



## Wireless Information Access System for Registered Vehicles Using SMS

(Prof). Inyama, H. C.

Department of Computer and Electronics Engineering,  
Nnamdi Azikiwe  
University Awka

Okoye Christian. O,

State Controller's Office, Division of Audits-Oil & Gas  
Program, CA,  
[cokoye@sco.ca.gov](mailto:cokoye@sco.ca.gov)

Okeke, Moses I.\*

Department of Computer Science, Nnamdi Azikiwe  
University, Awka, 08038739845,  
[iketec@yahoo.com](mailto:iketec@yahoo.com)

Ejiofor V. E,

Department of Computer Science,  
Nnamdi Azikiwe University,  
Awka, 08035611654

Onyesolu, M. O.

Department of Computer Science,  
Nnamdi Azikiwe University, Awka, 08039536257,  
[mo.onyesolu@unizik.edu.ng](mailto:mo.onyesolu@unizik.edu.ng)

**Abstract:** Wireless Database access System for Vehicle Registration Information System is a research aimed at supplying vehicle registration information to authorized personnel such as law enforcement agents wirelessly, anywhere, anytime. Such agencies include; the police, federal road safety commission, and vehicle inspection officers. Rising crime wave in our society today calls for real-time access to important information to enable law enforcement agents take appropriate decisions from their duty posts as necessary. This is the need that this project is designed to serve. The software was developed based on Structured System Analysis and Design Methodology. Visual Basic 6.0 programming environment was used to develop the software, MS-Access database was used to create a sample database, while the interface to wireless devices was achieved by means of Bluetooth, cable and AT-commands. A user can send text codes to indicate his particular need for information. Three text commands namely; informate, descripto and ownerinfo are recognized as the system access codes. Informate is a text command used to retrieve general information about a registered vehicle. Descripto is a command used to obtain the description information about a registered vehicle, while the ownerinfo is used to retrieve information about the owner of a registered vehicle. These three commands were found adequate and easy to use to enable law enforcement agents reach the information they need at any time.

**Keywords:** Vehicle, SMS, Database, GSM, Information

### I. INTRODUCTION

In this modern world of information explosion and revolution, the way in which human activities are carried out is being transformed due to advancement of computer technology. Corporate organizations including government agencies need information for their day to day running of activities. This information is used for planning, control and reformation or transformation of organizational policies or strategies to ensure adequate management and increased productivity.

The application of computer in data processing is traced back to the evolution of computer. It was then developed for only engineering and mathematical computation and mainly used for military purposes. In this new era, the application of computer is found in almost every aspect of human endeavor such as business, education, design and manufacturing among many others.

Recent innovation in technology has led to the miniaturization of computer systems to fit even in human palm with enormous speed and memory capacity. GSM (cell phone) is one of such innovation which was originally developed for voice calls only, but most of the GSM presently are found to possess all the features of the computer. It is even possible to interconnect the GSM and computer system and share information such as text, video, music, etc.[6]

GSM technology has also gained ground in Nigeria of which virtually everyone has one cell phone. Nigeria is rated as one of the fastest growing GSM markets in the world with many GSM Operators competing for better services to retain customers. [1]

The application of SMS feature of the GSM is found useful not only in sending text messages among people, but can as well be used in system automation and control when interfaced with the computer using such protocol as Computer Interface to Message Distribution (CIMD2)[5]. Signaling System7 (SS7) is the underlying protocol used by mobile devices in data communication just as TCP/IP is to computer. [3]

### II. STATEMENT OF THE PROBLEM

Vehicle registration exercise in Nigeria is still found to operate on the manual process. Physical file occupy offices making it untidy and porous such that unauthorized access and loss of records or data can easily occur. Even the few agents that use computerized method, operate on standalone bases where the use of floppy and other removable storage devices carried from one office or computer to another reduces the speed of operation and result in waste of computer resources.[4]

In a network environment, there is the threat of unauthorized access via the internet or intrusion of unwanted code (virus) that damage files stored in the

organization's central database accessible via the internet. Even fraudulent acts can be perpetrated by the irresponsible staff of an organization and these can affect the organization adversely if not monitored.

