Federal Polytechnic Ilaro Journal of Pure & Applied Sciences

{FEPI- JOPAS}

Volume 3 Issue 1,
June, 2021 Edition.

Published by:

The School of Pure and Applied Sciences (SPAS)
The Federal Polytechnic Ilaro, Ogun State, Nigeria.
https://fepi-jopas.federalpolyilaro.edu.ng
E-mail:fepi.jopas@federalpolyilaro.edu.ng

ISSN: 2714-2531

EDITORIAL TEAM

A. **Editorial Board**

NAME	STATUS	AFFILIATION
R.T. Oyede (PhD)	Chairman	The Federal Polytechnic Ilaro, Nigeria
Prof. O.O. Ajani	Member	Covenant University Ota, Nigeria
Prof. H.O.D. Longe	Member	University of Lagos, Akoka, Nigeria
Prof. I.A. Ayodele	Member	University of Ibadan, Nigeria
C.E Ogunlade (PhD)	Member	Federal Polytechnic Ede, Nigeria
O. E. Oduntan(PhD)	Member	The Federal Polytechnic Ilaro, Nigeria

B. **Consulting Editors**

NAME	AFFILIATION
Prof. H.O.D. Longe	University of Lagos, Akoka, Nigeria
R. A. Oloyo(PhD)	The Federal Polytechnic Ilaro, Nigeria
L.A. Azeez (Phd)	Osun State University, Oshogbo, Nigeria
A.O. Oyedeji (PhD)	The Federal Polytechnic Ilaro, Nigeria
O. O.Lanloye (PhD)	Bowen University Iwo, Nigeria, Kampala International University, Uganda.
N.O.A. Ilelaboye	The Federal Polytechnic Ilaro, Nigeria
E.O. Fatunmbi (PhD	The Federal Polytechnic Ilaro, Nigeria
O.J. Adebowale (PhD)	The Federal Polytechnic Ilaro, Nigeria
Engr. I.A. Adeyanju (PhD)	The Federal University, Oye Ekiti, Nigeria
Engr. O.P. Aiyelabowo (PhD)	The Federal Polytechnic Ilaro, Nigeria

C. **Editor-in-Chief**

NAME	AFFILIATION
Prof. O.O. Ajani	Covenant University Ota, Nigeria

D. **Managing Editor**

NAME	AFFILIATION
O. E. Oduntan (PhD)	The Federal Polytechnic Ilaro, Nigeria

E. **Associate Editors**

NAME	AFFILIATION
O.J. Adebowale(PhD)	The Federal Polytechnic Ilaro, Nigeria
O.J. Adegboye	The Federal Polytechnic Ilaro, Nigeria
O. Ogunyemi	The Federal Polytechnic Ilaro, Nigeria
T.O. Ogunseitan	The Federal Polytechnic Ilaro, Nigeria
E. Gabriel	The Federal Polytechnic Ilaro, Nigeria
A. O. Dawodu	The Federal Polytechnic Ilaro, Nigeria

Desk Officer:
Ayodele Emmanuel
The Department of Computer Science, The Federal Polytechnic, Ilaro. Ogun State.

Site Editors:
Dr. O. E. Oduntan
Omolewa Stephen

FOREWORD

I warmly welcome all and sundry to the volume 3 issue 1 of Federal Polytechnic – Journal of Pure and Applied Sciences (FEPI-JOPAS) which is a peer reviewed multi-disciplinary accredited Journal of international repute. FEPI-JOPAS publishes full length research work, short communications, critical reviews and other review articles. In this issue, readers will find a diverse group of manuscripts of top-rated relevance in pure and applied science, engineering and built environment. Many of the features that you will see in the Journal are result of highly valuable articles from the authors as well as the collective excellent work of our managing editor, publishing editors, our valuable reviewers and editorial board members.

In this particular issue, you will find that Joseph and Adebanji provided innovative technology on light traffic control system. Ogunkoya and Sholotan engaged standard method for microbiological assessment of shawarma from Igbesa metropolis for possible microbial contamination. Ilelaboye and Kumoye unveiled the effect of inclusion of different nitrogen source on growth performance of mushroom. Ogunyinka et al utilized Fletcher Reeves conjugate gradient method as a robust prediction model for candidates' admission to higher institutions. Omotola and Fatunmbi examined the impact of thermal radiation with convective heating on magnetohydrodynamic (MHD), incompressible and viscous motion of non-Newtonian Casson fluid. Aako and Are meticulously investigated factors affecting mode of delivery using binary dummy dependent models. Abiaziem and Ojelade successfully synthesized biologically active silver nanoparticles using *Terminalia catappa* bark as the eco-friendly source.

In addition, Olowosebioba et al. assessed the rectifying effects of various diodes in power supply units using multisim circuit design software programme. Olujimi et al. successfully accomplished the use of fingerprint based biometric attendance system for eliminating examination malpractices with enhanced notification. Alaba reported the nutritional status assessment of school age children (6-12 years) in private primary school in Ilaro. Muhammed-lawal et. al. assessed the execution and effect of corporate social responsibilities and return to marketing. Awolola and Sanni's research was about achieving quality of engineering education and training in Nigeria using Federal Polytechnic, Ilaro as the case study. Oladejo and Ebisin expatiated on virtual laboratory as an alternative laboratory for science teaching and learning.

