Missing Persons Kenya: A Web Based Application for Reporting Missing Persons in Kenya

Stacy Kemei Chebet

103722

Michael Owen Oduor

122287

Submitted in partial fulfilment of the requirements of the Bachelor of Business in Informatics and Computer Science at Strathmore University

School of Computing and Engineering Sciences

Strathmore University

Nairobi, Kenya

September 2021

Declaration and Approval

We declare that this work has not been previously submitted and approved for the award of a degree by this or any other university. To the best of our knowledge and belief, the project documentation contains no material previously published or written by another person except where due reference is made in the research proposal itself.

Student Name: Kemei Stacy Chebet

Admission Number: 103722

Student Signature: _____ Date: _____

Student Name: Michael Owen Oduor

Admission Number: 122287

Student Signature: _____ Date: _____

Supervisor Name: Daniel Machanje

Supervisor Signature: _____ Date: 17/09/2021

Abstract

Over the last couple of months, there has been a spike in the rate of kidnappings and missing persons reports in Kenya. According to Missing Child Kenya, “242 children were missing in the year 2020, 177 being male and 125 females”, and this number has recently spiked. Often, you will find posts on all the social media apps, be it Instagram, Twitter, WhatsApp, Facebook, telegram, of victims of kidnapping or missing persons or even in the newspapers, of which not everyone has access to.

It is notable that most of the missing persons reports involve women and young children, with almost 90% of the reports mainly involving young, school-going children. The main channels used for spreading information on missing persons to the public are the news and newspapers. Recently, there has been an increase in the use of social media apps to share this information, which is commendable, but not many people are active users of the said channels. This application aims to solve this problem by consolidating the missing persons reports into one application for easier viewing, reporting of missing persons and sightings of any missing persons.

The system has implemented the structured system analysis and design method of development to ensure there was timely completion of project milestones and also to eliminate any confusion during the development process.

Table of Contents

Table of Figures

List of Abbreviations

CID – Criminal Investigation Department

OB – Occurrence Book

SSADM – Structured System Analysis and Design Method

Chapter 1: Introduction

1.1 Background information

In Kenya, the first step to finding a missing person involves making a report to the Kenya Police who are significantly understaffed and irregularly spread. Not all police stations in the country are equipped to deal with missing person reports. One can make a report at any police station, but this information will be forwarded to a station with a Criminal Investigation Department (CID) officer (Chacha, 2015). Once this is done, the agonizing wait begins for the CID police to act. This is extremely frustrating to the family members because the CID officers do not communicate adequately with them often keeping them in the dark about the progress of the case. The use of traditional media such as newspapers to share details of a missing person is limited to few persons who have the resources to contact the media.

Over the last couple of months, there has been a spike in the rate of kidnappings and missing persons reports. This could be accidental in instances where a child strays away from their minder as they happily explore their surroundings. It could even be as a result of a mental condition suffered by the missing person. Most times however, there is a more sinister underlying reason behind this separation. This could include abduction for ransom or child trafficking. According to Missing Child Kenya, “242 children were missing in the year 2020, 177 being male and 125 females”. More often than not, you will find posts on all the social media apps of victim kidnappings or missing persons or even in the newspapers, of which not everyone has access to.

It is notable that most of the missing persons reports involve women and young children, with almost 90% of the reports mainly involving young, school-going children. The main channels used for spreading information on missing persons to the public are the news and newspapers. Recently, there has been an increase in the use of social media apps to share this information, which is commendable, but not many people are active viewers of the news or readers of the newspaper, and people are usually not active 24/7 on social media and may miss these posts dealing with missing persons.

This study analyzed the current models of reporting missing persons in Kenya and internationally as a way of identifying the challenges facing these models. Having an app that enables the users to report missing people, view a list of all missing persons reported and report any sightings of missing people will be a better solution than the current methods of

sharing this information because compared to the current technologies, the applications consolidates this information make it time and user friendly.

1.2 Problem Statement

The most common first step, in the event that a loved one goes missing, in Kenya is to file a report at the nearest police station. The complaint is filed and booked in the Occurrence Book (OB) and the ones reporting are given an OB number as a reference number. However, this is where the similarities end. There is no centralized database through which the police authorities and public can work together to solve cases of missing persons. There are also no defined laws that outline how missing person cases are to be handled by the police (Sum, 2014). The missing person case files are forwarded to the CID who are legally tasked to handle such cases. Most police officers in the local stations are reluctant to assist with missing person cases forcing the public to take matters into their own hands.

Most times, people turn to social media for assistance and the posts on social media will have the caption “Please share widely” or “Please retweet this post” just to enable the users to spread the word to all their audiences. The missing persons reports are mostly announced in the news and newspapers. Many Kenyans get their news online so most of them do not read newspapers or watch the news, and not everyone with a smartphone uses social media. This, therefore, means that not enough people will keep up with the missing persons reports, making the process to help find missing people take a longer period of time. This app’s objective is to make this process easier by enabling the users to report missing persons online, report any sightings of missing persons that have been reported and also, view a list of all missing persons within a certain area or a comprehensive list of all the missing people in Kenya.

1.3 Objectives

1.3.1 General Objective

To develop an application that makes it easier for users to report missing persons, view a list of all missing persons within an area and also report sightings of any missing persons within an area.

1.3.2 Specific Objectives

i. To investigate how missing persons are currently being reported and how this information is being shared with the public

ii. To study and analyze the challenges involved in the older model being used to spread information on missing persons
iii. To design an application that assists in the spreading of information on missing persons to the citizens of Kenya
iv. To build an application that assists in the spreading of information on missing persons to the citizens of Kenya
v. To test and validate that the developed application is effective in reporting and tracing a missing person in Kenya

1.4 Research Questions

i. What challenges are faced by the current systems of reporting missing persons in Kenya?
ii. How have current solutions tried to solve sharing information on missing persons to the general public?
iii. What are the challenges with current technologies used in the spreading of this information?
iv. How will an application that enables the spread of information on missing persons be designed?
v. How will an application that enables the spread of information on missing persons be built?
vi. How will the proposed solution be tested and validated?

1.5 Justification

The success of finding a person who has gone missing largely depends on how far and fast the missing person alert is spread. Unless the public is aware that one is indeed missing, they cannot act even if they come into contact with the missing person. Having an app that enables the users to report missing people, view a list of all missing persons reported and report any sightings of missing people will be a better solution than the current methods of sharing this information because compared to the current technologies which are being used, which is the news, newspapers, and social media, it is time friendly. In the case of missing persons, it is usually paramount to find them in the shortest time possible since the kidnappers may, in the worst-case scenario, be torturing them with the final goal being murder. An app that enables the masses to report any sightings quickly will shorten the time it takes to find the victims.

1.6 Scope and Limitations

The scope of this project covers means for the user to report any missing person, including their photo, name, age, description of physical features and what they were wearing last. It focuses on the means for the user to view a list of all the missing persons, and how the user can report any sightings of missing persons that were reported. However, this study is only limited to Nairobi County because of time and travel constraints. Other limitations include: the app is only available to people who have a device like a phone, tablet or laptop that enables internet connection via cellular data or Wi-Fi, and the police stations may not be willing to provide any assistance towards getting current data about the filed missing person reports.

Chapter 2: Literature Review

2.1 Introduction

This chapter entails the current technologies being used in the search for missing persons in Kenya and the shortcomings that the said technologies face. The chapter also focuses on the works that are related to the proposed application and the gaps in the related works that the proposed system can fix. Finally, the chapter also clearly defines the conceptual framework of the proposed system.

