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e-COP (Electronic Police Station Management)

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Declaration

We, the undersigned, declare that this project is our own original work, has not been presented for a degree in this or any other universities, and all sources of materials used for the project have been fully acknowledged.

1. Student Name

Signature

2. Student Name

Signature

3. Student Name

Signature

This Project has been submitted for examination with my approval as a university advisor.

Project Advisor

Signature

Acknowledgement

We would like to express our special thanks to our almighty God, who gave us the strength to complete the project. Next, we would like express our sincere gratitude from bottom of our heart to our advisor Mr. Tsegay, who under took to act as our supervisor despite his many other academic and professional commitments. Also the writing of this thesis would not have been completed without support and guidance of the following people and it is the time that we owe our deepest gratitude.

- ❖ To Abashge woreda police station staffs especially Inspector Belayneh Habte,
- ❖ To our lovely friends and finally,
- ❖ To our lovely family who have been persistent source of encouragement not only during this project but also throughout our academic career.

Abstract

The need for good record-keeping and information-sharing practices has taken on added significance in today's global environment. Not only do good records provide crucial internal information, law enforcement agencies now need to communicate agency-to-agency and across States in order to protect the citizens. The project titled as " e-COP " is web-based application and it will provide facility for reporting crimes, helps to automate police station works in terms of keeping first information report, keeping criminal records, keeping details of accusations, keeping details of witnesses, keeping records of traffic accidents or incidents, keeping details of employees and helps police department to convey new information's to the public including wanted person and missing person.

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List of Acronyms

CPU	Central processing unit
e-COP	electronic police station management
ER	Entity relationship diagram
FIR	First information report
CSRF	Cross site request forgery

Chapter 1

Introduction

1.1. Background

Modern society is characterized by increasing levels of global social mobility and uncertainty relating to levels of risk posed by internal and external security threats. Within this climate security driven by technology is increasingly being used by governments, corporate bodies and individuals to monitor and reduce risk. There has been an acceptance that the criminal justice system is limited in its capacity to control crime which has led to the exploration of the other avenues for tackling crime and this has provided a market for private companies to push forward the growth of technological security innovations. Crime is as old as the human race is a geographical. It occurs at a specific place, specific time and for a specific reason. It can affect everyone and anyone at any time. Crimes are complex and constantly changing. Social and technological changes introduced new targets, tools and motives for crime. These online web application for maintaining the proper common people complaints for police department. By using this application people who are afraid or don't have enough time to go police station for complaining about their personal legal issues here they can give their complaint through online to file any type of complaint. It consists of complaint box where the people can register their complaints. "eCOPS" is intended to provide computerized information system support for the work of the police. Its primary activities are to help provide police officers with information on criminal cases and on criminals.

1.2. Statement of the Problem

It is obviously believed that the police force is charged with the responsibility of protecting lives, property and assuring safety and well-being of all citizens through the detection and apprehension of criminals, prevention and control of crime. In current scenario poor keeping of records of different sections in police station make the works of the police department unreliable, there is no system to report crimes to police stations online, there is communication gap between police and the public. In general, the main problems behind the development of the intended system are: -Poor record keeping which makes the

processing and retrieval difficult, lack of good storage of data which makes retrieval of data and information quite stressful and cumbersome, the public does not have access to new information regarding missing and wanted person and manual work in performing day to day activities of police duties.

1.3. Objectives

General objectives

The general objective of this thesis is to design and develop electronic police station management system.

Specific objectives

In order to achieve the aforementioned general objective, this work has the following specific

objectives;

- ❖ Identify the functional and non-functional requirements of the system.
- ❖ Developing a system to report crimes online
- ❖ Developing a system that enables citizens to write complaints and give feedback to police station
- ❖ Developing a system that keeps records of the investigation process
- ❖ Developing a system that keeps record of criminal record
- ❖ Developing a system for managing employees
- ❖ Developing a system that keeps records of traffic incidents
- ❖ Developing a system that gives information to the public by the police station
- ❖ Testing and evaluating the system.

1.4. Methods

1.4.1. Requirement Gathering

1.4.1.1. Feasibility Study

a. Technical Feasibility

Usually new systems are established in order to overcome the technical illness of the previous system. In the same way, this system is technically enough to be applied easily

to the problem identified in the existing system. In addition, the development environments for this system are highly available and can be owned with small cost. Therefore, it can be concluded that the system is technically feasible.

b. Operational Feasibility

It might not be possible to see fully operational system within the given limit of time for software development. However with further great cooperation of the project team the system can address over all problems of the current system.

1.4.1.2. Requirements elicitation and analysis

In order to accomplish the objectives of the research, the following methods and procedures were used.

- a. **Data collection:** in order to get various information about police station work we have contacted a police station at woreda level at wolkite town. The following methods were used for data collection.

Observations: - We have observed the police station to analyze the previous police station management system.

Document analysis: - We have collected documents that are raw materials for the system to be developed

Interview: - For further information we have interviewed some police men in the police station.

- b. **Literature review:** Different literatures were reviewed on related fields for this research work.

Different open source tools and programming languages were selected to implement the system.

1.5. Scope and Limitations

The system 'e-COP' will be a web-based application that will be used for automating the manual work in police stations :namely criminal record keeping, traffic incident keeping, employee management, FIR management, keeping files of investigation process in addition provides a way to report crimes online, write complaints and feedbacks online and provides a platform where new information's are posted in case of communication with citizen.

1.6. Application of Results or Significance

The study when completed it would no doubt increase the general efficiency of police stations and their measures of keeping records that would be easy to retrieve information from, by crime investigator(s) and approved persons. It also looks forward to keep criminal records safe, automates the activities carried out by the police department, provide a platform where citizens can report crimes and will minimize the communication gap between the public and police.

1.7. Organization of Thesis

The remaining part of this thesis is organized as follows. Chapter Two presents the review of literature in the domain and proposed work. The analysis and design of the system is presented in Chapter 3. Finally, conclusions and future works are presented in Chapter 4.

Chapter 2

Literature Review

2.1. Literature review

a. Electronics Police Record Management System

This system registers the complaints from people through online and is helpful to the police department in identifying criminals. In this system any person can register their complaint online. The aim of this project is to develop police reporting and management system which is easily accessible to the public, police department and the administrative department.

b. e- crime management by Krishna Kinkar Jha

A web-based portal for online crime records management. The product provides a framework, which helps to execute the crime management system, a critical process having many calculations and operations. It results in regular and timely action against crime reported. The information can be obtained easily and accurately and Causes no threat to evidences. But only limited to crime record management

c. Android based crime management system

The main objectives of this projects was to improve the crime reports and managements system as well as making more peoples crime fighter by using computer and android based system and making the system more interactive and user-friendly and also this project is all about developing crime file management using android application.

The main reason we develop the intended system is to make accessible the listed objectives all in one place and to develop it by bringing to our context because some of the works are from abroad and not much suitable for our country.

2.2. The Proposed System

The proposed Electronic Police Station Management System enhances the existing system by Designing a web application that will manage the draw backs of existing system. Also, the system recommends the police men to get more sophisticated working environment

and the citizens to report crimes from where they are that will help the them to save their time as well as make them to get the services easily being at the home or anywhere

2.3. Requirements of proposed system

2.3.1. Functional requirements

From the requirement elicitation, we have gathered the following requirements. The system shall allow the super admin to: -

- ❖ Create roles
- ❖ To add another admin
- ❖ Delete roles
- ❖ Delete admin
- ❖ Change status

The system shall allow registered users to: -

- ❖ To report personal crimes
- ❖ To report property crimes
- ❖ To report other crimes
- ❖ To report missing person
- ❖ To write complaints
- ❖ To give feedback
- ❖ View status of reported crime

The system shall allow visitors/guest users to: -

- ❖ To view missing person
- ❖ To view wanted person
- ❖ To view Information's and news

The system shall allow Investigator to: -

- ❖ To manage witness's data
- ❖ To manage suspects data
- ❖ To reply to complaints
- ❖ To reply to reported crimes

- ❖ To assign investigator
- ❖ To manage FIR

The system shall allow Traffic Police to: -

- ❖ To create incident report
- ❖ To generate report

The system shall allow Employee Manager to: -

- ❖ To create employee details
- ❖ To view employee details
- ❖ To view edit/update employee details
- ❖ To delete employee details
- ❖ To generate report

The system shall allow police assigned for Posting information to; -

- ❖ To create, update and delete missing person post
- ❖ To create, update and delete wanted person post
- ❖ To create, update and delete news/information post

2.3.2. Nonfunctional requirements

The non-functional requirements also known as quality requirements specify the quality of system attributes such as reliability and response time.

- ❖ Usability: -The system shall be developed in a way to be easy to use. Taking into consideration of the effectiveness of the usage of the system both for police men and users, the system shall be designed to have easy navigations and some easy looking and feel buttons/links .since the system is an online platform which is available at anywhere, it might be accessed by hundreds or even thousands of users in a concurrent way. So, performance is the most important thing in our system and it shall be designed with high performance. It should also handle multiple users' requests at the same time and be responsive to the users' requests concurrently as well as the system should perform the tasks within a limited amount of time.

- ❖ Security: -To prevent unauthorized access of the system, it shall ensure that only authorized users access the system so that one cannot access a page which is beyond his/her privilege.

For this purpose we have selected Laravel framework to deal with security conditions. Laravel framework makes implementation of authentication techniques very simple. Almost everything is configured perfectly. Laravel provides a very simple way to organize authorization logic and control access to various resources. Below are security features included in the system.

a. CSRF token

CSRF stands for **Cross Site Request Forgery** and it's a web attack that forces a user to make unintended requests to a web application where they are previously authenticated.

Laravel makes it easy to protect an application from cross-site request forgery (CSRF) attacks. Cross-site request forgeries are a type of malicious exploit whereby unauthorized commands are performed on behalf of an authenticated user. Laravel automatically generates a CSRF "token" for each active user session managed by the application. This token is used to verify that the authenticated user is the one actually making the requests to the application.

So, for all the html forms that exist in the development the system csrf is included.

b. Hashing

This is encrypting passwords that are submitted to database and storing them. The Laravel Hash facade provides secure Bcrypt and Argon2 hashing for storing user passwords. Hence for the authorized user's their passwords are encrypted and stored in database table.

