RESULT VALIDATION AND VERIFICATION SYSTEM FOR KADUNA STATE UNIVERSITY (KASU E-VERIFY)

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ABSTRACT

Forgery has long crept into our educational system and, counterfeit and forged certificate and document have upper hand in various certificate and degree awarding institutions. Invalid studentship has become greater than valid studentship. The need for student verification systems have become necessary to check mate and expunge invalid studentship, invalid document and invalid certificate yielding to authenticity of certificate and documents. A student verification system for Kaduna State University (KASU E-VERIFY) was developed. A web-based application implemented on a relational database system (SQLite) is concerned with monitoring the studentship of students, keeping students basic academic records, and verifying every certificate of Kaduna State University. HTML (Hypertext markup language), CSS (cascading style sheet) and Django(python) are the modern languages used in implementing this Result Validation and Verification System for Kaduna State University (Kasu E-Verify). The result is a user-friendly, interactive system with menus that delivers timely and accurate information about certificates. The certificate operations are documented, saved, and retrievable at any time using a database management system. Users must log in before and after any certificate is added or printed, which further increases security for the system. This specific project addresses the issues with managing a student certificate while avoiding the issues that arise when doing things manually.

1.0 INTRODUCTION

Information and Communication Technology is one of the divers' industries in the world which are increasing development in a certain country. Verification is the process of establishing the truth, accuracy, or validity of something such as the verification of official documents (Musee, 2017). Most of applicants falsify their educational credentials. What's more, industry experts cite academic fraud as the most common lie on resumes. This poses the greatest dander to organization. This has been accelerated by applicants who falsify the information. The risks involved of not verifying applicants certificate details includes, greater recruiting and replacement costs, increased employee turnover, compromised business performance, embarrassment and negative impact to reputation.

In Africa as time goes by the rate of growing of ICT technology increases as time to time though in Africa, most of the institutions and organizations rely on use traditional paper records verification methods to verify the documents presented to them. These organizations/Institutions do not have the enough capacity to verify the documents presented to them instantly. One of the problems we have in traditional paper based is that people and especially recruiters and employers find difficult in knowing the validity of documents such as academic certificates presented to them because there is no way they can authenticate those documents instantly. In the current scenario most of the organization does not have the capacity to instantly authenticate the documents presented. Traditional identity information verification and validation processes were developed in a human/paper transaction world. In East Africa, Uganda is having a great progress in implementing IT systems than the other countries (Musee, 2018).

Therefore, for this case, a computerized system to obtain graduates certificates records and verification should be introduced in the school which will enable several recruiters to verify the certificate records from the ones issued in the system and the ones that they have. Recently employers have been experiencing has high alarming rate of fake certificates (Taylor, 2017). This is due to the traditional paper-based prototype of verification. We were motivated that a result validation and verification system (KASU E-Verify) would solve:

- Kaduna State University issuing admission to new applicant with fake result from Kaduna State University for further studies.
- Recruiting organizations giving jobs to applicants with falsified Kaduna State University result.
- Difficulty in determining the validity of Kaduna State University result presented by anyone.

This paper is aimed at designing a working platform in Kaduna State University which will be used nationally and perhaps internationally in verifying the records of academic certificates for all graduates from Kaduna State University in Nigeria.

Definition of Terms

Website: also written as web site, collection of related web pages, including multimedia content, typically identified with a common domain name, and published on at least one web server. (thefreedictionary.com 2020).

Hypertext Markup Language (HTML): HTML (Hypertext Markup Language) is a text-based approach to describing how content contained within an HTML file is

structured. This markup tells a web browser how to display the text, images and other forms of multimedia on a webpage (thefreedictionary.com 2020).

Python: Python modern scripting language and interpreter that is freely available and used on general computers.

Common Gateway Interface (CGI): The common gateway interface (CGI) is a standard way for a Web server to pass a Web user's request to an application program and to receive data back to forward to the user (thefreedictionary.com 2020).

Information: is any kind of event that affects the state of a dynamic system.

Data: Data is any sequence of one or more symbols, data requires interpretation to become information.

Database: it is a system intended to organize, store, and retrieve large amounts of data easily.

Django: Django is a free and open-source cross-platform web server solution stack package that encourages pragmatic design.

2.0 REVIEW OF RELATED LITERATURE

Result verification is the process of ensuring certificate presented by a prospective employee to a prospective employer is genuine and that the holder is the rightful owner. Obilikw Usman (2019). Result verification is the also the process of determining or confirming that a certificate is original. Moreover, a graduation result has to be verified to ensure that its content is true and also to ensure that the issued certificate comes from a real source. Ghazali Os (2019).