Finally, Aneke and Folalu investigated the prospect and problems of the hotels in Ilaro, Ogun State.

I would like to thank and extend my gratitude to my co-editors, editorial board members, reviewers, members of FEPI-JOPAS, especially the Managing Editor, as well as the contributing authors for creating this volume 3 issue 1. The authors are solely responsible for the information, date and authenticity of data provided in their articles submitted for publication in the Federal Polytechnic Ilaro – Journal of Pure and Applied Sciences (FEPI-JOPAS). I am looking forward to receiving your manuscripts for the subsequent publications.

You can visit our website (https://www.fepi-jopas.federalpolyilaro.edu.ng) for more information, or contact us via e-mail us at fepi.jopas@federalpolyilaro.edu.ng.

Thank you and best regards.

E-Signed
Prof. Olayinka O. AJANI

FEPI-JOPAS VOLUME 3 ISSUE 1 TABLE OF CONTENTS

Serial No	Paper Tile and Author(s)	Page
01.	**INNOVATIVE TECHNOLOGY ON LIGHT TRAFFIC CONTROL SYSTEM.** [1]Engr. E. A Joseph & [2]Mr. S. A Adebanji [1,2]Departmentof Electrical/Electronic Engineering the Federal Polytechnic, Ilaro, Ogun State, Nigeria Phone/WhatsArp No: [1]08057023944; [2]08039535936 **e-mail: [1]adelekejoe12@yahoo.co.uk; [2]divineabbey01@gmail.com**	1-7
02.	**MICROBIOLOGICAL ASSESSMENTS OF "SHARWAMA" A READY TO EAT STREET FOOD IN IGBESA, OGUN STATE, NIGERIA** Ogunkoya, Wole Adepero Department of Science Laboratory Technology Ogun State Institute of Technology, Igbesa, Ogun State. **Corresponding author: +2348107087482** **ogunkoya.adepero@gmail.com**	8-13
03.	**EFFECT OF INCLUSION OF DIFFERENT NITROGEN SOURCES IN VARIOUS SUBSTRATES ON GROWTH PERFORMANCE OF MUSHROOM (*PLEUROTUS PLUMONARIUS*)** ***Ilelaboye N.O. and Kumoye D.E.** Department of Science Laboratory Technology, The Federal Polyethnic Ilaro *nasir.ilelaboye@federlpolyilaro.edu.ng. 08137657580	14-21
04.	**A Robust Prediction Model for Candidate's Admission using Fletcher-Reeves (FR) Conjugate Gradient Method** **Ogunyinka, T. K., Dada I. D., Oni, O. O.& Ayemowa, M. O.** *Department of Computer Science, Gateway (ICT) Polytechnic Saapade-Remo, Ogun State.* ✉*tkogunyinka@yahoo.com*	22-31
05.	**Modeling Mode Of Childbirth Delivery Using Dummy Dependent Variable Models** **Aako, O. L. ✉, Are, S. O.** *Mathematics and Statistics Department, Federal Polytechnic, Ilaro, Ogun State, Nigeria* ✉ *olubisi.aako@federalpolyilaro.edu.ng.*	32-37
06.	**Green Synthesis of Silver Nanoparticles Using *Terminalia catappa* Bark Extract and Its Antibacterial Activity** **Abiaziem, C. V. & Ojelade, I. A.** *Department of Science Laboratory Technology,*	38-44

FEPI-JOPAS VOLUME 3 ISSUE 1 TABLE OF CONTENTS

	Federal Polytechnic Ilaro, Ogun state, Nigeria *vyvycox@yahoo.com*	
07.	**Magnetohydrodynamic Radiative Casson Fluid Motion Past a Convectively Heated and Slippery Non-linear Permeable Stretching Plate** **E.O. Omotola, E. O. Fatunmbi** *Department of Mathematics, Federal Polytechnic, Ilaro, Nigeria* *ephesus.fatunmbi@federalpolyilaro.edu.ng*	45-55
08.	**Assessment of Rectifying Effects of Various Diodes in Power Supply Units Using Multisim Circuit Design Software Programme** **Olowosebioba, A.A., Odunaike, R.K., Akingbade, F.S.** *Department of Science Laboratory Technology, Ogun State Institute of Technology, Igbesa, Ogun State* ✉ ***wolowoelectro@yahoo.com***	56-66
09.	**A Fingerprint Based Biometric Attendance System for Eliminating Examination Malpractices with Enhanced Notification** **Olujimi, O. O., Aderemi, T. A., Taiwo, K. O., Adeleke O. A.** *Department of Computer Science, Gateway (ICT) Polytechnic, Saapade, Ogun State.* ✉ ***oniolujimi@gmail.com***	67-74
10.	**ASSESSMENT OF NUTRITIONAL STATUS OF SCHOOL AGE CHILDREN (5-12 YEARS) IN SELECTED PRIVATE PRIMARY SCHOOLS IN ILARO METROPOLIS OGUN STATE. NIGERIA.** **ALABA, K. E.** *Department of Nutrition and Dietetics, School of Pure and Applied Sciences* *The Federal Polytechnic, Ilaro, P.M.B 50, Ilaro, Ogun State, Nigeria.* ✉ *kikelomo.alaba@federalpolyilaro.edu.ng*	75-81
11.	**Virtual Laboratory: An Alternative Laboratory for Science Teaching and Learning** **Oladejo, A. I. & Ebisin, A.F.**✉ *Africa Centre of Excellence for Innovative and Transformative STEM education, Lagos State University, Ojo* *gbadegeshin86@gmail.com* *Ogun State Institute of Technology, Igbesa* ✉*ebironke16@gmail.com*	82-91
12.	**Achieving Quality of Engineering Education and Training in Nigeria: The Federal Polytechnic, Ilaro as a Case Study**	92-97