2.2 Reporting of Missing Persons in Kenya

Currently, reporting of missing persons in Kenya is mainly done in the nearest police station to the victim's family, then the report is forwarded to the Criminal Investigations Department (Chacha, 2015). The family then waits for the police to act. Some of the organizations being used in Kenya that reinforce the police in finding missing persons include:

2.2.1 Kenya Missing and Unidentified Persons (KMUPS)

KMUPS was a community-based organization launched in May 2012 that assisted families to locate their missing or unidentified persons including runaways who may be facing abuse (Techmoran, 2013). This was a service that they offered free of charge without discrimination (Techmoran, 2013). They made use of the huge numbers of Kenyans using social media, over 5 million according to the latest statistics published by Internet World Statistics, to push their agenda of sharing details of MPs on Facebook and Twitter. The organization depended on volunteers to report any MP sighted so that they could upload the details onto their Facebook Page (Techmoran, 2013). They have at least 9,000 likes on their Facebook page and over 13,000 followers on Twitter. The organization relied on donations from well-wishers to keep it running (Techmoran, 2013). They accepted all kinds of donations from money to manpower to distribute flyers. KMUPS closed shop at the end of 2016 when the CEO relocated to the USA.

2.2.2 Missing Child Kenya (MCK)

MCK was born in early 2016 when a group of six women became overly concerned at the increase in cases of missing children being reported (Simbasafe Kenya, n.d). It is best described as a central place through which the Kenyan public can communicate about their missing children thanks to time, money and resources from amazing selfless digital citizens and organizations who want to create safe communities for children in Kenya (Simbasafe Kenya, n.d). Their main tool of communication is a standardized poster that can be customized to display a missing child's photo and core details such as name, nicknames, and

area they were last seen at. The team creates personalized posters for each child reported as missing at no cost. They then share across their social media accounts including Facebook, Twitter, WhatsApp, and Telegram. In case of a lost and found child taken to a police station, the caseworkers liaise with the police officers to reconnect the child with their family. The organization recently got funds from a well-wisher to put up a noticeboard outside the Children's Court at Milimani Law Courts in Nairobi. This is another platform through which they share posters of unsolved MPs.

2.2.3 The Child Welfare Society of Kenya (CWSK)

This is a state corporation that was established through a Gazette notice in 1955. Its mandate includes the care, protection, welfare, and adoption of children. It's also the National Emergency Response for children in Kenya. In 2014, President Uhuru Kenyatta signed a legal notice turning CWSK into a Government agency (PSCU, 2014). The organization runs an online database holding details of children who are lost and found and currently residing in their shelters (PSCU, 2014). They also post photos and information of children reported as missing. Their database has minimal functionality and interactivity. One can click on the children's photos to enlarge them and read more information such as their age and where they were found.

2.2.4 Shortcomings Facing the Current Technologies

Their niche is children under the age of 18 meaning the organization will not handle any case of a missing adult. Also, a child abducted at a young age barely has any memory about his/her parents and the geographical location of his home. Their changing facial features with age further complicate the matter. To solve this complex issue, the Chinese Child Missing Prevention Platform (CCMP) application uses facial recognition software, which is powered by Artificial Intelligence (AI). It reconstructs the facial features of a child with progressing age. Also, sharing personal data with a public platform has raised the issue of privacy. Consent from the relatives of a missing person is a must before the notifications are sent out. Poor quality of the images taken as well as the time it takes to notify the community consumes minutes and hours that can mean the difference between life and death to these abducted persons.

2.3 Related Works

Some of the software applications and databases that have been created to aid in the search for missing persons in other countries include the Chinese Child Missing Prevention Platform

(CCMP) application, National Missing and Unidentified Persons System (NamUs), and Technology to Recover Abducted Kids (TRAK).

2.3.1 The Chinese Child Missing Prevention Platform (CCMP) Application

According to the China Global Television Network news site , “With more than 166 million people above 65, China has the world’s largest population of older adults, making it a challenging task for the country to deal with a large number of missing people”.

Parents upload photos of their missing children on the application, and the algorithm tries to match it with the missing children’s database. The database consists of photos of children suspected of having been abducted which have been uploaded by community members. The organization works in collaboration with the Ministry of Civil Affairs in China. The application also sends push notifications to people in the locality of a similar incident and nearby areas, seeking the community’s help to provide clues about a missing person.

Once the software comes up with a match, the information is verified, and a notification is sent to the police. The information is also sent to the child’s biological parents (CGTN, 2020).

2.3.2 National Missing and Unidentified Persons System (NamUs)

Figure 2.1: National Missing and Unidentified Persons System (NamUs, 2020).

The National Missing and Unidentified Persons System (NamUs) is a national information clearinghouse and resource center for missing, unidentified, and unclaimed person cases across the United States. Its database fills an overwhelming need for a central repository of information related to missing, unidentified, and unclaimed person cases. The database is

searchable by all, with biometric and other secure case information accessible only to appropriate, vetted criminal justice users. Missing person records can be entered into NamUs by anyone, including the general public; however, all cases are verified with the appropriate law enforcement agency prior to publication in NamUs.

Unidentified and unclaimed person records are entered into the NamUs database by medical examiners, coroners, and other criminal justice designees. Missing and unidentified person cases in NamUs are automatically compared to locate potential matches based on dates, geography, and core demographic information. Advanced searches can be performed to locate matches based on additional unique descriptors such as scars, marks, tattoos, clothing, jewelry (Office of Justice Programs, 2020).

2.3.3 Technology to Recover Abducted Kids (TRAK)

(TRAK) is a computer system that helps police create and electronically distribute flyers with any type of image, including the photograph of a missing child or a criminal, to distribute information to police offices, other jurisdictions, media representatives, and the community. According to the Office of Justice Programs, "The TRAK system costs $6,500 and includes a scanner, computer, modem, color printer, software, warranties, access to system support, phone number database management. The annual fee is $100 to $250. Creating a flyer with a TRAK system is simple and takes 5 to 10 minutes." A former police officer who directs the nonprofit agency that created the TRAK systems attributes its success to its ease of use.

The software is used not only for finding missing children but also for tracing runaways, robberies, burglaries, people with Alzheimer's, and in schools (Office of Justice Programs, 2020).

2.4 Gaps in Related Works

The most notable gap in the related works outlined above is that the initial cost of installation of the systems is quite high due to the purchase of gadgets like scanners, color printers, cameras, and some like the Technology to Recover Abducted Kids (TRAK) charge an annual fee of between $100 and $250. This alone makes the system not inaccessible to people that cannot afford the fee. The proposed system aims to bridge this gap by virtue of being free of charge hence it is more accessible to anyone with a smart phone and access to the internet.

2.5 Conceptual Framework

Figure 2.2 is a mockup which illustrates the working of the system. It shows an overview of how the system functions together with how activities are done within the system. The

entities involved in the system are the administrator and the registered user. The administrator performs tasks like adding or deleting users, deleting posts of users that have been found and also verifying posts of missing persons before they are posted. The user can post details of a missing person and report sightings of any missing person that has been reported.

