Computerization of FRSC (Federal Road Safety Corps) Database for Road Traffic Accidents and Infractions

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ABSTRACT

This project aimed at designing a computerized web-based road traffic accident and infraction database system for the Federal Road Safety Corps (FRSC) which will enable FRSC to get summarized traffic accident and infraction information at various level easily and quickly. The collection, management and dissemination of road traffic accident and infraction related events have represented a serious issue to road safety officers and all stakeholders alike due to the absence of a central repository from which all accident and infraction data can be stored and managed. Where accessible, these data available in the paper-based form and this represents a bottleneck in updating the available data. The purpose of the system is to design a computerized system that will collect, record, disseminate and manage road traffic accident and infraction information for the FRSC. The system is achieved using structured system analysis and design methodology. The software that is used to design the system is Adobe Dreamweaver and XAMPP local server, the programming language that was used comprise of Hyper Text Mark-up Language (HTML), JavaScript, Cascading Style Sheet (CSS) and Hypertext Pre-Processor (PHP). The website was tested using on a local web server "XAMPP" and Structured Query Language is used for the Database design. The system has different subsystem to meet its core functionalities. An administration subsystem authenticates administrators and road safety officers to login to the system and executes their defined task. The accident and infraction report subsystem allow the officer to enter and submit road traffic accident and infraction details using a simple to use web-based interface.

Keywords: accident; database; computerization; FRSC; traffic

INTRODUCTION

Around the world road traffic injuries are a major public health challenges that requires concerted efforts for effective and sustained prevention. An estimated 1.2million people are killed in road crashes every year and as many as 50million suffer injuries. The world health organization believes that these figures could increase by more than half over the next 20years unless there is a firm commitment to road safety and accident prevention, especially in Nigeria, most adults will know of someone who has been killed or injured in a road traffic accident. It is a dead fact that many of these accidents and their consequences would have been avoided (Williams, 2007; Ibrahim and Falola, 2021).

Road Traffic Accidents is when a vehicle or motorcycle collide with either a second vehicle or hits an individual, but Accident is far more than that, road accident refers to any accident involving at least one road vehicle, occurring on a road open to public circulation, and in which at least one person is injured or killed (Ibrahim, 2020; Ibrahim and Falola, 2021). Intentional acts (murder, suicide) and natural disasters are excluded (National Institute of Statistics and Economic Studies, 2016). Road Traffic Accidents claim more than 1.2 million lives each year and have a huge impact on health and development they are among the major causes of deaths in young adults and children between the ages of 15 – 29 years (World Health Organization, 2015; Ibrahim and Falola, 2021).

Road safety has become a major problem during the last decades in most of the developed countries all over the world. Traffic accidents have vast social and economic impacts every year, and public authorities seem sometimes unable to tackle effectively this problem. In other cases, things are improving slowly but consistently due to the systematic, continuous and combined efforts of many organizations, public and private, involved in the fight for safer roads.

Therefore, the Computerized Road Traffic Accident and Infraction Database System will help to keep records of all traffic accident and infraction committed by road users and also maintain the databases of the commission (FRSC).

LITERATURE REVIEW
Information System
Information System is the study of systems with a specific reference to information and the complementary networks of hardware and software that people and organizations use to collect, filter, process create and also distribute data, an emphasis is placed on an information system having a definite boundary, users, processors, storage, inputs, outputs and aforementioned communication networks (Marc, 1995; Ibrahim, 2019).

Information systems found in the 1980's textbooks were a pyramid of systems that reflected the hierarchy of the organization, although the pyramid model remains useful since it was formulated a lot of technologies have been developed and new categories of information systems have emerged.

Example of the new developed Information systems are:
  i.   Expert Systems
  ii.   Enterprise Resource Planning
  iii. Geographic Information Systems (GIS)

Information System Development and application of Information Technology in organizations has a series of processes to develop and use an IS, depending on the choice of the developer the use of software engineering techniques is employed, techniques such as the Waterfall model, V- Shaped Model, Iterative Model, Spiral Model, Big Bang Model and Agile Model. Each of these techniques has its own strengths and weaknesses and depends on the type of Information System developed the model of choice can play a big role (Marc, 2014; Ibrahim and Adamu, 2020).

Database Management System
A database is defined as a usually large collection of data organized especially for rapid search and retrieval. A database refers to a set of related data and the way it is organized access to a database is done by the use of a Database Management System (DBMS). Databases are used to support internal operations of organizations (Ibrahim and Adamu, 2020) and to underpin online interactions with customer and suppliers.

There are four main types of DBMS and a database model determines the way data is stored in them. They are namely:
- Relational Database Management System
- Flat File Based Database Management Systems
- Hierarchical Database Management System (Ibrahim and Adamu, 2020)
- Network Database Management System
- Object-Oriented Database Management System.

A database management system or DBMS is essentially a computerized data keeping (IBM, 1990). Users of the system are given facilities to perform several kinds of operations on such a system for either manipulating data in the database or the management of the database structure itself. A Database Management System (DBMS) is a single or set of computer programs that are responsible for creating, editing, deleting and generally maintaining a database or collection of records (Obbayi, 2017).

