Integrating ICT in Traffic Police Department in Uganda: Design and Development of Traffic Case Management System (TCRIS)

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Abstract

The study was about the development of Traffic Case Records Information System (TCRIS) that would ease storage and retrieval of traffic cases in the Traffic Department of the Uganda Police. The method used to manage traffic cases is manual; information collected daily is written on paper and stored in files for reference, thus making the captured cases susceptible to loss, easy access by unauthorized people and destruction. The researcher set out to study the current system, analyze the needs and then improve on the system by designing and developing a Traffic Case Records Information System. Data collection techniques such as interviews and observation were applied to get the necessary information from the Traffic officers in the Traffic Department at the Central Police Station, Kampala. The system developed captures the defaulters' bio data, traffic offence committed and the charge for the traffic offence. The TCRMS makes the use of the camera that captures the photo of the defaulter and the biometric gadget that captures the defaulter's thumb print for police reference. All these are centrally stored in the database but are sharable with migrations department, Bank of Uganda (BoU) and Uganda Revenue Authority (URA) which government departments work closely with police in regard to such offences. Different programming languages were used during the development of the system including Visual Basic for the front end and SQL Server2005 for the back end. The system is thus user friendly in the way it inserts, retrieves and updates user information.

Keyword: Traffic, Records management, court, customer care

1. Introduction

Rules and regulations are paramount in all aspects of life that range from way one wishes to live to how others should accommodate one's life style. All human being need to enjoy their rights to access and use public infrastructure. The police forces world over are charged with such a responsibility and work towards sustaining it at the expense of keeping law and order. One such related public infrastructure is roads that accommodate automobiles. Much as each person is free to use the road he/she should not infringe on the other's right too. But at time drivers and pedestrians fall short on this calling for law enforcers' intervention.

Motivation

Uganda has of late been known to be one of the major importers of used cars from Japan. Some of these vehicles date as old as 10 years of manufacture while some are relatively new (Uganda Revenue Authority, 2012). A number of factors, other than mechanical conditions, including bad roads, un qualified drivers and relatively weak laws have geared up accidents in Uganda to the extent that thousands of traffic cases are reported daily (Annual Traffic Report, 2011). One thus wonders: i) how are traffic case records and customer care managed? and   ii) Of what significance would a computerized system be to this noble cause?

2. Background

Uganda Police was established in 1906, at the start, the force had a primary function of maintaining peace and stability during the era of colonial government. In 1926, the need to put a mechanism in place to control traffic started since the increment in the traffic activity needed control. This was achieved by selected constables, who were trained and posted to fixed points in Kampala and other towns. Those constables were supplied with red armlets which were heavily distinguishable. In 1928, the mobility of the traffic force was realized. In the 1930s,

owing to rising numbers of motor vehicles on the Ugandan roads, it was realized that there was need to come up with ways of managing Traffic records in the entire country. Still in the 1930s, the records showed that there were three thousand six hundred nineteen (3619) vehicles in the country as compared to current 665,176 registered vehicles (Uganda Revenue Authority, 2012).

Currently in Uganda, law is enforced by the Police and the courts of law. The Uganda police have many departments used to enforce law but this study centers on the Traffic department. Traffic cases are on increase day by day (Traffic Report, 2011), these records have acted as a decision making tool for the deployment of more Traffic officers in identified areas. It has been observed that most of the work in the traffic department is done manually, a process that involves use of paper where the information is recorded and stored in files which at times get lost or tampered with. The Traffic police in Uganda which was introduced to enforce traffic laws, preventing violations of traffic regulations, prosecution of offenders, assist the public in various social events and functions where motor traffic is involved investigate into accidents and control traffic flow on highways. The Uganda Police established the traffic department at every Police station all over the country. The numerous cases reported include: Over speeding, driving without a permit, drinking while driving, driving a vehicle without a third party, driving a vehicle in a poor mechanical condition among others.   The management of these cases is manually done and this has made the process of recording cases cumbersome. The Traffic department is divided into various groups among which are: Traffic Officers who are concerned with controlling traffic on highways, busy roads and urban centers. The officers always stand by the road sides to monitor and control the flow of vehicles and motorcycles. In the process, they record traffic offenders and release receipts to offenders for charges. The other group is the mobile traffic, a title given to the traffic controllers who use patrol motor bikes, cars and trucks to monitor traffic flow around towns and on highways, they always write reports about incidents of accidents anywhere and report them at the station. The objectives of the project were; i) To examine the current traffic management system at the Central Police Station; and ii) To design and develop a Traffic Case Records Management System.

