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Design and Implementation of Mobile Information System for Federal Road Safety Corps (FRSC) of Nigeria

Olatunde Akanbi* and Omolayo Abegunde

Department of Computer Science and Engineering, Obafemi Awolowo University, Ile-Ife, Osun, Nigeria

Abstract

With a daily increase in the use of mobile devices in the 21st century, handheld devices are fast reaching the unreached and information is now easily disseminated. Nigeria as a developing nation in the western Africa needs to be all information technology compliant. Far from this, vehicles have been registered manually. This mobile information system is designed to aid the every member of the Nigeria community in building an information network with the Federal Road Safety Corps (FRSC). Motorists, drivers and others who had registered their vehicles manually would be able to register their vehicles number plates and report accident victims to the Corps with ease from their mobile devices. This work focuses mainly on the vehicle registration, issuing number plates and information dissemination to the Federal Road Safety Corps, Nigeria.

Keywords: Mobile Information system • Federal Road Safety Corps (FRSC) • Number plates

Introduction

Over the years, Nigeria has grown to join the league of developing nations. Sundry arms of the government have been touched and transformed through the evolving hands of information technology [1]. Nigeria consists of 36 densely populated states with the Federal Capital Territory Abuja. Many researchers had focused on languages, games, transportation, food, communication etc. But, researches that are based on improving the government sectors such as the Federal Road Safety Corps, NAFDAC, military and others have been scarce. A syllabicate for Yoruba language, language digital text automatic restoration system were developed to improve on the language sector of Nigeria [2,3]. To aid in the medicals, an online monitoring system was designed for hospitals [4].

The Federal Road Safety Corps of Nigeria has been left out over the years from the refining flames of technology. The Corps has sundry responsibilities such as enforcing the regulation on road traffic laws as outlined in the Nigeria constitution, providing prompt attention and care to victims of road traffic crashes, looking towards the efficient use of the highways by motorists and issuing of number plates and the drivers' licenses [5]. Although the scheme has aimed towards excellence and improved technology, it has met with limitations due to its multi-facet operations and insufficient researchers. This research is therefore aimed at improving on the existing manual registration, operations and issuing of number plates. The design of the mobile information system will serve as a nexus between the community and the corps. Further works are suggested at the conclusion.

General Analysis and Methodology

A mobile system is simple system designed and implemented with the aim of supplying needed information to end users via mobile devices and thereby tends to resolve the challenge of communication between the parties involved. Researchers expounded on the field of Information Systems (IS) with its concern for interaction between social and technological upturns [6-9]. There have been designs of mobile applications that focused on the arrangement of short-term events [10]. Others worked on application designs for managing schedules on calendars or planners [11]. Another work on mobile systems was made to maximize mobile application features that utilize Short Message Service (SMS) to convey highlighted information to users [12]. Research on the development of mobile applications has also been carried out in developing useful applications for Personal Information Management (PIM) [13]. Information had been accessible only through office computers in some seemingly upgraded firms. Mobile application as an analytical tool could be useful in assessing the needs of a user [14]. But, the development of mobile information systems for governmental organizations has been left unsearched. Most of the research works are not firm-specific. A typical example is the Federal Road Safety Corps, Nigeria.

The Federal Road Safety Corps (FRSC) of Nigeria is a popular sector in Nigeria as a country. The FRSC could be dated to its formation in 1974; then called NRSC (National Road Safety Commission). But, the name FRSC (Federal Road Safety Commission) was finally birthed on 18th February, 1988. Besides, a remarkable transformation took place in 2007 when it was changed from a Commission to Corps. Before this, it was merged with the Nigeria police in 1999 but was demerged in 2003. It finally became an establishment with an Act under the Nigerian constitution in 2007. Professor Wole Soyinka was the first chairman in

***Address for Correspondence:** Olatunde Akanbi, Researcher, Department of Computer Science and Engineering, Obafemi Awolowo University, Ilelfe, Osun, Nigeria, Tel: 2348062298572; E-mail: akanbiolatudedavid@yahoo.com*

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1988 when its name was changed from NRSC to FRSC. Accidents are bound to happen and the corps must ensure victims are treated and vehicles monitored. The vehicle registration plate therefore came into existence as a system of registration for official purposes and also as a way of raising fund for road development and maintenance [15].

Considering the purpose of this work on issuing number plates and linking the operation of FRSC, it is expedient to understand the mode of operation of the corps on number plates and its evolution.

Issuing number plates in Nigeria

One of the top leaders of FRSC, Omdiji A, in a workshop on "FRSC: Transforming into World Class Organization" stressed that the corps rests on the bridge of information. He further stated some major problems associated with FRSC were in issuing number plates: faked number plates aid criminal activities which may be cumbersome to track by the security personnel, fake number plates production by uncensored and uncultured vendors, proliferation of the country with number plates outside the national coding sequence, no availability of database on vehicle registered with the corps and lack of available central verification facility [5]. Motorists and drivers cannot endure the stress of the manual number plate registration. This will cost them the processing fee, additional transportation expenses to the state capital or the registration center and prolonged queuing process as a result of poor attendance and crowd control.