- c. Middleware: - Middleware acts as a bridge between a request and a response. It is a type of filtering mechanism. Laravel includes a middleware that verifies whether the user of the application is authenticated or not. If the user is authenticated, it redirects to the home page otherwise, if not, it redirects to the login page and in addition for our case admins side is authenticated with respect to admin's roles. Only after successful completion of authentication a page to authorized admin is

displayed. Which means an investigator cannot access traffic police page and vice versa.

d. Creating password for database

This is also included to protect the database where every files are located.

- ❖ Availability: -The system is a wireless system and it shall be available at any place and anytime.
- ❖ Error handling: -Invalid input from the users shall be handled in an interactive manner and appropriate messages would be displayed to the users.

2.3.3. System requirement

a. Software requirements

- ❖ For web application development: -Laravel frame work
- ❖ Web Server: - Wamp Server
- ❖ Microsoft word: - to prepare document for the project
- ❖ Dia software: -to draw the use case, sequential, activity and follow diagram.
- ❖ For using Laravel frame work(coding): Visual studio v1.35.0

b. Hardware requirements

- ❖ Laptop computer with
- ❖ 8GB RAM
- ❖ 1TB hard disk
- ❖ Processor: -Intel® CORE™ i7-5500U [CPU@2.40GHz](#)
- ❖ System Type: -64bit with windows 10 Operating System

Chapter 3

System Design and Analysis

System analysis is the part of the system development life cycle in which we determine how the current police station functions and assess what the user would like to see in the new system. During system development, there are expected level of capabilities like functionality of the system that are expected by the users of the system. To do this, during requirement elicitation we have gathered information and requirements of the system during the data collection phase. This Chapter describes the analysis of the existing system to determine exactly how the existing system works as well as what problems exist and finally provide a solution to the problems.

3.1. Existing System

The Current police station management system and works they carry out in their daily routine is file based or is all paper work. As number of papers increase with the daily routines, retrieval and processing of information will be very cumbersome. In addition, as years goes by the papers containing very crucial information and other papers may decay and everything written on them may fade out which leads to information loss.

At present a person is required to directly go to police station to file his/her complaints. So, with the existing system if anybody wants to complaint against crimes, he must do it through the police.

With existing system many minor errors will occur. Error detection in the previous entries made and data cross verification is another important function. These are done manually, and it would take time.

Some drawbacks of the existing system are listed below: -

- ❖ More man power.
- ❖ Time consuming.
- ❖ Because of large number of serious crimes, small complaints may be ignored
- ❖ Consumes large volume of paper work.

- ❖ Retrieval information is difficult
- ❖ Data redundancy
- ❖ Processing of information is difficult
- ❖ Poor keeping of files

3.2. System Model

System model is used to correct and captures all functionalities as well as eliminates the unnecessary requirements. Analysis model mainly contains three models. The first model is functional model that can be described by use case diagram, the second model is object model which is described by ER diagrams, and the third one is dynamic model that can be described in terms of sequence diagrams and activity diagrams. Regarding to this fact, we aim to construct the model analysis based on formalized requirements of the system. In our work, the analysis model will be described in terms of functional model, object model, and dynamic model using use case diagram, class diagram, and sequence diagrams respectively.

