



ONLINE REGISTRATION SERVICE OF DIVISIONAL SECRETARIAT

**A dissertation submitted for the Degree of Master of
Information Technology**

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2020**



Online Registration Service of Divisional Secretariat

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2020

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

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under my supervision. The thesis has been prepared according to the format stipulated and is of an acceptable standard.

Certified by:

Supervisor Name: DR.G.D.S.P.Wimalaratne

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ABSTRACT

This project has designed to implement an online registration system for Divisional Secretariats. It has observed that the general public should go to their Divisional Secretariats to obtain certificates. This project is sure to help the general public to register for, their applications and get rid of difficulties. The public does no longer require the physical presence of Divisional Secretariats.

The public can now access the system at any time and anywhere, using the web browser, as web pages are visible. This online system has done adhering to the Rapid Application Development approach, which has well suited for this project. PHP has used to develop the system. The MySQL is the server for the database. Bootstrap provides the Mobile-First feature and the user-friendliness to the system.

The online registration system is easy to handle. The public has known, how to use the Internet, so they can register as a user, submit the request and track the status of their applications. This system manages the necessary information about the staff members, the public of the applications and the progress.

The administrator can monitor the entire process and the employees involved at the same time by keeping a tab or smart mobile phone with an internet connection at any time anywhere in the world. It will help the administrator to improve these processes and provide efficient service to the public. The Administrator has generated the report for the work and print it.

The login performance has used for the users (admin and public) with the opportunity to log in to an online registration system. The admin performance has created to enable the public with admin privileges to register the public. The mail server has once implemented for emailing the public their direction.

The evaluation has done with the public in the questionnaire to apprehend their opinions and get comments. The online registration system has used to be thoroughly examined and evaluated in phrases of functionality, protection and usability with the help of the public at the offices to make sure that it is a match for purpose.

It has agreed that the aspects and amenities supplied by way of the new system will play an essential role in enhancing the public planning, administration and convenience. When implementing this system, the following advantages reach the public; There will be no delay, lack of exploitation and abuse, no money wastage.

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LIST OF ABBREVIATIONS

PHP-Hypertext Preprocessor

MySQL-My Structured Query Language

ICT-Information Communication Technology

ERD-Entity Relationship Diagram

DBMS-Data Base Management System

HTML-Hypertext markup Language

CSS-Cascading Style Sheet

JS-Java Script

MIT-Master of Information Technology

ID-Identity

eGovernment-Electronic Government

IT- Information Technology

EU-Europe Union

IDB- Inter-American Development Bank

UNICEF- United Nations Children's Fund

PIN- Personal Identification Number

UNPSA- United Nations Public Service Awards

SMS-Short Message Service

MVC-Model View Controller

ADSL- Asymmetric digital subscriber line

Chapter 1: Introduction

1.1 Project Background

The person typically requests the Legal Documents to Birth, Death and Marriage in our democratic country. Official documents have prepared and made available to the informed public at the specific request of the local people.

They typically receive a monthly approximately fifty thousand applications to Divisional Secretariats. Two thousand five hundred applications have favourably received every day. Divisional Secretariat has appointed three qualified officers to handle.

The response to public requests has delayed due to the limited number of staff and time constraints, but they work in a chain structure. Applications have exacerbated by unexpected natural disasters such as floods and hurricanes.

An average of three hundred thousand people was affected by the natural disaster in 2017. They made claims to all the divisional secretariats. The requests had increased the number of applications available to Divisional Secretariats.

Documenting and gathering of documents only occurs when a specific need arises. Applications increase during this disaster. However, processing is a continuous process and shows the efforts of the employees. This system has designed to make the above activities efficient and effective using limited resources.

1.2 Aims and Objectives

The method now found is done by manual. This manual system is not able to process applications efficiently. However, records have handled efficiently even though no records or indicators have maintained as a source of processing.

The project has developed for the following aims (a) Increase efficiency when processing applications,(b) Improve documentation and storage functionality.

The system should have the following objectives to achieve these goals;

1. Process more applications than the current system on time.
2. To reduce the time of locating records and maintaining records related to the request processing.
3. Applications are being processed even under challenging circumstances. (Tsunami, Floods)
4. Employee practice has improved by reallocating more employees to provide one day service.
5. Supervision of all processing can be done anywhere and at any time.
6. Maintain necessary documents in the applications.
7. Improving communication and, coordination among employees.
8. Improving Satisfactory Relationships Between Public and Office Employees.

1.3 Scope

The public is welcome to get birth and death certificates at Divisional Secretariats in Sri Lanka. Increasing the number of jobs in the offices will not provide the best service. Scope of the project is to investigate and design a software solution which can facilitate.

This system is a web-based system. The public need not come directly to the Divisional Secretariats. It has used to improve the performance of employees, to perform daily tasks and to help them be more productive. The system has designed as an online web-based application, any digital devices such as a computer, mobile phone and tablet.

This system primarily has targeted to serve my local town, and then by more modification, it shall serve the whole country. This online registration system will get connected to the specific officer who will offer the information and or give a hand to receive their applications. It will help save time, quick response and attentive service. This system will replace the manual method.

This application has to build a user-friendly website, where the user will request any certificate which is available nearby or anywhere around the globe. Employees can easily save their services and time by using the online registration system.

The public can apply online, create distinct users based on their details and authenticate users at their login. User can know their application status through via online and email notification. They can send their applications from anywhere. All services are accessible when registering as users. Generate the reports. Monitor status through the dashboard. Staff can see all the requests coming to them.

1.4 Structure of the Dissertation

Chapter two presents literature evaluate comparable structures and technologies; consists of their benefits and disadvantages.

Chapter 3 consists of issues of the present system, practical and non-functional requirements, the strategies used to collect a use case layout of the use cases.

Chapter 4 provides a clear picture of the application architecture, database design, user interface design and security design structure.

Chapter 5 provides their details about implementations along with logical database design, user interface design and the system architecture.

Chapter 6 provides details and proves about testing and evaluation of the system; provides details with the testing framework and Quality.

Chapter 7 includes a brief introduction, achievement of the objectives, future enhancements and lesson learned.