3.   Related Literature

Traffic Case and Customer Care Management

Information system is a set of hardware, software, data, procedural and human components that work together to generate, collect, store, retrieve, process, analyze or distribute information (O'Brien, 2001). While Loudon (2005) says that an information system is a combination of human and computerized resources that result in the collection, storage, retrieval, communication and use of data for the purpose of efficient management of operations and for business planning. According to Inmon (2003), system of record (SOR) is an information storage system commonly implemented on a computer system, which is the authoritative data source for a given data element or piece of information. The need to identify systems of record can become acute in organizations where management information systems have been built by taking output data from multiple source systems, re-processing this data, and then re-presenting the result for a new business use.

According to Loudon (2005) all traffic management departments in any country around the world have systems that they employ to manage the records of the traffic itself, staff, penalties and cases. The coming of foreigners into Uganda saw the introduction of a formal system of law keeping and the fall of an old informal system where law keeping involved clan authority. The rise of the new system of case management introduced building of jail rooms, use of knowledgeable people for example policemen, fines after every case coverage and compensations. Also Inmon (2003) notes that in United States of America, the Model State Traffic Records System (MTRS) was developed to integrate information now stored in different forms and systems through the state, to integrate operations of various agencies and to reduce duplication of effort by different entities. MTRS also aids in comprehensive planning and evaluation. Highway safety problems are isolated by applying accident and UTC data supported by roadway environment, driver, and vehicle background information to: i) location analysis techniques to identify hazardous locations; ii) standard statistical analysis techniques to identify patterns that indicate possible problem areas and details of the MTRS data base are summarized.   The Traffic Records System Inventory is provided as a service to the public and in particular those within the highway safety community. It represents the best available information about each of the traffic safety data systems within each state and territory. The information contained in the Traffic Records Systems Inventory drawn from a database containing basic information about the traffic records systems within each state and contact information for each state system. States are encouraged to update their pages at least annually.

Customer Care

Sam(1997) considered in Track it 'beats manual customer support systems', following a   swift installation at

Mazars, Track it quickly began to provide what has now become a valuable knowledge base. Technicians would now access previous call histories to view how similar problems and issues have that been resolved. Mazars has also been able to utilize Track it! In other areas of the business for example, it assists in monitoring how quickly customer support issues are being resolved. This information is valuable when reporting to the senior management, particularly when resource and budget allocations are under considerations. However Gama (2008) using Microsoft office share point server 2007, INEGI has implemented a prototype online system submitting customer service requests. The new prototype customer support portal has streamlined technical support by automating support request routing and with a new knowledge base for self service troubleshooting, INEGI anticipates that it will reduce customer support call volume, freeing valuable personnel resources.lt is now able to give users the status of requests in a matter of seconds versus days.   As for Turban et al. (2002), evaluated Customer service as a series of activities designed to enhance the level of customer satisfaction – that is, the feeling that a product or service has met the customer expectation. In a guide to customer service, Donna (1999) defined the online customer support system that is a single point of contact within a company for managing problem and request and providing solution oriented support services. Customer support system is also defined as a problem solving tool designed to provide technical support concerning a specific product. This designed system helps in quick communication among the police staff and the traffic offence victims or offenders whereby within the shortest time possible a customer will be answered through the use of internet and then that client will get to know what to do next.