MATERIALS AND METHODS
Introduction
The materials and methods adopted for this project work towards achieving the set objectives is the use of object-oriented methodology. This entails the input and output specifications for the design and implementation of an information system, use case activity and class diagram as well as the system requirements.

Methods of Data Collection
The method of data collection used in this project work are Personal interview, Observations and Internet search.

Systems modeling
System modeling is a theoretical description that can help you understand how the system or process works, or how it might work, by the use of symbols to represent on object. There are many diagrams in system modeling, but three diagrams will be used in this project (use case diagram, class diagram, and activity diagram).

Output Design
This declares and show the result obtained from the input specified. The output product by the automated system depends on the input. Below is the output specification.

System Requirements
System requirement is a combination of hardware and software components that makes work to be carried out. The system requirement for this research work is subdivided into Hardware and Software requirements.

Hardware Requirements
Hardware is the computer equipment and devices that are involved in the function of a computer system together with the software components. Hardware are the physical components of the computer system assembled together to interact with the software in order to form a composite system.
The minimum hardware requirements from the test running are:
  i.   CPU Core i3 processor
  ii.   100MB available disks space
  iii.   RAM (1 GB)
  iv.   Keyboard
  v.   Mouse
  vi.   14'SVGA Colored Monitor
  vii.   U.P.S 650va (uninterruptible power supply)
  viii. Hard Disk Drive (HDD) of 60GB

Software Requirements
Software is set of program modules needed to control and co-ordinate the activities of the hardware device of the computer system. The following are software's required for the system to function:
a. Operating System (O/S) – Windows XP or higher version
b. MYSQL version 6 or higher
c. XAMPP

Choice of Programming Language
This project is designed using PHP as the programming language for the front-end while MySQL is used for the design of the database (back-end). PHP is the web development language written by and for web developers. PHP stands for Hypertext Pre-processor. It is a robust, server-side, open source scripting language that is extremely flexible and very easy to learn.

RESULTS AND DISCUSSIONS
System Testing and Evaluation
In order to properly evaluate the designed system, the application should be installed in an offline system. Each of the units of the application can run independently but some of the units depend on the data supplied by the other. In such case, the needed operations or fill data would have to be entered first before usage by the segments that need them.

System Conversion Plan
The changeover plan is the process whereby the new system is taken to usage. However, the type of changeover employ in this research is piecemeal changeover which means the system will be taken one piece at a time, gradually will be run and tested for a period of three (3) to six (6) months; this will enable us to identify any errors that may be associated with the new system and also to ensure that the system meet its requirement.

System Installation
The various operations required for the successful installation of the system and databases as well as its implementation are explained.

System and Database Installation

After the system has been tested for some period, and found to be working smoothly as expected, the system will be ready for Installation and Implementation. For the new system to be install successful, the following are needed:

Computer systems require for installing the new system.
- Minimum of Windows XP or higher version OS.
- XAMPP Control Panel.

Program Sample Output

Installing the Program Folder/Files
- Open the directory containing the program file "accident"
- Copy the entire folder to the C/xampp/htdocs/
- Close
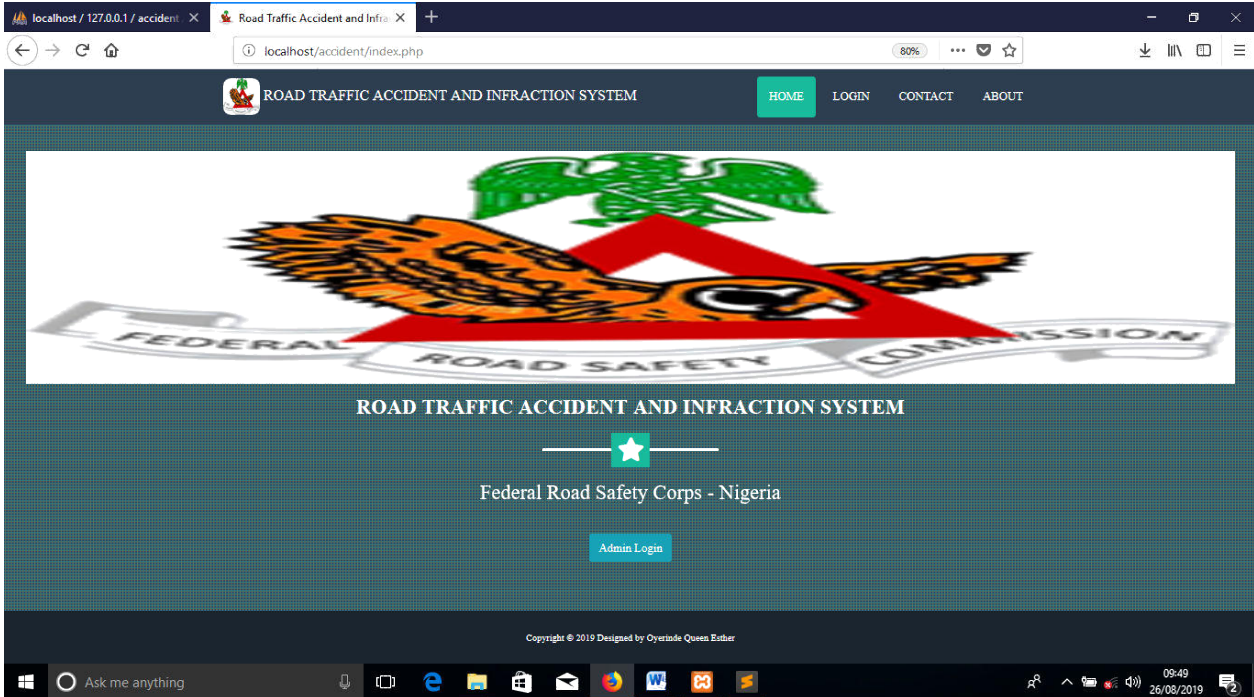
FIGURE 1: home page.

