
Automation and Multifactor School Runs Security System (Case Study: Command Nursery/Primary School, NASME Barracks Makurdi)

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Executive Summary

Safety and security are the major challenges faced by the children or school students in the present day world. School runs plays an essential role in carrying most of children everyday all over the world. Security system that will help the school kids school runs in a protected and more secure way. The circumstance of unauthorized person gaining access into the school to pick up a child is one of the problems suffered, that has risen considerably in recent years. This has often led to the demise of many students due to child adoption or kidnapping. This system, through entry and exit recordings, intends to create an appropriate environment via following certain set of criteria of security and wellbeing for the school record that will have a positive impact on the student and their family, also having a robust database of the staff in duty each day to ascertain the security of the system such that the parents can view the staff on duty at daily basis to ease communication between the pupils parents and the school system.

However on the parents side the system enable them to provide an alternative means of picking their children from the school with a reasonable evidence and prove to enhance the safety of the children.

Abstract

School is the most time spent by school-age children. The presence of children at school is the responsibility of the teacher and the principal. Schools must increase student security to prevent child abduction. Therefore, as an effort to save the children's future, all parties must ask for help to prevent kidnapping. One way to enhance the security is keep proper record of who come picking up a child in the school premises. The development of technology is so rapid at this time. This has resulted in the development of the use of technology in daily life. This research describes the uses of newly developed school security measures to verify child pick up if they are their parents or an authorized person to pick up the child so children did not go to the wrong hands. The technology used for Android Application to minimize child abduction cases and also to keep track record via robust database system.

Keywords: Security Systems, Automation Systems, Global Positioning System (GPS), Global System for Mobile (GSM), Node MCU, Radio Frequency Identification, Safety System.

1. Introduction

Accurately identifying a person is the most critical process in security applications, and issued for recognizing and determining an individual identity based on his or her physical or behavioral characteristics including finger-prints and face.

Biometric based identification system has been widely utilized in many security applications. Biometrics is a marvelous technology that is lower in cost, faster and more accurate. Over the last couple of decade, biometric based recognition systems have been widely investigated, a number of biometric features have been studied tested and successfully deployed in application including information security, law enforcement, surveillance, forensics, smart cards, access control, time/place control points and computer networks.

This describes background information and verification system (AFIVSs), face Recognition Systems (FRSs) and multi-modal biometric system (MMBSs), respectively.

Child abduction needs special attention from the school that abduction events do not occur in the school environment, sorts or in learning activities safely and comfortably, and parents also do not feel threatened. Educational institutions, in this case, schools, are institutions that become the media in developing all aspects of human life, both cognitive, affective, and psychomotor aspects, so the school must play an active role in student activities, starting from the arrival of students, rest, and time of return. Including preventing kidnappings in the school environment, School principals are asked to immediately disseminate to teachers and homeroom teachers to increase awareness of their students presence while in school.

The development of technology is so rapid at this time many things can be used to help parents monitor the existence of children who are beyond the reach of parents (Anwar, 2014), Current technology is inseparable from GPS (Global Positioning System), almost all sophisticated transportation equipment today both on land, sea, and air, have used GPS, Not only that, but several brands of sophisticated gadgets have also embedded GPS components in them, some of the use of technology that uses the concept of GPS to minimize cases of child abduction include (1) the Child Tracker application uses the Assisted Global Positioning System (A-GPS technology) (2) Android applications using LBS (Location Based Service).

1.1 Description of Study Area

With the introduction of multi-modal biometric authentication of systems identify. The students and society will benefit in the following ways.

- Proper record keeping of registered student will be ensured.
- Robust database comprising the Student, Staff, Parents / Guardians and School bus driver will be properly ensured

This research work covers only the use of fingerprint and faces recognition, identification (authentication of parents, guardians, drivers' identity). Mostly beats on picking up a child/children up from the school.

2. METHODOLOGY

This section presents a detailed account of the researcher's methods, procedures and techniques employed in data sourcing, analysis and interpretation in the course of the research work.

In the course of trying to design a multifactor system devoid of error and mistake, Identity of parents/guardians driver responsible for children school runs, the investigation and observation carried out revealed the following flows in the existing system.