Chapter 2: Background

2.1 Literature Review

Registration of legal documents relating to movable and immovable property and registration of titles in Sri Lanka, and registration of marriages, births and deaths, primary domestic events of the people; Protecting such documents and providing certified copies upon request and thereby assisting the public to protect their rights.

The Department of the Registrar General has established to record legal documents relating to the births, marriages and deaths and property of the people of Sri Lanka, to protect their fundamental rights. Civil registration activities have extended to the level of Divisional Secretariats and, accordingly, the District Registrar Division is functioning in all Divisional Secretariats. People of Sri Lanka obtain their birth, death and marriage certificates at the Divisional Secretariats. These types of certifications are essential when going to fulfil their needs in other public and private institutions. The public prefers these types of records as they have recognized in Sri Lankan law.

The Importance of Registration:

- Registration helps to provide an opportunity to identify the eligible person.
- Registration helps to reduce fraud and manipulation; Information technology has gone a long way to help with the dealing of fraudsters.
- Registration decreases the risk of criminal or terrorist activities.
- Registration reduces informal business activities.

In a hastily rising world of technological upward and innovations, the computer has grown to be a way of existence and a riding pressure of innovative enterprise and businesses. It has grown to be one of the most widespread for more extensive productive operations and correct results. Government firms preserve their presence on the web.

Web development can confirm its presence. It can range from the web page of classic text to the most sophisticated internet-centric applications, digital enterprises or social services. Government institutions and establishments make bigger their investment in web-technology and online systems. Web-based software has grown noticeably and has moved to emerge as a platform that can guide all aspects of managerial work.

The system is in place to organize and monitor the daily workflow of public requests in the Divisional Secretariat offices. The structure would handle the process with a little help from the staff [11]. The automated system is one of the businesses processes of Divisional Secretariats.

Many divisional secretariats in the country are planning how to meet the needs of the public during this period. They have designed the system to safeguard the public needs in the structure, securely register and automatically receive reports and expunge unnecessary records. The difference between these systems represents how the interface has created. The designer is thoughtful when designing the user interface. It should be user friendly.

2.2 Existing System

The current registration system works by the manual. The Manual means that the public has to go to the office directly and perform things with their hands without operating the computer.

The manual system relies on just filling out forms. After filling up, it has handed over to the concerned authorities. Officers register for services. Manual recording is said to run on non-technical devices, including paper, writing tools and a physical filing cabinet for processing.

A person who wants to know the details about any government documents or registration has to visit the government office. The person has to spend time in the office and has to visit different sections of the department which are a highly time-consuming process. There is no system by use of which a user can know the status of the applied documents. A person faces many problems during government-related work. This data has not shared among other departments.

2.3 Drawbacks of Current system

The following are the shortcomings in the existing system:

1. Since public information has stored in manual document case data loss is probable.
2. Information retrieving is unquick for inquiring because of manual file usage.
3. To store manual files in record room space.
4. The paperwork has done during this process.
5. The public has to visit the divisional secretariat office and have to fill the form to submit their request.
6. Several times have to visit the office for some tasks.
7. Public those who are in overseas have faced inconveniences to get the services.
8. Security is not enough for documents.
9. Inconstancy in data entry.

2.4 Justification of Proposed System

The alternative method solves the problem that affects manual configuration in excessive use. It has designed for online access, freeing the experienced public and managed staff from the manual system from too much stress.

It will automatically analyze and store information; It will use online access to the Internet. There will be some other features, such as the proposed system;

1. The new system can provide.
2. It is accurate in handling data.
3. The system's fastest operating rate and the best response time.
4. It is accessible to any part of the country at any time.
5. The new system can help eliminate stress.

2.5 Review of Similar Systems

2.5.1 SLOVENIA- eCRP[1]

The Ministry of Public Administration has designed an e-government program to simplify administration using ICT. A national telecommunication network has set up to link the central administrative registry to each local department. This horizontal integration aims to facilitate the proper circulation of valuable information and improve coordination.

The system provides a modern facility for which local government must properly manage trusted data on social identity - when needed for social service - directly from a centralized database. All e-government services departments have deemed to have reasonably accurate information. This integrated platform supports many electronic application improvements and simple government systems provided by the e-government state portal.

In the past, data on primary events have usually collected on paper filled by employees of the administrative departments. Entries and records have been filed with IT support in the National Register of Civil Status; Facts about civil status have electronically transferred to the Central Register of the Population.

Every Slovenian resident has registered with the Electronic Central People Registry (ECRP). ECRP is a central database that has used to provide information about identity cards, passports, elections, and addresses. Civil status data (name, surname, date and place of birth) is updated and sent directly from the civil status registry.

A Citizen CRP A prerequisite for exercising this number of rights or access to services in Slovenia. It has also provided qualified foreigners living in Slovenia. The PIN is a thirteen digit number based on unique characteristics such as date of birth and gender.

This number is used by various companies to exchange, analyze and collect data on citizens and foreigners residing in Slovenia. The Interior Ministry manages the Federal Register of Civil Status and the CRP and is responsible for its integrity; In fact, the population registry contains specific and personal information in addition to the PIN and citizen name, place of birth, citizenship, residence address and family details.

The Interior Ministry received the UNPSA 2013 Award, becoming a Category 4 winner in the region of Europe and North America (promoting full government approaches in the information age).

2.5.2 PERU- RENIEC[2]

Peru is an example of a middle-income country whose national identity system has based on civil record with extensive security.

RENIEC (Registro Nacional de Identificación y Estado Civil) was created in 1995 to identify Peruvian people, present documents and record important events. The country has a classic IT framework, the primary base for sending information to the civil registry population.

Successful implementation of a civil registry created the opportunity to incorporate many social security initiatives, such as *juntos* - a program that supports people in extreme poverty. This system allowed RENIEC to issue identity cards that have currently converted to electronic.

By creating a network of specialist offices and implementing a travel registration system, many cooperatives participated in the project (such as the EU, UNICEF and IDB).