To fully invest on complete hitch free computer based data processing; there is the need to consider enormous cost implications for regular power supply, adequate security measure, expertise, design and maintenance which might be difficult for some organizations to come by.

It is evident that we are in the era of information explosion where information is needed in our everyday life. More vehicles keep on coming in every day increasing the registration workload and complex data access problems. The information keep on increasing spontaneously calling for the need for effective, precise and concise access and control.

There is need to access data stored in remote branches or central office of vehicle registrations or liaison offices at a reduced cost, at any point in time and anywhere, any day around the globe even without the need to have internet connection, once there is GSM network coverage within the area.

The researchers investigated the operations of Motor Licensing with a view to ascertain possible ways to improve in their operations regarding vehicle identification using SMS in order to reduce fraud and combat crime.

### III. OBJECTIVE OF THE STUDY

Contributing to the innovation and application of SMS in modern technology this research is also intended to.

- a. Create a new, easy and concise means of accessing corporate database using SMS and apply such in accessing registered vehicle information.
- b. Create a portable means of distributing relevant information to authorized agents.
- c. Increase the efficiency of vehicle registration exercise in Nigeria by maintaining a central database for all registered vehicles.
- d. Reduce fraud associated in vehicle registration and duplication of registration.
- e. Reduce cost of manual processing in vehicle registration/corporate database information access.
- f. Increase efficiency in the use of computer resources in data processing and revenue collection to the government.

### IV. MATERIALS AND METHODOLOGY

The data used in this study is obtained from both primary and secondary sources

The Primary source is from direct interview with the personnel of Anambra State Motor Licensing Office of Awka South Local Government at Amawbia.

The Secondary data sources are from textbooks and the internet from where other relevant information about GSM and vehicle registration information were extracted.

#### A. Vehicle Registration:

Vehicle Registration in Nigeria began over 100 years ago and the records have been essentially manual which in turn has not helped to raise the efficiency of general automotive services in recent years. Vehicle Registration used to involve manual recording of vehicle's information

which ranges from cars to buses and later to trucks and heavy duty equipment on ledgers and tracking other related information such as registration, road worthiness test certificates, change of ownership, engine and chassis numbers; and expiration of road license. This process has been extremely inefficient and the recovery of the information was not possible once ledgers were damaged or lost as is frequently the case. Even when the ledgers are available, the time to search the volume of files and forms would be enormous. [4]

The current manual process employed by the state agencies and parastatals charged with administering motor vehicle documentation and registration has over the years failed to effectively address the objectives of the stakeholders to the process i.e. the federal and state authorities, and the vehicle owners and users in the country.[4]

Recently Nigeria is partnering with Autoreg Company to carryout automated vehicle registration where an individual after registering at the local liaison office proceeds to Autoreg to have an online registration. The Autoreg has covered the whole of Lagos and gradually penetrating into other states in Nigeria.[2]

From the findings, the owner's registration form contains some of the following Information.

- i. Name of Owner
- ii. Sex
- iii. Marital status
- iv. Nationality
- v. State of origin
- vi. Postal address
- vii. Residential address
- viii. Phone Number
- ix. Next of kin
- x. Identification Mark/number(Plate Number)
- xi. Make
- xii. Model
- xiii. Engine number
- xiv. Chassis number
- xv. Vehicle type

The above information will be used to construct a sample database using Ms Access from which the SMS operations will be based.

#### B. Procedure used in Vehicle Registration:

The registration office adopts manual procedure in processing and management of their documents. The clients or car owners go to any registration office and pick up the form and fill the information listed above after which he will be issued the necessary cover documents such as registration receipt, prove of ownership, vehicle license and identification mark.

The forms are filed in the licensing office for reference purposes, while copies are distributed to the State board of internal revenue headquarters on weekly, monthly or annual basis.

