Design and Implementation of a Policing Control Information System (PCIS) for the Zambian Police Service (ZPS)

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Abstract:

An Occurrence Book (OB) is a type of book found at the Front Desk of all Police Stations in Zambia, which the Zambian Police Service (ZPS) uses to record and capture all the cases reported on 24/7 basis for possible criminal investigations and litigation. The process of criminal record capturing involves the complainant's reporting the offender to a respective Police Station wherein the officer present at the Front Desk captures the preliminary information such as the date and time, case category etcetera and assigns to it the Occurrence Book number. The police officers only clear off a suspect or criminal after they have concluded all the necessary criminal, legal processes and retain a criminal record. Currently, the Zambian police service records cases manually. We designed a web-based software application for handling policing records management within the Zambian Police Service. We implemented the software as a PHP application; manage code in PHP, JavaScript, Ajax, CSS and HTML incorporated with MySQL relational database technology. This project work makes use of data collection from the Ministry of Home Affairs, Materials, and Journals from various authors and we developed the software to meet the aim of the project. The main modules of the Policing Control Information System are Front Desk Module, Criminal Investigations Department Module, and Administer. The system administrator creates user accounts using the Administer Module.

Keywords: Occurrence Book, Offence, Criminal Recording/Capturing, Docket, Investigation and Litigation.

1.0 INTRODUCTION

An Occurrence Book (OB) is a type of book found at the Front Desk of all Police Stations in Zambia, which the Zambian Police Service (ZPS) uses to record and capture all the cases reported on 24/7 basis for possible criminal investigations and litigation. Police officers mainly disentangle misdemeanours through counselling and payments of light fines and they do not open dockets for such. A docket is only opened for criminal (felony) cases and then submitted to the Criminal Investigations Department (CID) for further processing (or dealing) such as the assignment of officer(s) to handle such a case, and when all necessary investigations are completed, the Criminal Investigations Department submits the Docket to the National Prosecutions Authority for possible criminal litigation. (Kamtambe, F., 2017).

The process of suspect records capturing involves the complainant's reporting the offender to a respective police station or police post wherein the officer present at the Front Desk captures the preliminary information such as the date and time, case category etc. and assigns to it the Occurrence Book number and writes an occurrence in perfect intonation. Clearing-off of criminals is dependent upon the conclusion of all necessary criminal, legal processes after which police retains criminal records. Now, police officers manually record all such data in all respective Police Stations and police posts in Zambia.

1.1 Background of study

The Zambia Police Service (then called Zambia Police Force) has been in existence since 1964. The Zambian government established the Police Service under Article 103 of the Constitution of Zambia. Zambia Police Service is one of the departments under the Ministry of Home Affairs whose main responsibility is to enforce the law against all forms of crime and disorder in order to maintain peace and order throughout Zambia. The Zambia Police Service is one of the institutions under the Ministry of Home Affairs charged with the responsibility of providing and maintaining internal security in the country. (Mwangala M.P, 2015).

Article 104 (and the Zambia Police Act Chapter 107) provides the mandate and functions of the police service.

Following are the legal mandates of the service:

- Protect life and property;
- Preserve law and order;
- Detect and prevent crime ;

- Cooperate with the civilian and other security organs established under the constitution;
- Apprehend offenders against peace; and
- Preserve peace.

At a government institution like the Zambian Police Service, there is a need for an automated method of keeping data, more so greater need for an online policing system. (Lyoko G. et al, 2016). This would be a long way of alleviating the various problems and stress involved with in the manual system of policing. Moreover, the issue of delayed commission and completion of criminal investigations services is mainly because of mobility to complete the tedious manual process of policing. (Mwangala M.J., 2015.)

We can curtail this.

2.0 METHODOLOGY

The design and implementation of this web-based *Policing Control Information System* adhere to the rules of software requirements analysis, design, code generation and debugging, testing, implementation and support. Software design is actually a multistep process that focuses on four distinct attributes of a program: data structure, software architecture, interface representations, and procedural (algorithmic) detail. The design process translates requirements into a representation of the software that we can access for quality before coding begins.

Like requirements, we document the design and it becomes part of the software configuration. We intensify the requirements gathering process is and focus specifically on software. To understand the nature of the program(s) we need to build, the software engineer ("analyst") must understand the information domain for the software, as well as required function, behaviour, performance, and interface. We document and review the requirements for both the system and the software with the customer or users.

2.1 SYSTEM IMPLEMENTATION TECHNOLOGIES

We develop the web-based Policing Control Information System as an online information and eliminates the inadequacies in the security of records within the Zambian Police Service police command. We used the following tool in the implementation of this system:

- *PHP* – (Personal Home Page_ now known as hypertext processor. A dynamic server side scripting language.

