DEVELOPMENT OF WEB-BASED APPLICATION FOR CRIME REPORT HANDLING IN POLICE FORCE: A CASE OF JUBEK STATE, SOUTH SUDAN NATIONAL POLICE SERVICES

BY

SIMON GAWAR DAK

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DECLARATION

I Simon Gawar Dak do hereby declare that this thesis is my own original work and has never been presented or will never be submitted for the award of any degree in Kampala International University or any other academic institution of higher learning.

Signed..... Date..08/10/2018.....

SIMON GAWAR DAK

(Researcher)

APPROVAL

The undersigned thesis certified that this work recorded was carried out by **SIMON GAWAR DAK** and has been read and certified to have satisfied the requirements for the School of Computing and Information Technology of Kampala International University for the award of Master of Science in Software Systems Engineering

Sign: ..... Date: 11/10/18

DR. PAUL SSEMALUULU
(Supervisor)

DEDICATION

I dedicate this thesis to my dear lovely brothers Peter and Riak for their love, care, patience, prayers, and time they sacrificed themselves for me without them it would not have been a accomplished. My dedication goes to my lovely wife Sarah for making me strength for her support and encouragement, may the Lord of heaven bless you so much, this is one of the fruits of your good will, and you will be remembered forever. Thank you very much.

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ABSTRACT

Paper based system for handling crime reporting becomes one of the challenging methods in police services globally ever since paper was invented. The South Sudan National Police Services (SSNPS) uses this system for handling crime reporting. This system presents a number of challenges such as a delay in disseminating crime reports by victims or witnesses, misplacement or loss of crime recorded files from the Police shelves and inconsistency of suspect documentation due to wrong manipulation or alteration by some individual in the Police offices. Many studies have reached the importance of Police Force in crime report and investigation process; however few researches have focused on how to handle crime report and hence law enforcement agency experienced trouble with methods of handling crime reports. This research work focused on the development of a web-based application for enhancing crime report and investigation in the Police Forces. This is based on qualitative and quantitative approach using cross-sectional design. Both qualitative and quantitative data analysis methods were used for Police departments data including structured questionnaires and interviews with some Police personnel and a thematic analysis was conducted based resulting in emerging coding categories.

Then four constructs such as suspect identity/recorded information, crime details, digital and physical evidences were analyzed using questionnaires and interview guide respectively. The results indicated that respondents are concerned about the loss, misplacement and manipulation of the crime details, suspect identity/recorded information, physical and digital evidence respectively in Polices Services. Secondly after the data were analyzed, then web-based application was designed. This was done to illustrate the user functional requirements using unified modeling languages (UML) by envisioning Use case diagrams, activities diagrams, class diagram and deployment diagram. Thirdly web-based application was implemented using PHP, HTML and Java script programming languages and database system using MYSQL programming language. Finally, the web-based application was tested and validated to ensure that its actual requirements and specifications are met.

In conclusion based on the finding the researcher recommended that the Police Force need to put more emphasize on effective utilization of crime reporting factors to mitigate and reduce risk of losing evidence, assigned officer is needed to supervise the uses of application implemented in the Police Forces to make sure it is used for right work and moreover organizing training should be done to the Police officers for effective operation and management of the web-based application system.

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LIST OF ACRONYMS/ABBREVIATIONS

CID - Criminal and Investigation Department

COMPOL -Commissioner of Police

CSS - Cascade Style Sheet

DCRHS -Database for Crime Report Handling System

HTML - Hypertext Markup Language

IG -Inspector General of Police

MYSQL - My Structural Query Language

PHP - Hypertext Preprocessor

SPSS - Software Package for Social Scientist

SSNP -South Sudan National Police

UK - United Kingdom

UML -Unified Modeling Language

USA -United State of America

WAMP - Windows Operating; Apache, MYSQL and PHP

CHAPTER ONE

1.0 Introduction

The need for effective method to handling information related to crime reporting has taken on any added significance in today's global environment. Police forces now need to communicate agency-to-agency to share and manage crime information for satisfaction of victim as well as public. Nothing is more important to accomplishing that mission than having accessibility to accurate and timely records (Shoewu et al., 2016). So the availability of this information is vital for Police Force as they serve as evidences basis during the court hearing and for future referencing. Therefore, to accomplish that mission effectively, there is a need for Police Forces to endeavor a method to improve the efficiency and effectiveness in their service provision system.

1.1 Background of the Study

1.1.1 Historical Perspectives

Crime report handling is one of the principal tasks of any Police agent. To achieve this task successfully, there is a need of effective method which can underpin their service delivery for satisfaction of victims' needs and to increase their credibility in crime prevention. Due to the pressures for these demands to maintain a high level of efficiency, Police Forces have been forced to catch on to the technological craze to replace the existing paper based information system that has fails to deliver effective handling of criminal matters and others activities. However, this leads to unanticipated effects on Police performance and tremendous mistrust between public and Police personnel (Richard et al., 2000).

Current literatures have stated that ongoing advancement in information systems and communication technologies allow government institutions to achieve greater levels of productivity, efficiency and service delivery (Brown et al., 2000). For instance electronic workflow processing allows operational reports to be stored and forwarded to appropriate units for follow-up without a host of manual intervening steps. In this 21st century, Police agencies all over the world have come to realized that only those having effective system that overhaul the whole of their administrative systems and operations efficiently are likely to survive and prosper

(Mohamod et al., 2014). For this reason, technological web-based application is widely acknowledged as trustable, economical, faster and effective method to enhance the Police service delivery. Many scholars also from law-enforcement and technologies experts across the world have long been emphasized the importance of technology—and increasingly web-based innovations—in shaping the potentiality of transferring data across hemispheres and between countries (Francesco, 2013). A technological web-based application system would prioritize sustainable solutions based on the fair and transparent application of the policy rule.

By giving the importance of technological system, the web-based application has shaped policing in many important ways, to a great potential for enhancement of Police work. It has been introduced and developed in USA and other European nations at the beginning of early twenty century as a technology innovation and effective method to support Police officers on crime management service delivery to respond the victims and public needs in general (Lyoko et al., 2016; Christopher, 2009). This concept was coined as a digital platform for effective management and to promote accountability in work place in recent year in respond to the victims need. With the growing number of crime support system, scholars argued that those with automated application are better equipped to address the crime investigation challenges today than those with paper based system to satisfy victim of crime (Christen, 1999). Web-based application is also used for different purpose in government administration such as a tool to assist the core business activity as well in military warfare and there are also some more studies about it today (John et al, 2001; Jason et al., 2014; Addreley, 2014). In developing countries like Thailand and Malaysia, Police Forces take an initiative to adopt web-application to security data storage, records crime information and share this information across the country in different Police units. Some African countries for instance South Africa, Zambia, Kenya, and Nigeria also take an initiative to improve Police operational through the use of innovative web-technologies to support them in management of crime cases and efficiency in operations (Henry et al, 2014).

Despite some initiatives taken place about the adoption of web-based technology in those few developing countries, some have limited capacity to come up with this technological innovation for handling crime reports. For this reason, gaps remain in their web-based technological capabilities. This factor led some individuals and private sectors to come up with such a technological innovation to address those challenges in Police Services. However, as the world

clinches on the rapid increase in advancement and the use of web-based technology, South Sudan Police Force is still behind in implementing the new technology in particular at the criminal investigation and crime reporting (Kuot, 2017). Therefore, there is a need to address this gap in South Sudan National Police Services particularly in Jubek State as the study is concern.

1.1.2 Theoretical Perspective

This study was guided by hybrid evidence investigations theory (Konstantinos et al., 2012). This theory hold that various items found in a crime scene may be examined as both physical and digital evidence, which we consider as hybrid evidence. Both physical and digital evidences add the possibility of a physical object to have hidden digital characteristics which should be considered in crime report and investigation. Digital evidence is data of different forms like text, images, audio and video which is stored, processed and transmitted by using digital enable devices and networks.

Physical evidence is considered as any physical material or object found from the crime scene such as broken glass or gun shoot used as evidence for investigation purpose. These evidences are any available bodies of information indicate where a belief in some proposition is justified. They are used as sources of information to solve the case successful. This theory holds that both physical and digital evidences are used to support the hypothesis of the crime incidence where the examined result is reconstructed and statement produce entails the proof to solve the case.

1.1.3 Conceptual Perspective

The crime report handling is defined as way of managing the crime recorded files in the Police to make decision. The crime report is a process of notifying the Police for any crime incident through the use of communication services to contact or visiting the police station. The crime report handling perspectives was looking at the difference crime scene details, suspect identity, victim-witness survey, physical and digital evidences respectively.

The web-based application referred to a software package that can be accessed through the web browser to process and transmit data via the Internet connecting heterogeneous hardware and software system. Web-based application is any application that uses a website as the interface or

front-end. It is automated system that provides remote access to the end-users from any Internet connected computer machine ((Heike, 2006). Web-based applications become common today to do difference work required compare with traditional paper based system. For instance it can be used to share reliable information in law enforcement agencies to enhance crimes management. In this study, the web-based application can be presented in three tier architecture which included web-browsers, web-application servers and a back-end information system supported by a suite of crime databases used to manage the suspect identity/ recorded information, victim and witness information in police departments. One of the main benefits is to get accurate report or reliable crime information. It is primarily uses hypertext approach for disseminating crime information.

1.1.4 Contextual Perspective

In the context of South Sudan National Police Services, the uses of paper based system still existed. As recently study revealed that, the South Sudan National Police Services with exception of immigration department, all work are done manual on the paper based system,(Kuot, 2017). It has been found that the information reported by the victim/volunteers to police officers in Jubek State, lost from the Police offices. Sometimes the suspects recorded are manipulation by some Police officers in-charged which resulted into inconsistency of the data simple because that are stored on paper files in Police shelves. However, the system has failed to help Police Force to disseminate and share crime information reported as fast as possible.

This research looks at the development of a web-based application for crime report handling in Police Forces aimed to enhance the accountability in law enforcement agencies.

1.2 Problem Statement

The South Sudan National Police Services (SSNPS) currently uses a paper based system where information related to crimes activities are being kept in the form of hard copied documents. Keeping the crime data and information in such a hard copied documents presents a number of challenges in the Police Services. One of these challenges is that there is a delay in disseminating crime information reported by victims or witnesses which results in miscarriage or failure in the administration of justice. Most evidences recorded files are often misplaced by Police Officer (s)

in charge and even loss of recorded crime details from Police shelves. Finally there is an inconsistency of criminal records documents due to wrong manipulation or alteration by some individual in the Police offices.

To solve these challenges by professional based policing, web based application system is developed to support Police officers for handling of crime cases, speed up the dissemination of criminal information reports, records searching, retrieval of complainants' offenders' information as well as to follow up the case status, reports generation, and keep track of information concerning crime cases in Jubek State, South Sudan National Police Services. This system mitigate the data loss and inconsistency of criminal information due to wrong manipulation by some individuals within the Police offices by increasing the data integrity and transparency, ensured authorized access to all users.

The motivation/enthusiasm to study the topic under discussion was the result of the difficulties Police Force faced in developing secure and effective method that can be used to mitigate the data loss and manipulation of criminal information in Jubek State which were addressed with the use of web-based approach designed to enhanced handling of crime reporting system. The users of this web based application are predominantly the registered Police Officers only for security reasons.

1.3 Purpose of the Study

The main purpose of this study is to automate the handling of crime reporting in Police Force.

1.4 Objectives of the Study

1.4.1 General Objectives

The main objective of this research work was to develop a web-based application for crime report handling in Police Force.

1.4.2 Specific Objectives

The specific objectives are to:

1. investigate the existed problems of crime reporting system in Jubek State, South Sudan National Police Services.

2. design a model of web-based application for crime reporting system in Jubek State, South Sudan National Police Services.
3. implement the web-based application for crime reporting system in Jubek State, South Sudan National Police services.
4. test and validate the web-based application so as to ensure that its actual requirements and specifications are met.

1.5 Research Questions

1. What are the existed problems of crime reporting system in Jubek State, South Sudan National Police Services?
2. How can a model of web-based application for crime reporting system be designed in Jubek State, South Sudan National Police Services?
3. How can the web-based application for crime reporting system be implemented in Jubek State, South Sudan National Police Services?
4. How can the web-based application be tested and validated to ensure its actual requirements and specifications are met?

1.6 Scope of the Study

1.6.1 Geographical Scope

This study was based on three Police stations of Jubek State namely Malakia Police station, Juba central Police prison, and Juba Police Traffic central where interview was conducted from the few individual of the Police officers. Structural or close-ended questionnaires were distributed to some selected Police officers in three stations mentioned above.

Those three stations were chosen because they represented a good demographic spread and due to their easily accessibility due to the financial and security situation to the researcher.

1.6.2 Theoretical Scope

This research is underpins by hybrid evidence investigation theory developed by (Konstantinos, 2012). This model focused on both physical and digital nature of the objects collected as potential evidence which he referred as hybrid evidence-physical and digital evidences. He stated that both physical and digital evidences are two investigative factors which require proper attention to avoid losing them because they provide reliable source of information needed other

why there would be no successful solution in case they are not available. This theory seeks to provide law-enforcement agencies to have more attention and comprehensive understanding on the successful investigation factors used as sources of information needed to make decision. This model also requires law-enforcement agencies to used digital method used for managing them to avoid the loss of crucial evidence, physical or digital. In his statement early saying that both physical and digital evidences are only reliable sources of information in crime investigation but stated that other essential elements can be considered to uncover the information needed in crime investigation.

For this reason, three additional factors are incorporated which include victim-witness survey, suspect identity/recorded information and crime details/nature of type to enhance crime investigation process to make decision. These constructs form a new theoretical model.

1.6.3 Content Scope

The research study examined both crime report handling and the development of a web-based application as independent and dependent variables respectively.

The crime report handling mainly focused on the investigation of existed problems of crime reporting system such loss of crime details, inconsistency of suspect identity/recorded information, misplacement of victim-witness survey, physical and digital evidences respectively because these data are used as reliable sources of information in court of law.

The development of a web-based application was focused especially on design, implementation, testing and validation of a web-based application. The design was focused on application models and the implementation explored the coding of a web-based application. The web-based testing and validation specifically look at the two aspects; usability of the web-based application to determine whether the application system accomplishes the tasks proposed it for or how the web-based application provides the functionality required it to accomplishes, these involved the application effectiveness in term of consistency, documentation of records, feature set capabilities, security and visibility of all images uploaded in the system, efficiency-included task completion time or system response time , and satisfaction usage in term of users easy navigation of the system are the talking point in this study.

1.6.4 Time Scope

This study took more than one year since June 2017. It starts from the project concept paper and proposal up to the days of data requirements collections, analysis of the data requirements finding, design, implementation, testing and validation of the proposed web based application as well as thesis defending.

1.7 Significance of the Study

The management of crime reporting is the interest of both law enforcement agencies and public domain (David et al., 1995; Daud, 2014). The study helps different law enforcement agencies in handling crime reports particularly the Traffic Police officers, Police civil defense, and Police Prisons as the main beneficiaries.

The researcher and academicians will benefit from this study in the area of knowledge acquisition by enabling them to learn and understand how to manage crime investigation process factors on crime incidence reported in the current dynamic and complex world of this 21st century and upcoming centuries for modern method needed in handling crime activities. This knowledge contribution will impact the existing web-based application used as method to promote accountability and integrity of records and improve their work performance.

The study findings and recommendations as well as the method used helps researcher to identify viable areas for further research and service as a point of reference.

1.8 Operational Definitions of Key Terms

These are essential terms which were used in this research study in order to give their specific meaning on how they are conceptualized in the study.

Crime report handling is the way of dealing and utilizing various crime activities which the South Sudan Police Forces engage with to improve their work performance. This is vital task to all Police Force to use information in affective manner to achieve a common goal of the Police institution for the community service deliver.

Crime details these are related crime information regarded as numerous types of crime needed by the South Sudan Police Officers to investigate and identify the most committed types of crime affect the community often and find way to handle such crime situation amicable.

Physical and digital evidences these are available body of information investigated from physical and digital nature of an object.

Suspect identity is concern with particularly offender information which enables Police Forces to get reliable data that can be used for making decision.

Victim-witness survey/testimony is the historical information gathered from both victim and witness that provide Police officers to make decision.

Polices Services the South Sudan National Police Services are regarded as responsible personnel that deliver effective community services by cooperating with civilians to maintain efficient management of services for ultimate security of all people. The Jubek State, South Sudan Police officers offer demand such effective system by enforcing traffic and crimes investigation rules needed to solve the case successfully.

Law enforcement agencies are South Sudan especial agencies responsible to enforce the law based on constitution. The Police like any other law enforcement agencies have been given power by the constitution of the country to enforce the law to the public.

Web based application entails the method which the South Sudan National Police used to facilitate the exchange and management of information that has a lot of potentials for the information process component to deliver such information between the offices. It is where Police user can easily access and share crime data and information reported by victim-witness using only installed network premises bound within South Sudan and accessible to the registered Police users only.

1.9 Organization of the Research Study

The first chapter introduces the background of the study, problem statement, purpose of the study, general and specific objectives of the study, research questions, significance of the study, scope of the study, definition of the key terms and organization of the research study.

The second chapter looks at the conceptual definitions of crime report handling, development of web based application, theoretical model supporting the study, related literature review from various scholars' worldwide, conceptual framework or model and research gaps.

Chapter three looks at research methodology, research design, population of the study, sample strategies, sample size, data collection instruments, validity and reliability of research instruments, tools and technologies used for the proposed web-based application system that involves data analysis tools, model design tools, application implementation languages, application development process, data collection and analysis process and ethical consideration of the participations , order of information in South Sudan Police National Services and system information flow.

Chapter four explained the analysis of research findings for the issues collected from Jubek State, South Sudan National Police Services, discussion of research finding, architectural modeling design of web-based application, data table design, implementation of a web-based application, testing and validation of the web-based application, and deployment of the proposed web-based application.

Chapter five explained the conclusion of the study, recommendations and challenges of the study.

CHAPTER TWO

LITERATURE REVIEW

2.0 Chapter Overview

This section provides a brief definitions of key concepts on web based application and enhancing crime report handling from various literatures related to this study. The main focus in this context is to entail the sub key factors of crime reports needed to gather the information about the challenges faced by the Police Forces and by identifying the web-based application as reliable method to replace the paper work. This literature review provided a brief explanation about the theory suitable to support this study. The study identified the gaps left in that theory by the researchers and other similar studies and then the researcher attempted to filled the gaps so that it can contribute to new knowledge in the academic world.

2.1 Crime Report Handling

Crime report handling entails the management of crime investigation and utilized these records in appropriate manner for wellbeing of the public (Fabrizio et al., 2012). This also entails monitoring various related crime issues, integrating essential method to enhance service deliver to encourage victims to report any incidence in Police station so that the opportunity to share knowledge and exchange ideas could be enhanced.

Information about crime and who is responsible is critical management. For this information to be of great use, it has to be handled. Crime report may take various forms of crime activities reported such as digital and physical evidences, which (Johnson, 2014) need crime statistic program to obtain intelligence about crime evidence and public mobilization in general on how to report different types of crime. For this community mobilization to occurs, the effectiveness handling of the Police crime as a crime reduction effort must be in place. In the Police need professional policing and effective method to avoid the manipulation of suspect identity/ recorded information in the Police offices (Shea, 2003). Such evidential data provides the Police Forces to identify the victims and the suspects as well as to identify the most people committed the crime between the youth and old ages. The information also helps them to know the crime

trends in order to find a proper decision to enhance the handling of crime reports (Gerald et al., 2003).

The handling of various crime reports is to deliver the service to the community after the external support has occurred.

2.2 Development of Web-based Application

Development of web-based application encompasses the notion of the application of technologies to information handling (generation, storage, processing, retrieval, dissemination etc) and presents the data to desired parties (Marghalani, 1987). With regard to that information, web-based systems until now have dealt with largely transactional data in predominantly numerical form, with a bit of textual information, which can be more easily normalized, structured, sorted and searched (Kantatamalunda et al., 2004). The web-based application is an essential system addressing user's problem anywhere in the world. The web based applications is associated with the Internet to support internal work within that institution by transferring the data to reach others business partner (Tomas et al., 1998). Many scholars widely argued that the web-based system is an essential method for handling information which in turn leads to efficiency in performance of organization.

As tied to the performance "the ability to share information agencies-to-agencies depends on how the work environment is designed to enable Police departments utilize work activities as if it were an asset (Baumer, 2004; Buzawa et al., 2003). This helps Police to improve effectiveness and victim to benefit from collective knowledge. The working environment designed to satisfy victim and free flow of exchange of ideas is a better medium of solving the case (Vlachopoulos, et al., 2007). In this study it is necessary to use new technologies to support conventional criminal evidence investigation that can be adopted in law enforcement. Most of us now a day rely on Web-based applications for reliability, performance and maintainability of reliable data (ISO/IEC 9126-1, 2001). The web-based application is predominantly become essential method used to prevent loss of volatile data or evidence related to the crime committed in Police agency. Therefore it is necessary to adopted new technologies to support conventional criminal evidence investigation process in law enforcement (Vlachopoulos, et al., 2007). The web technology has become an effective system to handle the information in its myriad forms such as text, graphics,

video and audio etc and provides a remote access to the end-users from any Internet connected computer machine and a back-end information system supported by a suite of crime databases. This method is used to investigate both criminals and political suspects (Christopher et al., 2009). Police records (in the form of crime rates, patterns, etc.) are very important and will probably become more so as we expand our data collection and analysis capabilities.

The recorded data in this system are useful for decision making (Kantatamalunda, 2004). But the development and implementation of this method depends on functionalities needed to handling their data.

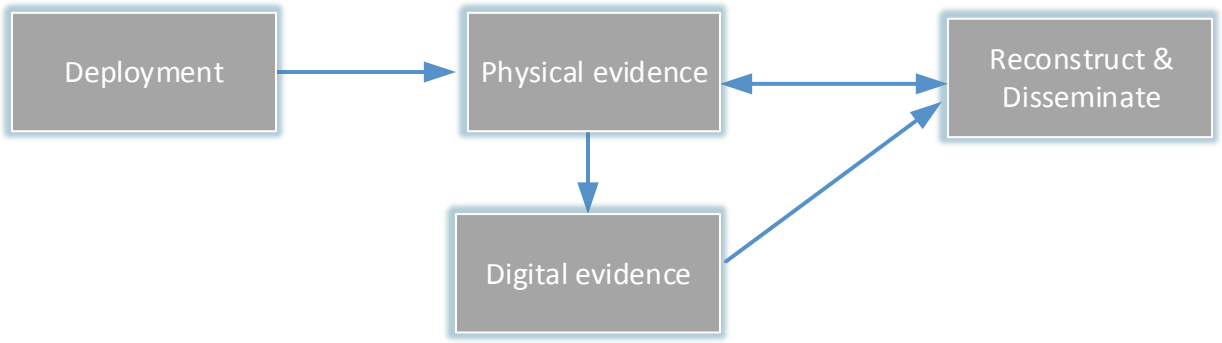
2.3 Theoretical Model Supporting the Study

2.3.1 Hybrid Evidence Investigation Theory

The Hybrid Evidence Investigation theory had been proposed by Konstantinos in the year 2012. This theory suggests that the hybrid evidences; physical and digital evidences are factors play an important role in crime investigation process to provide relevant information needed if managed properly. An investigator conducting investigation process on crime incidence reported need to put into consideration the digital method used for managing them to avoid the loss of crucial evidence, physical or digital (Konstantinos 2012). In another way successful finding of information required can be attained through physical and digital evidence investigation process and if they are handle properly through digital method to avoid losing them. He argues that these factors are evidential data objects found on crime scene to support the hypothesis of the crime investigation process where the result is reconstructed to be presented to the court of law for decision-making. He also advice that the need for investigating crime in a more accurate way has open a way for effective system focusing on the collection and examination of evidence connected to a crime with the goals of achieving satisfactory results and motivate victims so as to give them a sense of pride and purpose in what they want.

The theory stated that an authorized investigator can be motivated to perform better when there is an effective method of carrying out the process that will lead to good result. This theory holds the majority of the benefits of the existing models as it can be implemented to every crime scene investigation whether digital evidence is present or not (Vlachopoulos, 2007). He argued that the format of the model has been adjusted to face the challenges of digital evidence and the emergent

technologies and expansion of this model is possible for other researcher. He concludes that certain factors used in investigation process result in satisfaction if storage and handle properly, but if absent, they do lead to dissatisfaction and no more confidence or enthusiasm toward the investigator or authorized entity deployed so far. His model below presenting the investigation process based on specified phases as illustrated and explained below the diagram.



Source: (Konstantinos et al., 2012)

Figure 2.1: Hybrid Evidence Investigation Model

As in the diagram he argued that investigator in the deployment phase is authorized entity appointed to carry out the investigation process leading to uncover information of various items as in the second phase consist of different types of physical evidence collected as documents, glass, soils, minerals and other vegetative matter, fingerprints, hair, fibers, firearms and ammunition, powder residue, explosives and petroleum products, impressions and tool marks, drugs, paint, blood, semen, saliva, organs and other physiological fluids. As this study is concerned, due to the development of computers and related technologies, digital evidence has become an equal important material in many investigations process to law enforcement agencies. In his third phase he argued that digital evidence is data of different forms like text, images, audio and video which is constructs and disseminate the finding to other parties to take a critical decision as indicated in the final phase. The two ways arrow from second and final phases respectively indicated information that physical evidence can be review by others investigators when further check is needed.

Based on those explanations, this study indicates that the success of satisfaction of the case largely depends on the effective method used by the Police Force. Konstantino's research proved that people will strive to achieve confidence toward the Police because they are satisfy with the process of information they provide if managed properly but soon wears off if their satisfaction is not considered or met. Then as now, poorly managed Police institutions fail to understand that people are not confidence by addressing their needs through effective use of advance technology to store, process and transmit by many digital enable devices and networks.