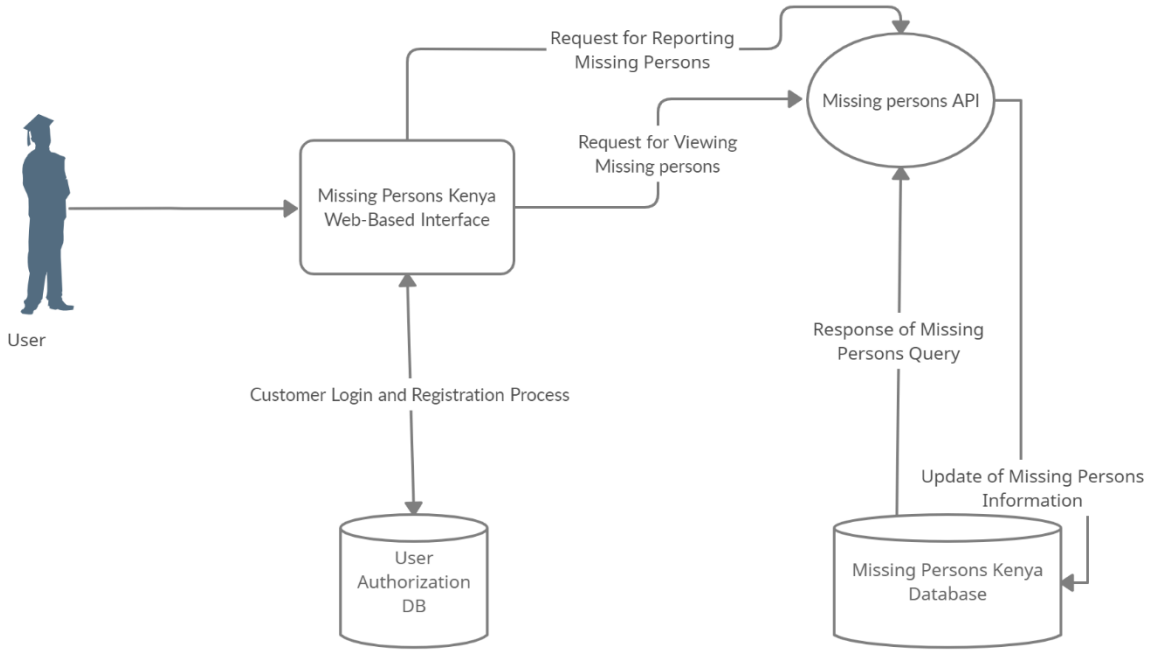

Figure 2.2: Conceptual Framework

Chapter 3: Research Methodology

3.1 Introduction

This chapter encompasses the methods chosen for research into the current methods used in reporting of missing persons in Kenya and also how sightings of missing persons are currently being reported. It also entails the justification for the research methodology chosen, over other available methodologies. The chapter also contains the methodology of system development chosen, which is the structured system analysis and design methodology, and the justifications for choosing the said method. Finally, this chapter encompasses the tools and techniques that will be applied in the development of the Missing Persons' application.

3.2 Applied Development Approach to be Used

The applied development approach to be used is the Structured System Analysis and Design Methodology (SSADM) which is a waterfall method used in the design and implementation of information systems. (Semantic Scholar, 2020).

The SSADM method was chosen because it encompasses a deep analysis of the system at the beginning stages of development hence there are fewer chances of misunderstanding the project and also, since the method contains three different techniques to analyze the viability of the system which are logical data modelling, data flow modelling and entity event modelling, the development of the application becomes very accurate to eliminate any errors during the design phase. Figure 3.1 illustrates the SSADM methodology as was implemented in the development phase.

Phases of Structured System Analysis and Design Methodology

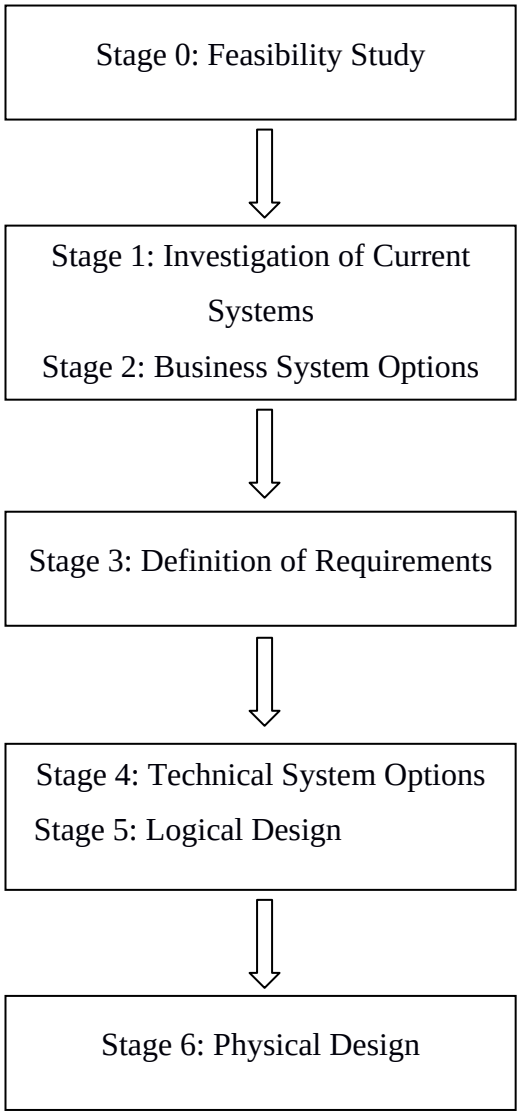

Figure 3.1: Structured System Analysis and Design Method (Semantic Scholar, 2020).

3.2.1 Feasibility Study

This section encompasses the investigation of the technical and economic feasibility of the proposed system.

3.2.2 Investigation of Current Systems

Here, the definition of broad requirements of the system was done. Also, the costs were identified and calculated.

3.2.3 Business System Options

Under this section, the business system requirements were formulated, and the evaluation of the advantages and disadvantages of each option were evaluated.

3.2.4 Definition of System Requirements

This section entails the identification of functional and nonfunctional requirements in detail and a logical structure of the system is defined.

3.2.5 Technical Systems Options

Here, the definition and selection of different methods of implementation of the system was done.

3.2.6 Logical and Physical Design

In this phase, physical and logical design of the application was constantly refined using use case diagrams and a sequence diagram.

3.3 System Analysis

The purpose of conducting system analysis for the system was to clearly define what the system should do and who the system was for, in order to determine any conflicting objectives, if any, and to define a clear pathway in development of the system. The tools used in the analysis are discussed below.

3.3.1 Use Case Diagrams

A use case diagram is a diagrammatic representation of the interactions between the users, called actors, of the system, and the system itself. The use case diagrams of the developed system define two main actors: the user and the administrator.

3.3.2 System Sequence Diagram

Sequence diagrams are diagrams that capture the way in which operations in a system are to be carried out.

3.4 System Design

3.4.1 Database Schema

Logical database schema is a structure that defines how the data is organized in a database and states the relations among the tables. The schema also defines the logical constraints that are applied on the stored data.

3.4.2 Wireframes

Wireframes are used to layout the content of web pages and also the functionality of each page and interface.

The system includes different screens to display different information relevant to the intended users of the particular interfaces.

3.4.3 System Architecture

System architecture is a conceptual model that describes the structure and behavior of the proposed system. It may include the framework, the end user requirements and a list of both hardware and software components.

3.5 System Deliverables

3.5.1 System Proposal

The system proposal encompasses the problem at hand being solved, the workings of the developed system and the justifications for the system, the methods used in the research before building the system, the stages that must be completed in the design and implementation of the system and also the drawbacks that the system has.

3.5.2 Authentication Module

The authentication module entails the registration and logging in of the different types of users into the system. The two main actors are the users of the system and the administrator of the system. The two actors have different interfaces and before interacting with each interface, one must first be a registered user hence enabling logging into the system.

3.5.3 Missing Persons Reports Module

The missing persons reports module encompasses the page used to report missing persons by users and the page used to view a list of all missing persons within an area.

3.5.4 Missing Persons Sightings Module

The missing persons sightings module entails the page used to view sightings of missing persons by users.

3.5.5 System Documentation

The system documentation is a document that contains the description of the requirements, capabilities and limitations, design, operation, and the maintenance of the system.

Chapter 4: System Analysis and Design

4.1 Introduction

This chapter encompasses the analysis and design of the system. It explains in detail the functional requirements of the system and how the modules of the system should interact with each other to ensure smooth running of the developed system.

4.2 System Requirements

Requirement analysis is the process of defining the expectations the user has for the system that is being built. The requirements for the developed system were collected by interviewing a sample group of people and also by observation of the methods that were being used, especially social media platforms.

4.2.1 Functional Requirements

Functional requirements describe the behavior of the system, that is, how the system should act in response to particular inputs and how the system behaves in specific situations. The functional requirements of the system are described below.

i) Authorization Module

Authentication of users ensures security and authenticity of the posts of missing persons since only authorized users can report missing persons and also report sightings of missing persons.

ii) Authorization Levels

A regular system user can only access the user's page and only has functionality like uploading a missing person post or reporting a sighting. The system's administrator has access to both the administrator's dashboard and also the user's interface. Only an administrator can verify the authenticity of a post before it is published to the missing persons' list.

iii) Verification and Authentication

For users to be able to access and use the system, they need to ensure they input a valid phone number to the phone number field, a valid email in the email field that will receive the verification email, and the password entered in the password field must be the same as the password in the password confirmation field. Also, all the fields must be filled before one can successfully register and thus, log in to the system.