Significance of Computerized Systems

The Traffic Records System Inventory is provided as a service to the public and in particular those within the highway safety community (Sam, 1997). It represents the best available information about each of the traffic safety data systems within each state and territory. The information contained in the Traffic Records Systems Inventory drawn from a database containing basic information about the traffic records systems within each state and contact information for each state system. States are encouraged to update their pages at least annually.   The automated records' tracking system eliminates the exchange of papers containing records or tracking data between parties within the traffic department and between nationals. This is achieved by bringing all data together in one database and giving relevant parties access to this data. However, according to Inmon (2003), automated records' tracking systems used in traffic offices or departments have different strengths which are laid as follows: i) the system requires a username and password so that only authorized people can update records; ii) the system can be configured so that a staff member can access and manage only the section of the system they are responsible for; iii)the system is very quick and fast to change the content in the system without any programming skills whatsoever. The literature reviewed above stipulates that where there is bulky work that may involve daily manipulation for analysis and interpretation (case processing) for the good of customers, an integrated system suffices. This will reduce redundancy and bring effectiveness and efficiency to the traffic management system, hence better service and transparency in the traffic police force.

4.   Methodology

The study employed both qualitative and quantitative approaches. It was qualitative in that opinions of the traffic officers and some road users were sought and the researcher contextualized them according to his understanding. Quantitative data included annual traffic cases that were analyzed and interpreted using statistical packages. A case study design was used at Kampala Central Police Station (CPS) in the centre of the capital of Uganda because it is a hub of most cases (registers the highest crime rate) including traffic. The deep understanding of CPS records would assimilate other police stations country wide. The existing system was studied to establish its weak and strong points. The information that was acquired from this study gave the basis for the design of the system. A number of steps, procedures and tools were employed as shown below:

Upon interviewing the traffic officers, there seemed to be problems associated with the existing system, they included the following; i) It was evident that there was a lot of duplication in recording of the case records and requirements. For example there were recordings with the OC, with the Regional police division, and registers were kept; ii) Information retrieval from these sources was not easy; and iii) There was a problem when it came to serving the offended in time, among others. A review of existing reports confirmed the mentioned scenarios and both traffic officers and road users contacted acknowledged the significance of a system that could quickly and efficiently serve them (i.e. computerized system).   Hence the researcher expected to achieve; i) system that was easy to learn, convenient and use; ii) system that would improve on the efficiency of information storage and retrieval; iii) system that was fast in executing data ready at the point of need; iv) system that had an element of error validation, (i.e. one that prompts the user on entering unusual command or data format inconsistent with

the database); v) system that provided attractive interfaces with easy navigation throughout the system; vi) system that was faster in processing and producing reports timely and accurately.