2.1. System Analysis

The proposed system, which explain the behaviour and structure of the system. It illustrates how the actors communicate with the system. The system stores all enrolled bio-data of the pupil, guardian and bus driver into the database for easy access. The pupil clock-out of the system with authentication and authorization. The guardian can communicate with the school using a mobile device for receiving SMS alert and request for an OTP from the school, the OTP is automatically generated and sent to the guardian's mobile device by the system, then guardian's trustee present it to the school authority to input into the system for authorization, if the parent / guardian is unable to pick-up the pupil.

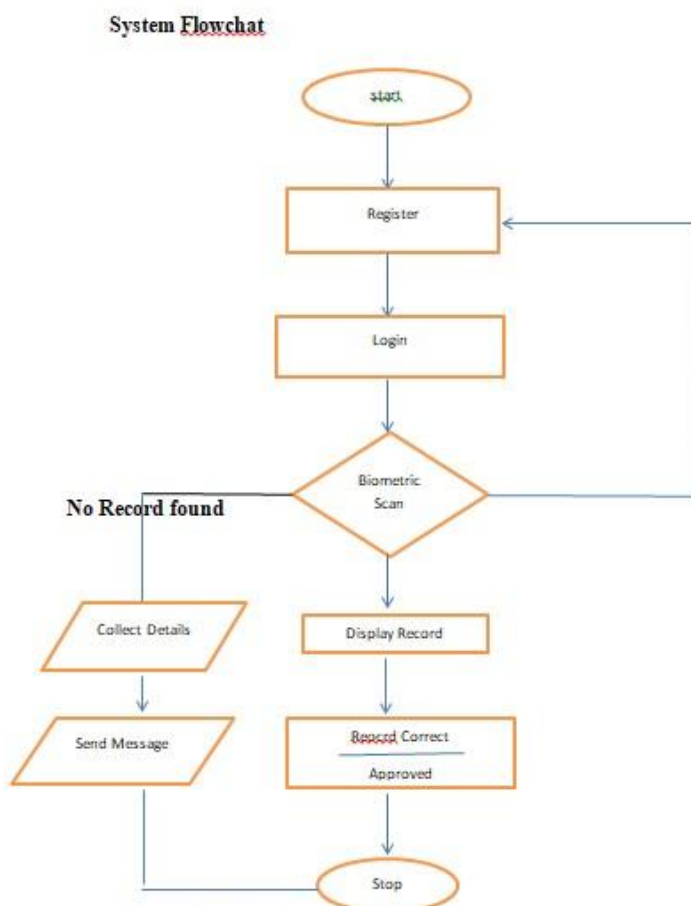


Fig 1. Proposed System FlowChart

Class Diagram of the Proposed

Class diagrams are the most popular UML diagrams used by the object oriented community. It describes the objects in a system and their relationships. Class diagram consists of attributes and functions. A single class diagram describes a specific aspect of the system and the collection of class diagrams represents the whole system. Basically the class diagram represents the static view of a system.