4.2.2 Non-Functional Requirements

Non-functional requirements define how the system should perform functions. They do not affect the basic functionality of the system since the system will still perform its basic functions even if the non-functional requirements are not met. The non-functional requirements of Missing Persons Kenya are as described below.

i) Reliability

The developed system should be reliable in the sense that it does exactly what it is expected to do and should always be available even in the event that hiccups are met in the long run. This will be ensured by regular maintenance of the system so as to update the features.

ii) Security

Missing Persons Kenya has an administrator that verifies every post made about a missing person to ensure the authenticity of each post. Also, only users that verify their emails can login to the system after registering to ensure authentic emails are provided.

iii) Portability

The developed system can be used on different platforms like mobile phones, desktops, laptops, tablets to ensure it caters to many users with different devices.

4.3 System Analysis Diagrams

System analysis diagrams were used in the design of the system to provide a reference when developing the system hence shortening the development process due to extensive planning and fine-tuning of the layout and working of the system. Some of the diagrams used include: use case diagrams, sequence diagram, entity relationship diagram and an activity diagram.

4.3.1 Use Case Diagram

A use case diagram is a graphic illustration of the interactions between the elements of a system that is used to aid in identifying and organizing system requirements. Figure 4.1 shows the interactions between the administrator and the system user where the user logs in and posts information on a missing person that first needs to be verified by the administrator.

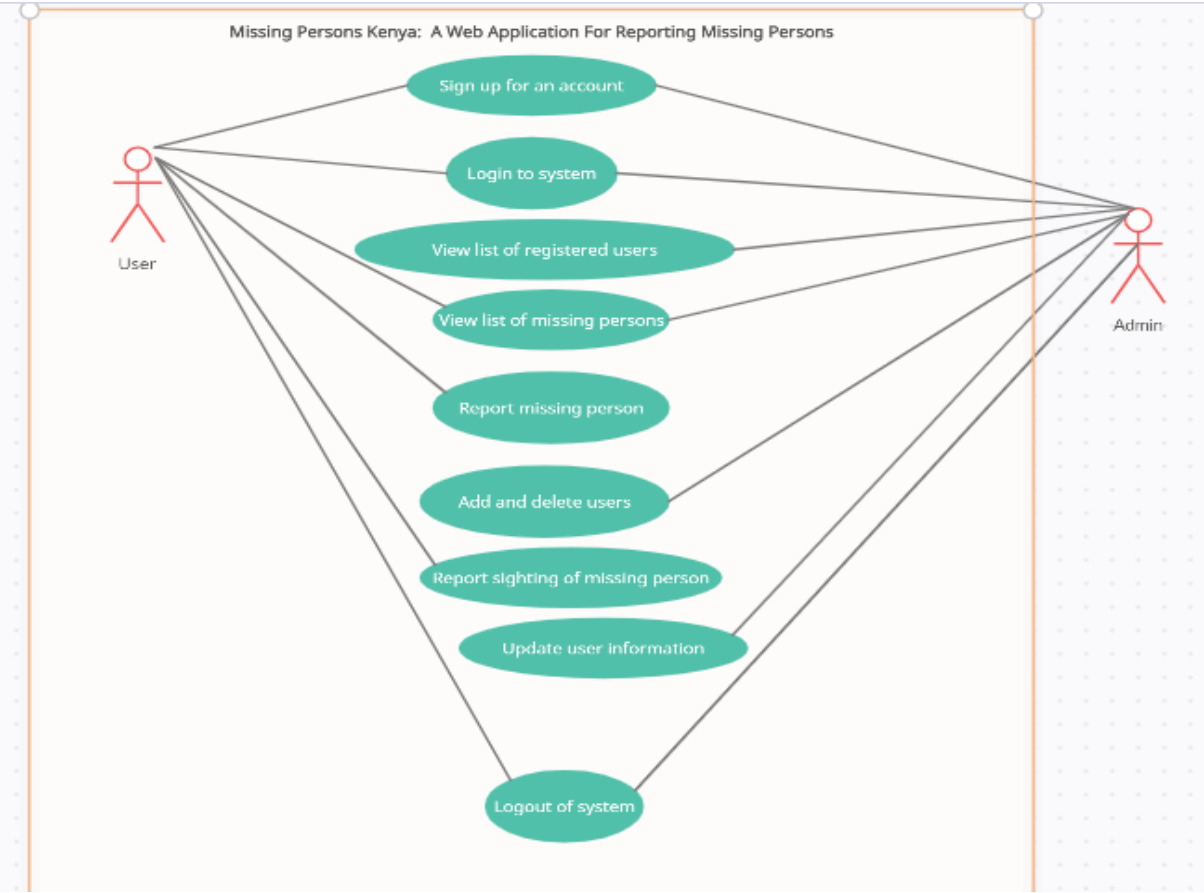

Figure 4.1: Use Case Diagram

4.3.2 Sequence Diagram

A sequence diagram is an interaction diagram that describes how and in what order a group of objects works together in a system. Figure 1.2 illustrates the interactions between the administrator, the user, and the system.

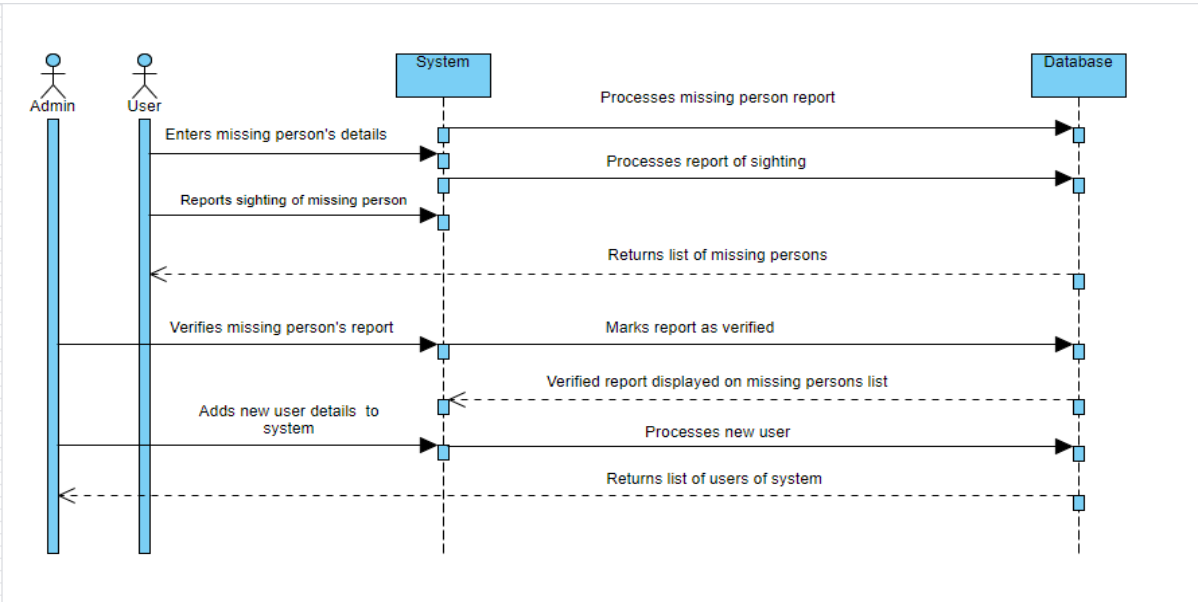

Figure 1.2: Sequence Diagram

4.3.3 Entity Relationship Diagram (ERD)

An entity relationship diagram is a graphical representation of the relationship between entities in a system.