The computer interprets the PHP code (not complied by a server with a PHP processor module, which generates the resulting web page. The computer can directly imbed PHP commands directly into an HTML source document rather than calling an external file to process data. PHP has evolved to include a command-line interface capability and used in standalone graphical applications.

- *Java Script* – Dynamic client side scripting language that response to users' events. JavaScript based in Java, an object-oriented program language popularized for use on Web by way of embedded applets. Although JavaScript has a similar syntax and programming methodology, it is not a "light" version of Java. Instead, JavaScript is its own dynamic language, finding its home in web browsers around the world and enabling enhanced interaction on web site and web applications alike.

- *Ajax* – (asynchronous JavaScript) enables client side and server side to communicate without page refresh. Ajax is an all-encompassing term surrounding the use of asynchronous server without

unloading the page. We can execute these requests in any number of ways and using any number of different data transmission formats. Combining this remote data retrieval with the interactivity of the Document Object Model (DOM) has bred a new generation of web applications that seem to defy all the traditional rules of what can happen on the web. Big companies such as Yahoo and Microsoft have devoted resources specifically towards the goal of creating web applications that look and behave like desktop applications.

- *MySQL*- MySQL works on many system platforms, including AIX, BSDi, FreeBSD, HP-UX, eComStation, i5/OS, IRX, Linux, OS X, Microsoft Windows, NetBSD Novell, NetWare, OpenBSD, OpenSolris, OS/2 Warp, QNX, Solaris, Symbian, SunOS, SCO OpenServer, SCO UnixWare, Sanos and Try64. A port of MySQL to Open VMS also exists.

- *HTML* – (Hypertext Mark-up Language is the main mark-up language) for layout and displaying information that can be displayed on the web. We write HTML in the

form of HTML elements consisting of tags enclosed in angle brackets (like), within the web page content.

- *CSS* – (Cascading Style Sheets) for describing looks and formatting documents. The design of CSS such that it enables the separation of documents content from document presentation, including elements such as the layout, color and fonts.

- *Web browser* – (commonly referred to as a browser) for retrieving and presenting information resources on the World Wide Web.

- *Server* – Testing is done through Wamp sever.

- *Windows Operating System* – We developed and deployed this system on a windows operating system – Windows 10 Enterprise to be precise.

3.0 SYSTEM DESIGN

This Policing Control Information System suggests a policing system that feature unlimited registration of police suspects, which are murder, robbery, cybercrime, suspect, trespassers, defaulters, criminals and other unlisted suspect into any of these ranges. In addition, the choice of the core programming and database language used in the development of this project is PHP (Hypertext processor) and MYSQL database.

MySQL holds the tables that contains all the information and functioning of this system and these tables are:

- *Admin tables,* which holds information about the administrator, suspect tables holding the information about the entire set of suspects in the database,

- *Officer tables,* which hold all information of officers, registered into the system at time of reporting at a given police station or police post, and record all cases as they are reported at the station,

- *CID Section tables,* which hold information about officers/detectives in the criminal investigations department charged with the responsibility of conducting suspect and criminal investigations.

We have the testing tables holding several crime category to be available in the system. Other tables holding other information and users to develop this system which are JavaScript, Ajax, CSS and HTML, both JavaScript and Ajax have been basically used for styling and positioning of web component and HTML is known as Hypertext mark-up language

which is the structure that builds any web page. This system contains the administrator page, Officer Registration page, Suspect Registration page, Victim Registration Page and the Case assignment Page for CID section.

