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Bimodal Biometric Authentication and Verification system for Ghost workers, Using Fingerprint and Iris

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Abstract

In so many institutions, especially the ones controlled by the government, there are so many ghost workers who receive salaries on monthly basis even when they don't come to work. This work explores solutions of ghost workers' conundrum as suggested by researchers of your, and gives a two way authentication and verification panacea using Fingerprint and Iris. It takes in the data of all workers daily in an attendance format, and makes sure a staff is up to date before the activation of his or her salary at month end. And because no fingerprint is the same, one can never be impersonated using this system. Data was gathererd secondarily. The fingerprint detection Application program interface was designed using VisualBasic.net. The digital persona was used to read the fingerprints into the system and MySQL was used at the back end of the system. At the end, the system was able to reduce the influx of ghost workers in any institution that uses the proposed system to checkmate their workers on daily basis.

Keywords: Biometric, Iris, Fingerprint, Authentication, Automated, Ghost workers.

Introduction

Iris and fingerprint recognition are automated method of biometric identification that use mathematical pattern-recognition techniques on video images of one or both of the irises of an individual's eyes, or finger pattern of fingers whose complex patterns are unique and stable (Mohammed, Dlay, & Woo, 2014). Just like Fingerprint, Iris recognition system consists of four stages such as Pattern acquisition, segmentation,

normalization, feature extraction and matching which leads to a decision. Just like Fingerprint, Iris recognition system consists of four stages such as iris acquisition, segmentation, normalization, feature extraction and matching which lead to a decision. Unlike finger print, the characteristics of an iris are significantly unique for each and can be recognized from a distance. The above bimodal biometric system has been proposed to curb the menace of ghost workers in MDAs of Nigeria. In the other hand, Ghost workers are people recorded on the payroll systems, but who do not work for the organization. The ghost workers can be real persons, who with or without their knowledge is placed on the payroll, or a fictitious person invented by a dishonest management staff. The public is tired of hearing it, scarce government funds filling the pockets of corrupt officials. A government worker dies and remains on the payroll, a ghost worker in the most literal sense payments keep coming and someone finds away to access the cash. Not very difficult in cash based payment systems, which still exist in many fragile countries. The payment agent simply takes the money, perhaps a signature needs to be forged. If further controls are in place and involve additional people the profit may need to be shared. Waiting for staff to passion is not a very ambitious approach to profiting from corruption. Ghost workers has been a challenging task affecting all societies today so solving the problems of ghost workers using the biometric authentication is a very important aspect of every organization managing staff payment and other entitlement. This is because it has to do with collections of information from the staff, such that the organization can use it to reference the staff, compute or process the staff payment record before payment. This is done at the end of every month and when new staff are employed but with the increase in number of staff and pensioners there is a need for effective dynamic, efficient and secured personnel management system. The

effectiveness of biometric management system can only be achieved by having among other things computerized well Managed Information System (MIS).

It is therefore pertinent to describe the design and implementation of a biometric authentication using both Iris and finger print techniques, a solution to ghost workers in government organizations. Looking at the proposed system critically, there are basically two methods of personnel management system, the computerized method and the manual method.

Presently, most organizations are operating on the manual method. In this method staff of the organization queue up at payment office or banks to collect their entitlement. The manual process has been posing some problems in the past and is still a bottle neck in today's staff personnel information.

However, a pitfall of the above mentioned method (manual system) after some series of securitization has brought about the proposed project or solution to ghost workers in government organization.

This system when implemented will help the organization validate staff record before payment or entitlement collection. Also, the new system will allow the organization to populate the database with ease and display information about any staff anytime it is needed. The system has a great success in developed countries; it will also be a great success if implemented in Nigeria.