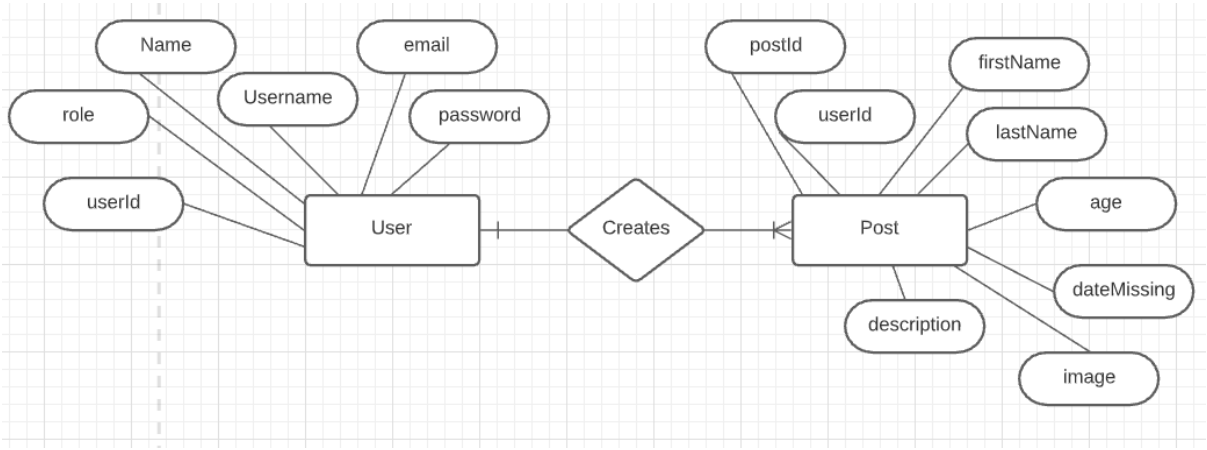

Figure 4.3: Entity Relationship Diagram

4.3.4 Class Diagram

Class diagram is a static structure diagram that describes the structure of the system by defining the system's classes, attributes, and relationship among the objects.

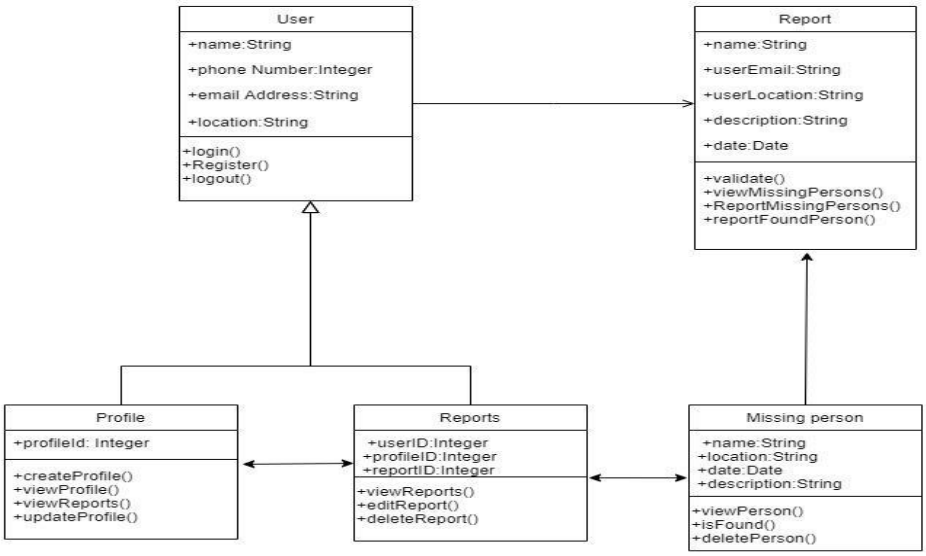

Figure 4.4: Class Diagram

4.3.5 Activity Diagram

An activity diagram is a behavioral diagram that describes the flow from one activity to another in a system.

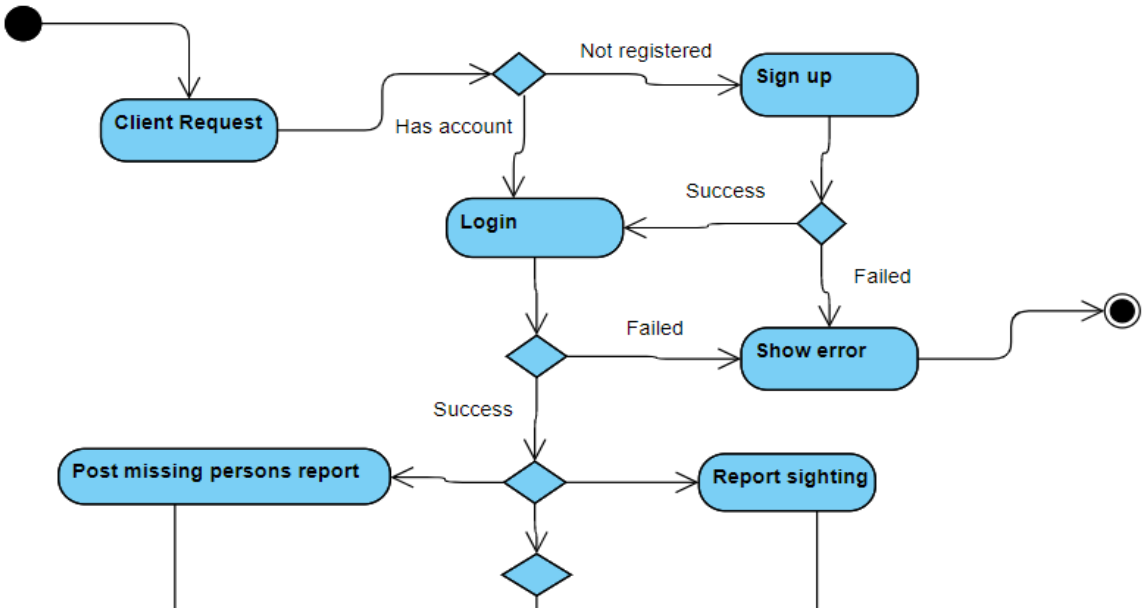

Figure 4.5: Activity diagram (a)

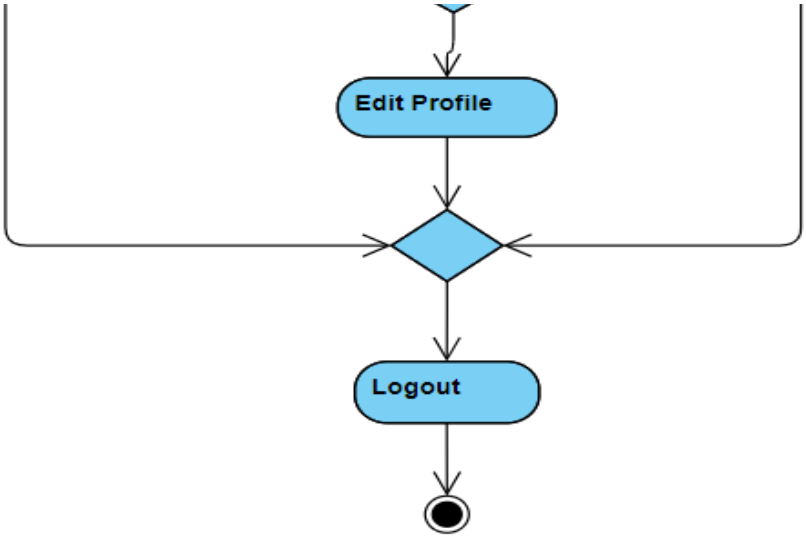

Figure 4.5: Activity Diagram (b)

4.4 System Design Diagrams

Some of the system design diagrams used are as described and illustrated below.

4.4.1 Logical Database Schema

A logical database schema is the skeleton structure that defines the logical view of the database, that is, how the data is organized and how relations among them are associated, and also defines the constraints that are to be applied on the data.