FEPI-JOPAS VOLUME 3 ISSUE 1 TABLE OF CONTENTS

	Awolola, O. O✉., Sanni, E.O *Department of Mechanical Engineering,* *The Federal Polytechnic, Ilaro, Ogun State.* ✉*olalekan.awolola@federalpolyilaro.edu.ng*	
13.	**Saw Millers Corporate Social Responsibilities and Returns to Marketing** **Muhammed-lawal, A.A., Lawal, R. A. & Ogunseitan, T. O.** *Department of Agricultural Technology, Federal Polytechnic Ilaro, Ogun State, Nigeria.* ✉ *lawaz71@yahoo.com; raimot.lawal@federalpolyilaro.edu.ng*	98-107
14.	**Investigating the Prospect and Problems of the Hotels in Ilaro, Ogun State Nigeria.** **Aneke F.O., Folalu A.A.** *Department of Hospitality Management, The Federal Polytechnic Ilaro, Nigeria* ✉ *omobolanle202@gmail.com*	108 -112

https://fepi-jopas.federalpolyilaro.edu.ng Experimental

A Fingerprint Based Biometric Attendance System for Eliminating Examination Malpractices with Enhanced Notification

Olujimi, O. O., Aderemi, T. A., Taiwo, K. O., Adeleke O. A.
Department of Computer Science, Gateway (ICT) Polytechnic, Saapade, Ogun State.
✉ *oniolujimi@gmail.com*

Abstract

The role of attendance in the integrity of examinations in higher institutions of learning cannot be overemphasized. Also, attendance lays more credence to the authenticity of the conduct of examination. The traditional attendance is limited in a number of ways due to its non-interactivity and it is subject to manipulation. This paper presents a Fingerprint Based Biometric Attendance System for Eliminating Examination Malpractices with Enhanced Notification (BASEMEN). BASEMEN uses biometric technology based on students' fingerprints that ensures dynamic updates of legitimate students' records. This means that only qualified students would be allowed to sit and write the examination. The notification subsystem reports match/mismatch of the registered students' fingerprints appropriately. BASEMEN was implemented in Framework7.css (for interface design) using HTML/CSS and PHP/MYSQL. jQuery Ajax was used to send request to PHP using Cross Domain. A combination of PHP/MYSQL (to process the request sent by jQuery Ajax and serves as the backend that communicate with database). The proposed system was tested in a tertiary institution. The result showed that BASEMEN effectively reduced the case of examination malpractices vis-à-vis impersonation, masquerading etc and eliminated the stress of manual examination attendance and record keeping.

Keywords: Fingerprint, Biometric, Attendance System, Classification, Notification, Examination Malpractice.

INTRODUCTION

In tertiary institutions, attendance taking or marking is one of the sure ways to keep as well as tracks the records of students (Ojuawo & Arowolo, 2018). Attendance can also be used to confirm students' identity for taking part in classes or examinations. Hence, the role of attendance in higher institutions of learning cannot be overemphasized. According to Marriam Webster Dictionary, attendance can be defined as the persons or number of persons attending an event. It could also mean the number of times a student attends a class or is present at an examination (Ikuomola, 2018). So, attendance lays more credence to the authenticity of the conduct of examination. Rufai *et al.* (2012) defined examination as an assessment of learners' knowledge in a given course of study. Examination must be devoid of any form of malpractice in order to be credible. One of the instruments to achieve the credibility of an examination, is the use of attendance. This is why institutions of higher learning consider attendance of the students in an examination very important (Adetiba *et al*., 2013; Ugwoke & Anyakorah, 2015).

Attendance for examination has been implemented in a number of ways. For instance, the use of paper and pencil in which only accredited students are verified manually into the examination hall by examiners who ensure that only authenticated students sit for preregistered examinations. The second type is using electromechanical device for authentication of students during examination (Yadav et al., 2018). Thirdly, biometric based attendance is a new paradigm that has just been gaining acceptance in research community. The biometric approach include the use of fingerprint, face recognition, DNA, hand geometry, iris recognition, retina etc (Rufai *et al.*, 2012). Meanwhile, this method has previously been applied to authenticate systems using different physiological traits such as automated teller machine (Coventry et al., 2013), mobile access control (Wójtowicz & Joachimiak, 2016). However, for examination attendance, the use of fingerprints is now prominent (Rufai et al., 2012; Talaviya et al., 2013; Chitresh & Amit 2013), as researchers have studied this methodology passionately.

