Complaint Management System to Sri Lanka Police

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Complaint Management System to Sri Lanka Police

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ABSTRACT

In this project, an attempt is made to build a web-based offence complaints management system for Sri Lanka Polices and it will be used for managing offence complaints handling process in each police station. This system will simplify the complaints management process to all parties who are involved with that. Any citizen can place a complaint or provide any piece of valuable information to any particular police station by revealing or hiding their identity at their own preference. In this proposed system, the complainer can avoid all the time wasting and troubles involved in regular manual process. Not only that, Sri Lanka Police can also simplify the complaints handling process while achieving high level of efficiency and effectiveness level by using ICT. Hence, police officers also can enjoy a happy working life since this system can reduce redundant routing tasks in the manual process.

Any citizen can make complaints to SLP on any matter and trace the progress of the made complaint by using a system generated reference number. Moreover, to encourage citizens to engage with SLP in friendly and proper effective manner, the facility for revealing or hiding the identity of complainer at their own preference is available in the system. Likewise, registered police officers also can add complaints which are directly reported to police station, in regular manner. All complaints received from citizen and police officers to the stations, are added to a shared database which can be accessed by all the police stations attached to Sri Lanka Police. Most importantly, this system allows users to trace their complaint and all related parties of the complaint will get allowed updates about the status of the complaint by SMS. Depending on the given user privileges, users can manage user profiles, police station profiles, search for details and generate reports.

This web-based complaint management system will lead Sri Lanka Police to function smoothly and reduce much of routine work load. As a result, the quality of the service and the transparency of the Department of Police will be maintained at the level of citizens' satisfactory

CodeIgniter framework (MVC architecture) was used to build the solution (PHP, CSS, Java Script, Bootstrap). NetBeans 6.1 as the IDE, Navicat for MySQL for handling the Database and Xampp 3.2.2 as server solution were used in the solution.

DECLARATION

The thesis is my original work and has not been submitted previously for a degree at this or any other university/institute.

To the best of my knowledge, it does not contain any material published or written by another person, except as acknowledged in the text.

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This is to certify that this thesis is based on the work of ~~Mr.~~ / Ms. H.A.P. Anusha under my supervision. The thesis has been prepared according to the format stipulated and is of acceptable standard.

Certified by:

Supervisor Name: Dr. H.A. Calder

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Signature: Date:

ACKNOWLEDGEMENT

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Abbreviation	Definition
CMS	Complaints Management System
ERD	Entity Relationship Diagram
IGP	Inspector General of Police
MVC	Model View Control
OCMS	Offence Complaint Management System
PCMS	Public Complaints Management System
SL	Sri Lanka
SLP	Sri Lanka Police

1. INTRODUCTION

1.1. Overview

A web-based solution to handle offence complaints from general public to the Sri Lanka Police will be developed and implemented by this project.

The police force is responsible for enforcing criminal-and traffic law, enhancing public safety, maintaining order and keeping the peace throughout Sri Lanka. There are more than 2000 police stations around the county. But all the police stations attached to the Sri Lanka Police and its head-quarter handle all the offence complaints manually which leads to many mistakes and delays in actions. Currently there is no any adequate online application in Sri Lanka Police to handle complaints and valuable information which are received from general public. Moreover, there is no any proper mechanism to do accurate and useful analysis on data which is gathered in bulk every day, yet.

Currently, the Department of Police has a website which provides General details of SLP, News updates and a way of placing any complaints to the Inspector General of Police (IGP) via the form of "TELLIGP" [1]. To place a complaint and to see the status of the complaint facilities have been provided there. But they do not have such system to efficiently handle offence complaints which can be processed and analyzed as the solution I have implemented in this project. "TELLIGP" only allows citizens to place and trace complaints. It doesn't provide facilities for placing a complaint to a selected police station by citizen, assigning police officers to handle each case and keep record updating on it, acknowledging relevant parties with allowed information, generate regular reports on existing data, analyze data to make more useful information.

In current system the complainer/ informer must physically be at the police station or call them directly. Even with "TELLIGP" facility, it doesn't allow anyone to contact particular police station as they want. It wastes lots of time and effort of the busy public individual who is going to involved with the said things.

Not only that even though a complaint is made, or information is given by a general public to police station which operate manually with lots of paper movements from one place to another, tracing on a particular complaint or information is so difficult. That also one of the unsatisfactory factors to general public when dealing with SLP.

Hence, if there is a proper online system by which the general public can place complaints or provide information to the particular police station or headquarters, whole society will be benefitted by the efficient and effective service of Sri Lanka Police.

This kind of application will encourage general public to support for enforcing the law and order in country in the level where everyone is safe and happy.

1.2. Motivation

When I got to know that there is no any computer-based system to handle complaints in police station, I felt that it is one of the best projects I can do as my master program project. The main reason for selecting that was the very diversified scope which can be covered depending on the level of skills I have now and even in the future I can do further expansion of this, based on the skills I can possess in varies technology areas, such as Image Processing, Artificial Intelligence etc., to make this application a remarkable one. Finally, I decided to develop an application to handle offence complaints for Sri Lanka Police as my master program project, with a limited scope which can be covered within the given period with available resources.

1.3. Objectives

This application is built to help the Sri Lanka Police to enforce law and order properly by the support of ICT. Objectives of the project in detail are as below.

- Simplifying the offence complaints handling process taken place in police stations.

- Effectively and efficiently handle the information coming from general public to the police stations to enforce the law and order in the country.

- Increase the transparency and citizen friendliness of Sri Lanka Police.

- Improve the quality of service by delivering the citizen-oriented service with the support of ICT.

- Reducing manual and redundant records keeping.

- Providing varies analysis on offences/ information and processing status of complaints received to the Department of Police.

- Getting the support of general public by encouraging them to support the activities of Sri Lanka Police to make Sri Lanka a peaceful and a better country.

- Maintain and disseminate data and information accurately throughout SLP.

1.4. Scope of the Project

Scope of the project is what will be covered out of whole. It can be 100% or, most of the times, less than that of whole processes. In this project I also cover only a portion of the whole process. Scope of the project will be discussed in details in Background and Methodology chapters. Scope of the project is listed below.

1. Login facility for police officers.
2. Police officer registration and granting user control level.
3. Manage police officer profile.
4. Adding complaints online to particular police station by a citizen.
5. Adding complaints by police officer reported to their station.
6. Managing Police station profile.
7. Viewing the status of the complaint by using a reference number.
8. Search facility on complaints, citizen and police officer details.
9. Sending notifications as a SMS to involved parties of the complaint.
10. Sending daily summary to OIC and allow him to comment on each case separately and show it as an update in complaint history.
11. Dashboard to show the latest of complaints and statistics of complaints.
12. Generate reports for daily, monthly, yearly and selected date range to get details of reported complaints in police station vise and overall.

SLP collects huge amount of biometric and non-biometric information regarding criminals such as figure prints, photos of different angles, family back grounds. They are not discussed in this scope. More over SLP has payment procedures for few of their daily activities such as fine settlement, payment for re-issuing the copy of complaints. Payment handling regarding the offence are not included in this solution.

1.5. Assumptions

There are few basic assumptions which have been set over the solution. They are;

- Every police station has the basic infrastructure for accessing Internet.

- Every individual who are involved with handling public complaints from lower level to the top has been registered to the system.

1.6. List of Deliverables

As the final output followings will be delivered by the solution.

- Functional web application to handle offence complaints to the Sri Lanka Police (24 hours a day, 7 days a week)
- User Manual

1.7. Structure of the Dissertation

Chapter 2 will cover the background of the solution system. It will explain how the existing system and the proposed system is analyzed. The requirement of the system will be explained and depicted by diagrams.

Chapter 3 will be focus on the Methodology. The design of the system will be explained here. For that, database table structures, different diagrams which explained system in different view ports will be discussed in this chapter.

Evaluation of the system will be discussed in chapter 4 and testing process and some selected test cases will be presented.

Final chapter will summarize the result results of the project. Future improvements to the application also will be explained.

References in IEEE format and Appendices are included in the end.

2. BACKGROUND

2.1. Introduction

Department of Police is one of the statutory bodies by which the law and order is stablished and maintained in a country. Sri Lanka Police performs lots of routing and non-routing activities to achieve it in Sri Lanka to the expected level of government and citizens. For that, it is a must to maintaining a good relationship with citizen and make them comfortable when they are involved with Sri Lanka Police. But the current, regular manual system which Sri Lanka Police uses for handling complaints is not rich enough to do it. Hence with the support of ICT they can implement a web-based online system as I have proposed here to achieve their objectives to the fullest level.

2.2. Analysis of the current system

Sri Lanka Police does not use any computer-based system to handle offence complains at police station yet, except the facility they have given to citizen to place a complain to the Department of Police through "TELLIGP" on their website. But "TELLIGP" doesn't allow public to place complaints to a selected police station online.

When any police station of SLP received a complaint in regular way where complainer physically visits the police station to place the complaint, police officers use paper and pencil to record the complaint. There is no any computer-based system which can be used to make the tasks much easier. It wastes lots of time and effort of all the parties involved to the case from initial stage to the end. Tracing a placed complaint is also takes considerable amount of time since all the necessary details cannot find at once in a one place. This makes the situation much worst when the complaint is getting older. Not only that they have no way of generating required reports easily, quickly and accurately from data which they have already possessed. All the manual steps have to be performed when generating reports by employing much effort and time on it. Hence much of useful facts, which can be very useful to have, have been missed due to not having a computer-based system where those facilities are available.