The flow chart illustrates the workings of this web-based Police Control Information System.
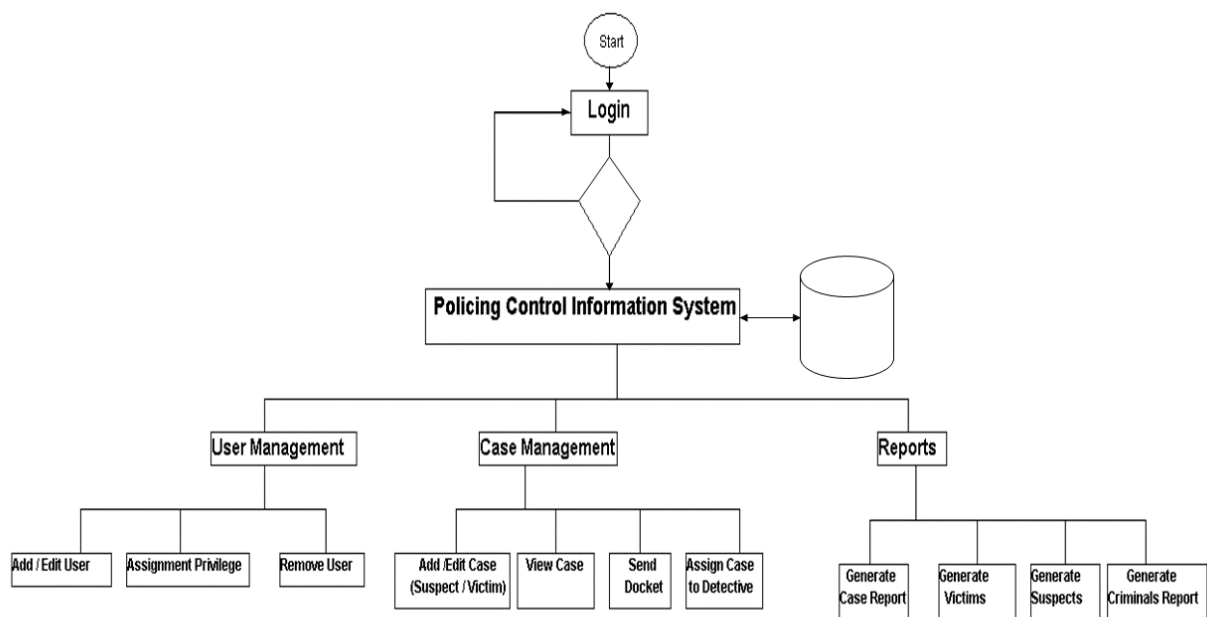
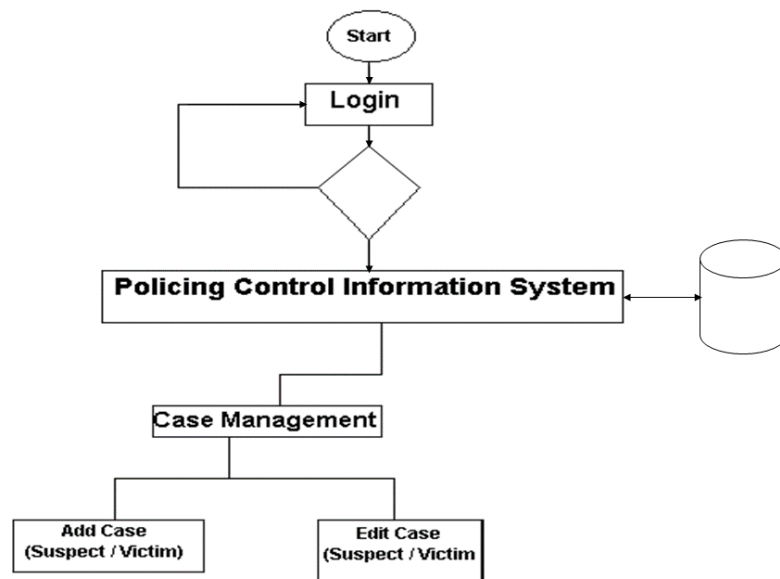## 3.1 SYSTEM DESIGN FLOW CHARTS

Figure *1*: Admin PCIS Flowchart
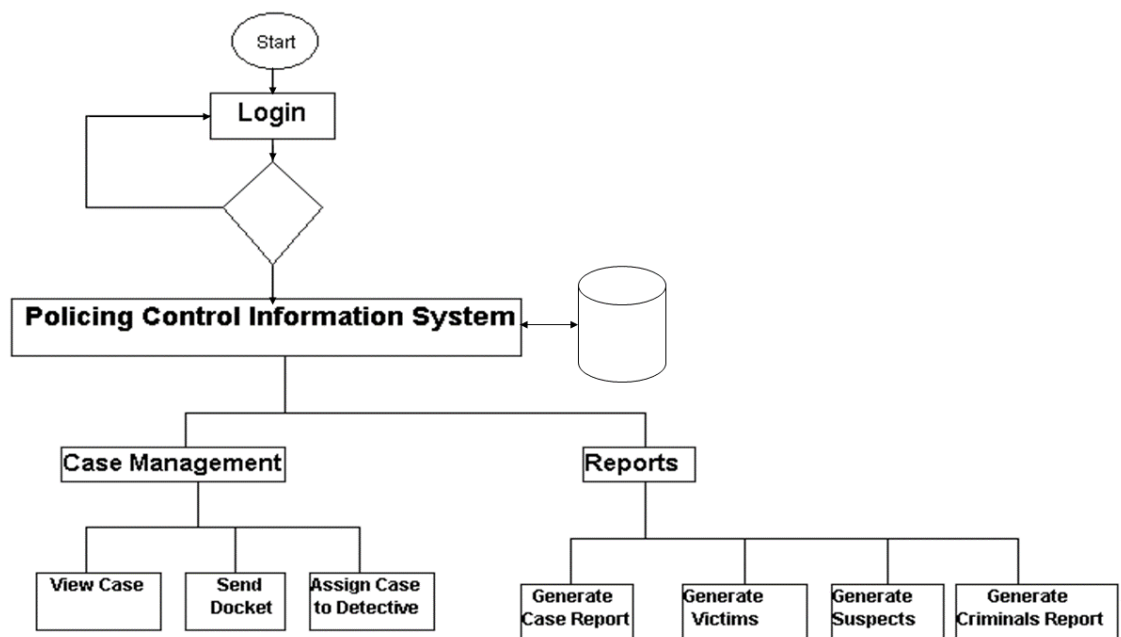
Figure *2*: Officer Module Flowchart