When we talk about a verification 3system, we define it as a set of actions used to check the correctness of any element, such as a system element, a system, a document, a service, a task, a requirement, etc. (SEBoK, 2017). These types of actions are planned and carried out throughout the life cycle of the system. Verification is a generic term that needs to be instantiated within the context it occurs. As a process, verification is a transverse activity to every life cycle stage of the system. In particular, during the development cycle of the system, the verification process is performed in parallel with the system definition and system realization processes and applies to any activity and any product resulting from the activity. The activities of every life cycle process and those of the verification process can work together. For example, the integration process frequently uses the verification process. It is important to remember that verification, while separate from validation, is intended to be performed in conjunction with validation. (SEBoK, 2017)

Verification is the confirmation, through the provision of objective evidence, that specified requirements have been fulfilled. With a note added in ISO/IEC/IEEE 15288, the scope of verification includes a set of activities that compares a system or system element against the requirements, architecture and design characteristics, and other properties to be verified (ISO/IEC/IEEE, 2015). This may include, but is not limited to, specified requirements, design description, and the system itself. The purpose of verification, as a generic action, is to identify the faults/defects introduced at the time of any transformation of inputs into outputs. Verification is used to provide information and evidence that the transformation was made according to the selected and appropriate methods, techniques, standards, or rules (Musee, 2015).

Verification is based on tangible evidence; i.e., it is based on information whose truthfulness can be demonstrated by factual results obtained from techniques such as inspection, measurement, testing, analysis, calculation, etc (SEBoK, 2017). Thus, the process of verifying a system (product, service, enterprise, or system of systems (SOS) consists of comparing the realized characteristics or properties of the product, service, or enterprise against its expected data record for example E-Verify USA works by comparing the information employees provide for Employment Eligibility Verification against records available to SSA and DHS. Generally, if the information matches, the employee's case receives an Employment Authorized result in E-Verify, if the information does not match, the case will receive a Tentative Non-confirmation (TNC) result and the employer must give the employee an opportunity to take action to resolve the mismatch (E-Verify. 2018). Therefore, the graduates and recruiters have the chance to verify certificate records in similar process as the E-Verify works.

DOMAIN REVIEW

Several researchers have used cloud computing for verification. According to (A.C &H.R, 2016) they developed a model for authorization of certificates in Government sectors using cloud computing Environment. They designed and developed a model where a user can request and administrator can authorize certificates through online several sectors. They used fifth generation cloud computing environments to maintain data. The application allows users to make a request to get certificates through online by filling user application form by attaching appropriate proof (voter id, Driving License, ration card etc. They authorize the certificates using digital signatures. They ensure data integrity and security using RSP algorithm.

THE PROPOSED SYSTEM

There are a number of methods of verification process as stated from (SmartBear, 2018), therefore regarding to (SEBoK, 2017) processes of verification which includes comparison of the data record set available in the system or database and the data provided by the user, this will be the best method to verify the certificate to as far as its implementation, and hence the certificates will be verified according to the comparison of the data record set. However there are several existing systems that verify certificate such as the iCredify, and CVS, this new system (KASU e-Verify) is still different from the others because it is more user friendly, multi-dimensional, organizations/recruiters can verify certificates using the same system also the issuing institution can manage the certificates they offer systematically unlike other systems. Therefore because of the large number of job applicants who make false educational claims (Taylor, 2017), certificate records verifications are a valuable honesty check, while helping to protect an employer against negligent hiring claims, hence this is an honourable chance to implement such a system in Kaduna State University so as to get rid of the issue of acquiring fake certificates records from several applicants/employees and even leaders qualifying for a position in the Government.

3.0 RESEARCH METHODOLOGY

Method of Data Collection

In executing any system, one has to have an insight of what is happening, it is important that information and fact about the existing

system is gathered. In executing this research, two methods were employed

Observation Method: This method was employed in gathering information/data for this research by looking at the way in which the manual system was carried out. The glaring issues with the existing system were detected by careful observation Utilizing the observational method can exert varying amounts of control over the environment in which the observation takes place. Observation research method was used in the following areas to observe the process of result record verification:

- **Academic Institution Application:** Different academic institution such as Universities, Schools and Colleges, generally we can term them as learning institutions; these institutions require some certificates in order to apply. These certificates include Birth Certificate, previous attended School Certificate, Loan Application Details, Public Service Certificate and other qualification certificates. However, some certificates may be optional but still there has to be included either one among the mentioned certificates, this is particularly in Nigeria.
- **Employment Application:** This is one of the places where the certificates are forged at maximum level. Different members applying for a job are required to attach their certificates of qualification in their CV, now at most cases the issuing organization can't verify correctly and seriously the certificates of the members applying for the jobs. This all happens due to lacking an international system that could be used to verify the certificates at any time and at any place. With this system the issuing organization could effectively verify the certificates or result from Kaduna State University.

Documentation: Documentation method is a secondary method of data collection. This method involves the use of journals, handbooks, past projects and newspapers. This method of data collection is used because it serves as a basis of reference to existing research work. This includes internet which is a method of data collection the web was used in sourcing for information on areas that seems difficult or confusing in order to achieve an alternative, workable result verification system (KASU e-Verify).