When a complaint received to the police station, any police officer available in that time record it in their complaint register in detail as the initial step. Then depending on the

the gravity of the complaint (case) they place it to deferent stages to be solved. If it is a minor case, they are handed over to "samatha mandala" or the "court" directly.

2.3. Analysis of the proposed system

This application is trying to simplify and manage the offence complaints handling process of Sri Lanka Police. It makes citizens feel more comfortable when they work with SLP. Not only that, it will encourage citizens to support to maintain the law and order in the country. This system allows SLP to maintain the transparency of activities they perform with complaints handling as well.

This project's main objective is to simplify the offence complaints handling process taken place in police stations by handling complaints effectively and efficiently to enforce the law and order in the country at standard level. Not only that, this system allows SLP to generate very useful reports which are quite difficult or impossible to generate in manual system. Moreover, the transparency can be achieved in handling complaints activities is one of the tremendous benefits SLP can gain through this proposed system. Finally, SLP can maintain a good friendly relationship with citizens and citizens will be encouraged to engage with activities in much better way with SLP. The proposed solution gives user friendly interaction through interfaces to make users' task much easier. Not only that the system allows or restricts the operation depending on the user privilege level the user has been granted. It secures data in the system.

2.3.1. Requirement gathering

Requirement gathering is one of the very important and critical tasks, because the successfulness of the project completely depends on the properness and accuracy of requirement gathering process. In this project, several types of requirement gathering techniques were used.

To gather details, I contacted few police officers in Gandara police station and they allowed me to refer few of their documents which were available there. Complaint registry, receipt issues on payment were few of them.

To get more understanding of operations in a police station, I referred to a Woman Police Constable (WPC) who have been working for more than 30 years in different

polices station island wide with wider range of experience. Moreover, I referred the website of Sri Lanka Police and most of articles related to SLP.

2.3.1.1. Use case Diagram

The diagram depicts the core functionalities of the system with corresponding users. It helps to identify goals of each user. Diagram in Figure:1 depicts the overall high-level Use-Case of the proposed system
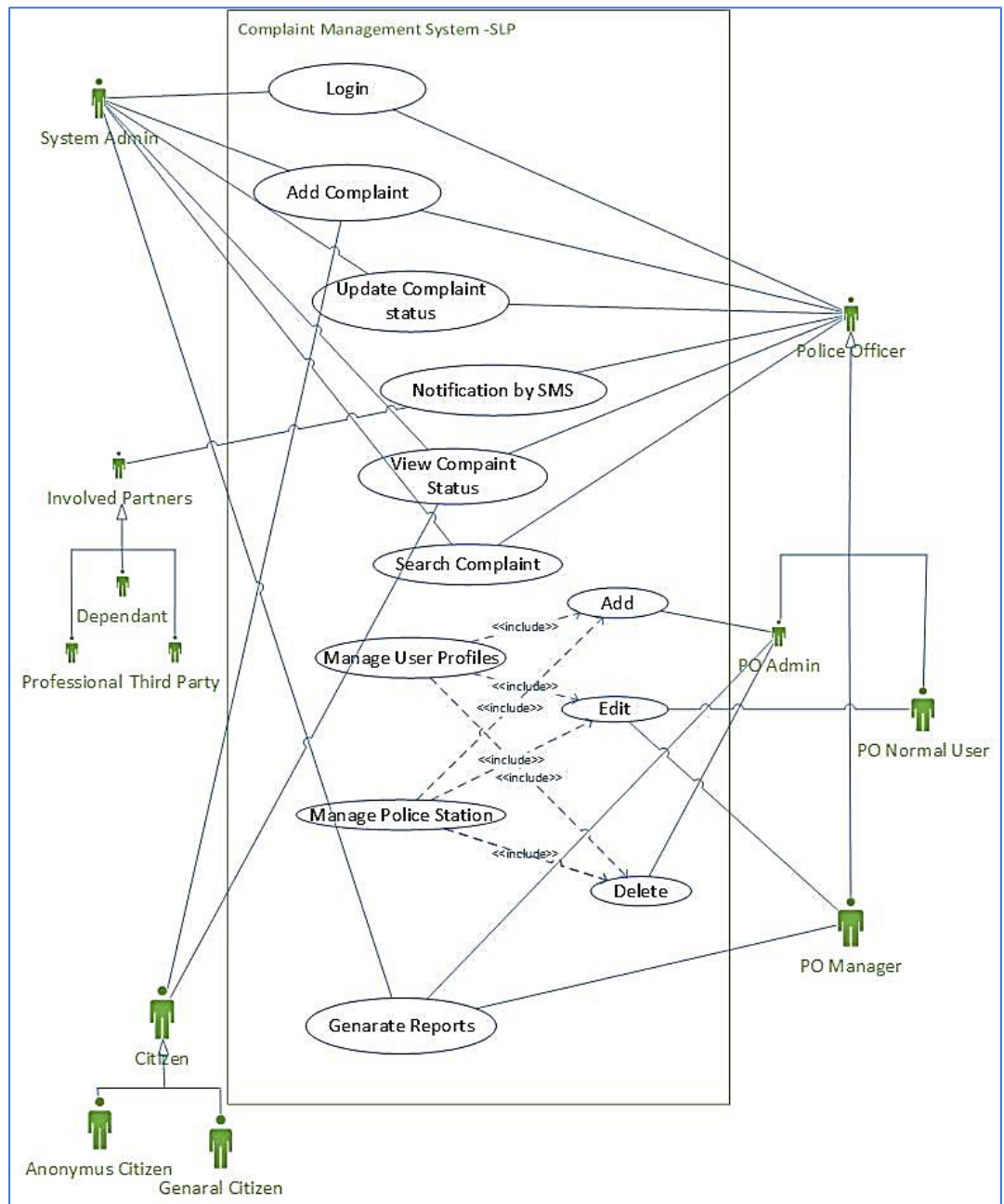

Figure 1: high level Use-Case of the proposed system

2.3.1.2. Modularized use case diagrams

Modularized use case diagram of the proposed solution is depicted below.
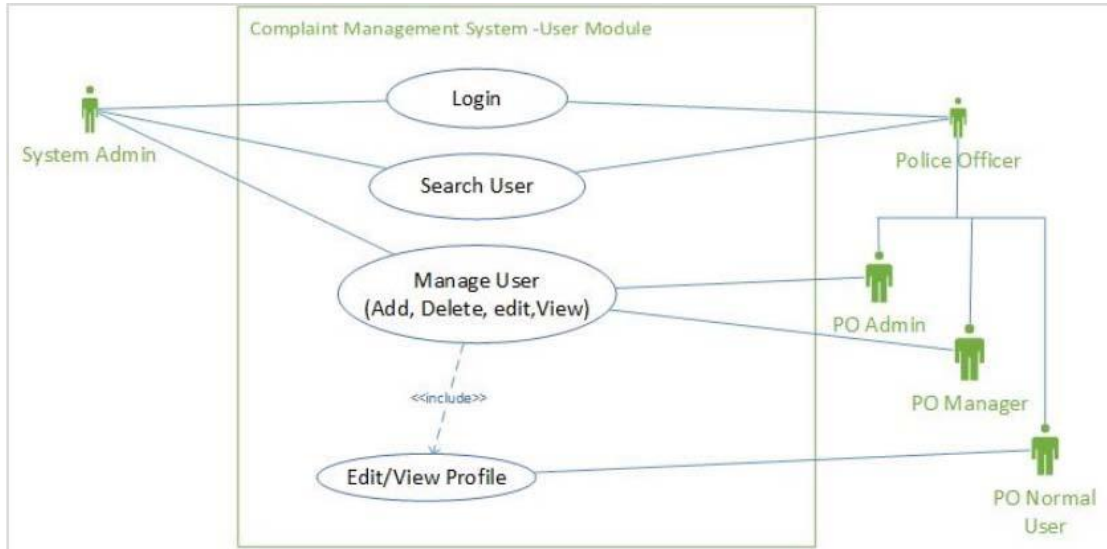
User Module:

Figure 2: User Module of Modularized use case diagram
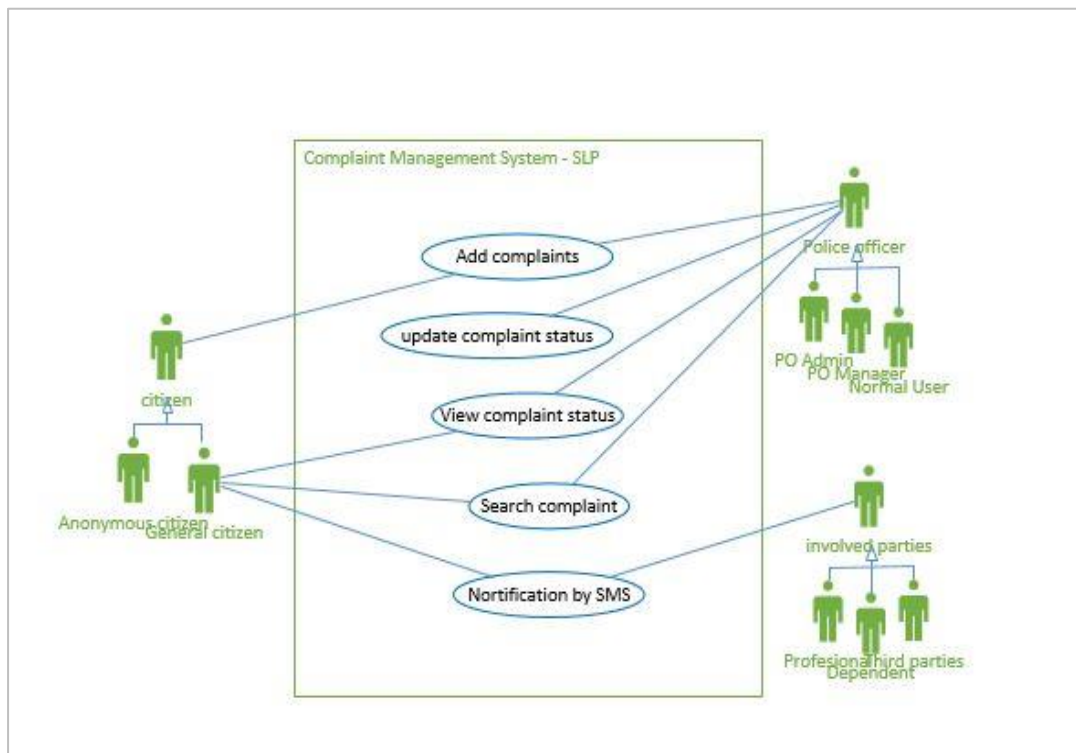
Complaint Module:

Figure 3: Complaint Module of Modularized use case diagram
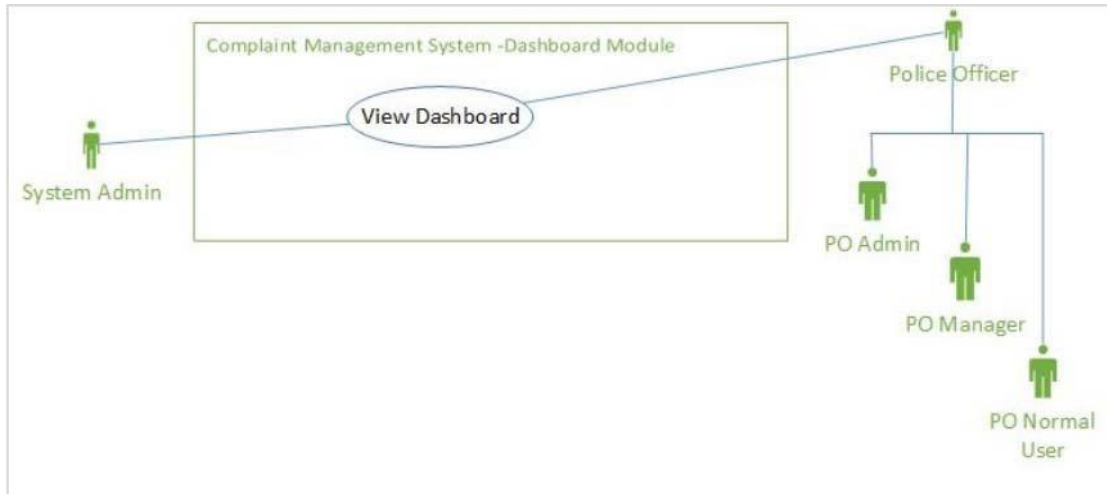
Dashboard Module:

Figure 4: Dashboard Module of Modularized use case diagram
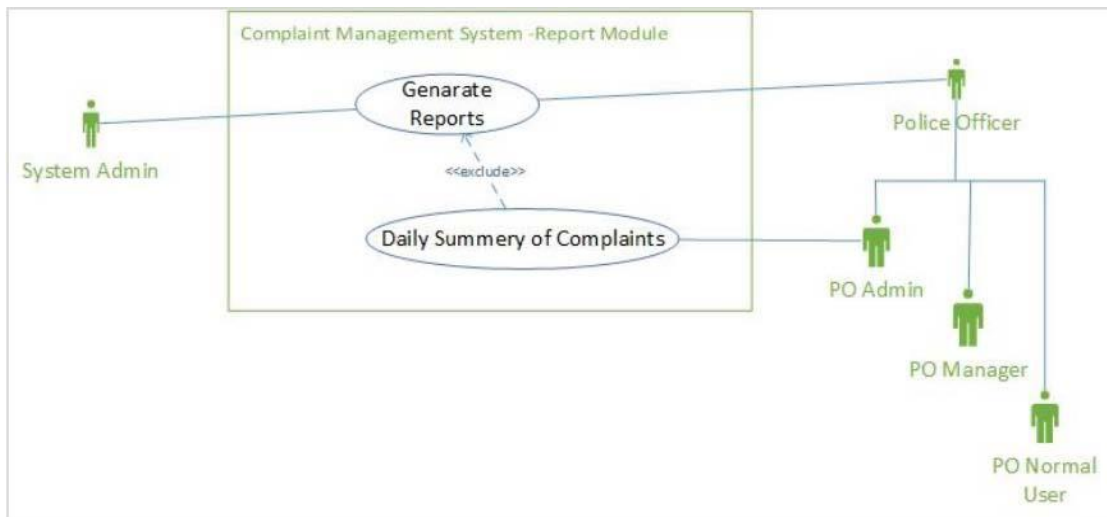
Report Module:

Figure 5: Report Module of Modularized use case diagram
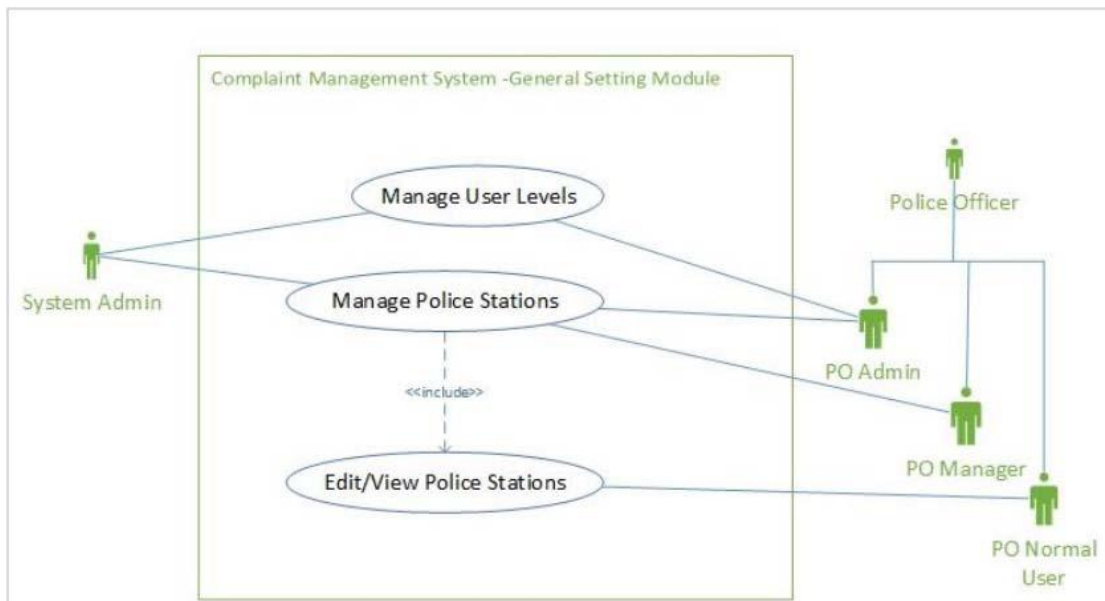
General Setting Module:

Figure 6: General setting Module of Modularized use case diagram

2.4.Functional and Non-Functional requirements

Basic behavior of the system will be explained here as functional and non-functional requirement of the system.

2.4.1. Functional requirement

What the solution system does or must not do will be defined here.

- **Log into the system:**

Only police officers need to give "user name" and "password" to log into the system.

✓ An interface to select whether the user is a citizen or a police officer, must be available at very beginning of the system.

✓ Then, if the user is a Police officer, he/she must be able to log into the system by using the given User Name and Password which are provided by the System Administrator.

   o Initially, a default password will be given to users.

   o The Password must be changed at very first login to the system.

End of the logging in process, police officers must be prompted to the dashboard depending on their user privilege level.

✓ If the user is a citizen, then, they must be able to select whether they like to reveal their personal details or not when they place the complaint (Non-Anonymous or Anonymous). End this process, the citizen must be prompted 14 relevant form for adding complaint(s) and the form for tracing the status of the complaint based on the preference they had given.

- **Making complaints:**
  ✓ Any citizen who like to reveal their identity must be directed to the "Add complaint" interface and must collect very basic personal details and details related to the complaint, properly.

  ✓ Any citizen who DO NOT like to reveal their identity (Anonymous citizen) also must be directed to the "Add complaint" interface but only the details related to the complaint must be collected there.

  ✓ Police officers who logged in to the system using username and password, must be directed to the Dashboard of the system with allowed functionalities. They must be able to select "Add complaint" interface from the dashboard and the police officer must be able to add complaints to the system if any complaint(s) is/are reported to their police station. Not like as citizen, Police officers must be able to add details like Name, Profession and Contact details of any professionals assigned to the case such as Lawyers, Medical officers to the complaint/ offence. Moreover, details of defendant and any third parties also must be added to the system, if needed.