Traditional paper and pencil form of examination attendance has been observed to be very stressful, time consuming, unreliable (Ugwoke & Anyakorah, 2015), inaccurate and inefficient (Adetiba et al., 2013; Rufai *et al*., 2012) due to its non-interactivity and errors prone or easily manipulated (Ojuawo & Arowolo, 2018). Electromechanical type is also limited in that it can give false report when malfunctioning and does not give prompt verification of data. Biometric based attendance for examination on the other hand, is fast and convenient but despite its effectiveness, it has not been fully explored and deployed in most institutions in the developing

countries (Adeoye, 2014). However, the identification and verification process of biometric methodology is simple, particularly with the use of fingerprints (Soyemi & Isinkaye, 2020). In the identification stage, students' fingerprints are captured as images with the aid of fingerprint scanner, and processed using some sets of rules and stored in a database as templates, while in verification stage, new fingerprints are captured and compared with those stored in the database (Oloruntoba &Akinode, 2020).

One of the main reasons for using attendance in an examination is to curb examination malpractice, which is the undue advantage a student could have over others due to sharp practices during examination (Isinkaye et al., 2020). In fact, the biometric form of attendance has been said to deter various fraudulent activities of the students during examinations such as impersonation, masquerading and so on (Isinkaye et al., 2020). The punishment for examination malpractice is determine by the weight of its offence. For example, impersonation is writing examination on behalf of someone else (Ikuomola, 2018). This is a very serious offence in examination since underserved students may eventually record best performance if unchecked. Impersonation is unintended permissible especially in the traditional paper and pencil-based attendance system due to fatigue and carelessness on the part of invigilators who are responsible to make sure that only accredited candidates sit for examination. Masquerading is similar to impersonation. The impostor here does not intend to write examination or someone else but pretends to be one of the legitimate candidates for examination.

In order to stamp out examination malpractice, presented in this work is a secured fingerprints based biometric system for eliminating examination malpractice with enhanced notification (BASEMEN). BASEMEN presents a biometric technologies for measuring and analyzing biological trait of fingerprints to authenticate students for examination. The structure of this new design is such that students' status can be verified both automatically and manually using their biometric features. The notification subsystem ensures that status of only registered students when verified for a particular examination are reported appropriately. Also, the reports give the administrator adequate information about the registered students based on the verification of their fingerprints stored in the database. This will help to uniquely identify the students for the examination.

Related Work

Attendance can lay credence to the integrity of examinations in higher institutions of learning. Also, attendance can be used to prevent many known examination malpractices. It is an active research area and researchers have studied this area with various proposed systems and methodologies. For instance, a mobile system running on the Android Operating System was developed by Isinkaye et al., 2020. The system uses Viola-Jones object detection framework and Eigen faces to carry out Facial Recognition of students and take record of attendance in classes in a user-friendly and secure manner. The accuracy of the facial recognition and facial detection abilities of the system were reported as 95% and 78% respectively. Meanwhile, examination malpractice was not the focus of their work.

In Chitresh and Amit (2013), an automatic attendance system using Fingerprint Verification Technique was developed. This work focused on attendance management and the specification of accuracy of the time consumed during enrolment and verification process. Talaviya *et al*. (2013) developed wireless fingerprint-based attendance system which can send report of the attendance to each student, parents, head of department and lecturers through email and also show updated attendance. The weakness of these works is that their real life application was not demonstrated. In Ojuawo & Arowolo (2018), a mobile based application was developed to reduce the time spent on manual operations, curb loosing of attendance records and curb manipulation of attendance records. Their system was designed only to be operated or used by the lecturer (user), and the system accepts input of course data, such as course code and course title, as well as students' data like student name and student matriculation number. The authors sampled the lecturers' opinion through administration of questionnaire in order to validate it. They further utilized SPSS application to analyze the data from questionnaire.

Shoewu *et al.,* 2018 proposed Smart Attendance Management System (SAMSYS) for an Academic Institution. Their system maintains the attendance records of students adequately and automatically by creating an efficient module that comprises a fingerprint sensor to manage the attendance records of students at all levels in an academic institution. The module enrolls the students at the beginning of each semester with adequate semester course registration. Soyemi & Isinkaye, 2020 developed a Biometric Fingerprint-based Attendance System for Staff Management (BFASSM) to monitor the staff of higher institution using the Federal Polytechnic, Ilaro, Nigeria as case study. The proposed application was designed using C# programming language, Macromedia fireworks and Microsoft Visio. The authors used Microsoft SQL Server for database management at the back end with Windows 7 as the minimum operating system. They claimed that the implementation of this system in any other institution of higher learning will eradicate manual attendance

taking, curb the problem of infringement and manipulation of staff attendance, create an avenue to make staff resume work punctually and also sign out at the appropriate time. It will also enhance proper documentation of attendance record and bypass the manipulations experienced in the manual process and with the expectation of improved service delivery. These systems may not be able to deter examination malpractices as they lack appropriate notification scheme to report status of legitimate and illegitimate students that are supposed to sit for an examination.

Ikuomola (2015) developed an educational time and attendance management system (EduTAMS) that records and manages the time and attendance of students in a university community. EduTAMS uses fingerprint technology to authenticate every student. The author reported that the result of average time taken per student using fingerprint-based attendance and manual attendance register were 6.65 and 23.66 seconds respectively. The performance of the EduTAMS shows that it provides robust, secured and automatic time and attendance management system for students. However, key features that can stamp out examination malpractices were not considered in the system.

