

# Application of Fingerprint Security Technique in UBIQUITOUS Learning System

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**Abstract**— Ubiquitous learning system is a kind of learning system in which the student(s) can access information and learn anytime, any day and anytime, without necessarily being with the tutor. Biometrics is a study that involves the analysis of human anatomy majorly for the purpose of security. Parts of the human body used in biometric may be iris, fingerprints, human faces, footprints and so on. However, this project is about using fingerprint to gain access into an ubiquitous learning system environment. The language used for the accomplishment of this learning module is C-sharp and ASP.NET since it is a web application while MySQL server 2005 is used for the database.

To a very large extent, the finger print recognition system seems to be one of the most reliable means of authentication with Grfinger SDK being an efficient finger print recognition technique[3] in an environment where an electronic system has to be deployed as in the case of an ubiquitous learning system, even though resource intensive. It is a wireless platform developed for lecturer and students to establish a classroom dynamically irrespective of location and time bounds taking lesson in a lively, vivid, and new learning environment, it enhances students learning performance without any burden like attending classes physically.

**Keyword**-Ubiquitous Learning, facial Recognition

## I. INTRODUCTION

Ubiquitous learning system is a kind of learning system in which the student(s) can access information and learn anytime, any day and anytime, without necessarily being with the tutor[1]. Fingerprint biometric security method is a security method that takes an image (either using ink or a digital scan) of a person's fingertips and records its characteristics in a database. Software is used to encode and decode the information in a database.

Academics increasingly become more globalized, the need for student and instructor interaction via technology increases. Why? At a rapid rate, universities and colleges are offering new ways to boost student enrolment, retention, and access to resources and course participation. Students are requesting off-site access to college courses due to a variety of reasons, including geographical, familial, and financial challenges to the more traditional, on-site student experience. Ubiquitous learning often provides a way to bridge the gap between the changing generations of students and the increased need for higher education in the global market.

## II. OVERVIEW OF FINGERPRINT RECOGNITION SYSTEM

Finger print recognition is a biometric security method that integrates with applications and other technologies to provide a way to identify a person by scanning a person's fingerprint to gain access. Fingerprint recognition is a way to provide higher security because a fingerprint biometric system does not use any password but only valid fingerprints [12].

Fingerprint recognition provides a great solution for doors, computer room access, and desktop login authentication and application integration. Fingerprint recognition provides a low cost biometrics solution and with its small designs makes it a prime choice when setting up a high security solutions [4]. It also offers an infallible means of personal identification which is an essential explanation for their having supplanted other methods of establishing the identities of criminals reluctant to admit previous arrests [3]. Fingerprint recognition requires the comparison of an individual fingerprint with all the fingerprints in a database which may be large.

## III. UBIQUITOUS LEARNING

Ubiquitous computing will help organize and mediate social interactions wherever and whenever these situations might occur. its evolution has recently been accelerated by improved wireless telecommunications capabilities, open networks, continued increases in computing power, improved battery technology, and the emergence of flexible software architectures. With those technologies, an individual learning environment can be embedded in the real everyday life[10]. The main characteristics of ubiquitous learning are shown as follows:

- a) Permanency: learners never lose their work unless it is purposefully deleted. In addition, all the learning processes are recorded continuously every day.
- b) Accessibility: learners have access to their documents, data, or videos from anywhere. That information is provided based on their requests. Therefore, the learning involved is self-directed.
- c) Immediacy: wherever learners are, they can get any information immediately. Thus, learners can solve problems quickly. Otherwise, the learner can record the questions and look for the answer later.
- d) Interactivity: learners can interact with experts, teachers, or peers in the form of synchronous or asynchronous

communication. Hence, the experts are more reachable and the knowledge becomes more available.

e) Situating of instructional activities: the learning could be embedded in our daily life. The problems encountered as well as the knowledge required are all presented in their natural and authentic forms. This helps learners notice the features of problem situations that make particular actions relevant.

#### IV. METHODS FOR DEVELOPING UBIQUITOUS LEARNING

The design is divided into two parts viz;

1. The Ubiquitous learning environment; this application will run on two sides, the server and the client. The server side will contain a central database which will act as the repository for the learning materials and the platform from which each lecture will be streamed to the network which the client side application will decode and show to each students on their PCs, it will also serve as the database for all registered students and lecturers.

1. The Authentication aspect; A fingerprint scanner will be used which takes the image of each unique fingerprint of users, which is converted to a sequence by a software and this is stored in the database. Access will be granted to a user only if the characteristics of his or her fingerprint match with any of those in the database, if not access will be denied. The ubiquitous learning module will be developed using the various methods and steps involved in developing a web application using a high level programming language [4]. The language used for the accomplishment of this learning module is C-sharp and ASP.NET since it is a web application while MySQL server 2005 is used for the database[5].

#### EVENT DIAGRAM

Event diagram is the diagram that shows the various activities that each entity performs to fulfil the necessary requirements. It shows the role each entity performs in the cause of the whole event.

#### V. IMPLEMENTATION



Figure 1: Ubiquitous Learning Home Page

The Figure shown above is the first interface encountered in the ubiquitous learning environment. It displays the options of the types of users that can access the environment as there

exist two types of users that can work on the client application which are the lecturer and the student.