Running the Software System
- Start XAMPP Control Panel
- Open a browser and type localhost/accident
- The computerized systems home page will automatically be displayed
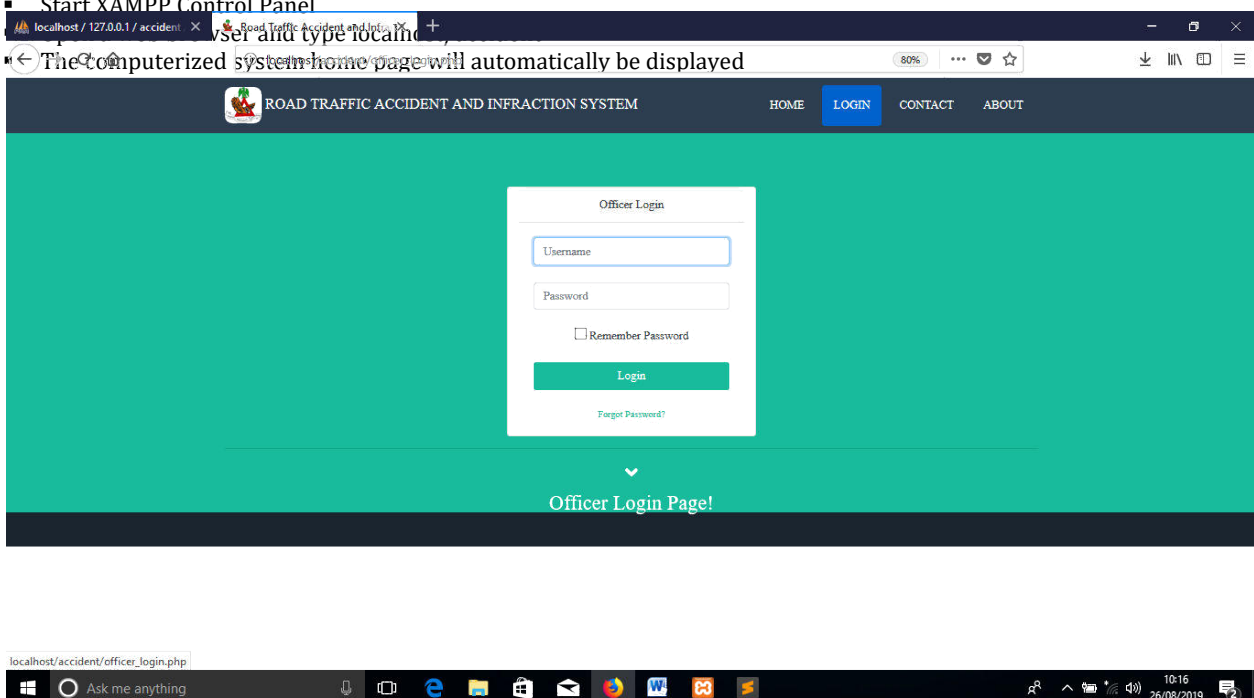
FIGURE 2: Officer Login Page.
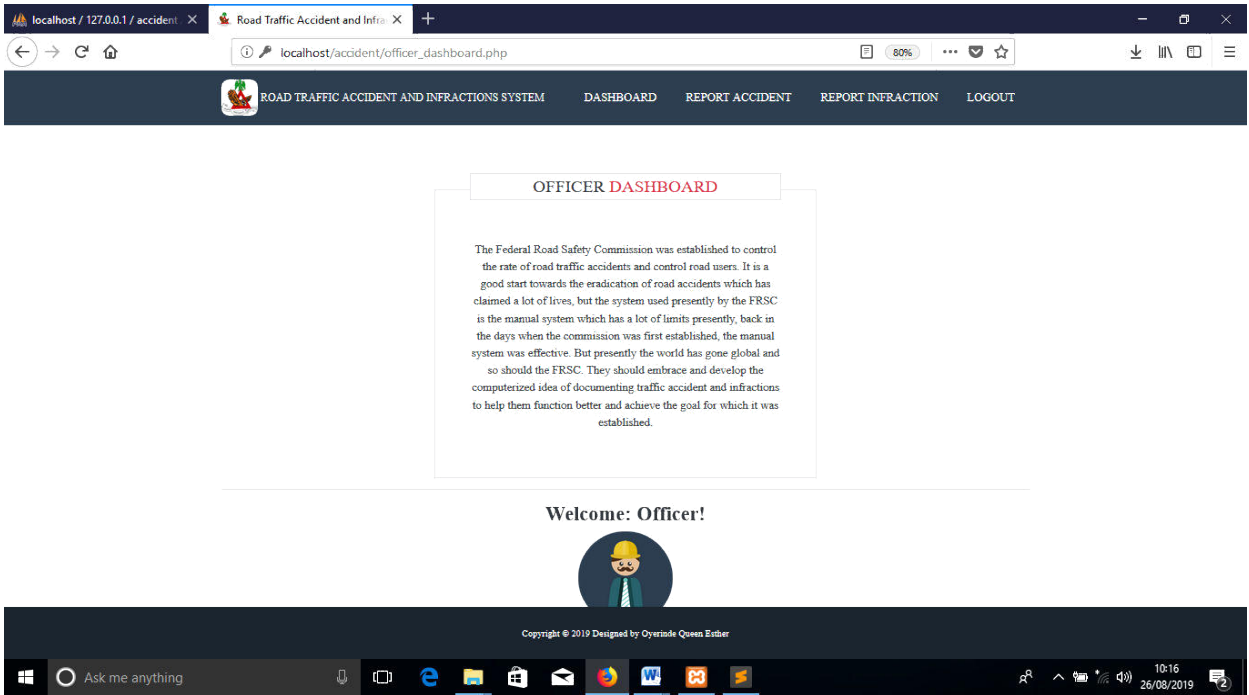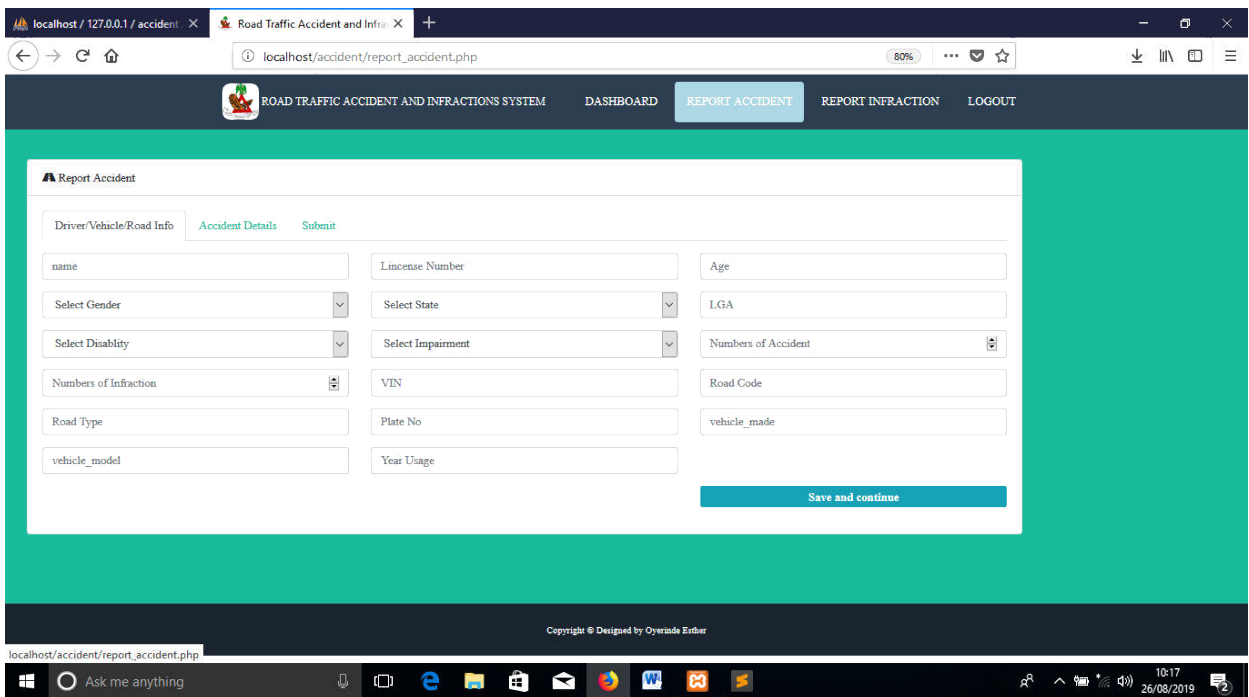
FIGURE 3: Officer Dashboard.