Statement of the Problems

Ghost workers fraud being one of the major problems faced in government organization has raised a great concern in Nigeria in view of its devastating effects on the nation's economy. This problem has increased to the level that most public organizations are paying salaries to ghost workers; consequently government loses about a billion naira monthly through this racket. Although, many argue that the detection of frauds

should be the auditors principal function, auditors are responsible for detection of immaterial frauds but are responsible for frauds that could cost materials impact on financial statements and one of such frauds is ghost workers fraud. The problem normally occurs when there is delay brings about poor management of frauds, misappropriation of funds, poor record keeping, forgeries and embezzlement of funds.

Aim and Objectives of the Study

The aim of this study are to design and implement a biometric identification And verificatin system in an organization. The objectives are;

(i) To develop a fingerprint and iris based biometric system for employee attendance management.

(ii) To provide a biometric system for accurate audit traits of all employee punctuality.

(iii) To generate reports regarding employee information and attendance to assist in tracking and analyzing employee performance.

(iv) To build a secure system which allows safe access And employees verification by applying biometric technology.

Ghost working concept

Technically speaking, a ghost worker is someone recorded on the payroll system, but who does not work for the organization. The ghost worker can be a real person, who with or without their knowledge, is placed on the payroll, or a fictitious person invented by the dishonest staff.

There are three types of ghost workers;

(i) Fictitious persons,

(ii) Real person, and

(iii) Real person leaves/dies but remains on the payroll.

- **Fictitious Persons:** Invented someone with influence. True ghost worker. The largest schemes, easiest to detect.
- **Real persons:** Collaboration kick-backs for a job, or maybe they are just late for work, or sick, hardest to detect.
- **Real person leaves/dies but remains on the payroll:** Can also be poor and inaccurate processing is someone actually getting paid.

All else same it is preferable to enroll fictitious ghost workers. No one to share the profit with, no loose lips, and no one to attempt to increase their share of the pie through, for example, blackmail. However, things are not always easy.

Staff Information System

Staff information system is any written information about a staff. It can be described in terms of their content, use and storage medium. The maintenance of extensive, accurate, historic and current data of individual staff is essential to the functioning of an organization management.

Typical content may include family information, job title, hire data, employee number, salary and job level etc staff information is used for many important issues, such as monitoring complaisance with the attendance and health law and administrative purpose. Staff information may be stored in file in the organization, office or other approved location. It can also be stored in a central location such as computer (central data) for the convenience of anyone with authorized access and the need to obtain information (Silver 1996).

Personnel Information Management System

Personnel information management system is an organized presentation of the staff details and performance or an assessment of staff over a specified period of time. It is one of the components of staff information

system. It is used for collection and process analysis and to store staff performance. In order to properly organize and process staff information staff details will be needed, this information is stored.

Biometric Staff Information Management

The automated recognition of individual using biological and behaviour traits has been presented as natural identify management tool that offers greater security and convenience than traditional method of personal recognition.

Indeed many governed identity management system employs biometric to ensure that each person has only one identity in the system and that only one person can access each identity.

However, history has it that, biometric invades privacy, that specific, technology error rates unsuitable for large scale application. Nevertheless, it has been proven wrong, because there is a great difference between digital identification and personal identification. Biometric personnel management system is the best or safe way of preventing ghost workers in an organization since it has to do with biological trait.

Methodology

Structured system analysis and design methodology (SSADM). This is a set of standards for systems analysis and design of information system. This structured system analysis and design methodology is an open methodology based on the waterfall model. it has been used by many commercial business consultants, educational establishments and CASE tool developers.

Method of Data Collection

Data collection is an important aspect of any type of research study. In accurate data collection can impact the result of a study and ultimately leads to invalid result. This is also a process of gathering and measuring information on targeted variables in an established systematic fashion. Data collection is a component of research in all fields of study including physical and social

sciences, humanities and business. The goal of all data collection is to capture quality evidence that allows analysis to lead to the formulation of convincing and credible answers to the questions that has been posed.

Types of Data Collection

- Primary data collection
- Secondary data collection

Primary Data Collection: Are collected afresh and for the first time, especially for the designated study.