Since information systems are now accessible and affordable through mobile devices, it is time we have a paradigm shift from the stress-filled manual processes to the mobile e-platform. This is therefore a problem solving mechanism to utilize applications that will enhance safety and ease on such gadgets with the minimum internet connectivity provided by mobile communication companies in Nigeria.

A general over-view of number plates

A number plate is a flat metallic, ceramic or plastic attached to a motor vehicle for official identification purposes. The number must be a unique reference number/ alphanumeric code or index as taken from the national database (FRSC, as applicable to Nigeria). Number plates have three basic standards as used worldwide. There are 12 by 6 inches (300 mm by 150 mm), 20.5 by 4.5 inches (520 mm by either 110 or 120 mm) and 14.5 by 5.5 inches (372 mm by 135 mm). All number plates are expected to be attached (screwed or glued) to both the front and rear of a vehicle, except in motorcycles, that has only the rear attachments. These number plates on registration are linked to vital information of the vehicle such as the vehicle type, purpose of usage, make, vehicle identification number called chassis, type of fuel used, name and address of the owner or user of vehicle, color, model, engine size etc. This information link would provide recipes for the road vehicle database. It could also be used in association with road infrastructure data for road transport organization and planning. Number plates have evolved over the years with different series. Type A is for the private vehicles, as shown below in Figure 1.

After this series, the Federal Road Safety of Nigeria started the newest Number plate series in 2014. Here is an example:

Some symbols could be seen in Figure 2. There are basically six identifications on the number plate:

- The national flag symbol at the top left hand (Green, White and Green).
- The Issuing state in Nigeria (Lagos was the issuing state in Figure 2. There are 36 states in Nigeria and the Federal Capital Territory, Abuja)
- The Slogan of the issuing state (Lagos is center of excellence)
- The Symbol of the Issuing Local Government (KJA is Ikeja in Lagos. Nigeria has 774 local governments)
- A 3-digit Number for the user (193 as in Figure 2)
- A 2-letter Code (AA as in Figure 2)

The type B is for the commercial, government, dealers, diplomatic vehicles, special number vehicles, military, armed forces etc. This series does not have a specific coding system. The coding is based on the type of organization using it. Here are 1992 series (Figure 3).

Number plates violation in Nigeria

Obtaining number plates are not free. The fees attached serves as a source of revenue to the state or road fund where they existed. Driving a vehicle or riding a motorcycle without a number plate in Nigeria is an offence punishable under the National Road Traffic Regulations (NRTR) [16]. The penalties for number plate violation (NPV) in terms of point and fines are 3 points and 3,000 naira respectively.

Number plate violations (NPV) rise on yearly basis. As shown in Table 1, from the FRSC, Abuja, it could be seen that about 38 thousand number plate violators were apprehended in 1995. This forms about 6.35per cent of the total offences recorded by the FRSC for the year. Astronomically, the figure rose to about 258 thousand in 1998. Cumulatively, a total of about 1.56 million number plates violators were apprehended between 1995 and 2005. This is on the

Figure 1. Private vehicles number plate type A.

Figure 2. Number plate series 2 in Nigeria.

Figure 3. 1992 series number plate types for commercial, dealers.

high side because that represents 14.92 per cent of the total traffic violations for the specified period.

Table 2 clearly reveals the offense sheet of the FRSC. There are 44 possible offences with different codes, fines and points. Our target is the Number Plate Violation (NPV). It is the number 35 of the road offences with three points. There are other three-point offences on

Table 1. Number plate violation (NPV) in Nigeria (1995-2005) (Source: FRSC, Abuja.).

Year	Violation (NPV)	% of NPV in total traffic violation
1995	38, 133	6.35
1196	76,190	9.29
1997	220,400	23.96
1998	258,039	24.82
1999	182, 400	15.16
2000	152, 019	11.99
2001	124, 830	11.50
2002	218, 500	20.89
2003	165, 609	17.32
2004	109, 630	13.09
2005	1, 559, 035	14.92

Table 2. FRSC offense sheet.