Oloruntoba &Akinode (2020) designed a students' attendance monitoring system that could efficiently monitor student attendance in their various classes in the Department of Computer Science, Federal Polytechnic, Ilaro, Ogun State. Student attendance is marked after a student's biometric identification has been stored in the database. The study developed an electronic class attendance monitoring system using a feature extraction algorithm for matching a fingerprint template and questionnaire was also prepared and administered to sample the opinion of lecturers and students involved. The result from the analysis showed that the electronic method is better. Authors believed that the system would help students not to skip their classes and thereby improves performance. On the flip side, this work did not report the use of notification and the system was for students' class attendance only.

Architecture for the Fingerprint Based Biometric System for Eliminating Examination Malpractice with Enhanced Notification

The architecture for the fingerprint based biometric system for eliminating examination malpractice with enhanced notification (BASEMEN) is shown in Figure 1. The main task of BASEMEN is to authenticate the candidates for examination by verifying their legitimacy using the fingerprints feature while granting them access to examination hall. The system is based on biometric access control techniques, which is designed with extended graphical user interface using Framework7.css with a combination of HTML/CSS and PHP/MySQL integrated with Microsoft fingerprint reader. The student information is stored by MySQL, which serves as database located in the user's computer or server. The access point is through the use of fingerprint scanner as an input device.

BASEMEN adopted a modular design that is made up of phases namely; registration phase, configuration phase, and authentication phase explain as follows:

Registration Phase

This stage involves pre-registration of candidates by administrator using the biometric features of the students updated on the school portal. At this stage also, the system is pre-registered based on the context aware and personalization using the particulars of lecturer who took the course, the number of students eligible for examination and the venue for the examination are recorded here. The reason for pre-registration and storing of information in the database is to be able to recall them for verification of students' status.

Configuration Phase

For effective usage of the system, it will have to be configured firstly before it can be used for any examination. This is the stage at which the relevant inputs are supply to the system for proper authentication and verification of students. Firstly, the students' data must have been loaded at the registration phase before any configuration can be done. From the configuration interface, the administrator selects the school, the department, level and the particular course that the students will sit for and automatically all information of the pre-registered students are loaded into authentication phase where verification of legitimate students are conducted for the proposed examination.

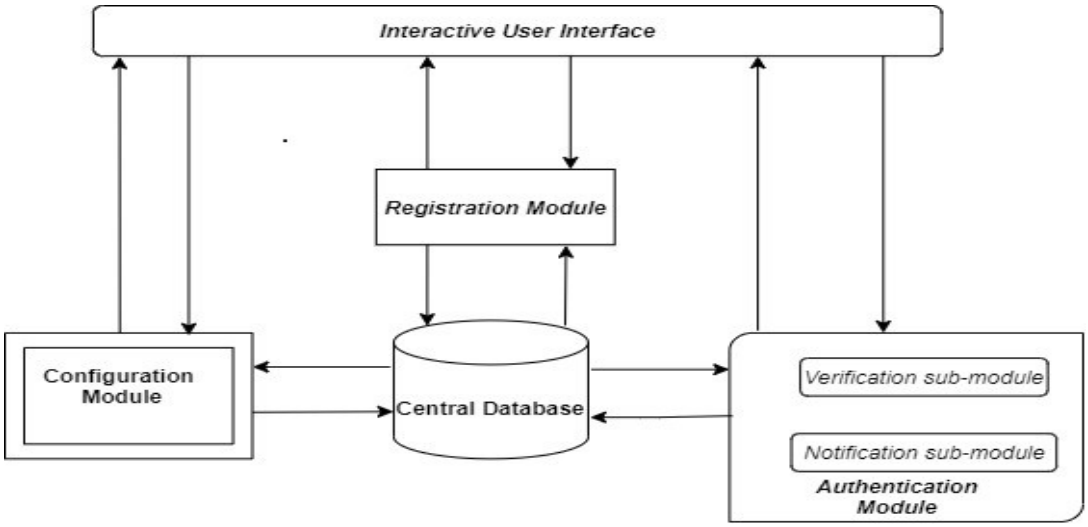

Figure 1: Architecture for context aware and personalization based biometric examination attendance system.

Authentication Phase

This phase being the last phase of the proposed system entails two major functions. First, biometric based verification of students' records and reporting. In the biometric based verification, students' records are called from the database once there is a match from the input fingerprint of a particular student and that of the pre-registered fingerprint stored in the database collected during course registration of students. Aside this automated verification, the system also has the ability of verifying the students manually by supplying the Matriculation Number of the student into the allotted portion which will fetch the data of the student as well from the database. However, it should be noted that here that only accredited personnel are given the right to do manual verification, in order to maintain the sanctity of the system. The second part, which is the reporting system presents the data of the student being verify along with his or her Matriculation Number, photograph and other detail for proper identification. This is to ensure that only legitimate students are allowed to sit for examination and to foreclose all forms of examination malpractices.

Interface Design

The Graphical User Interface (GUI) of the proposed system was designed to be very attractive and easy to use. The user may form the home page select test attendance or examination attendance. The two options lead to a similar interface accept the inscription (label) indicating the page which show either the user open and examination attendance or test attendance. The following screenshorts demonstrate the use of the proposed system.