3.3. ER (Entity-Relationship) Diagram

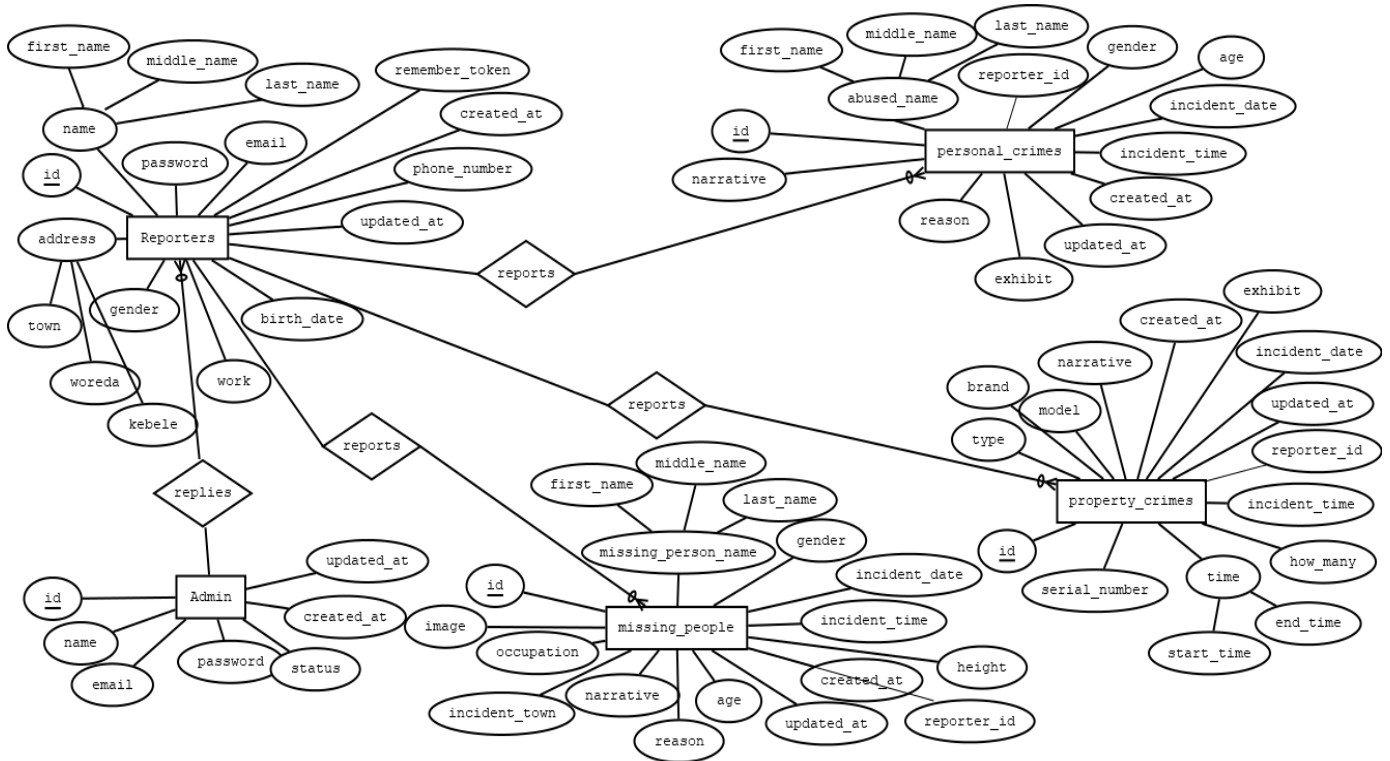


Figure 3. 1 Part A ER diagram

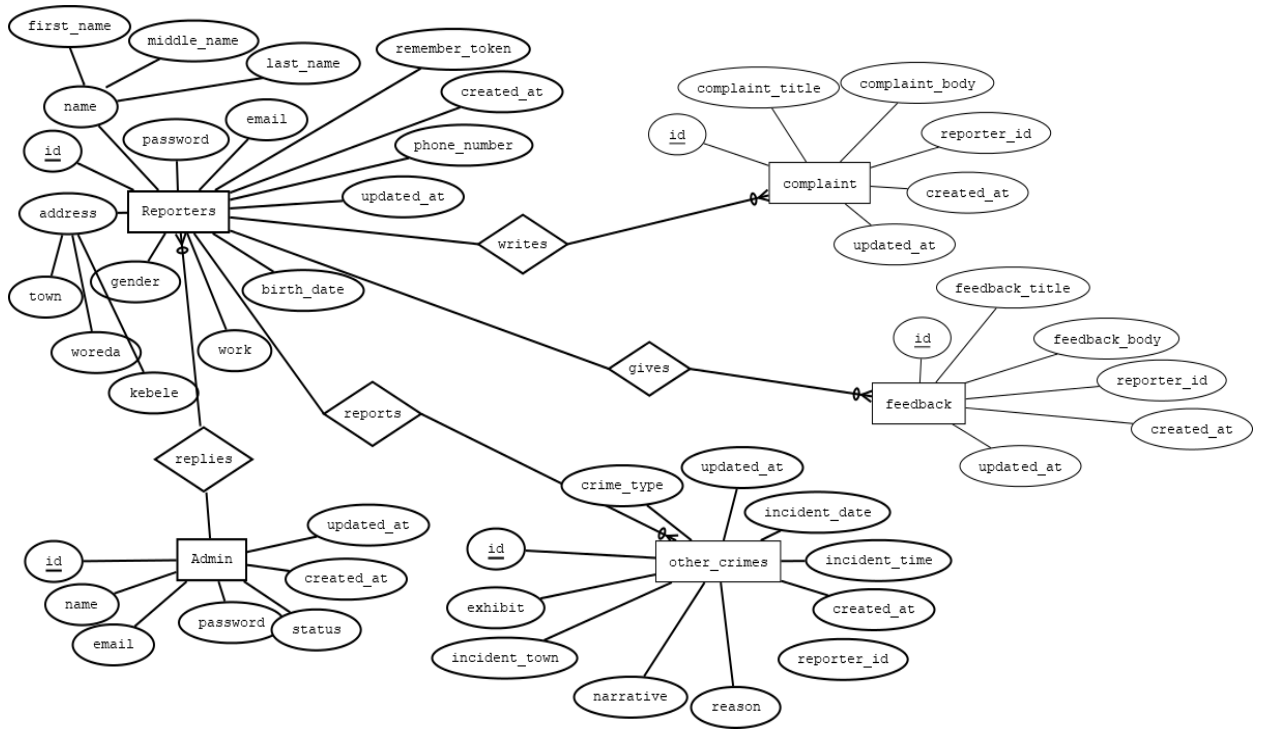


Figure 3. 2 Part B ER diagram

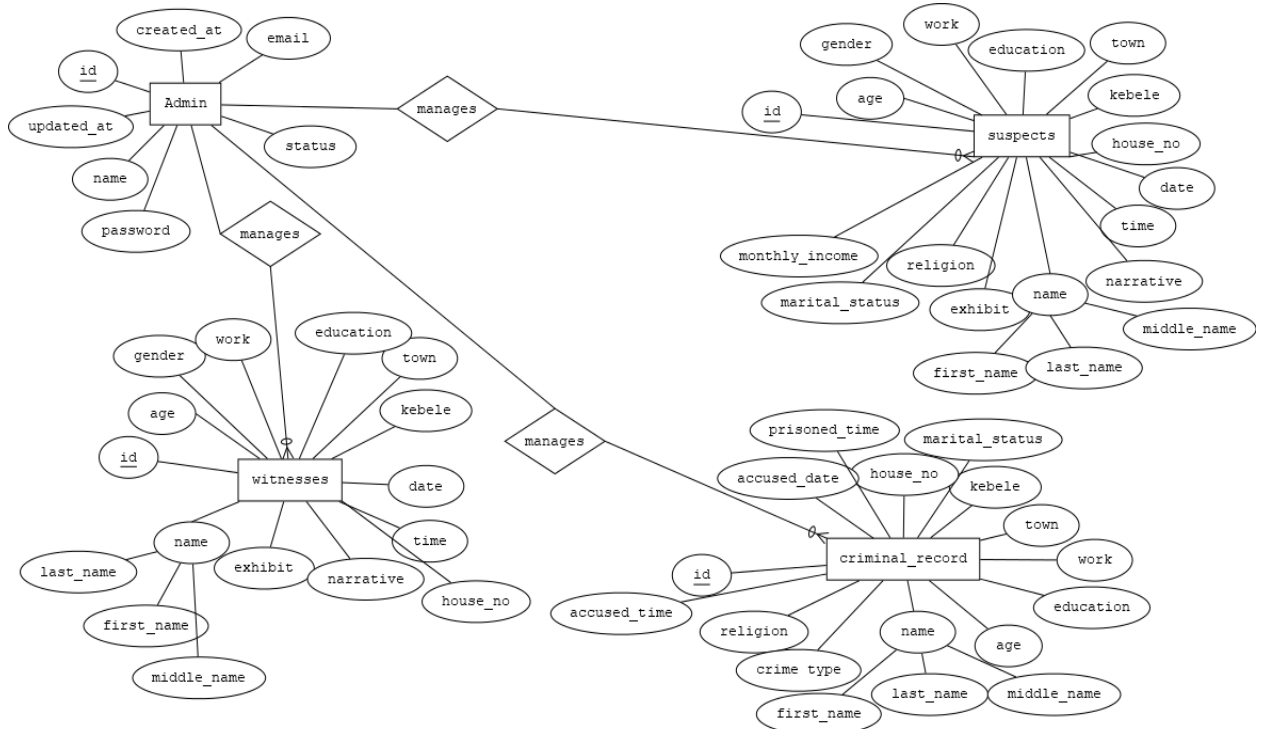


Figure 3. 3 Part C ER

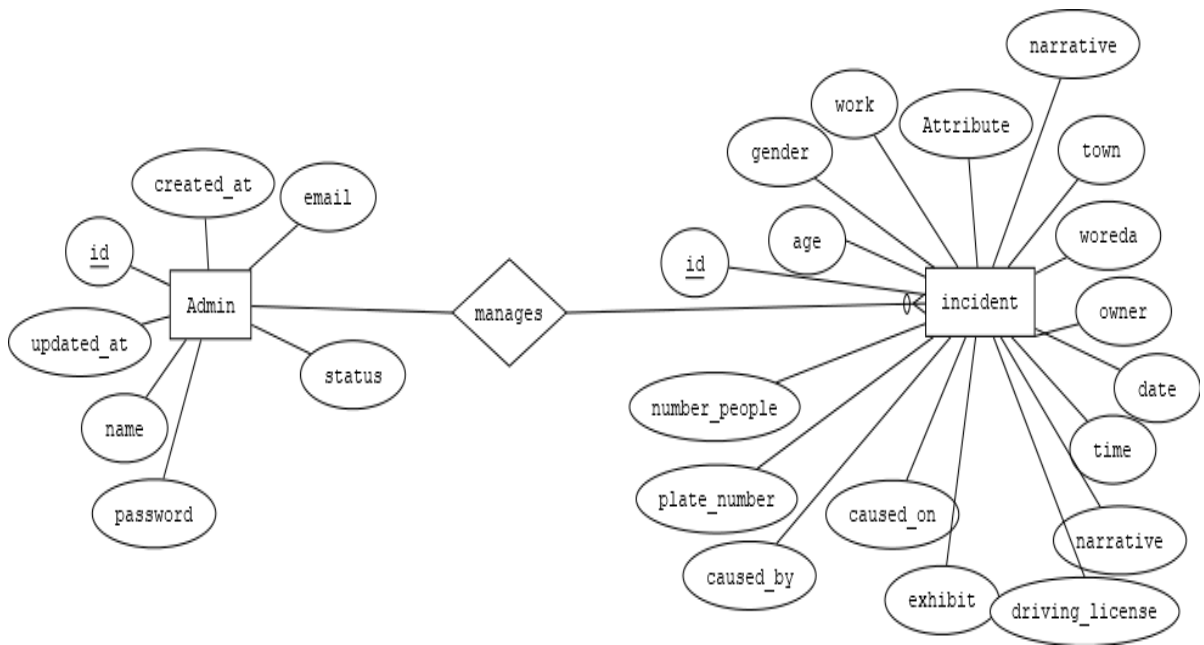


Figure 3. 4 Part D ER

3.4. Use case diagram

A use case is an interaction between users and a system. It captures the goal of the users and the responsibility the system to its users. It is the functionality of the system or the service provided by the system.

The use case diagram that depicts the overall description of the electronic police station management is shown in below figures.

