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# ABSTRACT/EXECUTIVE SUMMARY

Attendance by definition is the action or state of going regularly to or being present at a place or event. It is the number of people present at a particular place or event. Student’s attendance in lecture halls is usually directly proportion to their performance. For this reason, their attendance is taken using an attendance sheet to ensure clarity and improve performance.

Institutions of higher learning such as Egerton University require checking of student’s lecture attendance in various lecturer halls as essentially required by various rules and principles. Monitoring student attendance during allocution period is a bit challenging to both the lecturers and the student’s representatives. It is tough to determine attendance of each student based on signatures. Hence, competent automated attendance system for students is to be designed. Student Automated Attendance System using fingerprint recognition is a biometrics-based broad attendance system for taking the Egerton Students turnout in class. It provides a fast, secure, robust and automated attendance system to manage students’ attendance.

Fingerprint based systems and other biometrics-based technologies are actually supposed to be very efficient personal identifiers as they can pay attention to a distinct characteristic believed to be unique to each and every person. Fingerprint recognition is universally applied in many fields such clime detection and law enforcement, financial verification, voters’ identification, biometric locks, mobile biometrics etc. Various fingerprint scanners and reader technology exists. However, scanners are widely used in most institutions since they output a clear and verifiable image. For this factor assumptions that every lecturer can access easily the SecuGen Hamster Plus fingerprint scanner which have automatic finger placement detection, is portable, readily available, fast and accurate, uses Automatic Image Adjustment and possess USB connection favorable for the system.

Through the Waterfall methodology, the system is to be developed incessantly. Each phase will be tested separately and the final product tested in a class attendance scenario. The attendance system is to successfully capture or register all students’ fingerprints and record the same. Their fingerprints will then be saved in database. The student attendance system will hence have the fingerprint compared each time a class is to commence. In an event that the fingerprint cannot be taken the lecturer will be required to take the attendance automatically or manually. The lecturer however can assign a course representative to take the fingerprints on his/her behalf.

The results of the system in an optimist view will show improved performance over the manual student attendance sheet.

CHAPTER ONE

## INTRODUCTION

Student attendance system is a web-based system that is to be developed for day-to-day monitoring of students in Egerton University. It will facilitate the access to daily attendance information of a particular student in a particular course. The main operators of the system will be the admin and lecturers. Necessary report will be provided about the state of the student attendance monthly and after a semester. The student attendance percentage will be provided as the main link to the attendance aspect.

### THE PRESENT SYSTEM

In the present attendance system, the whole session is stored in separate sheets by either the lecturer or the students’ representative. One sheet cannot accommodate attendance for a whole semester. The lecturer therefore has to manually trace the attendance of students and make the necessary recommendation.

### CHALLENGES IN THE PRESENT SYSTEM

The existing system is not absolutely reliable as it is time consuming. Much effort is used in taking attendance and the cost in printing the attendance sheets is a bit demanding. It is less accurate as student can make an attendance on behalf of others by duplicating signatures. Furthermore, large manual data input is prone to error. The present system is disruptive if used in large teaching venues. Finally, the ongoing need for organized storage and burden of extracting register sheet in an event of audit. From this point of view, an attendance system is to be developed to try and curb these difficulties. One such system is the newly proposed fingerprint attendance system which is more accurate, less costly, and faster and saves time compared to the existing system.

### THE PROPOSED SYSTEM- FUNCTIONALITIES

Fingerprint attendance system is expected to replace the existing attendance sheets. The operators of the system will initially be the admin and the lecturers. However, the lecturers can authorize the students’ representative to take or monitor the attendance. The attendance will be marked present or absent depending on the students’ real attendance. Authentication will either be done using the fingerprint or manually marking the student’s presence depending on the actual attendance in an event where the student fingerprint cannot be found. The system will benefit the school management, lecturers and students.