Figure *3*: *Officer Module Flowchart*
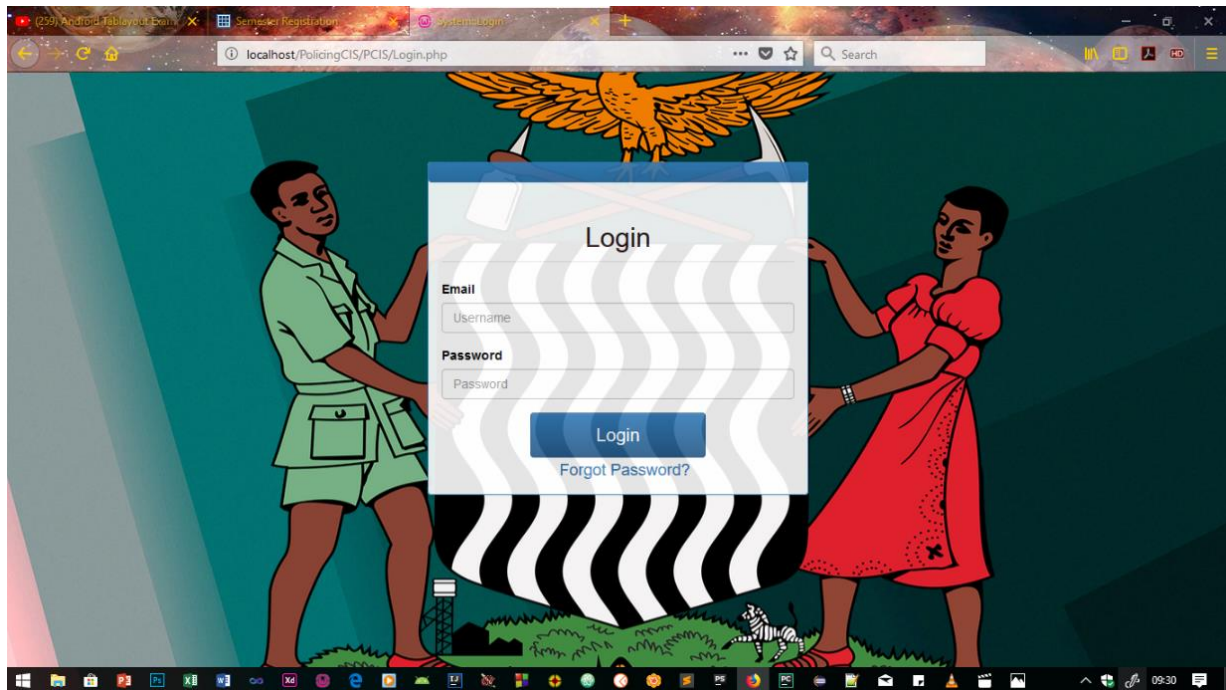
3.2 USER LOGIN PAGE

Figure 4: *PCIS User Login Screen (as screenshot from actual system).*

Figure 4 is a representation of the PCIS login screen. The system prompts the user to supply their authentication details. If the credentials match with the information stored on the database, the system permits the user to carry out an operation. Notably, the system does not leave room for autocomplete filling. This is an added authentication feature to ensure system and data integrity and confidentiality.

4.0 DATABASE STRUCTURE

The main function of a DBMS is to provide efficient and reliable methods of data retrieval to many users. The community of users of a DBMS includes a variety of individuals and organizational entities. We classify these users based on their roles and interest in accessing and managing the databases. The model of database employed in this project is the entity –relationship (E/R) model. The E/R model uses the notions of entity, relationship and attitude. These notions are quite intuitive. Informally, entities are objects that the system need to represent in the database; relationships reflect interactions between entities; attributes are properties of entities and relationships. We used MySQL database throughout this study. This system made use of two (3) tables as listed below.