System Modelling

System model is the conceptual model as a result of the system modelling that describe and represent a system. A system describes a relationship between any set of components to achieve some common objective. The Unified Modeling Language used in this new system design includes a set of graphic notation techniques to create visual models of the Object-oriented software-intensive systems. The UML applied in this new design include Use Case Diagram, Class Diagram and Activity Diagrams. In this research work, a Unified Modelling Language (UML) is used.

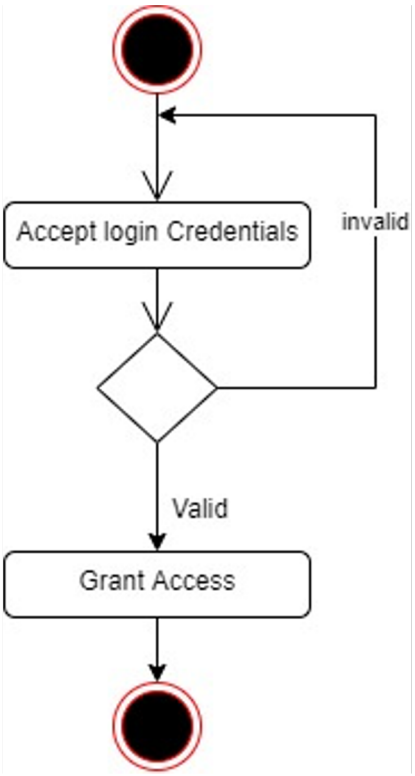

Fig 1 Login Activity Diagram

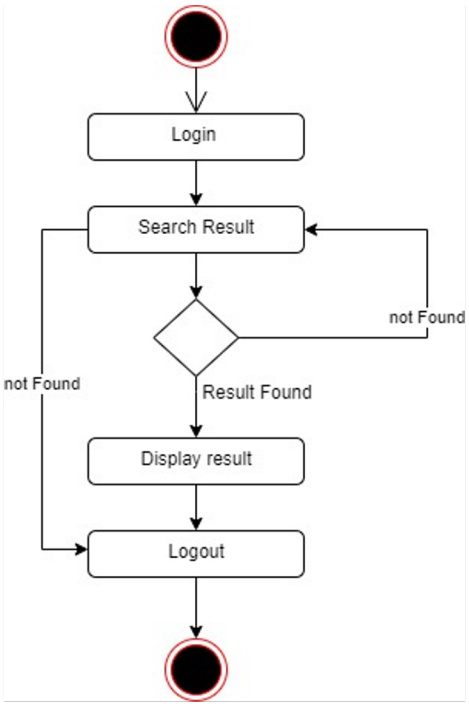

Fig 2: Verify Result Activity Diagram

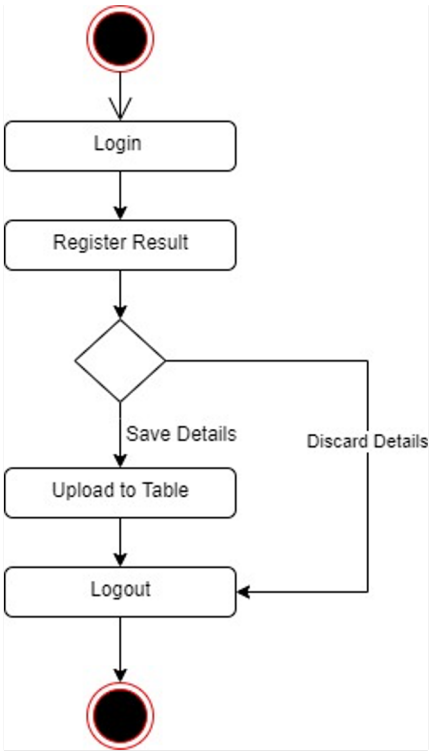

Fig 3: Register Result Activity Diagram

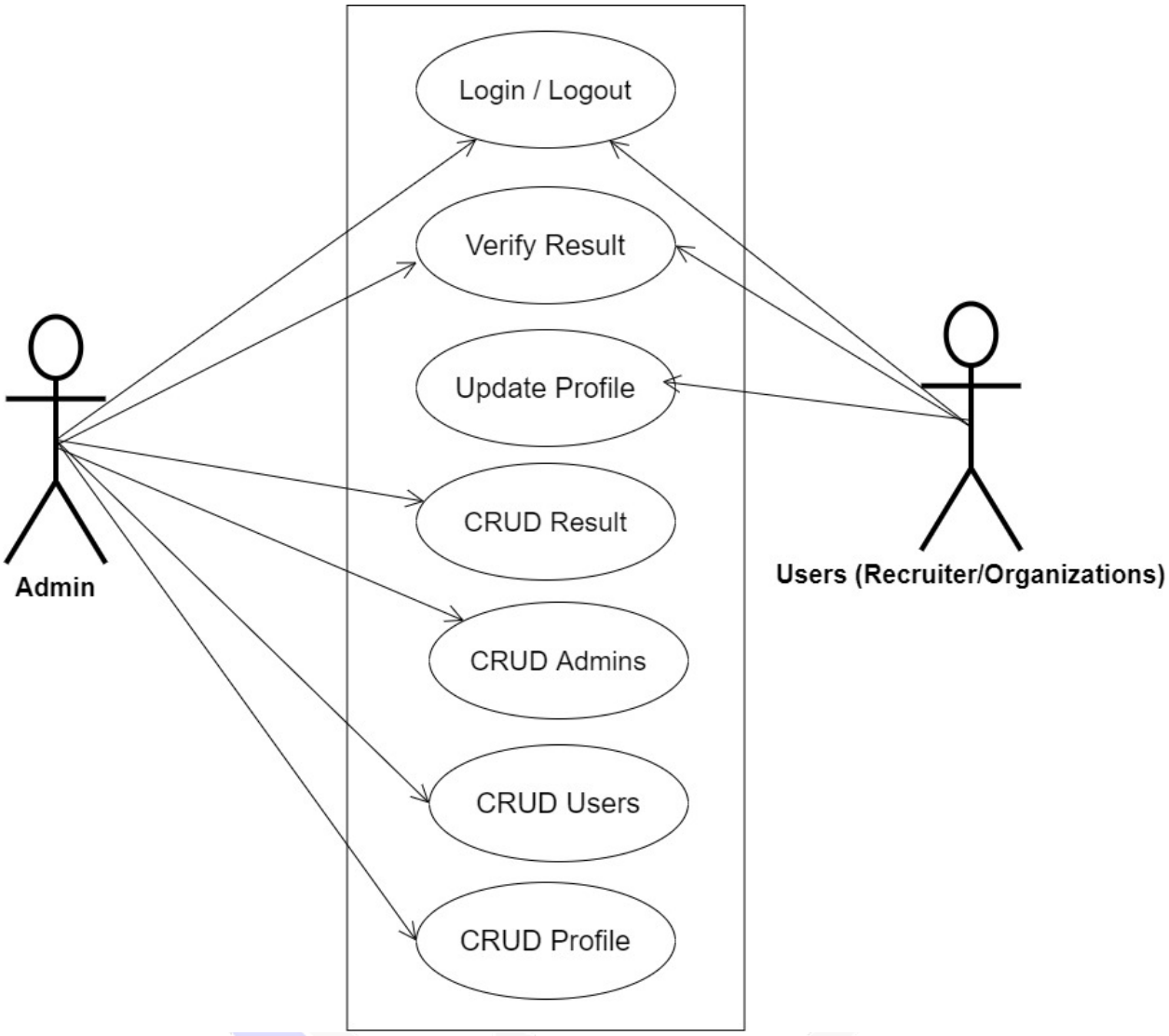

Fig 5: System Use Case Diagram

Database Design

Input specification is the logical presentation of how data is stored in the computer's memory. SQL standards are vital so that structured data will be uniform and independent of applications, the flexibility encountered in the use of the system as well as the ease in recalling and reading the data and ensuring applicability through the internet.

Output Design

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

Input and User Interface Design

This displays the pictorial representation of the system interface, the interface is going to be designed in a way that it will be user friendly, responsive and attractive. It will also be well secured such that login will be

required to access some level of contents. The designs are aided by a mid-fidelity wireframing tool called Draw.io

System Requirement

All software system developed has a predetermined system requirement on which it has been designed to operate on for maximum performance. However, the system requirements are the minimum hardware and software required for a smooth operation of the system that is designed.

The Hardware Requirement

System Hardware Requirement;