- **Viewing the status of complaint**
  ✓ When a complaint is placed by a citizen, the Status of Complaint must be able to see by using the reference number and NIC number of that particular citizen.

- ✓ Police officer of particular police station, must be able to view the Status of Complaint by using the reference number of the complaint, after he/she has logged in to the system.

- **Managing Police Station profile**
  - ✓ Only Manager level Police officers and System Administrator(s) can Add/ Update/ Delete Police station. Enough details, ranging from Name to the Google Map location, must be recorded to each Police station. Normal User level Police officer must be able to only see the details of police stations.

  - ✓ Citizen also must be able to view the general details of police stations.

- **Add/ Delete Police Officer**
  - ✓ Only Admin level Police officers and Administrator can Add and Delete Police officers to the system. Enough details, ranging from officer number to the profile image, must be able to record to each police officer.

- **Managing Police Officer profile**
  - ✓ All police officers must allow to view details of police officers in their respective station while allowing individuals to update with allowed personal facts by themselves.

- **Forwarding the complaints summary of the day (24 hours) to OIC of particular police station for his/her perusal.**
  - ✓ Daily summary of all complaints reported to a particular police station must be forwarded to the OIC (Manager Level user) of that Police station for his/her perusal. The OIC must be able to comment on each complaint or just mark as "Noted" and it must be shown in history of particular complaint.

- **Searching Facility**
  - ✓ Searching facility must be available by key fields on each interface to speed up the task.

- **Email notification**
  - ✓ To police officers: to inform the User name and the Password
    - o Registered police officers of the system will get their individual account's details from the system administrator via a personalized email address immediately after they registered.
  - ✓ To citizen: to acknowledge the status of the complaint:
    - o Email notification will be sent to the complainer immediately after he/she place a complain to inform the "Reference Number" of the complaint.
    - o A personalized email notification will be sent to the complainer to acknowledge the latest status of the complaint.

- **Generating Reports**
  - ✓ Manager level and Administrator level police officers must be able to generate different kinds of reports provided in the system.

2.4.2. Non-Functionality requirement

Non-functional requirements are the requirements which are not directly affected with the exact basic functions delivered by the system. But, failing to meet non- functional system requirements may make the whole system unusable or less quality product. Nonfunctional requirements are relevant with quality attributes, quality of service requirements and non-behavioral requirements. The non-functional requirements of the system are listed below.

- The system should provide a user-friendly environment including flexible interfaces,
- Person who has average computer skills can work with the system with a short period of training.
- The system should be accurate and consistent, when manipulating the fed data in proper way and displaying correct information,
- The system should keep up security and reliability, because the system handles important data related to business processes of the company.

- Occasionally backups should be taken to maintain reliability and necessary security measures.

2.5. Roles in the proposed system

- Administrator and Police Officer (Admin Level) have access to everything in the system.

- **Citizen_General** (Non-Anonymous citizen) must be able to;
  - ✓ Place a complaint to a particular police station while providing personal facts of him/her.
  - ✓ View the status which are updated by particular police station on his/her complaint
  - ✓ give feedback on that complaint.
  - ✓ View all police station's profile

- **Citizen_Anonymous** must be able to;
  - ✓ Place a complaint to a particular police station without providing personal facts of him/her.
  - ✓ View all police station's profile

- **OIC (Administrator Level)** must be able to;
  - ✓ Place a complain
  - ✓ Update/ View status of complaints
  - ✓ View/Edit their own user profile with allowed settings
  - ✓ View/ Edit their own police station's profile
  - ✓ View all police station's profile
  - ✓ Search information
  - ✓ Generate allowed reports

- **Police Officer (Manager Level)** must be able to;
  - ✓ Place a complain
  - ✓ Update/ View status of complaints
  - ✓ View/Edit their own user profile with allowed settings
  - ✓ View/ Edit their own police station's profile
  - ✓ View all police station's profile
  - ✓ Search information
  - ✓ Generate allowed reports

- **Police Officer (Normal user Level)** must be able to;
  - ✓ Place a complain
  - ✓ Update/ View status of complaints
  - ✓ View/Edit their own user profile with allowed settings
  - ✓ Search information
  - ✓ Generate allowed reports

2.5.1. Review of similar systems

"TELLIGP" :

"TELLIGP" [1] is one of the few similar systems where the facility to place a complaint to SLP by citizen is provided and along with that the complainer can see the status of it as well. But no citizen can place a complaint to any selected police station there. It just gathers all complaints, if any, to one common place. Not only that, it doesn't allow any anonymous to place a complaint or provide any valuable piece of information. Forcing the complainer to reveal his/ her personal details will discourage all the complaints which can be benefited by the society. But the data they have collected and the design layout they have used were useful when I was designing my application.

url: http://www.telligp.police.lk/index.php?option=com_complaint&view=complaint

PCMS of National Police Commission:

National Police Commission [2] also maintaining a public complaint management system [3] to investigate allegations of bribery or corruption of Sri Lanka, which is a fully government own institution. The National Police Commission's Public Complaint Management System was launched by the National Police Commission (NPC) very recently. It allows the public to submit complaints via a web-based interface, streamline public complaints investigation process and strengthen monitoring process and data analysis & reporting capacities of the NPC. It provides such strong interface for collecting data from the complainer. Reference number of the complaint allows user to trace it later. But still it looks like a complex, as data gathering objects are arranged horizontally rather than vertically which is users are more comfortable with. Some of the data gathering ideas were captured by referring to this.

url: http://www.npc.gov.lk/public-complaints/

Few of top Customer complaint Management systems in 2020:

I explored the trial versions and the Demos [5] of few of top Customer Complaint Management Systems in 2020. Even though, none of them are not kind of complaint management system related to police station, the functionality they provide there and their application design were really worth to have a look. Lots of ideas were gathered during this exploration and it was really helpful to my application.

3. METHODOLOGY

3.1. Introduction

In this chapter, the design of the system will be discussed. After analyzing the requirement gathered, the interfaces, layouts and database were designed for the system. Class diagram, ER diagram, Sequence diagram, Key interfaces and few of code segments will be included here.

3.2. Design Approach

The system was designed by using Object Oriented Analysis and Designing (OOAD) approach [9]. Collected user requirements were converted into system models by using OOAD tool. Functional requirements as well as non-functional requirements were modeled. Different views of the system were designed depending on the different access rights.

3.2.1. System Modularization

OOAD concepts were used to divide the system in to 05 main modules and its sub modules as given in the table below. Other than that user groups were designed. Each user group had different privileges. User groups are administrator, OIC, Citizen, Police Officer (Manger Level), Police Officer (Normal User Level). Table 1 shows main modules of the system below.

Offence Complaints Management System main modules
User Module: Add/ Edit/ Delete/ View Users Manage user levels Login Search user
Complaint Module: Add/ Edit/ Delete/ View Complaint Add/ Edit/ Delete/ View Status of the complaint Search Complaint Email notification on status update
General settings: Manage Police stations profile Manage Police Officer profile Manage categories Search Facility
Dashboard: Different views for different user groups
Report: Generate Reports

Table 1: Main modules of the proposed system

3.2.2. Class diagram

The system is represented as set of classes. A class has three major sections. There are class name, attributes and methods. Class name is used to identify a class. Properties of a class are described by attributes. Behavior of a class is described by methods.
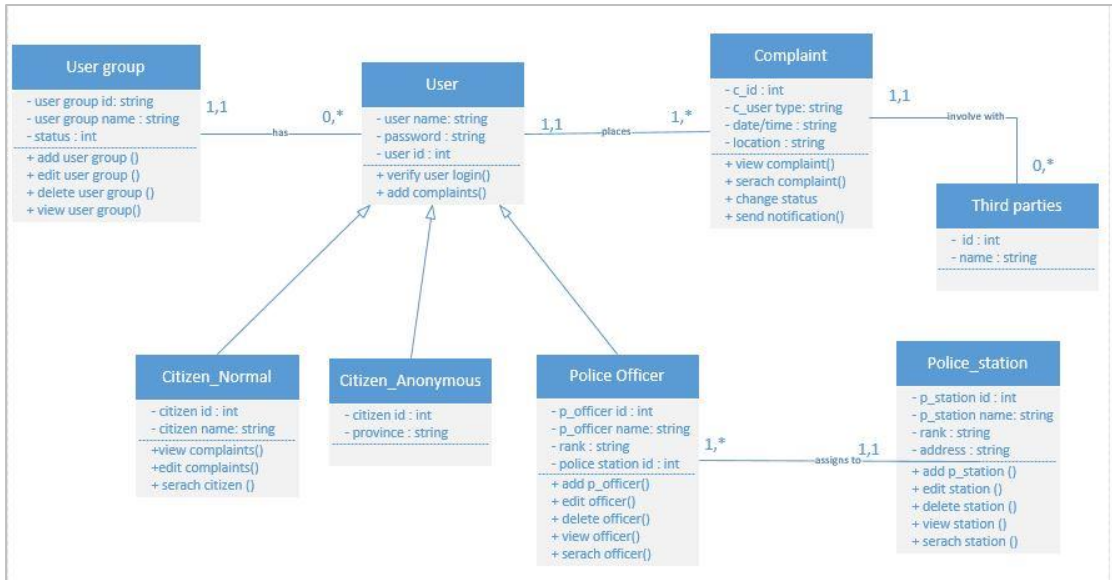
Figure 7: class diagram