FIELD NAME	DATATYPE	FIELD NAME
Surname	TEXT	20
First name	TEXT	20
Other names	TEXT	20
Gender	TEXT	6
NRC number	VARCHAR	13
Service number	VARCHER	10

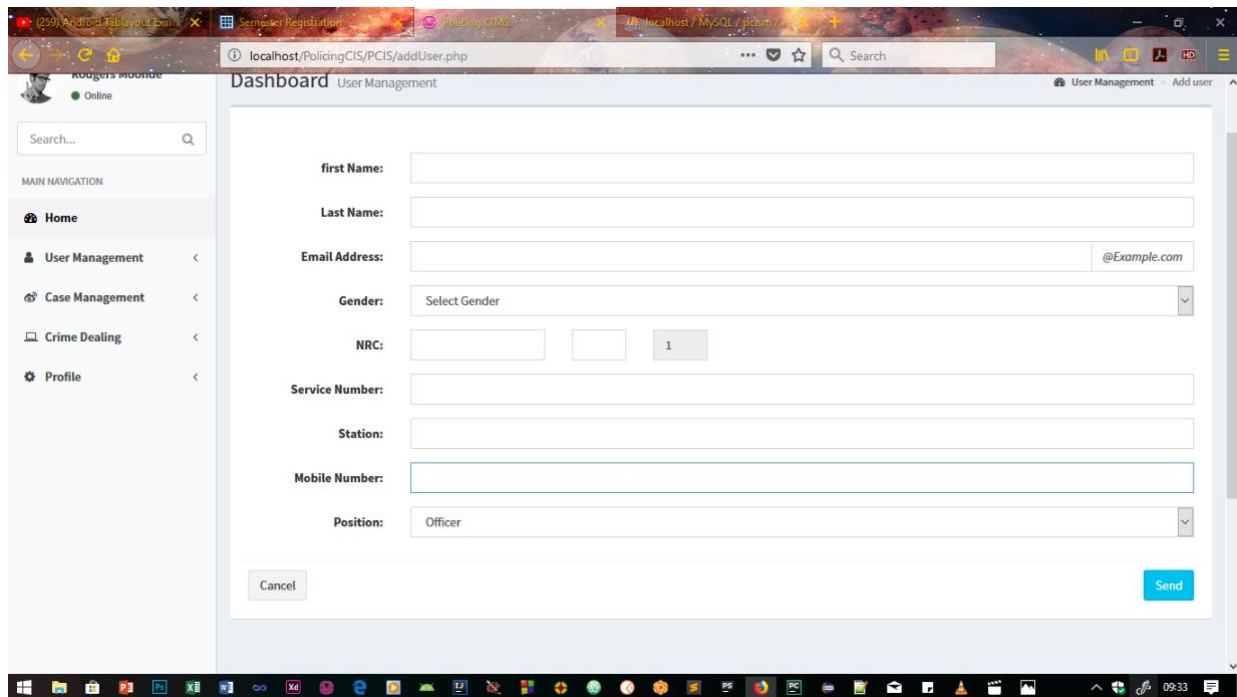| Phone number	Integer	10
Station	TEXT	20

Table 1: *Officer Registration*

Figure 5: *Officer Registration/User Creation Screen (as screenshot from actual system).*

As noted in the previous sections of this project, the admin user creates the users and provides the needed information as per *figure 5*. He does this at the time a given police officer reports at a given station. The service as well as their NRC numbers uniquely identifies each user. Finally, the admin selects the rank or position of the new officer at that station.

Once registered, the least ranked officer can only capture suspect(s) and victim(s) details. The officer can only do that and edit the case entries. We do this to avoid chances of unauthorized user privilege escalation leading to defying of some key elements of information security.

a) Suspect registration table

FIELD NAME	DATATYPE	FIELD NAME
Surname	VARCHAR	20
First name	VARCHAR	20
Other names	VARCHAR	20
Gender	VARCHAR	6
NRC number	VARCHAR	13
Phone number	Integer	10
Town of origin	VARCHAR	20

Nationality	VARCHAR	20
Gender	VARCHAR	10
Date of birth	VARCHAR	10
Residential address	VARCHAR	20
Case name	VARCHAR	20
Case category	VARCHAR	20
Case nature	VARCHAR	15
OB number	VARCHAR	10
Subject	VARCHAR	20
Occurrence	VARCHAR	500