a. Minimum of Intel Dual core processor.
b. Minimum of 1 GB of RAM (Random Access Memory).
c. Minimum of 250GB HDD (Hard Disk Drive).

Software Requirement

Software Requirement;

a. At least window 7 OS.
b. Browsers includes: Chrome, Firefox.
c. Python installation
d. Vs Code installation

Choice of Programming Language

Various types of programming language exist that could have been used in writing this tutorial application but the choices of programming languages used involve HTML5, CSS3, JavaScript, Python (Django) and SQLite. The reasons for choosing these programming languages is that it is a web base applications and require web programming language

4.0 DISCUSSION OF FINDINGS

System Testing and Evaluation

There are many reasons to conduct the testing for the developed system, because is only through testing that we can be able to analyze any problem in the new system and provide solutions to these problems This project employed both Unit and Integration testing to ensure effectiveness and efficiency of design and to ensure that the new system meets its required functionalities and is error-free.

I. **Unit Testing:** Individual units or single components of the system are tested independently to ensure that individual phases are working effectively without errors.
II. **Integration Testing:** Testing of the program was implemented using integration testing all the units were put together as one so they function as one. The link between the various units were tested to be sure that they are correctly integrated, also to be sure that the units can function correctly together as one.

System Conversion Plan

The conversion of the new system is parallel approach i.e. both the existing and new system will be used concurrently before it finally has good stand in the system. This is used because having jumped out to new system directly with existing system completely out can cause breakdown to every record already taken during the cause of using the new system alone if there is any problem in the program maintenance.