2.5.3 MALI-RAVEC[3]

From 2008 to 2010, the Republic of Mali conducted a national survey to establish the country first computerized civil registry, known as the RAVEC (Recensement Administrationratif Administrator Vocation d'Etat Civil). During this period, more than 13.5 million Malians were recorded using a combination of alphanumeric and biometric (fingerprints and photographic) data and, were assigned a unique national identification number known as NINA (Numero de Identification National). The recording process includes six fingers, a portrait, and a complete set of personal data.

The RAVEC represents the Malian government's response to many of the country's ongoing problems: the lack of proper documentation to prove who they are and the rights and interests of some citizens; Issuing and using fraudulent certificates or documents; Low participation rate in contested elections.

To make sure the credibility, security and content of the electoral process, with the support of the majority of political parties in Mali, it decided to use the voter system based on the production of National Identity Card (NINA) cards. Biometric Profiles of Malians in RAVEC's Civil Registry Database. This system includes opening up more access to financial, banking and healthcare services for Malians, providing a globally accepted ID format for travel across the country, and helping to establish security.

Earlier Mali: An average of 25-30% of voters participated in the general election held under peace and stability in the country. During the 2013 elections, more than 55% of the people cast their votes, making it one of the most successful elections in the country's history. Both the EU and the United Nations monitoring missions sent to oversee the elections were declared free and fair throughout the country.

2.6 Comparison of the similar systems

	eCRP	RENIEC	RAVEC
Handling	Easy	Easy	Easy
Registration	No	Yes	Yes
Notification	Yes	Yes	Yes
Help	Yes	Yes	Yes
Security	Yes	Yes	Yes
Privacy	Yes	No	No
Authentication	Yes	Yes	Yes
Acceptance	Yes	Yes	Yes

Table 2.1 Comparison of the similar systems

2.7 Summary

This chapter summarises the Similar Web application for the public request; which explain all aspects of the project's course. It includes information on the online registration system.

Chapter 3: Analysis and Design

3.1 Analysis

At present, there is no organized process or system in place to handle public requests. During the analysis stage, several problems have identified and noted. It has sorted and prioritized based on the complexity and necessity of the issue. The is prevalent in the existing system are;

1. Limited or no proper modes of documentation available. As an example, there are no documented proofs for accepted requests, except in the form of submitted applications.
2. Some appeals have lost because of the massive inflow of the request.
3. It is challenging to trace the file because there is insufficient action to identify the employee who processed a specific document or a particular stage of the respective record.
4. The current status of the request and reasons causing delays have not identified using the existing mechanism.
5. The work allocation and the number of activities handled by each staff have not traced.
6. The time consumed to process the document is high since the system is paper-based. Effective work allocation for the staff has not carried out due to this.

The system has conveniently equipped to deal with the above issues. The scope and objectives of the design have carefully defined to overcome the problems.

Functional requirements have collected, mapped, and used in the preparation of the requirements case analysis map. Each use case has further analyzed, using the use case diagram and the use case descriptions have derived from the use cases.

3.1.1 Functional Requirements

A login form must be available to authenticate users. The login form must authenticate and verify the user, using the username and password. This system requires the creation of an employee account using a separate login form.

The details have maintained in a form that needs to be maintained. Applications of requests have created and modified based on circumstances. The object details and its section have stored in advance, and the object details have used where necessary.

The period of topic processing and the cost of that also have entered the system. The stages have linked with the relevant subject. Personal details of the public should be able to save.

The request given by the public should be able to enter into the system. The entered details could be able to view and filter where it is necessary. The system should allow changing the status of a request based on the requirement during the process.

One application should allow only one subject. The levels of the subject of an appeal will distinguish with that request. The stages of the request should keep one or more status. The status should be able to change by the staff members during the process.

Some public requests should be able to send for approval to the subject staff. The appeal has approved or rejected only the subject staff. Significant applications will fall under the process flow.

Approved and rejected list should be able to display. There should be a way to send the progress of requests via Email to the applicant demands. The administrator needs an appropriate dashboard to track all categories, lessons, general and request status.

History of a request and the staffs who were responsible for that also can be viewed in the system. The following conditions of applications can be known using this system; Filled, Opened, Opened, Closed.

3.1.2 Non-functional requirements

The expected requirements for the system are listed below:

- i. It should efficiently be a user-friendly interface.
- ii. It can carefully regulate standard errors.
- iii. Every specific input typically needed for successful authentication has handled.
- iv. This system should typically provide relief to significant users from the traditional structure.
- v. Inefficiency has improved.
- vi. The system must be compatible with Microsoft Windows and platforms like Macintosh or Linux families.

3.1.3 Security Requirements

- i. The system uses a secure database.
- ii. Ordinary users can use this setting to read the instruction, but cannot edit or modify anything except their personal and other information.
- iii. There are two types of users on the system; there are access barriers for the user.
- iv. Proper user authentication has provided.
- v. No one can hack the user's details or any other information.
- vi. Users who have no access to the database must have a separate area; only the administrator has the right to update the database.

3.2 Technique Used in Requirement Gathering

The client has offices across the country in the form of Divisional Secretariats. To create the system, the client office at Batticaloa Town, Batticaloa District has used as a source. The client is far away from Colombo.

3.2.1 User Story

The user story has conveyed by the Additional District Register. He is the one who manages the ICT related work. The user story has provided below;

The user story:

“The Public submits their request by filling a form. The form has consented at the Divisional Secretariat to a staff member. In most cases, the documents have accepted by a staff member from the administration division. Then the appeals have sent to the relevant division or, the application has received by the responsible division. The subject in the request has a set of stages to be performed by the staff member. After completing the service, it has given to the public individual. Monitoring the process is too hard for the Divisional Secretary. The staffs and Head of divisions have questioned by the Divisional Secretary to get information about the request. Sometimes public misunderstand the office staffs, due to delay in processing their applicants.”

3.2.2 Site Visits

The office has visited three times during the project. More facts have found in these visits; revealed details about their ICT infrastructure. It has observed in the site visit that the office is fully networked and they use an intranet connection and the office has equipped with an ADSL broadband internet connection. The staff members have trained; they possess adequate ICT skills.

3.2.3 Observer the phone conversation

The phone conversation with the Additional District Registrar reduces the number of ambiguities and doubts.