5. System Design

E-R diagram is a high level conceptual data model to facilitate database design. The main purpose of using this model was to ease the identification of the entities, the relationships between entities, their attributes and their actions.
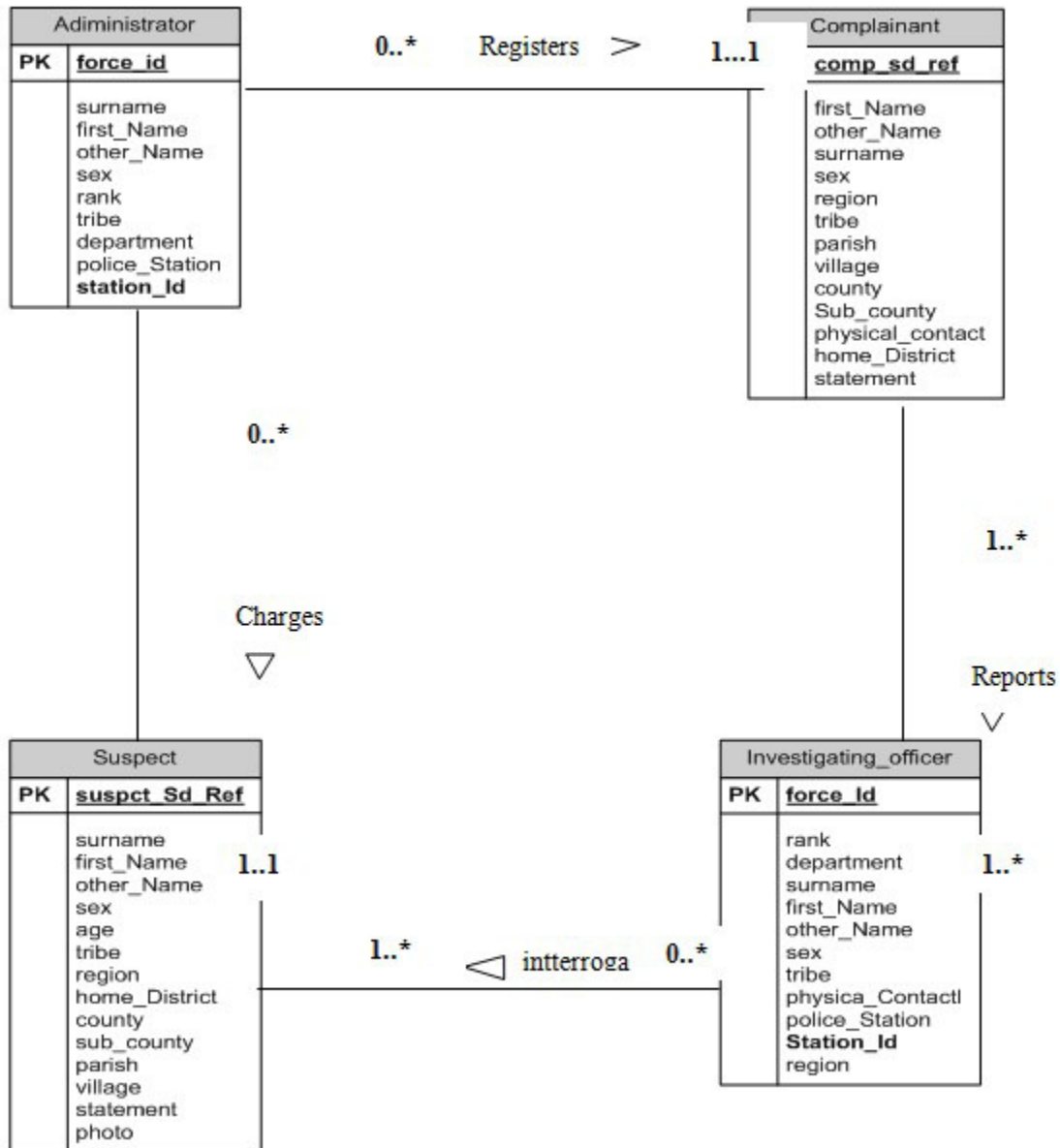

