
Attendance Management System Using Biometric: Ogun State Institute of Technology under Consideration

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Abstract: Attendance Management System is an indispensable tool to every organization. It regulates the problem of time wastage and absenteeism. Unfortunately many organizations are still using manual attendance management system. This paper therefore, examined way of keeping modern technological attendance management system. It discussed finger print attendance system. Data flow diagram was used as methodology. Three data tables featured in the study (User login, staff identity and staff attendance). Visual basic 6 language was used to design the system application. The system is still at infancy stage, but with time, it is believed that it would play critical role in future use of computer at the level of administration and organization. Without doubt, the modern technological ways of managing attendance would eliminate the old system of taking attendance by paper.

Keywords: *Attendance management system, client server based attendance system.*

Introduction:

Attendance Management System is a software developed for daily attendance monitor in schools, colleges and organizations. It facilitates actual attendance information of a particular staff in a particular school or organization. This system will also help in evaluating attendance eligibility criteria of a staff. Having a computerized attendance system has proved to improve the efficiency of any business, and in this case, it is for an institution. It will eliminate the need for a lot of paper work and will help in tracking employees' absence dates.

The attendance system application will be integrated with a biometric device (Fingerprint) in order to enhance security of the application and to avoid multiple sign-in by from particular employees for another employee's absence. The attendance system will have several privileges

attached to it in order to authenticate different users using the application.

Background (Ogun State Institute of Technology Igbesa):

Ogun State Institute of Technology Igbesa is a higher institution that is located in Igbesa, Ado Odo Ota Local Government, Ogun State. In the case study, staffs attendance is done on paper. The whole session attendance is stored in register and at the end of the session the reports are generated. Sometimes false sign- in is done and because of this, improper result is got.

Aim and Objectives:

To design and implement a staff attendance management system based on fingerprint recognition that manages records for attendance in Ogun State Institute of Technology Igbesa.

with the following objectives;

1. To generate a system that is friendly by making retrieval and storing of data fast and efficient and giving access to the user to use the system easily.
2. To generate reports easily and periodically.
3. To keep staff attendance using fingerprint

Literature Review:

The first employee time clock was invented in 1888 with one purpose which is to record the time an employee resumed at work and the time an employee will leave the factory (Redcoat,2011). This machine-driven employee time clock would stamp day and time information on a heavy paper card, hence the name time card(Wikipedia, 2016). This gave the factory owner an official record of the hours each employee worked. The time card safe the business owner by making sure that each employee worked the number of hours they said they did. Time cards also protected the employees by providing the exact number of hours they worked, making it much more difficult for employer to cheat the workers of their wages. Attendance tracking systems advanced with smaller electrical time clocks eventually replacing the large mechanical ones(BTRS,2008). Later time cards even had time in and time out areas marked on them already, so workers had to carefully line up the time card in just the right place. Business owners and employees were no longer the only ones interested in accurate time tracking systems. Timecard software featured in the 1990s as business owners started moving away from mechanical and paper time of attendance systems to computer

based time and attendance software. Software based systems greatly reduced the amount of time needed to prepare employees time cards for payroll processing, by automatically totaling employee hours and overtime. Timecard software also reduced the reliance on mechanical or electrical time clocks that were subject to failure and expensive to repair. This allowed business owners to reap the benefits of reduced operating costs. As computers have become more sophisticated, so has timecard software. Attendance tracking is far easier as vacation, sickness, and personal leave time can now be automatically tracked and accrued. Employee time clock computers can be networked together with time card data maintained in a centralized location, yet accessible from all.

Time and attendance systems have come a long way since 1888, but the purpose has remained the same: to record the time an employee starts work and the time an employee stops work.

Client Server Based Attendance System

Client-server architecture can be considered as a network environment that exchanges information between a server machine and a client machine where server has some resources that can be shared by different clients. TMS Client-Server Attendance System uses the concept of Client-Server Architecture. It allows the company to monitor their employees' attendance from their other branches on real-time based. It was observed (Timesoft, 2009) that the TMS Client-Server Attendance System contains 2 modules which are client module and server module.