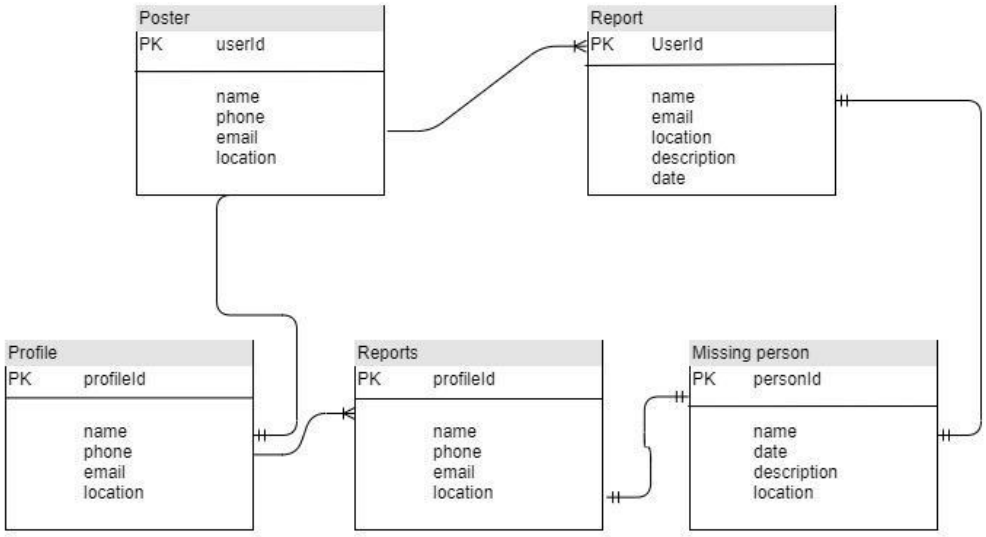

Figure 4.6: Logical Database Schema

4.4.2 Wireframes and Mock-ups

Wireframes are images that describe the functional elements of the system which are used for planning the system's functionality and interface.