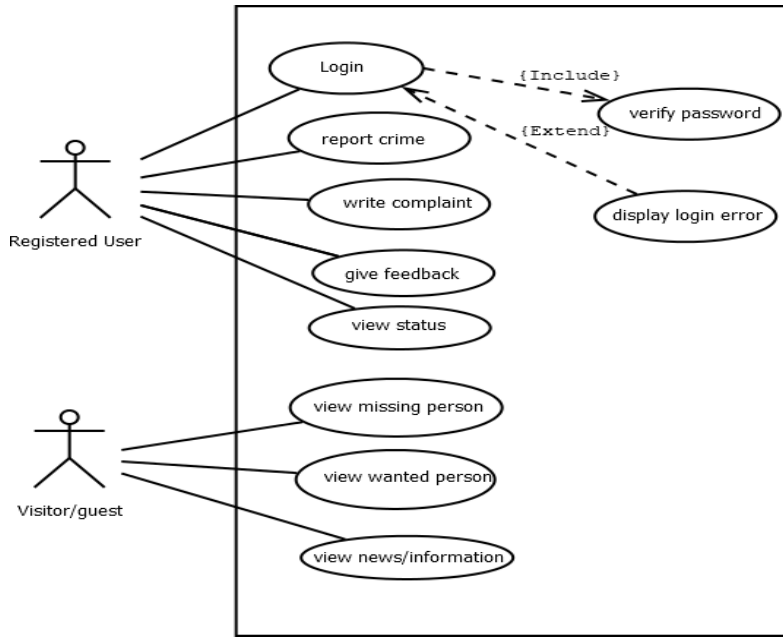


Figure 3. 5 Visitor and Registered user use case

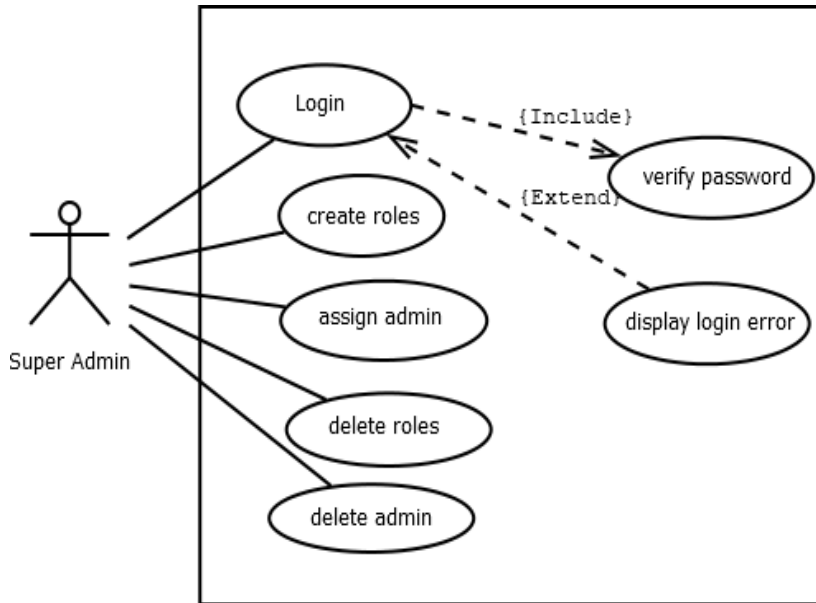


Figure 3. 6 Super admin use case

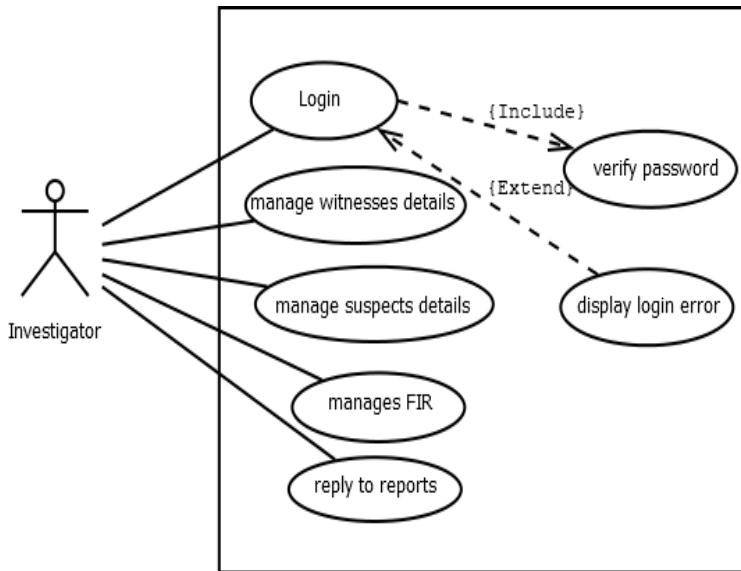


Figure 3. 7 Investigator use case

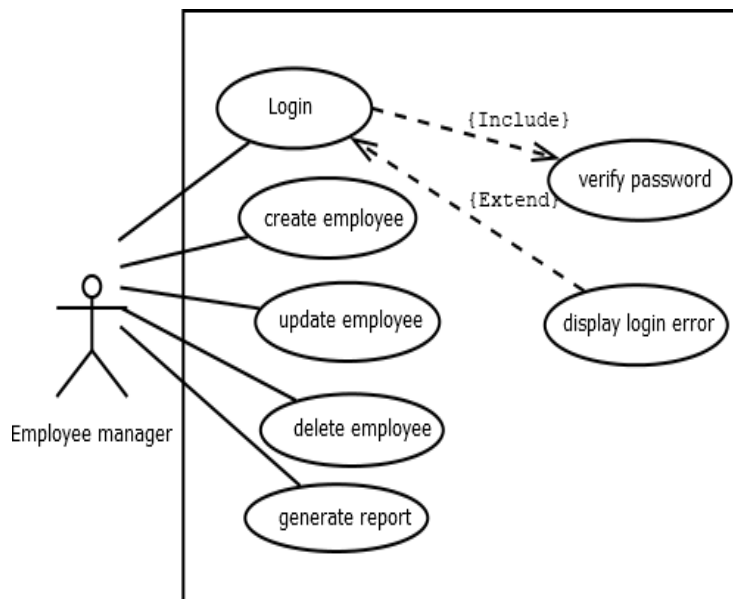


Figure 3. 8 Employee Manager use case

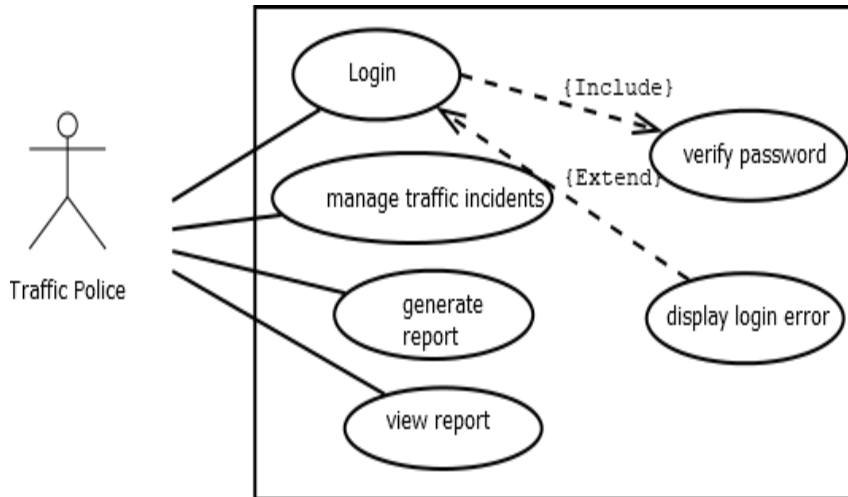


Figure 3. 9 Traffic Police use case

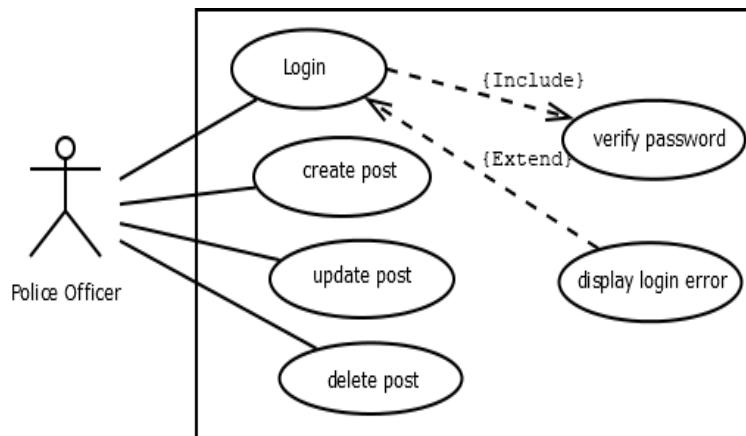


Figure 3. 10 Police officer use case

Actors are entities which can be a person or organization that can play role in one or more interaction with the system. The system interacts with actors through web interface. In our proposed system the use cases, actors and their brief description are listed below.

Actors	Description
Visitor	is guest user capable of viewing pages on home pages
Registered User	is a registered user, who can report crimes, write complaints and give feedback.
Super admin	Admin who is responsible for creating roles and assigning admins to roles

Investigator	admin assigned by super admin for investigation role, who is capable of managing suspects details, managing witnesses' details, managing FIR and replies to reports.
Traffic police	admin assigned by super admin for traffic police role, who is capable of managing traffic incidents and generates reports.
Employee manager	admin assigned by super admin for employee manager role, who is capable of managing details of employees
Police officer	admin assigned by super admin for posting information role, who is capable of managing posts regarding missing person, wanted person and new information

Table 3. 1 Actors of the system

Use case name	report crime
Actor	Registered user
Description	Contains forms of reporting crimes namely personal crimes, property crimes and other crimes
Precondition	user needs to be authenticated before form is displayed
Post condition	report forms are viewed submitted to the database

Table 3. 2 Report crime use case

Use case name	write complaint
Actor	Registered user
Description	Contains forms of writing complaints to police station
Precondition	user needs to be authenticated before form is displayed

Post condition	complaint forms are viewed submitted to the database
----------------	--

Table 3. 3 Write complaint use case

Use case name	give feedback
Actor	Registered user
Description	user needs to be authenticated before form is displayed
Precondition	user needs to be authenticated before form is displayed
Post condition	feedback form is viewed to be filled and saved into databases

Table 3. 4 Give feedback

Use case name	create roles
Actor	Super admin
Description	they are roles that are to be created to assign an admin
Precondition	only created by super admin
Post condition	assigned to specific admin

Table 3. 5Create role use case

Use case name	assigning admin
Actor	Super admin
Description	is process of assigning admin to roles
Precondition	roles must be created first by super admin

Post condition	assignment of admin
----------------	---------------------

Table 3. 6 Assigning admin use case

Use case name	delete roles
Actor	super admin
Description	deleting roles that are created when unnecessary or needs to be replaced by another
Precondition	admin must be removed from specific role
Post condition	roles are deleted

Table 3. 7 Delete roles use case

Use case name	deleting admin
Actor	Super admin
Description	deleting an admin from specific role
Precondition	only done by super admin
Post condition	admin is deleted

Table 3. 8 Deleting admin use case

Use case name	Login
Actor	Registered User, Super admin, Investigator, Traffic police, police officer, Employee manager
Description	Authenticates users for interacting with the system
Precondition	username and password must be verified

Post condition	pages are displayed according to the user
----------------	---

Table 3. 9 Login use case

Use case name	create employee
Actor	Employee manager
Description	creating new employee details
Precondition	only done by admin which is employee manager
Post condition	employee details are created

Table 3. 10 Create employee use case

Use case name	update employee
Actor	employee manager
Description	updating details of existing employee
Precondition	only done by employee manager
Post condition	employee details are updated

Table 3. 11 Update employee use case

Use case name	deleting employee
Actor	employee manager
Description	deleting employee from system
Precondition	only done employee manager
Post condition	employee details are deleted

Table 3. 12 Delete employee use case

Use case name	creating post
Actor	Police officer
Description	creating post regarding missing person, wanted person and new information
Precondition	only done by police officer
Post condition	posts are created

Table 3. 13 Creating post use case

Use case name	updating/editing post
Actor	Police officer
Description	editing created post regarding missing person, wanted person and new information
Precondition	only done by police officer
Post condition	posts are updated

Table 3. 14 Updating post use case

Use case name	deleting post
Actor	Police officer
Description	deleting posts that are outdated regarding missing person, wanted person and new information
Precondition	only done by police officer
Post condition	posts are deleted

Table 3. 15 Deleting post use case

Use case name	managing traffic incident
Actor	Traffic Police
Description	creates, deletes report of incidents
Precondition	only done by traffic police
Post condition	traffic incidents are managed

Table 3. 16 Managing traffic incident use case

Use case name	generating report
Actor	Traffic police, Employee manager
Description	creating reports of incidents in case of traffic police and details of employees incase of employee manager
Precondition	only done by police officer
Post condition	posts are created

Table 3. 17 Generating report use case

Use case name	Managing Suspects details
Actor	Investigator
Description	manages details of suspects during investigation
Precondition	only done by investigator
Post condition	suspects details are stored in database

Table 3. 18 Managing suspects detail use case

Use case name	Managing Witnesses details
Actor	Investigator
Description	manages details of witnesses during investigation
Precondition	only done by investigator
Post condition	witnesses details are stored in database

Table 3. 19 Managing witnesses use case detail

Use case name	FIR management
Actor	Investigator
Description	manages details of first information reports
Precondition	only done by investigator
Post condition	FIR's details are stored in database

Table 3. 20 FIR management use case

Use case name	reply to FIR
Actor	Investigator
Description	replies to user reported crimes
Precondition	only done by investigator
Post condition	checked for further processing

Table 3. 21 Reply FIR use case

3.5. Sequence Diagram

Sequence diagrams are used to depict graphically how objects interact with each other via messages in the execution of a use case or operation. They illustrate how the messages are sent and received between objects and in what sequence.