2.4 Review of Related Literature

This empirical analysis attempts to discuss the different related studies on the crime investigation handling and web based system from various sources.

For crime investigation to be successful, difference attributes of crime reporting have to be considered during the investigation process (Lee et al., 2001). He emphasized that these factors helps the investigator to find the evidence. Factor like physical evidence investigations open the door as a point of reference to search the digital evidence in crime investigations. This lead the crime investigation theory remains an open field of research to find new way method of handling crimes committed, (Vlachopoulos, et al., 2007).

Information technology can facilitate this orientation by improving the integration, analysis, and dissemination of information both within and across agencies to increase the efficiency of Police in ways that ultimately improve their service and performance (Agarwal et al., 2011). It helps agencies to manage offense reporting better and thus have the potential to both improve citizen satisfaction and facilitate crime prevention. Other scholars argued that the duration which the crime information is processed by the Police investigators provide a better understanding on how long the Police keep the case reported by victim or witness/volunteer to the court (Akins, 2013).

Based these research studies as this study is concern it is recommended that, it is important for Police Forces to identify the necessary crime investigation model and come up with innovative approach.

As supported by other scholars that technological modeling system keeps a lasting record for crime committed and criminal arrested (Steven et al., 2000). In United State of America, the

Federal state authorities like Atlanta Police department, all criminal's information reported are processed in criminal justice information system for all law enforcement agencies to share the information. The system helps the attorney general who is responsible to handle the cases of criminals and civil appellate cases in united State of America. The investigations perform by criminal justice system and protective services personnel to find essential evidence and record that information in the system (Whitney et al., 2005). When a crime has occurred , the goal of a crime investigator or verification officer is to collect the evidence, from both the scene of a crime and anything or anyone that have come into contact with the crime scene, recognized and document the finding (Shoewu, et al.,2016). This evidence services as a future reference for court of law.

However, other initiatives of crime preventative approach are used to gathering information to (Lawrence .et. al., 2013). The crime investigator selected to give full-time service to the detection of crime information. This information produced is used as basis for local management reports. In USA, the automated case management system, i.e. database developed by the executive attorney general office to help in the tracking all criminals and civil matters, cases and appeals and personnel resources matters, (Kenneth et al., 2003). All these reports assist both Police and the court for the resolution of the case with the goal of reducing the insecurity to maintain the law and order.

But in Africa, many countries today suffers from some aspects of economic, social and political underdevelopment, lack of human development and technology but the most salient characteristic is their insecurity caused by all those factors(Christabella e tal., 2014). The argument can thus be made by effectiveness of handling crime report in African countries to improve the security and hence increase the public trust toward Police Forces. The technological advancement introduction, the web-based application in Police services reduce the insecurity and improve the performance of law enforcement agencies. The study revealed that many of the public are not satisfies with performance of the Police Force in handling crime report. The relationship between the web-based application and the crime report handling is become significant in Police Forces. The crime report handling involved factors: type of crime committed associated to victim/witness victimized at specific location and time, suspect identity/recorded

information, digital and physical evidence and such factors are so important in crime investigation process.

The crime rate often increases in the cities of South Sudan due to the economic problem which is also caused by urbanization (Joke, 2013). In addition to, civil war plagued the country into different crime activities.

Study finding showed South Sudan National Police Services used that manual paper based system for keeping such information and store records in manual books instead of it being in the form of data input into computer and store in system, problems arise which have plagued the South Sudan policing system in the country. As far as the empirical findings indicated, the use of paper based filed system by the South Sudan National Police Services resulted into number of problems such as delay of the criminal case without being charge as crime reported flow from one office to another(Joke, 2014). This indicated that the crimes reported daily by the victims or witness can take some weeks or months without being submitted to the court for trial. However, according to (Human Right Watch, 2012), some detained individuals spend a lot of time in person without forwarding his/her case to the court. In addition sometimes there is a loss of information from the Police offices due to improper handling which resulted into long detention of the criminal without being charges in the court. Based on the empirical findings during interview to some Jubek State Police officers, there was one Police Station burned down by accidence some few months ago in Juba and the entire crimes recorded document lost and this also effect the victim of crime. According to a report by (ECPO, 2015), several issues in Jubek state have been identified. These issues can be examined to know the contextual handling of crime reporting in government. It is through these contextual issues analysis that was done to examine the problems that affect government in handling crime report. These problems have been categorized as suspect identity/recorded information, physical evidence, historical text, digital evidence and crime scene committed. To deal with these challenges, vital role is needed to enhance the crime report handling in Police Services to improve the security of the country and in turn the effectiveness of the Police in their services provision. This is in line with public needs to know more about Police performance so that they will develop true confidence toward Police personnel (CEPO, 2015).

The adoption of advance computer technologies has led to more effective ways of detecting and fighting crime in society. Today, engineers and researchers have proposed and developed a number of computer based systems, especially for crime detection and reporting. With the improvements in spatial information and databases, this is making the integration of GIS more effective in those implementations. The section below gives a summary review of the designed issues of web-based systems developed around the world and how these issues can be addressed in this study.

2.4.1 Weakness and Strength on the Web-based Application

Web-based systems, especially larger systems, are complex. Many larger and high performance systems have been successfully developed in various organizations. However, it is not unusual to hear stories of failures. The primary causes of failures are flawed design model and development processes and poor management of development efforts (Deshpande, 2002). There are some common issues on the designing and development of web-based application. Web Engineering uses scientific, engineering and management principles as well as systematic approaches to successfully develop, deploy and maintain high quality Web-based systems and applications.

The failures of Web-based application systems are similar to software crises in 1970's. However, there is a major difference between Web-based systems and traditional software. One of the strength solutions for software engineering approach is to try to freeze the user requirements. The understanding of user requirements is considered to be the first step of most design models as illustrated in chapter four of this research work. It is unfortunately a fact that web-based application system bears the nature of evolution. Not only the requirements but also the information content keeps changing. The scalability and maintainability are two important concerns of development (Deshpande, 2002) some other issues include accessibility, security, interface, and personalization.

Security is a key issue of the design of Web-based support system. With protection measures at network level, we still face attacks at the application levels (Prentza et al., 2001). Modifying HTML forms and SQL queries at the client side are some feasible vulnerability. Cross Site scripting (XSS) is an even dangerous one. XSS is a special kind of attack that users may submit

malicious HTML with JavaScript or other scripts to dynamic Web applications (Prentza et al., 2001) any in-puts from a browser should be sanitized before storing to prevent such attacks. It is crucial to protect Web-based support systems against unauthorized access or modifications of information, and against denial of service to authorized users (Joshi et al., 2001). It is evaluated that various access control models may be used for Web-based applications and their suitability for supporting such systems are accessed. A detailed review can be found in (Joshi et al., 2001). Proponents stated that it is possible to diagnose security holes of web-based system such as web vulnerability and error scanner (WSVES).

Others system problems caused by human errors such as accidently deleting data. These problems can be solved using undo proxies and rewind-able storage could be used to quickly restore a prior snapshot of all system state. Others considerations to address these weakness is that one need to ask the following questions for any system design model. Although the following set of criteria (Kuittinen, 2001) was proposed for a special type of Web-based system, we can generalize it easily. It is basically the questions we should ask before designing a system model.

• To whom the system made for and for what purpose? How does the system support searching or manipulating information effectively? How does the system support different kinds of users?

• What are the levels of services in terms of versatility, adequacy, and functionality? What are the levels of tools in terms of versatility, adequacy, and functionality?

• What is the level of communication possibilities among interest groups? What is the level of possibilities to give feedback? What is the level of the system in its entirety?

These factors need to be bear in mind if you are designing the system. However, other initiatives of preventative approach like Uniform Crime Reports can establish to handle crime investigation process (Christopher et al., 2005).

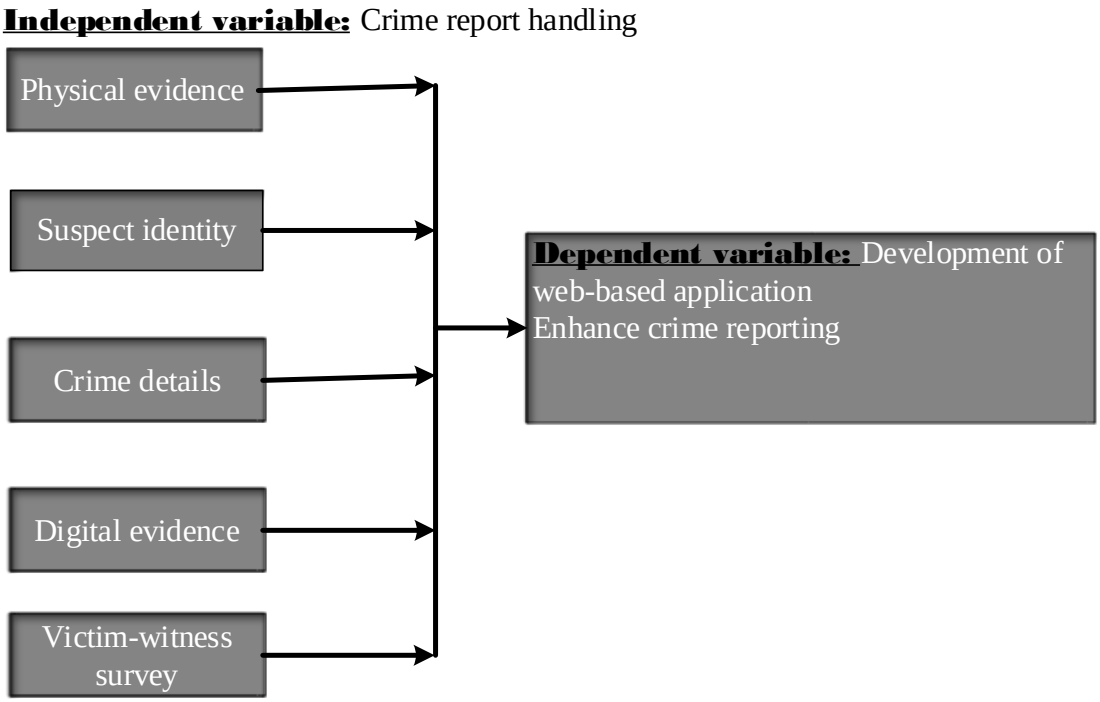
2.5 Research Gaps

The theoretical and empirical studies especially from Konstantinos model address specifically acknowledge both physical and digital evidence for crime investigation process. The theory holds that others available body of information can be incorporated to support the evidence

finding successfully as process to recognized, identified, individualized and reconstructs it to the suspect or the accused person (Lee 2001; Whitney et al., 2005). The reviewed study theory sought to identify the essential factors used in crime investigation process by acknowledging that physical and digital evidences are two constructs that can help Police Forces to gather information during crime investigation process (Konstantinos et al., 2012). However, this study did not acknowledge that others constructs such as suspect information and victim-witness survey as well as crime details can be incorporated in crime investigation process to enhanced crime reporting and technological method that can be used for managing them. Others scholars acknowledge that web-based technology has been adopted by both developed and third world countries' law enforcement agencies as a method for handling crime activities to enhance their work and to promote accountability in Police office (Lyoko G.et al., 2016 ; Henry et al, 2014**)**. However, this study was never been conducted in South Sudan as it was conducted in USA, Europe and others third world countries like Kenya and many more. Therefore, both content and contextual gaps have been identified in those studies and address by defining the role played by web-based application to ensure the information integrity and to improve the efficient of services delivers in Police Forces.

2.6 The Conceptual Framework

This conceptual framework suggest the systematic information exchange model of crime investigation processing to enhance the crime investigation process in Police Services as depicted in the figure below.



Source: (Adapted From Konstantinos et al., 2012; Extended By Researcher 2018)

Figure 2.2: Proposed Conceptual Frameworks

2.6.1 Explanation of Theoretical Framework

This conceptual framework is showing the relationship between the independent and dependent variables. As indicate in the diagram at the left side is crime report handling as independent variable and development of web-based application as dependent variable. This conceptual framework was adapted from Konstantinos theory which focused on both physical and digital evidences as only sources of information needed however other investigative factors are also reliable to uncover information and therefore three additional variables namely crime details, suspect identity and victim-witness survey were incorporated to enhanced crime investigation process. The availability of crime details, suspect identity, victim-witness survey, physical and digital evidences enhanced crime reporting. The development of web-based application helps to attain successful crime report handling. These were chosen because they are the key points of crime investigative factors in Jubek States.

2.6.1.1 Suspect Identity

Suspect identity/recorded information are an essential aid for crime investigation process. It purposes is to support the investigator to verify the identity of an individual commit crime in crime reporting. In this model, the availability of this determinant helps the Police Force to make decision as a one of the crime reporting factors for evidential data if preserved in web-based application. Suspect can be defined as an accused person who committed crime to the certain victim. In any crime reporting the suspect particulars reported are important in Police inquires to identify the one behind the incidence. In this study the suspect identities are particulars included suspect national identity number, name, sex, address, weight, height, scan photo etc. These data help the Police Force for easily identification of terrors involved in crimes activities if recorded on the web-based application. They also help Police Officers to make decision on how to deal with terrors associated with such crimes and to know the crime trends rising in the state. As far as investigation is concern, the primary aim of law enforcement is to know the evidence and identity the age group or classes of the people in the society who are involved in the crime activities. .

2.6.1.2 Crime Details

Crime details constitute types of crime, name of crime, physical evidence, and it associated temporal element which refers to chronological time/date of the crime occurrence. The spatial location of the crime which refers to the location the crime took place. Crime scene is one of the crime report variable which help the Police Forces to identify the nature of crime committed. Moreover, it helps the law enforcement agency to know the affected age groups in the society. In this model, the availability of this determinant helps the Police Forces to analyze the trends the most committed type of crimes affect the people in the country. These types of crime or crime nature reports are categories into four major different ways, (Joneset al., 2007). These classification included violence, white-collar, organized and consensual crimes types. Some authors classified them into serious (felony) and less serious (misdemeanor) crimes respectively which is not the interest of this research study.

2.6.1.3 Physical Evidence

People in our daily life commit crimes through the medium of things that we called physical evidence. Such evidence may be in the form of weapons, fingerprint, blood drop on the floor,

suspect clothing, broken glass, identity card or any other thing the criminal has left either on crime scene and captured in the photo or video form by the investigator. In this model, the availability of this determinant helps the Police investigator to find evidence for solving the case. The objective is to identify the suspect behind this crime in order to solve such a problem. It is a medium that connect (suspect, victim, and crime scene) and a supportive sub-element of the crime committed to justify the fact reported by a victim/witness. Physical evidence is as a rule more reliable than eyewitness testimony and is an important investigative aid to the investigator (Crime Scene Search, 2010). The physical evidence variable is sometimes examined forensically for the police to identify the criminal who committed the crime. Furthermore it is a very powerful tool in resolving the case in the court if properly handled and storage on digital web-based application. Hence, physical -real evidence is material, tangible evidence such as an object, a tape recording, a computer printout or a photograph used for decision making.

2.6.1.4 Digital Evidence

Digital evidence is one of the crime reporting elements used in crime investigation. Digital evidence referred to us information sources in the form of text, audio and video. These data are important for crime investigation to obtain evidence. The evidence defines the documentation of collectives evidences used for criminal investigation process that are needed by the investigator to support the presented case which play a crucial role in Police services. We believe there is often a constant interaction between digital and physical evidence in a crime scene investigation, so aiming to avoid the loss of crucial evidence, physical or digital. For example, if an operating computer is used only as a source of physical evidence (for example fingerprints), there is the danger of losing volatile data or terminating a running process by an accidental move of the mouse or a keystroke. On the other hand if a computer is faced only as a source of digital evidence it is possible to miss physical evidence like fingerprints and DNA which could be collected from the surface or the internal of a computer or peripheral device. In this model, the availability of this determinant help the court to make decision and hence web-based application is important to streamline is challenge.

2.6.1.5 Victim-Witness Survey

Victim-witness survey defines the preliminary statement or historical information investigated and provided by the victim or witness to the investigator to uncover the information or which we

sometimes called as victim/eyewitness-testimony. This survey helps the court during jurisdiction hearing to make a decision (Gerald et al., 2003). In this model, the availability of this determinant help the court to make decision and losing the preliminary statement resulted into negative impact for the investigated evidence for crime incidence reported. Other information such as victim/witness particulars that involved identity number, name, address, mobile number, age, sex, and nationality data are important to identify and know which groups of people are more venerable to certain crimes than others in the community. Failure of handling these details resulted into retaliation from the individual criminal in the community. For this reason, web-based application is usefully for sharing this information and stores them in database for future reference.

CHAPTER THREE

RESEARCH METHODOLOGY

3.1 Research Design

This study employed a cross-sectional descriptive research design which was identified as appropriate for doing this research work, aimed at exploring the existed problems of crime reporting system within Police Forces. The existed problems collected are based on quantitative and qualitative data. This cross-sectional design was used because the researcher wants to collect the data in a short period of time or from selected individuals in a single time period.

3.2 Population of the Study

The target population of this research study was from Jubek State, South Sudan National Police Services. The total of this target populatikon was about **200** police personnel selected from different Police departments. These departments were categorized into three departments which involved Traffic Police Officer, Police civil defense, and the Police Prison in the Jubek State.

3.3 Sampling Strategy

The simple random sampling technique was used for collecting the data. This technique was used because the researcher desired equal representation for all relevant subgroup of the population. Simple random sampling provides every respondent to have a chance of being selected in this research work or used to select one participant of Police department from each of the three departments of the Police Forces.

3.4 Sample Size

In this study, a sample size of **133** respondents were selected out of **200** population comprised different departments from Police personnel because they are considered to represent and having vital information for this study by virtue of their departments as (Best et al., 2006) stated that the respondents help researcher to plans and generalize the findings. The research investigations involving several hundreds or thousands of elements, it would be practically impossible to collect data from, or test, or examine every element that is why sampling is made which is breakdown into categories using table (Sekaran, 2010). The sample size of this study was taken from the Traffic Police Officers, Police civil defense, and Police prison in Jubek State. The

sampling size can be obtained by using the Slovene's formula to compute the result (Sekaran , 2010). In this study the sampling size was calculated as in the following:

$\boldsymbol{n = \frac{N}{1+N(e^2)}}$ Where **n** is sample size, **N** target population and **e** level of significance, of which $\mathbf{e^2}$ = 0.0025.

$$\boldsymbol{n = \frac{200}{1 + 200(0.05^2)} = 133}$$

The sample size of the participants was broken down and presented in the table according to (Morgan, 1970).

Table 3.1 Population and Sample Size of the Study Participants

No	Participants	Population	Sample size
1	Police Civil Defense	80	53
2	Police Prison	65	43
3	Traffic Police Officers	55	37
	Total	200	133

Source: Field Data

3.5 Data Collection Instruments

It is crucial to identify what data is required in any research work. In this research work, the researcher used two instruments to collect the data from the informants in the field particularly the issues of the current crime reporting system in Jubek state. It is stated that no single technique or instrument may be considered to be adequate in it in collecting valid and reliable data (Creswell, 2005). The two instruments used to collect primary sources are explained as in the following;

A) Structural Questionnaires: This is primary sources of data collection from the users where researcher had a field visit and distributed some self-administered structural questionnaires to

users. However, the critical point is that when designing a questionnaire, the researcher should ensure that it is "valid, reliable and unambiguous" (Mohammad 2013; Kothari 2004; Schmidt et al., 2002, p. 438). Through this method, selected respondents of this study had to answer questions on their own and the researcher retrieved the questionnaires from respondents. This instrument was used to provide inquirer with quantitative or numerical data.

B) Interview: This is also one of the primary sources of data collection from Police personnel where the researcher had person-to-person interview to few Police Officers selected from three different Police departments of the Jubek State. This instrument was widely used to obtained more depth information from the collected qualitative data.

3.6. Validity and Reliability of Research Instruments

3.6.1 Validity

In this way, the validity is deal with our research trustworthiness and whether it is evaluating what it supposed to evaluate. Validity is define as the quality of a data gathering instrument or procedure that enables it to measure what is supposed to measure (Best et al., 2006). The validity states the degree to which results obtained from the analysis of the data actually represent the content of variables in this study. In justifying the validity of this study, number of steps was taken. First, the research instruments and data content were reviewed by the expert in the field of research (particularly my supervisor and Two IT Police officers). Unclear questions were reworded and nonfunctioning questions discarded. This means the questions content reflected the specific problems stated early. Secondly, internal validity was done to make sure the research findings reflect the reality. So a data collection method was carried out using questionnaire and interview instruments to confirm findings and ensure the excel outcome. Then content validity was computed from expert's judgment using content validity index (CVI) formula and the researcher found the **CVI=0.91**

$$\mathbf{CVI} = \frac{\mathbf{Number\ of\ Question\ Declared\ Valid}}{\mathbf{Total\ number\ of\ questions}}$$

The minimum CVI to declare an instrument to be valid is **0.70**

Therefore the total number of questionnaires were 11 and 10 of them were valid while 1 was invalid which was dropped and the number of questions content validity index (**CVI**) found was **0.91** and calculated as in the following;

$$\mathbf{CVI} = \frac{\mathbf{10}}{\mathbf{11}} = \mathbf{0.91}$$

3.6.2 Reliability

Reliability is concerned with consistency, dependability or stability of a test (Nachmias, 1996). Reliability is the ability of a research instrument to consistently measure characteristics of interest over time. It is the degree to which a research instrument yields consistent results or data after repeated trials or tests. The main requirement is to obtain the reliability of the data and findings in research process. The researcher measured the reliability of the questionnaires to determine its consistency in testing what they are intended to measure. In this study reliability was achieved by measuring consistent results from the respondents. This involved the administering the same test twice to the same group of the Police respondents from three different Police departments who have been identified so far. Reliability of data was assured through information collected from those relevant respondents, from three different departments of the Police with specific attention to key factors of crime report handling and development of web-based application were properly worded and logical arrangement of questions that were asked done correctly. The instrument found reliable based on those questionnaires repeated to same group and few interviewed from the police respondents. Instead of getting the same results it is better to think about the dependability and consistency of data (Mugenda, et al., 1999; Lincoln e tal., 1985). In this study the purpose was to obtain the similar answered and agree on that based on data collection process, the finding and the results are consistent and dependable. For Cronbach's alpha to be acceptable when measuring the reliability should be above **0.7** and any figure below that is not acceptable (George et al., 2003; Frillness, 2015). Therefore, in this study the researcher found an average of Cronbach's alpha; of **0.80** on **10** question items given which show an instrument is reliable (see the table below).

Table 3.2 Description of Cronbach's Alpha

S/NO	Cronbach's alpha	Internal consistency
1	$\alpha \geq 0.9$	Excellence(high stake testing)
2	$0.7 \leq \alpha \leq 0.9$	Good(low-Stake testing)
3	$0\text{-}6 \leq \alpha \leq 0.7$	Acceptable
4	$0\text{-}5 \leq \alpha \leq 0.6$	Poor
5	$\alpha < 0.5$	Unacceptable

Source: Adopted from (George et al., 2003; Frillness, 2015)

3.7 Tools and Technologies Used for the Proposed Web-based Application

These technologies involved the tools used to analysis data or requirements and design models as well as implementation languages as explained in the following subsections.

3.7.1 Data Analysis Tools

After data collected from respondents were checked for consistency immediately when the researcher retrieved them from the informants. This was done to ensure that no question returned unanswered by the informants selected to answer the distributed questionnaires. Data collected from the Police members about the existed issues of crime reporting system in Jubek State are recorded on Microsoft excel and analyzed using SPSS particularly frequencies and percentages to show responses of the participants and their characteristics background information. Then the results were presented in tables and charts.

3.7.2 Models Design Tools

In this research work, the object-oriented approach was used to modeling object-oriented systems known as unified modeling language (UML) to break down a system into logical domain models. The object-oriented modeling language was used to construct objects collected where application and database system architectures were designed. The unified modeling language (UML) is object-oriented programming language that is mostly adopted to design the domain problem. The UML was used to design applications by defining the classes and their relationships to meet the end-users requirements contained in software requirements specification. The objects are represented by entities and grouped into classes that are optimal

for reuse and maintainability. The UML models illustrated the end-users constant interaction of the systems.

The reason of using unified modeling language (MUL) was to visualize the design components of the application system. The researcher used use case diagrams, activities diagrams, sequence diagrams, class diagram and deployment diagram. These tools were used to designed models using Microsoft Visio professional platform, version 2013. This software version was also used for designing a powerful database proposed in this research work. Therefore, these designed tools which were used in this proposed application and database system are explained in the following;

3.7.2.1 Use Case Diagram

The use case diagram was used to illustrate the scenario for user's instant interaction with the system components design. It is a set of the scenarios describing the user's interaction with the proposed application system. The use case model is a software development process which documented the behavior of the system from the customer's point of view. The reasons of using use case model is to described the user capturing requirements coded on the proposed software system and database as well as to described the function performed by the user on the application which are the mains purpose of this research project.

3.6.2.2 Sequence Diagram

The sequence diagram in this proposed application system demonstrates the behavior of objects in a use case by describing the objects and the message they pass. The main reason the researcher used this sequence diagram was to demonstrates how the user process information from one module (object) to another module(object) or one component to other in the proposed application and database system respectively. This information process indicated the sending and returned messages of the user interaction to the proposed application and database system.

3.7.2.3 Activities Diagram

The activities diagram is the model that represents the workflows in a graphical way. It was used in this research work to illustrate the process of how the data moves around application system. The activities diagram describes the business workflow or the operational workflow of any component in the proposed application system. The sequences of steps to be follow or

operations to be executed were require for problem needed to be solve which is mostly used in system analysis and designing phases of the proposed application system.