#### C. Problems of the Existing System:

Presently, the mode of storage is in physical form and in some cases computer form, owing to lack of proper database maintenance plan, database recovery plan, coupled with the increase in the vehicle registration. The problems are itemized below.

- a. Poor performance experience during information retrieval, due to lack of efficient storage of data,
- b. Lack of proper, correct, accurate and concise information about the car owner.
- c. The delay associated with the registration, because of the manual methods of operation.
- d. Lack of proper and accurate keeping of information about old records that have been stored for some time.
- e. The issue of security of records.
- f. Time wastage: some activities are time consuming in the system for instance, searching for a particular car owner's record will take some time.
- g. As different people are in charge of registration, it is possible for registration anomalies to occur.
- h. The problem of work monotony and tediousness that result from doing the same thing repeatedly.

#### D. The New System:

Since the problems facing the existing system have been identified, there is need for an alternative system. This alternative system is an SMS based system that will ameliorate the problem experienced in the current system. The SMS feature of GSM is used in accessing the vehicle information stored in a central database. The need for this new system cannot be over emphasized as it is aimed at achieving;

- a. Productivity
- b. Effectiveness and efficiency by reducing work intensity
- c. Less tedious operation.
- d. Portability
- e. Speed optimization and reduced use of paper
- f. Ease of update and maintenance of operation
- g. Accuracy of computation
- h. Consistency of data
- i. Reliability
- j. Productivity achieved through the optimization of speed.
- k. Enhancement of service delivery through prompt accurate and concise retrieval of information.
- l. Less complex connectivity: Doesn't require internet set up
- m. Simplicity and ease of use since GSM is common
- n. Easy and fast way to detect vehicle related crime and unauthorized vehicle users

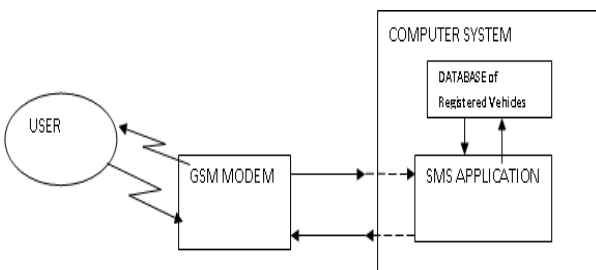


Figure 1: Model of the New System

The USER types his request from his cell phone and send to the desired mobile number. The request is received via the GSM MODEM connected to the computer system at the other end. The SMS APPLICATION then reads the message from the modem, decodes the message, retrieve the desired information from the DATABASE and send back the response back to the USER via the GSM MODEM

## V. SYSTEM DESIGN

There is need for one to design a system by showing what the system entails, identifying and defining the various components of the system before the actual implementation. The whole aim is to determine how the problem identified in the system analysis can be solved. This gives the designer the chance of making a choice of the way the solution can best be realized.

### A. Input Interface:

The **input** to the system is normal text messages from the GSM or handset. There are three main commands to be used in requesting for information via the GSM; "INFORMATE", "OWNERINFO", AND "DESCRIPTO" in combination with other information relating to what the user wants.

"INFORMATE [ ] Vnumber [ ] SECURITY CODE" is used to retrieve the general information about the vehicle with plate number = Vnumber, [ ] = space

"OWNERINFO [ ] Vnumber [ ]"; this Retrieves the name and address of the owner of a vehicle with number as Vnumber

"DESCRIPTO [ ] vnumber [ ]" this is used to retrieve the description information of a vehicle with the plate number as vnumber



Figure 2: Sample user interface to request information

In this project work, a simple Microsoft Access database is designed to hold the required file of vehicle registration particulars. A file or table is a collection of related records, which is made up of fields/columns and rows, field in this context means data columns. The following table is contained in the database:

Table 1: Sample Database Table

Field number	Fieldname	Data type	Size
1	Name	Text	40
2	Sex	Text	5
3	Marital status	Text	10
4	Date of birth	Date	
5	Religion	Text	20
6	Nationality	Text	20
7	State of origin	Text	20
8	Postal address	Text	40
9	Resident address	Text	40
10	Phone number	Number	15
11	Next of kin	Text	40
12	Engine number	Tex	16
13	Chassis number	Tex	16
14	Vehicle type	Text	20
15	Vehicle make	Text	20
16	Model	Text	20
17	Mode	Text	20
18	Manufacturer	Text	40
19	Registration date	Date	
20	Identification/plate	Number	10

## B. Control Software:

This SMS based system involves software development using Visual Basic programming language. The programming language option depends on the choice of the programmer and the type of problem to be solved. There are many programming language available which can perform the same function using different syntax. For the course of this work the researcher chose Visual Basic because of its simplicity and ease of use. The software has five sub modules. These modules are responsible for reading text messages sent by users from the GSM Modem. The received messages are translated to extract the commands needed to process the desired operation. The commands obtained are used to query and retrieve desired information from the database. The information retrieved from the database is then formatted into text format and send back as response to the user.

The sub modules are; Scann4Message, DecodeMessage, CheckSecurity, QueryDatabase, and SendMessage.

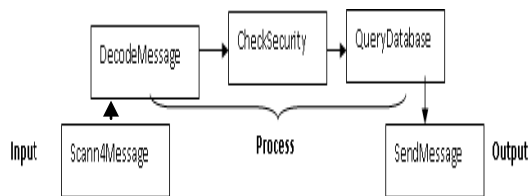


Figure 3: Program Modules

## C. The Output Interface:

The **output** command is the response information generated from the processing of the input by the program. The output is sent as a text message from the computer to the user GSM relating to the information the user requested. Figure 4 is a typical reply message about general information of a registered vehicle.

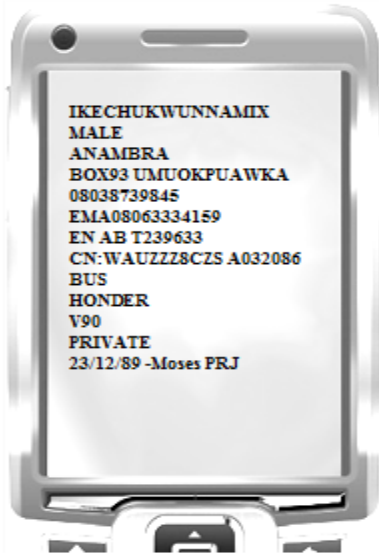


Figure 4: Sample Output when user request general information about a registered vehicle

## VI. RESEARCH FINDINGS

This study shows that:

- Vehicle registration process is carried out manually at Local Government Area liaison office in Nigeria. The vehicle owners fill paper forms with their payments after

which license and Registration number/plate number is issued.

- Large volumes of paper forms occupy the file cabinet in the offices posing the danger of loss of record, damage by pest and fire. In addition, current system increase chances of documents duplication and difficulty in access or retrieval of individual documents. It is difficult to identify vehicle theft because access to vehicle records is very slow and in most cases very difficult to execute. Also identifying vehicle owner's relations during accident cases proves impossible.
- The inconsistency of registered vehicle record-keeping results in loss of revenue due the state and federal governments respectively. No accurate record of registered vehicles is given at any point in time. The figure (amount) is at the mercy of those doing the computation.
- The Autoreg System introduced to overcome the problem of data inconsistency has not been duly employed by the vehicle owners and has not been extended to all states, so there is not yet a central database for vehicle registration. The Autoreg still depend on the manual process because vehicle owners will first of all register manually before proceeding to the Atoereg registration. It is a duplication of work and waste of resources.
- The new SMS system will depend on the existing systems (Autoreg and GSM) capable of accessing the content of the database using short messaging service (SMS).
- Itel IT2600 and Tecno mobile phones model were found appropriate as GSM Modems for the application interconnectivity within the period of the report. Each of these modems was able to connect to the pc through the application which reads the content sent to the modem, process the request and sent back the desired result back to the modem using combination of VB code and AT command. Nokia 2700 was tested but could not connect or give desired result when used as modem
- With the new SMS application system, authorized agents can access vehicle information from their duty post anywhere around the globe using SMS. It guarantees prompt and accurate response to requested registered vehicle information; to check if a vehicle is registered or not, to retrieve registered vehicle information and owner's information at a spot. This will be used to combat vehicle theft crime as well as reach vehicle owner's relatives in case of accident.
- The SMS based system requires mobile network coverage in an area to work, even with limited coverage. It can work on any network. The system was tested using MTN network, while network charges apply.