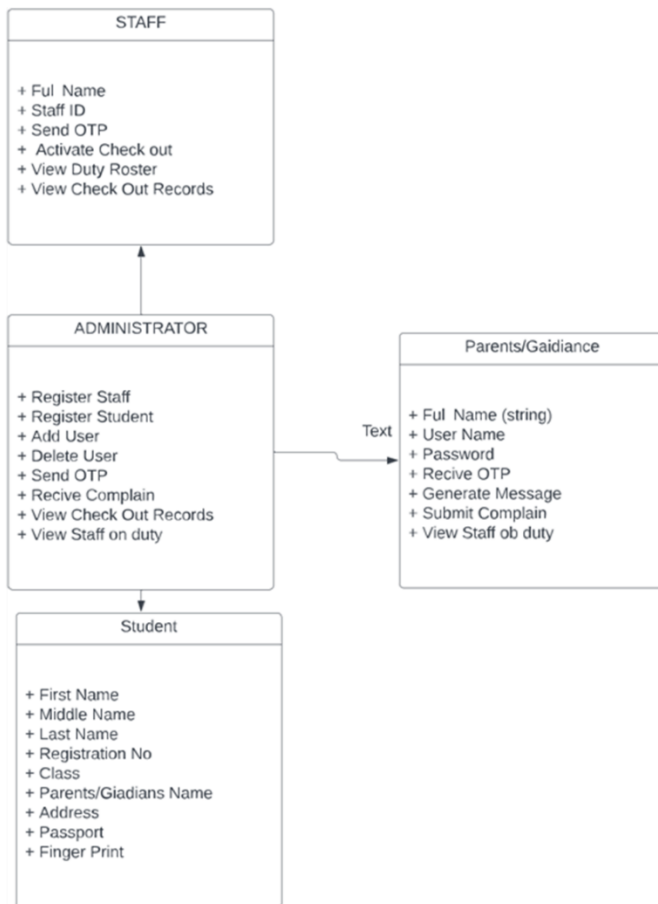


Fig 2. Use Case Diagram of the Proposed System.