3.7.2.4 Class Diagram

In this proposed application system, the UML class diagram was used to illustrate the classes within the database. The main reason of using class diagram was used to describe the attributes, operations of the classes and constraints imposed on the application system, or to show the data structures of the classes, their relationships and their interface. It also illustrated the specific instance of the classes of the system.

3.7.2.5 Deployment Diagram

This diagram was used to shows the hardware of the proposed system and the software in those hardware deployment. The reason of using deployment diagram was because we need to show the proposed software solution components deployed across multiple machines where each having a unique configuration, to describe the functionalities performed by the system, collaboration among the elements of the static view. The 3-N tier was used to illustrate the deployment of the proposed application system.

3.7.3 Technologies for Implementing the Web-based Application

The web-based application for enhancing crime report handling in Police Services was developed as online information application in order to eliminate the insecurity of data records from the paper based system used in Police Services. This was achieved using the languages that are listed and explained below;

A. **PHP:** This is a preprocessor hypertext language that was used to enable communication between the front end and the backend. This PHP was used to create dynamic content that interacts with databases or content connected to the proposed web application to the database system. Others uses are restriction of users to access some pages of your website, encrypt data, access cookies variables and set cookies and handle forms.
B. **HTML and CSS:** they are two front end tools technologies which were used for building user interface and the web pages. **HTML (**Hypertext markup language) was used to displays the contents of the web pages in the web browser. It uses tags to describe the structure of the web pages while web browser uses a hypertext markup language document to interpret

the content and display it as a web page. **CSS** was used to control the style and layout of the web pages.

C. **JavaScript:** The JavaScript is a programming language used as front end tool for designing the dynamic contents of the web pages and to validate the input data entry from the form by the user in this proposed application.

D. **MYSQL:** is used as a back end tool in designing a robust database. The **MYSQL** was used to develop the proposed database system.

E. **Server –WAMP/APATCHE:** this was used for testing the application which hosted apache HTTP server. WAMP is an acronym name for Windows operating; Apache, MYSQL and PHP. Apache HTTP Server is software version that receives a request from the users who need to access a web page. It is a web server that checks the web page you have requested and fetches it for your viewing.

F. **Operating System:** the windows operating system that included 8, 7 XP were used to developed and deployed application.

3.8 Application Development Process

The study adopted waterfall model for software development process. The researcher used this method because; it is easy to understand, easy to use, it provided structure to inexperienced staff, milestones were well understood, it sets requirements are stable and good for management control (plan, staff, and track).

The phases in this model are in sequences order to ensure that each phase is completed before the other start. This model emphasizes that the planning in the early stages were all known and in addition its documentation and planning make it work well for the projects of which the quality is major concern (Oludele et al., 2015; Adeyinka , 2013). In this research work, the phases that were adopted from the waterfall model were explained as in the following;

A. **Requirement Gathering and Analysis:** This phase emphasized gathering of requirements from users of the system. The requirements collected using distributed questionnaires and oral interview conducted to few Police personnel were analysis in a requirements specification document. In this phase, the specific functions that were carryout by the system

were explained. Here in this phase also, hardware and software functional requirements specification of both were analysis in this phase.

B. **Design Model of Application System:** The requirement specifications from the first phase are studied in this phase and the system design is conducted. The unified modeling language tools which involved use case diagram, sequence diagram, activity diagram were used in this phase to design the application and database system and also deployment diagram was used to deploy the application.

C. **Implementation of Application System:** The web-based system for crime report handling was developed using the system implementation languages mentioned above.

D. **Integration and Testing of Application System:** All the units developed in the implementation phase are integrated into a system after testing of each unit. Then the entire system was tested and validated to ensure it allow the specified or authorized access to the users and to identify the application fault and failures. Then application system usability validation was also been done.

E. **Deployment and Maintenance of Application System:** Once the functional and non-functional testing is done, the product is deployed in the customer environment or final product released to the police personnel. The proposed system is installed in the new environment and the transition phase from the old environment is monitored.

There are some issues which come up in the client environment. To fix those issues patches are released. Also to enhance the product some better versions are released. Therefore, maintenance is done to deliver these changes in the customer environment. This stage involves training of the officers that will be given the privilege of operating the system, populating the database with existing records, and converting such data.

3.9 Data Collection and Analysis Process and Ethical Consideration of the Participations

Before the commencement of data collection, the researcher obtained introductory letter from Kampala international University. Upon getting clearance, the researcher in person distributed the questionnaires to the sampled individuals who are working in police forces. Use of questionnaires is expected to ease the process of data collection as all the selected respondents were reached in time.

The researcher explained to the respondents about the research that this study is for academic purposes only. It was made clearly to the users that the participation is voluntary and the respondent is free to decline or withdraw any time during the research period .The respondents were told not to be coerced to participate in this study. The participants were informed consent to make the choice to participate or not. The police personnel were guaranteed that the information they provided are exactly be used for improvement of crime report handling in the states.

Both quantitative and qualitative approaches were used for data analysis. Quantitative data from the questionnaire were coded and entered into the computer for computation of descriptive statistics. The Statistical Package for Social Sciences (SPSS) was used to run descriptive statistics particularly frequency and percentages so as to present the quantitative data in form of tables and charts based on the major research questions.

3.10 Order of Information in South Sudan National Police Services

The South Sudan Police Service is a department under ministry of interior in the republic of South Sudan. The head of the ministry of interior is appointed by the president of the republic of South Sudan. The inspector general of the Police who head the department is appointed by the president of the republic as well as a deputy inspector of the Police. The inspector general of the Police is assisted by the commissioner of the police who is also appointed by the president of the republic. There is also division commander known as the zonal commander of the Police according to the region such as greater Upper Nile, Greater Equatorial, and Greater Bhar el Ghazal and under the zonal commander there are others commanders heading the state and the counties.

The information has to pass through many offices according from one office to another office. This flow of information from one office started from the Police post, the lowest levels to Police headquarter, the highest level and this communication consume a lot of time. And this communication need introduction of technology to facilitate easily transmission to disseminate the information in a possible and quick period in order to managed the case communicated and reported daily in the Police offices. The information flow based on the standing order in either direction from highest level to lowest order or vice verse depending on the input being communicated by the two levels. Such a communication flow from the Police post to Police

head quarter is illustrated how the South Sudan crime report activities pass from one office to other as shown below;

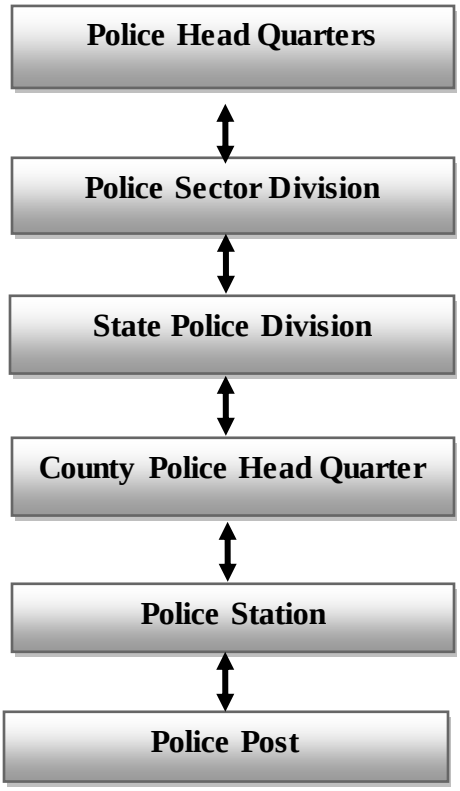


Figure 3.1: Standing Order of Information in South Sudan National Police Services

Source: South Sudan Police Service 2018

3.11 System Information Flow

The system input and output flow chart which is fig 3.7 shows how victim-witness survey, crime details, physical and digital evidences (data) is been transfer from the Police user to the system ,processed, displays the report, stores it in a disk storage and gives out the output. Input data is the data from the user, input from the keyboard is the media through which the data is being typed and is transferred to the CPU were the web-based system data is being processed and the report shown as well. The processed data is stored in a data storage, and back to the CPU which supplies the output to an output media which now displays the output.

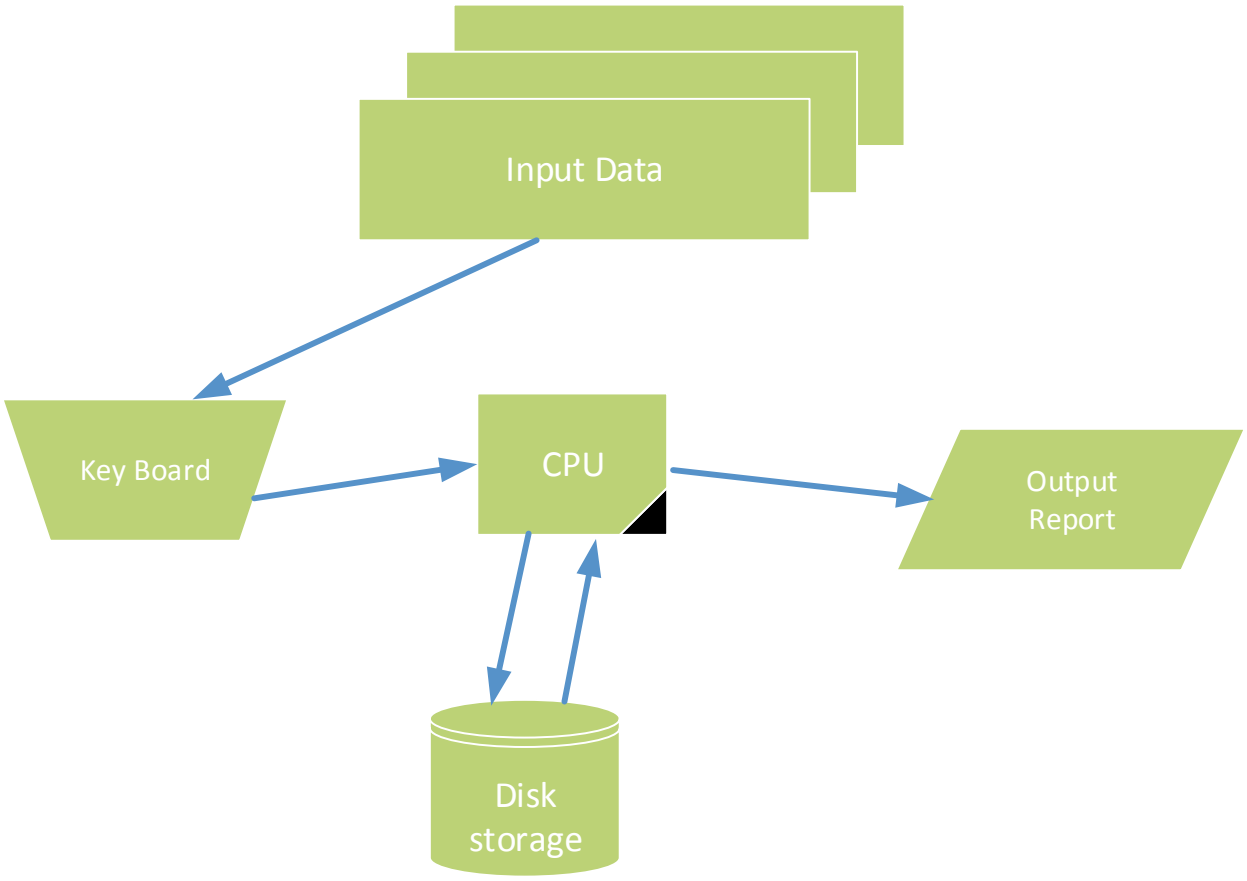


Figure 3.2: System Information Flow Chart

CHAPTER FOUR

ANALYSIS, DESIGN, IMPLEMENTATION, TESTING AND VALIDATION OF THE WEB-BASED APPLICATION

4.0 Chapter Overview

This chapter illustrates the analysis of data collected from the users or respondents about the existed problems of crime reporting systems in Jubek state Police Services using tables, charts and graphs. These findings helped the researcher to come up with a solution of the problem to improve the crime management or administration of justice system. Then system models designed, system implemented, tested and validated as proposed in the objectives stated earlier in this study.

4.1 Analysis of Research Findings and Discussions

4.1.1 Basic Background Information of Respondents

A total of 133 questionnaires were produced and administered to the sampled respondents, at the end of data collection process, a total of 120 questionnaires were retrieved, coded and analyzed while 13 questionnaires are not returned.

4.1.1.1 Gender of Respondents

The researcher included the gender of participants answered the questionnaires of 133 sampled participants where 120 of them were returned as indicated in the table given below.

Table 4.1: Gender of Respondents

Category	Frequency	Percent	Valid Percent	Cumulative Percent
Female	43	36.0	36.0	36.0
Male	77	64.0	64.0	100.0
Total	120	100.0	100.0	

Source: Field Data, 2018

The tables above depicted that out of 120 questionnaires retrieved, 64% of the respondents were male while 36% of them were female from different Police departments answered the

questionnaires distributed and this indicated that the study results was dominated by the male. Length of working period on Police employee performance is determined by person's ability to perform crime report handling well and we realized that Policewomen are more transparency of which they have heartfelt or sincere than Policemen.

4.1.1.2 Level of Education

The education level was used in this study in order to know the educated level of the respondents answered the questionnaires distributed so far.

Table 4.2: Level of Education

Education level	Frequency	Percent	Valid Percent	Cumulative Percent
Primary certificate	38	31.0	31.0	31.0
Secondary certificate	36	30.0	30.0	61.0
Diploma	20	17.0	17.0	78.0
Bachelor	18	15.0	15.0	93.0
Masters	3	3.0	3.0	97.0
Others specify	5	4.0	4.0	100.0
Total	120	100.0	100.0	

Source: Field Data, 2018

From the table 4.2, out of 120 respondents, 31% of the respondents have primary certificate as a highest number, 30% have secondary certificate, 17% constitute respondents with a diploma, 15% constitute respondents with bachelors, while 3%) and 4% constitute respondents with masters and other certificates of qualification respectively answered questionnaires distributed. This mean having higher certificate it leads to positive result to the performance from the Police employees, meaning the higher the certificate training you have the more you handling the case better.

4.1.1.3 Years of Work Experience

The years of work which the respondents spend in South Sudan National Police Services was used in this study to know the respondents experience about the problem they face in crime report handling.

Table 4.3: Years of Work Experience

Years	Frequency	Percent	Valid Percent	Cumulative Percent
< 1 year	9	8.0	8.0	8.0
1-6 years	40	33.0	33.0	41.0
7-30 years	70	58.0	58.0	99.0
31 year's above	1	1.0	1.0	100.0
Total	120	100.0	100.0	

Source: Field Data, 2018

Out of 120 participants, 58% constituted the majority of them are those who were working in Police services between seven and thirty years. 33% of participants, the second majority who were working in Police service between one and five years while 8% and 1% makeup the respondents who were working for less than one year and thirty years above respectively in Police services. The finding suggested that the working experienced for Police Forces determined the person's ability to perform well as it helped them positively to identify the suspect.

4.1.1.4 Police Department

The respondent department was used in this study to know the different departments of the Police Forces who were involved and answered the questionnaires distributed.

Table 4.4: Police Department

Department	Frequency	Percent	Valid Percent	Cumulative Percent
Police civil defend	50	42.0	42.0	42.0
Police prison	42	35.0	35.0	77.0
Traffic Police	28	23.0	23.0	100.0

Total	120	100.0	100.0	

Source: Field Data, 2018

From the table 4.4, the 42% constitute the respondents of Police civil defend department while 35% of the respondents constitute Police prison department and the lowest, 23% of the respondents were from the traffic Police department answered the questionnaires distributed. The main reason of including the Police departments is that we want to determine the performance of each department in handling the crimes in related to countermeasure against illegal activities.

4.1.2 Findings of Objective One

4.1.2.1 To Investigate the Existed Problems of Crime Reporting System in Jubek State, South Sudan National Police Services

The first objective of the study based on the independent variable in this study was crime report handling into two questions; suspect identity/recorded information (with 1 question), crime details (with 1 question) and interview part.

4.1.2.1.1 Suspect Identity/ Recorded Information

The table below indicates the participant's responses asked through distributed questionnaires about the inconsistency of suspect identity/recorded information due to wrong manipulation by some individuals in Police office which resulted into the lack of integrity and transparency of suspect recorded data.

Table 4.5: Participants Responses Rating on the Suspect Identity/ Recorded Information

Responses	Frequency	Percent	Valid Percent	Cumulative Percent
Never	10	8.0	8.0	8.0
Not sure	8	7.0	7.0	15.0
Rarely	4	3.0	3.0	18.0
Sometimes	44	37.0	37.0	55.0
Always	54	45.0	45.0	100.0
Total	120	100.0	100.0	

Source: Field Data, 2018

Out of 120 respondents who participated in the study, 45% stated that there is an inconsistency of suspect recorded information always due to wrong manipulation or alteration by some individual in the Police offices. 37% of the respondents stated that the inconsistency of suspect recorded information due to wrong manipulation or alteration by some individual is sometimes existed in the Police offices. 8% of the respondents are not sure about the inconsistency of suspect recorded information due to wrong manipulation or alteration by some individual in the Police offices. While 7% of the respondents stated that they have never see inconsistencies of suspect recorded information due to wrong manipulation or alteration by some individual in the Police offices and the remaining 3% of the respondents stated that it is rarely to see inconsistencies for suspect recorded information due to wrong manipulation or alteration by some individual in the Police offices. By having inconsistency record of the suspect information resulted into lack of data integrity and transparency and hence decrease the victims trust toward the Police Forces in handling the crime reports.

4.1.2.1.2 Crime Details

The respondents were asked to choose their extent to which they precept their view about the loss of crime details recording files in Police Services through the distributed questionnaires.

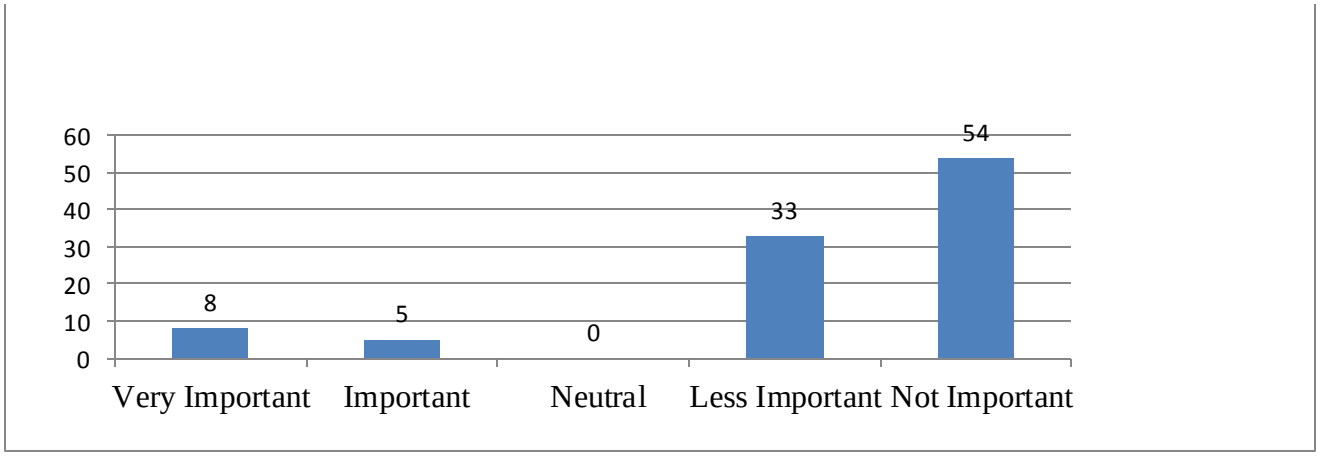


Figure 4.1: Respondents Rating on the Crime Details

Source: Field Data, 2018

As illustrated in the table above, out of 120 participants in the study, 54% of the participants believed that storing of crime details in Police shelves is not important. 33% of the respondents

stated that storing of crime details in Police shelves is less important. 8% of the respondents believed that the handling of crime details in Police shelves is very important while 5% of respondents stated that handling of crime details store in Police shelves is important while the rest of the respondents have no decision about the handling of crime details store in Police shelves. From this finding, the researcher concluded that the handling of crime details files is not necessary as information needed to solve the problem is being loss from the Police store shelves.

4.2 Discussion of Results

The study overall results on the crime report handling in Jubek State was generally rated as poorly. The study results imply that the status of crime report handling in Jubek State, South Sudan National Police Services need more improvement in the institution.

Findings show that 45% of participants stated that the inconsistency of suspect identity/recorded information is existed in Police office. This result implied that there is no integrity and transparency of information recorded in Police offices and this has consequence on the crime reporting practices as far as respondents are concerned. It is similarly supported by (Johnson, 2014) who reported that an inconsistency of recorded document is likely resulted into invalided information which brings mistrust between the two parties–the Police and the victims of the crimes. Many scholars also observed that, this resulted into victim dissatisfaction that is much higher than satisfaction of victim to say they would probably not contact the Police again for any incident, and in fact, were significantly less likely to re-report the incident (Buzawa et al, 1999). This finding suggests that it is always important for the Police to bear in minds the possible consequences of victim satisfaction and their perceptions for effectiveness. This is quite clearly indicated by the findings where some interviewed officers stated that victims do want them to demonstrate their best by conducting effective work and by making the information more integrity.

A finding shows that 54% of the participants constituted the majority answered by saying that the storing of crime details in Police shelves is not important. This result implied that chance of losing potential evidence is high for recorded files store in Police shelve which lead into failure to cross reference record that may be used against alleged criminals. Inline to this as further supported by (Lyoko et al., 2016; Heike 2006) who found that a lot of information remains

concealed from the Police and court of law which may lead into failure of getting the information needed to resolve the case. Such a finding may be interpreted to suggest that first and foremost for the information needed; in order to be available and for the departments to transparent about what they do, the information has to be present, stored in digital form and meaningful.

In the interview conducted with 25 respondents, it was also discovered that there is misplacement of physical and digital evidences and victim-witness survey in Police store office as far as finding was concerned, this finding implied that handling of recorded evidences in Police office is inappropriate as finding was concerned. This mean lack of management process on recorded evidences where (corruption including fraud and bribery are existed) victim-witness survey/testimony, physical and digital evidences to attainment sufficient evidence for solving the case successfully in the court are always misplaced by individual Police officers in-charge . This was another fundamental challenge to attainment sufficient evidence for solving the case successfully in the court. This finding suggests that physical evidence provides valuable support to a charge and video evidence play important role in making decision if handle effectively. This finding was supported by (Gill, 1996) that in the absence of witness, the physical evidence is useful aid for the criminal detection and the resolution of case. Furthermore, physical evidence is one of the key ingredients for solving the case and probably the reverse. Such information may serve as a basis for crime evidence or provide important pieces of evidence in prosecution perspectives.

By cataloging every piece of information, they would be more likely to find matches that could link or identify suspects (Christina et al., 1999). In another way, misplacing the recorded victim-witness survey would probably be difficult to find the evidence. Therefore, Police personnel conducting such enquiries of crime reporting need better access to the appropriate technology and other resources.

4.3 Objective Number Two

4.3.1 To Design a Model of Web-based Application for Crime Reporting System in Jubek State, South Sudan National Police Services

This objective involved both analysis and design of the proposed application and database system. The application analysis is transformation of user requirement specifications into physical architecture through application modeling and database system proposed.

A) Application functional requirements specification

After the user requirements gathering analysis, the next step was the web-based application functional and non-functional requirements specifications respectively. The system functionality specifies what the system or proposed, for enhancing crime report handling should carry out. The system input the crime information reported by the information source- victims/volunteer as mentioned below in the following;

- This system provide login interface to the Police and Admin users respectively to register their particulars details and assign them with different level of privileges.
- The system validates and authenticates each user username and password details to ensure secure protection of their identities.
- It allows these users to register or add, store and retrieved information about the crime scene committed, suspect, victim and witness particulars details.
- It also allows the user to delete information based on the privileges assigned to him/her.
- The system can facilitate inter-station communication between all stakeholders (difference police departments) to share the information recorded in their different location online.
- The system generates data reports about the victim, suspect and the crimes scene committed.

The users of this proposed system involves the registered police staffs and admin user who administrate the application. In addition to system functional specifications, there are also two types of system requirements specifications. These are hardware and software functional requirement specifications.

B) Application Non-Functional Requirements Specification

In this nonfunctional requirements specification the researcher here elaborate the performance characteristic of the application.

- The application response time is less than two seconds that is acceptably short interval of the number of records change.
- The application system will provide the users with update number of crime record store in the database.
- Some of this application component, code, designs, and even requirements can be reuse in other systems orcode can be modified or add as per user demands.
- The downtime or length of time between failures and uptime or length of time needed to resume operation after a failure identified (typically measured) or estimated by researcher probably to be 0.01% and 99.99% respectively before application is fully deploy in police services.
- The application is fully secure both front-end and back-end that is its ability to resist unauthorized attempts at usage, notifying admin and provide service to legitimate users while under denial of service attack. At least 99% of intrusions shall be detected within 10 seconds.
- The application shall identify all of its users before allowing them to use its capabilities.
- The application shall ensure that the name of the user in the Police services and databases exactly matches the name printed on the personal's social security card.
- These security issues such as authentication and verification of police user passwords and username were tackled with mysql_real_escape_string _function technology while integrity check and confidentiality of the web-based system was accomplished and achieved using PHP hash functions.
- The user interface of the application is easily to use as well as end users training is concerned.
- Operating System: - Development environment needed is windows 7 XP and 8.