Figure 2: Lecturer Login Interface

Figure 2 above is the interface that comes up once a user selects Lecturer login option on the first interface shown in Figure 1. If the user has registered as a lecturer, once he places his finger on the reader, access is granted to him to the learning environment. Else, a message comes up that the user has to be registered.



Figure3: Student Login Interface

Figure 3 above shows the Student Login Interface. On this interface, a registered student places his finger on a fingerprint scanner to access the learning environment and access is granted to the learning interface else, a message appears telling the user to register



Figure4: Lecturer Registration Form

In Figure 4, if a user selects the lecturer Registration option, it brings the user to the page described in Figure 5 below where his information like Name, phone Number, course taken e.t.c together with the fingerprint is entered before the registration is completed. If all entries are correctly entered a “saved successfully” message is displayed else an error message is displayed.

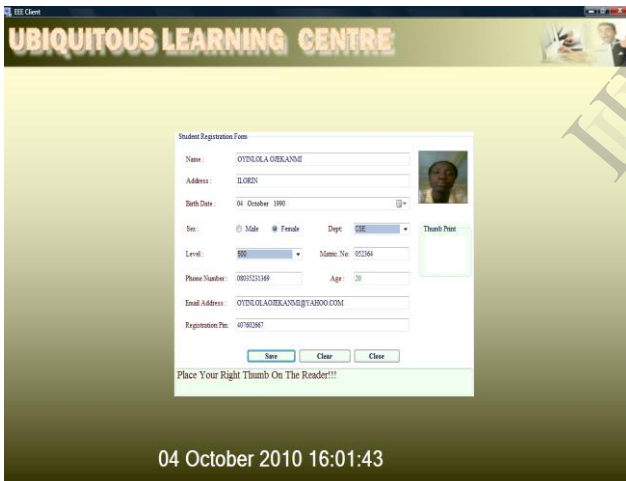


Figure 5: Student Registration Form

If a user selects the student Registration option, it brings the user to the page shown in Figure 5 above where his information like Name, phone Number, Department e.t.c together with the fingerprint is entered before the registration is completed. If all entries are correctly entered a “saved successfully” message is displayed else an error message is displayed.

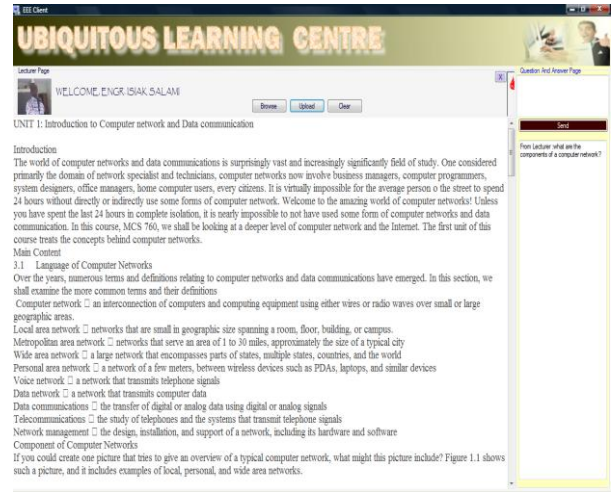


Figure 6: Lecturer Window

This simply displays the operations that can be carried out by the lecturer which are uploading of notes, setting of questions, answering students’ questions.

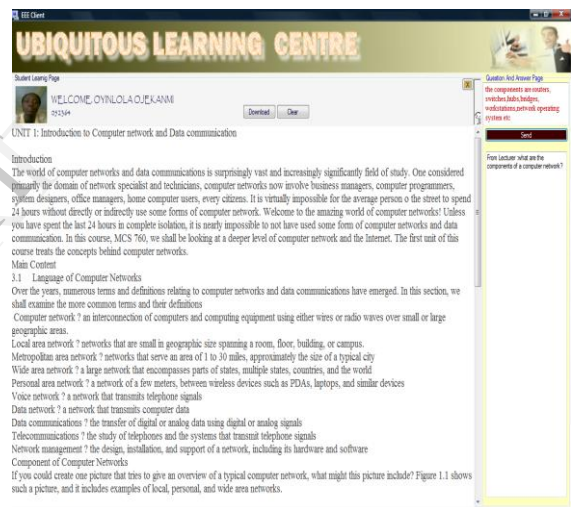


Figure 7: Student Learning Page

## VI. CONCLUSION

Ubiquitous learning is a learning technology that has been developed with the purpose of having an advanced wireless technology for building an Ad Hoc classroom in order to contrive a modern and new learning environment. It is a wireless platform developed for lecturer and students to establish a classroom dynamically irrespective of location and time bounds taking lesson in a lively, vivid, and new learning environment, it enhances students learning performance without any burden like attending classes physically.[7]

Security is a necessity due to the nature of today’s society; it plays an important role in all software systems. In order to ensure a more reliable verification, identification and authentication security checks, characteristics features that can really characterise a given person uniquely should be employed. Biometrics ensures that this purpose is fulfilled as it offers automated methods for identification and verification

based on measurable physiological or behavioural characteristics.

To a very large extent, the finger print recognition system seems to be one of the most reliable means of authentication with Grfinger SDK being an efficient finger print recognition technique in an environment where an electronic system has to be deployed as in the case of an ubiquitous learning system, even though resource intensive.

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