3.2.3. Activity diagram

Functional approaches of the system are shown by activity diagram. Figure 8 shows the activity diagram of a complaint placement to the system.
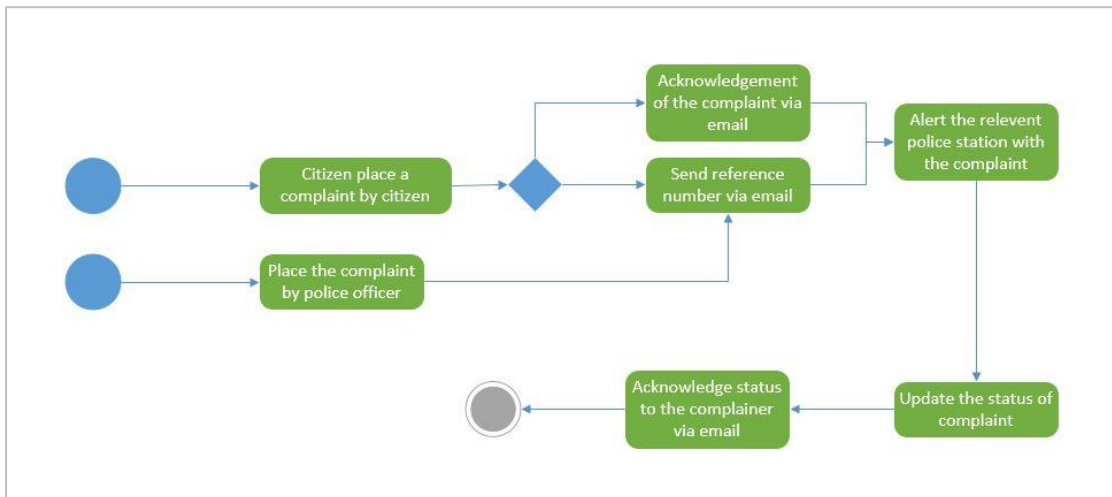

Figure 8: Activity diagram of complaint placement

3.2.4. Data design

Data design part reflects Database Management System of Application. Data model which is used in the system will be described here.

Relational database concept has been used to design database in the system. The database was modeled by using Entity Relationship (ER) diagram which represents the structure of the database. The ER diagram (full diagram) for the Offence Complaints Management System (OCMS) is shown in Appendix. Entities of the system and their attributes have been identified as shown here.
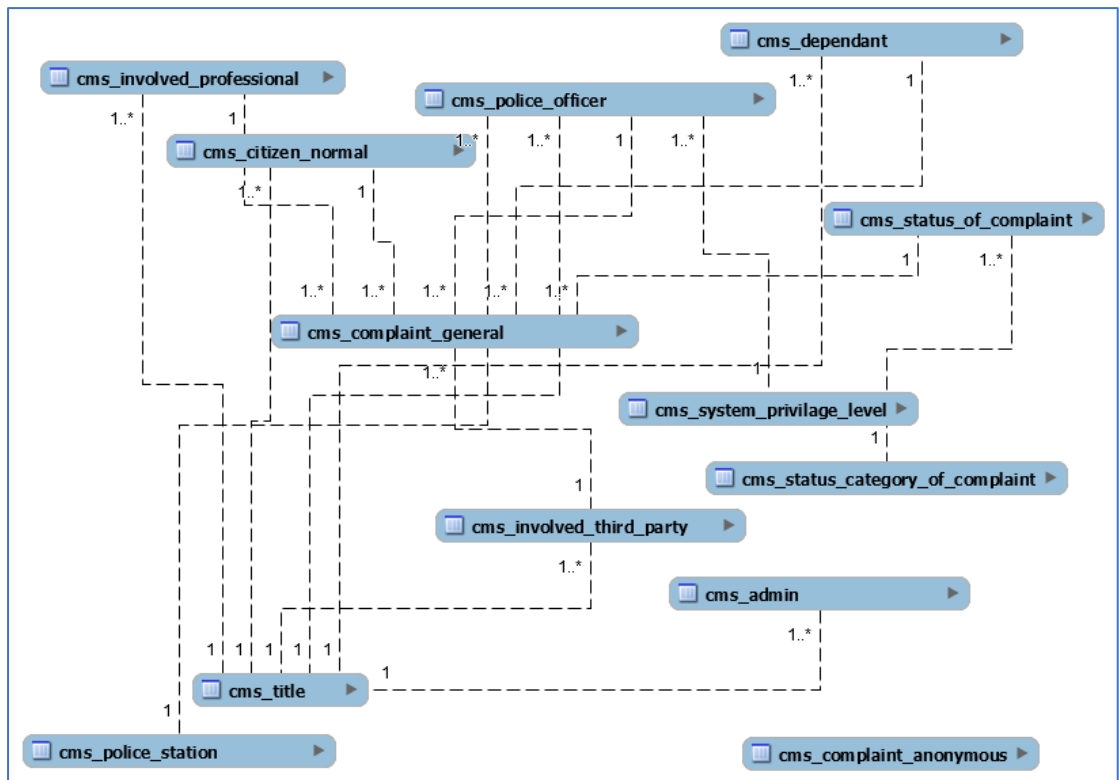
Figure 9: ER Diagram of SL-CMS

3.2.5. User Interfaces of SL-CMS

Interfaces of the system is designed to maintain the user friendliness. From the first loaded page to the reports generated through the system are well organized so that any user can easily navigate the system less or without any training.

Major user interfaces for each user group are briefly explained here.

✓ **Login Form:**

Login process needs several clicks to be performed to get into the system. figure 3 shows the very first interface any user come across in the system. Depending on the user type they can select either "As citizen" or "As Police Officer" in the login options here. Other than those two options, "View the status of complaint" option also available there to ease the usage of the application. That option will load the "Status of complaint" page directly.
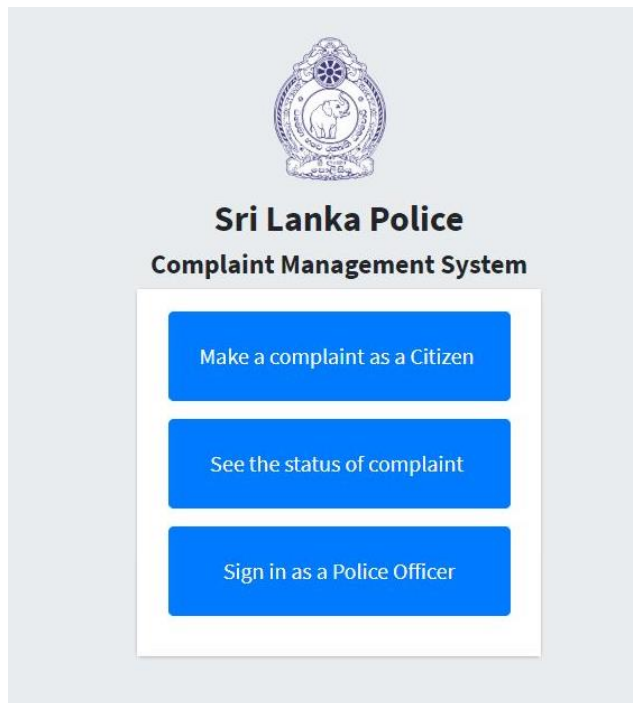
Figure 10: Index page of the system

If the user is a citizen, they are allowed to log into the system by using either "As You" or "As Anonymous" options (figure 4). "As You" option allows

citizens to get into the system as a normal user where users identity is revealed while placing the complaint whereas "As Anonymous" option allows to get into the system as Anonymous citizen where personal details are not collected. Citizen are not given username password for logging to the system. Based on the citizens' selection, relevant complaint interfaces will be prompted.
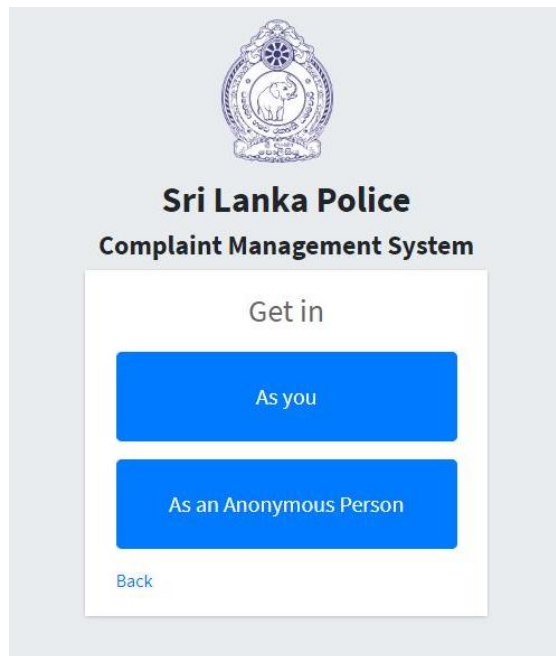
Figure 11: User preference selection interface

if the user is a police officer, they are prompt with the typical login form which needs username and the password to be log in to the system. The police officer login interface is shown in the figure 5 below
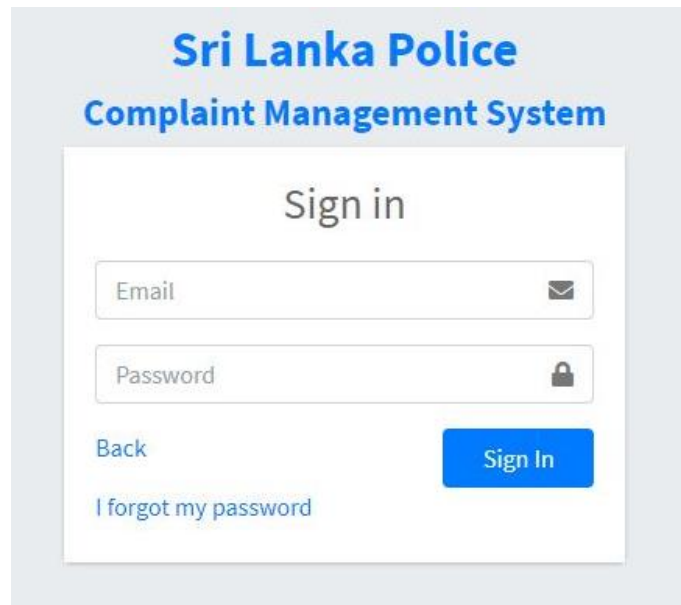
Figure 12: Police officer login interface