3.3 Design

Functional and non-functional requirements are changed in design to create a better understanding of the system. Many convenient methods available in industry have used for computer design purposes.

The system design has based on Object-Oriented methodology except for database design. The system has based on a structured analysis and design system. The object-oriented design has done by UML diagrams. ERD diagram has used to develop the database, respectively. The reasons why the above design methodologies have used are,

1. Past Experience and knowledge.
2. The reputation.
3. Convenient to identify the system structure and behaviour.

It is a mobile-first, web-based and platform-independent system that not only is used on personal computers but has used on a variety of smartphones and tabs. The system has designed to run on a web browser. The system has developed using multiple layers based on the model-view-controller architecture. The design focuses on non-functional attributes such as reuse, safety, testability, maintenance and more.

3.3.1 Limitations Of the system usage

- i. The administrator and user must remember the login ID and password.
- ii. The user must have a personal computer or cell phone with an Internet connection.

3.3.2 Database Design

The logical model has established the following detailed design in MySQL database. The following tables describe data type, length, primary key, null, default and extra information, such as auto_increment(AI).

Figure 3.1 shows the graphical representation of ERD; Tables 3.1, 3.2 and 3.3 show, respectively Structure of Table New user, Structure of Table User Request and Structure of Table Admin.

Field	Type	Null	Key	Default	Extra
name	Varchar(150)	no		none	
RollNo	Varchar(150)	no	PRI	none	
Depart	Varchar(150)	no		none	
Email	Varchar(150)	no		none	
Pass1	Varchar(8)	no		none	
Pass2	Varchar(8)	no		none	

Table 3.1 Structure of Table New user

Field	Type	Null	Key	Default	Extra
no	int(5)	no	PRI	none	
nog	Varchar(150)	no		none	
rno	Varchar(25)	no		none	
cat	Varchar(150)	no		none	
type	Varchar(150)	no		none	
date	Date	no		none	
dep	Varchar(150)	no		none	
action	Varchar(25)	no		none	

Table 3.2 Structure of Table User Request

Field	Type	Null	Key	Default	Extra
Id	Varchar(25)	no	PRI	none	
pwd	Varchar(25)	no		none	

Table 3.3 Structure of Table Admin

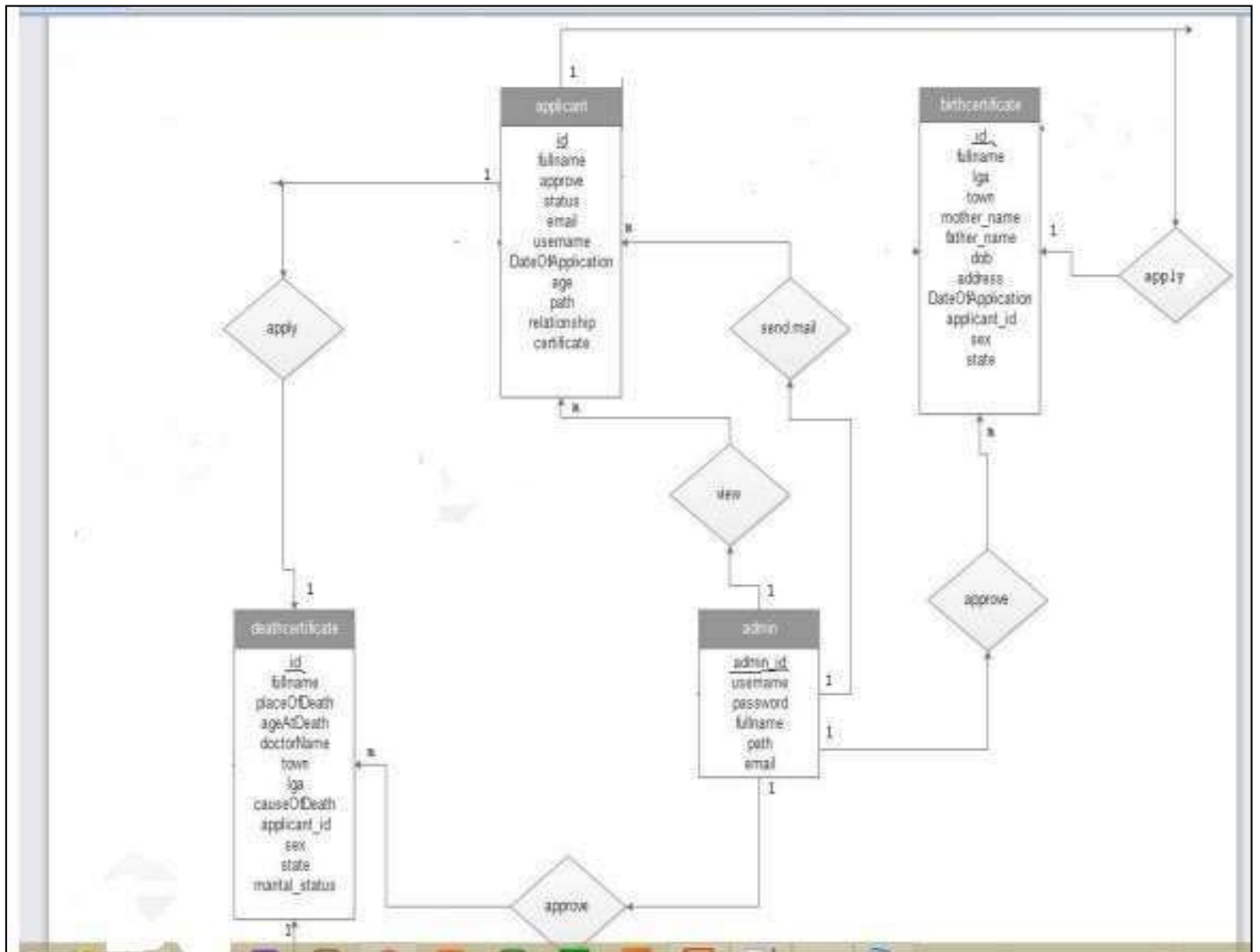


Figure 3.1 E-R Diagram

3.3.3 Use Case diagram

Communication is usually defined to achieve a goal between an actor and the organization. The actor can be a human being or an external organization. Figure 3.2 and 3.3 show, respectively the use case diagram of the public and admin.