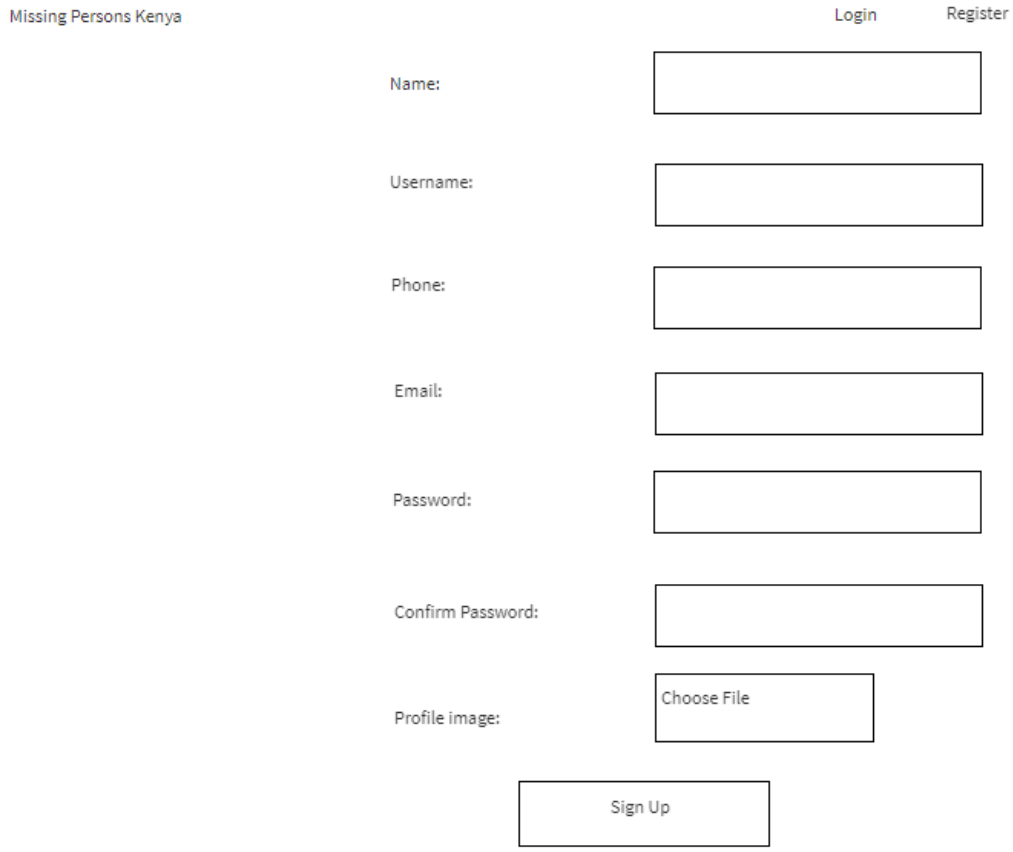

Figure 4.7: Registration Page Mock-Up

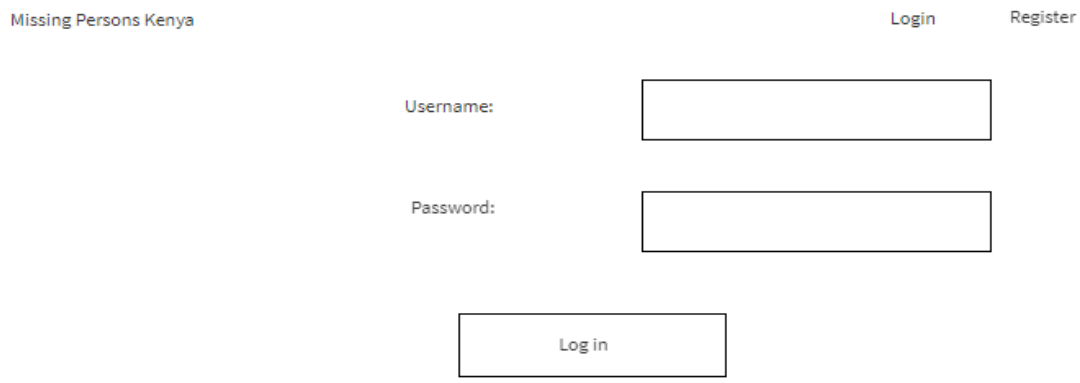

Figure 4.8: Login Page Mock-Up

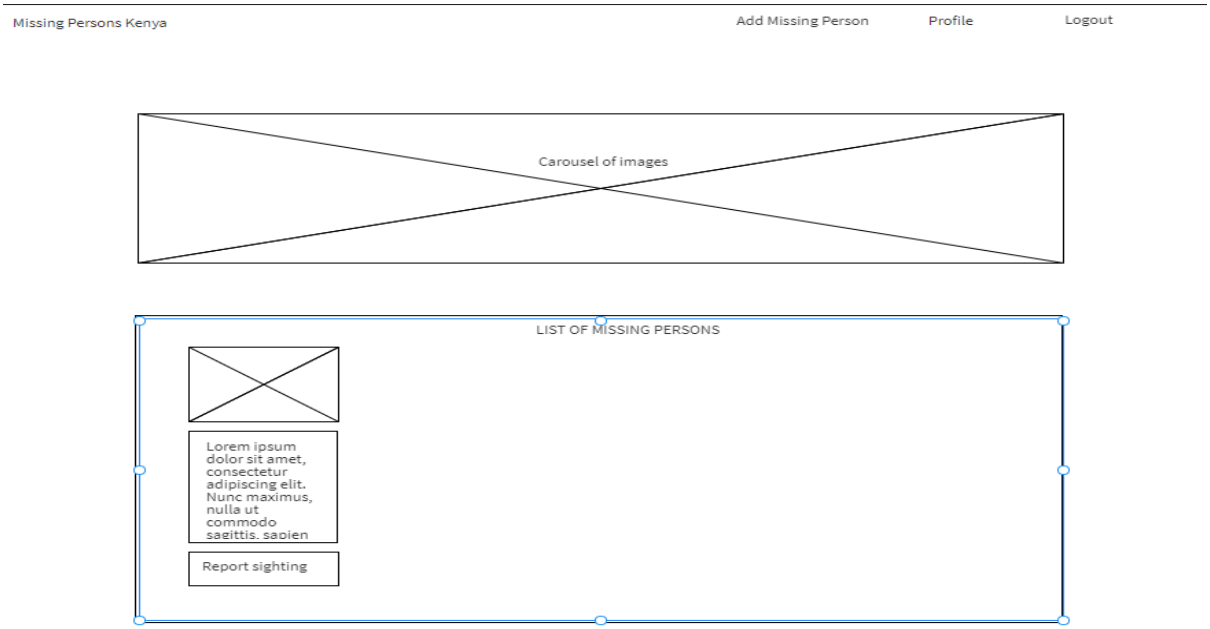

Figure 4.9: Homepage Mock-Up

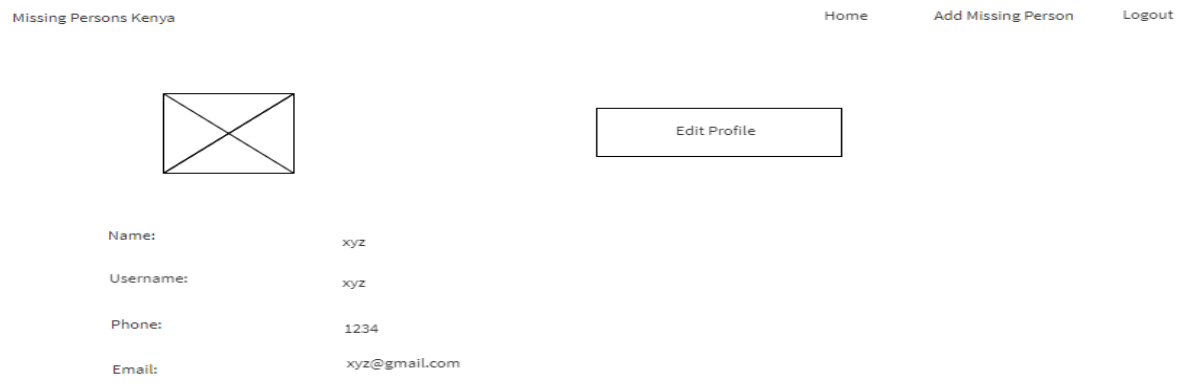

Figure 4.10: Profile Page Mock-up

4.4.3 System Architecture

A system architecture is a conceptual model that defines the structural behaviour of the system.

Chapter 5: System Implementation and Testing

5.1 Introduction

This chapter describes the system implementation environment and the testing paradigms that were used during the testing phase.

5.2 Description of the Implementation Environment

During the implementation phase, all the visions that were drawn up in the wireframes and system design diagrams became a reality. The implementation environment entails the software and hardware resources that were required for the implementation and smooth operation of the system.

5.2.1 Hardware Specifications

The hardware requirements for the web application and the system's database were defined based on the number of users expected to interact with the system. Both the best- and worst-case scenarios were considered to define the minimum requirements as shown below.

Item	Web Server		Comined Web and Database Server	
	Worst-Case	Best-Case	Worst-Case	Best-Case
HDD	1 x 50GB free space for system software			
RAM	2GB	4GB	4GB	8GB
Processor	1.6 Ghz CPU	2 x 1.6 GHz CPU	2 x 1.6 GHz CPU	4 x 1.6 GHz CPU

Figure 5.1: Hardware Specifications

5.2.2 Software Specifications

5.2.2.1 Operating System

Missing Persons Kenya was designed to run on both Windows OS and Mac OS for desktop. The system can also run on the Linux based systems like Ubuntu. The most optimal browser for running the application is google chrome.

5.2.2.3 Database Server

Missing Persons Kenya was designed to work with MySQL server or Microsoft SQL Server. It was designed to be compatible with MySQL 8.x + and SQL Server 2005 Express + .

5.2.2.2 Web Server

Missing Persons Kenya was designed to work with Apache web server 2.x. Another supported web server is NGINX.

5.2.3 Implementation User Interfaces

5.2.3.1 Registration Interface

The registration interface contains a registration form where users enter details like name, username, phone number, image, email address and password.

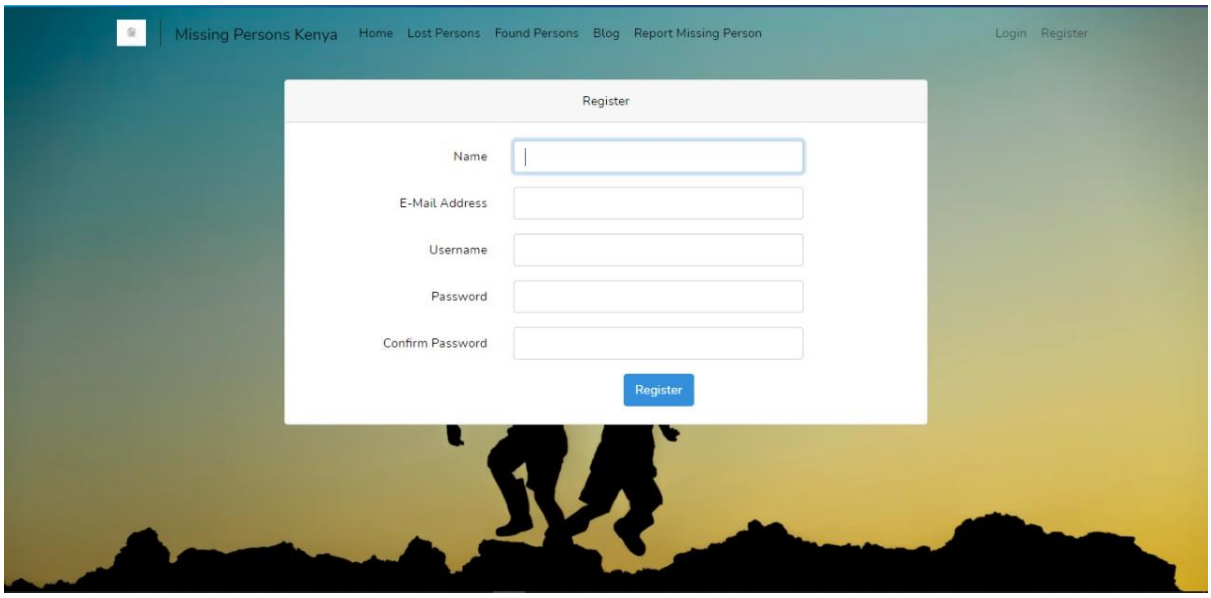

Figure 5.2: Registration Interface

5.2.3.2 Login Interface

The login interface has a form with two fields, the email and password, and is only available to registered users.

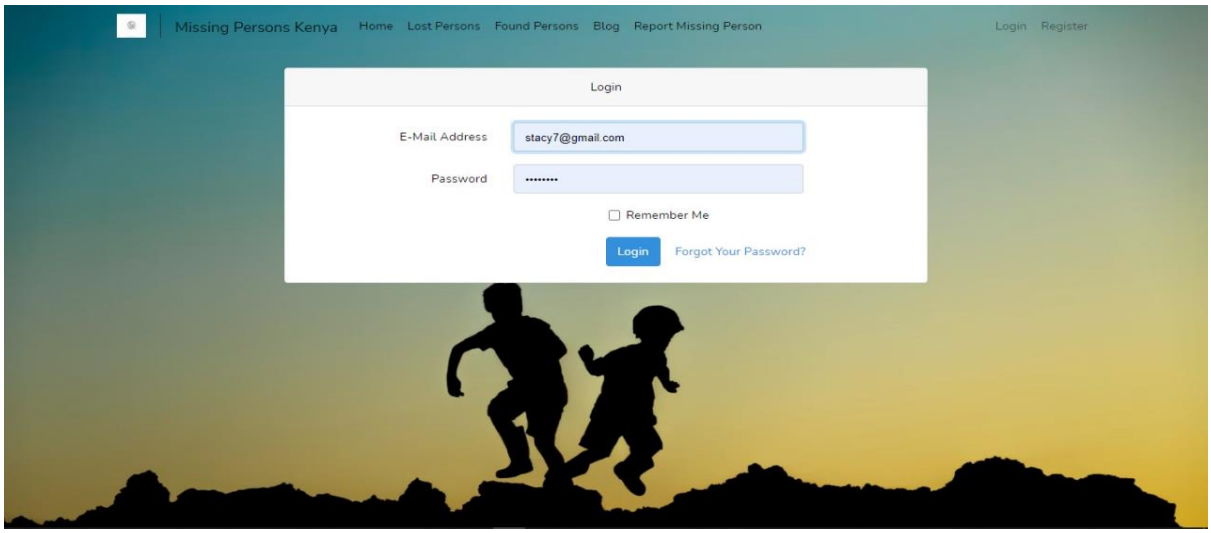

Figure 5.3: Login Interface

5.2.3.3 Administrator Dashboard

The admin interface has tables that display the users and the reports awaiting approval.