Secondary Data Collection: Have already been collected and compiled by someone else.

Analysis of the Proposed System

The proposed system, biometrics authentication system is an application which depends on the input from a biometric machine for validation and authorization of staff. The proposed system will help check increasing crimes of ghost workers in government organization. All it takes is to access the application; it involves the finger print of the staff and the staff's personal data, such that when it is being submitted, the system will validate it with what is stored in the database. If it matches, then it authorizes payment if it does not match, it will disapprove payment.

Use Cases of the Proposed System.

Use cases of the proposed system is pictures of actions system performing depicting the actor (user) and they described the behavior of the system when a particular stimulus is sent by one, the actors use CASES are used during the analysis phases of a project to identify and partition system functionalities. They are powerful tools when combined with their textual description to give better semantic information. They provide context for the requirement by expressing sequences of events and common language for end users and technical team. Use CASE facilities and enlarges shareholders participation which is one primary factor of ensuring project success. In addition it provides a

means for identifying tracking, controlling and managing system development.

Uses case diagram

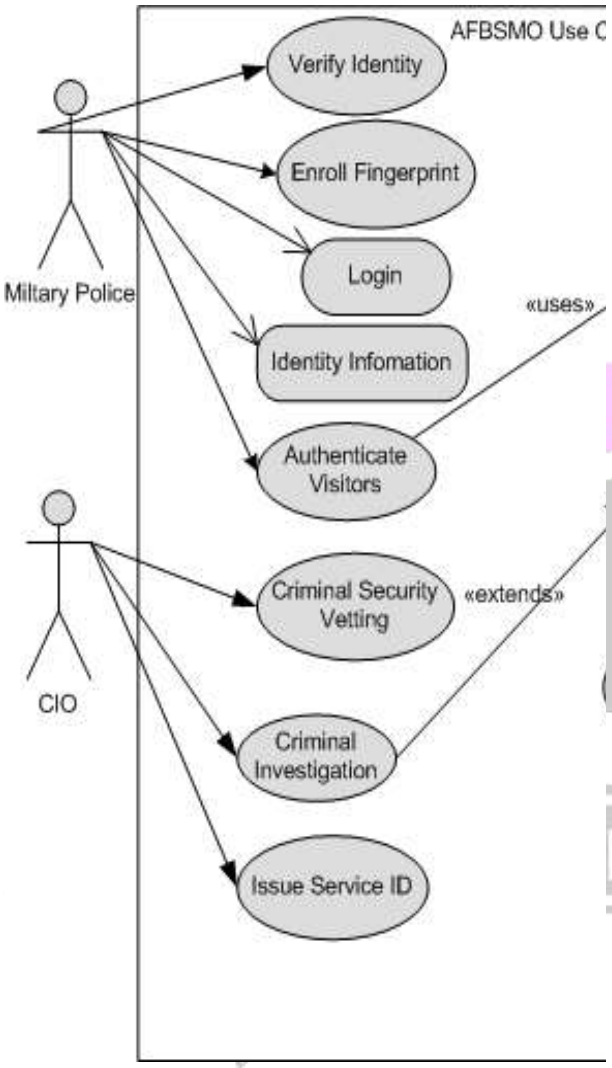

Fig. 1 Use Case of the proposed system

Description of Input and Output Documents

These are files generated while running a case, which are meant to be printed out or stored digitally outside process maker. They are useful for creating external records of case data, as well as creating formulated output such as bills, receipts and letters. They are generated from HTML templates containing reference to system and case variables which are auto inserted when the output document is generated as a stop when running case.

Input Documents; This is a feature that allows the user to upload a file or files to attach them to a particular case. These files can be text documents, spread sheet, images or any kind of file. An input document can be hardcopy which has been printed out and stored in a filing cabinet.