S. No	Tick infringement	Code	Points	Penalty
1	Assaulting Marshal on duty	AMD	10	10, 000
2	Attempting to corrupt Marshal on duty	ACS	10	10, 000
3	Caution sign violation	CSV	3	3, 000
4	Construction area speed limit violation	CAV	3	3, 000
5	Dangerous driving	DGD	10	50,000
6	Do not move violation	DNM	2	2,000
7	Driver's license violation	DLV	10	10, 000
8	Driving Under Alcohol/Drug Influence	DUI	5	5, 000
9	Driving with worn-out tire	TYV	3	3, 000
10	Driving with expired/without spare tire	EWT	2	2, 000
11	Excessive smoke Emission	ESE	5	5, 000
12	Failure to cover unstable materials	FCM	5	5,000
13	Failure to fix red flag on projected load	FFF	3	3, 000
14	Failure to move over	FMO	3	3, 000
15	Failure to report road crash	FRC	10	20, 000
16	Fire extinguisher violation	FEV	3	3, 000
17	Inadequate construction warning sign	ICW	-	50, 000
18	Light/sign violation	LSV	2	2, 000
19	Medical personnel/hospital rejection of road crash victim	RCV	-	50, 000
20	Operating mechanically deficient vehicle	MDV	5	5, 000
21	Obstructing marshal on duty	OMD	3	3, 000
22	Operating a vehicle with forged documents	OFD	10	20, 000
23	Overloading	OVL	10	10, 000
24	Passengers' manifest violation	PMV	10	10, 000
25	Riding motorcycle without helmet	RMH	2	2, 000
26	Road obstruction	ROB	5	5, 000
27	Road marking violation	RMV	5	5, 000
28	Route violation	RTV	10	10, 000
29	Seat belt use violation	SUV	5	5, 000
30	Speed limit violation	SLV	5	5, 000
31	Unauthorized removal/tampering with road sign	UTA	5	5, 000
32	Under aged driving/riding	UDR	-	10, 000
33	Use of phone while driving	UPD	4	4, 000
34	Vehicle license violation	VLV	3	3, 000
35*	Number plate violation	NPV	3	3, 000
36	Vehicle windshield violation	VWV	3	3, 000
37	Wrongful overtaking	WOV	3	3, 000
38	Projected load in excess of prescribed limit	PLE	3	3, 000
39	Vehicle mirror violation	VMV	3	3, 000
40	Learner driving regulation violation	LDV	10	3, 000

41	Child restraint violation	CRV	6	3, 000
42	Child sitting position violation	CPV	6	3,000
43	Driving right-hand steering vehicle	DRV	10	3, 000
44	Other offences/violations	OFV	2	3, 000

the table. This includes CSV, CAV, FFF, FMO etc. NPV is one of the commonest road offences. These information and data tables exclude those apprehended by police. Some of the violators might have been left off the hook without booking due to bribery. The coverage of FRSC is limited. No one can be apprehended in the evening, early morning or night.

The above reasons make the data by the FRSC a tip of the ice berg compared to what really occur through the number plate violation. Although the breakdown of the number plate violations is given, violations couldn't be traced by vehicle types due to non-availability and inaccessibility of data by the corps. The vast numbers of numberless motorcycles on the minor roads tend to suggest that motorcycles constitute a greater proportion of violations.

Obtaining number plate

The manual approach to obtaining number plate in Nigeria seems uneasy. The applicant (driver or owner) will be ordered to fill a prescribed national motor vehicle administration form where the details of the vehicle such as the make, model, type, color, chassis number, engine number, number of cylinder, engine capacity, purpose etc. are manually recorded with pen. Besides, the conditions of the vehicle (new or old), owner's information (name, address, telephone etc.) are equally filled. Once a number is allocated, it becomes permanent for the vehicle. The owner/driver of the vehicle travels to the state licensing center where the registration is made and a particular fee is paid (depending on the type of number plate) as obtaining and processing fee.

This registration sometimes takes as long as one or two week(s) due to the obvious limitations of the manual registration. Often times, the owners were told to travel back to their places and check back at convenience for the final processing module. This process has been a grave discouragement to sundry vehicle owners. Hence, they normally resolve into getting the counterfeit from fake vendors or evading the FRSC officials. Attempting to avoid arrest has caused accidents of varied fatality. Some leading to loss body parts and the other, death. Despite this high percentage of NPV in road traffic violations, the evaders could be more than the recorded.

The Mobile System for the FRSC

This mobile system would be accessible on mobile devices with the mobile data plans from different network providers in Nigeria. Besides, the Federal Road Safety Corps will have access to the data as stored in the database on every vehicle or motorcycle registered. The system on submission automatically saves the user information and the corps awaits the user to pick the number plate at the office. It will enhance an easy usability to a level of semi-literate vehicle/ motorcycle user in the country.

Number plate registration input analysis

The data required to be entered are of the vehicle and the owner. The vehicle information includes: Vehicle category, Vehicle sub-category, Old plate number, Police number, Make, Vehicle model, Vehicle type/group, Color, Chassis number, Engine number, Engine capacity, Fuel type (e.g. Diesel), Capacity in liters (e.g. 50), Year of manufacture, Odometer (Mileage). And, the owner's information includes: Identification type, Identification number, Names, Address, City, State, Local Government, Mobile number, fixed line, E-mail address, Fax.