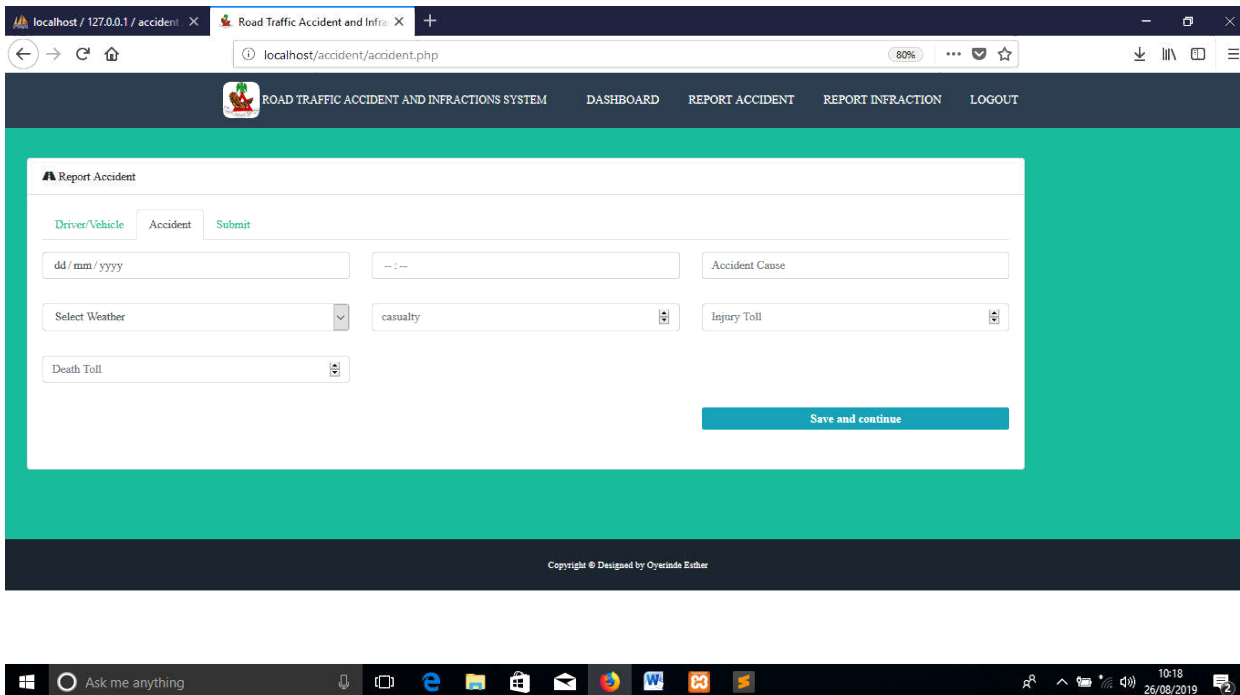**FIGURE 4:** Vehicle/Road/Driver Registration Page.
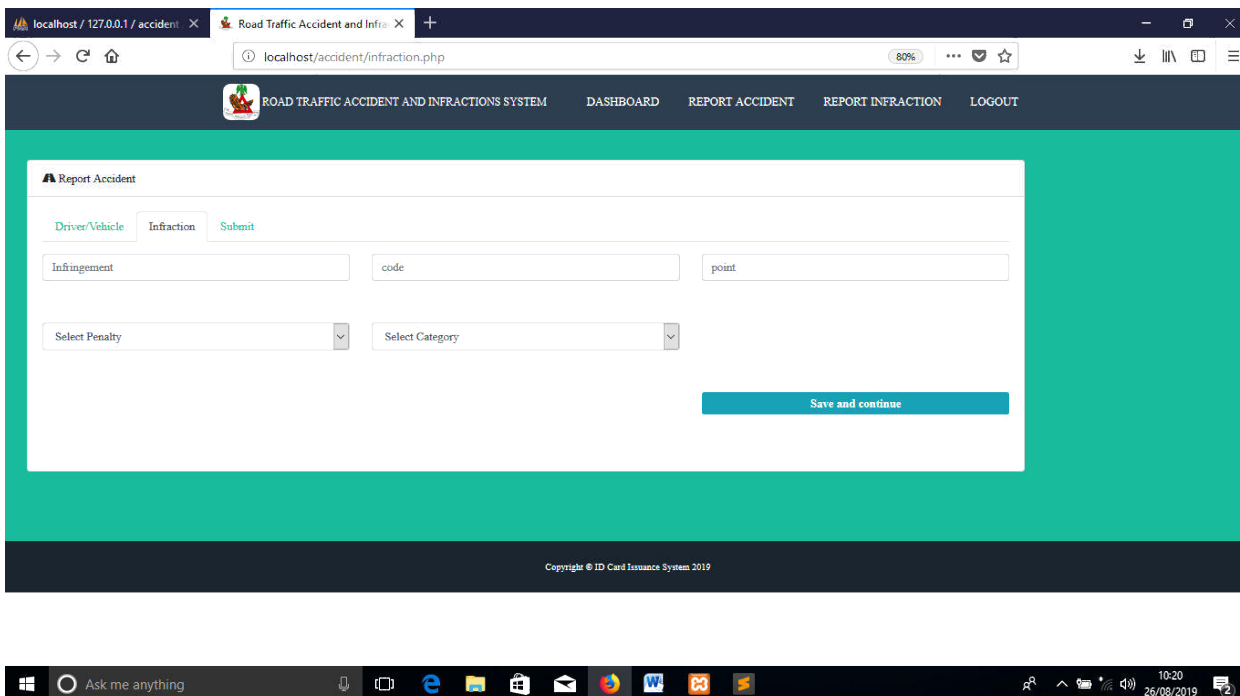
FIGURE 5: Accident Report Page.
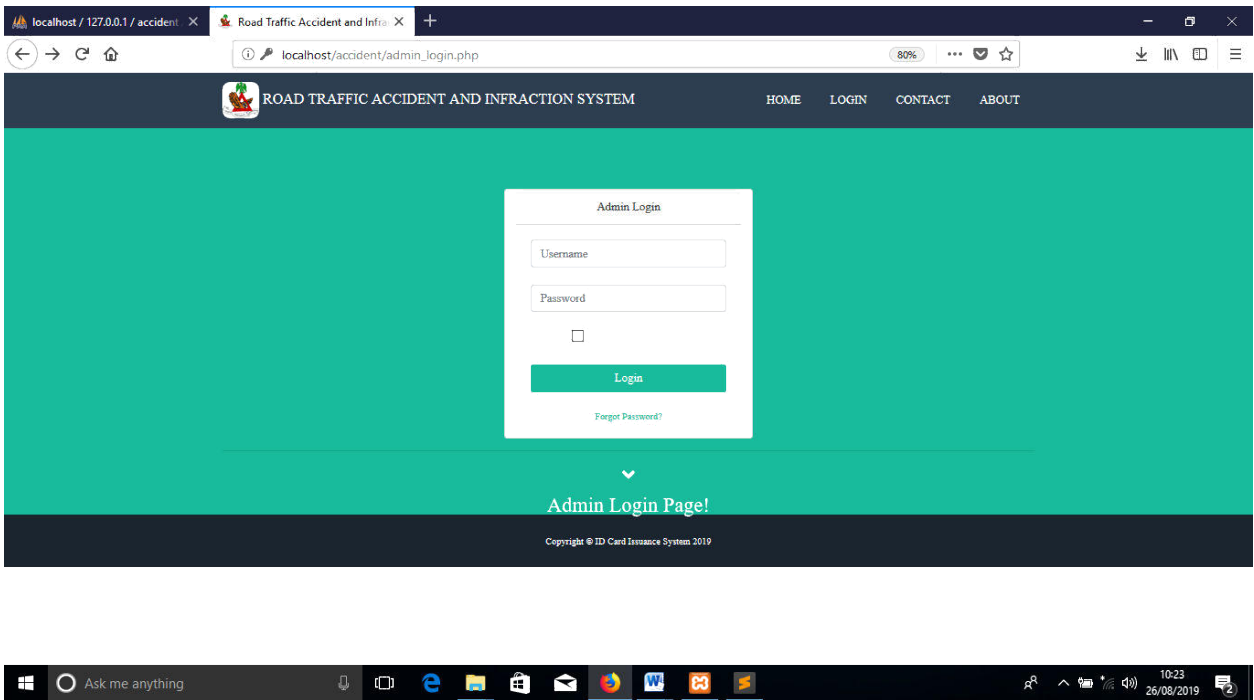