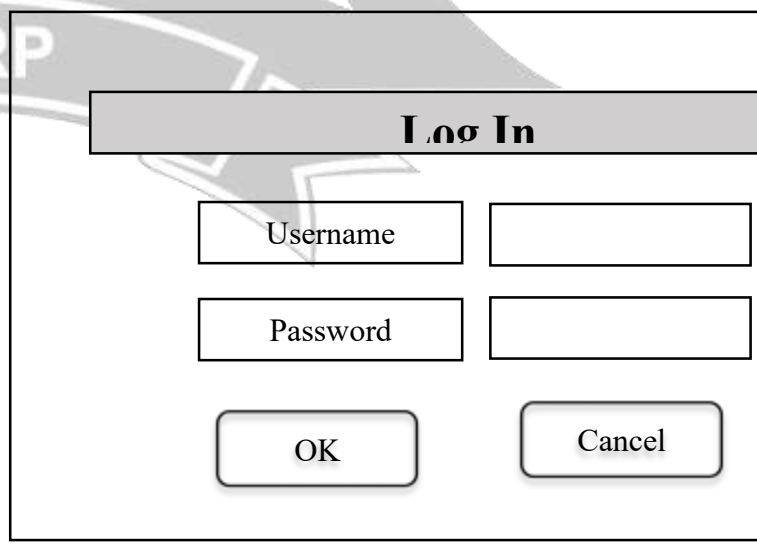

Fig 2 Login Interface

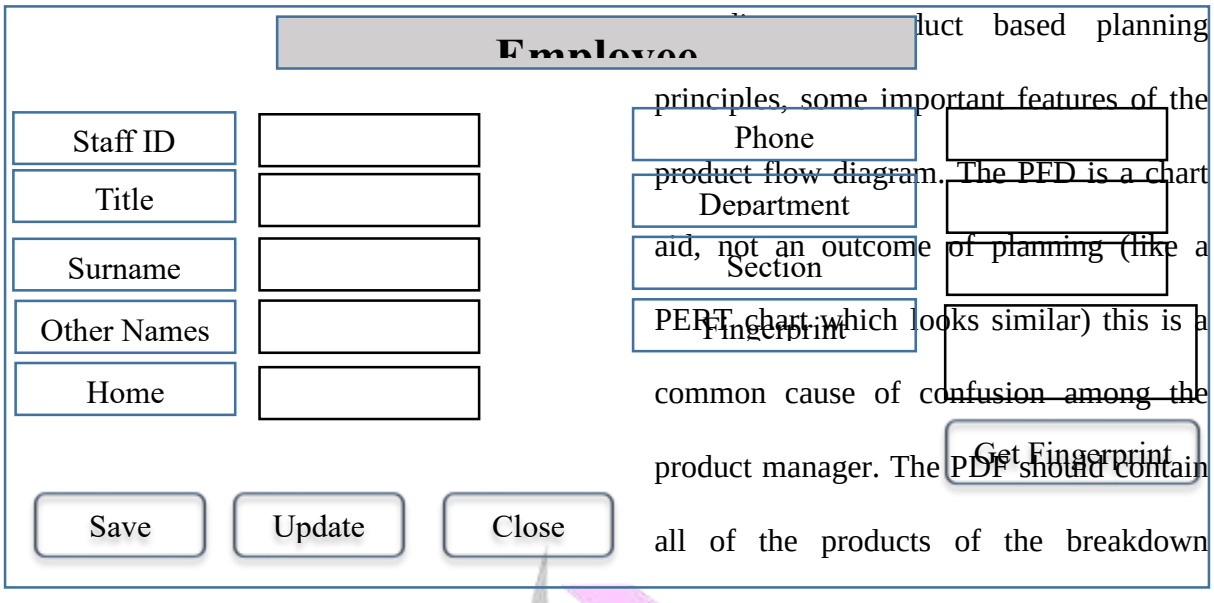

Fig. 3 employee registration form

Output Document

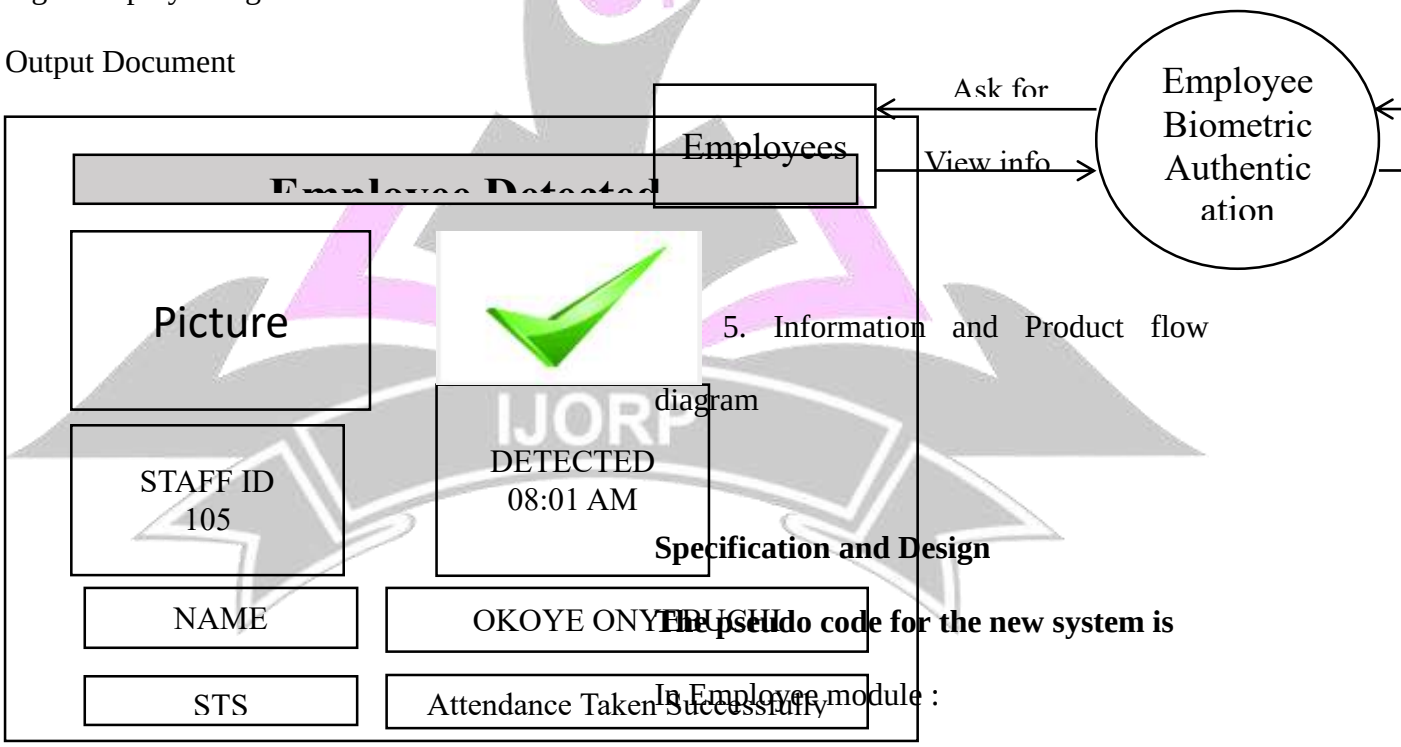

Fig 4 Employee Attendance form

Information and Product Flow Diagram

The product flow diagram (PFD) is a graphical representation of the order by which a sequence of product is created based planning principles, some important features of the product flow diagram. The PFD is a chart aid, not an outcome of planning (like a PERT chart which looks similar) this is a common cause of confusion among the product manager. The PDF should contain all of the products of the breakdown structure.