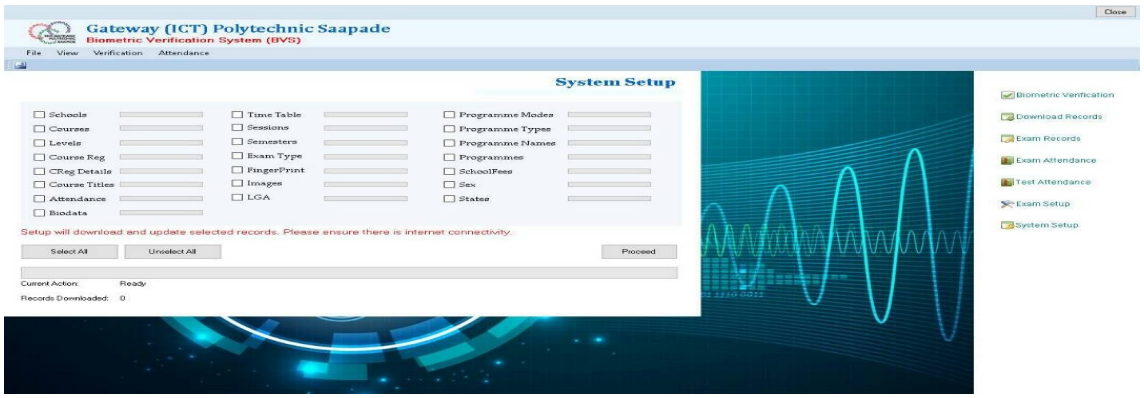

Figure 2: shows that the administrator is selecting the appropriate fields for during configuration stage to put the system to use.

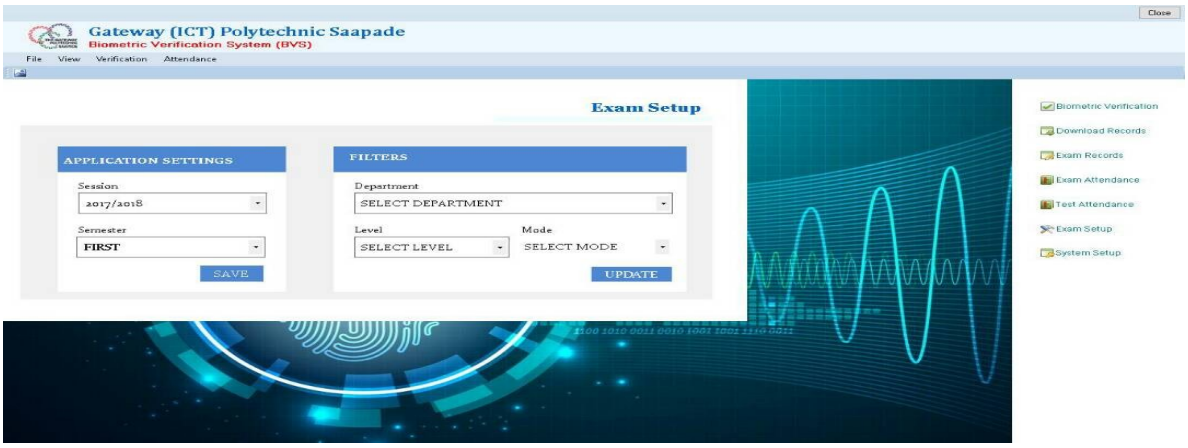

Figure 3 shows the examination attendance page where all parameters for the examination are key into the system for effectiveness.

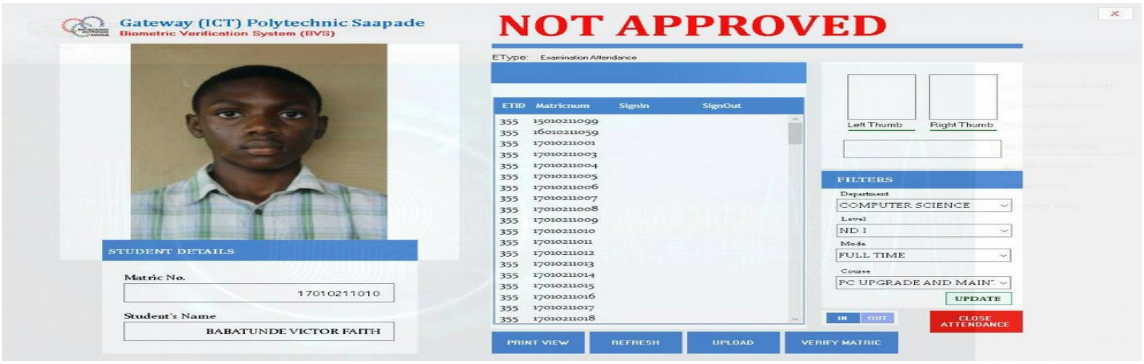

Figure 4 shows the authentication page in automated examination attendance where a student was disapproved when his parameters did not match the information in the database.