FIGURE 6: Infraction Report Page.
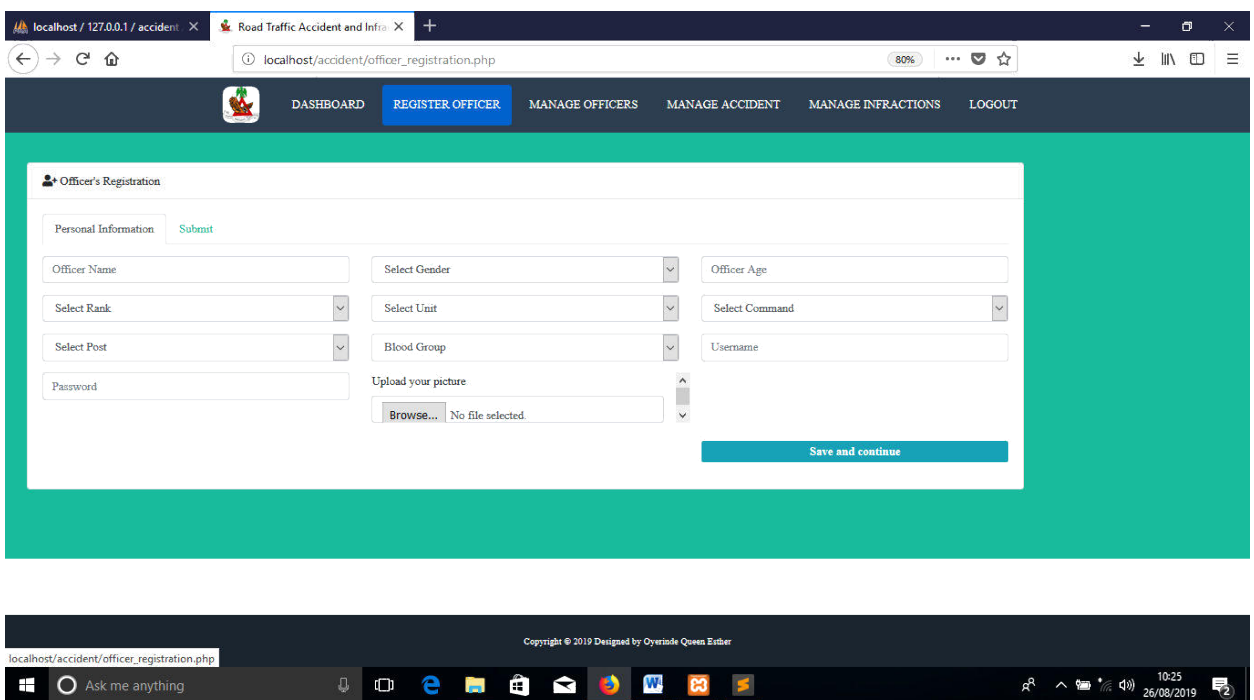
FIGURE 7: Admin Login Page.