Figure 1: An E-R Diagram

The logical design shows the different processes that a user has to go through to use the system from user login to the user logout. Users with valid username and password can access, input and retrieve information from the system.
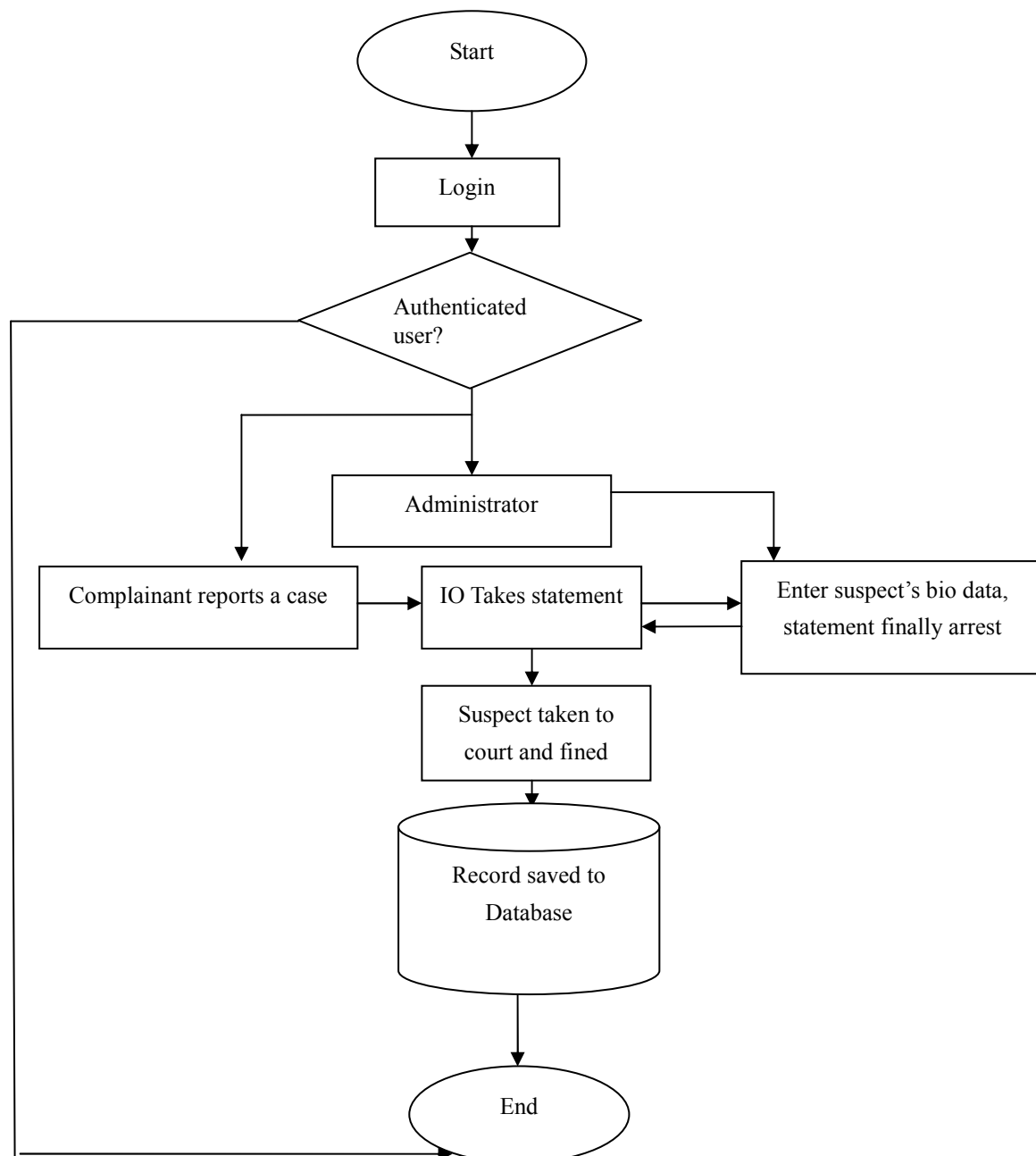
Figure 2: Logical Design

This gives a high level view of the new system with its main components, the services provided and how they communicate to the system. At this stage of the system development, the focus is on the definition of the central architecture of the system.
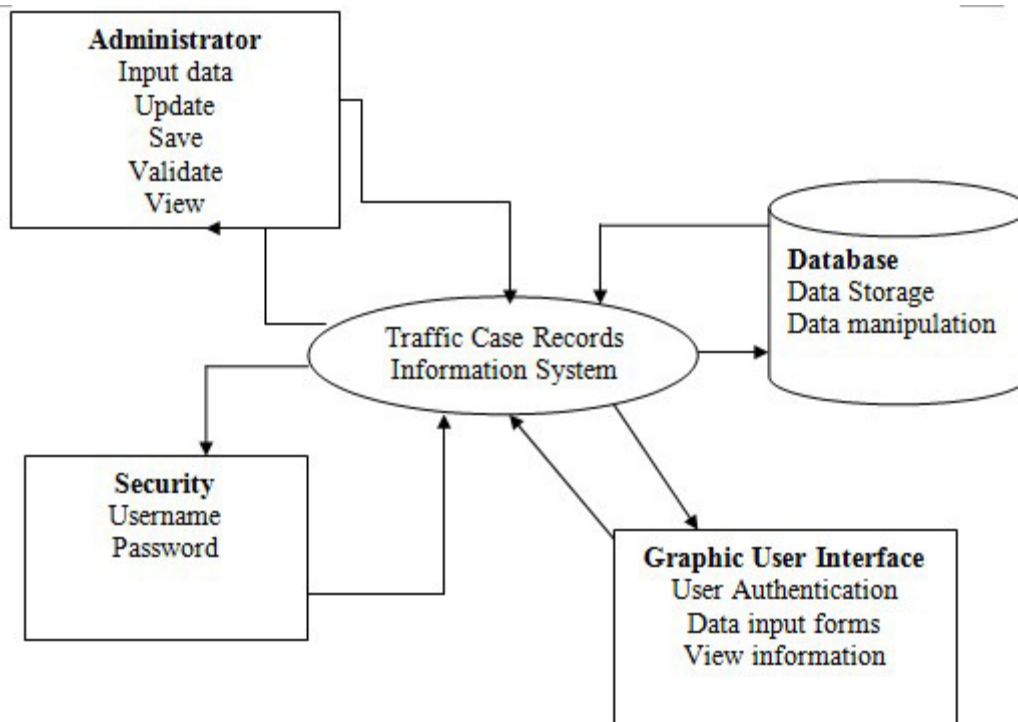
Figure 3: System Architecture