Table 2 illustrates the backend structure of the suspect registration screen. The officers at the front desk capture the suspect details in the order as given in table 2.
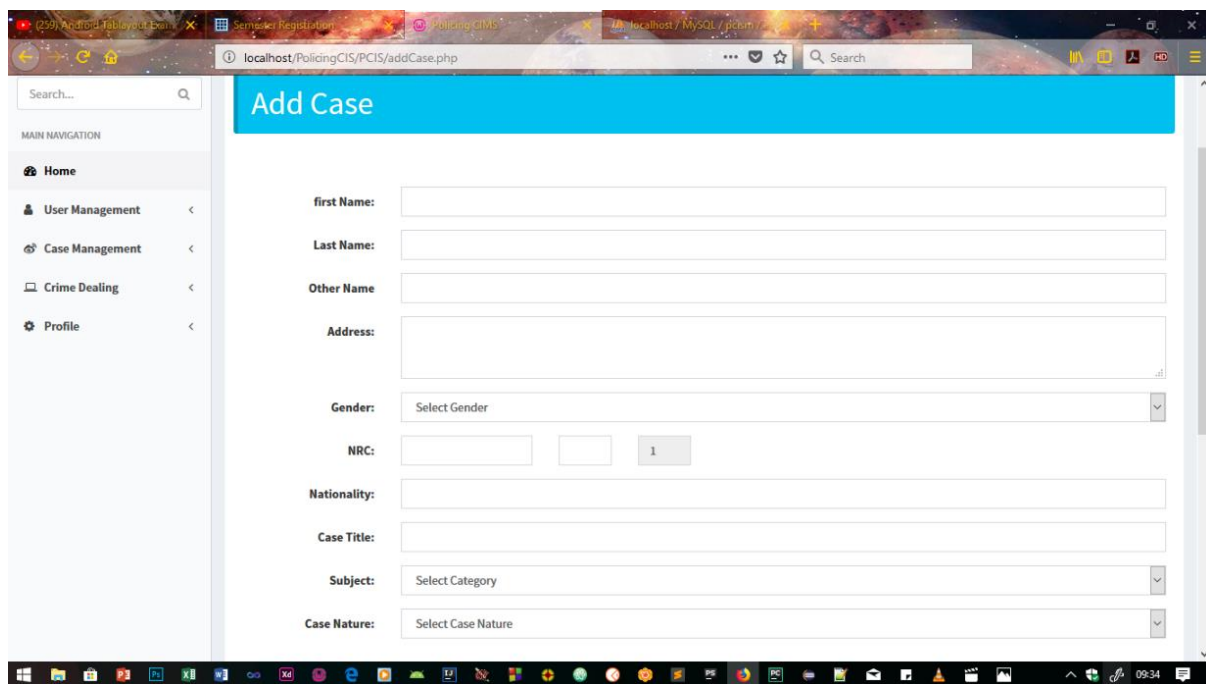

Figure 6: *Suspect Registration Screen (as screenshot from actual system).*

Important to note that the officer(s) at the enquiries desk record all details pertaining the reported case (as seen in *figure 6 and figure 7).*

a) **Victim registration table**

FIELD NAME	DATATYPE	FIELD SIZE
Surname	VARCHAR	20
First name	VARCHAR	20
Other names	VARCHAR	20