Security Measures

Since the scope of the website is public, some of the information such as index page, login page etc. are available to anyone who

visits the website. But some other information and functionalities are restricted to some and not all who visit the website. The restrictions are carried out by the use of passwords which gives different level of access to users. The highest level of access is held by the admin, followed by the organizations with lesser access.

Sample Outputs

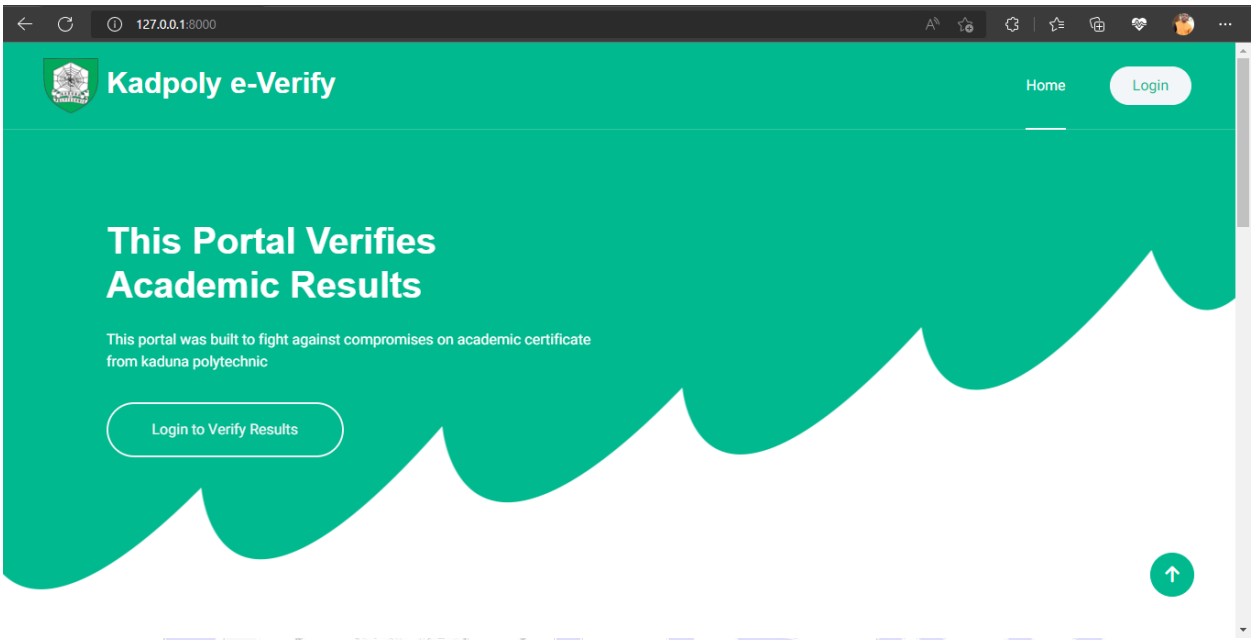

Fig 4: Home Page

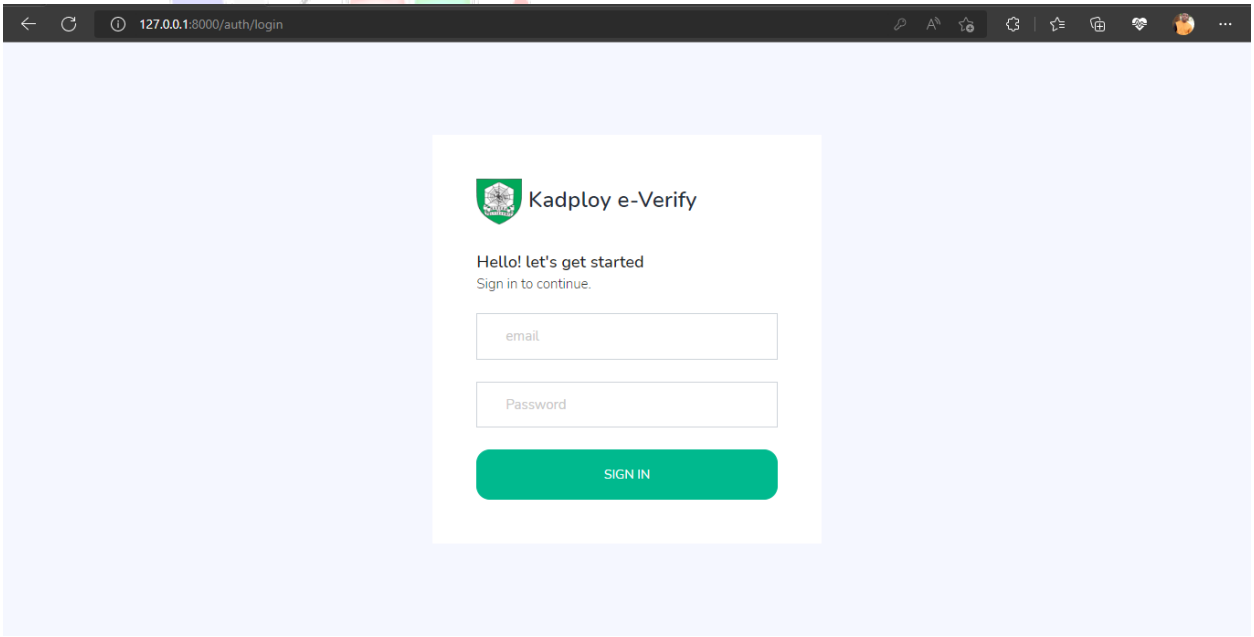

Fig 5: Login Form

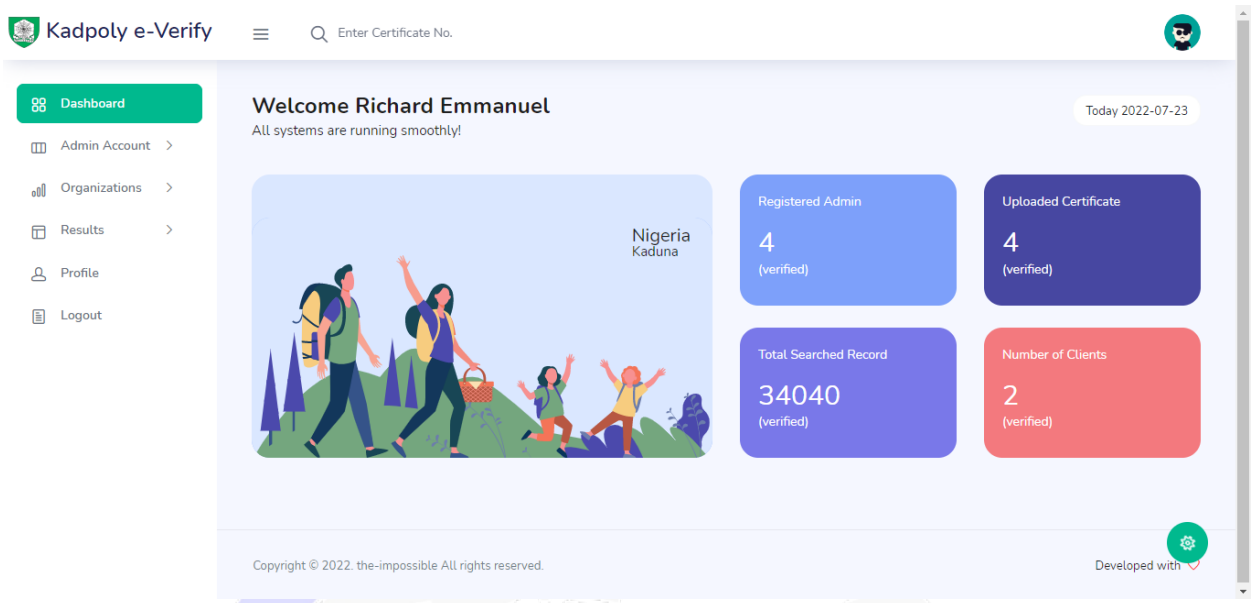

Fig 6: Admin Dashboard

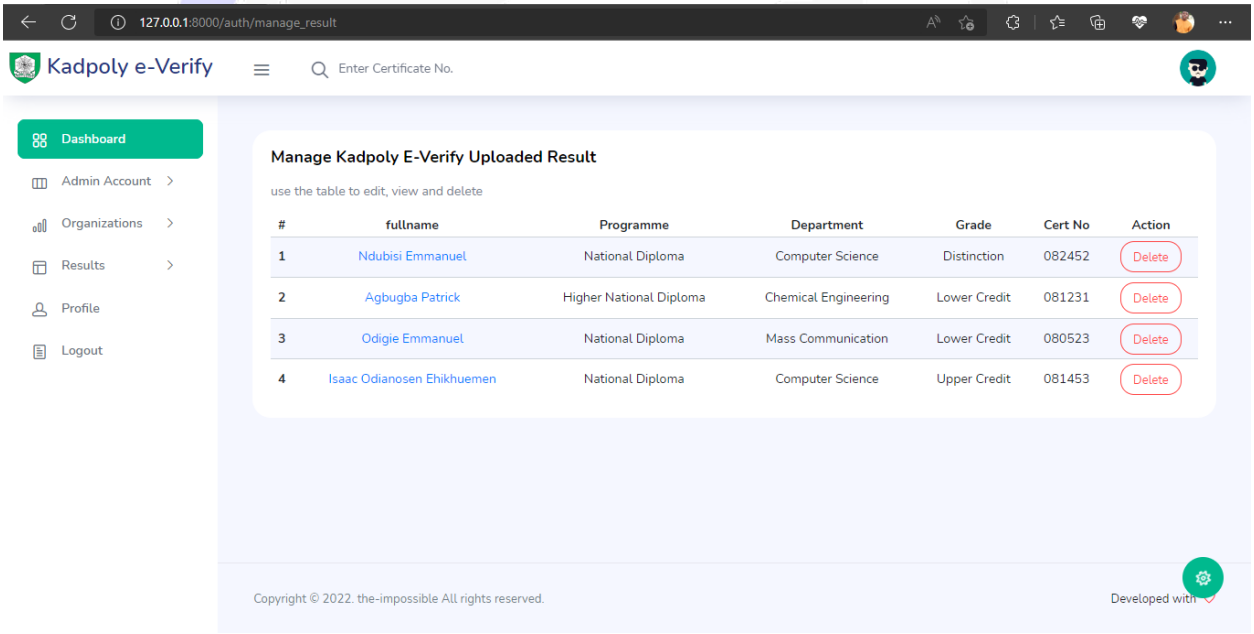

Fig 7: Manage Result

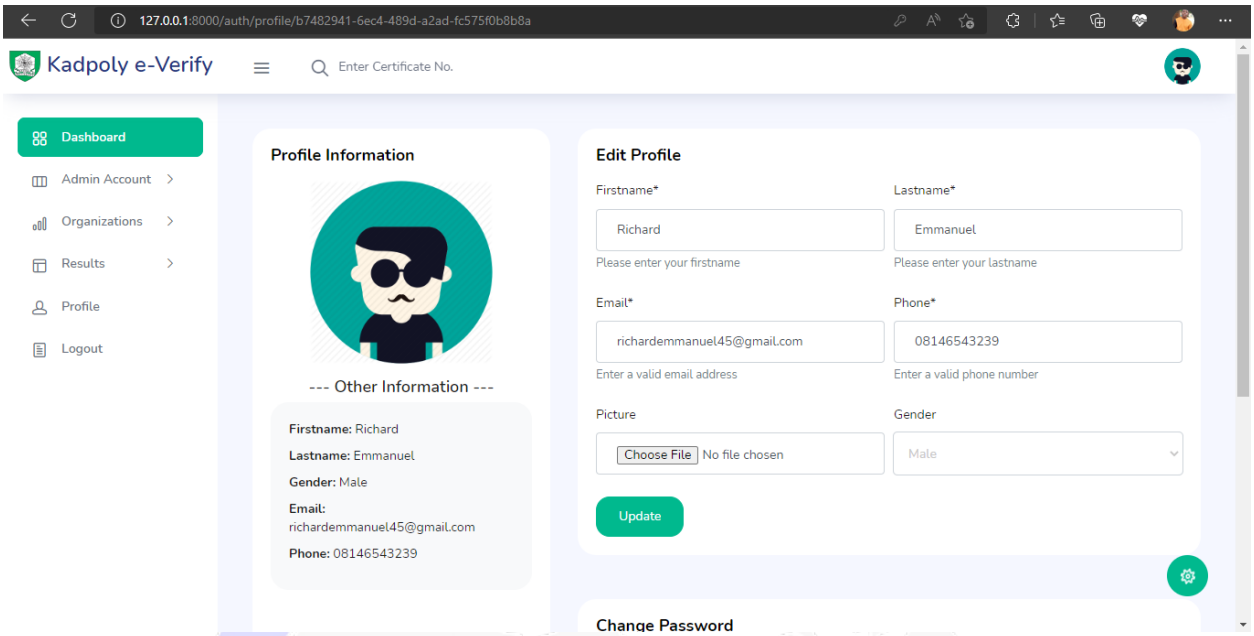

Fig 8: Profile Page

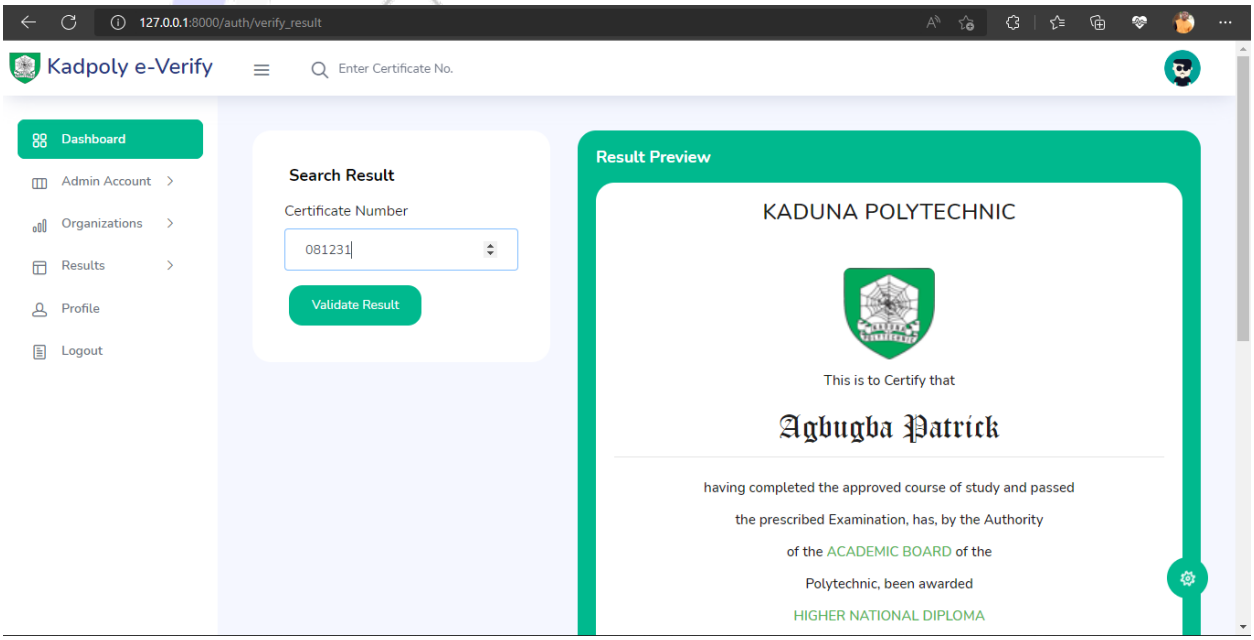

Fig 9: Result Verification Page

5.0 CONCLUSION AND RECOMMENDATIONS

This research work is an effort towards elimination of fake certificates in learning institutions. As discussed in the introduction chapter of this study, verification of academic certificates is one of the important research areas today. This work contributes towards solving problems in academic fraud.