System Implementation

The implementation of the system involved different features of validation and verification of different functionalities. The interface input forms were designed with a visual basic code running behind them. The proposed system was developed with an aim of effectively and efficiently handling cases. The proposed system also allows only authorized users with a verified user name and password to use the system. A detailed description of this functionality is shown below: The performance of the proposed system is over seen by two users (administrator and the investigating officer) with a verified account to access and use the system at any time of the day; Users with an account of the system can logout in case they are through with using the system. The interfaces below show different functionalities of the system.
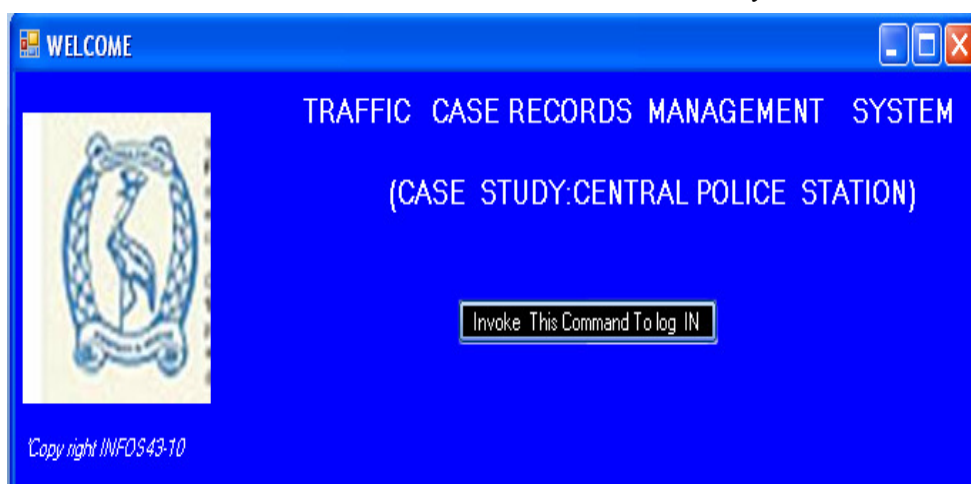
Figure 4: Welcome Page