Figure 5.4: Admin Interface

5.2.3.4 Missing Person Report Interface

The missing person report interface contains a form where the user can post information regarding the missing person.

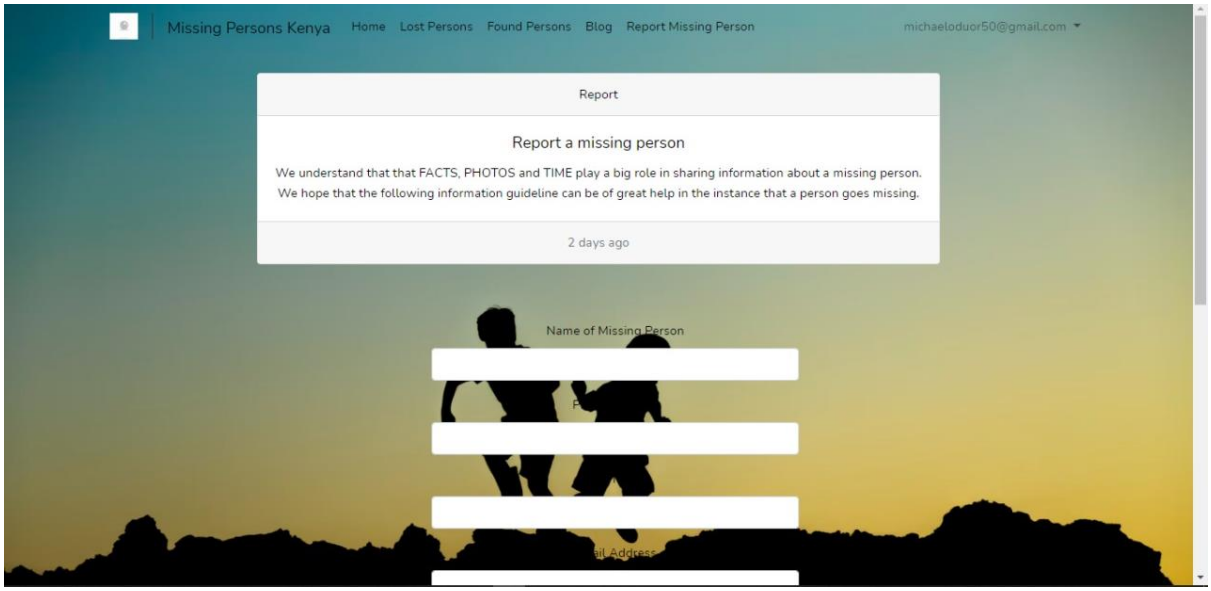

Figure 2.5: Missing Person Report Interface

5.3 Description of Testing

Software testing is the process of checking whether the software works in accordance with the expected functionality and whether the output produced with respect to the input is as it should be. Testing was done to ensure that the functional and non-functional requirements of the system met the expectations. The main goal of the testing was to determine whether the system responded correctly to both correct and incorrect inputs.

5.3.1 Testing Paradigm

Black box testing was the main testing paradigm employed. This was done to ensure that the output produced was as expected with respect to the user's input. Testing also included input validation and exception handling.

5.4 Testing Results

5.4.1 Authentication Testing

Test Case	Description	Test Data	Expected Outcome	Actual Results	Test Verdict
TC001	Verify user cannot post without logging in	Click on 'Add missing person'	Alert that user needs to log in first	As Expected	Pass
TC002	Verify user cannot log in without being registered	Username: StacyChebet, Password: Stacy@001	Inform user that they need to be a registered user	As Expected	Pass
TC003	Verify that user verified their email address after registering	Click on 'Log in' after registering	Alert that user has not verified their email yet	As Expected	Pass

Figure 5.6: Authentication Test

5.4.2 Admin module Test

Test Case	Description	Test Data	Expected Outcome	Actual Results	Test Verdict
TC004	Verify user cannot log in to admin interface	Username: StacyChebet, Password: Stacy@05	Alert that user needs to be an admin to log in to admin interface	As Expected	Pass
TC005	Verify admin cannot log in without being registered	Username: StacyChebet, Password: Stacy@001	Inform admin that they need to be a registered user	As Expected	Pass
TC006	Verify that admin intends to delete a user	Click on 'Delete User' button	Prompt admin whether they are sure about deleting user	As Expected	Pass
TC007	Verify that admin intends to approve a post	Click on 'Approve post' button	Prompt admin whether they are sure about approving the missing person post	As Expected	Pass

Figure 5.7: Admin Module Test

Chapter 6: Conclusions, Recommendations and Future Works

6.1 Conclusions

The systems that were reviewed pertaining to the sharing of information on missing persons proved that the use of the news, newspapers and social media wasn't as widespread since not enough people currently read newspapers or watch the news, and social media platforms like Twitter, Facebook and Instagram are updated by the minute, hence many of the users may fail to interact with the posts concerning the missing persons reports. Missing Persons Kenya provides a platform whereby information on reported missing persons is consolidated into a list of reports containing descriptive information about the missing person like their official government name, age, the area they were last seen, the date they went missing, their image and even what they were last dressed in when they went missing. In the event that a user of the system comes across a child or adult who seems lost, it is easier for them to cross-reference the person against the reports of missing persons that are displayed on the list, making it easier to report a sighting and hence contact the person that posted the missing person report.

6.2 Recommendations

Missing Persons Kenya was tested on an Apache server which is quite efficient. It is recommended that the system be deployed and hosted over the internet to increase its accessibility to people that want to use the application.

6.3 Future Works

This system mostly caters to regular Kenyan citizens who need to spread information to a wider audience about their lost loved ones, and also those that are interested in viewing a consolidated list of missing persons within an area. There is a great need for the system to be incorporated with the current police system to enable the citizens to work together with the police in finding missing persons. There is also need for provision of a section where users should add the OB number or document from the police station verifying that they reported the missing person in a police station, to ensure security and authenticity of the system. In the future, a mobile application that will be an extension of the web application will also be considered to increase the scope of the Missing Persons Kenya system which will make it even easier for users to use the system due to portability of mobile phones.

References

Kenya Missing & Unidentified Persons Takes The Road Less Travelled To Find Your Missing Loved One. (n.d.). TechMoran. Retrieved July 17, 2021, from https://techmoran.com/2013/03/27/kenya-missing-unidentified-persons-takes-the-road-less-travelled-to-find-your-missing-loved-one/

2.0 Technology. (2020). NamUs. Retrieved July 8, 2021, from https://namus.nij.ojp.gov/namus-2-0-technology

App developers help find missing persons through crowdsourcing. (2020). CGTN. Retrieved July 8, 2021, from https://news.cgtn.com/news/2020-06-17/App-developers-help-find-missing-persons-through-crowdsourcing--RopozAARAQ/index.html

Lost and Found Software Market Size, Share & Trends Analysis By Type, By Deployment, By Enterprise Size, And S. (2019, July 24). OpenPR.Com. https://www.openpr.com/news/1810233/lost-and-found-software-market-size-share-trends-analysis

Missing Persons Software | Wonder. (2020). Wonder. Retrieved July 8, 2021, from https://start.askwonder.com/insights/understand-market-need-competitive-landscape-software-helps-find-missing-persons-dcrqw5n4x

Structured systems analysis and design method (SSADM). (n.d.). Semantic Scholar. Retrieved July 17, 2021, from https://www.semanticscholar.org/paper/Structured-systems-analysis-and-design-method-Ashworth/1f1927c29dd2a09780fbbe46d50677d23a249aa2

TRAKing Criminals and Missing Persons | Office of Justice Programs. (2020). TRAKing. Retrieved July 8, 2021, from https://www.ojp.gov/ncjrs/virtual-library/abstracts/traking-criminals-and-missing-persons

UML Use Case Diagram Tutorial. (n.d.). Lucidchart. Retrieved July 8, 2021, from https://www.lucidchart.com/pages/uml-use-case-diagram

Spacey, J. (2019). *4 Examples of System Architecture*. Simplicable. Retrieved July 8, 2021, from https://simplicable.com/new/system-architecture