The client module features such as:

1. **Client Login:** For the Client Login page, employee has to key in their Employee Code and Password in order to enter the main page of the system.
2. **Punch in And out:** Employee used a barcode scanner to punch in and punch out their attendance. Information scanned from barcode will be sent to the system and displayed as the employee data.

While in the server module, they are:

3. **Administration Setting:** This function is created to allow admin to manage the data systematically. Under the administration setting there is the leave management which let admin set the leave's information, and employee setting is to let admin know employee details. Assign schedule feature enable admin to arrange the work schedule for the workers.

- 4. Attendance Report:** TMS Client-Server attendance system also provides an attendance report function which allows admin to print out any related report easily.

The reports that are to be printed out are:

- Simple personal report
- General report
- Performance report

Smart Card Attendance System

Attendance system enable accurate management and tracking of staff attended hours against a schedule, roster of activity or daily and weekly contract hours, ensuring that staff are accurately measured and paid correctly (Bioenabletech, 2016). Aplus MyKad is one of the attendance system using smartcard. The purpose of this system is to record employee's clocking data to replace conventional manual time punch clock. This computerized system provides an easy and accurate way of keeping track of the attendance of employees. When MyKad is inserted into Aplus Smart Card Reader, the computer will immediately capture the Mycard individual information such as card holder's name, identity card number, address and time (Jambi, 2014 and Wehr, 2004).

There are four modules created in Aplus MyKad which are staff attendance, member registration, visitor login and issue dispatch notes. Apart from these four main modules, this system also provides the function to generate staff attendance report. Using MyKad to record employee attendance has one shortage. This is because MyKad is only available for Malaysian. If one company has foreign workers, this system will not be suitable for that related company anymore.

Fingerprint Attendance System

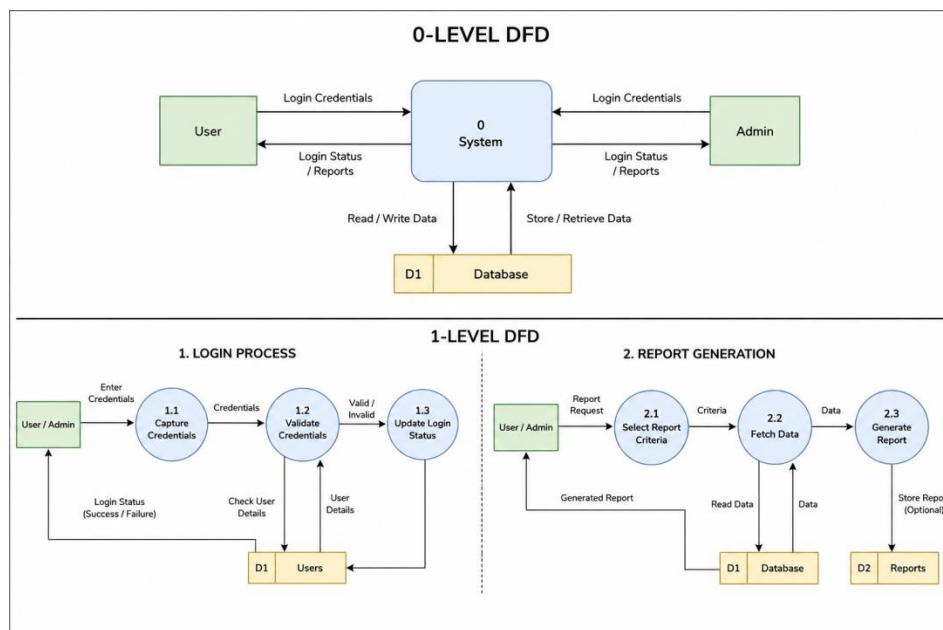
Fingerprint can be considered as the oldest method and most reliable and popular human characteristics that are widely used for individual identification and verification in the field of biometric technology (Dictionary, 2014). Fingerprint is unique because it is believed that no two people will have the same fingerprint pattern in the world (Neurotechnology, 2014). Finger Flex is an example of fingerprint biometric time attendance system that helps to automate data collection and process timesheets faster. This system can prepare attendance report faster for organizations of any size. Besides that, it can eliminate buddy-punching and improve overall workforce punctuality. The main functions of Finger Flex Time Attendance System as observed by LING (2012) are listed below:

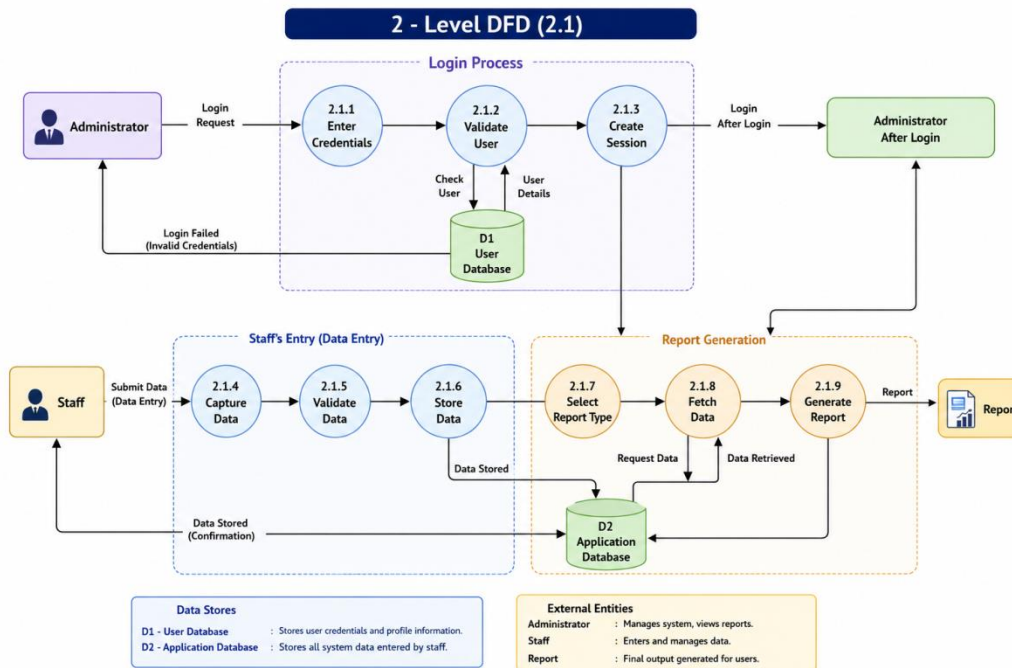
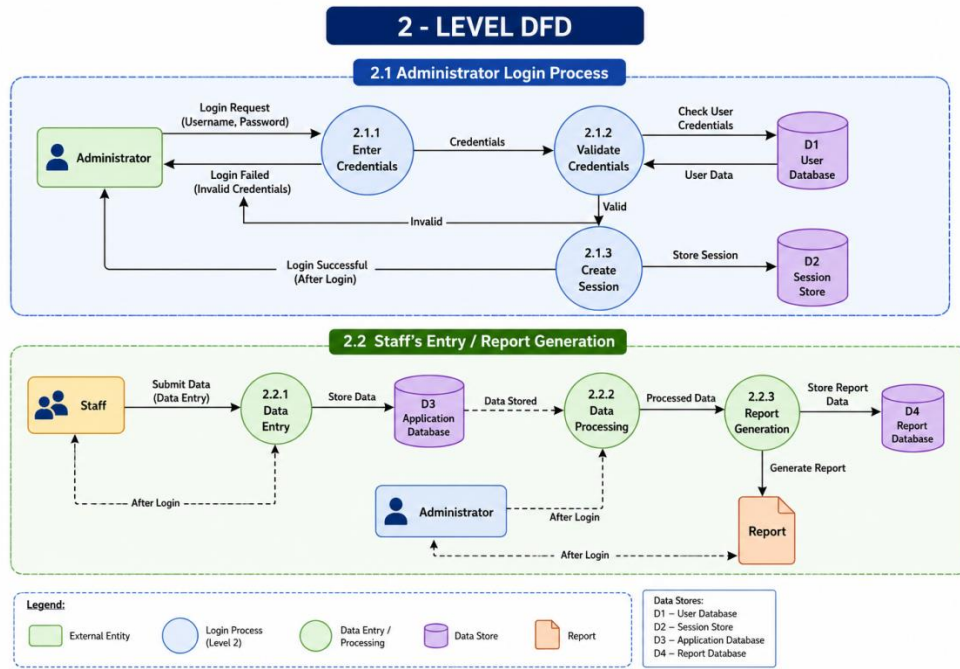
1. **One Touch Fingerprint Biometric Time Clock:** No password or cards is necessary, Finger Flex Time Attendance will identify staff clocking in and clocking out just by the fingerprint.
2. **Flexible Schedule Management:** This system can also manage work groups and time shifts required. FingerFlex can cater for all the time management requirements and manage different working hours for different groups.
3. **Monitor Abnormality:** This system has a trigger alert system on monitoring people who are coming late consistently. Companies can set their own rules for late attendance and the system will alert them.
4. **Flexible Leave Management:** With this feature, staffs who take leave can be recorded within FingerFlex and will show up in related reports
5. **Generate Report:** All the time attendance reports generated by FingerFlex can be exported to Microsoft Excel which can then use them for payroll calculation or to generate report.