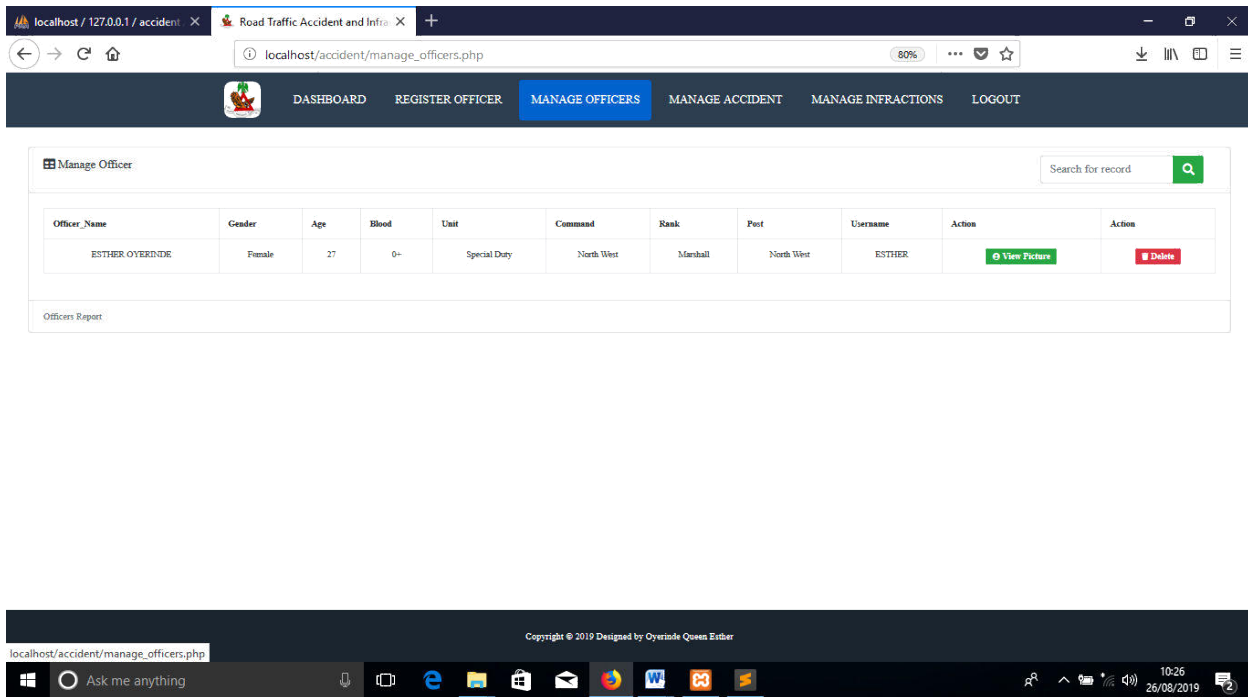**FIGURE 8:** Officer Registration Page.