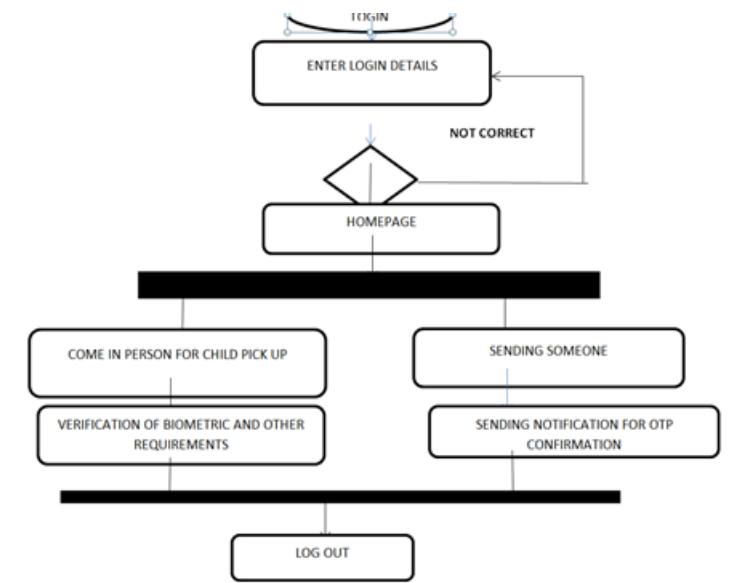


Fig 3. Parents Activity Diagram

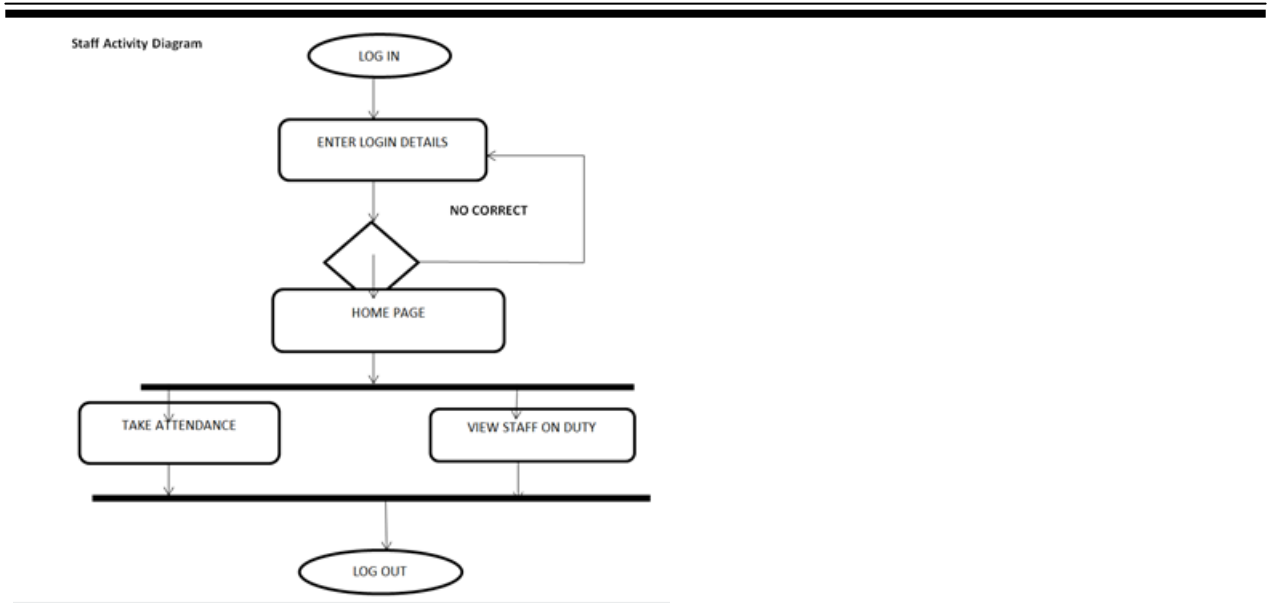


Fig 4. Staff Activity Diagram

2.2. Method of Data Collection

In a bid to access extensive data and to provide additional value to the quality of this work, the researcher, adopted dual methodologies comprising of interview methods and the questionnaire method. In both cases, questions of relevance were carefully tailored towards possible extractions of needful data.

The questions contained in the interview and the questionnaire, though moderately simplified yet is purposefully designed and randomly distributed to staff and students of the Kingdom Heritage Nursery / Primary School North Bank Makurdi.

3. Result

The program was first tested in modular bases and afterwards integrated and tested again. This was done repeatedly. Errors encountered were adequately taken care of as they were debugged.

The following are some test and outputs obtained:



Fig 5. The Administrator login page of the system.

The administrator login page is controlled by the system administrator in the school, which is responsible for adding and removing users and activities on the system and also maintains the system functionality.

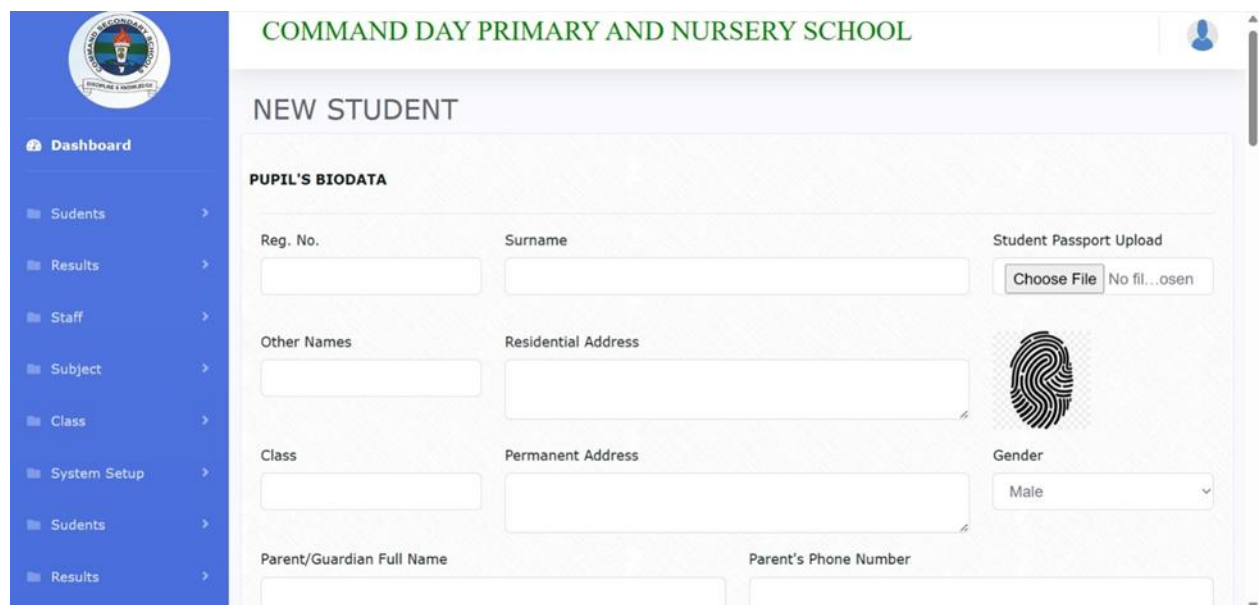


Fig 6. New Student Registration page

The student registration is controlled by the admin officer in charge of the pupils being admitted into the school, who takes responsibility for the student's strength to register every new student and their class and other activities like uploading the student result so it can be viewed by the pupil's parents.