✓ **Citizen complaint interface:**

Except the personal details other details which related to complaints, are same in both interfaces for Anonymous and Non-Anonymous citizen. Add Complaint interface for normal citizen is given in below. Email notification will be sent to complainer's email address immediately, with reference number to trace updates of complaint.

Figure 13: Add complaint interface for citizen _Non-Anonymous
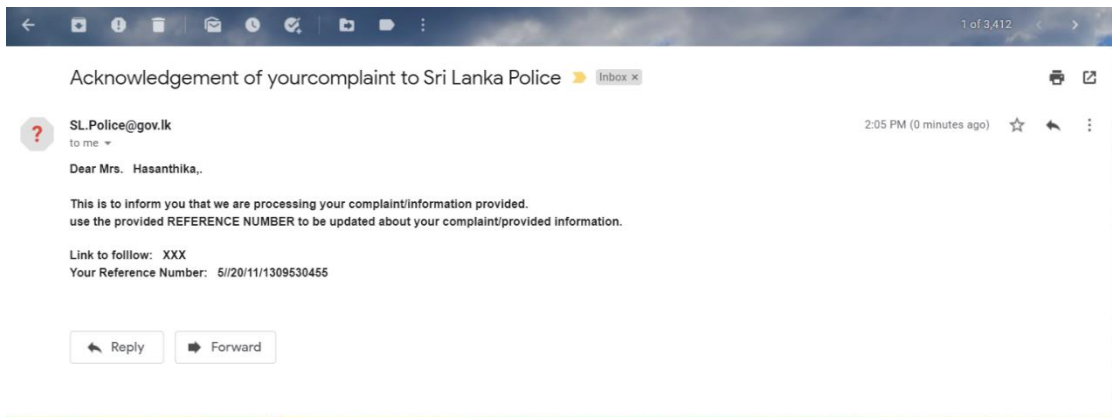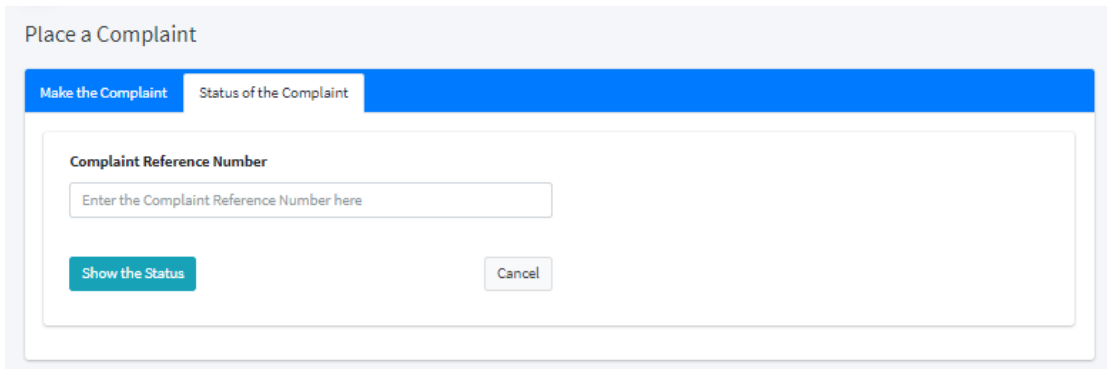
Figure 14: email notification with username and password to complainer

Figure 15: Add complaint interface for citizen _Anonymous

✓ **Viewing the status of complaint.**
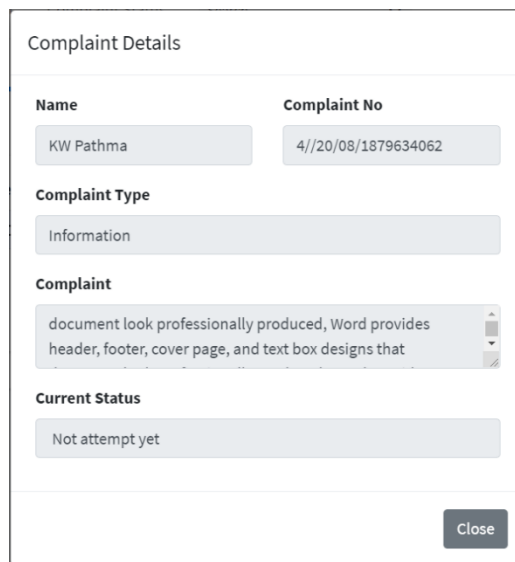
User can enter reference number to see the updates of complaint using this interface.

Figure 16: Status of complaint interface

This will load the status interface as a Ajax form as shown in the below.

Figure 17: Status viewing Ajax form

✓ **Dashboard for Police Officers:**

Dashboard provide the latest updates of the system and general statistics for user to get an overall understanding of updates of the system here at a glance. This dashboard makes users aware about the latest processing of the information with very less effort and time.
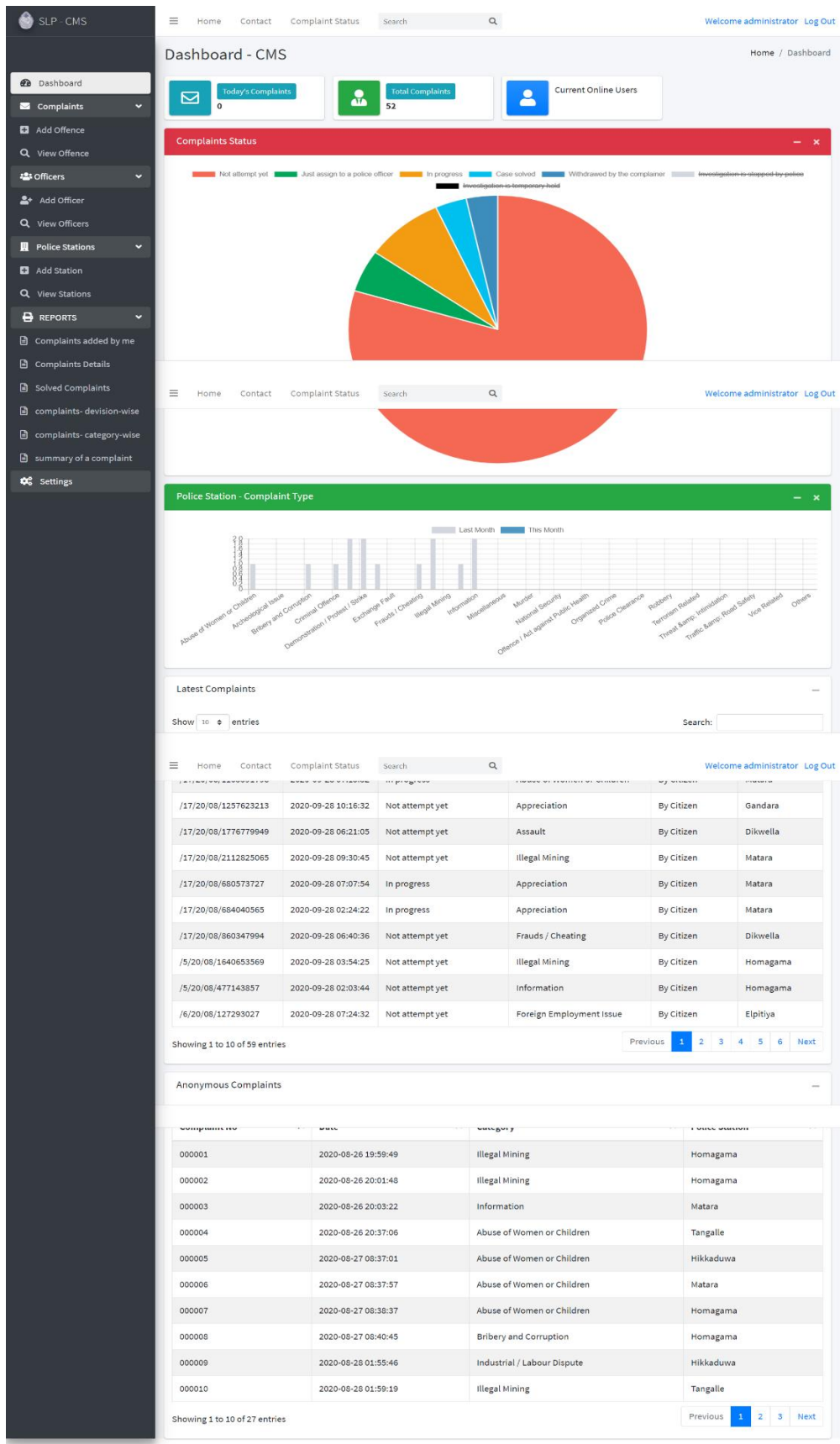
Figure 18: Dashboard for Administrator