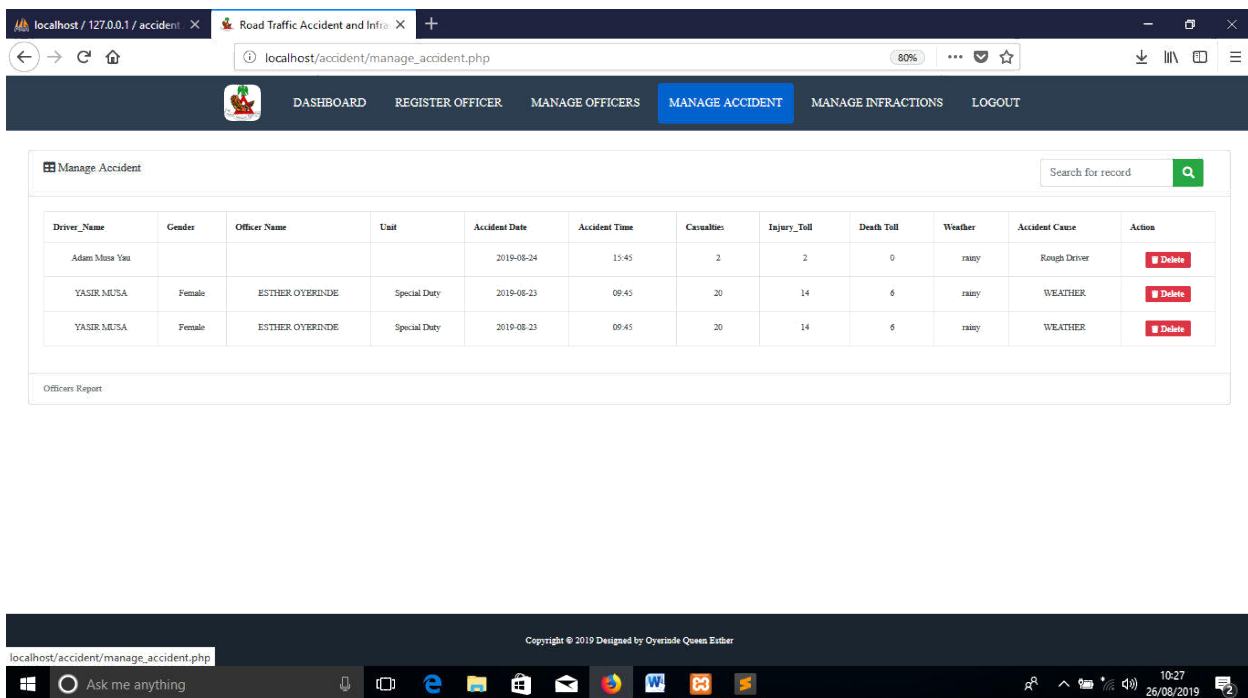**FIGURE 9:** Manage Officer Page.
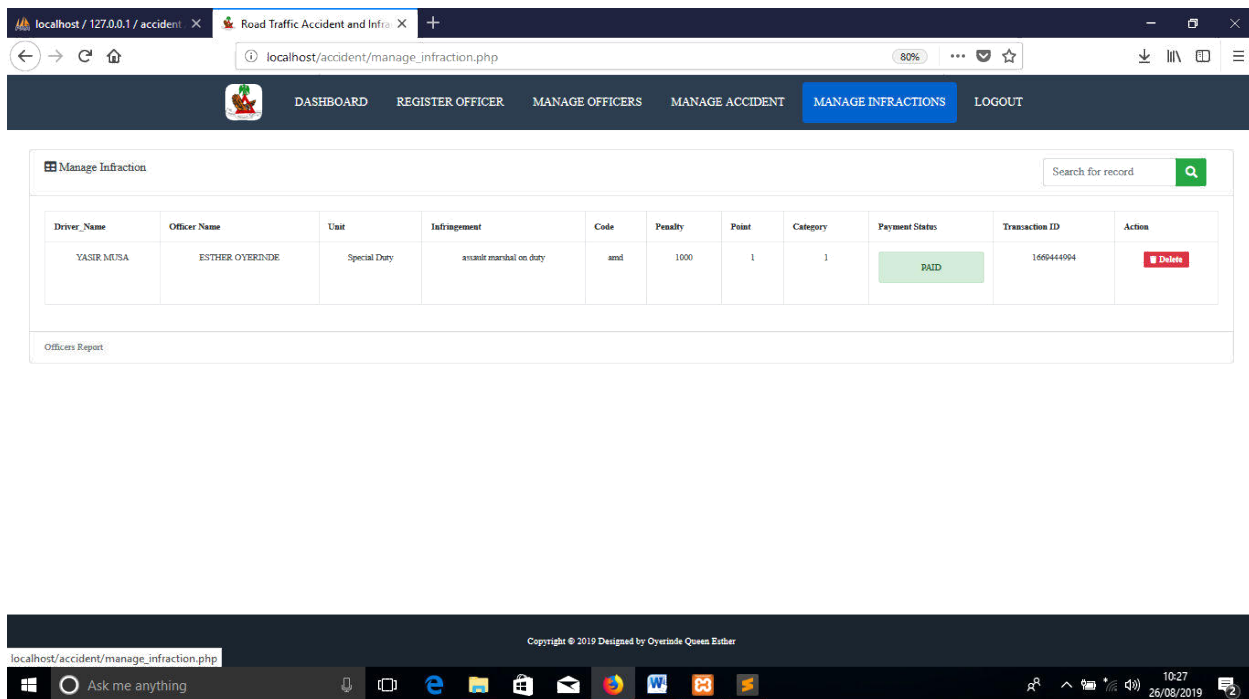