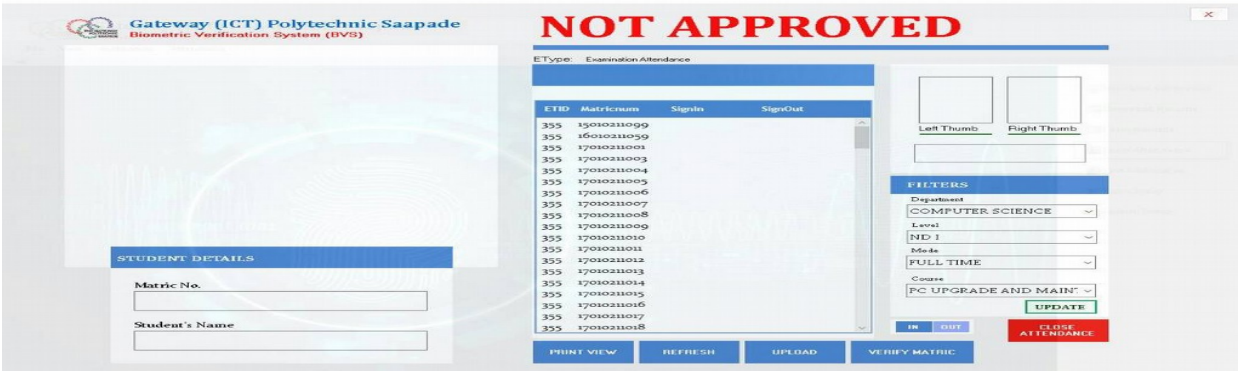

Figure 5: Manual authentication page for examination attendance

.

Figure 5 shows the manual authentication page for examination attendance when a particular student who had already been rejected by the system can be verify manually by accredited personnel

Database Design

The database is responsible for storing data of students which include the fingerprints sample, students' biodata and course information. Different relational database tables were constructed for these specific assignments. The tables are subjected to

normalization so as to avoid data redundancies and duplication.

Records of students and course registrations are downloaded to enable the system function optimally in such places where network connectivity is not available once records downloaded and saved onto the local database of the system. The records become available for use, for this purpose, some of the local data tables were created with same schema with online ones.

Implementation Procedure

The fingerprint verification is performed once a finger is placed on the fingerprint sensor. The fingerprint sensor raises different invent to notify when finger is placed or removed from the fingerprint sensor. The event handler for finger placed rapidly capture finger print sample and compare with the list of fingerprint templates of students in the examination list. If a match is found, sign in time is updated if the sign in switch button is active or sign out time if sign out switch button is active and student had already signed in.

A print table report is also available so as to allow hard copy prints of the attendance generated. All examination records are also viewable in a table listing all the course, department, date etc. Finally, all acquired records where expected to be uploaded online, so as to have the record kept, available and retrievable at any time. Each upload record was also included with the system unique MAC address so as to identify from which system records were uploaded.

System Testing and Validation

Simple comparison of examination malpractice data was adopted to validate the effectiveness of the proposed system. To this end, the number of students involved in examination malpractice in the previous section was collected from Examination Malpractice Committee (EMC) of the Polytechnic so as to check whether the system was able to achieve part of the objectives for which is was designed as depicted in Table 1.

Table 1: Number of Students who sat for Examinations in three consecutive 2016/2017, 2017/2018 and 2018/2019 Academic Sessions

.

Session/Semester	No of Students not involved in Malpractice	No of Students involved in Malpractice	Total
1st Semester 2016/2017	3,145	53	3198
2nd Semester 2016/2017	3,157	61	3218
1st Semester 2017/2018	4,562	42	4604
2nd Semester 2017/2018	4,538	27	4565
1st Semester 2018/2019	5,872	23	5,895
2nd Semester 2018/2019	5,865	16	5,881

RESULTS AND DISCUSSION

The design was tested and run with real life data of National Diploma I (ND I) and Higher National Diploma I (HND I) students' records who sat for First and Second Semester Examinations of 2016/2017, 2017/2018, and 2018/2019 Academic Sessions in Gateway Polytechnic, Saapade.

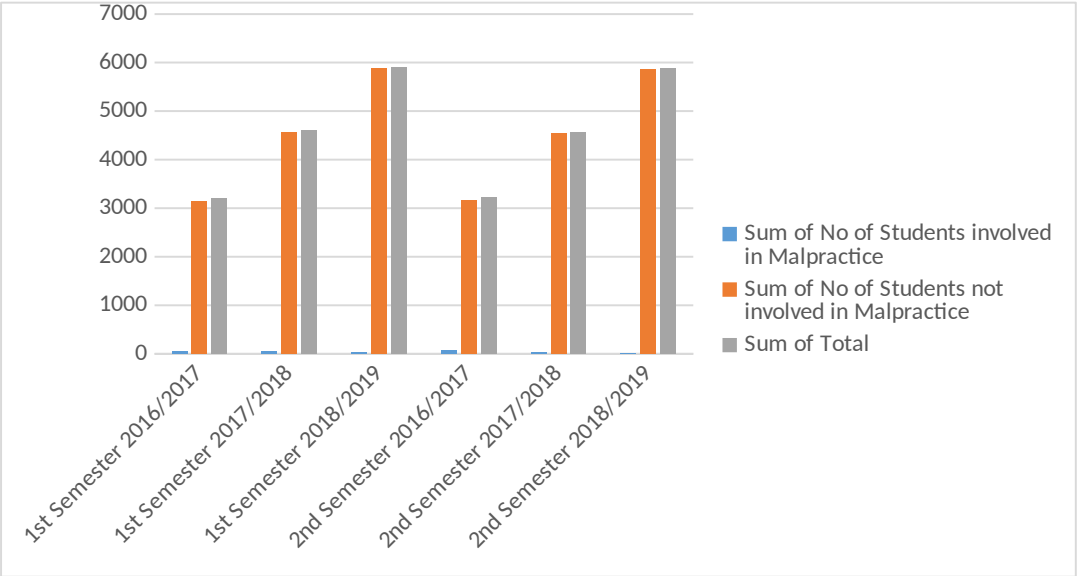

Figure 6 Graph showing the sum of no of students involved against those that were not involved in malpractice

.