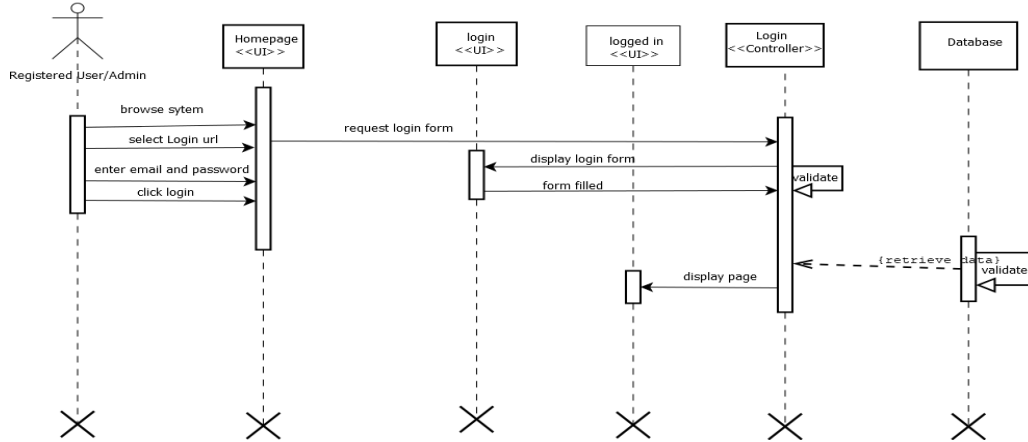


Figure 3. 11 sequence diagram for Login

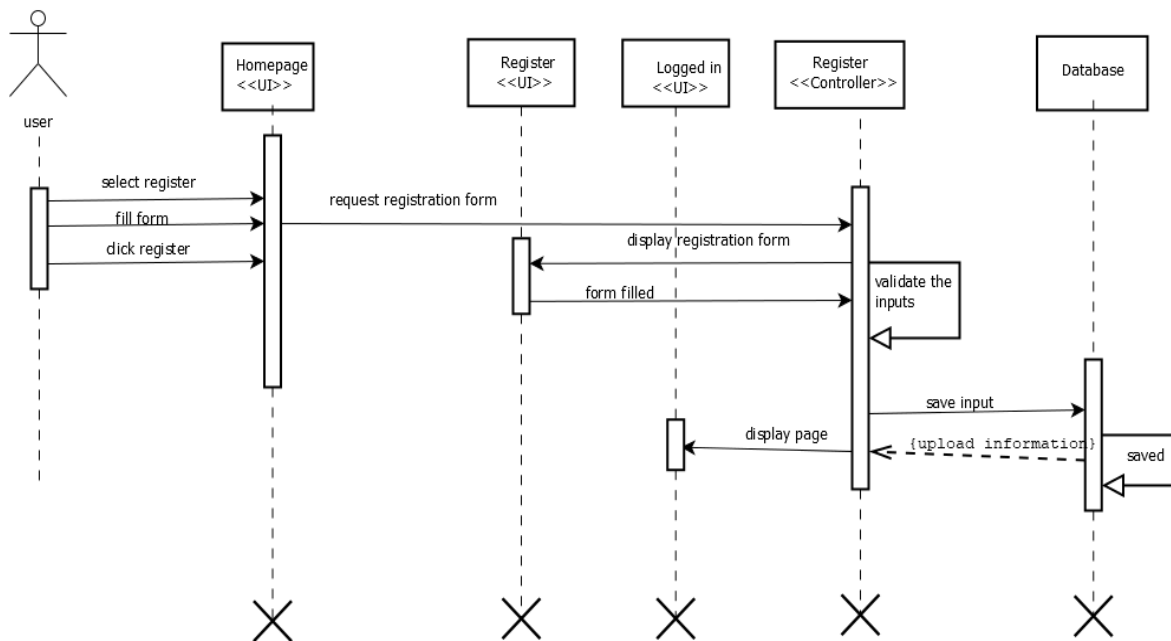


Figure 3. 12 sequence diagram for Registration

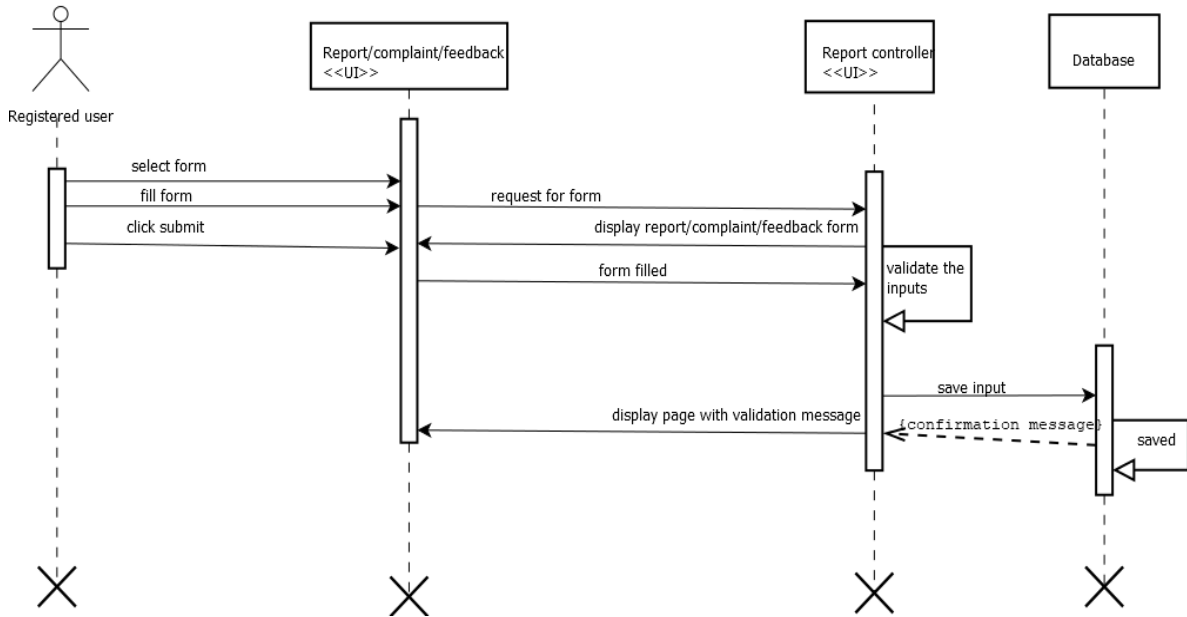


Figure 3. 13 Sequence diagram for report form

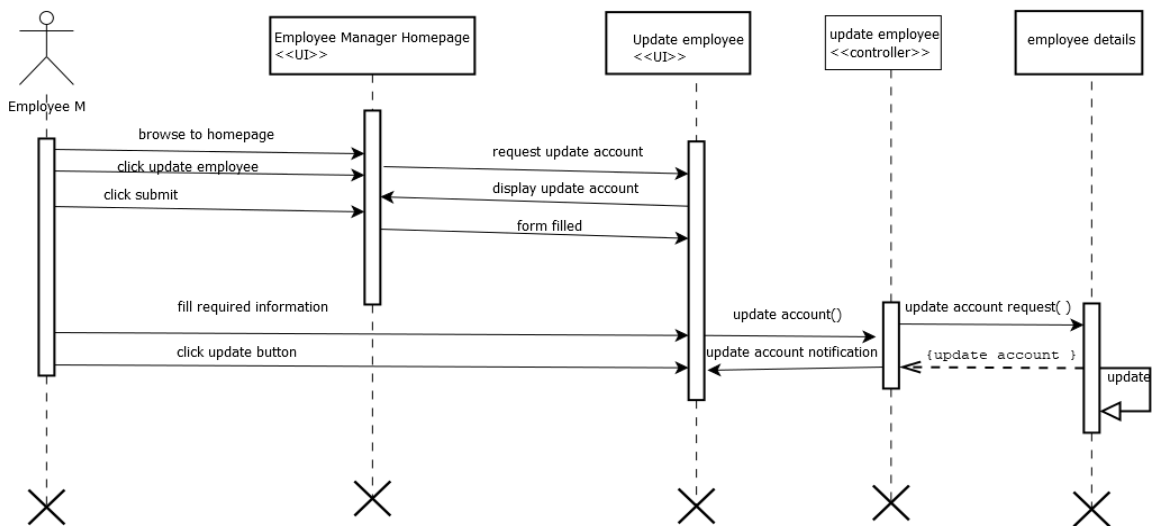


Figure 3. 14 sequence diagram for updating employee details

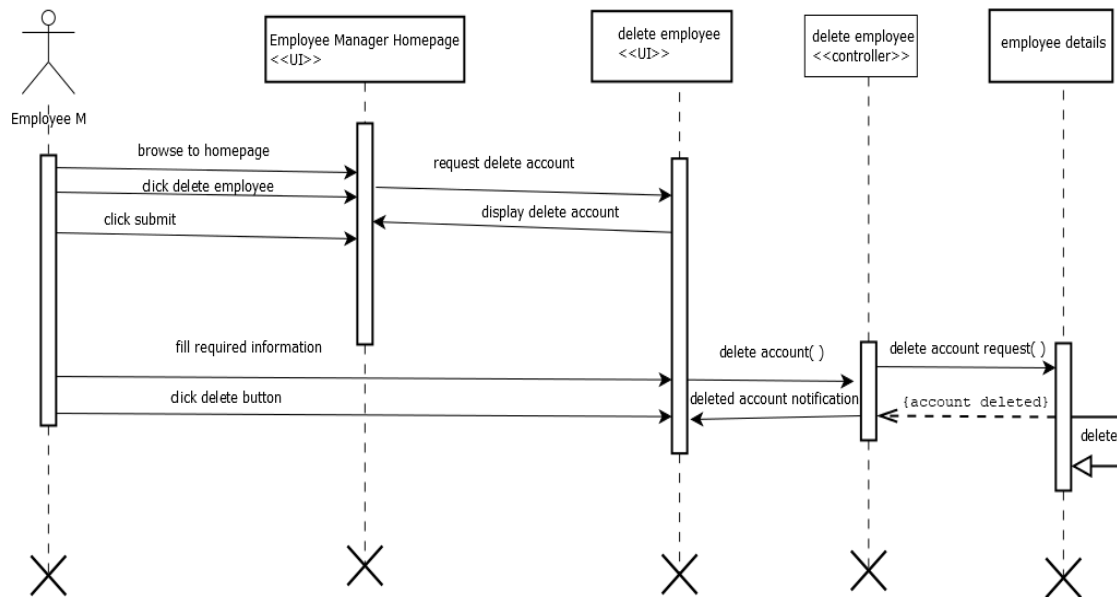


Figure 3. 15 sequence diagram for deleting employee details

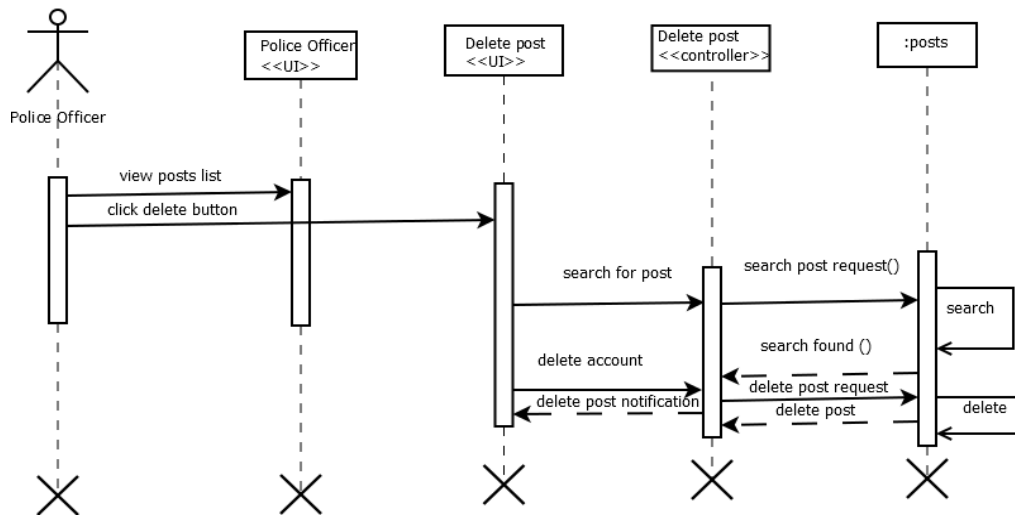


Figure 3. 16 Sequence diagram for delete post

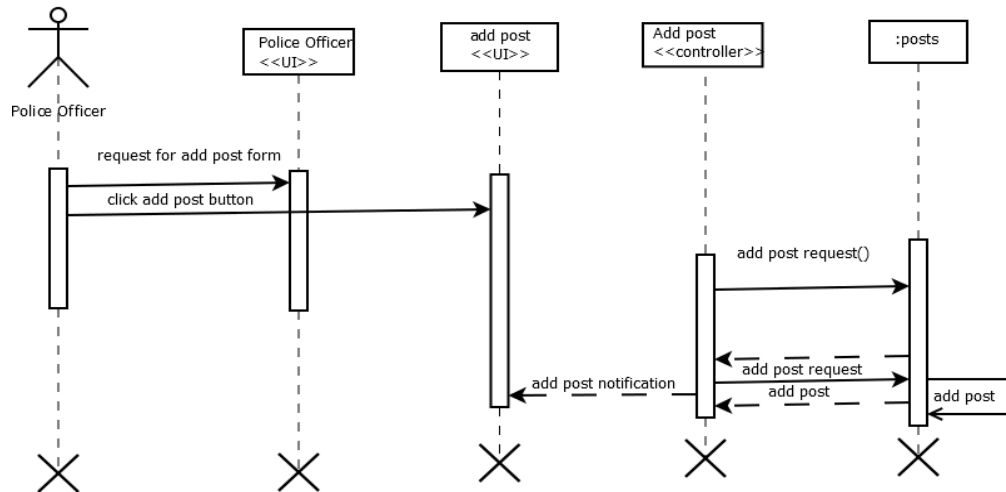


Figure 3. 17 Sequence diagram for add post

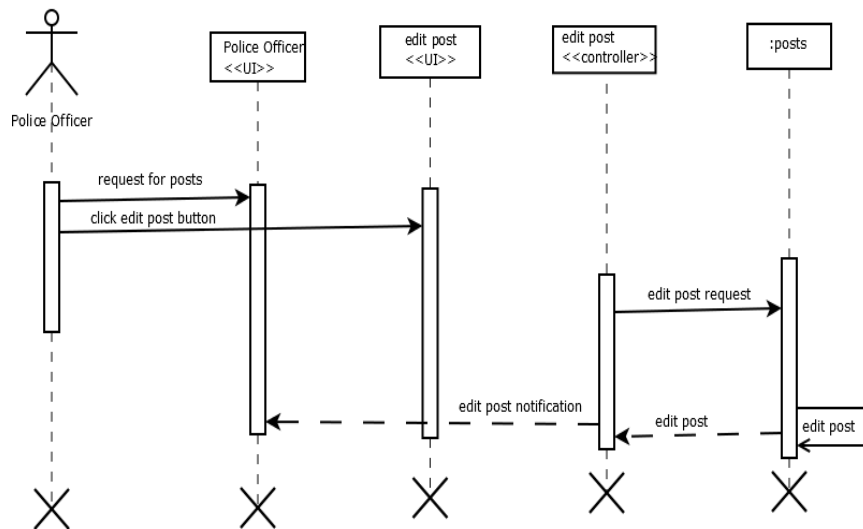


Figure 3. 18 Sequence diagram for edit post

3.6. Activity Diagram

Activity Diagrams are used to Document the logic of a single operation, a single use case, or the flow of logic of a business operation. In many ways, Activity Diagrams are the object_ oriented Equivalent of flow from structure development.