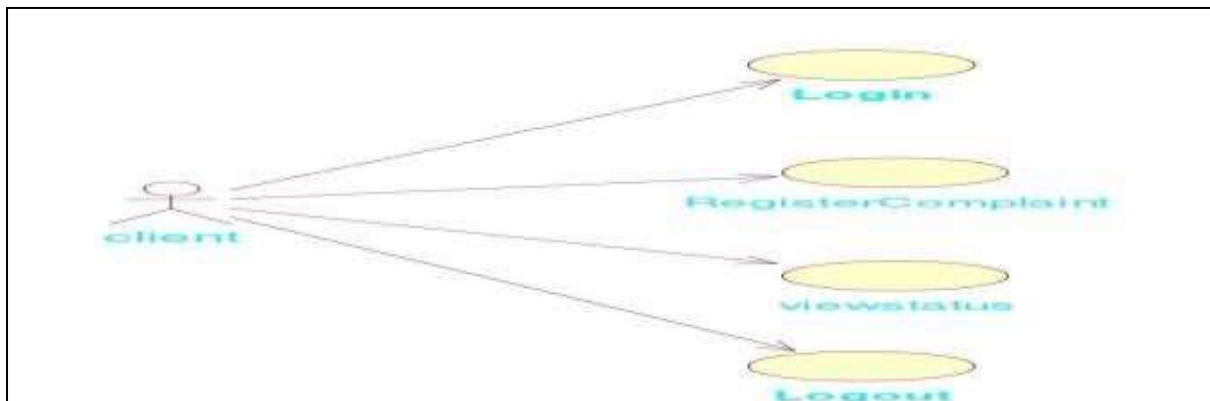


Figure 3.2 Use Case Diagram-Public

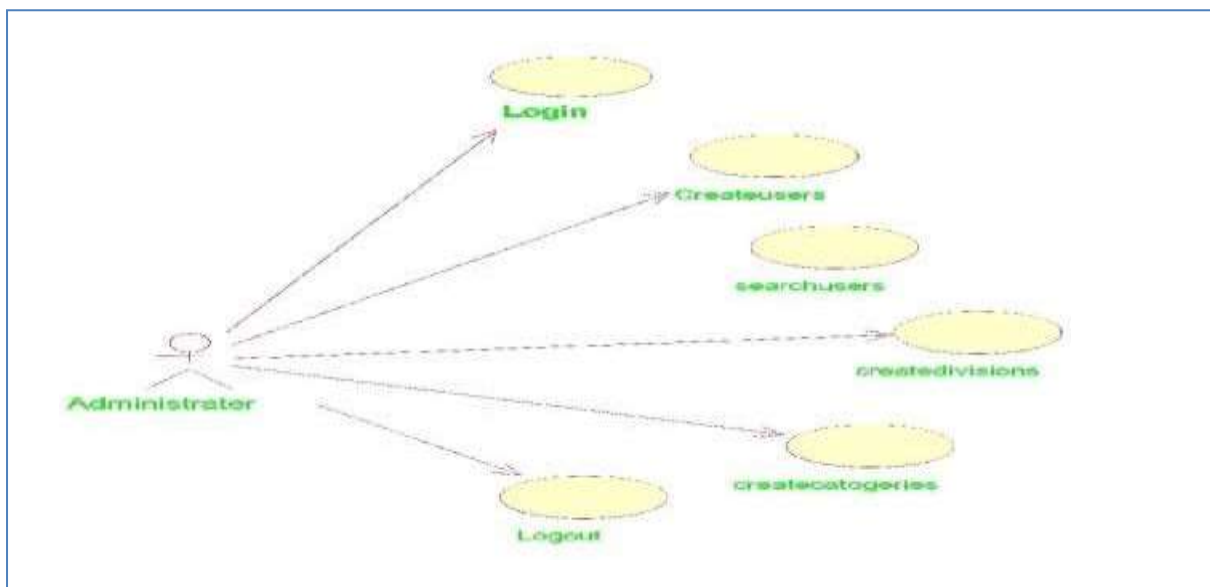


Figure 3.3 Use Case Diagram-Admin

3.3.4 Activity Diagram

The activity diagram represents another functional figure involved in UML graphs to explain the dynamic aspects of the system. It shows the activity diagram of the proposed structure in Figure 3.4.