Research Methodology:

Data Flow Diagram (DFD)

Data flow diagram used has the system design tool to represent the graphical representation of the system, forming its process. It was used to create an overview of the system which will later be explained. The DFD below shows what kinds of information will be input to and output from the system, where the data will come from and go to, and where the data will be stored.





3.4 Database Tables

Table 3.1 User Login

Primary Key: Username- This table stores all user details

S/No.	Field name	Data Type	Description
1	Username	Text	Store user name for checking correctusername
2	Password	Text	Store password corresponding to username
3	User Type	Text	User Type Administrator or User

Table 3.2 Staff

Primary Key: Staff ID - This table is used to register staff Details

S/No.	Field name	Data Type	Description
1	Staff ID	Text	Staff's ID is Unique and automated
2	First Name	Text	To Store name
3	Middle Name	Text	To Store name
4	Last Name	Text	To Store name
5	Gender	Text	To Store gender
6	Address	Text	To Store address
7	State of Origin	Text	To Store State of origin
8	Contact No	Number (long Integer)	To Store phone number
9	Nationality	Text	To Store nationality
10	Marital Status	Text	To Store marital
11	Religion	Text	To Store religion
12	Email	Text	To Store emails
13	Date Employed	Date/Time	Keep record of date employed
14	Date Registered	Date/Time	Keep record of date employed
15	Kin Name	Text	To Store kin details
16	Kin Address	Text	To Store kin details
17	Kin Gender	Text	To Store kin details
18	Kin Relationship	Text	To Store kin details
19	Kin Phone Number	Number (Long Integer)	To Store kin details
20	Position	Text	To store position
21	Image Passport	OLE Object	Saves Passport
22	Fingerprint	OLE Object	To store template created

Table 3.3 Attendance Table:

Primary Key:ID and Staff ID- This Table takes record of all time in and out

S/No.	Field name	Data Type	Description
1	ID	Integer	Automates at every clock in
2	Staff ID	Text	To keep track of staffs
3	Staff Name	Text	To display Staff name

4	Department	Text	To display Staff Department
5	Time In	Date/Time	Takes the time in
6	Time Out	Date/Time	Takes the time out
7	Image	OLE Object	Displays the image on clock in