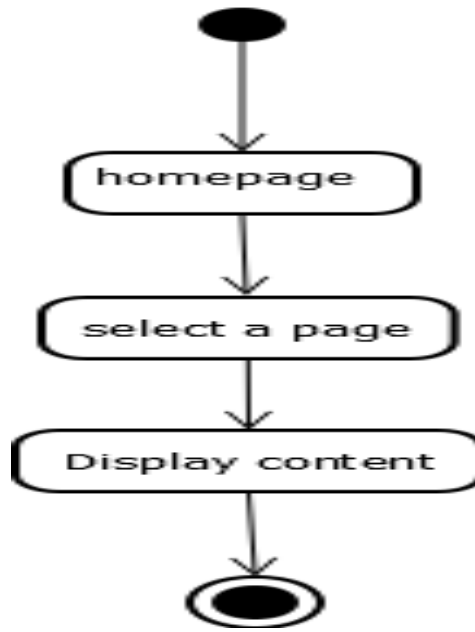


Figure 3. 19 activity diagram for visitor

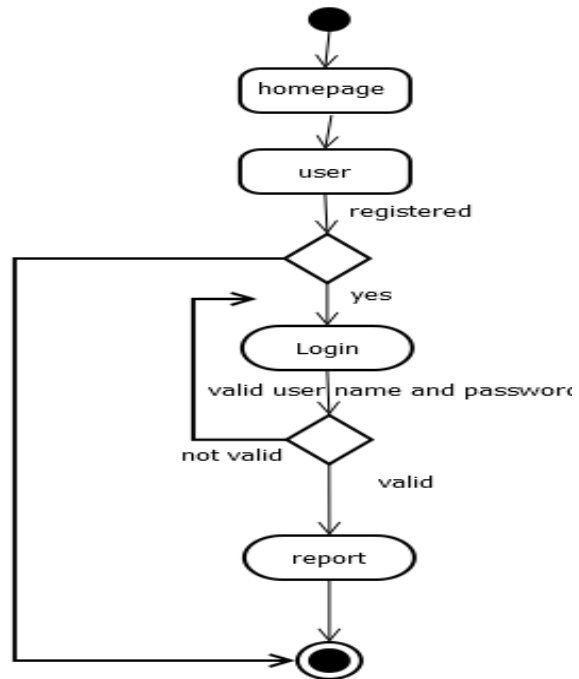


Figure 3. 20 activity diagram for Registered user

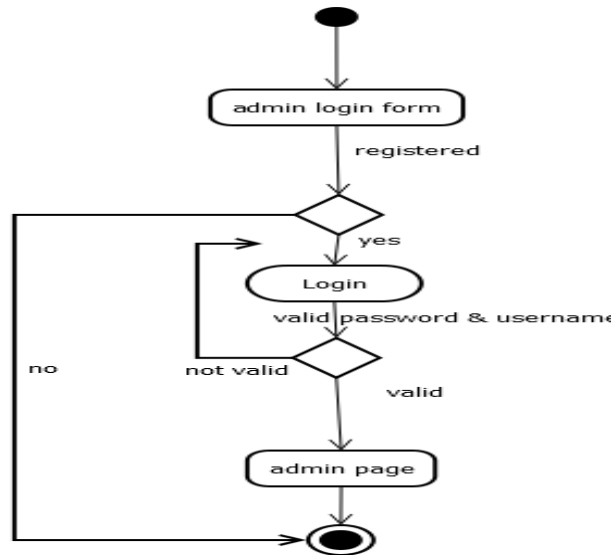


Figure 3. 21 activity diagram for admin

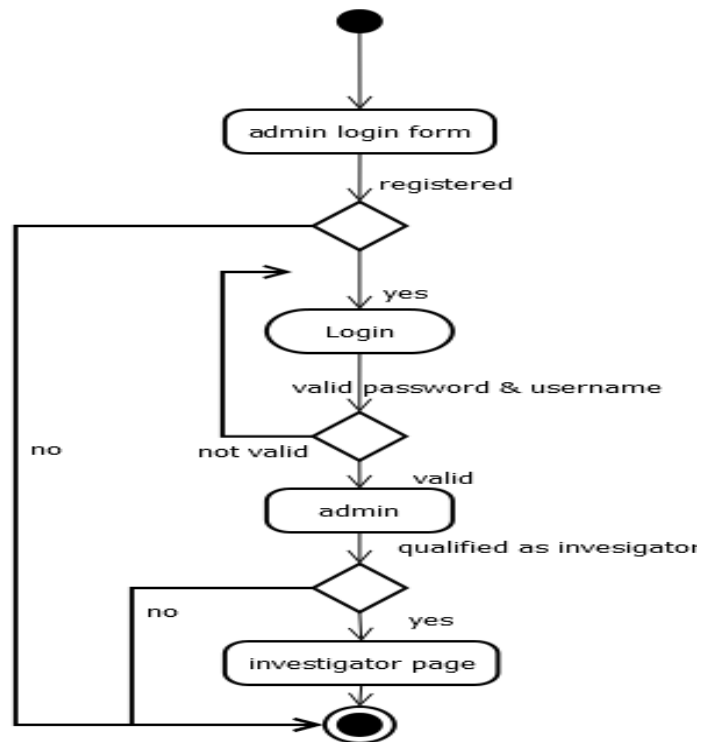


Figure 3. 22 activity diagram for investigator

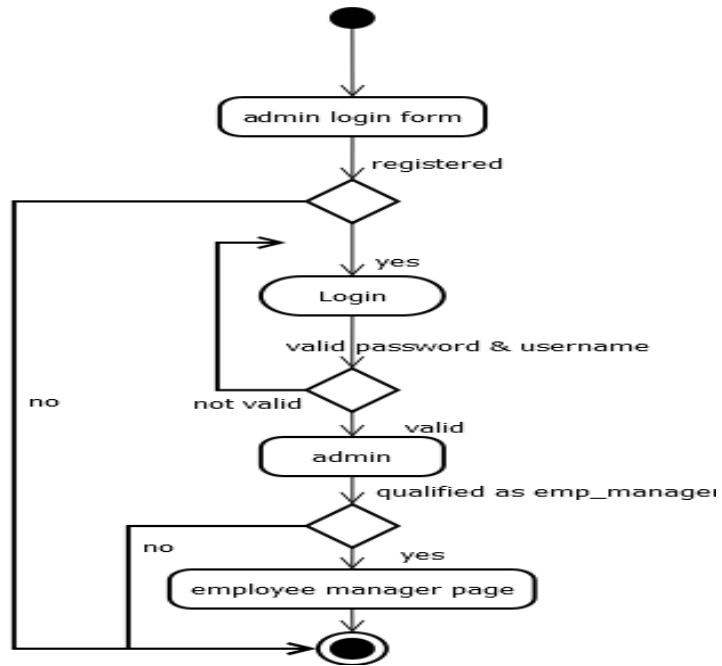


Figure 3. 23 activity diagram for Employee manager

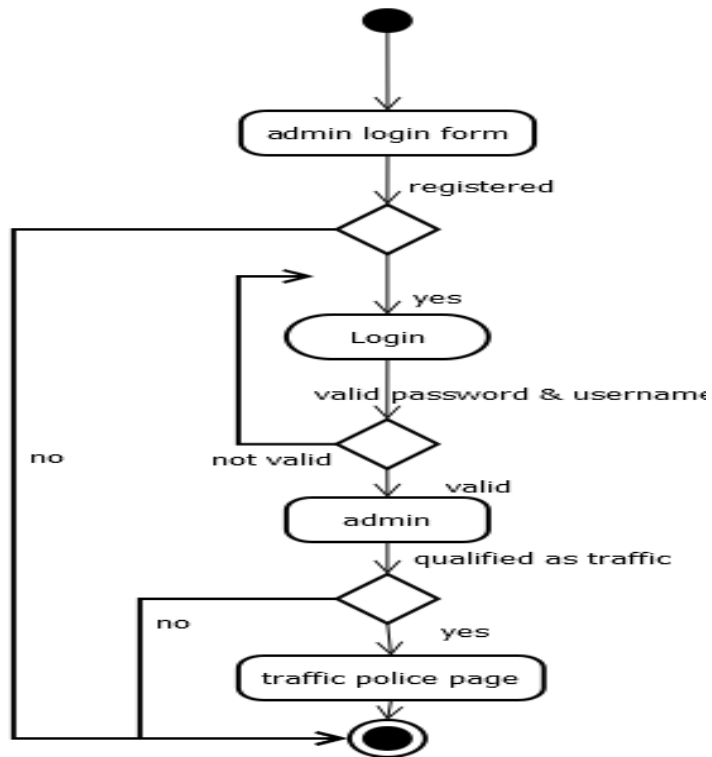


Figure 3. 24 activity diagram for Traffic police

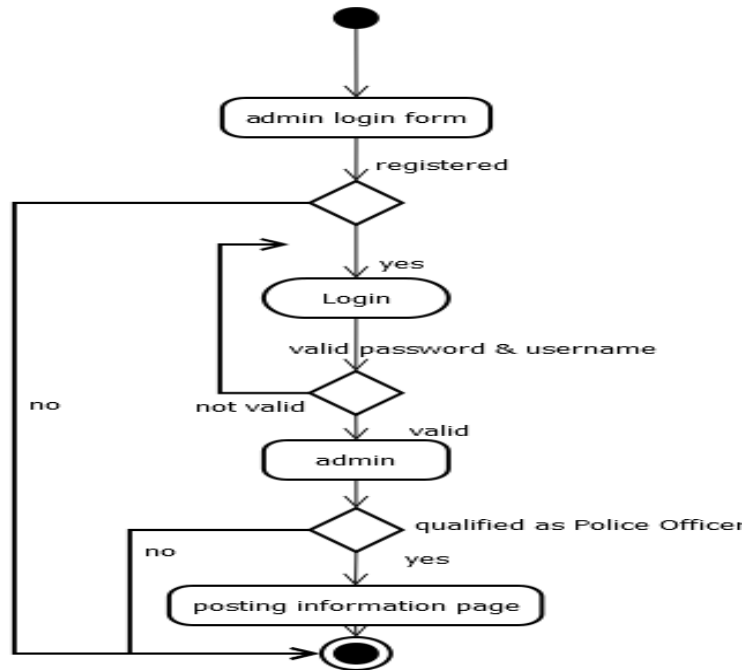


Figure 3. 25 activity diagram for Police officer

3.7. User interface flow diagram

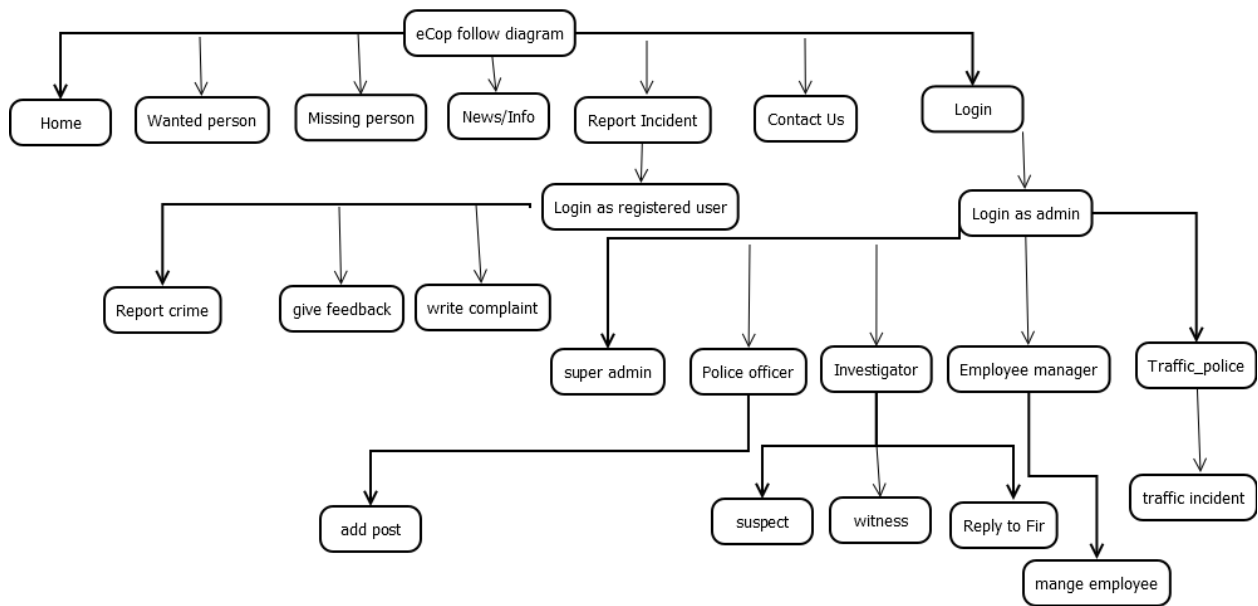


Figure 3. 26 user interface flow diagram of the system

3.8. Sample screen shots

Super admin creates roles before assigning admin to specific role

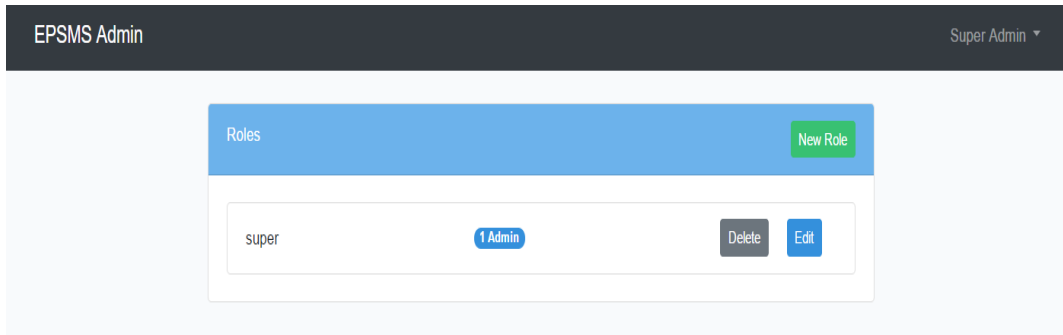


Figure 3. 27 role creation by admin

When New Role button is clicked this page is displayed

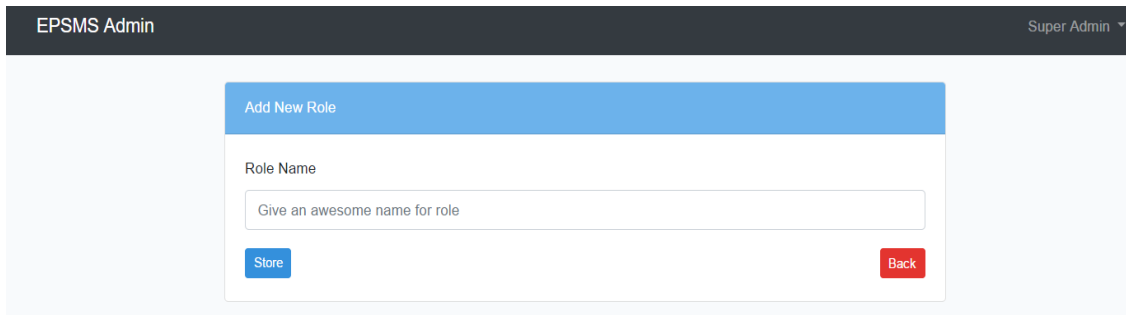


Figure 3. 28 new role form

After New Role called investigator is created success message is developed

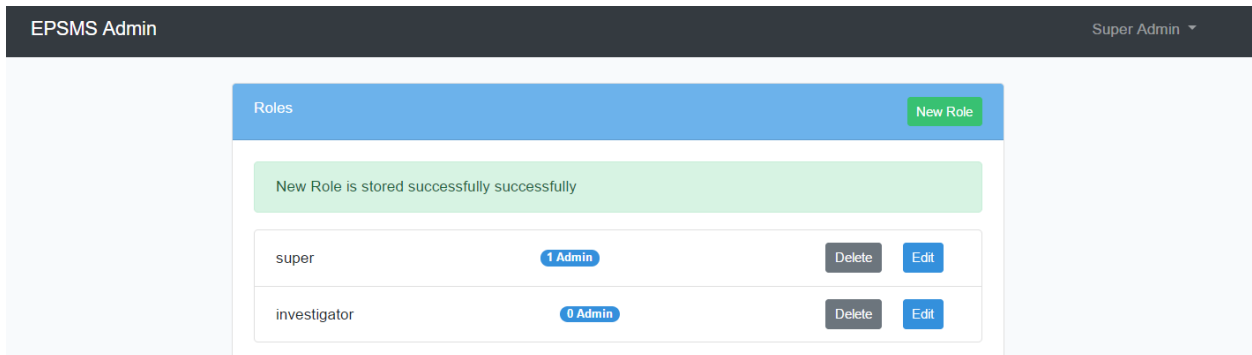


Figure 3. 29 validation page after successful role creation

This is page where Super Admin assigns an admin

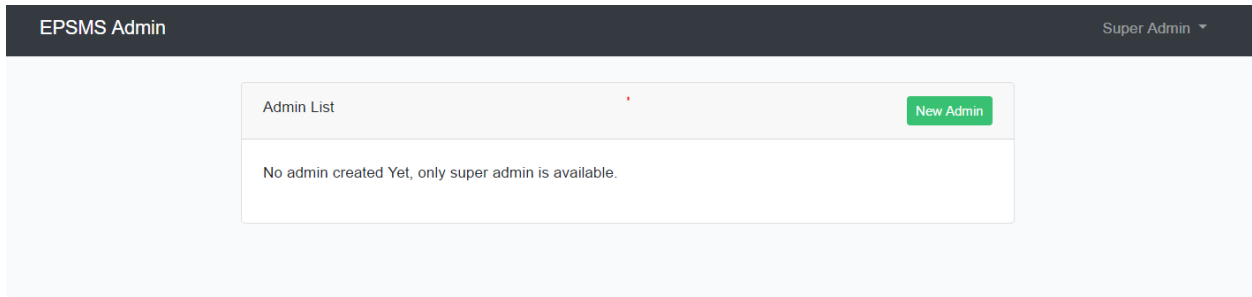


Figure 3. 30 admin assignment

When New Admin button is clicked the following page will be displayed

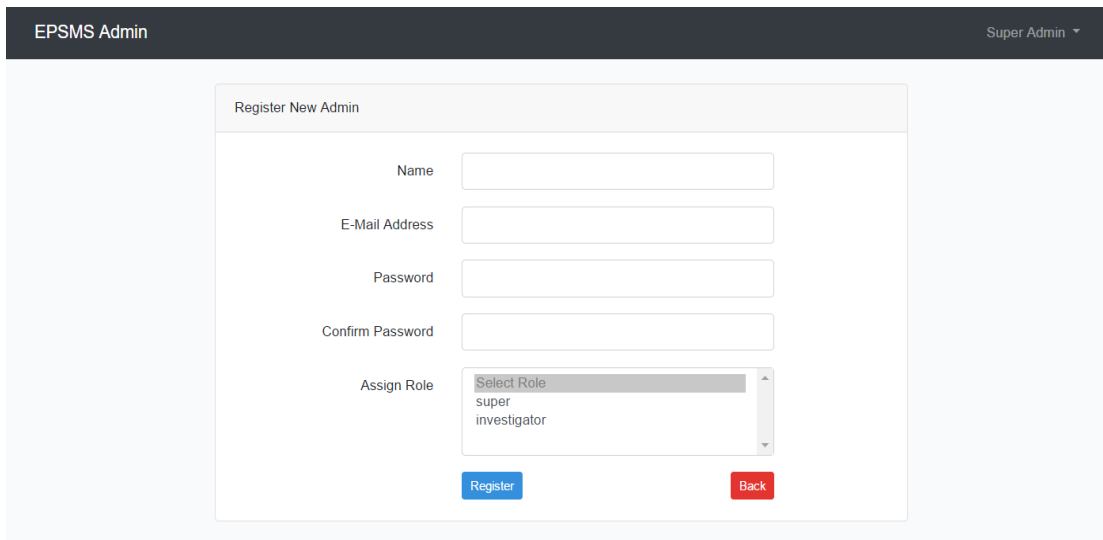


Figure 3. 31 form for assigning admin to role

Assignment of admin to fore created role “investigator” with inactive status.

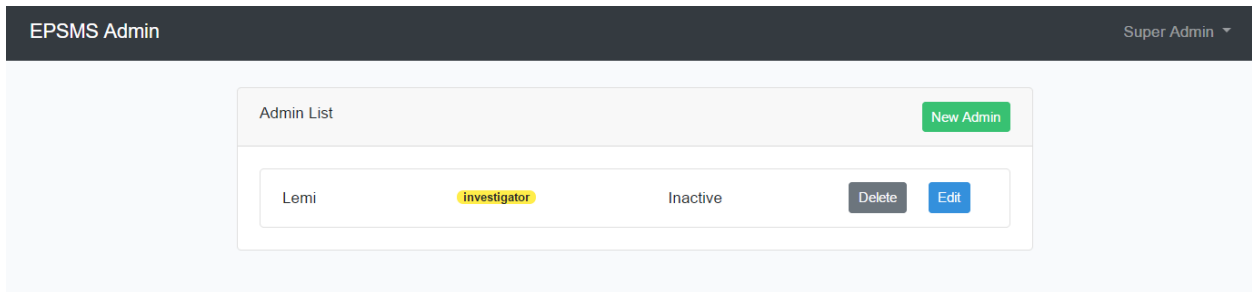


Figure 3. 32 admin assigned to role