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## OVERVIEW AND LITERATURE LEVIEW

Fingerprint is one of the biometric identification features. A. Kumar (September 1997). Department of Computing, “*The Hong Kong Polytechnic University*, Research in computing, 1997, stated that biometric refers to identification and verification of a person based on physically or behavioral through some particular techniques. In easier words to understand, biometric means a unique personal attribute that we have can used for identification a person in various purpose. The common biometrics based on physically or behavioral characteristic that a normal person have are: Face, iris, retina, voice, handprint, fingerprint and signature.

According to Wikipedia, a fingerprint is an impression of the ridges of all any other part of the finger. Because no two fingerprints have ever been found to be alike, a fingerprint is an excellent tool to positively identify a person beyond reasonable doubt. Using fingerprints scanners and so, different patterns are brought out clearly. The main ones include the ridge, minutia and whorl. Various research has been made and among them is:

1. Qi Jun Zhao et al. (1960) proposed an adaptive model for fingerprint extraction. Sweat pores have been employed for automated fingerprint recognition, in which the pores are usually extracted by using a computationally expensive skeleton method or a unitary scale isotropic pore model. The fingerprint image is partitioned into blocks and a local pore model is determined for each block. Experiments on a high resolution (1200dpi) fingerprint dataset are performed and the results demonstrate that the proposed pore model and pore extraction method can locate pores more accurately and robustly in comparison with other state-of- the-art pore extractors.
2. Moheb R. et al. [1977] proposed an approach to image extraction and accurate skin detection from web pages. This paper proposes a system to extract images from web pages and then detect the skin color regions of these images. As part of the proposed system, using Band Object control, they build a. ChandraPrakash Singh1IJECS *Volume 3 Issue 1 January, 2014 Page No.3805-3812* Page 3806
3. Manvjeet Kaur et al. [8] proposed a fingerprint verification system using minutiae extraction technique. Most fingerprint recognition techniques are based on minutiae matching and have been well studied. However, this technology still suffers from problems associated with the handling of poor quality impressions. One problem besetting fingerprint matching is distortion. Distortion changes both geometric position and orientation, and leads to difficulties in establishing a match among multiple impressions acquired from the same fingertip. Marking all the minutiae accurately as well as rejecting false minutiae is another issue still under research. Our work has combined many methods to build a minutia extractor and a minutia matcher. Also, some novel changes like segmentation using morphological operations, improved thinning, false minutiae removal methods, minutia marking with special considering the triple branch counting, minutia unification by decomposing a branch into three terminations, and matching in the unified x-y coordinate system after a two-step transformation are used in the work.
4. Hoi Le, The Duy Bui. [9] proposed online fingerprint identification with a fast and distortion tolerant hashing method. Particularly, fast fingerprint indexing is one of the most challenging problems faced in fingerprint authentication system. In this paper, they present a specific contribution by introducing a new robust indexing scheme that is able not only to fasten the fingerprint recognition process but also improve the accuracy of the system.
5. Wang Yuan et al. [36] proposed a real time fingerprint recognition system based on novel fingerprint matching strategy. In this paper they present a real time fingerprint recognition system based on a novel fingerprint minutia matching algorithm.
6. In Egerton University, attempts have been affected to try and introduce new and strict ways of taking attendance of employees and students. Manual sheets have been used and inspection have been made physically. All these attempts are labor-intensive.

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## PROBLEM STATEMENT

The current system is faced with the many hitches. Not that it is completely bad but there exist better ways to take attendance. A close scrutiny on the system attested the some of the shortcomings which have been discussed.

First, the method is not flexible because the risk of losing the attendance data is very high. Also, analysis of the attendance by the lecturer or the student representative is time consuming as more than one sheet may require inspection. Some lecturers also have different lecturer classes in more than one campus.

Second, unethical problem may be occurring such as cheating of signature by student. For example, lecturers sometimes find that a student have not attended the class but his/her attendance have been signed.

Third, time and cost are factors that largely scale a system. The current system consumes time while taking data from students. Due to this, attendance is taken as lecture is going on and hence disruptive. Considerable money is spent on the quest to produce sheets and distribute as required in the departments. Hence, a lot of time and money becomes fruitless.