The last non-functional requirements of application is efficiency which refers to the level at which a software system uses scarce computational resources, such as CPU cycles, memory, disk

space, buffers and communication channels. These non-functional requirements are suggested as explained in the following;

I) Server Side Requirements Specification

The second nonfunctional requirements specifications involved server side hardware and software respectively needed by the proposed web-based software and databases system. The specification requirements are the minimum requirements for the application server side. This is because the application store a large number of crime data for the whole state, minimum of approximately twenty thousands of the population.

Hardware		**Software**	
Processor	2.2 GHz	Front end	PHP & HTML
RAM	4GB	Back-end	MYSQL Server 2
Hard disk	8GB	Web server	Apache Server
		Operating system	Windows 7 XP, 8

II) Client Side Requirements Specification

The requirements specifications of the hardware here involved client side hardware and software respectively needed by the proposed software and databases system.

Hardware		**Software**	
Processor	2GHz	Operating system	Windows 7 XP/ 8/vista etc
RAM	2GB	Browser	Firebox, chrome , safari, Internet explorer
Hard disk	8GB		

The requirement specifications from the first phase are studied in this phase and the system design was conducted. In this architecture, the information provided by the victim/volunteer will be investigated by the police before recording them into the system.

The design involves in this study involved several designs to transform user functional into; architectural modeling using deployment diagram, use case diagram, sequence diagram and activities diagram as explained in the following subsection below.

4.3.1.1 Architectural Modeling of Web-based Application

This architectural depicted below is known as systematic digital information exchange model. It consists of two end-systems namely front-end and back-end. The front-end consist of investigation phase where the assigned inquire Police Officer register investigated evidential data for instance the suspect identity/recorded information, crime committed, physical-digital evidence and victim/witness-survey and store them into web-based application, retrieve and generate these evidential data report from the application for decision making. Only eligible user is allowed to access that interface as authentication and verification of identity of users is required for credible registration of crime investigation process. At the back-end, there is final stage that is data storage and analysis phase where the Administrator checks user eligibility accessing the application, by identifying and verifying the users. In this phase, the admin manages application system to ensure transparency, integrity of the records or to avoid the manipulation in Police Force. At the same time, the Admin register the new user into the application.

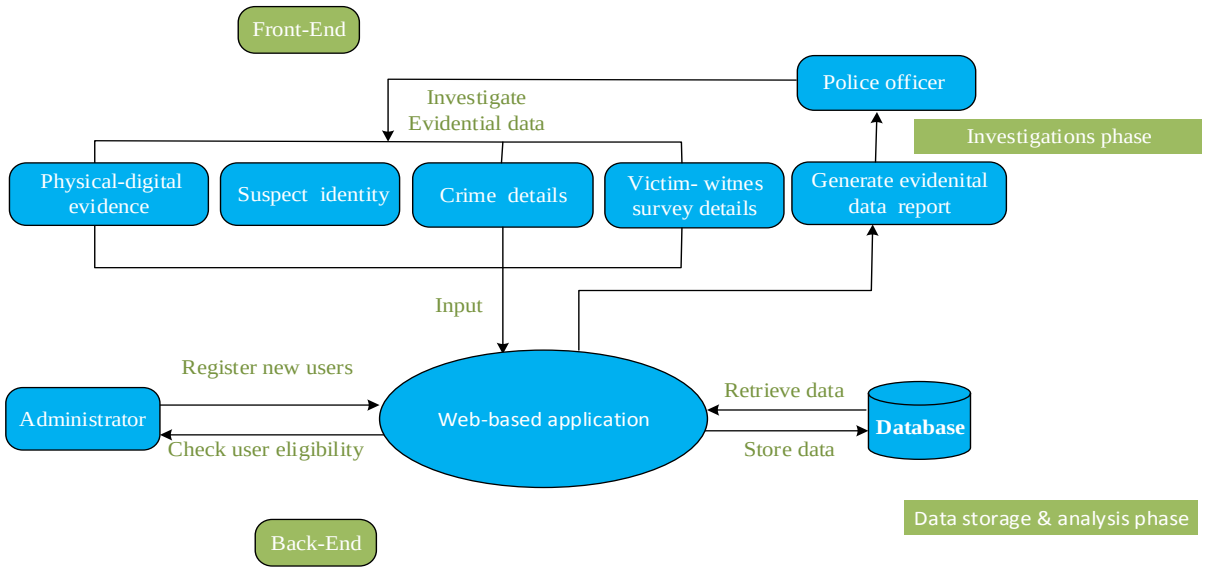


Figure 4.2: Architectural Model of Web-based Application

4.3.1.2 Web-based Application for Crime Report Handling: Activities Diagrams

The data flow diagram represents the sequence of steps to be follow or operations to be executed to problem require being solve that is mostly used in system analysis and designing phases of the proposed application system. We represent the system logic using activity diagram. Activity diagram show the totally activity of the application performed by different modules in it. Here there are two modules of the system namely police and admin modules respectively as in the following;

A) Police Activity Diagram

When the victim/volunteer visits the Police station, the Police user is restrictedly authorized to acquire, collect, classify and preserve identification, criminal identification, crime, and other records and to exchange such information with authorized entities and perform the following task(s) or processes as involved in the following;

i. Start to visit home page.
ii. If he/she is registered Police user, then login his/her privilege username & password into system.
iii. If his/her privileges username & password are valid then he/she is allowed to enter or add & view suspect, crime and victim details respectively as well as edit/delete his/her profile or else repeat again if the Username/Password is invalid. This is done to avoid unauthorized access and then logout from the systems after accessing the application and databases system.
iv. Otherwise invalid message is display for unregistered user and if want to be user then he/she has to register to the system or else logout to home page.

In this module, first of all Police will register with proper credentials which are unique for everyone. The registered Police user has a privilege to create, delete and edit the victim/volunteer information details.

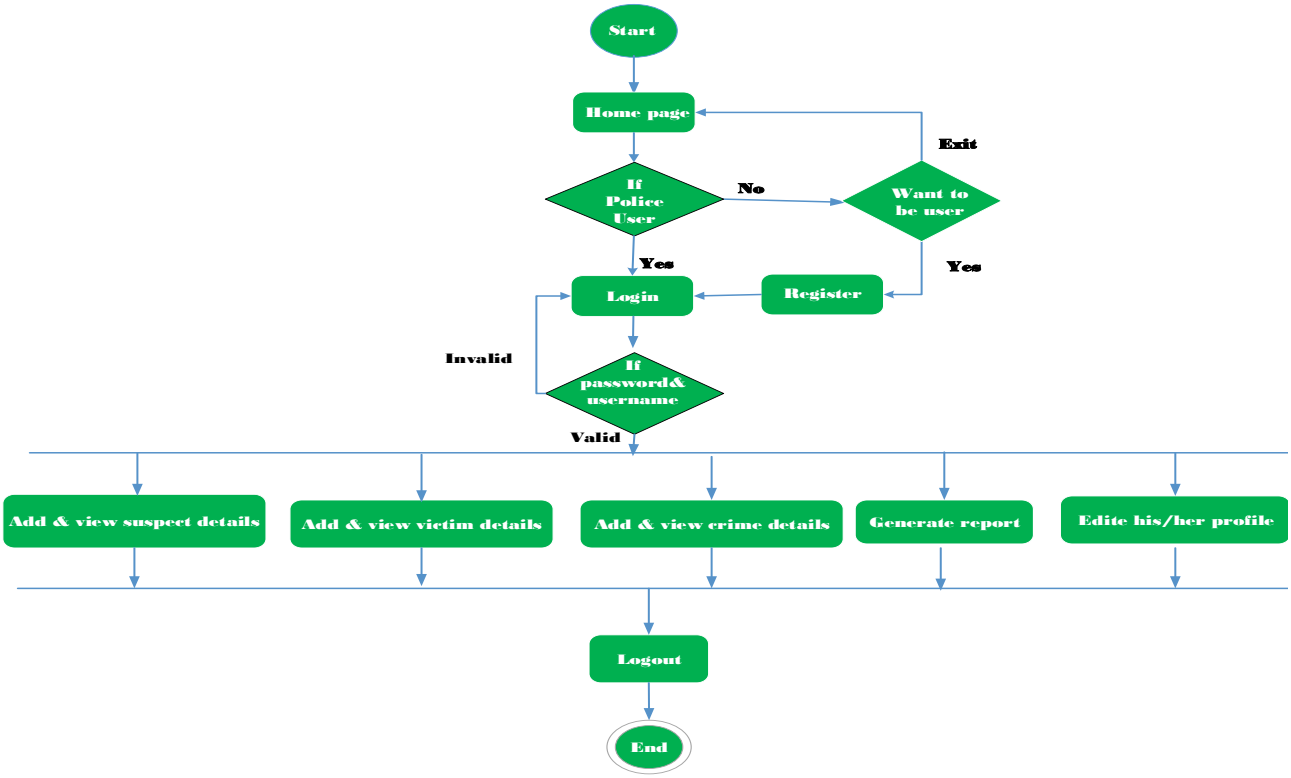


Figure 4.3A: Police Activity Diagram

B) Admin Activities Diagram

If the Admin user wants to access any information in the database, he/she has to perform the following activities:

i. The registered admin user login into application.

ii. If the privilege Username/Password is valid then he/she is allowed to enter or add & view users, stations & news update into & from the system respectively, otherwise "Invalid User/Password" message is displayed to repeat the Username/Password. This is done to avoid unauthorized access or else logout from the application after accessing.

iii. If it is unregistered user, then he/she has to register to the application system and then login to enter the information or accessing the system.

iv. Else the user exit to the main home page.

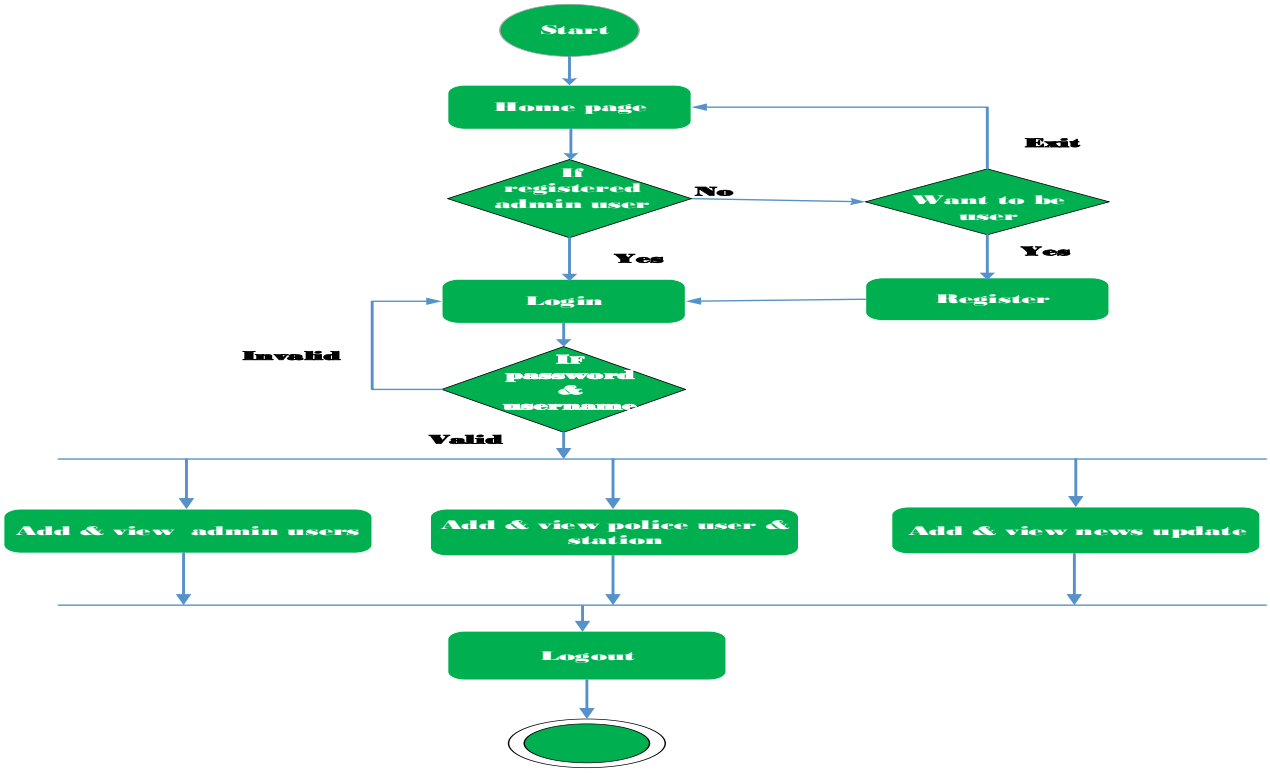


Figure 4.3B: Admin Activity Diagram

The Admin will assign police-officer to their respective police-station with proper credentials provided by giving them email-id and password address. He/she can also edit/update their database like if one Police-Officer will get promotion than his/her post will be updated.

4.3.1.3 Web-based Application for Crime Report Handling: Use Case Diagram

The Use case diagram was used to illustrate the scenario for user's instant interaction with the system components design. It is a set of the scenarios describing the user's interaction with the proposed system. It also describes the functions that are performed by the users on the system. This use case model is a software development process that was documented the behavior of the system from the customer's point of view.

The use case models describe the user capturing requirements designed into the software and database system which is the main purpose of this research project. This work mainly used use case diagram to represent the system logic.

A) Police Use Case Diagram

The police member is an active user-actor who has the responsibility of performing the investigations of crime report to get reliable information from the target victim/volunteer. A Police user is only allow for adding, viewing and editing victims, suspects, crimes and his profile details respectively. The Police user can manage and perform the following functions in the system as explained below;

i. Add or enter victim/volunteer details: the police user can enter the crime details reported by victim/volunteers who visit the police station face to face using phone call.
ii. View victims/volunteer details: the police user can view the complainant or volunteer details stored in the database system.
iii. Enter or add suspect details: the user can enter the suspect details into the system.
iv. View suspect details: the user can view or see the suspect details recorded in the database system.
v. Enter or add crime: to store the information about the crime investigated into the database system.
vi. View crime details: the user can view the crime details store in the database system.
vii. Edited profile: the users can edit his/her profile stored in the database system.
viii. Delete user: the user can delete the suspect, crime and victim details respectively stored in the database system.
ix. Generate data report: the user has a privilege to print the information recorded in the system.

The diagram in the following below illustrates the police user visual overview of his/her main requirements.

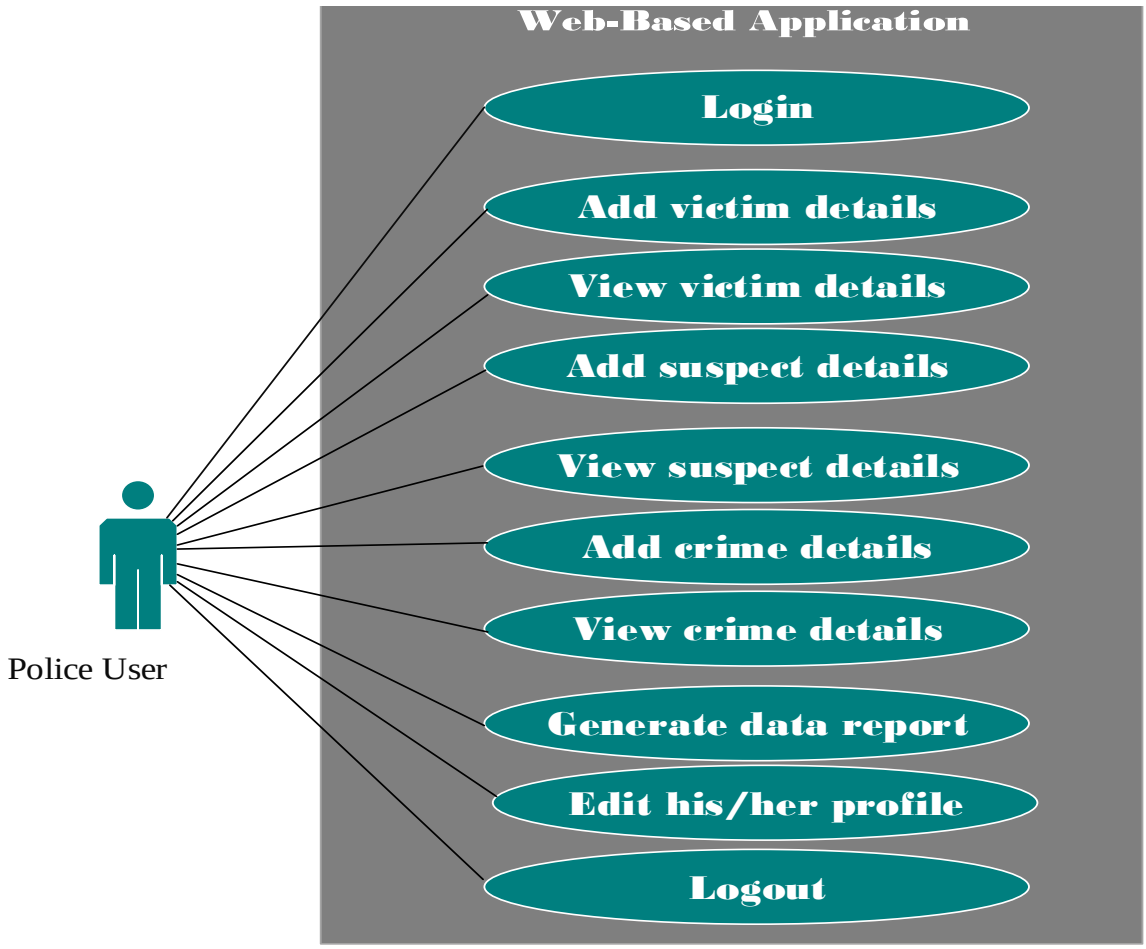


Figure 4.4A: Police Use Case Diagram

B) Admin Use Case Diagram

The administrator page is provided for him/her to manage the application and the database by performing the functions as explained in the following below;

i. Login: the Admin login his/her credentials into the application and access the information stored in the database system.

ii. Manage admin users: the admin can add the new users and view their information stored in the database system respectively.

iii. Manage Police users and station details: the Admin can add or register the new police users with his/her station duty and at the same time view the information of that member stored in the database system. He/she also has a privilege to delete the user's information.

iv. Manage news update: Admin can create and update news for the users to view the information provided. It also has a prevailed to delete the news update.

v. Track changes made & users: the Admin has a privilege to track changes made in the system and users who made the changes in the system.

vi. Manage & view feedback: the Admin has a privilege to manage & view feedback given by the users in the system.

vii. Edit & delete the profiles: He/she also has a privilege to edit and delete the user's information stored in the system.

viii. Logout from the system: then the Admin user cans logout to terminate the communication after accessing the system. The diagram in the following below illustrates the admin user visual overview of his/her main privileges requirements assigned to him/her.

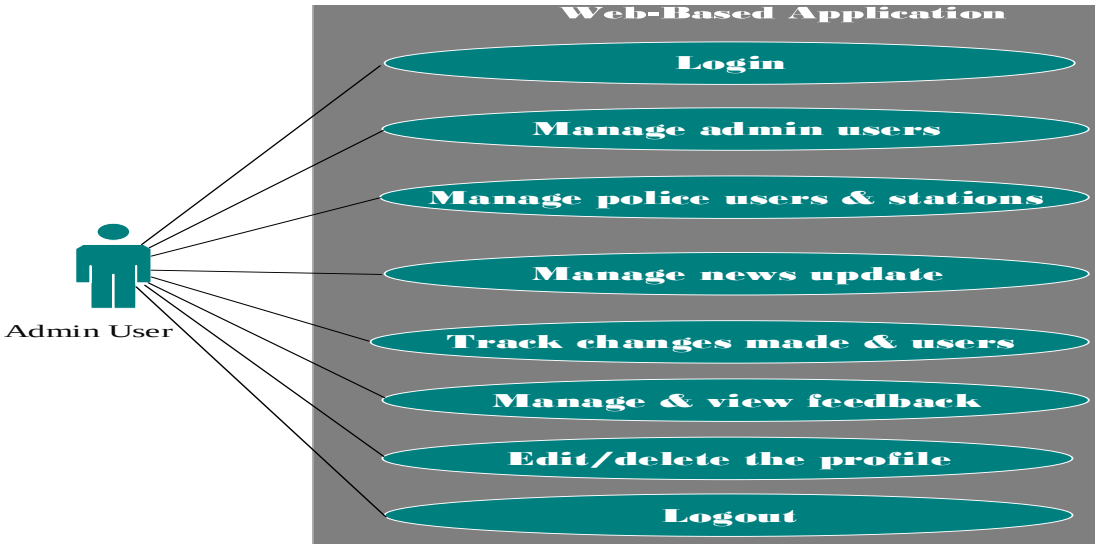


Figure 4.4B: Admin Use Case Diagram

4.3.1.4 Web-based Application for Crime Report Handling: Sequence Diagram

The Sequence diagram in this proposed application system demonstrates the behavior of objects in a use case by describing the objects and the message they pass. This shows the objects participating in the interaction by their life lines and the messages they exchange arranged in a time sequence. The elements of a sequence diagram are o**bjects**: represented by boxes at top of diagram, **Lifeline**: the time during which an object exists, **Messages:** means by which objects

communicate with each other and **Activation**: the time period during which an object performs an operation. The Sequence diagram demonstrates how the user process information from one module to another module like user, proposed application and database systems modules respectively. This work mainly used sequence diagram to represent the system logic.

A) Police Sequence Diagram

In the diagram below the user (Police) can perform the following operation in the system and database. Each module provides whole system process information step by step performance.

i. New Police user registers to the system if she/he was not registered user, save his/her registered details and then acknowledgement message of user details is popup as user registered successfully.

ii. Secondly, the registered user login to the application using his/her password and username where the system authenticates the credentials of the users, and then acknowledgement of either valid or invalid password/username message is popup.

iii. Thirdly after user login successfully, he/she can be able to add the victim details and save the victim details into the system then obtained return message acknowledgement of victim details inserted successfully to the user. Then user can now view the victim details he/she inserted or by others in the system.

iv. Fourthly, user can add suspect details and save the suspect details into the system then obtained return message acknowledgement of suspect details inserted successfully to the user. Then user can now view the suspect details he/she inserted or by others in the system.

v. Fifthly user can also add investigated crime scene committed and save crime scene committed into the system then obtained return message acknowledgement of crime scene save successfully to the user. Then user can now view the crime details he/she inserted or by others in the system.

vi. Sixthly the user can edit his/her profile and submit the edited profile then obtained return message acknowledgement of profile updated successfully to the user. Then view his/her profile update.

vii. Lastly the user terminates the communication by logging out his/her credentials password & username to main home page after accessing all or any one of the above function.

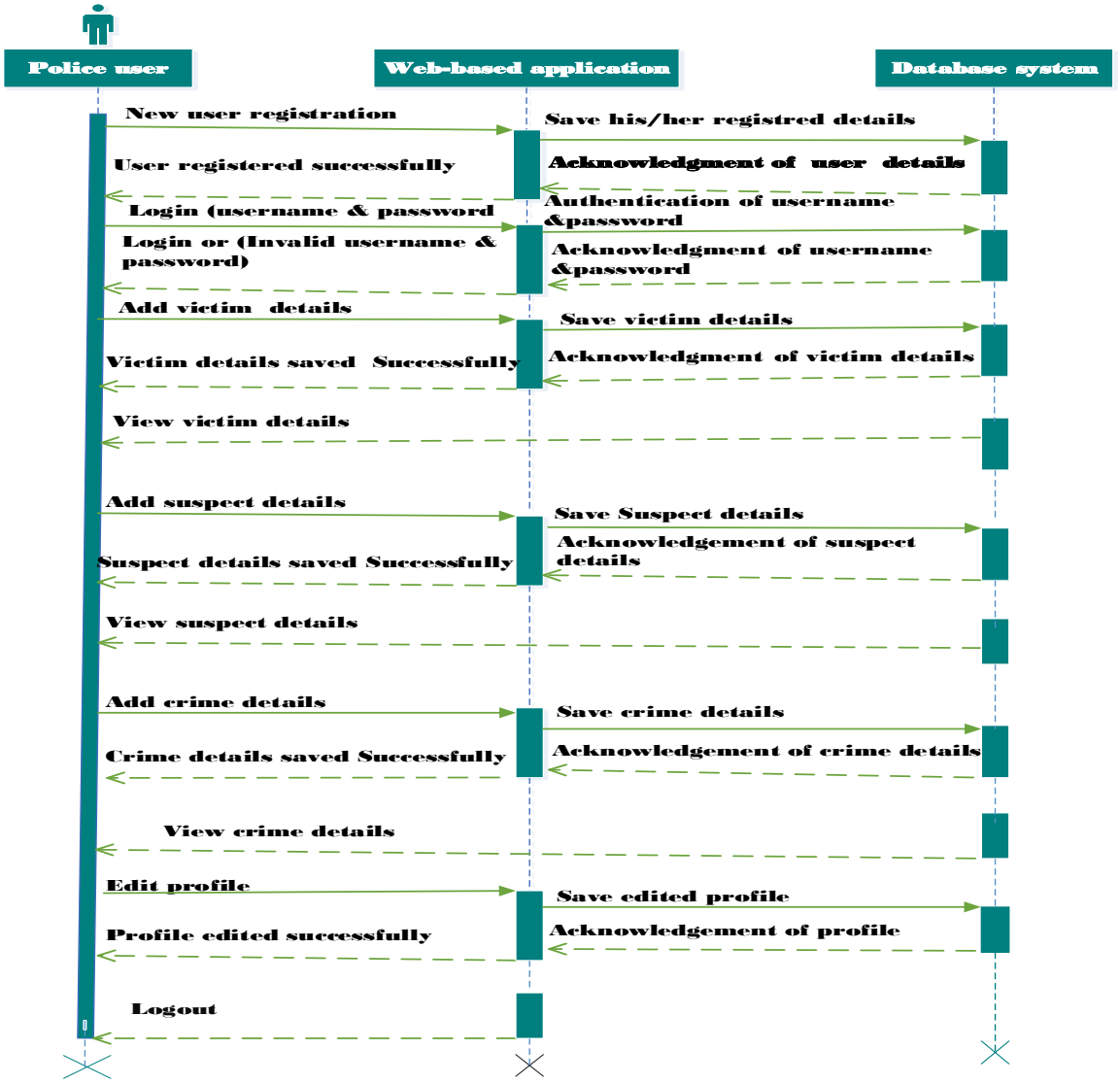


Figure 4.5A: Police Sequence Diagram

B) Admin Sequence Diagram

A sequence shows a series of messages exchanged by a selected set of objects in temporally limited situation, with emphasis on the chronological course of events. Objects are shown by vertical lifelines. This highlights the chronological sequence of the message where time runs from top to bottom. Based on this, the diagram below consist three different types of modules such as admin, web-based application and database system. Each module provides whole system process information step by step performance. The admin user can perform the following operation in the system and database. There are two condition associated to ; one the user must

registered to the system for him/her to access and secondly the user must login with correct credentials to access the system.

i. Firstly, a registered admin user login into the system using his/her password and username where the system authenticates his/her credentials and obtained acknowledgement of either valid or invalid password/username.
ii. Secondly after user login successfully, then he/she can add new user and save the user details into the system then obtained return message acknowledgement of user details inserted successfully to the user. Then user can view the user details he/she inserted in the system.
iii. Thirdly the user can add Police station and save the Police station into the system then obtained return message acknowledgement of police station inserted successfully to the user. Then user can view the Police station details he/she inserted in the system.
iv. Fourthly the user can add news update and submit news update into the system then obtained return message acknowledgement of news update inserted successfully to the user. Then view the news update he/she inserted in the system.
v. The last step is that, the user terminates the communication or session by logging out to home page after accessing all or any one of the above function.