10

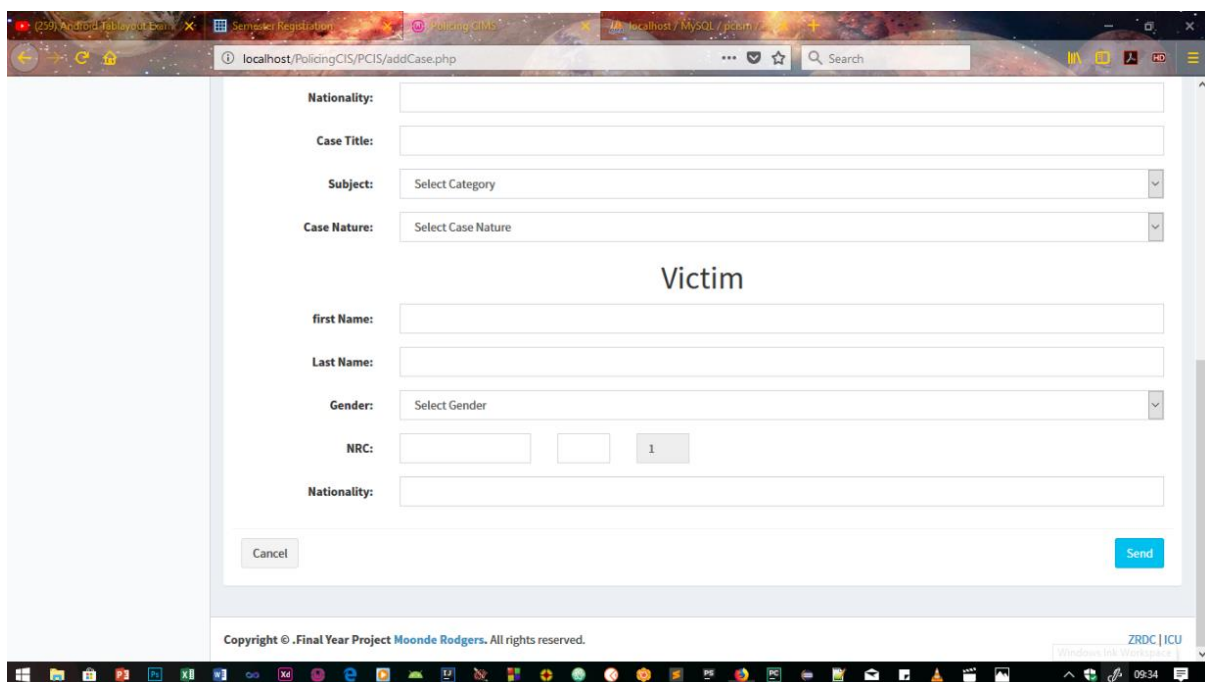| Gender	VARCHAR	6
NRC number	VARCHAR	13
Phone number	Integer	10
Town of origin	VARCHAR	20
Nationality	VARCHAR	20
Gender	VARCHAR	10
Age	Integer	3
Residential address	VARCHAR	20

Figure 7: Victim Registration Screen (as screenshot from actual system).

Front desk officers also capture the victim's details on the same table they register the suspect as observed in *figure 7*. Some of the details captured are the victim's names, gender, NRC and nationality.
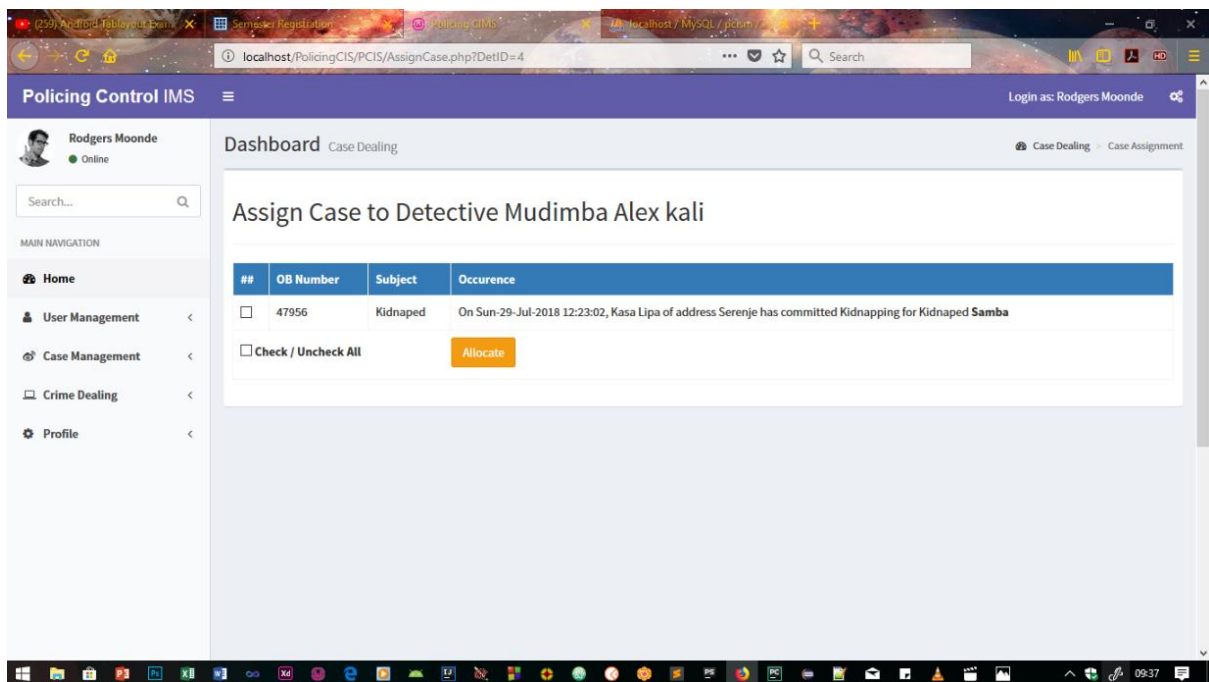
c. CID Section Detective Assignment