5. Information and Product flow diagram

Specification and Design

The pseudo code for the new system is

In Employee module :

When employee logins
If clicked on Save Details
 Expected-New data saved.
If clicked on View Schedule
 Expected-navigate to view schedule page
If clicked on View Attendance
 Expected- Navigate to related page.
If clicked on View Details

 Expected- Navigate to related page.
If clicked on Forgot Password
 Expected- Navigate to related page.

2. In Supervisor Module

When clicked on Delete Employee
 Expected- Navigate to empdelete1 & empdelete2 to delete employee.
When clicked on Set Schedule
. Expected- Navigate to empeventdesc1 to finally setting the schedule.
When clicked on Mark Attendance.
 Expected- Navigate to the related pages.
When clicked on View Details.
 Expected- Navigate to details, detailsprocess

Overview Description of the New System

The proposed system is made up of the following modules:

a) Employee Registration: Used to register and update the employees information
b) Fingerprint Capture: Used as the interface through which fingerprint of the employees will be captured and stored in the system
c) Admin: used by the administrator to manage employee profiles.
d) System Reports: used to view and print the reports that will be generated from the system.

High Level Model of the Proposed System

Most formal models are used in detailed design and focused on a single domain. Few effective approaches exist that can effectively tie these lower level models to a high level system models during models supporting design space exploration should be able to communicate information regarding resign trade-offs (e.g. safety versus ease of use) effectively in a multidisciplinary setting.

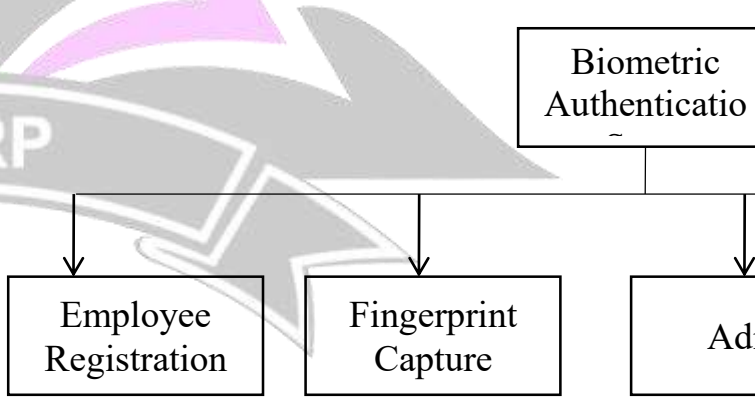

Fig. 7 High Level Model of the proposed system

Results and workings of the New System

The newly designed system works in order:

(i) To implement a search module for easy searching of records.

(ii) To design system that has adequate by implementing multiple authentication system concerning ghost workers.

(iii) To determine the effectiveness of workers and also tracking of ghost workers.

(iv) To design a system with authentication system using biometric technology such as face recognition and figure print as to detect and confirm management worker, and ghost workers.

The visual workings of the new system

Main Menu:

The main menu chart of the proposed system is illustrated in figure below.

Fig. 8 Main Menu

Database Specification

Databases are intended to support programs and exercise regarding to coding and database generation by the development group, the database structure content data field and fingerprints are based on research the design specifications requirement outline in the functional requirement depending on the system, this include instructions on testing specific requirement, configuration settings or review of functions or code.

All requirement outlines in the functional specification should be addressed, linking

requirement between the functional requirement and design specification is performed via the traceability matrix.

The good requirements are objective and testable and the design specifications include;

- Specific impact, including data-type to be entered,
- Calculation/code used to accomplish defined requirement,
- Outputs generated from the system,
- Explaining technical measures to ensure system.

The general design of the database is carried out in a deeper level by this precise definition and design of output. Since the staff employee information system the design for this new system one using MYSQL and the database have table (object) such as login, employee information form. The object details are show below;

Homepage:

The homepage services as the entry point of the application. This serves as an introductory point to users, it is made up of hyperlinks that when triggers, fires either to load that main application or quit the application.