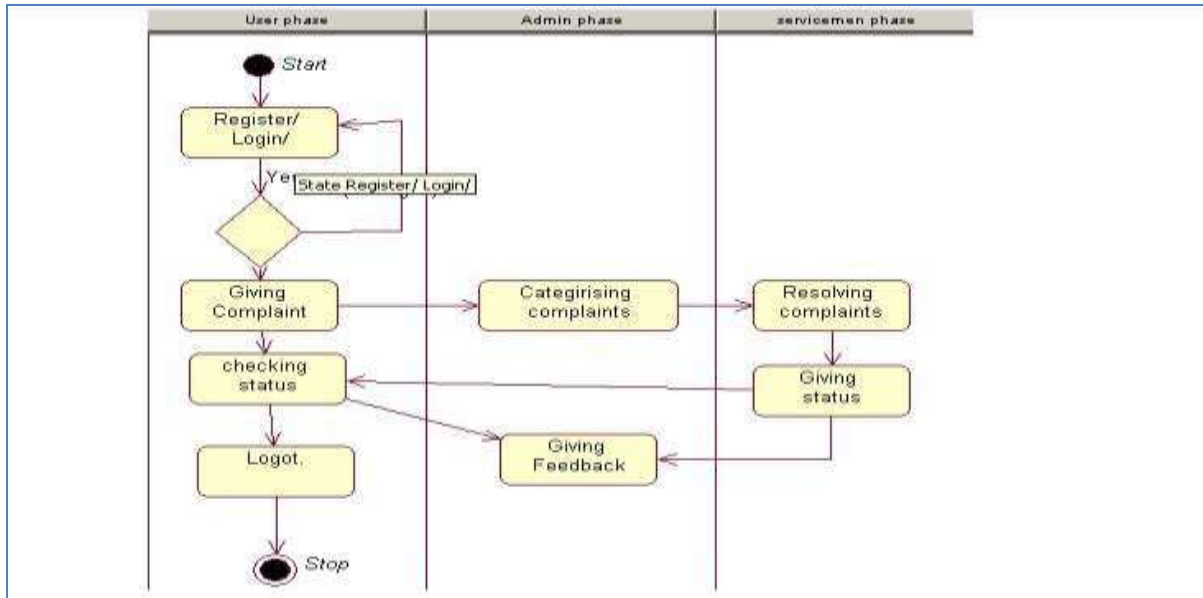


Figure 3.4-Activity diagram

3.3.5 Sequence Diagram

The vertical lines (Lifelines), various processes or simultaneous objects and horizontal arrows have shown in the order in which messages occur in a sequence diagram. Figures 3.6 and 3.7 show, respectively a sequence map of the Administrator and the Public