System architecture

This is made of the application user and engine (Figure 4). This is shown below:

Application user: The application users are the vehicle owners. In Nigeria, it is expected that all vehicles (motorcycles, motorcars etc.) must register for their vehicle number plates before plying the roads.

- The user is expected to possess a mobile device (Android enabled), which is the tool on which the application is installed.
- The user must be a literate/ semi-literate, so as to readily use the application without difficulty.

Application engine: The application engine encompasses the FRSC database as well as the mobile device on which the system will run. The application contains both the user visible (mobile device) and user invisible (database) of the system.

Mobile device: This is the mobile device on which the application will be installed. It has a direct link to the user as there must be communication between the user and these devices. Mobile devices vary from each other. Since the project aims at mobile information systems, mobile devices such as phones, tabs etc. are under this category. A minimum of 1GB RAM android device of 4.0 platforms (API 19) is needed.

Database: The database envelopes the data store and the user information needed to store the data provided. It is a very vital as its misrepresentation could be dangerous. It also contains a high level of privacy as a user cannot retrieve another user's information. SQLITE is the mobile database used for this project.

- **User information:** The owner/user of the vehicle provides all required information pertaining to the vehicle. He also supplies personal information. These are kept in record and used to generate the number plate code.
- **Data store:** This is solely owned and controlled by the FRSC. It contains the bank of information from all registered users, it is stored kept save with high level of security and privacy.

Module representation

As represented in the system module representation below in Figure 5, the system requests for the basic information of the owner either by choosing or by entering it. The module representation is a complete bit-wise display of what the system entails. The system is made up of FIVE pages. This entails the system information, vehicle registration information, owner's information, certification and submission/reset

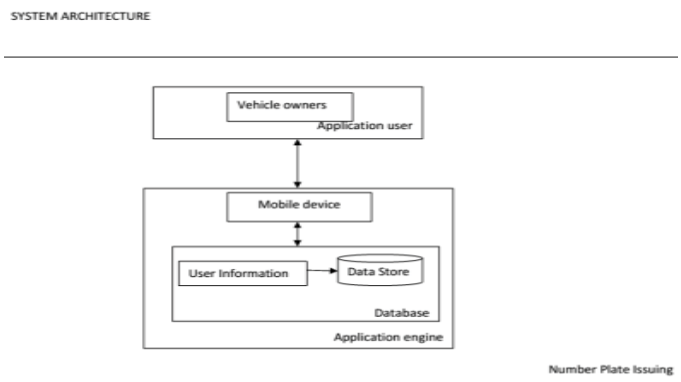

Figure 4. The basic architecture.

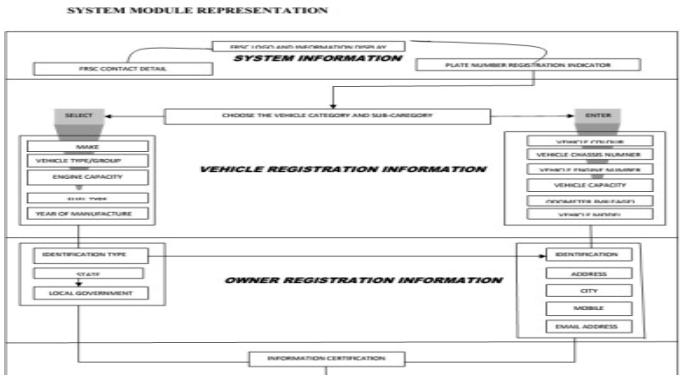

Figure 5. Module representation.

System information: The system information is the general information of what we can see on the system. This consists of the: The System Flash screen, navigation page, FRSC contact detail, About FRSC page, help page, Database/register page, Number plate registration.

Vehicle registration information: This consists of TWO sections. One is to enter the detail while the other is to choose.

- **Select mode:** Here, selection is made from the already provided list stored in database. This include:
  - **Vehicle category and sub category:** Commercial or private
  - **Make:** Is the vehicle Toyota, Honda…?
  - **Vehicle type/group:** Is the vehicle motorcycle, cars, Lorries…?
  - **Engine capacity:** Is the engine capacity 2.0 liter, 3.0 liters…?
  - **Fuel type:** Diesel or petrol engine
  - **Year of manufacture:** Year 2003, 2005 etc.
- **Entering mode:** Here, the user enters the information needed. This include:
  - **Vehicle color:** Black, grey etc.
  - **Vehicle chassis number:** Special vehicle identification number from the manufacture
  - **Vehicle engine number:** Special engine number
  - **Vehicle capacity:** The number of cylinders in the vehicle
  - **Odometer (mileage):** How much in km the vehicle has travelled.
  - **Vehicle model:** Luxury edition, extra luxury etc.

Owner's registration information: Like the vehicle registration information, it contains TWO sections; to select and enter.