Figure 4.5B: Admin Sequence Diagram

4.3.1.5 Web-based Application for Crime Report Handling: Class diagram

The static relationships between objects and their types are represented in Figure 4.6 class diagram. This is to depict interaction between each function of the objects, relationship types that exist between different actors, or the kind of operation they can execute in the logical view of the system. The class diagram uses object name, attributes of the class object, method or operation and relationship between the classes. The object name represents the class name or entity in the database, the attribute represent the properties, method or operation of the object and the relationships reflect the interactions between the class object/entities.

The figure 4.6 below shows the class diagram depicting some of the classes that have been developed in the system based on the paper tools that were provided by the Police. The Police and admin class represent the Police user or member and admin user entities in the application. Both class share common operations from the police user interface.

The admin class is generic class responsible for communicating with the database directly. The news and feedback class share common methods from the admin class. The Police class is also a generic class that handles saving of forms to the database. The crime, victim and suspect classes respectively also share common operations from the police class. Therefore, class diagram was mainly used to represent the system logic.

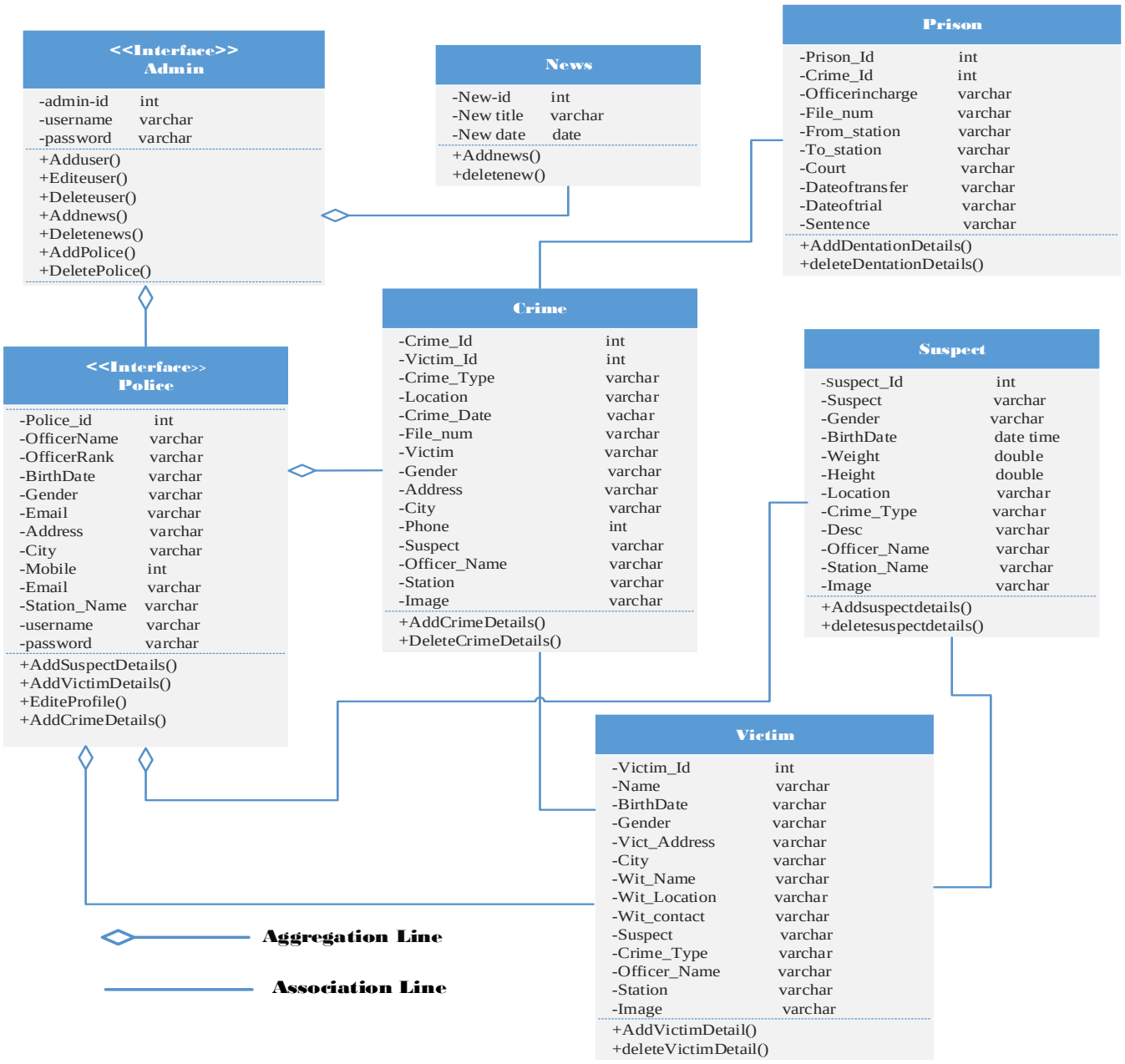


Figure 4.6: Web-based Application for Crime Report Handling: Class Diagram

4.3.2 Database Design

The main function of the crime database management system is to provide efficient and reliable methods for users to retrieve data. The main community users of this proposed database management system involve registered Police personnel and Admin. These users are classified based on their roles in accessing the information and managing the database. The database

design model adapted was the object oriented class diagram. In this research study, MYSQL was used for database design. So the designed database consists of two major options which involved:

Generate Evidence Report Option: this program is concern with the crime, suspect, victim and prison data tables generation on group of criminal involved in a crime reports.

Data Search Options: this program is also deal with searching the information or data from crime, suspect, victim and prison data tables based on user options for some purpose in a crime reports.

4.3.2.1 Data Tables

The database consisted of; admin, police, victim, suspect, crime, prison, feedback and news tables respectively. Here only few tables are used below for readers.

Table 4.6: Police Table

This table holds police member information registered for web-based & database system.

Filed name	Data type	Constraints	Description
Police_Id	Int(11)	Primary key	Unique police identification number
OfficerName	Varchar(35)	Not Null	It store police user names
OfficerRank	Varchar(25)	Not Null	It store officer rank
Birthdate	Date time	Not Null	It store user date of birth
Gender	Varchar(10)	Not Null	It store user gender
Address	Varchar(20)	Not Null	It store police address
City	Varchar(20)	Not Null	It store police city where she/he live
Mobile	Int (10)	Not Null	It store user contact number
Email	Varchar(20)	Not Null	It store user email address
StationName	Varchar(20)	Not Null	It store police member station name
Username	Varchar(20)	Not Null	It store username
Password	Varchar(20)	Not Null	It store user password

Source: Primary Data, 2018

Table 4.7: Feedback_Table

This table holds all contact information of the police and stored in crime reporting handling system.

Field Name	Data type	Constraint	Description
Feedback_Id	Int(11)	Primary key	Unique feedback identification number
Name	Varchar(20)	Not Null	It stores user name
Email	Varchar(20)	Not Null	It store user email address
Mobile	Int(10)	Not Null	It store user mobile number
Feedback	Varchar(200)	Not Null	It store feedback description
Date	Timestamp	Not Null	It store current date of user in the database

Source: Primary Data, 2018

Table 4.8: Suspect_Table

This table holds all suspect information investigated by the police and stored in crime report database management system.

Filed name	Data type	Constraints	Description
Suspect_Id	Int(11)	Primary key	Suspect unique identification number
Name	Varchar(20)	Not Null	It store suspect names
Gender	Varchar(20)	Not Null	It store suspect gender
DOB	Date time	Not Null	It store suspect date of birth
Weight	Int(12)	Not Null	It store suspect estimated weight
Height	Int(10)	Not Null	It store suspect estimated height
Location	Varchar(20)	Not Null	It store suspect location
Crime	Varchar(100)	Not Null	It store suspect crime
Suspect Desc	Varchar(100)	Not Null	It store suspect description
Officer_name	Varchar(50)	Not Null	It store police officer name
Station	Varchar(50)	Not Null	It store police station
Image	Varchar(50)	Not Null	It store suspect image

Source: Primary Data, 2018

Table 4.9: Victim_Table

This table holds all suspect information investigated by the police web-based application for enhancing crime report handling system.

Filed name	Data type	Constraints	Description
Victim_Id	Int(11)	Primary key	Unique victim identification number
Name	Varchar(20)	Not Null	It store victim first name
Birth_date	Date time	Not Null	It store victim date of birth
Gender	Varchar(10)	Not Null	It store victim gender
Vict_Address	Varchar(20)	Not Null	It store victim address
City	Varchar(20)	Not Null	It store victim city of living
Witness_name	Varchar(20)	Not Null	It store witness name
Witness_Contact	Int(10)	Not Null	It store witness contact number
Suspect	Varchar(20)	Not Null	It store suspect name
Crime_Type	Varchar(20)	Not Null	It store crime type done by the suspect
Officer_Name	Varchar(20)	Not Null	It store the name of police investigator
Station_Name	Varchar(100)	Not Null	It store station name where crime reported
Image	Varchar(50)	Not Null	it store suspect image

Source: Primary Data, 2018

Table 4.10: Admin_Table

This table holds all information about administrator and stored them in crime report management system.

Field Name	Data type	Constraint	Description
Admin_ID	Int(11)	Primary key	Unique admin identification number
Username	Varchar(20)	Not Null	It stores admin user name
Password	Varchar(20)	Not Null	It store admin password

Source: Primary Data, 2018

Table 4.11:News_Table

This table stores all new information publishing at particular time by the police officer.

Field Name	Data type	Constraint	Description
News_Id	Int(10)	Primary key	It store news unique number
News_Title	varchar(100)	Not Null	It store news title name
News_Date	Date	Not Null	It store news publishing date

Source: Primary Data, 2018

Table 4.12: Crime_Table

This table holds all information about the types of crime committed in the database system

Filed name	Data type	Constraints	Description
Crime_ID	Int(11)	Primary key	A unique crime identification number
Crime_type	Varchar(20)	Not Null	It store crime type committed
Location	Varchar(20)	Not Null	It store location where crime happened
Crime_Date	Date	Not Null	It store crime reported date
Reference_No	Varchar(20)	Not Null	It store reference number of crime
Victim	Varchar(20)	Not Null	It store victim name
Gender	Varchar(10)	Not Null	It store victim gender
Address	Varchar(25)	Not Null	It store victim address
City	Varchar(20)	Not Null	It store victim city where he/she live
Phone	Int(10)	Not Null	It store victim contact number
Suspect	Varchar(10)	Not Null	It store the suspect name
Police_Name	Varchar(40)	Not Null	It store officer name
Station_Name	Varchar(50)	Not Null	It store station names
Image	Int(10)	Not Null	It store officer contact number

Source: Primary Data, 2018

Table 4.13: Prison_Table

This table holds all information about the types of suspect detention details in the prison.

Filed name	Data type	Constraints	Description
Prison_Id	Int(11)	Primary key	A unique identification number
Officer	Varchar(20)	Not Null	It store the name of officer in-charge from prison
File_num	Varchar(20)	Not Null	It store suspect file number
From_station	Varchar(20)	Not Null	It stores the name of the station where crime reported.
To_prison	Varchar(20)	Not Null	It stores detention details of a suspect.
Court	Varchar(20)	Not Null	It store trial court of the suspect
Dateoftransfer	Datetime	Not Null	It stores transferred date of the case
Dateoftrial	Datetime	Not Null	It store trial date
Sentence	Varchar(20)	Not Null	It stores suspect sentence from the court

Source: Primary Data, 2018

4.4 Objective Number Three

4.4.1 To Implement the Web-based Application for Crime Reporting System in Jubek State, South Sudan National Police Services

This objective was achieved by implementing the proposed web-based application for crime report handling from window based graphical user interface (GUI) using hypertext markup language (HTML), cascading style, (CSS) for dynamic web page and JavaScript to validate the system. MYSQL and Hypertext Preprocessor (PHP) were also used for robust database and communication between backend and front-end respectively. The apache was used as environment which runs the software and the database.

There are two main users of the proposed web-based application used for enhancing crime report handling system in Jubek state: the police and the administrator user members respectively. The police member must be registered user to access the system. This user has privileges to add, delete suspect, crime done, and victim person details respectively. This user also has a right to add the investigated crime complaints and his/her edit profile if she wishes.

The administrator has a right to add and delete the police station, user, news and witness respectively. The following are environment of the web-based application system;

4.4.1.1 Home Page

The home page of the proposed application provided to the users simply to view the news update; contact others Police user and for new member to register in the application.

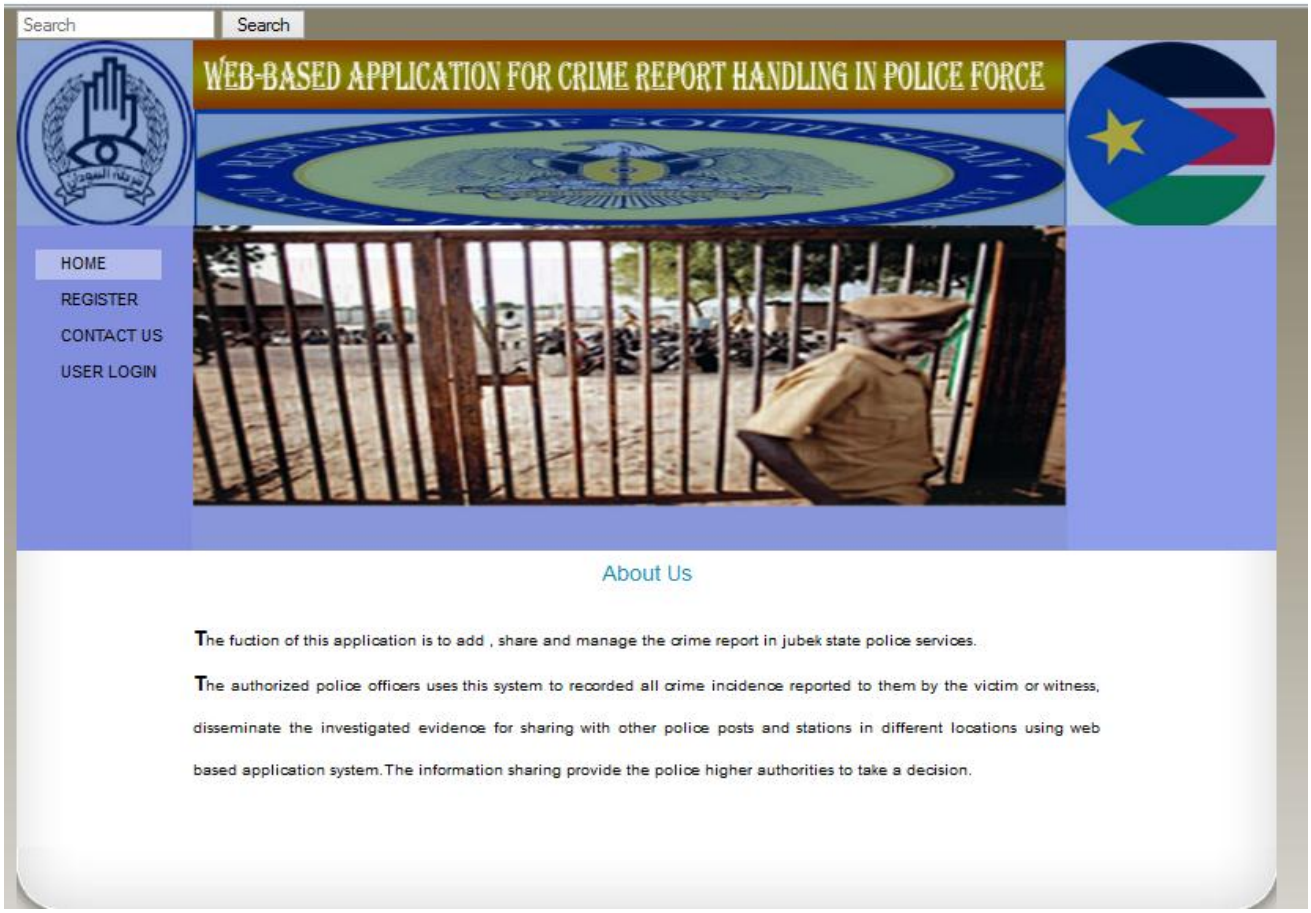


Figure 4.7: Home Page

4.4.1.2 Registration Form

This application allows the new member to register all his/her details using the given registration form as shown above. This form allow the users to registered their particulars, and credentials for accessing the application.

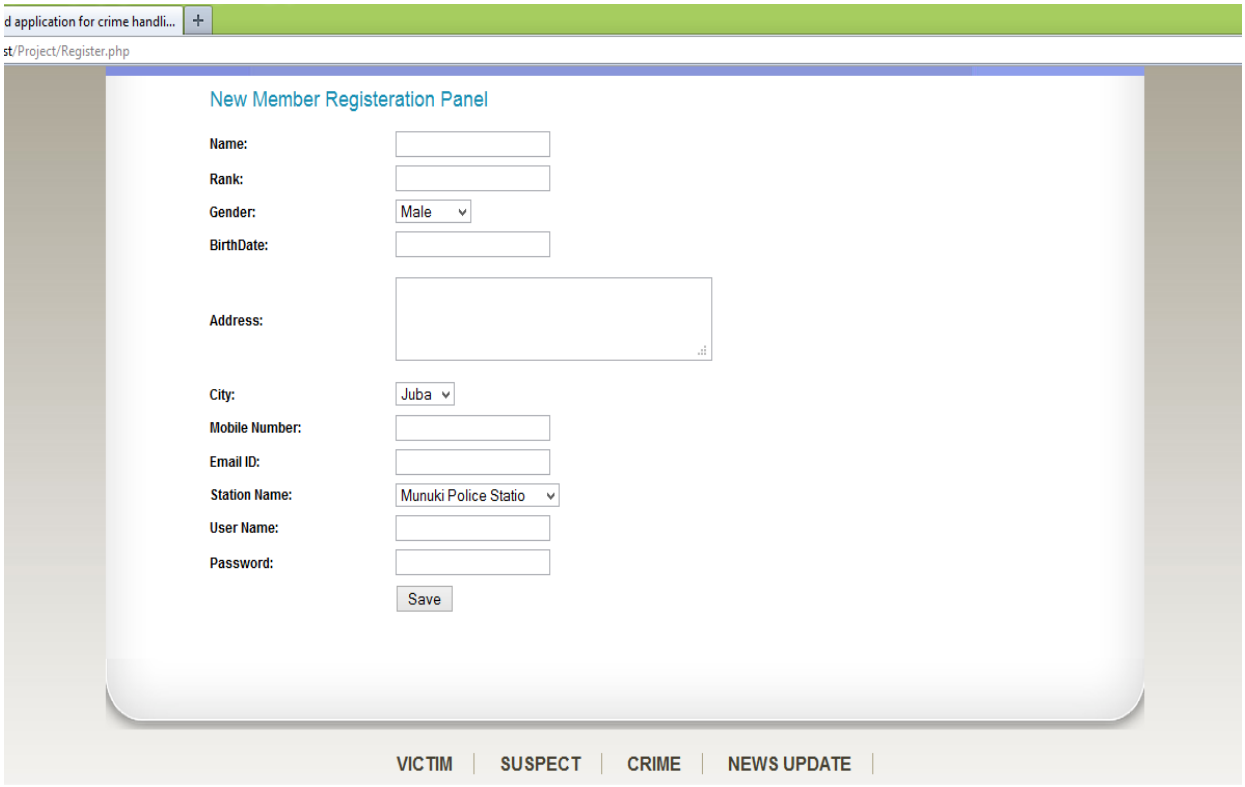


Figure 4.8: New User Registration Form

4.4.1.3 Contact Form

This contact form is used to give feedback to other members. In this feedback form, the user can provide the Police member information using his/her particulars (name, email, and mobile phone).

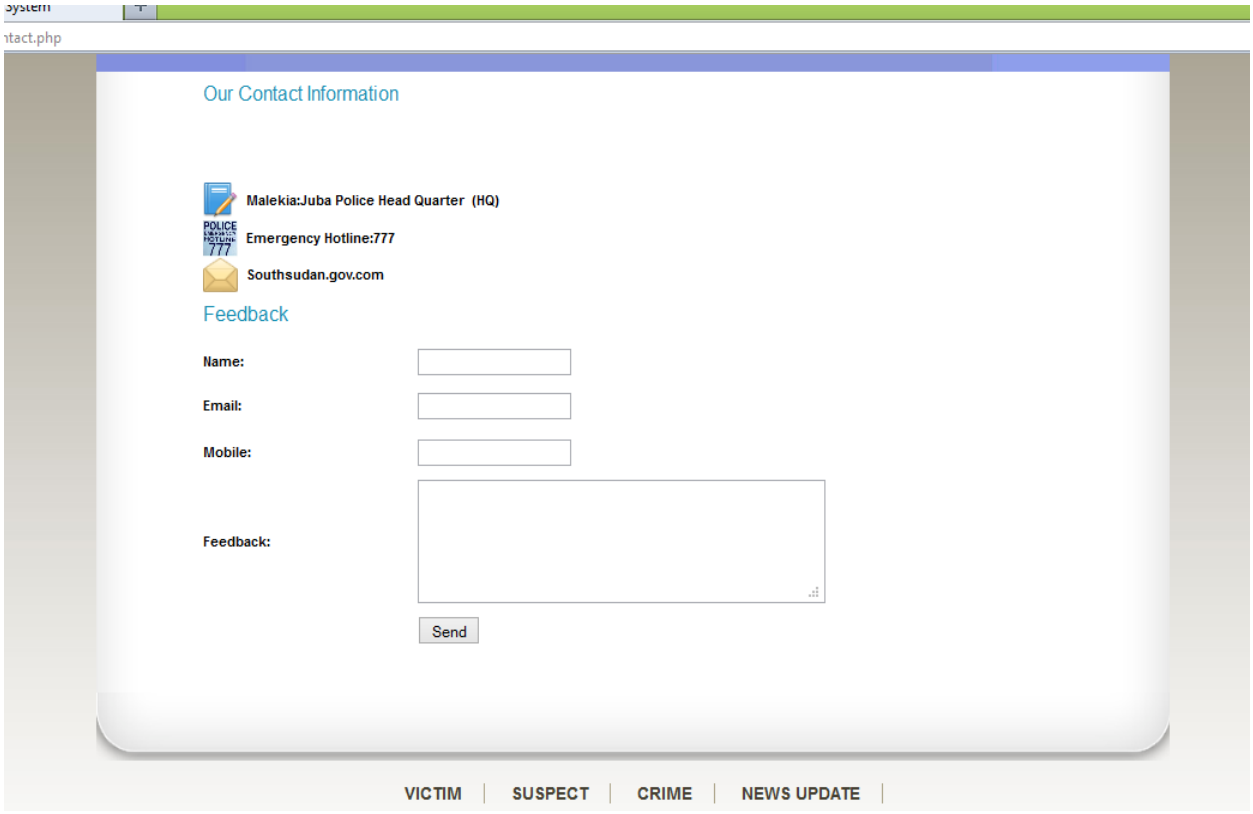


Figure 4.9: Feedback Form

4.4.1.4 Users' Login Panel

In this login panel, there two actors eligible to access the application; the police and admin users respectively having different roles assigned to them to access the application. The login panel allows the members to login and access the application by entering his/her credentials (username and password) correctly and deny to the access the application if the credentials are wrong likewise denied access if selection options for the user is correct

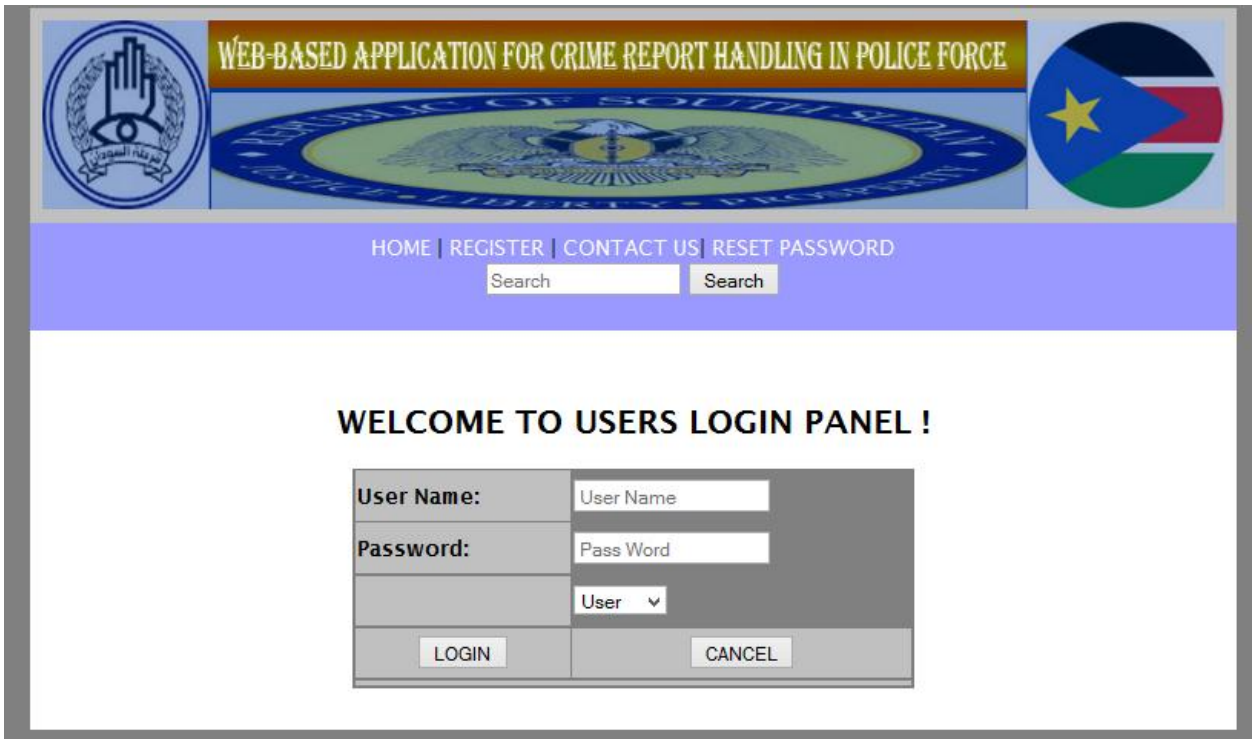


Figure 4.10: User Login Panel

4.4.1.5 Police User Home Page

This panel provided to the Police user member to mange complaint investigations, victim, property crime and suspect information with available options like add, view, delete and edit. Here the user can add, view and delete complaint investigations, victim, property crime and suspect information. The user also can edit and save his/her profile. After accessed the information he/she wanted, then logout to the main home page.