## VII. SUMMARY

The SMS based Vehicle Registration System is a mobile computing application which unveils the many features of GSM useful in data processing. Crave for better solutions and access to accurate and concise data access led to the development of this system. It is consequent upon the motive of the modern computer manufacturers to miniaturize the size of computer and increase its processing power that led to the invention of laptops, PDAs Palmtops and even GSM.

The GSM was primarily developed for voice transmission by the telecommunication industries. It is later found useful in data communication by incorporating the feature of SMS in the GSM. Due to technological advancement, the feature of digital computer was embedded into GSM and vice versa, which made it possible to use computer systems to make voice calls via telephone networks and internet in the same manner with GSM.

Since GSM (Cell phone) has these computing ability as digital computer, it is found useful in data communication using its SMS features. This project, therefore employs the use of SMS features in GSM to access or manipulate information stored in a remote database (relating to vehicle registration as in the case of this study) to ensure easy access to data as well as making desired information readily available just-in-time.

### VIII. CONCLUSION

The study of vehicle registration operation and the application of SMS in data processing is a real scientific innovation. It unveils the features of GSM technology and how it is useful in data processing especially in accessing or manipulating information/data or records stored in a remote corporate database. This study will assist in improving the Vehicle registration operation in Nigeria as well as other areas it could be duly applied.

This research work was really tough and challenging thou it was at the same time full of experience.

### IX. RECOMMENDATION

This project will go a long way to eliminate fraud associated in vehicle registration if well applied. It is therefore recommended that the government should adopt the system in vehicle registration information access exercise and extend Autoreg registration to Local Government liaison offices to maintain a central database of all registered vehicles in Nigeria. The Nigerian Police and

the Road Safety Commission should as well adopt the system in tracking vehicle crime related offences.

The SMS application is universal or generic. It is recommended to any corporate organization for their remote data access especially schools in result accessing, banks in customer account information access, supermarkets in accessing availability and cost of goods and services as well as ordering for services, production/manufacturing companies in accessing available product and order system among others.

This project can still be extended in the future to accommodate system control and automation. Further study can as well include the use of MMS capability of GSM to transmit Video and Images remotely which can be used in security system designs and general applications.

### X. REFERENCES

- [1]. Ajala I., (2005). "GIS and GSM Network Quality Monitoring: A Nigerian Case Study". MTN Nigeria Communication Ltd.
- [2]. Akindele B (2010) "Vehicle Registration Redefined - An Insight Into The AutoReg Initiative" Wheels Nationwide Magazine  
[www.wheelsnationwide.com/Blog/Vehicleregistrationredefined.htm](http://www.wheelsnationwide.com/Blog/Vehicleregistrationredefined.htm)
- [3]. NCS Technical Information Bulletin, (2003), "SMS over SS7" [www.ncs.gov/library/tech\\_bulletins/2003/tib\\_03-2.pdf](http://www.ncs.gov/library/tech_bulletins/2003/tib_03-2.pdf) Accessed October 26, 2011
- [4]. Olaitan (2009) Computerization and Vehicel Registrattion System and Enqiury,  
[www.indiastudychannel.com/resources/.....](http://www.indiastudychannel.com/resources/.....)
- [5]. Peersman G., Cvetkovic S., Griffiths P. & Hugh S.(2000). "The Global System for Mobile Communications Short Message Service." IEEE Personal Communications
- [6]. Samanta V. (2005). "A Study of Mobile Messaging Services" University of California, Los Angeles.