- **Select mode:** Here, selection is made from the already provided list stored in database. This include:
  - **Identification Type:** Mr., Mrs., Miss etc.
  - **State:** state determines the supplied local government. This is one of the most vital information needed for the design of the plate number. The first information on the plate number is the state and its title. For example; Lagos- center for excellence, Ondo- Sunshine state, Ekiti- Land of Honor, Benue- Food basket of the nation and so on.
  - **Local government:** This is picked as the product of the chosen state. This is so vital as the state of origin discussed above. There are about 774 local government areas in Nigeria. Each of this local government has distinct symbolic representation. For example KJA- Ikeja, SSE- Ise/Orun, ADK- Ado-Ekiti. It should be noted that the local government area will only reflect under the right state of origin picked. As above, Ikeja is a local government in Lagos state and will not be found in Kano State.
- **Entering mode:** Here, the user enters the information needed. This includes:
  - **Identification name:** This is stored in the database of the FRSC with the number plates to be allotted to the bearer. Since the number plate display doesn't contain the name of the bearer, inputting the name is for both allocation and reference purposes.
  - **Address:** Like the name of the owner, the address of the owner is needed for reference or future purposes. This address must be the address of the user of the vehicle or motorcycle. In case of any report of theft or smuggling, the owner can easily be located.
  - **City:** The place of residence
  - **Mobile number:** In this era of information technology, relevant information to be disseminated is done via the SMS (short message service) or phone calls. The mobile number is needed in future case of emergencies.
  - **E-mail address:** Enter your email.

Certification: This is an agreement given by the user that all information provided is correct and liable to penalty if false. After this, the user reviews all the input information and also monitored by the text watcher.

Submission/Reset: In this part, the submission is made and automatically and stored up in the database. The information could also be reset to erase all wrong information. Payment could be made later by the user following the help page.

System Design and Implementation

The system design is a systematic and rigorous approach to

design the demanded system. This project was designed using the android studio. It incorporates a lot of functions with the ADT (android development tools). It is easy to use and it is user friendly. The incorporation of SQLITE for the mobile database is also essential. SQLITE is mobile database software approach that doesn't require any internet facility. The software runs on android-based systems (especially handheld devices) with a minimum RAM of 1GB and android 4.0 Ice-cream Sandwich. The system is divided into different sections based on the design and the implementation.

The flash screen

The Figure 6 is the flash screen of the system. It contains the Nigeria coat of arm as well as the FRSC logo. It is a 3000 ms display page which will automatically disappear.

The navigation page

As shown in Figure 7, the navigation page is the first stable page; it is not a transition page. Unlike the flash screen that displays for only 3000 ms, the navigation page continues to be displayed as long as there is no manipulation by the user. This page is a fall back page that contains different navigation keys/indicators such as the plate number registration page indicator, the about FRSC page indicator, the contact us page indicator and the help page indicator. The page is designed in such a way that the user can return to it to choose any other indicator when done with one. This is one of the most vital parts of the design.

The help page

Figure 8 shows the help page of the system. The page tells little about the project and the aim of the project. It also consist the cost implications of obtaining the plate number. Apart, it displays the FRSC number plate obtaining account details. This page will help in lessening the claims of frauds, bribery and fee hiking in plate number registration. The help page is a non-proceeding page (it is meant for information display which cannot be manipulated). It contains the back button that will return the user to the navigation page.

The contact us page

The contact us page is a vital page of the system. Many of the country's citizens don't have access to the corps in case of emergency, accidents, theft or enquiries. It contains the emergency numbers for calls, text messages and enquiry help desks as shown in Figure 9.

The about FRSC page

Figure 10 is the about FRSC page. This page contains short and concise information about the FRSC. It also includes the corps major functions.

The database-register page

This page act as the nexus between the registration page and the home page: It is a needed page for the project. This page displays the essence of the SQLITE database used. SQLite is a known public domain software package that provides a RDBMS (Relational Database Management Systems) for works. JRE or SDK is not required to support SQLite. To the corps, the page is very vital. Unlike most RDBMS products available, SQLite does not have client/server architecture structure. The page contains only the register indicator when there is no registration as shown in Figure 11. A click on the 'register' indicator leads to the registration page. As soon as the users

Figure 6. The flash screen.

Figure 7. The navigation page.

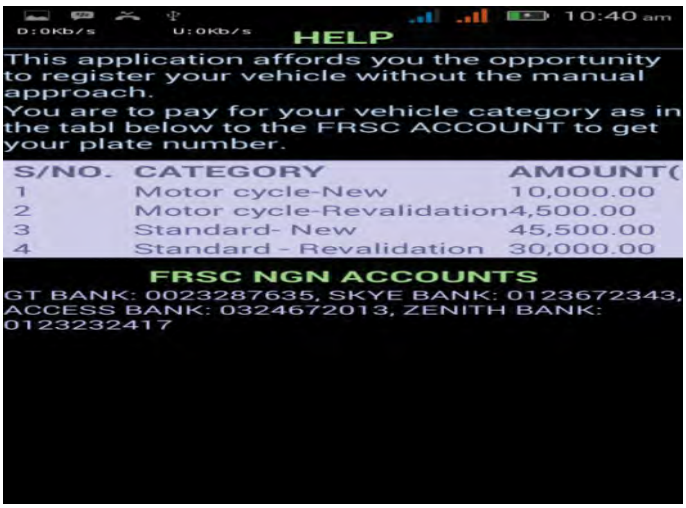

Figure 8. The help page.