✓ **Status update facility and Search facility provided in View complaints interface.**

The search facility provided to the complaint view interface is shown below.
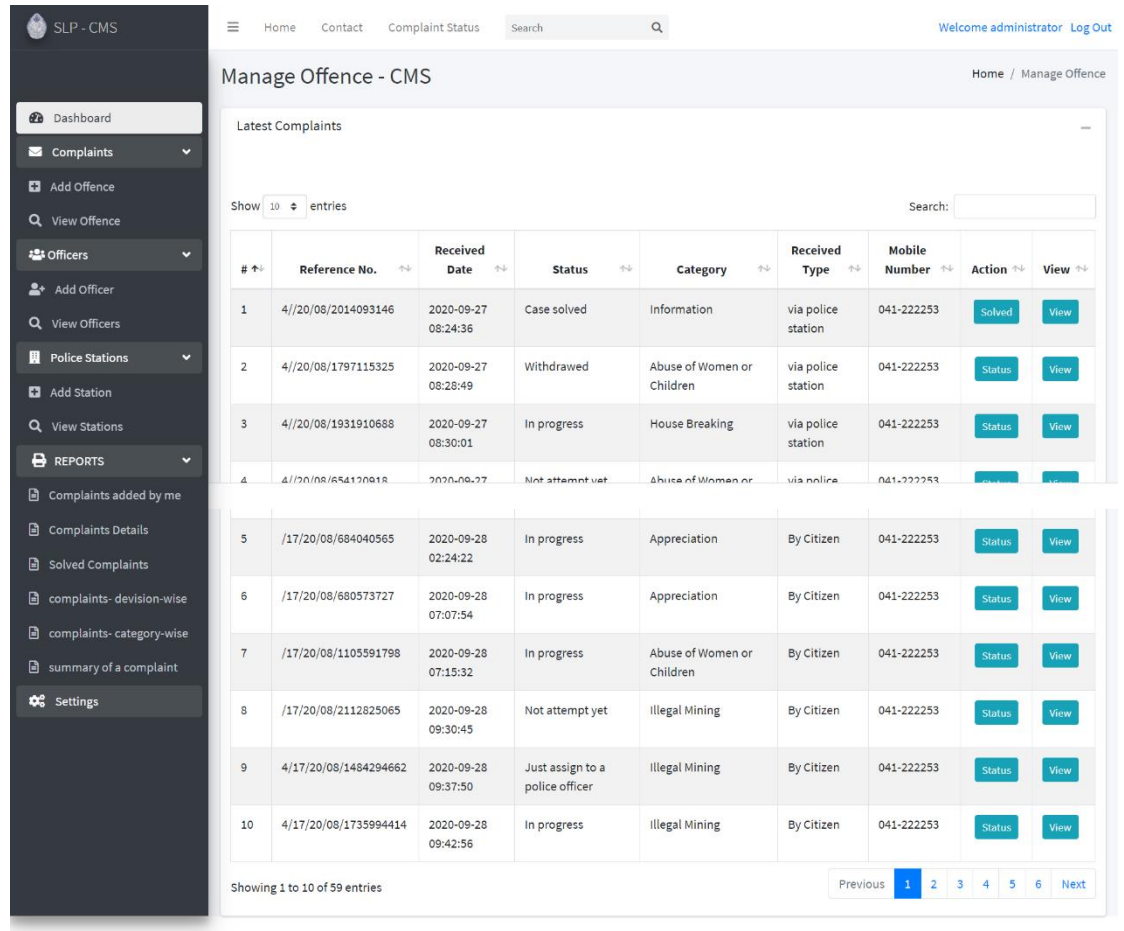
Figure 19:Manage offence interface with status update and search facility

✓ **Update complaint status**

" Complaint status change" interface allow system user to update the system with new information. "Status" link which is available in "Manage complaint" interface prompt the "Complaint status change" Ajax form. Email notification will be sent to the complainer with new updates.
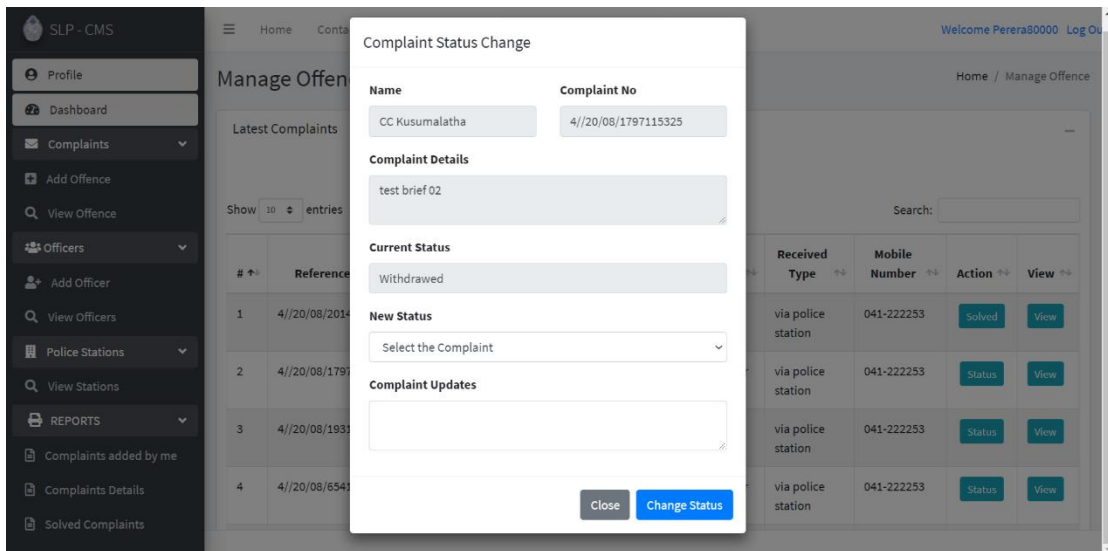
Figure 20: Complaint status change interface

✓ **View/ Edit profile**

User Profile view and to edit facilities are provided with this user interface. All the users can see their own profile but based on the user group it allowed users to edit details there.
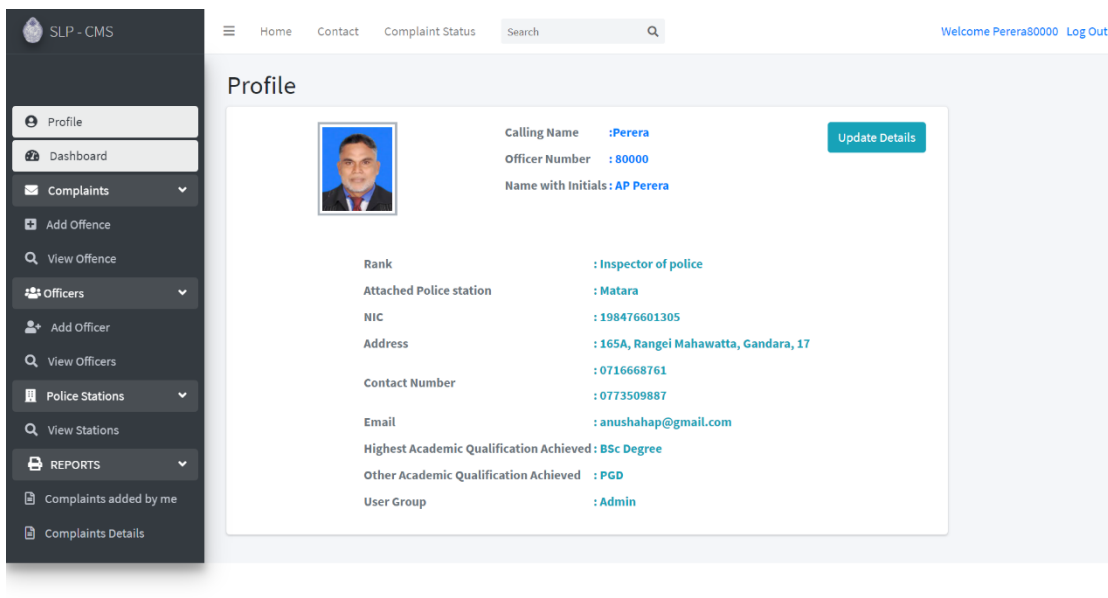
Figure 21: Profile of system users