Last but not least, the time is unnecessarily consumed by the student to find and sign their name on the attendance sheet, the student may have mistakenly or purposely signed another student’s name.

Many systems if not all nowadays are increasingly going online. Hence, a new system may be developed where each lecturer can access the same on an online platform. One of the attendance system that addresses the above outlined issues is the freshly proposed system, student automated attendance system using fingerprint recognition.

## JUSTIFICATION

Student attendance system using fingerprint overrides provides a fast, secure, robust and automated attendance system to manage students’ attendance. A student has to be physically present for the attendance to be taken. Scrutiny of the attendance will be done automatically hence no need for manually checking on each student’s attendance. The time taken to take the attendance will be reduced and the data collected will be more accurate.

Portentously, the system may be tamper-proof as only the authorized personnel will be able to run the system or take attendance. The data will remain in the system as long as the semester remains and then will be deleted or backed-up to make space. The system will reduce administration time and eliminate errors that occurred in the attendance sheets system.

In most places, students use the ID cards as identification while getting services in the school and while attending examination rooms. With fingerprint system in place and prophetically being improved, ID’s will indeed become replaced with time.

Students who may be physically challenged like the ones who are blind, deaf, dumb or mentally challenged can be taught to use the fingerprint system. This encourages uniformity of student protocol and also ensures that there is no personal biasing in attendance management.

The system will help the lecturers to pre-warn students who are not attending the classes regularly in ensuring strict measures are not taken.

**OBJECTIVES**

In the manual system, the attendance sheets are documented by the lecturer or stored in a file. Each time the sheet is needed, a search operation is conducted on the sheet from a file to locate a particular student’s attendance details. To eliminate this problem, there is need to develop an efficient platform that is reliable and cost-effective, which can manage the process efficiently. Therefore, the objective of this project concisely is as stated below:

* To reduce paperwork, save time and money with fingerprint-based attendance management system – The system will eliminate duplicate data entry and errors in attendance sheets entries. Human error is greatly reduced with the use of technology. It will further improve visibility to track and manage student attendance & absenteeism across the campus. Real -time status tracking of potential students’ attendances and automatic calculation of percentages will become considerably increased. Various types of reports of class or student attendance will be auto generated.
* To automate student attendance system – Provide a systematic and effective solution for administrator/lecturer to manage the students’ attendance record.
* To increased security and confidentiality with role-based permissions to users – Various users will have different permissions to the system. Easy attendance recording using fingerprint-based attendance system with authentication will monitor the attendance of students, assign work and manage allocation more efficiently. Punctuality will be enhanced mostly for the students.
* To increased productivity – Electronic attendance of students will improve performance of students. Punctuality will be enhanced mostly for the students and retrieval of data will be at ease.

CHAPTER TWO

**METHODOLOGY**

**Method of data collection**

During this project research work, data needed for the project will be gathered from the various sources. Major fact-finding techniques will be used in this work and these are:

1. Primary Source:

This refers to the source of collecting original data in which the researcher will make use of empirical approach such as personal interview and questionnaires

1. Secondary Source:

The secondary data will be obtained by doing research from journal, newspaper, library source and internet downloads.

1. Oral interview

This technique will be used to interview individuals responsible for the students’ attendance in the university.

1. Study Attendance Sheets

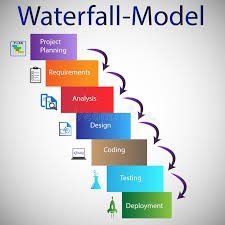
Students’ sheets and reports based on attendance will be a resourceful data collection area where a lot of information exists in the current manual system concerning the system in question to be obtained. The attendance sheets are to be gathered and information relating to attendance requirements are to be obtained.

1. Observation

This will help in gathering data about the student by observing their day to day attendance patterns and gathering data from the same.

**Development Methodology**

The proposed system uses a waterfall model through phases of planning, requirements collection, analysis, design, coding, testing, deployment and maintenance.



