each paper should also be included.

4. Fingerprints samples and passport photographs of each student should be captured and registered alongside other details collected.

5. A system and a fingerprint scanner should be provided at examination centers at each entry point.

6. Lectures invigilating should ensure that each student is identified by wiping his/ her fingerprint on the scanner and verified before going into the halls.to sit for the examinations.

7. Malpractice victims should be adequately delt with accordingly.

Furthermore, poor attendance of lecturers for lectures and students also contribute to the problem of malpractice. Students should enjoy lectures and lectures should also be giving full benefits such as health and transport allowances, huge salary scales and prompt payments.

These, if adequately provided, will induce lecturers to perform effectively and efficiently and also students will be encouraged to be serious with lectures. This will in a long way check source fraudulent and malpractices normally perpetuated in the department due to improper discharge of duties.

**REFERENCES**

Ab “peer Reviewed Glossary of the scientific worki8ng group on friction Ridge Analysis, Study and Technology (SWGFAST)”. Retrieve 2012-09-14

BhanooSinya N. (20 November 2015). “Science-New Technique can identify Gender From a fingerprint” New York Times. Retrieved 21 November 2015.

Fiebig, Tobias; Krissler, Jan; Hänsch, Ronny (August 2014). Security Impact of High Resolution smartphoneCameras. Usenix Association.Retrieved5 February 2015.

EliaZureik (2004) with Hindle, K. Governance, Security and Technology: The Case of Biometrics. Studies in Political Economy 73:113–137. 130

Helen, (1939). Smart car Security an Applications, Artech, Inc.

Jain, A.K.; Uludag, U., “Hiding biometric data”, Pattern Analysis and Machine Intelligence, IEEE Transactions.On, Volume: 25, Issue: 11, Nov. 2003.

Johnson, P. Lee(1973).”Life of latent”.Identification News 23(1) 16^ Johnson, P. Lee (1973)."Life ofLatent".Identification News 23 (1).

Lyon (2001): Surveillance Society Open University Press: Maidenhead, UK

Manchester Evening News, June 17,2010, front page

Olsen, Robert. Sr (1972). “the Chemical Composition of farmer Sweat” Finger Print an Identification Magazine 53 (10)