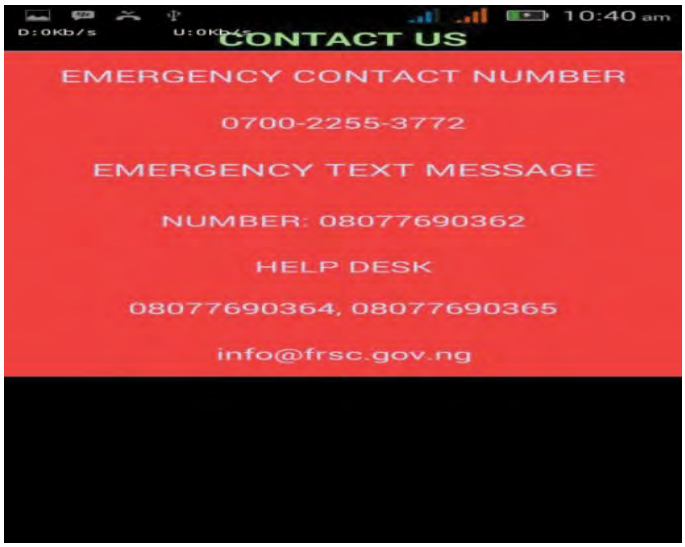

Figure 9. The contact us page.

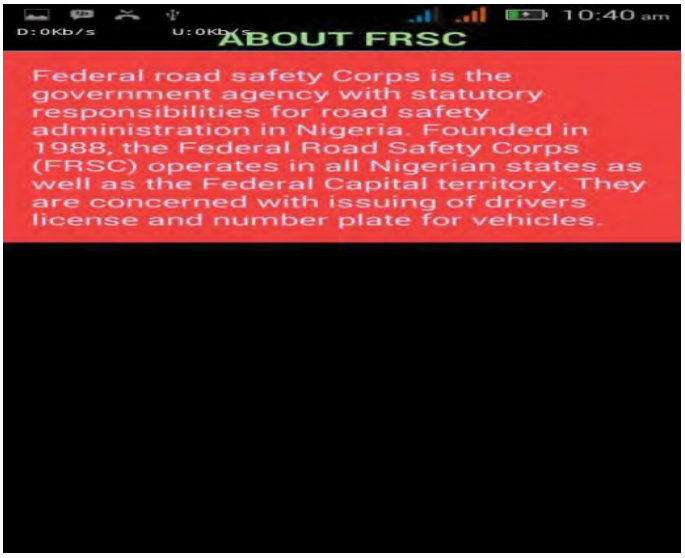

Figure 10. The page about FRSC.

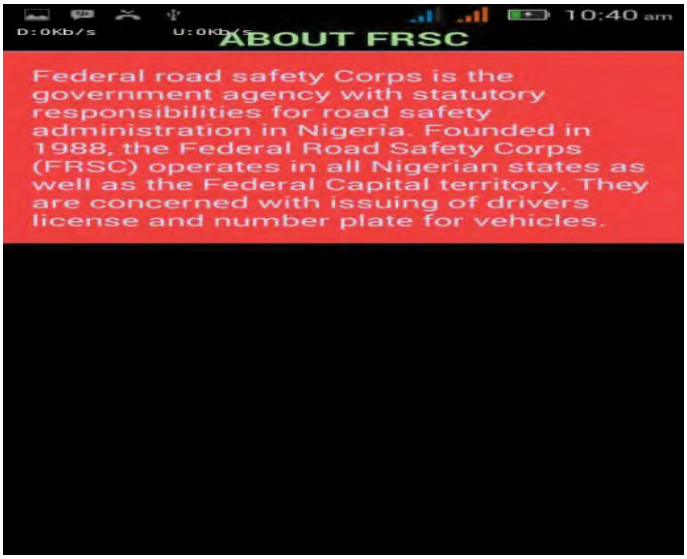

Figure 11. The database-register page.

register and submit, the information comes to this page in a single line horizontal format for a user as shown in Figure 12. The next registration takes the next vertical level with the information displayed horizontally. This type of single line information horizontal display is a peculiar attribute of the server less SQLITE database storage.