✓ **Report generating facility**

Various types of reports can be generated based on the system data. Reports can be generated from the beginning or between any given date range. Different types of reports are allowed to generate based on the user group. Normal user group are allowed with limited types of reports.
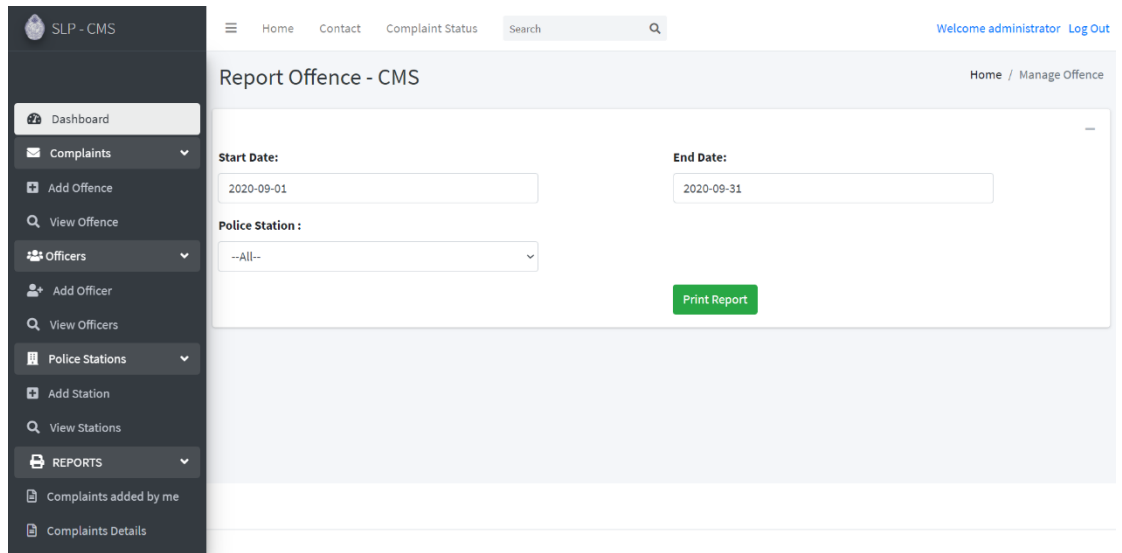
Figure 22: Offence details -police station wise

Figure 23: sample report generated by system

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3.3.Development technologies and Tools

Different technologies and tools were used to build the OCMS. Detail description of technologies and tools which were used for our system are as below.

- **Languages:**

  PHP: (PHP version 5.6.32)

  PHP, one of the most popular general-purpose server-side scripting languages which is especially used to web development, was used here.

  Java Script: -

  Forms validation was done by Java script in this application since java script is ideal form validating technology in web-based applications. Moreover, it can be embedded with web page easy and speedup the processing of web page by doing the validation at client-side. Finding Empty fields, matching password, checking email address format and etc. were done by java script.

- **Xammp 3.2.2: -**

  Free and open-source cross-platform web server solution was used.

- **CodeIgniter: -**

  CodeIgniter-3.0.6 was used here since it is one of the powerful and easy to use PHP frameworks. It provides simple and sufficient toolkit for creating a full-featured website.

- **Bootstrap: -**

  Bootstrap 4 version was used to build the front end of the solution. It is ideal for web based front end designing. AdminLTE-3.0.2 theme also applied here to ease the development activities of OCMS.

- **NetBeans: -**

  Netbeans-6.1 was used as the IDE for this system.

- **Navicat for MySQL:**

  Navicat for MySQL was used to ease the datbase handling activies here.

4. EVALUATION

4.1. Introduction

Critical evolution of the developed system will be done in this chapter. Verification and Validation of Interfaces and its functionality which were designed for the SLP-OCMS will be discussed. Moreover, quality factors of interface and some selected interface in the SLP-OCMS will be explained in this chapter. Lesson learnt of this development also will be described here.

4.2. Testing process

Content Testing:

By focusing on the content of the application, grammar, content alignment including graphical objects were checked. Appearance of the page layouts and color matching of visual objects also were checked.

Interface Testing:

All User interfaces were checked to verify whether the sufficient level of user friendliness is maintained.

Navigation Testing:

Links in the application were tested here. Founded errors in links were sorted.

Component Testing:

Individual components were tested and corrected many errors founded during component testing. Black box and white box testing techniques were used here.

Configuration Testing:

Configuration settings of this application were tested

4.2.1. Test Cases

OCMS was used by using test cases. Expected results and the actual results of the system were matched to verify the accuracy of the operation of the application. Manually test the Test cases and output has been recorded in tables below.

Test Case ID:01				
Test Case Name: User (Police officer) Login				
Test Case Description	**Input value**	**Expected results**	**Actual results**	**Pass/Fial**
User Login with valid username and password	User name: anusha Password: 123456	Load Dashboard	Loaded Dashboard	Pass
User Login with invalid username and password	User name: anu Password: 12345	view should not be changed. Delete password and focus it	view did not change. Deleted password and focused it.	Pass
User Login with valid username and invalid password	User name: anusha Password: 1234	view should not be changed. Delete password and focus it	view did not change. Deleted password and focused it.	Pass
User Login with invalid username and valid password	User name: anu Password: 123456	view should not be changed. Delete password and focus it	view did not change. Deleted password and focused it.	Pass

Table 2: Test case 01-User login

Test Case ID:02					
Test Case Name: Add User (Police officer)					
Field	**Test Case Description**	**Input value**	**Expected results**	**Actual results**	**Pass/Fial**
Officer Number	Empty "Officer Number"	<<nothing>>	Message: "Enter Officer number"	Message: "Enter Officer number"	Pass
	Text value as officer number	Abc	Message: "officer number must contain only digits"	Message: "officer number must contain only digits"	Pass
	Digits as officer number	Numbers less than 7	Move to the next field	Moved to the next field	Pass
	Existing Office number	<<existing value>>	Message: "Duplicate number"	Message: "Duplicate number"	Pass
Title	Unselected title	<<unselected title>>	Message: "select title"	Message: "select title"	Pass
Name with initials	Empty "Name with initials"	<<nothing>>	Message: "Enter Name with initials"	Message: "Enter Name with initials"	Pass
Calling name	Empty "calling name"	<<nothing>>	Message: "Enter calling Name"	Message: "Enter calling Name"	Pass
Rank	Empty "Rank"	<<nothing>>	Message: "select rank"	Message: "select rank"	Pass
Attached police station	Empty "police station"	<<nothing>>	Message: "police station"	Message: "police station"	Pass
Position in current station	Empty "Position in current station"	<<nothing>>	Message: "Enter Position in current station"	Message: "Enter Position in current station"	Pass
NIC	Empty "NIC"	<<nothing>>	Message: "Enter NIC"	Message: "Enter NIC"	Pass

	Text value as NIC	Abc	Message: "Enter 9 digits +one character or 10 digits "	Message: "Enter 9 digits +one character or 10 digits "	Pass
	9 digits +X or V	847661305V 847661305X	No error msg	No error msg	Pass
	9 digits +invalid letter	847661305B	Msg: "incorrect last letter"	Msg: "incorrect last letter"	Pass
	10 digits	198476601305	No error msg	No error msg	Pass
Contact number	Empty "contact number"	<<no value>>	Msg: "Enter Contact Number"	Msg: "Enter Contact Number"	Pass
Emil address	Empty "Email Address"	<<no value>>	Msg: "Enter Email Address"	Msg: "Enter Email Address"	Pass
Address	Empty "Address"	<<no value>>	Msg: "Enter Address"	Msg: "Enter Address"	Pass
Add profile picture	Optional				
System privilege level	Empty "System privilege level"	<<no value>>	Msg: "System privilege level"	Msg: "System privilege level"	Pass

Table 3: Test case 02-Add User

4.3. Implementation Considerations

The proposed Offence Complaints Management System for Sri Lanka Police is a web-based application which will be built on MVC pattern architecture. The project is expected to be implemented in Agile Software Life Cycle. This application is built with the support of CodeIgniter [6]and Bootstrap frameworks [7] [8]. Admin LTE theme also has been used here.

- **System requirements**

The proposed OCMS is installed in a server computer and its users can access by client computers. Server and client computers should be properly interconnected by using a computer network.

Server computer:
- ✓ Xeon 3.0 processor
- ✓ 16 GB RAM
- ✓ 01 TB free hard disk space
- ✓ Apache 2.0., MySQL 5.6, PHP 7.0 (or upper)
- ✓ Windows server 2008 or upper/ Ubuntu 18

Client computer:
- ✓ 1 GHz processor
- ✓ 2 GB RAM
- ✓ 10 GB free hard disk space
- ✓ Network Interface Card (NIC)
- ✓ Windows or Linux Operating system with any web browser

- **Other requirements**
  - ✓ Local Area Network (LAN)

5. CONCLUSION

5.1. Introduction

The main objectives of developing this Complaints Management System to SLP can be achieved with the developed application. Complaint handling process has been simplified here and many more searching facilities are available in almost all the interfaces which allows users to easily find details. Varies useful reports can be generated based on the collected details.

5.2. Future work

There is enormous amount of future works which can be added to the developed system in the future as further development, since the whole scope of SLP is very vast. Besides the obvious expansion opportunities, there are lots of creative things we can do with this system to polish this to a as a remarkable application. Few of those future developments are listed below.

- Gathered information by the SL-CMS can be analyzed to derive any existing patterns of offence taken place island wide with the support of data mining technology.

- By using the face recognitions technology, this application can be expanded to develop identifying culprits among others based on the previous records feed to the system.

- We can allow citizens also to maintain their profile here and filter out the best supportive citizen based on the contribution they have given to the society to maintain the law and order. Finally, we can employee a great rewarding mechanism to those unique persons to encourage others also to support SLP to maintain the country a better place.

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APPENDIX: ER Diagram