A part of this work focused on the application of the proposed prototype as proof of concept. In our proof of concept, the prototype was able to verify the student's academic details as they are in the database which was uploaded by the school.

Based on experience during the solving problem, I would like to recommend that more research be done in better data verification processes and a lot of literature review done for related work.

After successfully implementing and testing the project prototype, in order to realize the intended purpose of the study I recommend the prototype to be adopted by other Higher learning institutions and secondary education institutions as well organizations and recruiting agencies are the most targeted users of the system.

REFERENCES:

Ahituv, N., Neumann, S., & Zviran, M. (2002). A system development methodology for ERP systems. Journal of Computer Information Systems, 42(3), 56-67.

Nuseibeh & Easterbrook, 2000

Ben Taylor, September 1 2017, Clamp down on fake certificates, Published by Tanzania Affairs

Org., Retrieved from https://www.tzaffairs.org/2017/09/clampdown-on-fake-academic-certificates/ on 25th May 2018

Bittner, K. (2002). Use case modeling. Addison-Wesley Longman Publishing Co., Inc..

Chung, L., Nixon, B. A., Yu, E., & Mylopoulos, J. (2012). Non-functional requirements in

software engineering (Vol. 5). Springer Science & Business Media.

E-Verify User Manual, Apr 23 2018, Retrieved from https://www.e-

verify.gov/employers/verification-process/tentative-nonconfirmations on 26th May 2018

Jamii Forumns, 2018, Wafanyakazi waliofukuzwa kwa vyeti feki, Retrieved from

https://www.jamiiforums.com/threads/hatima-ya-waliofukuzwa-kwa-vyeti-feki-wenye-vyeti-vya-darasa-la-7-na-kuhusu-kupandishwa-madaraja-kujilikana-karibuni.1384764/

on 25th May 2018

Jiang, J. J., Klein, G., & Balloun, J. (1996). Ranking of system implementation success factors.

Project Management Journal, 27, 49-53.

Kotonya, G., & Sommerville, I. (2010). Requirements engineering: processes and techniques.

Wiley Publishing.

Nicholas Mwaniki Musee (January 2015), An Academic Certification Verification Sytem Based

On Cloud Computing Environment), Retrieved from http://www.bcs.org/content/ConWebDoc/18854 on 4th Jan 2018,

University of Nairobi.

Nils Adermann, Jordi Boggiano, Jan 19 2017, Getting started, retrieved from

https://getcomposer.org/doc/ on 30th May 2018

Nuseibeh, B., & Easterbrook, S. (2000, May). Requirements engineering: a roadmap. In

Proceedings of the Conference on the Future of Software Engineering (pp. 35-46). ACM.

Pressman, R. S. (2005). Software engineering: a practitioner's approach. Palgrave Macmillan.

SmartBear Software, April 10, 2018. How the Database Verification Procedure Works, Retrieved

from https://support.smartbear.com/testcomplete/docs/testing-with/checkpoints/database/how-comparison-procedure-works.html

SEBoK v. 1.9 , November 17 2017, System verification, Retrieved from

http://sebokwiki.org/wiki/Systems_Engineering_and_Management on 26th May 2018

Zeng, K., Yang, C. H., Wei, D. Y., & Rao, T. R. N. (1991). Pseudorandom bit generators in stream-cipher cryptography. Computer, 24(2), 8-17.