Fig 9. Homepage

Login page:

This page allows the administrator to have access to the main application form by entering the username and password. Its prototype is showed below;

Fig. 10. Login interface

Fingerprint capture interface:

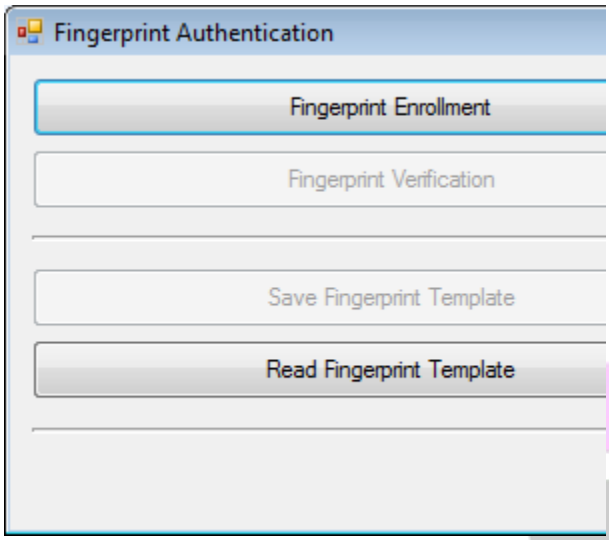

Fig 11 fingerprint authentication interface

Employee Registration

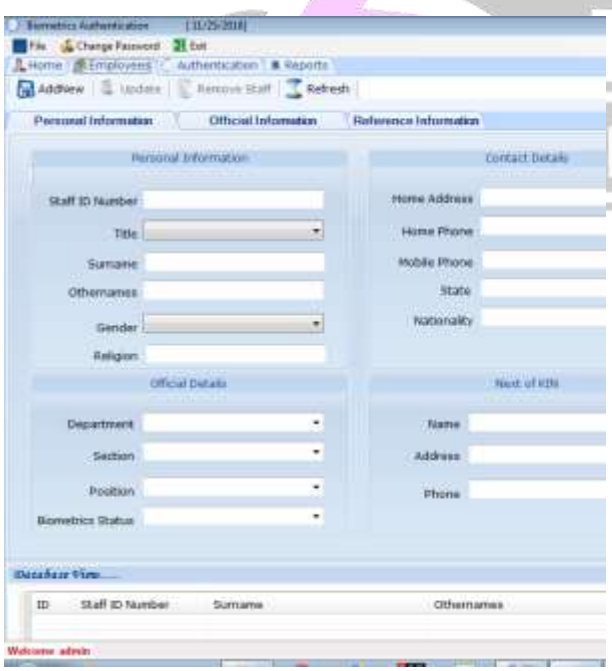

Fig. 12. Employee registration interface

Conclusion

The biometric authentication through fingerprint or Iris focuses on eliminating ghost workers in an establishment/organization. This research concludes that biometric system is a better way to handling management system in an organization; this is due to the fact that it helps eliminate fraudulent staff in the organization and helps store data of staffs in a better and safer way. Hence, the biometric system is a better way of solving the problem of ghost workers in government organization.

Recommendations

1. It is highly recommended that organizations should install this bimodal technology because of its convenience and ease of use, fingerprint authentication is becoming widest choice. A growing number of notebook PCS and computer peripherals are coming to market with

built in Iris and fingerprint readers scores of products are available including keyboards, mice, external hard drives, USB flash drives and readers built into PC card and USB plug, in devices most of these limits are relatively in expensive. These devices allow the user to maintain encrypted password that don't need to be remembered but instead are invoked after the user puts his finger on the reader. This can also be used with a separate PIN or Password to offer true two factor authentication.

2. Government should have a policy that will make sure that all governmental parastatals should use this system as ghost working syndrome is more prevalent in governmental organizations.

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