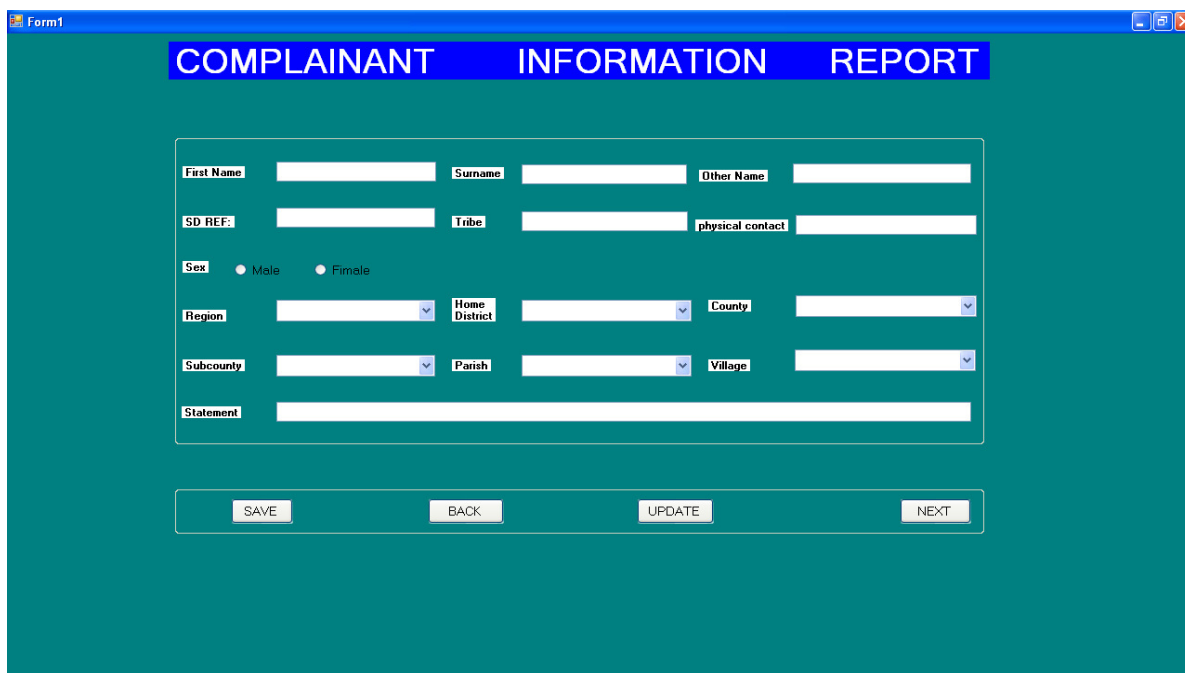Figure 4 shows the main window that prompts one to login
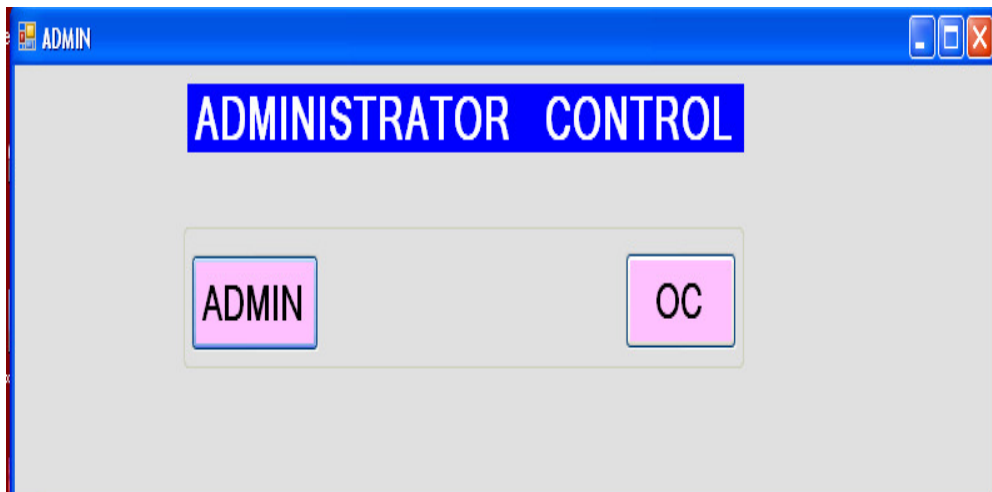
Figure 5: Administrator control

Figure 5 shows where administrators and OC can login respectively.

Figure 6: Login page

Figure 6 illustrates a sample login form for a user.

Figure 7: Complainant page

Figure 7 illustrates a sample complaint form.