TThe data from the testing and validation procedure of the system in the preceding section showed that the number of students involved in examination malpractice drastically reduced as shown in Table 1 when compared to the previous section. For instance, in Table 1, about 1.9% of the students were involved in examination malpractice during the second semester 2016/2017 academic session compare with a fragment of 0.59% of students involved in examination malpractice during the similar second semester of 2017/2018 academic session (Fig. 6). This could be due to the fact that many of them are now aware of the possibility of been detected and caught for fraudulent activities such as impersonation.

CONCLUSION

This work presents a fingerprint based biometric attendance system for eliminating examination malpractices with enhanced notification (BASEMEN). The system uses biometric methodology that captured fingerprints of registered students in the identification stage and compare them with new feature of their fingerprints during verification stage in order to authenticate students for examination. This reduces the time taken for matching of records and thereby reduces computational cost. To sum up, it is intended to curb the problems of impersonation and masquerading as noticed in the traditional paper and pencil based attendance system. The benefits of BASEMEN include: (1). The use of relational database system ensures that data are stored without the problems of data errors, redundancy and data duplication; (2). The software is very efficient in terms of speed of processing without delaying the students for examinations and modifications are made faster; (3). The system is very flexible to operate and personnel can easily be trained to handle it while file operations are automatically maintained.

The secondary data obtained from EMC of the Polytechnic during the periods under observation showed that BASEMEN is effective and as such achieved the objectives of its design. In future, the authors would like to investigate biometric based student attendance performance especially when different physical traits are combined.

.

REFERENCES

Adeoye, T. O. (2014). Development of a computerized biometric control examination screening and attendance monitoring system with fees management. *World of Computer Science and Information Technology Journal*, 4(6), 76-81.

Adetiba, E., Iortim, O., Olajide, A.T., & Awoseyin, R. (2013). An online Biometrics–based class attendance management system. *African Journal of Computing and ICT*, 6(3), 25–38.

Arulogun, O. T., Olatunbosun, A., Fakolujo, O. A., & Olaniyi, O. M (2013). attendance management system. *International Journal of Scientific and Engineering Research*, 4(2), 1-9.

Chitresh S., & Amit, K. (2013). An efficient automatic attendance system using fingerprint verification technique. *International Journal on Computer Science and Engineering*, 2(2), 264–269.

Coventry, L., De Angeli A., & Graham, J. (2013). Usability and Biometric verification at the ATM interface. *Journal of Advanced Technology and Research*, 5(1), 153–160.

Ikuomola, A. J. (2018). A new two-tiered strategy to e-examination system. *The Journal of Computer and its Applications*, 25(1), 16-24.

Ikuomola, A. J. (2015). Fingerprint-Based authentication system for time and attendance management. *British Journal of Mathematics and Computer Science*, 5(6): 735-747.

Isinkaye, F. O., Soyemi, J., & Arowosegbe, O. I. (2020). An Android-based Face Recognition System for Class Attendance and Malpractice Control. *International Journal of Computer Science and Information Security*, 180(1), 78-83.

Marriam Webster Dictionary retrieved from www.marriam-webster.org on 24 August, 2018.

Rufai, M. M. Adigun, J.O., & Yekini, N. A (2012). A biometric model for examination screening and attendance monitoring in Yaba college of Technology. *World of Computer Science and Information Technology Journal*, 2(4), 120–124.

Rui, Z., & Yan, Z. (2018). A survey on biometric authentication: Toward secure and privacy-preserving identification. *IEEE Access*, *7*, 5994-6009.

Shoewu, O., Akinyemi, L. A., & Makanjuola, N. T. (2018). Smart Attendance Management System (SAMSYS) for an Academic Institution. *Data Research Page*, 120-131.

Talaviya, G Ramteke, R., & Shete, A. K. (2013). Wireless fingerprint-based attendance system using Zigbee Technology. *International Journal of Engineering and Advanced Technology*, 2(3), 201–203.

Vijayarajeswari, R., Rakesh, K. V. S., & Reddy, S. S. K (2020). Automatic Attendance Marking System using Deep Learning Algorithm. International Journal of Research and Advanced Development. Retrieved on 18/06/2021, 16:19 h from http://www.ijrad.com/docs/v4n2/A94.pdf

Wójtowicz, A., & Joachimiak, K. (2016). Model for adaptable context-based biometric authentication for mobile devices. *Personal and Ubiquitous Computing*, *20*(2), 195-207.

Yadav, K., Chouksey, H., Yadav, J., Bramhankar, D., & Shelke, S. (2018). Automatic Attendance System using Biometric Sensor and IVRS. *International Journal of Scientific Research in Science, Engineering and Technology*, 4(4), 115-119.