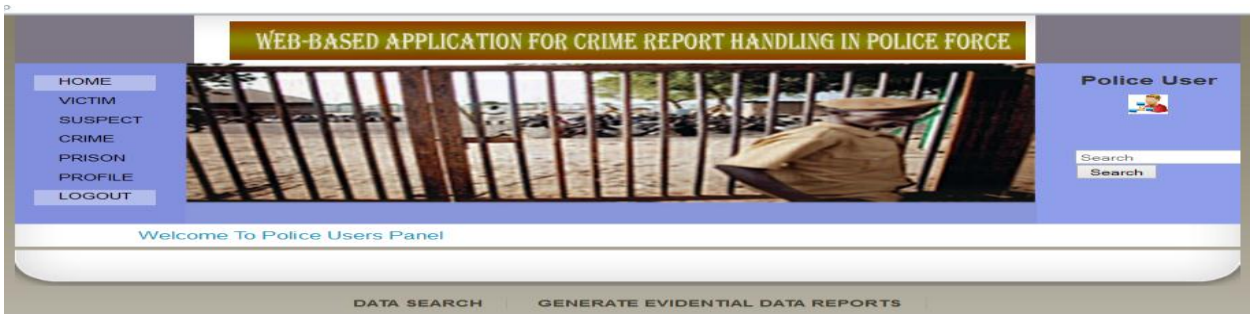


Figure 4.11: Police User Home Page

4.4.1.6 Victims Information Report Form

This is the Police report about the victim affected by the certain crime committed by the suspect. This form below shows the report sheet for victim generated when requested by the jury during court proceedings as to the details of a particular criminal and the crimes committed.

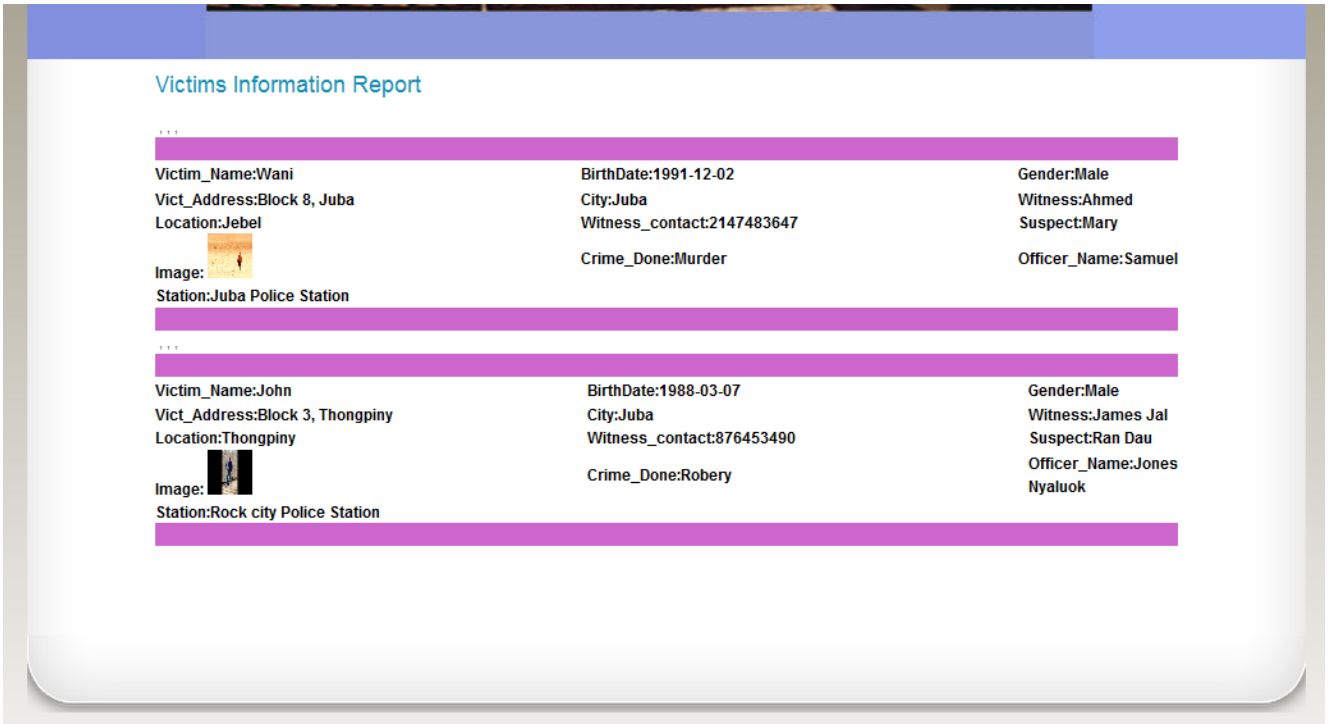


Figure 4.12: Victim Information Report Form

4.4.1.7 Suspect Information Report Form

The suspect information reports provide other Police Forces to view them. This form below shows the report sheet for suspect particulars, victim and the crimes committed which is generated when requested by the jury during court proceedings.

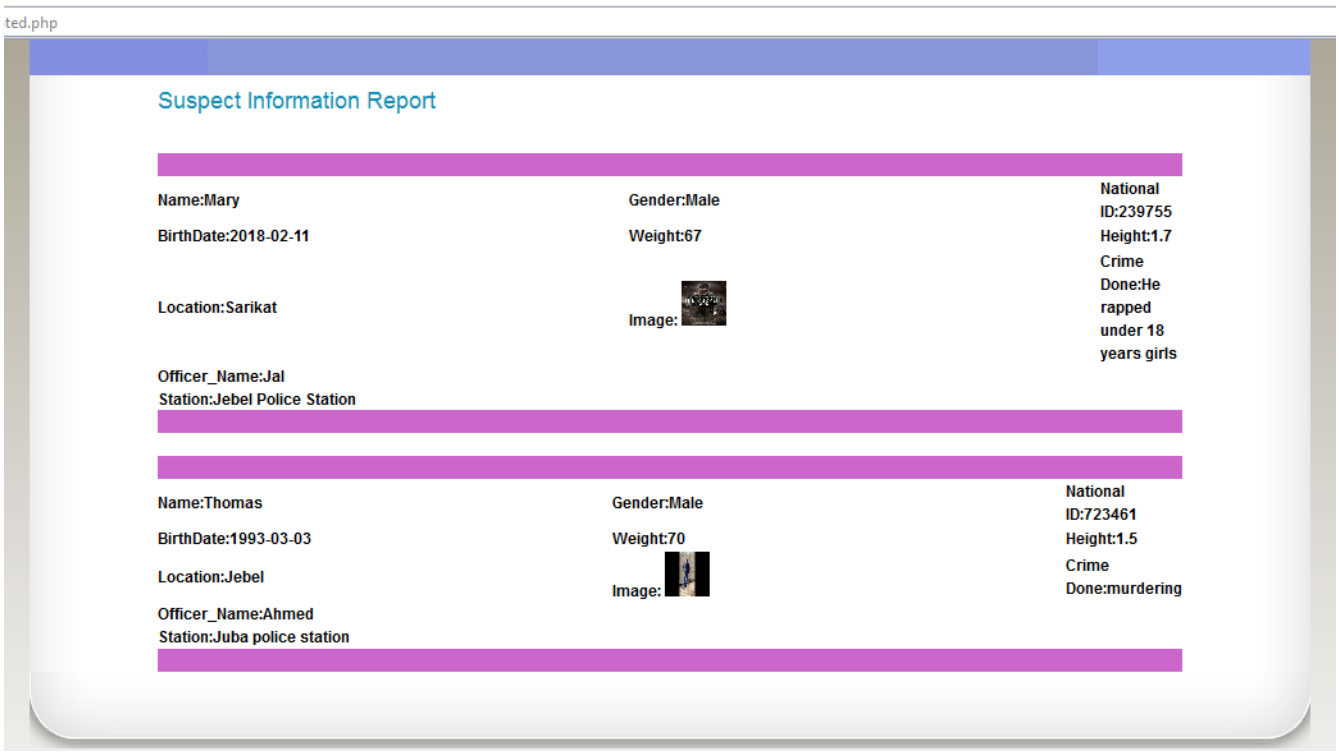


Figure 4.13: Suspect Information Report Form

4.4.1.8 Crime Information Report Form

This is the Police report about the victim affected by the certain crime committed by the suspect. This form below shows the report sheet for suspect particular, victim and the crimes committed which is generated when requested by the jury during court proceedings.

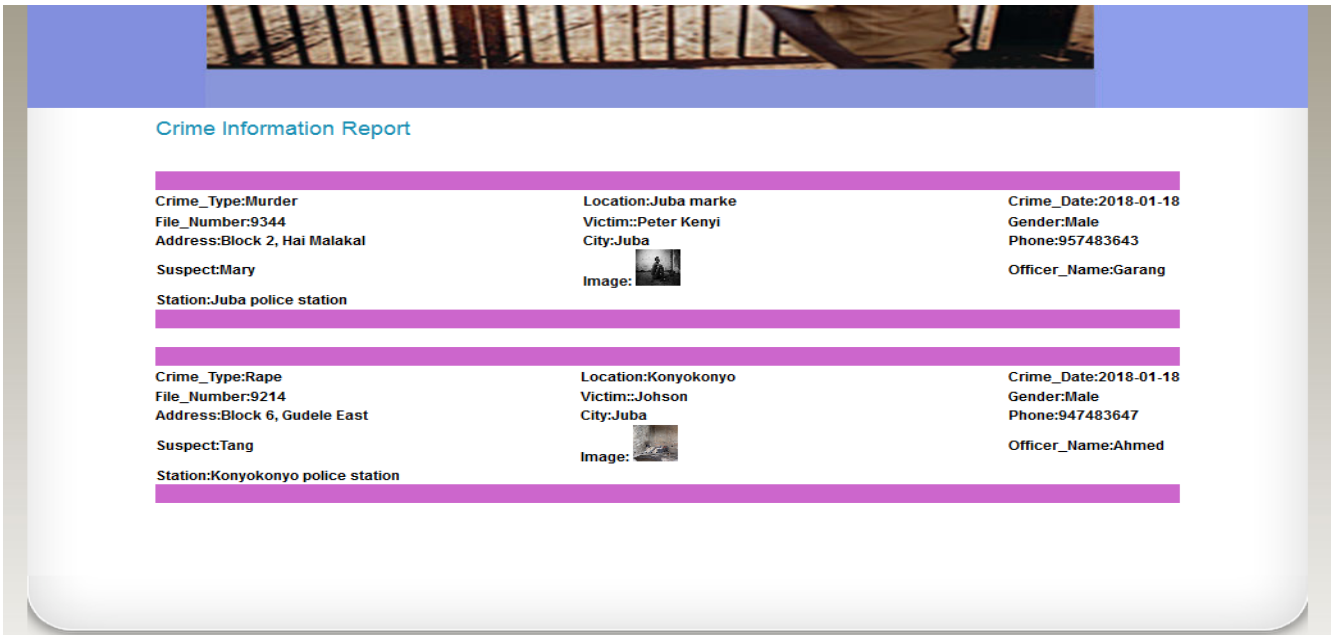


Figure 4.14: Crime Information Report Form

4.4.1.9 Admin Home Page Panel

In this admin panel, the admin user is managing Police users, Police station and news update with options like add; view and delete where the admin member can add, view and delete user, Police station and news update details respectively. The admin user can also edit and save his/her profile. Then final logout to main home page after finished for accessing the information he/she wanted.

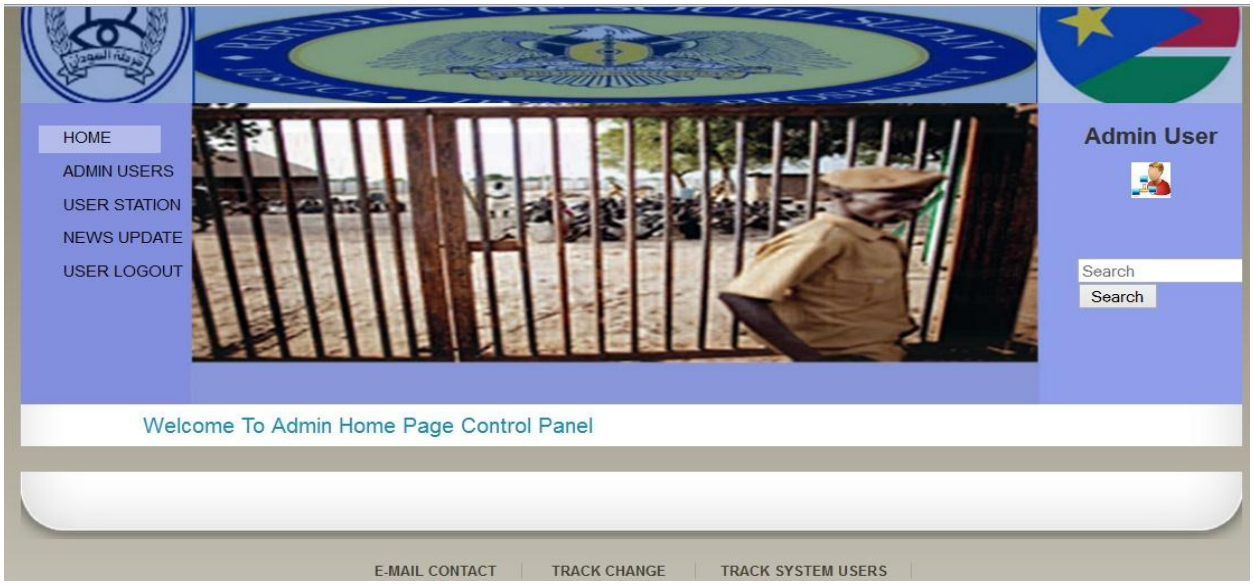


Figure 4.15: Admin Home Page Panel

4.5 Objective Number Four

4.5.1 To Test and Validate the Web-based Application to ensure that it's Actual Requirements and Specifications are met

This objective was done for testing different components of application to ensure both functional and non-functional requirements of the proposed application were fulfilled. Moreover, it was done also to make sure the system authenticate and verified user accessing it and reject authorized access by the intruders. Validations are provided in each field to avoid inconsistent or invalid data entry in the databases.

4.5.1.1 Components Testing and Validation

The component testing was performed to make sure that the system components are correctly coded and carried out based on the intended functionality. The integration testing was done also with a goal of testing the system interfaces e.g. login interface. This login interface involved both Police user and admin user integrated into the database system. Among the components and integration testing carried out involved login form, victim recording-information form, suspect information form, user registration form, and crime registration-recording form etc but only few components testing have been shown blow.

A) User Login Component Testing

Blow is the example of the login validation testing to make sure it rejects unauthorized access for the system or non-registered member and display the message titled invalid username or password. This shows the user validation page test. When users input incorrect or unregistered details, the page is returned with an error message showing "Invalid username or password". It gives another opportunity for the user to input validate username and password, after which the welcome page is displayed.

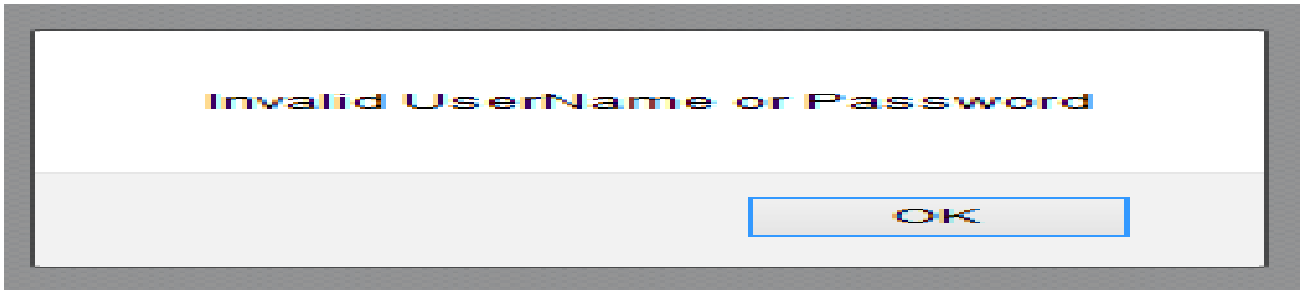


Figure 4.16: Invalid Login Message Display

This user validation above was done to test the system if it rejects the invalid or incorrect information.

B) Crime Registration Form Testing

The diagram below illustrate suspect form test case carried out to ensure that it deny empty value entered into the application by the users. This denial of the system for empty values entry was done to ensure that all fields in the forms have a not null key attributed to them. If some of the fields are left null, the system does not register the details and shows a pop-up error message, otherwise, it displays a success message for entered details.

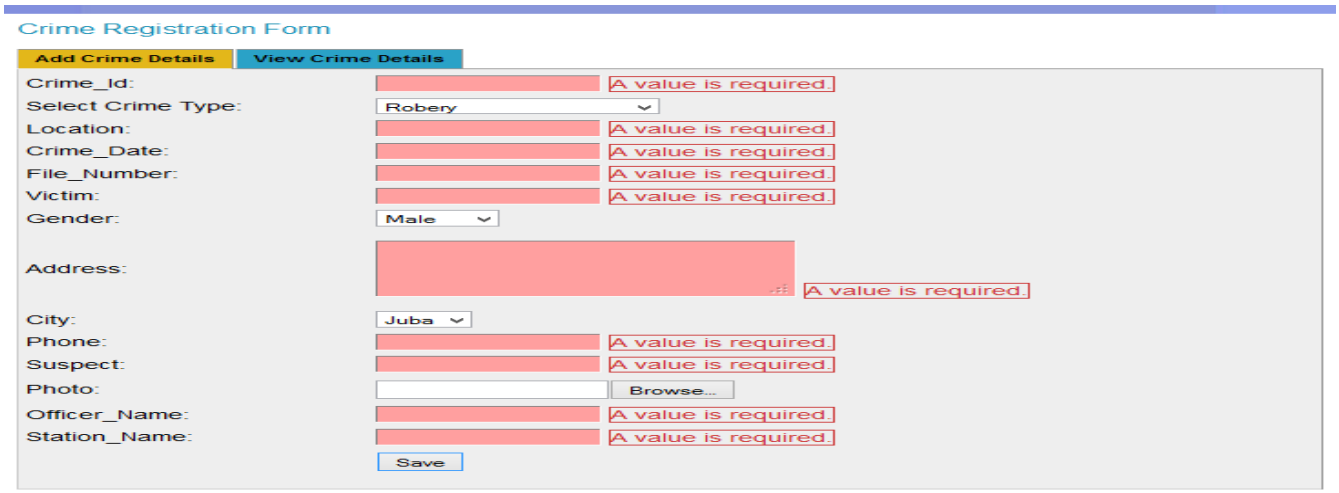


Figure 4.17: Crime Registration Form Testing

4.5.1.2 System Testing and Validation

The system testing here described types of test cases which were carried out by the developer to make sure that the system functionality is achieved. This was done to see whether the system can enter required values and reject injected or invalid values entered by authorized users. These objects were also validated to provide the user with actual resulted needed in the provided object space value. Moreover, it is also done to make sure that the system rejects empty values and undefined constraints value entered by the user. All the eleven modules tested and validated, four of them are illustrated in the table below which included login (both admin and Police) form, contact form, suspect registration form and user registration form.

Table 4.14: Summary of Testing and Validation of the Web-based Application System

Test case	Case type	Expected result	Actual result	Status: Deny or allow
Login	Invalid username or password	The system will deny invalid username /password and throws error away	The system will deny login Into the database	Deny
Validation	Require field Validation	Field should not be Empty	Users have to enter the value	Login allow
Feedback-contact form	Enter name current length required is zero	The system will deny the zero value for name and throws error away	The system will deny zero values submitted into database	Deny
	Entered email current length required is zero	The system will deny the zero value for email and throws error away	The system will deny zero values submitted into database	Deny
	Entered mobile current length required is zero	The system will deny the zero value for mobile and throws error away	The system will deny zero values submitted into database	Deny
	Enter feedback required length is zero	The system will deny the zero value for feedback and throws error away	The system will deny zero value submitted into database	Deny
Validation	Field validation Required	Field shouldn't be empty	User have to enter value	Allow
Suspect registration form	Suspect name required value is	The system will deny the zero, value for	The system will deny zero value	Deny

	empty	name required and throws error away	into database	
	Birth date required value is empty	The system will deny the zero, value for birth date required and throws error away	The system will deny zero value into database	Deny
	Suspect weight required value is empty	The system will deny the zero, value for weight required and throws error away	The system will deny zero value into database	Deny
	Suspect height required value is empty	The system will deny the Zero, value for location required and throws error	The system will deny zero value into database	Deny
	Suspect location required value is empty	The system will deny the zero value for location required and throws error	The system will deny zero value into database	Deny
	Suspect crime type required value is empty	The system will deny the zero value for crime type required and throws error	The system will deny zero value into database	Deny
	Description of the Suspect required value is empty	The system will deny the zero value for suspect required description and throws error	The system will deny zero value into database	Deny
	Station name required value is empty	The system will deny the zero value for station-name required and throws	The system will deny zero value into database	Deny

		error		
Validation	Field validation is Required	Field shouldn't be empty	User have to enter value	Allow
User registration form	Required entered Officer Name current length is zero	The system will deny the zero value for officer name and throws error	The system will deny zero value into database	Deny
	Required entered Officer Rank current length is zero	The system will deny the zero value for officer rank and throws error	The system will deny zero value into database	Deny
	Required entered Birth Date current length is zero	The system will deny the zero value for birth date and throws error	The system will deny zero value into database	Deny
	Required enter address current length is zero	The system will deny the zero value for address and throws error	The system will deny zero value into database	Deny
	Required Entered Mobile Number current length is zero	The system will deny the zero value for mobile number and throws error	The system will deny zero value into database	Deny
	Required entered Email current length is zero	The system will deny the zero value for email and throws error	The system will deny zero value into database	Deny
	Required enter UserName current length is zero	The system will deny the zero value for user name and throws error	The system will deny zero value into database	Deny

	Required entered Password current length is zero	The system will deny the zero value for user password and throws error	The system will deny zero value into database	deny
Validation	Field validation is Required	Field shouldn't be empty	User have to enter value	Allow

Source: Field Data, 2018

4.5.1.3 System Usability Testing and Validation Using Experts

The system usability testing is a technique used in user-centered to evaluate application product by testing it on users. The usefulness defines the extent of which the system enables its users to achieve their goals. In this context, the application usability is extent to which system product achieve specified goals specifically the effectiveness, efficiency and user satisfaction as specified in the context of user requirements. The system task accomplished by the system was based on the objectives layout by the Police users. The system usefulness and usability testing factor was not been discussed during project planning and development phase. The application product is considered as important to make something functional and expecting people to use it. The usability testing and validation of the web-based application system was achieved by selecting fifteen Police personnel based on those three factors mentioned above. The assessment consists of a 3 item questionnaires with five response options similar to a Likert scale.