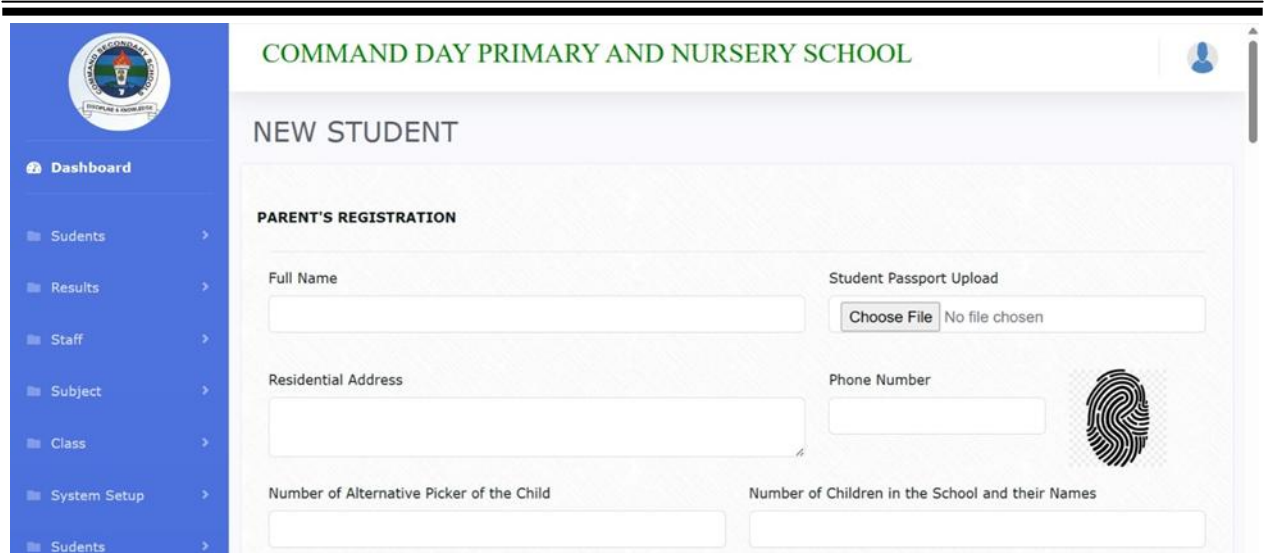


Fig 7. Parents Details Registration Page.

The parents registration page is handled by each parent of the pupils registered in the school, where the parents register their needed information to the school and carry out other activities such as viewing their children's results, communicating with the staff on duty, and also providing an alternative of picking up their children from the school.

4. CONCLUSION/ RECOMMENDATION

Biometric is a unique identity management approach that offers the combination of user convenience, cost-effective provisioning, and non-repudiated compliance audit for the system operator.

Biometric-based authentication clearly has advantages over these mechanisms, but there are also vulnerabilities that need to be applied universally; it may be a good choice for a given application, but unfeasible in another.

Fingerprint and face systems provide a higher level of security, non-repudiated identification for internal control and regulatory compliance, and increased user convenience and productivity without the costs associated with physical credentials.

A properly designed and implemented fingerprint biometric system is a viable way to accomplish all the objectives.

Biometric and facial recognition represent a wide range of new opportunities that can make necessary personal authentication and identification both more secure and convenient. On the other hand, the rise of biometric technologies might potentially compromise the individual's rights to privacy as well as lead to increased registration. Consequently, successful implementation of biometrics in the future must utilize the opportunities of the new technology but at the same time respect the integrity of the individual.

Acknowledgments

This research was possible through the financial support of Tertiary Education Trust Fund (TETFUND), Nigeria, provided to the corresponding author. Immeasurable thanks go to Maj. Gen. UN Babangida Rector, LT. Col. UI Jafaru SO1, LT. Col. OS Job Nigerian Army College of Environmental Science and Technology (NACEST) Makurdi, Benue State,

Nigeria respectively. Thanks to Institution Committee on Research (ICR), and the entire staff and management of the Nigerian Army College of Environmental Science and Technology (NACEST) Makurdi, Benue State, Nigeria, your technical support is highly commended.

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