The vehicle/owner registration page

This is the main page of the project. It is divided into two phases, the vehicle's registration and the owner's registration. From Figure 13, the vehicle's registration contains the information about the vehicle such as chassis number, engine number, vehicle make etc. As shown in Figure 14. The owner's information includes the name, address, local government, mode of identification, mobile number, email etc. This page seems to be a little bit long and therefore require a little scroll. Some information is to be input into the system by the user while others are to be chosen and generated by the system. It also contains the submission and the reset indicator that will lead to the end

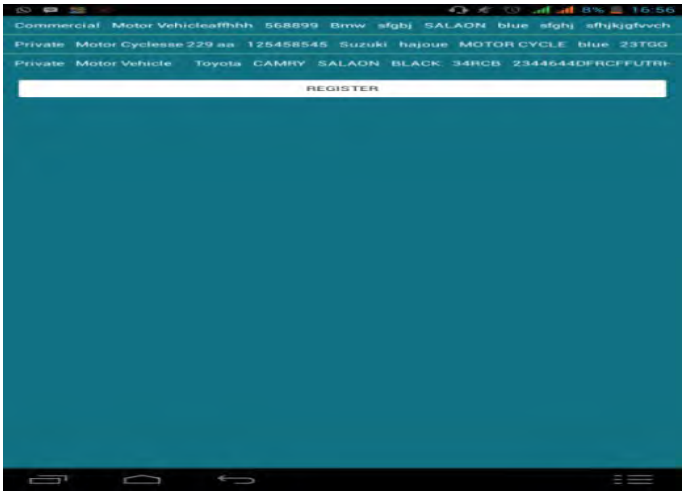

Figure 12. The database-register page (with examples of registered users).

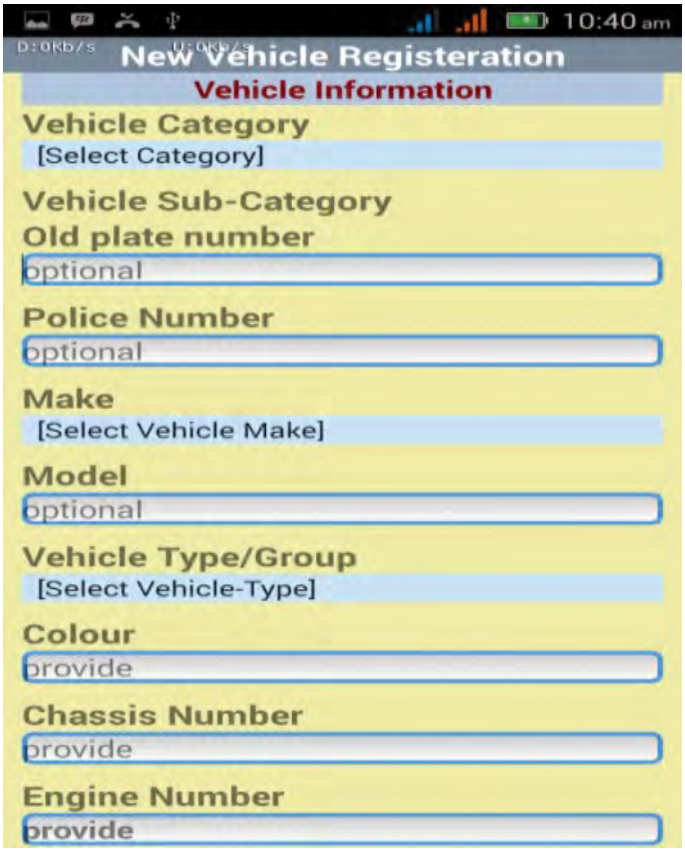

Figure 13. The vehicle registration page (vehicle information).