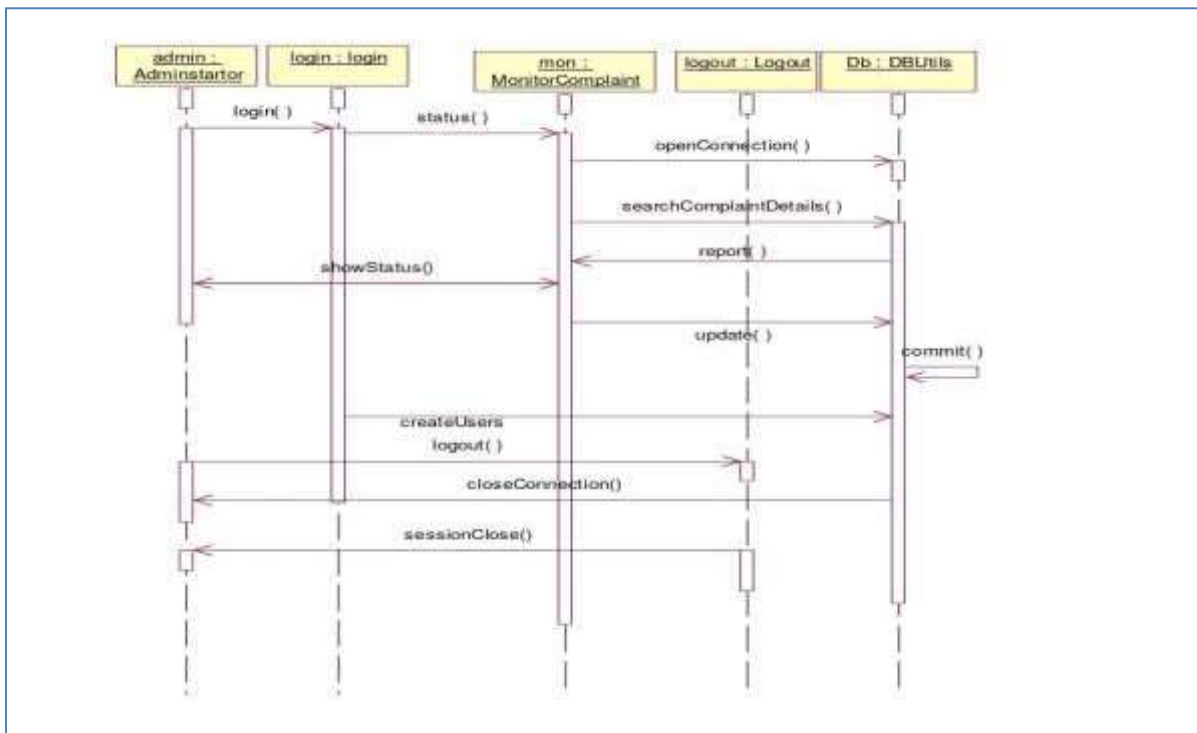


Figure 3.5- Sequence diagram-Administrator

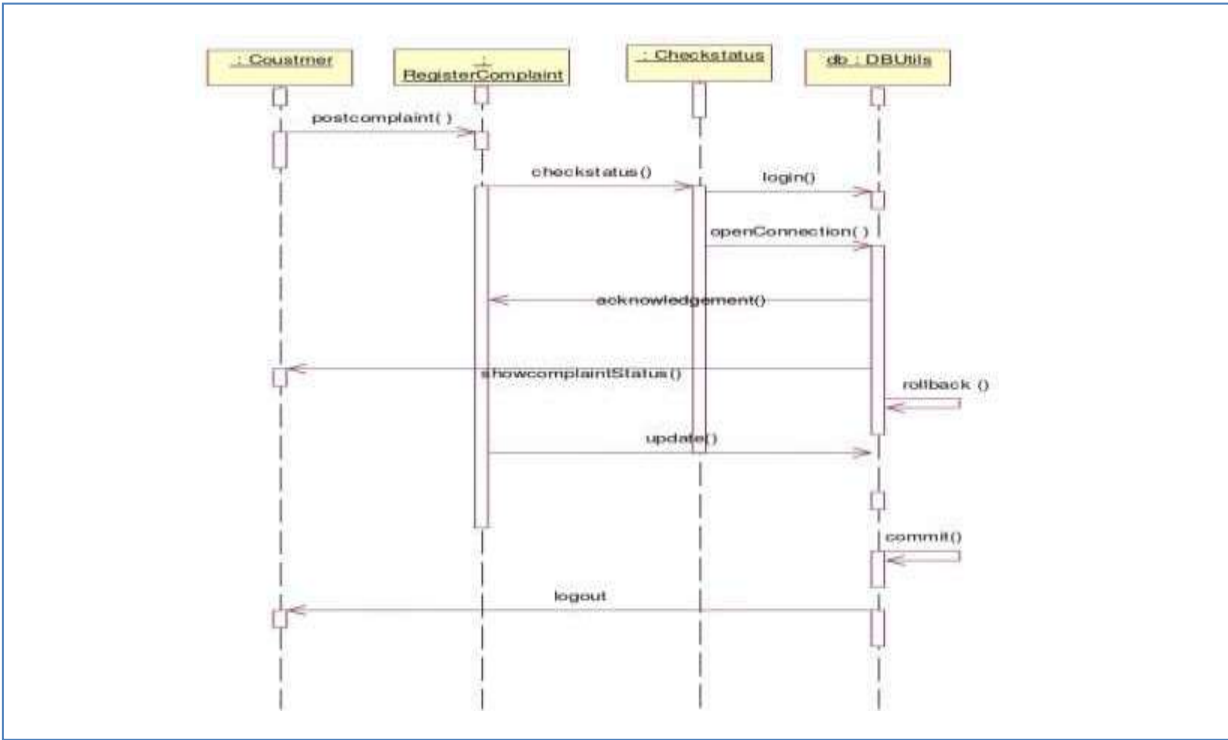
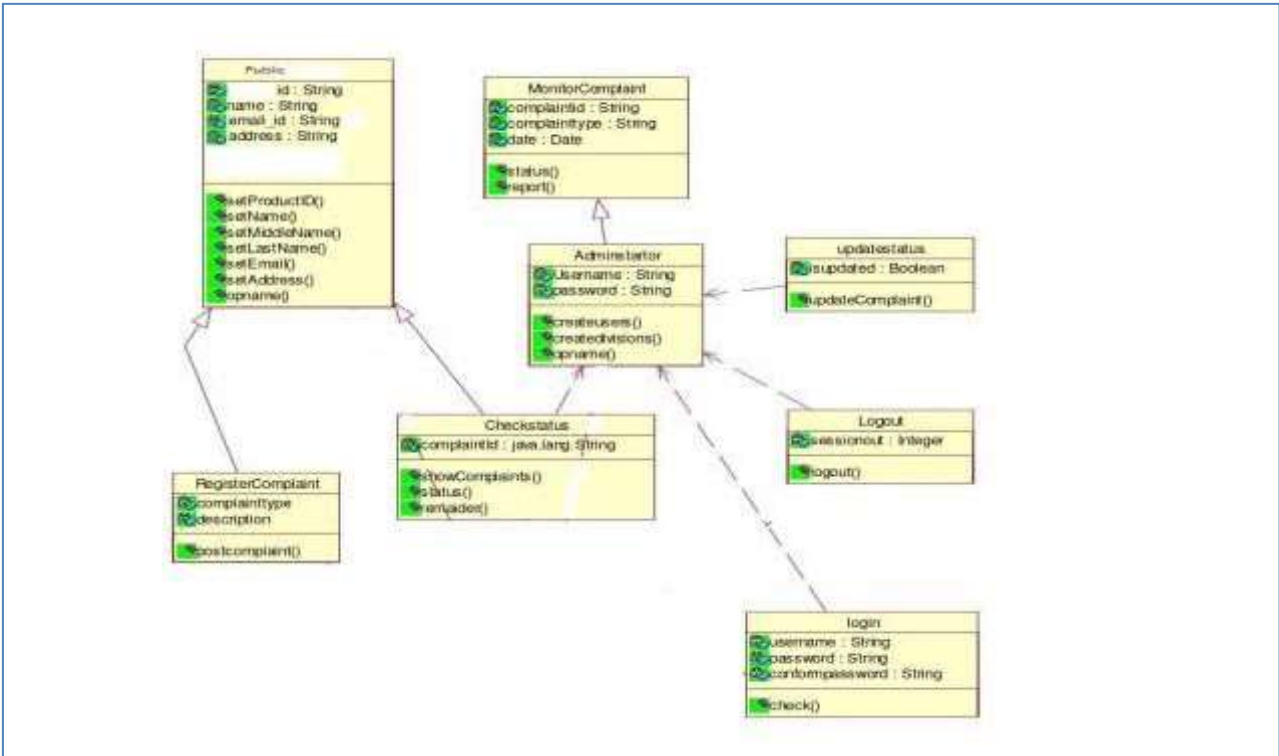


Figure 3.6- Sequence diagram-Public

3.3.6 Class Diagram

Figures 3.8 has shown, a class diagram of the proposed system



Figures 3.7 The class diagram of the proposed system

3.4 Summary

This chapter has explained the importance of the alternative system. It has also outlined the requirements for functional, non-functional and security. It has also noted that the information has collected to design the system properly. And the design of UML diagram, Database has described.

Chapter 4: Implementation

4.1 Introduction

A registration system of the Divisional Secretariat has developed as an online system. Web applications have become for development, maintenance, and support activities of management. The primary advantage of web implementation is the fact that they clustered it. It is easy to distribute and maintain. The responsible Divisional Secretariat staffs access this web application to communicate and promptly send client information. Another advantage is that a web application is platform-independent, through a web browser regardless of the user operating system.

4.2 Justification for selecting the development methodology

The system has implemented using the Agile Software Development method. The Key goals of selecting this method are to minify the development period, reduce the cost of the software, and to achieve adequate software quality. Even though this is agile development, it has only one iteration in the system implementation.

4.3 User Interface

The user interfaces have implemented using HTML5, CSS3, jQuery, JavaScript and Bootstrap framework. The user interface has formed by the view layer and the dynamic layer, which has mentioned in the Design chapter.

The mobile-first feature (mobile-friendly feature) has implemented by using the Bootstrap framework. Therefore, the user interfaces can be rendered by web browsers in different sizes of mobile devices except for wearable devices. Majority of the user interface components have implemented by using the features of Bootstrap. The features of Bootstrap include Coloring, Modal, Page Layouts, Fonts, Badges, Pills, Pagination Styles, Wells, Buttons, Labels, Icons and Hyperlinks and so on.

Form Validation is in place to reduce human errors. This system has mainly implemented through a bootstrap plug-in and HTML5 elements.

The Bootstrap, jQuery, Plug-in and CSS are independent of the view layer. The JavaScript files were coded specially for each view to provide the required functionality. These JavaScript provide the dynamic function to the visibility such as loading data tables, sending requests to the controller, displaying a message dialogue box, retrieving response, validating HTML forms, getting values to HTML components and setting values to them and so on.