**PROJECT SCOPE**

The scope of this project will include automatic management of the check in of students’ attendance function. This system will be governed by the administrator or lecturer and thus covers only the regular students study within Egerton University. Their attendance will be automatically record each time they check in to the system by using the prepared hardware. The system will be maintained daily by the administrator or lecturer and they can add, modify and delete data on the database of the student. The valid lecturers under register will use their fingerprint identification to treat it as unique identification for login to the system or the normal user name and password. The main concern will be the functions of system that identifies the student, recording check in of each lecture he or she has attended. With this information, it will lead to the calculation of percentage of the student attendance status.

Student Attendance Management System will take students attendance for university applied with fingerprint technology. The system will be able to manage the student daily attendance. There are five major modules which will be available in the system which is Student Information

Module, Subject Information Module, Subject Registration Module, Attendance Management Module, and Attendance Report Module. In Student Information Module, the system will allow the admin or lecturer to add, edit and delete student information with navigation and search features. Admin/lecturer will add, edit and delete subject information in Subject Information Module. This module will be used to allow administrator select a class in attendance management module. For convenience purpose, Subject Registration Module will be implemented to allow student register available subject in the system. With this feature, administrator will view the list of students who have taken the particular subject. Attendance Management Module is a module where the students’ attendance will be recorded. The fingerprint technology will be applied in this module that captured and template of fingerprint from database is compare. There is a checking attendance status feature in this module who is request from students for know their currently attendance status. Besides, reporting the students’ attendance records will have been implemented in Attendance Report Module. Administrator will print out each class attendance report or export it into html format for future checking purpose.

### EXPECTED OUTCOME

The system will automatically search and record a particular student’s attendance after finding the matched fingerprint, which was stored in a certain database. The database for the particular student will be recorded for each class he or she has attended. The administrators can view the student attendance information after the class. They can modify the attendance information through the login to administrator respective features.

**RESOURCES**

GENERAL

Internet access – Internet access is needed for testing and hosting of the system.

Computer (Desktop/laptop) – A computer is needed to develop the system.

Development tools - Text editor, Java Swing and MySQL.

Monetary funding – Funds are required to host the system in system.

SOFTWARE

1. Main Driver (WBF, Windows Biometric Framework)
2. Windows 10 or Windows 8.1/ Windows 8/ Windows 7 and Windows Server 2012/ Windows Server 2008 R2
3. The WBF driver is recommended for applications made to work with the Windows Biometric Framework. It will also support applications made to work with our “Legacy Drivers”. The WBF driver is automatically installed via Windows Update when a supported device is plugged into computers with Windows 7 or higher.

HARDWARE

1. Secugen Hamister Plus

Basically, this project does not involve the development of hardware. The hardware is integrated with the system through USB interface. Various libraries and methods will be used to retrieve data in form of fingerprint from the scanner.



1. General USB cable compatible with the scanner



CHAPTER THREE

## PRELIMINARY RESULTS

This project will contribute immensely to improved performance and knowledge through the development of an efficient and cost-effective students’ attendance system for Egerton University which has a potential of alleviating the delay problem associated with manual attendance system. When tested on samples (students), the proposed system will be able to process data with great speed thereby removing the uncertainties brought about by students’ sheets

CHAPTER FOUR

**CHALLENGES, OBSTACLES AND RISKS**

* Time factor – The project is to be completed within 12 weeks and hence other activities that may hinder its completion are always present and pose a challenge. This may include academic work which the project is part hence, acts as an obstacle.
* Budget constraint – Funds and resources are needed for the project’s completion. Special skills are required to improve productivity. Hardware and software requirements are one of the biggest challenge.
* Communication – When the project scope and requirements are misinterpreted, a gap develops between the expectations, requirements and the developed system.
* Integration – It will be very challenging for the project if the system fails to integrate within an existing system in the University. Another significant risk might occur when the system modules fail to integrate with each other.
* Fingerprints –:
  + Acceptability – Fingerprints recognition sensors have always been known for poor image capture. In this line however, students have fine fingerprints which can easily be captured by a scanner.
  + A finger can be cut off – Hence, adjustments to read all fingers or continuously update the same will be affected.
  + Fingerprint dummies – Fingerprint dummies are not too difficult to make; the effort is highly dependent of the biometric device to be fooled. Some of the cheapest devices can even be fooled by a fingerprint image that is printed on paper or transparency. Dummies can be created for each type of sensor, however in general the more complicated (and thus expensive) sensors are more difficult to fool. Liveness detection do make fingerprint readers a lot more difficult to fool.
  + False Acceptance Rate (FAR) and False Rejection Rate (FRR) – This depends on the scanner that is to be used.