Effectiveness: This is the accuracy and completeness with which users achieve certain goals. Indicators of effectiveness include quality of solution in term of consistency, documentation of records management, feature set capabilities, security and visibility of all images uploaded in the system and error rates as 26% of participants agreed on its effectiveness. In this study, we use quality to measure the outcome of the user's interaction, system error rate and visibility of all images uploaded in the system.

Efficiency: Indicators of efficiency include task completion time or system response time. In this study, we use task completion time to measure the efficiency from the user perspective and 65% of them agreed that the system response is much better.

Satisfaction: is the users' comfort with and positive attitudes towards the use of the system. Users' satisfaction was measured by the system navigation ease of use or was measured by the user easy navigation of the system. So the conclusion is that the system functions effectively and efficiently and satisfies their basic requirements as 56% agreed on that.

4.6 Deployment of Web-based Application

The system architecture under development is 3-tier application the client, application and the database layers respectively. The inquire officer login from the interface to enter crime information and store in the database. The servers provide an access for the information store in the database. The dot arrows indicate passive server in standby incase the other server fail. The active server is online server and these two servers work redundancy to each other if one fails the other takes over. The servers provide an access for the information store in the database. Load balancing scales the performance of server-based programs, such as a web server, by distributing client requests across multiple servers. Load-balancing technologies, commonly referred to as load balancers, receive incoming requests and redirect them to a specific host if necessary. The load-balanced hosts concurrently respond to different client requests, even multiple requests from the same client. For example, a Web browser might obtain the multiple images within a single web page from different hosts in the cluster. This distributes the load, speeds up processing, and reduces the response time.

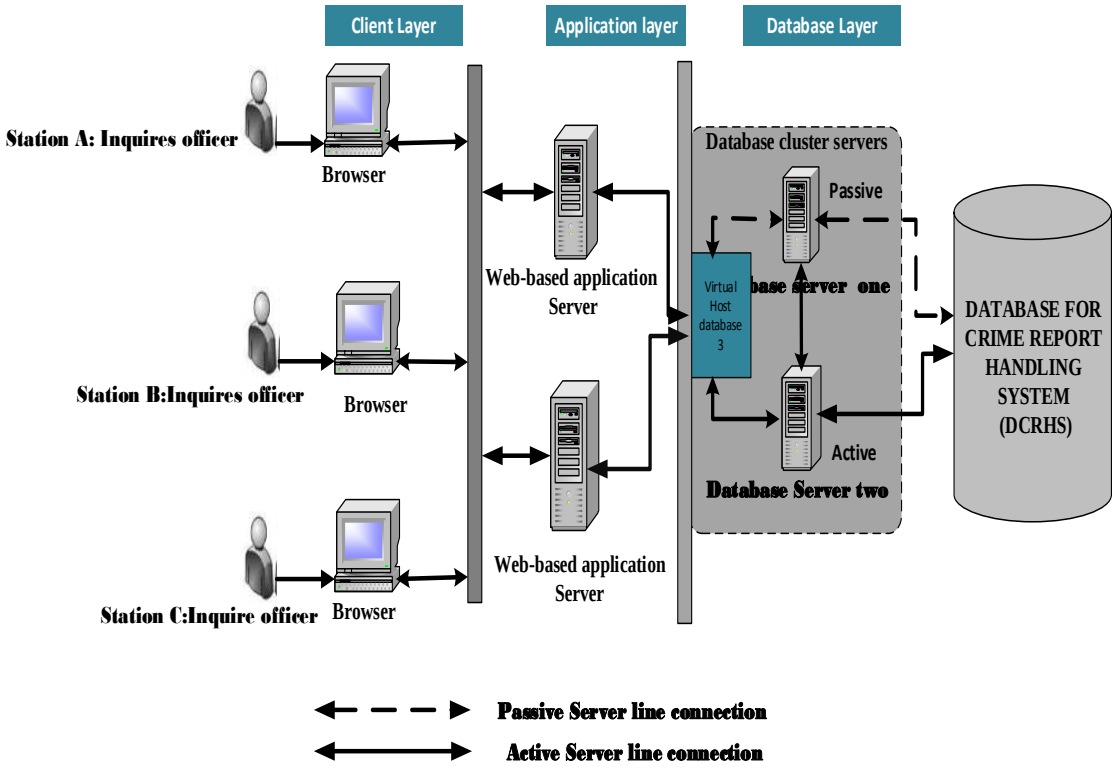


Figure 4.18: Deployment of Web-based Application

CHAPTER FIVE

CONCLUSION, RECOMMENDATIONS AND CHALLEGES

5.0 Chapter Overview

The main objective of this chapter is to discuss the finding of each sub variable of independent and dependent variables from literature review stated earlier and analyzed in previous chapter to see whether the objectives stated have been made. It also serves to see how they contribute to answer the research questions and draw conclusion and recommendations about them for future improvement.

5.1 Conclusion

The purpose of the study is to automate the handling of crime reporting in Police Force specifically in Jubek State, South Sudan National Police Services. The objectives are to investigate existed problems in the current crime reporting in Jubek State, South Sudan National Police Services, design a model of web-based application for crime reporting system in Jubek State, South Sudan National Police Services, implement web-based application for crime reporting system in Jubek State, South Sudan National Police Services and finally to test and validate web-based application to ensure that its actual requirements are met. The study concludes that the handling of crime report in Jubek State was poor and hence need further improvement in their service provision system. The noticeable evidences were inconsistency of suspect recorded information; losses of crime details as well as misplacement of recorded evidences that antidote or hinder attaining an efficient and effective management in Jubek State, South Sudan National Police Services in their service provision on crime policing. It was also noted that these issues increase the insecurity in the State and decrease credibility on Police Forces effort in their services provision.

The model produced in this study address the problem of crime report and investigation process in Jubek State, South Sudan National Police Services. In order to improve the crime reporting system and investigation process, it is suggested that the constructs used in the conceptualized model would be used to attain the information needed to solve the case. In the study we also

identified that background information (like gender, education and experience) are not included in this model as main constructs but they do have indirect influence on the crime report handling. For instance based on our interview women working in Police forces are more transparent compare with men due to the fact that women are heartfelt natural. Education play greater role too in crime report handling because the higher the education level the Police personnel have, the more chance he will definitely do precise work and the more experience the Police personnel become, the more he become effective in dealing with the case . Therefore, demographic variables do precisely indicate the conditions that produce variations in crime report handling. That is because demographic variables are believed to affect the identified determinants, but are not determinants themselves.

At the end of this research study, it was realized and concluded that those Police personnel conducting enquiries for any crime incidence reported need to use appropriate technological model and deploy web-based application for effective handling of these issues mentioned above. Therefore, web-based application was suggested as appropriate technology to reduce manipulation caused by the internal and external individuals by providing easily flow of information between difference departments, make records available and improve accountability and integrity of evidence for effectiveness of work-service provision system in Jubek State, South Sudan National Police Services. The crime investigations perform by the Police Forces need to be stored in digital form using web, e-mail, and cellular communication services to the various offices (Vlachopoulos, et al. 2007). Not only that, but also reduce delay of criminal case or pending of criminal case, provide retrieval of crime and criminal data, and improve information sharing of crime reports in Police Forces. The use of electronic system can reduce redundancies and inconsistencies information recording, ensures user defined rules to promote data integrity, enables sharing of data across all applications and ensures proper access authorization for users (Ernest, 2010).

The researcher observed that there is also a need of strategies and policy to be amended for the adoption of web-based application in Police services to enhance the crime reporting system. The system applications provide the following advantages; the firstly, the uses of proposed web-based system requires less number of staffs to complete the work when compared with the current crime reporting system which required more number of staff to complete the work.

Secondly, it reduces the data loss in compared with the existing paper work and provide less time for searching a record and dissemination of the crime data to different Police stations in shortest time. In another way it management time to disseminate the crime information recorded to other police station in less than few minutes compare with the existing paper work record where information take long time to reach other Police offices.

Lastly, the study concluded that for the usability of the web-based application based on the few individual asked for effectiveness and efficiency, it is seen that application users are comfortable about the use of the application and this indicated that the main objective of developing a web-based application for enhancing crime report handling in Police Force is achieved.

5.2 Recommendations of Research Findings

Based on the conclusions about results a number of recommendations were made for future implementation. These recommendations were suggested as stated in the following.

- As demand for information transparency and availability is concerned, it is essential for government to deploy web-based application to enhance their work effectively and efficiently in the State on crime provision services.
- Workforce (with maximum gender balance needed) training in conjunction with the government help need to be conducted for effective operation and management of the web-based application system.

5.3 Recommendation for Future Research Areas

This study explored the issues of crime reporting in Police Force from Jubek state, South Sudan National Police Services and the web-based application for enhancing crime reports handling was developed; however the limitations could be considered as an opportunity for future research on the effect of handling crime reporting in Police Forces as the study recommended in the following;

- This study suggested that an algorithm for those constructs used in that model need to be formulated.

- Further studies should be conducted to include the Integrated Ballistic Identification System (IBIS) for effective imaging to enhance the capability of the system for higher end application.
- The study suggested that further research should be conducted at national level of Police as this study only investigate existed problems of crime reporting system in Jubek State Police Forces, as scholars argued that it is impossible to generalized the finding of one organization with other (Bryman etal., 2008).
- Finally, it is suggested that deep investigations need to be conducted among the public rather than Police personnel only, to ask their opinion about the effectiveness of the Police Force in handling crime reports.

5.4 Challenges of the Research Study

Security and Financial Constraints: were among the challenges faced, the researcher was unable to visit most of the Police stations in Jubek state to gather information on the existing crime reporting system. Only few Police stations (eg. Malakia central Police, Juba Police prisons, and Juba central Traffic Police) were visited and the information gathered from the officers in charge forms the basis for the development of the new application system due to security and financial constraints. Because of those constraints, the researcher did not cover the other Police stations in Jubek State.

Information Hiding By Some High Rank Officers: was other encountered limitation so far in this study as some of the top rank Police Officers during interview by the researcher refused to provide detailed information compare to low rank Police officers and this make researcher depend on the information provided by some low rank Police Officers to specify the user requirements.

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APPENDICES

APPENDIX A: RESPONDENTS QUESTIONNAIRES

Dear Informant(S)

I am a student of Kampala International University (KIU) doing Master of Science in Software Systems Engineering, conducting research study entitled "**DEVELOPMENT OF WEB-BASED APPLICATION FOR CRIME REPORT HANDLING IN POLICE FORCE: A CASE OF JUBEK STATE, SOUTH SUDAN NATIONAL POLICE SERVICES**" Within this context, I am kindly requesting your cooperation to answer these questionnaires without hesitation. The information which you (informant(s)) provide shall be used for academic purpose and hence shall be disclosed to others academicians. I am humbly requesting you to fill all these questionnaires below without leaving a single one unanswered. Retrieving all these questionnaires answered would be helpful and great pleasure.

Yours faithfully,

SIMON GAWAR DAK (RESEARCHER)

SECTION A: BASIC BACKGROUND INFORMATION OF RESPONDENTS

1. Gender

A. Male **[ ]** B. Female **[ ]**

2. Educational background can best be describe as

A. Primary Certificate [ ]B. Secondary Certificate**[ ]** C. Diploma **[ ]** D. Bachelor **[ ]** E. Masters [ ] F. Others specify :----------

3. How long have you been working in Police Services?

A. Less than one year. [ ]B. 1-6 years. [ ]C. Between 7-30 years.[ ] D. 30 years above [ ]

4. Please choose the department you belong to.

A. Police Civil Defend[ ]B. Police Prison [ ] C. Traffic Police [ ]

SECTION B: TO INVESTIGATE THE EXISTED PROBLEMS OF CRIME REPORTING SYSTEM IN JUBEK STATE, SOUTH SUDAN NATIONAL POLICE SERVICES

B1: Please kindly tick [√] by rating your response describes inconsistency of suspect identity/record information in Police offices.					
1=Never, 2=Not sure, 3=Rarely, 4= Sometimes, 5=Always	**1**	**2**	**3**	**4**	**5**
5. Is the inconsistency of suspect identity/record information existed in Police office?					

B2: Please kindly tick [√] by rating your response describes the handling of crime details files store in Police shelves.					
1=Not important2=Less important, 3=Neutral, 4=Important, 5=Very Important	**1**	**2**	**3**	**4**	**5**
6. How would you describe the handling of crime details files store in Police shelves?					

SECTION C:TO IMPLEMENT THE WEB-BASED APPLICATION FOR CRIME REPORTING SYSTEM IN JUBEK STATE, SOUTH SUDAN NATIONAL POLICE SERVICES

C1: Please kindly tick [√] by rating your responses on the implementation of web-based application in Police Services.					
1=Not important, 2=Less important, 3=Neutral, 4= Important, 5=Very important	**1**	**2**	**3**	**4**	**5**
7. Does the development of a web-based application enhanced crime reporting by providing integrity and accountability of suspect recorded information; data processing, improve information sharing among the Police Forces if implemented.					

SECTION D: TO TEST AND VALIDATE THE WEB-BASED APPLICATION IMPLEMENTED TO ENSURE THAT ITS ACTUAL REQUIREMENTS AND SPECIFICATIONS ARE MET

D1: Please kindly tick [√] by rating your responses on the usability testing and validation of a web-based application in Police Services.

8. How appropriate or effective the use of application in term of consistency, documentation of records, feature set capabilities, security and visibility of all images uploaded in the system?

a) Very appropriate b) appropriate c) Average d) Inappropriate e) Very inappropriate

9. Please describe your satisfaction with application in term of ease navigation?

a) Very easy b) Easy C) Average D) Difficult E)Very difficult

10. Please describe the application efficiency in term of response time?

a) Very Easy b) Easy c) Average d) Difficult e) Very difficult

APPENDIX B: INTERVIEW GUIDE

Name your police department: ---------- Sex: ----------

1. How do you describe handling of crime details frequently from Police shelves?

Answers: ----------

2. Is there any misplacement of victim-witness survey, physical and digital evidences in your department and what effect do you think they can bring?

Answers: ----------

3. Is there inconsistency of suspect identity/record information in Police office?

Answers: ----------

4. What change do you think in your opinion can be brought by the web-based technology if implemented in Police Force?

Answers: ----------

THANK YOU FOR YOURPARTICIPATION

APPENDIX C: HOME PAGE CODES

```
<!DOCTYPE HTML >
<head>
<title>Web-Based Application System</title>
<link href="templatemo_style.css" rel="stylesheet" type="text/css" />
<style type="text/css">
<!--
.style1 {color: #000000}
.style2 {
        font-size: 18px;
        font-weight: bold;
}
-->
</style>
</head>
<body>
<div id="templatemo_wrapper">
<?php
include "Header.php"
  ?>
<div id="templatemo_content">
        <div class="section_w800">
<h2 align="center">About Us</h2>
<table width="100%" border="0" cellspacing="0" cellpadding="0">
<tr>
<td><img src="" width="282" height="282" /></td>
<td valign="top" align="justify"><blockquote>
<p align="justify" class="style1"><span class="style2"> W</span>e offer protection to all individual residing in the jubek state by managing all crime reported to all our police posts and stations. </p>
```

```
<p align="justify" class="style1"><span class="style2">P</span>olice force recorded all crime incidence reported to them using web based information system.</p>
</blockquote></td>
</tr>
</table>
<p> </p>
<div class="cleaner"></div>
</div><!-- end of section_w760 -->

</div><!-- end of templatemo_content -->
<?php
include "Footer.php";
  ?>
</div><!-- end of templatemo_wrapper -->
</body>
</html>
```

APPENDIX D: USERS LOGIN CODES

```
<html>
<head>
        <link rel="stylesheet" media="screen" href="login.css" >
</head>
<body>
        <table align="center" border="0" bgcolor="silver" width="540" cellpadding="9" cellspacing="0" height="525">
<tr>
<td colspan="3" height="2"><img src="templatemo_header.jpg " width="860"></td>
</tr>
<tr>
<td colspan="2" bgcolor="9999FF" height="1" align="center">
                <font size="3">
<a href="index.php">HOME</a> |
                <a href="register.php">REGISTER</a> |
                <a href="Contact.php">CONTACT US</a>
</font></td></tr>
<tr>
<td width="25%" bgcolor="#FFFFFF" >  
<kdiv class="ex">
<form action="login.php" method="post">
<table width="408" height="142" border="0" bgcolor="Gray" align ="center">
        <h2 align="center"><b>MEMBERS LOGIN PANEL</b></h2>
<tr>
<td height="36" bgcolor="silver" ><b>User Name:</b></td>
<td height="36" bgcolor="Gray"><input type="text" name="username" /></td></tr>
<tr>
<td height="36" bgcolor="silver"><b>Password:</b></td>
<td height="36" bgcolor="Gray"><input type="password" name="password" /></td>
</tr>
```

```
<tr><td bgcolor="silver"><b>Select User:</b></td>
<td height="36" bgcolor="Gray"><select name="cmbUser">
<option>Police</option>
<option>Admin</option></td></tr>
<td height="36" bgcolor="silver" align="center"><input type="submit" value="LOGIN" /></td>
</form></td></tr>
<tr>
<td height="4" colspan="3" align="center" bgcolor="silver"></td>
</tr>
</table>
</body>
</html>

<!DOCTYPE HTML>

<head>
<title>User Input Form</title>
</head>
<body>
<?php
session_start();
$UserName=$_POST['username'];
$Password=$_POST['password'];
$UserType=$_POST['cmbUser'];
if ($UserType=="Admin")
{
$con = mysql_connect("localhost","root");
mysql_select_db("cms", $con);
$sql = "select * from Admin_Tbl where Admin_Name='".$UserName."' and
Admin_Password='".$Password."'";
$result = mysql_query($sql,$con);
$records = mysql_num_rows($result);
```

```
$row = mysql_fetch_array($result);
if ($records==0){
echo $records;
echo '<script type="text/javascript">alert("Invalid UserName or Password");window.location=\'index.php\';</script>';
}
else {
header("location:Admin/index.php");

}
mysql_close($con);
}
else if($UserType=="Police"){
$con = mysql_connect("localhost","root");
mysql_select_db("cms",  $con);
$sql = "select  * from police_tbl
 where UserName='".$UserName."'  and Password='".$Password."'";
$result  = mysql_query($sql,$con);
$records = mysql_num_rows($result);
$row = mysql_fetch_array($result);
if ($records==0){
echo $records;
echo '<script type="text/javascript">alert("Invalid UserName or Password");window.location=\'index.php\';</script>';
}
else {
$_SESSION['ID']=$row['Police_Id'];
$_SESSION['Name']=$row['Station'];
header("location:RegUser/index.php");
}
mysql_close($con);
```

```
}
else{
$con = mysql_connect("localhost","root");
mysql_select_db("cms",  $con);
$sql = "select * from policestation_Tbl where UserName='".$UserName."' and Password='".$Password."'";
$result  = mysql_query($sql,$con);
$records = mysql_num_rows($result);
$row = mysql_fetch_array($result);
if ($records==0){
echo $records;
echo '<script type="text/javascript">alert("Invalid UserName or Password");window.location=\'index.php\';</script>';
}
else {
$_SESSION['ID']=$row['Station_Id'];
$_SESSION['Name']=$row['Name'];
header("location:RegUser/index.php");

}
mysql_close($con);
}

?>

k
```

APPENDIX E: USERS REGISTRATION CODES

```
// This is connection to the database system <?php require_once('Connections/CMS.php'); ?>
<?php
if (!function_exists("GetSQLValueString")) {
function GetSQLValueString($theValue, $theType, $theDefinedValue = "", $theNotDefinedValue = "")
{
  $theValue = get_magic_quotes_gpc() ? stripslashes($theValue) : $theValue;

  $theValue = function_exists("mysql_real_escape_string") ? mysql_real_escape_string($theValue) : mysql_escape_string($theValue);

switch ($theType) {
case "text":
    $theValue = ($theValue != "") ? "'" . $theValue . "'" : "NULL";
break;
case "long":
case "int":
    $theValue = ($theValue != "") ? intval($theValue) : "NULL";
break;
case "double":
    $theValue = ($theValue != "") ? "'" . doubleval($theValue) . "'" : "NULL";
break;
case "date":
    $theValue = ($theValue != "") ? "'" . $theValue . "'" : "NULL";
break;
caske "defined":
    $theValue = ($theValue != "") ? $theDefinedValue : $theNotDefinedValue;

break;

  }
```

```
return $theValue;

}

}

mysql_select_db($database_CMS, $CMS);

$query_Recordset1 = "SELECT Station FROM policestation_tbl";

$Recordset1 = mysql_query($query_Recordset1, $CMS) or die(mysql_error());

$row_Recordset1 = mysql_fetch_assoc($Recordset1);

$totalRows_Recordset1 = mysql_num_rows($Recordset1);

?><!DOCTYPE HTML >
<head>
<title>Web-based application System</title>
<link href="templatemo_style.css" rel="stylesheet" type="text/css" />
<style type="text/css">
<!--
.style1 {
        color: #000000;
        font-weight: bold;
}
-->
</style>
</head>
<body>
<SCRIPT language="JavaScript1.2" src="gen_validation.js"></SCRIPT>
<div id="templatemo_wrapper">
<?php
include "Header.php"
  ?>
```

```
<div id="templatemo_content">
        <div class="section_w800">
<h2>New Member Registeration Panel</h2>
<form action="CreateUser.php" method="post" enctype="multipart/form-data" name="form1" id="form1" onSubmit="return validateForm(this,arrFormValidation);">
<table width="100%" height="417" border="0" cellpadding="0" cellspacing="0">
<tr>
<td><span class="style1">Name:</span></td>
<td><span id="sprytextfield1">
<label>
<input type="text" name="txtName" id="txtName" />
</label>
<span class="textfieldRequiredMsg">A value is required.</span></span></td>
</tr>
                        <tr>
<td><span class="style1">Rank:</span></td>
<td><span id="sprytextfield2">
<label>
<input type="text" name="txtRank" id="txtRank" />
</label>
<span class="textfieldRequiredMsg">A value is required.</span></span></td>
</tr>
                        <tr>
<td><span class="style1">Gender:</span></td>
<td><label>
<select name="cmbGender" id="cmbGender">
<option>Male</option>
<option>Female</option>
</select>
</label></td>
</tr>
```

```
<tr>
<td><span class="style1">BirthDate:</span></td>
<td><span id="sprytextfield3">
<label>
<input type="text" name="txtDate" id="txtDate" />
</label>
<span class="textfieldRequiredMsg">A value is required.</span></span></td>
</tr>
<tr>
<td><span class="style1">Address:</span></td>
<td><span id="sprytextarea1">
<label>
<textarea name="txtAdd" id="txtAdd" cols="35" rows="3"></textarea>
</label>
<span class="textareaRequiredMsg">A value is required.</span></span></td>
</tr>
<tr>
<td><span class="style1">City:</span></td>
<td><label>
<select name="cmbCity" id="cmbCity">
<option>Juba</option>
</select>
</label></td>
<k/tr>
<tr>
<td><span class="style1">Mobile Number:</span></td>
<td><span id="sprytextfield4">
<label>
<input type="text" name="txtMobile" id="txtMobile" />
</label>
<span class="textfieldRequiredMsg">A value is required.</span></span></td>
```

```
</tr>
<tr>
<td><span class="style1">Email ID:</span></td>
<td><span id="sprytextfield5">
<label>
<input type="text" name="txtEmail" id="txtEmail" />
</label>
<span class="textfieldRequiredMsg">A value is required.</span></span></td>
</tr>
<tr><td><span class="style1">Station Name:</span></td>
<td><label>
<select name="cmbStation" id="cmbStation">
<?php
do {
?>
<option value="<?php echo $row_Recordset1['Station']?>"><?php echo $row_Recordset1['Station']?></option>
<?php
} while ($row_Recordset1 = mysql_fetch_assoc($Recordset1));
  $rows = mysql_num_rows($Recordset1);
if($rows > 0) {
    mysql_data_seek($Recordset1, 0);
        $row_Recordset1 = mysql_fetch_assoc($Recordset1);
  }
?>
</select>
</label></td>
</tr>
<tr><td><span class="style1">User Name:</span></td>
<td><span id="sprytextfield6">
<label>
```

```
<input type="text" name="txtUserName" id="txtUserName" />
</label>
<span class="textfieldRequiredMsg">A value is required.</span></span></td></tr>
<tr><td><span class="style1">Password:</span></td>
<td><span id="sprytextfield7">
<label>
<input type="password" name="txtPassword" id="txtPassword" />
</label>
<span class="textfieldRequiredMsg">A value is required.</span></span></td>
</tr>
<tr>
<td> </td>
<td><label>
<input type="submit" name="button" id="button" value="Save" />
</label></td></tr></table></form>
<div class="cleaner"></div>
</div><!-- end of section_w760 -->
</div><!-- end of templatemo_content -->
<?php
include "Footer.php";
  ?>
</div><!-- end of templatemo_wrapper -->
</body>
</html><?phpmysql_free_result($Recordset1);?>
```