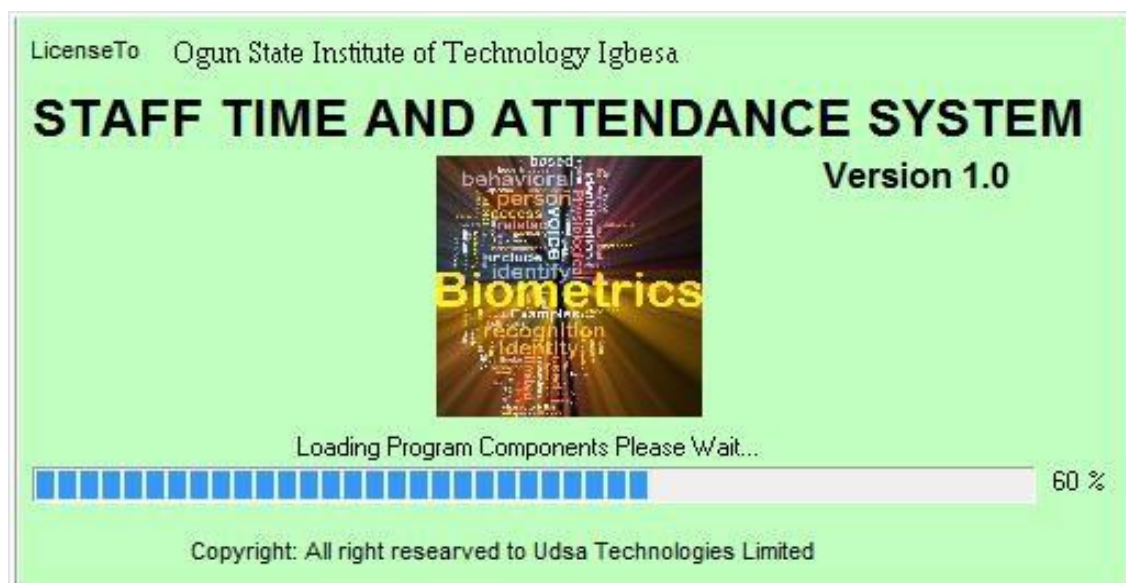
Language Justification:

The visual basic 6 language is the language used in designing the program for the system V.B.6.0 language offers the best in terms of its availability, easy to understand good graphic ability, flexibility and machine independence(Code-vb, 2013).. The program can run in other versions i.e. 2003 and 2005 with little modification.System selection is to select a module (subsystem) when the main is displayed on the screen; the cursor is passed to choose on optional and enter to select it. If this is done, control is passed to the main program after a subroutine is completed depending on the task that needs to be accomplished by the user choosing the exit to terminate a subroutine; this returns control to the calling program and to terminate the system is by closing exit application from the main menu.

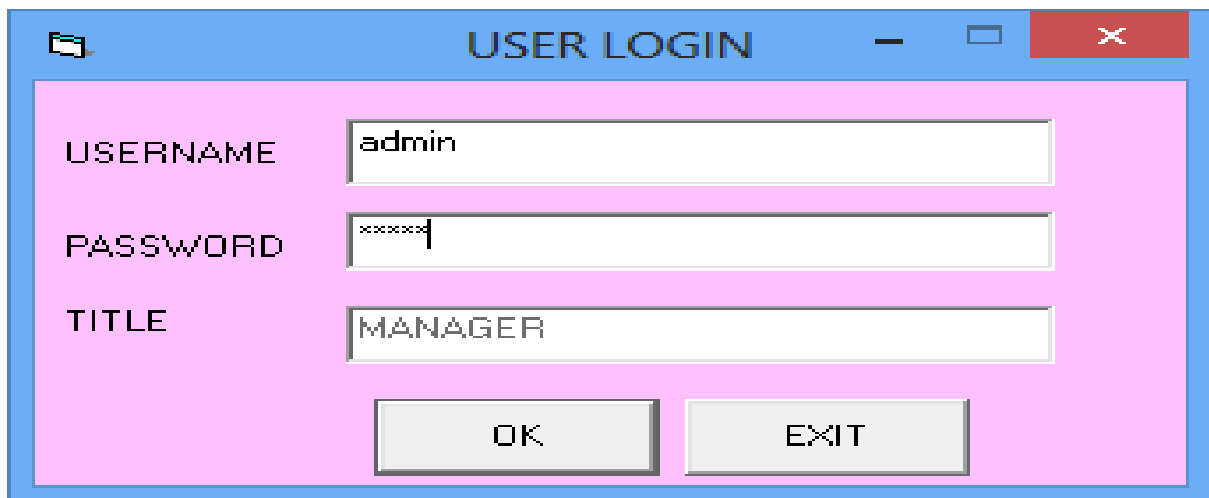
Discussion of Findings:

The Visual Basic 6.0 was used to design the forms and Microsoft Access 2003 for the database, so that retrieval, update and viewing of information can be done. Some of the screenshots for the implementation of this research were explained below.

1. Splash Screen: This is where the beginning of the application.



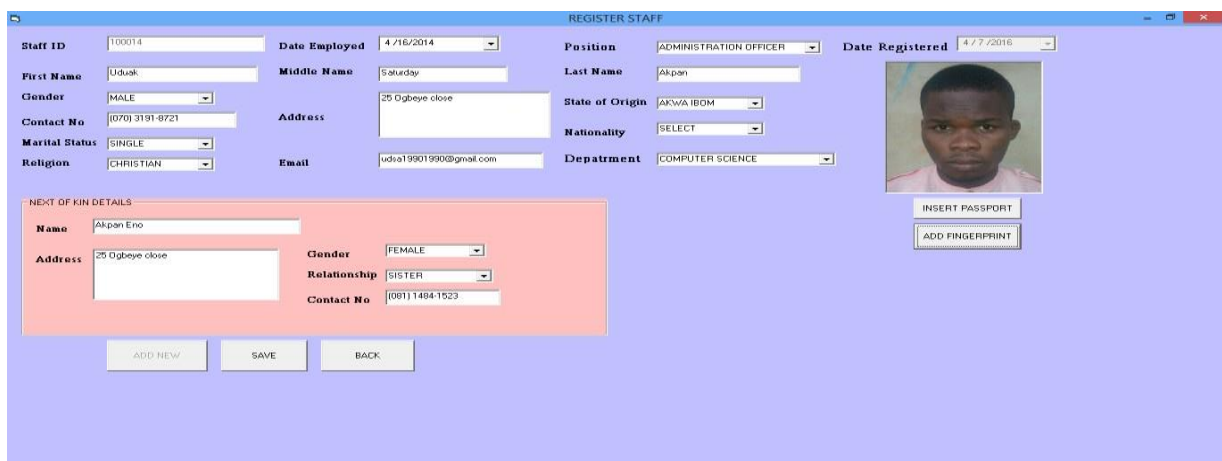
2. **Login Page:** This is where users are authenticated.



3. **Main Menu:** This is the page where the Administrator does various operations on the application



4. **Registration Page:** This is where new staff is registered including the fingerprint.



5. **Edit/Update Page:** In this page, if there is a change in staff information, it will help edit and update the information.

EDIT AND UPDATE STAFF DETAILS

Enter Staff ID: 100003 SEARCH Date Employed: 16/04/2014

First Name: WERWR Middle Name: WERE Last Name: WERWE

Gender: MALE Address: WER State of Origin: ABIA

Contact No: (889) 8932-8904 Marital Status: SINGLE Nationality: NIGERIAN

Religion: CHRISTIAN Email: werew Re-Email:

Department: Position:

NEXT OF KIN DETAILS:

Name: EWRR Address: WERWR Gender: MALE Relationship: SON Contact No: (080) 8032-8434

EDIT UPDATE BACK

INSERT PASSPORT

6. **Enrolment Page:** This is where the staff's fingerprint is registered.