FIGURE 10: Manage Accident Page.

FIGURE 11: Manage Infractions Page.

SUMMARY, CONCLUSION AND RECOMMENDATIONS
Summary
Computerized Road Traffic Accident and Infractions Documentation system is designed to overcome the problems encountered with the existing system (i.e manual) such as prone to attack, data redundancy, time wasted in searching for records, poor security and protection, misplacing and mismanaging of files. The new system is designed in such a way that records about each traffic offender are stored in a database for easy retrieval of data. The new system also helps the Federal Road Safety Commission to have an organized traffic accident and infractions documentation system to eradicate the use of the manual system.

Conclusion
The Federal Road Safety Commission was established to control the rate of road traffic accidents and control road users. It is a good start towards the eradication of road accidents which has claimed a lot of lives, but the system used presently by the FRSC is the manual system which has a lot of limits presently, back in the days when the commission was first established, the manual system was effective. But presently the world has gone global and so should the FRSC. They should embrace and develop the computerized idea of documenting traffic accident and infractions to help them function better and achieve the goal for which it was established.

Recommendations
The following are the recommendation required in order to effectively use the new design are:
i.   The hardware and software requirement should be as specified.
ii. Staff should have basic knowledge of computer operation, the Federal Government should budget funds for adequate training of all personnel and the staff of Commission should be paid well in order for them to work effectively and yield maximum results.
iii. The Federal Road Safety on their own part should employ well educated graduates with the right discipline and qualifications to occupy right positions to function effectively and improve their efforts to serve the nation and mankind better.

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