APPENDIX F: SUSPECT REGISTRATION FORM CODES

```
<!DOCTYPE HTML >
<html xmlns="http:// ">
<head>
<title>Web-Based Application System</title>
<link href="templatemo_style.css" rel="stylesheet" type="text/css" />
<style type="text/css">
<!--
.style3 {color: #000000}
.style6 {color: #CCCCCC}
.style7 {color: #289EC2}
.style9 {font-weight: bold}
.style10 {color: #FFFFFF; font-weight: bold; }
-->
</style></head>
<body>
<div id="templatemo_wrapper">
<?php
include "Header.php"
```

```
?>
<div id="templatemo_content">
        <div class="section_w800">
<h2>Suspect Information Report</h2>
<?php
//This indicate establishing connection with database
$con = mysql_connect("localhost","root");
// Select Database
mysql_select_db("cms", $con);
// Specify the query to execute
$sql = "select * from suspect order by Station";
// Execute query
$result = mysql_query($sql,$con);
// Loop through each records
while($row = mysql_fetch_array($result))
{
$Id=$row['Suspect_Id'];
$Suspect=$row['Suspect'];
$Gender=$row['Gender'];
$National_Id=$row['National_Id'];
```

```
$BirthDate=$row['BirthDate'];

$Weight=$row['Weight'];

$Height=$row['Height'];

$Location=$row['Location'];

$Crime_Type=$row['Crime_Type'];

$Officer_Name=$row['Officer_Name'];

$Station=$row['Station'];

$Photo=$row['Photo'];

?>

<table width="100%" border="0" cellspacing="0" cellpadding="0">

<tr><td colspan="15" bgcolor="#CC66CC"> </td></tr>

<tr><td height="21" bgcolor="#FFFFFF"><span class="style3"><strong>Name:</strong></span><span class="style3"><strong><?php echo $Suspect;?></strong></span></td>

<td width="46%" bgcolor="#FFFFFF"><span class="style3"><strong>Gender:</strong></span><span class="style3"><strong><?php echo $Gender;?></strong></span></td>

<td width="46%" bgcolor="#FFFFFF"><span class="style3"><strong>National ID:</strong></span><span class="style3"><strong><?php echo $National_Id;?></strong></span></td></tr>

<tr><td height="21" bgcolor="#FFFFFF"><span class="style3"><strong>BirthDate:</strong></span><span class="style3"><strong><?php echo $BirthDate;?></strong></span></td>
```

<td width="46%" bgcolor="#FFFFFF">Weight:<?php echo $Weight;?></td>

<td width="46%" bgcolor="#FFFFFF">Height:<?php echo $Height;?></td></tr>

<tr><td width="46%" bgcolor="#FFFFFF">Location:<?php echo $Location;?></td>

<td width="4%" height="12" bgcolor="#FFFFFF"><span class="style3"align ="right">Image:

<img src="Documents/<?php echo $Photo;?>" alt="" width="35" height="35" border="5" align="" valign="bottom"/></td>

<td width="46%" bgcolor="#FFFFFF">Crime Done:<?php echo $Crime_Type;?></td>

</tr>

<tr><td width="46%"bgcolor="#FFFFFF">Officer_Name:<?php echo $Officer_Name;?></td></tr>

<tr><td width="46%"bgcolor="#FFFFFF">Station:<?php echo $Station;?></td></tr>

<tr><td colspan="15" bgcolor="#CC66CC"> </td></tr>

```
</table>

<?php

}

// Close the connection

mysql_close($con);

?>

<div class="cleaner"></div>

</div><!-- end of section_w760 -->

</div><!-- end of templatemo_content -->

<?php

include "Footer.php";

?>

</div><!-- end of templatemo_wrapper -->

</body>

</html>
```

APPENDIX G: CRIME REGISTRATION FORM CODES

```
<!DOCTYPE html >
<head>
<title>Web-based application System</title>
<link href="templatemo_style.css" rel="stylesheet" type="text/css" />
<style type="text/css">
<!--
.style3 {color: #000000}
.style6 {color: #CCCCCC}
.style7 {font-size: small}
.style8 {font-family: Verdana, Arial, Helvetica, sans-serif}
.style9 {color: #2AA2C7}
-->
</style></head>
<body>
<div id="templatemo_wrapper">
<?php
include "Header.php"
?>
```

```
<div id="templatemo_content">
        <div class="section_w800">
<h2 align="">Crime Information Report</h2>
<?php
// Establish Connection with Database
$con = mysqli_connect("localhost","root");
// Select Database
mysqli_select_db("cms", $con);
// Specify the query to execute
$sql = "select * from crime_tbl order by Station";
// Execute query
$result = mysqli_query($sql,$con);
// Loop through each records
while($row = mysqli_fetch_array($result))
{
$Id=$row['Crime_Id'];
$Crime_Type=$row['Crime_Type'];
$Crime_Date=$row['Crime_Date'];
$Reference_No=$row['Reference_No'];
$Victim =$row['Victim'];
```

```
$Gender =$row['Gender'];

$Address=$row['Address'];

$City=$row['City'];

$Phone=$row['Phone'];

$Suspect=$row['Suspect'];

$Officer_Name=$row['Officer_Name'];

$Station=$row['Station'];

$Image =$row['Image'];

?>

<table width="100%" border="0" cellspacing="0" cellpadding="0">

<tr><td colspan="15" bgcolor="#CC66CC"> </td></tr>

<tr><td height="21" bgcolor="#FFFFFF"><span class="style3"><strong>Crime_Type:</span><span class="style3"><strong><?php echo $Crime_Type;?></strong></span></td>

<td width="46%" bgcolor="#FFFFFF"><span class="style3"><strong>Crime_Date:</strong></span><span class="style3"><strong><?php echo $Crime_Date;?></strong></span></td>

<td width="46%" bgcolor="#FFFFFF"><span class="style3"><strong>File_Number:</strong></span><span class="style3"><strong><?php echo $Reference_No;?></strong></span></td></tr>

<tr><td width="46%" bgcolor="#FFFFFF"><span class="style3"><strong>Victim::</strong></span><span class="style3"><strong><?php echo $Victim;?></strong></span></td>
```

<td width="46%" bgcolor="#FFFFFF">Gender:<?php echo $Gender;?></td>

<td width="46%" bgcolor="#FFFFFF">Address:<?php echo $Address;?></td></tr>

<tr><td width="46%" bgcolor="#FFFFFF">City:<?php echo $City;?></td>

<td width="46%" bgcolor="#FFFFFF">Phone:<?php echo $Phone;?></td>

<td width="46%" bgcolor="#FFFFFF">Suspect:<?php echo $Suspect;?></td></tr>

<tr><td width="4%" height="12" bgcolor="#FFFFFF"><span class="style3"align ="right">Image:

<img src="Documents/<?php echo $Image;?>" alt="" width="35" height="35" border="5" align="" valign="bottom"/></td>

<td width="46%" bgcolor="#FFFFFF">Officer_Name:<?php echo $Officer_Name;?></td>

<td width="46%" bgcolor="#FFFFFF">Station:<?php echo $Station;?></td>   </tr>

<tr><td colspan="15" bgcolor="#CC66CC"> </td>

```
</tr>

</table>
<?php
}
//This code indicate closing the connection
mysqli_close($con); ?>

<p>&amp;nbsp;</p>

<p>&amp;nbsp;</p>

<div class="cleaner"></div>

</div><!-- end of section_w760 -->

</div><!-- end of templatemo_content -->

<?php

include "Footer.php"; ?>

</div><!-- end of templatemo_wrapper -->

</body>

</html>
```

APPENDIX H: VICTIM REGISTRATION FORM CODES

```
<?php
if (!isset($_SESSION))
{
  session_start()
}
?>
<!DOCTYPE HTML >
<head>
<title>Web-Based Application System</title>
<style type="text/css">
<!--
.style1 {font-size: 12px}
.style2 {color: #FFFFFF}
--></style>
<style type="text/css">
<!--
.style3 {color: #000000}
.style6 {color: #CCCCCC}
```

```
--></style>
<style type="text/css">
.ds_box {
	background-color:#336633;
	border: 2px solid #666600;
	position: absolute;
	z-index: 32767;
}
.ds_tbl {
	background-color: #FFF;
}
.ds_head {
	background-color: #E3B71A;
	color: #FFF;
	font-family: Arial, Helvetica, sans-serif;
	font-size: 13px;
	font-weight: bold;
	text-align: center;
	letter-spacing: 2px;
}
```

```
.ds_subhead {
        background-color: #E3B71A;
        color: #000;
        font-size: 12px;
        font-weight: bold;
        text-align: center;
        font-family: Arial, Helvetica, sans-serif;
        width: 32px;
}
.ds_cell {
        background-color:#FFFFCC;
        color: #000;
        font-size: 13px;
        text-align: center;
        font-family: Arial, Helvetica, sans-serif;
        padding: 5px;
        cursor: pointer;
        border: 1px solid #666600;
}
.ds_cell:hover {
```

```
        background-color: #F3F3F3;
} /* This hover code won't work for IE */
</style>
<script src="SpryAssets/SpryValidationTextarea.js" type="text/javascript"></script>
<link href="SpryAssets/SpryValidationTextarea.css" rel="stylesheet" type="text/css" />
<style type="text/css">
<!--
.style9 {font-size: 75%; font-weight: bold; color: #003300; font-family: Verdana, Arial, Helvetica, sans-serif; }
--></style></head>
<body>
<table class="ds_box" cellpadding="0" cellspacing="0" id="ds_conclass" style="display: none;">
<tr><td id="ds_calclass"></td></tr></table>
<script type="text/javascript">
// <!--<![CDATA[
// Set the initial date.
var ds_i_date = new Date();
ds_c_month = ds_i_date.getMonth() + 1;
ds_c_year = ds_i_date.getFullYear();
// Get Element By Id
```

```
function ds_getel(id) {
	return document.getElementById(id);
}
// Get the left and the top of the element.
function ds_getleft(el) {
	var tmp = el.offsetLeft;
	el = el.offsetParent
	while(el) {
		tmp += el.offsetLeft;
		el = el.offsetParent;
	}
	return tmp;
}
function ds_gettop(el) {
	var tmp = el.offsetTop;
	el = el.offsetParent
	while(el) {
		tmp += el.offsetTop;
		el = el.offsetParent;
	}
```

```
	return tmp;
}
// Output Element
var ds_oe = ds_getel('ds_calclass');
// Container
var ds_ce = ds_getel('ds_conclass');
// Output Buffering
var ds_ob = '';
function ds_ob_clean() {
	ds_ob = '';
}
function ds_ob_flush() {
	ds_oe.innerHTML = ds_ob;
	ds_ob_clean();
}
function ds_echo(t) {
	ds_ob += t;
}
var ds_element; // Text Element...
var ds_monthnames = [
```

```
'January', 'February', 'March', 'April', 'May', 'June',
'July', 'August', 'September', 'October', 'November', 'December'
]; // You can translate it for your language.
var ds_daynames = [
'Sun', 'Mon', 'Tue', 'Wed', 'Thu', 'Fri', 'Sat'
]; // You can translate it for your language.
// Calendar template
function ds_template_main_above(t) {
        return '<table cellpadding="3" cellspacing="1" class="ds_tbl">'
            + '<tr>'
                + '<td class="ds_head" style="cursor: pointer" onclick="ds_py();">&lt;&lt;</td>'
                + '<td class="ds_head" style="cursor: pointer" onclick="ds_pm();">&lt;</td>'
                + '<td class="ds_head" style="cursor: pointer" onclick="ds_hi();" colspan="3">[Close]</td>'
                + '<td class="ds_head" style="cursor: pointer" onclick="ds_nm();">&gt;</td>'
                + '<td class="ds_head" style="cursor: pointer" onclick="ds_ny();">&gt;&gt;</td>'
                + '</tr>'
            + '<tr>'
                + '<td colspan="7" class="ds_head">' + t + '</td>'
                + '</tr>'
```

```
                + '<tr>';
}
function ds_template_day_row(t) {
        return '<td class="ds_subhead">' + t + '</td>';
        // Define width in CSS, XHTML 1.0 Strict doesn't have width property for it.
}
function ds_template_new_week() {
        return '</tr><tr>';
}

function ds_template_blank_cell(colspan) {
        return '<td colspan="' + colspan + '"></td>'
}

function ds_template_day(d, m, y) {
        return '<td class="ds_cell" onclick="ds_onclick(' + d + ',' + m + ',' + y + ')">' + d +
'</td>';
        // Define width the day row
}
function ds_template_main_below() {
```

```
        return '</tr>'
            + '</table>';
}
// This one draws calendar...
function ds_draw_calendar(m, y) {
        // First clean the output buffer.
        ds_ob_clean();
        // Here we go, do the header
        ds_echo (ds_template_main_above(ds_monthnames[m - 1] + ' ' + y));
        for (i = 0; i < 7; i ++) {
                ds_echo (ds_template_day_row(ds_daynames[i]));
        }
        // Make a date object.
        var ds_dc_date = new Date();
        ds_dc_date.setMonth(m - 1);
        ds_dc_date.setFullYear(y);
        ds_dc_date.setDate(1);
        if (m == 1 || m == 3 || m == 5 || m == 7 || m == 8 || m == 10 || m == 12) {
                days = 31;
        } else if (m == 4 || m == 6 || m == 9 || m == 11) {
```

```
        days = 30;
} else {
        days = (y % 4 == 0) ? 29 : 28;
}
var first_day  = ds_dc_date.getDay();
var first_loop  = 1;
// Start the first week
ds_echo (ds_template_new_week());
// If sunday is not the first day of the month, make a blank cell...
if (first_day  != 0) {
        ds_echo (ds_template_blank_cell(first_day));
}
var j = first_day;
for (i = 0; i < days; i ++) {
        // Today is sunday, make a new week.
        // If this sunday is the first day of the month,
        // we've made a new row for you already.
        if (j == 0 && !first_loop)  {
                // New week!!
                ds_echo (ds_template_new_week());
```

```
                }

                // Make a row of that day!

                ds_echo (ds_template_day(i + 1, m, y));

                // This is not first loop anymore...

                first_loop = 0;

                // What is the next day?

                j ++;

                j %= 7;

        }

        // Do the footer

        ds_echo (ds_template_main_below());

        // And let's display..

        ds_ob_flush();

        // Scroll it into view.

        ds_ce.scrollIntoView();

}

// A function to show the calendar.

// When user click on the date, it will set the content of t.

function ds_sh(t) {

        // Set the element to set...
```

```
	ds_element = t;
	// Make a new date, and set the current month and year.
	var ds_sh_date = new Date();
	ds_c_month = ds_sh_date.getMonth() + 1;
	ds_c_year = ds_sh_date.getFullYear();
	// Draw the calendar
	ds_draw_calendar(ds_c_month, ds_c_year);
	// To change the position properly, we must show it first.
	ds_ce.style.display = '';
	// Move the calendar container!
	the_left = ds_getleft(t);
	the_top = ds_gettop(t) + t.offsetHeight;
	ds_ce.style.left = the_left + 'px';
	ds_ce.style.top = the_top + 'px';
	// Scroll it into view.
	ds_ce.scrollIntoView();
}
// Hide the calendar.
function ds_hi() {
	ds_ce.style.display = 'none';
```

```
}

// Moves to the next month...

function ds_nm() {

	// Increase the current month.

	ds_c_month ++;

	// We have passed December, let's go to the next year.

	// Increase the current year, and set the current month to January.

	if (ds_c_month > 12) {

		ds_c_month = 1;

		ds_c_year++;

	}

	// Redraw the calendar.

	ds_draw_calendar(ds_c_month, ds_c_year);

}

// Moves to the previous month...

function ds_pm() {

	ds_c_month = ds_c_month - 1; // Can't use dash-dash here, it will make the page invalid.

	// Message Provided: we have already passed January, let's go back to the previous year.

	// Message Provided: Decrease the current year, and set the current month to December.

	if (ds_c_month < 1) {
```

```
		ds_c_month = 12;
		ds_c_year = ds_c_year - 1; // Message Provided: Can't use dash-dash here, it will make the page invalid.
	}
	// Redraw the calendar.
	ds_draw_calendar(ds_c_month, ds_c_year);
}
// Moves to the next year...
function ds_ny() {
	// Increase the current year.
	ds_c_year++;
	// Redraw the calendar.
	ds_draw_calendar(ds_c_month, ds_c_year);
}
// Moves to the previous year...
function ds_py() {
	// Decrease the current year.
	ds_c_year = ds_c_year - 1; // Can't use dash-dash here, it will make the page invalid.
	// Redraw the calendar.
	ds_draw_calendar(ds_c_month, ds_c_year);
```

```
}

// Format the date to output.

function ds_format_date(d, m, y) {

        // 2 digits month.

        m2 = '00' + m;

        m2 = m2.substr(m2.length - 2);

        // 2 digits day.

        d2 = '00' + d;

        d2 = d2.substr(d2.length - 2);

        // YYYY-MM-DD

        return y + '-' + m2 + '-' + d2;

}

// This is when the user clicks the day.

function ds_onclick(d, m, y) {

        // Hide the calendar.

        ds_hi();

        // Set the value of it, if we can.

        if (typeof(ds_element.value) != 'undefined') {

                ds_element.value = ds_format_date(d, m, y);

        // Maybe we want to set the HTML in it.
```

```
        } else if (typeof(ds_element.innerHTML) != 'undefined') {
                ds_element.innerHTML = ds_format_date(d, m, y);
        // I don't know how should we display it, just alert it to user.
        } else {
                alert (ds_format_date(d, m, y));
        }
}
// And here is the end.
// ]]> -->
</script>
</head>
<body>
<div id="templatemo_wrapper">
<?php
include "Header.php"
  ?>
<div id="templatemo_content">
        <div class="section_w800">
<h2>Victims Recording Form</h2>
<div id="TabbedPanels1" class="TabbedPanels">
```

```
<ul class="TabbedPanelsTabGroup">

<li class="TabbedPanelsTab style1 style2" tabindex="0">Add Victim Particulars Details</li>

<li class="TabbedPanelsTab style1 style2" tabindex="0">View Victim Particulars Details</li>

</ul>

<div class="TabbedPanelsContentGroup">

<div class="TabbedPanelsContent">

<form action="InsertVictim.php" method="post" enctype="multipart/form-data" name="form1" id="form1" width="150%">

<table width="100%" height="512" border="0" cellpadding="0" cellspacing="0" >

<tr><td><span class="style3">Name:</span></td>

<td><span id="sprytextfield1">

<label>

<input type="text" name="txtNames" id="txtNames" />

</label>

<span class="textfieldRequiredMsg">A value is required.</span></span></td></tr>

<tr><td><span class="style3">BirthDate:</span></td>

<td><span id="sprytextfield2">

<label>

<input type="text" name="txtBirthDate" id="txtBirthDate"onclick="ds_sh(this);" />

</label>
```

A value is required.</td>

</tr>

<tr><td>Gender:</td>

<td><label><select name="cmbGender" id="cmbGender">

<option>Male</option>

<option>Female</option>

</select></label></td></tr>

k<tr><td>Address:</td>

<td>

<label>

<textarea name="txtVictim_Address" id="txtVictim_Address" cols="30" rows="3"></textarea>

</label>

A value is required.</td>

</tr>

<tr>

<td>Victim _City:</td>

<td><label>

<select name="cmbCity" id="cmbCity">

<option>Juba</option>

</select>

```
</label></td>
</tr>
<tr>
<td><span class="style3">Witness_Name:</span></td>
<td><span id="sprytextfield3">
<label>
<input type="text" name="txtWitness_Name" id="txtWitness_Name" />
</label>
<span class="textfieldRequiredMsg">A value is required.</span></span></td>
</tr>
<tr>
<td><span class="style3">Witness_Location:</span></td>
<td><span id="sprytextfield4">
<label>
<input type="text" name="txtWitness_Location" id="txtWitness_Location" />
</label>
<span class="textfieldRequiredMsg">A value is required.</span></span></td>
</tr>
<tr>
<td><span class="style3">Witness_Contact:</span></td>
```

<td>

<label>

<input type="text" name="txtWitness_Contact" id="txtWitness_Contact" />

</label>

A value is required.</td></tr>

<tr><td>Suspect:</td>

<td>

<label>

<input type="text" name="txtSuspect" id="txtSuspect" />

</label>

A value is required.</td>

</tr>

<tr>

<td>Photo:</td>

<td><label>

<input type="file" name="txtFile" id="txtFile" />

</label></td>

</tr>

<tr>

```
<td><span class="style3">Select  Crime  Type:</span></td>

<td><label>

<select name="cmbCrime_Type"  id="cmbCrime_Type">

<option>Robery</option>

<option>Murder</option>

<option>Rape</option>

                                        <option>Aggravated  Assault</option>

                                        <option>Arson</option>

k                                       <option>Drug  or narcotic  offence</option>

                                        <option>Burglary</option>

                                        <option>Larceny-theft  </option>

</select>

</label></td>

</tr>

                                    <tr>

<td><span class="style3">Officer_Name:</span></td>

<td><span id="sprytextfield7">

<label>

<input  type="text"  name="txtOfficer_Name"  id="txtOfficer_Name"  />

</label>
```

A value is required.</td>

</tr>

<tr>

<td>Station Name:</td>

<td>

<label>

<input type="text" name="txtStation" id="txtStation" />

</label>

A value is required.</td></tr>

<tr>

<td> </td>

<td><label><input type="submit" name="button" id="button" value="Save" />

</label></td></tr></table></form>

<table width="40" border="1" border color="#E3B71A" >

<tr><th bgcolor="#99CCCC" class="style6"> ID </th>

<th bgcolor="#99CCCC" class="style6"> Victim </th>

<th bgcolor="#99CCCC"class="style6"> DOB </th>

<th bgcolor="#99CCCC" class="style6"> Sex </th>

<th bgcolor="#99CCCC" class="style6"> Address </th>

<th bgcolor="#99CCCC" class="style6"> City </th>

<th bgcolor="#99CCCC" class="style6"> Witn </th>

<th bgcolor="#99CCCC" class="style6"> Loc </th>

<th bgcolor="#99CCCC" class="style6"> Phone </th>

<th bgcolor="#99CCCC" class="style6"> Suspect </th>

<th bgcolor="#99CCCC" class="style6"> Photo </th>

<th bgcolor="#99CCCC" class="style6"> Crime </th>

<th bgcolor="#99CCCC" class="style6"> Officer </th>

<th bgcolor="#99CCCC" class="style6"> Station </th>

<th bgcolor="#99CCCC" class="style6"> Delete </th>

```
                                        <th bgcolor="#99CCCC" class="style6"><div align="left"
class="style9 style2 style4"><strong>Print</strong></div></th>
</tr>
<?php
// Establish Connection with Database
$con = mysql_connect("localhost","root");
// Select Database
mysql_select_db("cms", $con);
// Specify the query to execute
$sql = "select * from victim_tbl where Station='".$_SESSION['Name']."' ";
// Execute query
$result = mysql_query($sql,$con);
// Loop through each records
while($row = mysql_fetch_array($result))
{
$Id=$row['Victim_Id'];
$Victim=$row['Victim'];
$BirthDate =$row['BirthDate'];
$Gender =$row['Gender'];
$Address=$row['Address'];
```

```
$City =$row['City'];

$Witness =$row['Witness'];

$Location=$row['Location'];

$Contact=$row['Contact'];

$Suspect=$row['Suspect'];

$Image =$row['Image'];

$Crime_Type=$row['Crime_Type'];

$Officer_Name=$row['Officer_Name'];

$Station=$row['Station'];

?>

<tr><td class="style6"><div align="left" class="style9 style5 style4 style3"><strong><?php echo $Id;?></strong></div></td>

<td class="style6"><div align="left" class="style9 style5 style4 style3"><strong><?php echo $Victim;?></strong></div></td>

<td class="style6"><div align="left" class="style9 style5 style4 style3"><strong><?php echo $BirthDate;?></strong></div></td>

<td class="style6"><div align="left" class="style9 style5 style4 style3"><strong><?php echo $Gender;?></strong></div></td>

                                    <td class="style6"><div align="left" class="style9 style5 style4 style3"><strong><?php echo $Address;?></strong></div></td>

<td class="style6"><div align="left" class="style9 style5 style4 style3"><strong><?php echo $City;?></strong></div></td>
```

<td class="style6"> <?php echo $Witness;?> </td>

<td class="style6"> <?php echo $Location;?> </td>

<td class="style6"> <?php echo $Contact;?> </td>

<td class="style6"> <?php echo $Suspect;?> </td>

<td class="style6"> <img src="../Documents/<?php echo $Image;?>" height="30" width="30" /> </td>

<td class="style6"> <?php echo $Crime_Type;?> </td>

<td class="style6"> <?php echo $Officer_Name;?> </td>

<td class="style6"> <?php echo $Station;?> </td>

<td class="style6"> <a href="DeleteVictim.php?VictimId=<?php echo $Id;?>">Delete </td>

<td><button onclick="myFunction()">Print</button>

<script>

function myFunction() {

window.print();

```
                        }
</script></td></tr>
<?php
}
// Retrieve  Number  of records returned
$records = mysql_num_rows($result);
?>
<?php
// Close the connection
mysql_close($con);
?></table></div></div></div>
<p> </p>
<div class="cleaner"></div>
</div><!-- end of section_w760  -->
</div><!-- end of templatemo_content  --><?phpinclude  "Footer.php";
   ?></div><!-- end of templatemo_wrapper  --></body></html>
```

APPENDIX I: BUDGET SUMMARY

Unit of activities	**Costs per work in Uganda shilling (UGX)**
Research Concept Paper	6000
Research Proposal	20000
Data collection transportation	644000
Progressive and final report	230000
Total of the budget	900000

APPENDIX J: STUDY PLAN SCHEDULE

Years	2017		2018		
Date and months	June -Nov	December 8-23	Dec- January 26-31	January-Feb 1-30 & 9	Feb-Aug 10-30
Number of Days	119	15	7	39	208
Project Activities and Development Process					
Concept and Proposal Writing					
Data Requirements and Analysis					
Application Design Modeling					
Implementation of Application					
Validation and Testing of Application					
Thesis Final Report