Fingerprint Enrollment

Prompt: Touch the fingerprint reader again with the same finger.

Status:

1 The fingerprint reader was touched.
The quality of the fingerprint sample is good.
The fingerprint sample was captured.
The fingerprint feature set was created.
The finger was removed from the fingerprint reader.
The fingerprint reader was touched.
The quality of the fingerprint sample is good.
The fingerprint sample was captured.
The fingerprint feature set was created.
The finger was removed from the fingerprint reader.

Fingerprint samples needed: 2 Close

7. **Attendance Page:** This is where staff's thumb print to take their attendance.

SIGN IN

1:56:58 PM 4/7/2016

TIME IN 1:56:48 PM

LATE

Please Enter Your Staff ID

Staff ID: 100014

TIME OUT

Place your finger on the sensor

Name: Uduak Department: COMPUTER SCIENCE

8. Report Generation: This page helps to generate different reports

REPORT REGISTERED STAFF

STAFF ID	First Name	Middle Name	Last Name	Address	Contact Number	Marital Status	Discipline	Position	Gender	Nationality	State/Origin	Religion
100001	Felicia	Ogbonne	Ogbonne	26 Ibebo Street	(080) 7746-7672	SINGLE	COMPUTER SCIENCE	SELECT	MALE	NIGERIAN	OGUN	CHRISTIAN
100002	Saturday	Alkpan	Uduak	25 Ogbeye Close	(070) 31 91 8721	SINGLE	COMPUTER SCIENCE	SELECT	MALE	NIGERIAN	AKWA IBOM	CHRISTIAN
100003	Mary	Abiodun	Abiodun	12 Ibebo Road	(081) 7676-4763	SINGLE	COMPUTER SCIENCE	LECTURER	FEMALE	NIGERIAN	ONDO	CHRISTIAN
100004	Lesley	Gidig	Habesab	13 Ibebo road	(080) 7776-7673	SINGLE	COMPUTER ENGINEERING	PROG	MALE	NIGERIAN	LAGOS	MUSLIM
100005	Pauline	Pauline	Pauline	12 Ibebo road	(080) 7776-7672	MARRIED	COMPUTER SCIENCE	LECTURER	FEMALE	NIGERIAN	IKITI	CHRISTIAN
100006	Jude	Eyo	Solomon	23 Abaka road	(080) 7767-6672	MARRIED	ACCOUNTANCY	ADMINISTRATION OFF	MALE	NIGERIAN	AKWA IBOM	CHRISTIAN
100007	Edem	Awoye	F	13 Ibebo road	(080) 7776-7676	MARRIED	COMPUTER SCIENCE	LECTURER	FEMALE	NIGERIAN	OGUN	CHRISTIAN
100008	USA	Saturday	Alkpan	25 Ogbeye Close	(070) 31 91 8721	SINGLE	COMPUTER SCIENCE	ADMISSION OFFICER	MALE	NIGERIAN	AKWA IBOM	CHRISTIAN
100009	John	M	John	12 Ibebo Close	(080) 6767-6722	MARRIED	COMPUTER SCIENCE	LECTURER	FEMALE	NIGERIAN	OGUN	MUSLIM
100010	Tobi	Mary	John	12 Ibebo	(080) 6676-7961	SINGLE	COMPUTER SCIENCE	LECTURER	MALE	NIGERIAN	LAGOS	CHRISTIAN
100011	Uduak	Saturday	Alkpan	76 Ibebo road	(080) 7767-6767	SINGLE	MECHANICAL ENGINEERING	SECRETARY	MALE	NIGERIAN	ABIA	CHRISTIAN
100012	Saturday	Johnson	Mary	14 Ibebo	(080) 6767-6768	SINGLE	COMPUTER SCIENCE	SELECT	MALE	NIGERIAN	ABIA	CHRISTIAN
100013	Shalom	Johnson	Edem	120 opp Ibebo bank	(081) 1464-1523	SINGLE	COMPUTER SCIENCE	SELECT	FEMALE	NIGERIAN	ABIA	CHRISTIAN
100014	Uduak	Saturday	Alkpan	25 Ogbeye Close	(070) 31 91 8721	SINGLE	COMPUTER SCIENCE	ADMINISTRATION OFF	MALE	NIGERIAN	AKWA IBOM	CHRISTIAN