To make new admin access the system the status should be active, that is why it is edited in this way

EPSMS Admin Super Admin ▾

Edit details of Lemi

Name

Email

Assign Role

Select Role
super
investigator

Active

Change Back

Figure 3. 33 changing inactive state to active state

After editing status now, the admin is set to active with validation message and can access the system

EPSMS Admin Super Admin ▾

Admin List New Admin

Lemi details are successfully updated

Lemi	investigator	Active	Delete Edit
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Figure 3. 34 status changed

Chapter 4

Conclusion and Recommendations

4.1. Conclusion

The manual system in police station is somehow useful in the handling of crimes, employee details, traffic incidents, witnesses and suspects management. However, the automated or electronic police station management is more functional because people automatically can report crimes around them in picture format even if the police is not there, police stations can manage their work in automated way is less prone to error. With these features, a web-based application can solve the primary problems being encountered during the Crime reporting and managements. Recent developments in the ICT Industries has revolutionized and consequently brought about a paradigm shift in the way activities are accomplished. As a result the, police stations needs to embrace these new technologies.

4.2. Recommendations for Future Works

Anyone who is interested to take on this title can enhance the system by

- ❖ Developing SMS alert for Phone and Smart phone by which user can report from the mobile.
- ❖ Developing the system by using sophisticated secure mechanisms
- ❖ Adding mechanism that automatically backup files in database.