Figure 8: *Detective case assigning Screen (as screenshot from actual system).*

Figure 8 displays the CID module. The head of the CID section is responsible for assigning respective detectives to the reported cases requiring investigations. The CID head receives such information from the enquiries desk as OB number, Occurrence, and subject. At this level, the head of section assigns a respective detective to handle the needed investigations after which, the detective arrests the suspect (and only when the investigation findings do not favour the suspect). Else, the detective lets go the suspect.
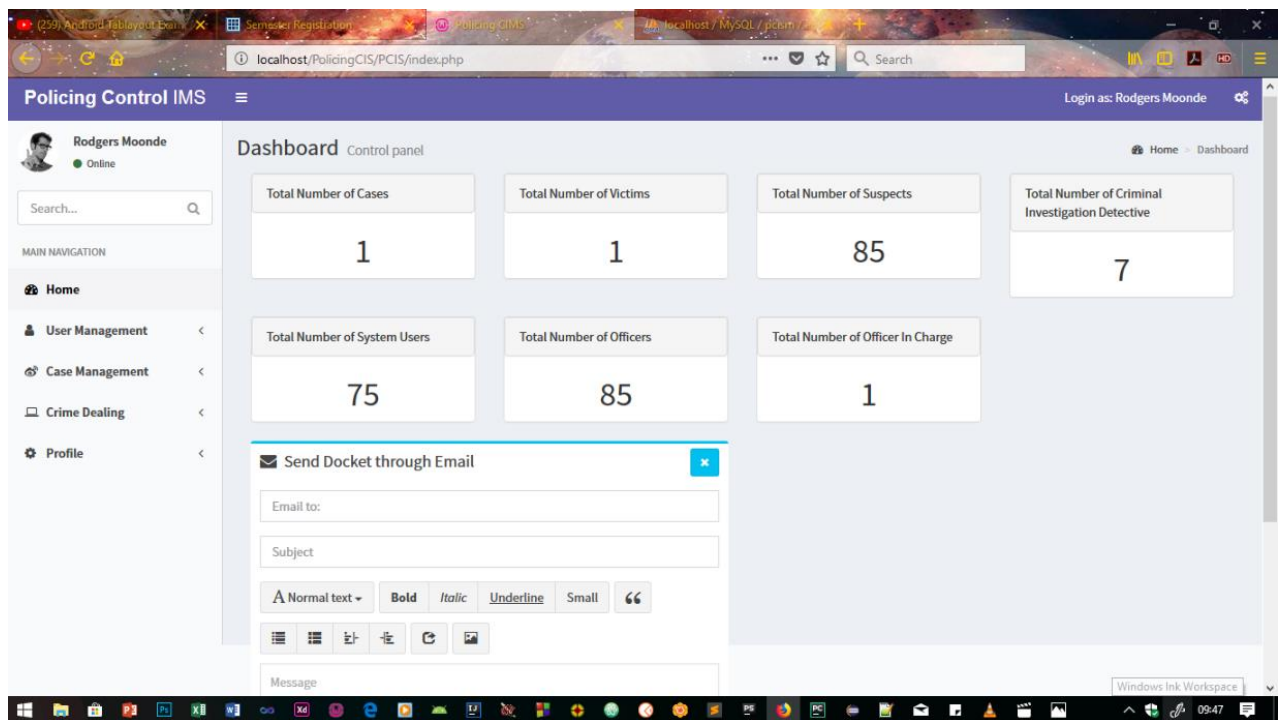
Figure 9: *Main system Screen (as screenshot from actual system).*

The admin user can even send the docket to the requesting parties easily as exemplified in *figure 9*. Among the prime beauties of the system are that you are able to see are the number of system users, total number of cases, total number of suspects and victims etcetera at prompt. Such information is key in decision-making by administration.

5.0 CONCLUSION

A successful implementation of the web-based Policing Control Information System will greatly increase the efficiency of the Zambian Police Service officers and will help to ensure that criminal records are managed properly monitoring of criminal suspects in the country. the problem of delay in retrieving criminal suspects records for reference purposes and for appropriate court action or prosecution to be taken can be reduced drastically and the efficiency in the management of criminal records and investigation of criminal case being rendered by the Zambian Police Service will greatly be improved upon.

FUTURE WORK

The research work carried out is limited to online policing only. We move that we develop a full police portal for effective and wholesome information management technology in our police system. That portal must include the following modules:

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i.   National Prosecution Authority to ease docket acquisition and evaluations,

ii. Developing an online correctional admission system to enable full tracking of criminal records,

iii. Automation of criminal records to enable the management to have access to criminal correction, and

Maintaining a central database for accessing information relating to criminals.

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