REPORT ATTENDANCE

ID	StaffID	StaffName	Image	Department	TimeIn	TimeOut	DateClock	Status
1001	100001	Felicia	C:\Users\B\Pictures\p	COMPUTER SCIENCE	6:20:21 AM	6:25:00 AM	9/11/2014	EARLY
1002	100006	USA	C:\Users\B\Pictures\p	COMPUTER SCIENCE	2:03:02 PM	5:05:12 PM	9/11/2014	EARLY
1003	100008	USA	C:\Users\B\Pictures\p	COMPUTER SCIENCE	2:07:25 PM		9/11/2014	LATE
1004	100010	Tobi	C:\Users\B\Pictures\p	COMPUTER SCIENCE	2:43:35 PM		9/11/2014	LATE
1005	100011	Timothy	C:\Users\B\Pictures\p	MECHANICAL ENGINEERING	5:17:23 PM	5:18:19 PM	9/13/2014	LATE
1006	100002	Saturday	C:\Users\B\Pictures\p	COMPUTER SCIENCE	5:18:39 PM	9:08:27 PM	9/21/2014	LATE
1007	100002	Saturday	C:\Users\B\Pictures\p	COMPUTER SCIENCE	9:58:24 PM		9/21/2014	LATE
1008	100003	Mary	C:\Users\B\Pictures\p	COMPUTER SCIENCE	10:08:21 PM		9/21/2014	LATE
1009	100002	Saturday	C:\Users\B\Pictures\p	COMPUTER SCIENCE	11:44:51 AM		9/22/2014	LATE
1010	100012	Precious	C:\Users\B\Pictures\p	COMPUTER SCIENCE	12:58:33 PM	1:52:02 PM	4/7/2016	LATE
1011	100013	Shalom	F:\downloads\C360_20	COMPUTER SCIENCE	1:43:05 PM		4/7/2016	LATE
1012	100002	Saturday	C:\Users\B\Pictures\p	COMPUTER SCIENCE	1:45:17 PM		4/7/2016	LATE
1013	100014	Uduak	C:\Users\B\Pictures\p	COMPUTER SCIENCE	1:56:48 PM	1:57:54 PM	4/7/2016	LATE

VIEW BY TIME AND DATE
Date: 9/11/2014
Time From: 2:17:11 PM
Time To: 2:26:14 PM
VIEW

VIEW BY DATE
FROM: 8/8/2013
TO: 8/8/2013
VIEW

VIEW BY STAFF ID
Enter Staff ID:
Date: 9/11/2014
Date To: 9/11/2014
VIEW

Summary:

Though the field is still in its infancy, many people believe that biometrics will play a critical role in future computers, and especially in electronic commerce. Personal computers of the future might include a fingerprint scanner where you could place your index finger. The computer would analyze your fingerprint to determine who you are and, based on your identity, authorize you different levels of access. Access levels could include the ability to use credit card information to make electronic purchases.

Conclusion:

The Attendance Management System is developed using Visual Basic 6.0 which fully meets the objectives of the system for which it has been developed. The system has reached a steady state where all bugs have been eliminated. The system is operated at a high level of efficiency and all the staff and users associated with the system understand its working and advantages. The system solves the problem it was intended to solve as requirement specification. Finally the system will definitely eliminate the old system of taking attendance by paper if it will be properly operated.

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