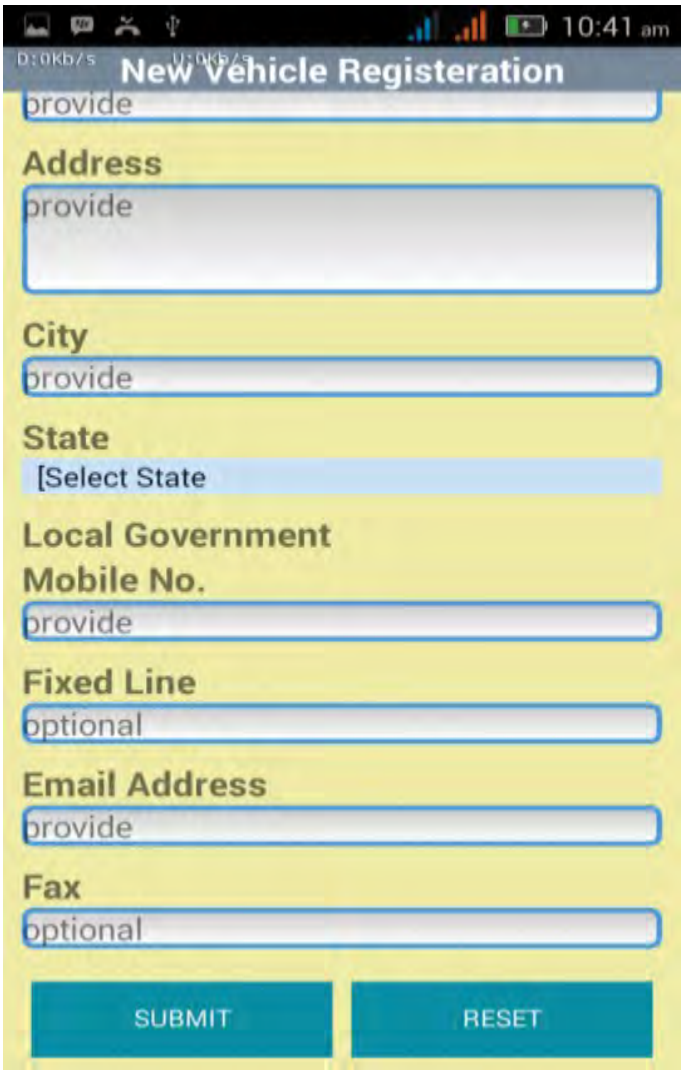

Figure 14. The vehicle registration page (Owners information).

of the registration or reset the page respectively. After submission, the system returns to the database/register page.

Conclusion

Issuing the number plates initially had been developed manually. In this work, it has been improved and developed to be used on android devices. Registration of vehicles by drivers and road users are also included. The implementation of this work is a major landmark in bringing the Federal Road Safety Corps to the doorsteps of every Nigerian. As hundreds of vehicles are acquired in the country day-by-day; proper data storage is needed so as to avoid errors of duplication, elimination and substitution. Manual registration is fading away in many organizations; also mobile devices are saliently replacing laptops. The implementation of this system will be a major pathway into a better information retrieval for FRSC and easy number plate acquiring for vehicle owners without additional cost. There is still much to do with the Corps. These other areas would require a separate system of application to be integrated into this work. But this work has established a shift from the manual registration to the e-registration; bridging the communication with the corps and getting a database for all vehicles plying Nigeria roads.

References

1. Olajubu, Emmanuel, Lyabo Awoyelu, Franklin Oladiipo Asahiah, and Deborah Ninan. A framework for penetration of information communications technology in developing countries for manpower and economic development. Information Technology Journal 5 (2006): 30-34.
2. Franklin, Oladiipo Asahiah, and Emmanuel Rotimi Adagunodo. Development of a syllabicator for Yoruba Language. Faculty of Technology International Conference 2010, OAU, Ile-Ife 1 (2010): 47-51.
3. Franklin, Oladiipo Asahiah. Development of Standard Yoruba digital text automatic diacritic restoration system. A Presentation for Computer Scientists. 22 (2014).
4. Peter, Adebayo Idowu, An online neonatal intensive-care unit monitoring system for hospitals in Nigeria. Hospital Management and Emergency Medicine: Breakthroughs in Research and Practice. 23 (2020): 122-144.
5. Ayo, Omidiji. FRSC: Transforming Into World Class Organization. A presentation for the Federal Road Safety Corps. 2009.
6. Lee, Allen. Retrospect and Prospect: Information systems research in the last and next 25 years. Journal of Information Technology. 25 (2010): 336-348.
7. Richard, Baskerville, and Allen S Lee. Generalizing generalizability in information systems research. Information Systems Research 14 (2003): 221-243.
8. Gordon, Davis. Diagnosis of an Information system failure: A framework and interpretive process. Information & Management 23 (1992): 293-318.
9. Allen, Lee. Going back to the basics in design science: from information technology artifact to the information systems artifact. Information Systems Journal 25 (2015): 5-21.
10. Thad, Starner, Cornelis M Snoeck, Benjamin A Wong, and Robert Martin. Use of mobile appointment scheduling devices. Proceedings of the Extended Abstracts on Human Factors in Computing Systems, ACM Press, Vienna, Austria. (2004): 24-29.
11. John, Payne. Management of multiple simultaneous projects: a state of the art review. International Journal of Project Management 13 (1995): 163-168.
12. Scott, Guthery, and Michael J Cronin. Mobile Application Development with SMS and the SIM Toolkit. Material & Energy Research Center. (2002).
13. Kari, Heikkinen, Juha Eerola, Pekka Jäppinen, and Jari Porras. Personalized view of personal Information. WSEAS Transactions on Information Science and Applications. 2 (2004).
14. Juhlin, David. Mobile application analytics: Specification for an online analytics tool. Master's thesis, Lueala University of Technology. (2010).
15. Godwin, Arosanyin. Determinants of Earnings from Okada Operation in Ilorin, Nigeria. Department of Economics, University of Ilorin, Nigeria-Research Report. (2006).
16. National Road Traffic Regulations. FRSC, Nigeria general road guide with constitutional acts and rights, (2004).

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