CHAPTER FIVE

## SCHEDULE AND BUDGET

### Schedule

The schedule for the project is as follows

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **TASK DESCRIPTION** | **PLAN START** | **PLAN END** | **ATTENTION** | J | F | M | A | M | J | J |  |
|  |  |  |  |  |  |  |  |  |  |  |  |
| **Project Development** | 01-01-18 | 01-02-18 |  |  |  |  |  |  |  |  |  |
| Preliminary Research | 01-02-18 | 20-02-18 | Low |  |  |  |  |  |  |  |  |
| Requirements Collection | 20-02-18 | 20-03-18 | Medium |  |  |  |  |  |  |  |  |
| Analysis | 20-03-18 | 11-04-18 | Low |  |  |  |  |  |  |  |  |
| Design | 11-04-18 | 01-05-18 | High |  |  |  |  |  |  |  |  |
| Coding | 01-05-18 | 01-06-18 | High |  |  |  |  |  |  |  |  |
| Testing | 01-06-18 | 17-06-18 | High |  |  |  |  |  |  |  |  |
| Implementation | 17-06-18 | 30-06-18 | Low |  |  |  |  |  |  |  |  |
| **Documentation** |  |  |  |  |  |  |  |  |  |  |  |
| Project proposal | 01-01-18 | 01-02-18 | Medium |  |  |  |  |  |  |  |  |
| SRS | 01-02-18 | 01-03-18 | High |  |  |  |  |  |  |  |  |
| Design Document | 01-03-18 | 20-04-18 | High |  |  |  |  |  |  |  |  |
| Test Plan | 20-04-18 | 13-05-18 | Medium |  |  |  |  |  |  |  |  |
| Project Document | 13-05-18 | 14-06-18 | High |  |  |  |  |  |  |  |  |
| Implementation Plan | 14-06-18 | 10-08-18 | Low |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |  |

### Budget

The estimated budget for the project is as follows

|  |  |  |
| --- | --- | --- |
| **Expenditure Description** | **Budget Requested (Ksh)** | **Justification for Expenditures** |
| Equipment |  |  |
| Computer(Laptop) | 35, 000 | A computer is provided for in the lab (coding and testing) |
| Scanner and USB connector | 5, 000 | For taking the students’ fingerprints |
| Supplies and services |  |  |
| Hosting | 5,000 | Hosting the system |
| Risks and uncertainties | 4,000 | Recovering from any risk that might happen |
| Project evaluation | 2,000 | For testing before implementation |
| Implementation and maintenance | 4,000 | Updating the system |

CHAPTER SIX

## CONCLUSION AND FUTURE WORK

Research and development are continuous processes; this is same in computer and software development. However, the effectiveness and efficiency of this new system provide room for further improvement. Hence the objectives of this project could be improved upon, the student attendance system developed will offer greater opportunity in university management.

The following are some future addition:

* All the attendance be it for employees, supporting staff or lecturers, be done using fingerprint recognition.
* A more complex hardware device be used to take attendance of the students. It may be placed at the entrance such that it can also be used to monitor mandatory examinations.
* Improve the quality of images taken by a scanner.
* All universities endeavor to adopt and use an automated student attendance system since it is capable to carry out all the attendance process and keep records effectively and efficiently.
* Any proposed attempt to overcome some weakness regarding attendance concern of the current system. The experimental results demonstrate that the proposed approach and its associated functionalities, accurately and robustly can help to improve the verification accuracy of most fingerprint recognition-based systems.

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