Figure 8: Suspect page

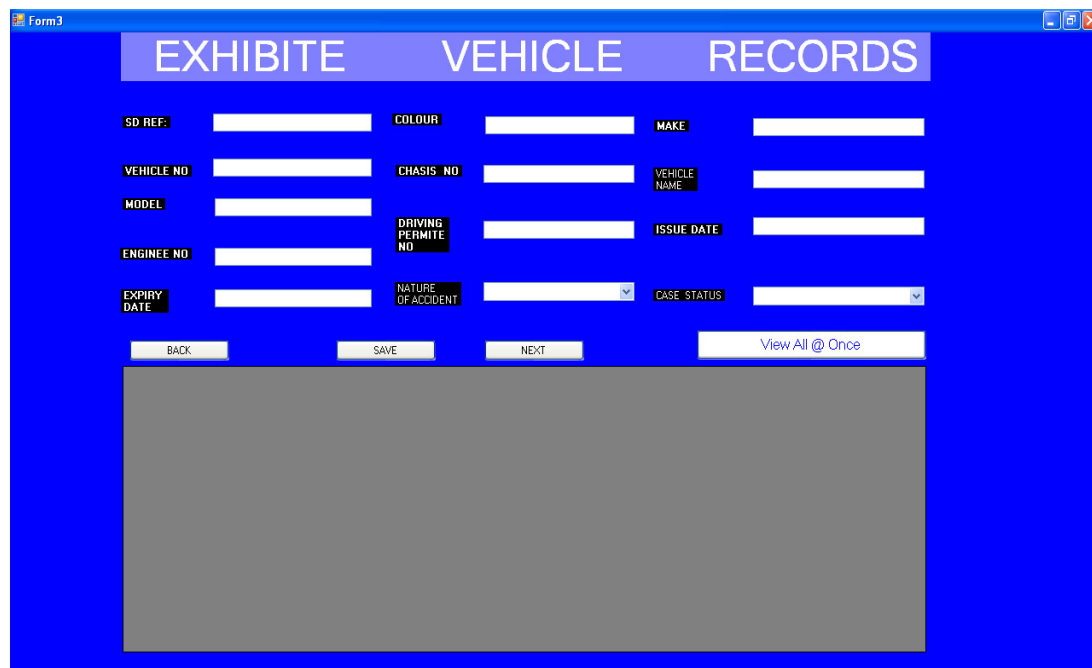Figure 8 shows a sample suspect detail form.

Figure 9: Exhibit vehicle page

Figure 9 shows an exhibit vehicle form

6. Discussion

Traffic Case and Customer Care Management

The designed system can capture, process and retrieve traffic case reports easily. The traffic department has increased the number of particulars captured against each case. This was formerly neglected for fear of bulky processing. Now that the system can capture such details at once then only updates would be required. It has also been noted that traffic cases have reduced to some extent unlike in the past where offenders relaxed. This was partly due to bribery and conspiracy in the police force to lose some files and hence the case. This observation is in support with Inmon (2003) and Sam (1997) who assert that records management is paramount in bringing efficiency in any system.

Significance of the system

The proposed system registered significant degree of efficiency in case management. The cases that were paper based were entered and the officers concerned observed that it is quite easier now to serve customers (i.e. offenders and offended) in time. However it was also noted that further training of police staff suffices. Given that police officers are re located regularly, the replacements usually made may not be IT savvy; thus   a need for refresher   courses. The former practices of bribery have been reduced in that file losses are no longer excuses. Donna (1999), Turban.et.al (2002) and Loudon (2005) think along the same line in that automated systems need patience if good results are expected out of them. The users must get acquainted with them first and further training would emphasize so.

7. Conclusion

The system developed can now provide means for the traffic police to handle various traffic cases. The system has removed delays which were experienced through the old system because cross checking through the traffic records has been time consuming. The traffic police has benefited from the new system because there are no longer delays in storing and retrieving traffic offences at the central police station in case pattern government departments (i.e URA, BoU etc) need information. The researchers thus recommend that to beef up service delivery in the police traffic department, the designed system should be integrated with mobile applications that can run on cell phones so that the offended parties can notify and retrieve pertinent data about the offender which will ultimately reduce traffic and other crimes committed.

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