- ❖ Developing the system by using local languages depending on the region where police station is located.

References

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Appendix

Part 1

1.How files are kept in investigation office at present



Figure a. 1 investigation files

2.Existing police/employee details management



Figure a. 2 investigation/employee details

3. Existing traffic incident report form

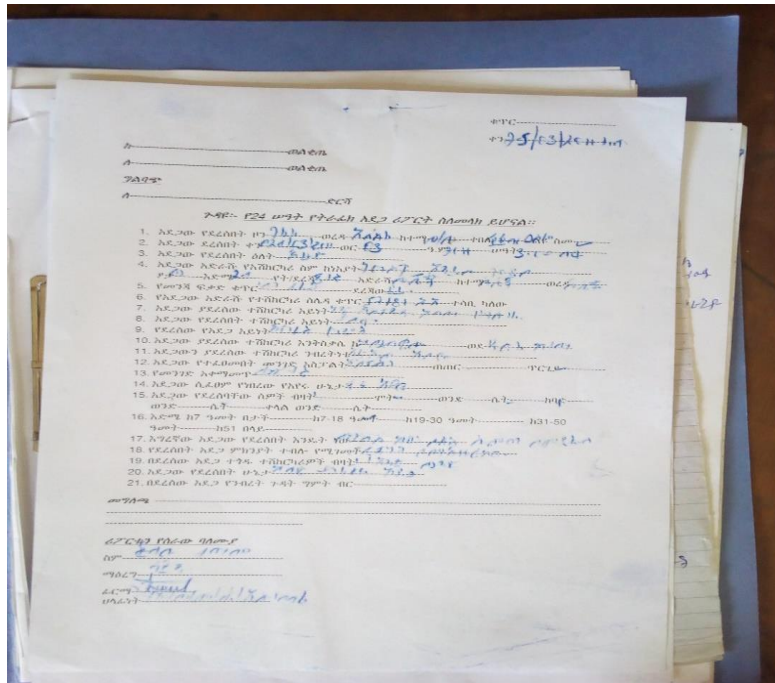


Figure a. 3 Traffic incident report format

3. Existing criminal record management

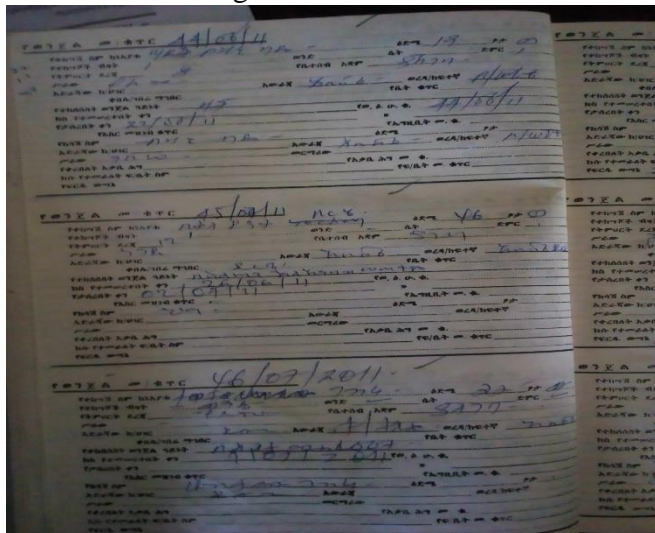


Figure a. 4 criminal record

PART 2

Sample snip shots of the system

Enter Property Information:- Please enter the Property information.

Type

Brand

Model

Serial Number

How Many

Enter Incident Information:- Please enter the information required.

Incident town

Incident Date

Incident Start Time

Incident End Time

Enter Narrative:- Please enter a detailed description of the incident.

Narrative

Figure a. 5 Property crime form

Note: Filing a false Police Report is a crime: giving false information intentionally is a punishable act.

Enter Missing Person Information:- Please enter all the information that applies.

First Name

Middle Name

Last Name

Gender Male Female

Age

Incident Town

Missing On Date

Missing On Time

Occupation

Height

Image of Missing Person No file chosen

Enter Narrative:- Please enter a detailed description of the incident.

Narrative

Figure a. 6 Missing person reporting form

Register

First Name

Middle Name

Last Name

E-Mail Address

Phone Number

Password

Confirm Password

Town

Woreda

Kebele

Gender Male Female

Birth Date

Work

Figure a. 7 User registration form