4.4 Development

The Controllers get the AJAX request coming from the client-side and perform the relevant functions. The client-side applications have mapped. For example, the CRUD functions have carried out. This system accepts the AJAX request sent by the jQuery, which is a form of submission function.

4.5 Selection of Technologies

The system has entirely built using open source technologies. The server-side components of the system have built using PHP based technology. The client-side has developed by using HTML5, Bootstrap and jQuery.

PHP stands an open-source language for developing dynamic Web content. PHP is one of the quickest scripting languages around the globe. PHP is convenient to use. The minor projects are additionally comfortable in PHP than the massive initiatives comparatively.

WAMP Server is a web development platform on windows, allowing the developers to create dynamic web applications with Apache and MySQL. This server helps web developers by providing built-in Apache, PHP and MySQL. The database has easily managed using PhpMyAdmin. The features found in WAMP can help developers make growth faster.

Apache HTTP Server is a useful and flexible web server. Apache Server has used in PHP implementation. These are the points that should run on all computer operating systems. This UNIX has initially based on a purely net server. But for now, Apache Unix runs on all types of Unix platforms and more on Windows. The Apache server does not need to be installed and comes with WAMP by default.

MySQL is an open-source software program used to gain access to databases. It is a relational database, which stores information in a separate table, providing flexibility. It is the most stable relational database management system. This software ensures that only approved users can access their rights.

There are plenty of open source technologies that can be accessed or used for free at no cost to the industry. There are several plug-ins, tools and reusable components available. Numerous open-source forums provide several problem-solving solutions.

HTML is the frequently used markup language in all web-based application developments. This system follows the same by implementing a previous version of HTML5, compared to HTML4. HTML5 possesses modern elements, semantics and new APIs. These features supported to design and develop the user interfaces of the system effectively and efficiently. It equally made the Validating form controls were with the help of HTML5, manipulating its modern elements. HTML5 also helped in reducing the lines of JavaScript saving time when designing the user interfaces.

The jQuery is a powerful JavaScript library used to manipulate HTML DOM. jQuery reduces lines of coding of Java script, through its fundamental functions(Shorthand functions).jQuery comprise a widely used JavaScript library across the world, therefore testing this was unessential. JQuery is renowned for improving the performance of Web-based systems. It would mean that using jQuery will upgrade the performance of this system too.

Bootstrap is the main component that provides mobile-first, user-friendly user interfaces to the computer. Because of this, mobile devices do not need to create separate user interfaces during development. The pre-defined elements found in Bootstrap make it easy to design the user interface and make it visually trendy. Bootstrap elements such as modal, progress bars, glyph icons, form controls and standard colours add value to user interfaces. Most of the open-source browsers support this framework.

4.6 List of Tools

- I. IDE-Adobe Dreamweaver CC
- II. Microsoft Visio
- III. Google Chrome Developer tools

4.7 Specifications of the hardware and software

4.7.1 Hardware Specifications

- I. CPU-i3 generation
- II. RAM-4GB or above
- III. Hard disk-Minimum 150GB
- IV. SLT Router

4.7.2 Software Requirements

- I. Web Server-Apache tomcat latest version
- II. Database Server MySQL server
- III. This system runs on Windows 7
- IV. Latest Google Chrome
- V. Business Logic-PHP

4.8 Screenshots of the user interface

4.8.1 Welcome Page (index.php)

The welcome page of this system has shown in Figure 4.1.

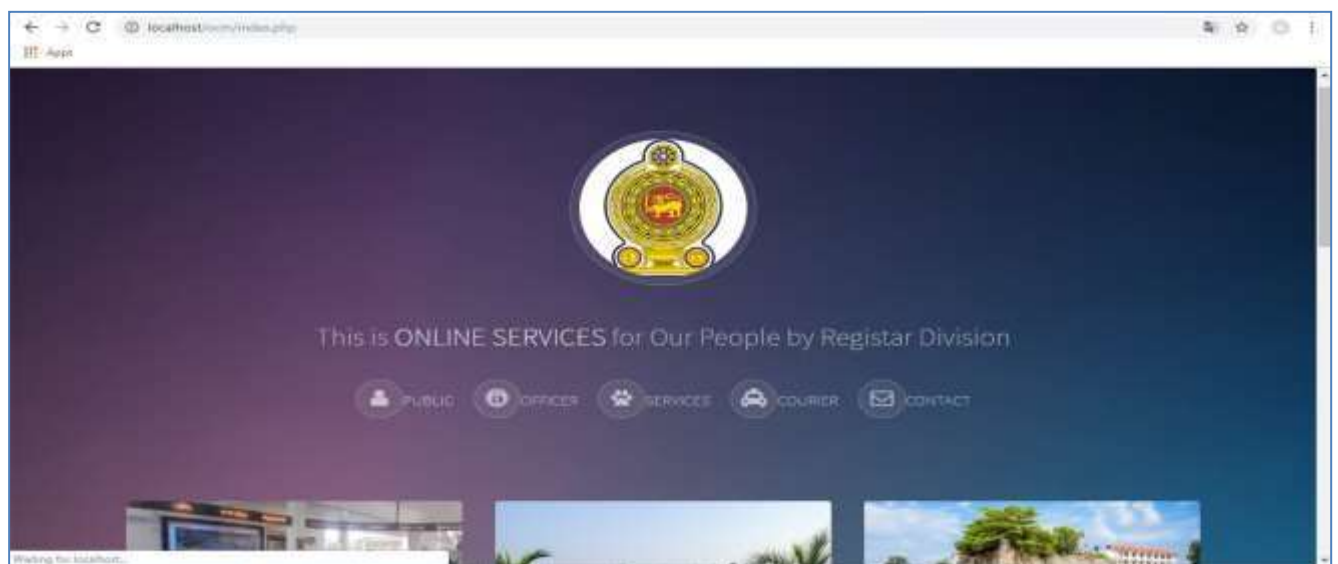


Figure 4.1 Welcome Page

4.8.2 Login Page

If the user is using the login page as shown in Figure 4.2, if the username or password or both are not valid, the message will appear; “That NIC NO is invalid or the wrong password”. If the information provided by the user is correct, it will appear as in Figure 4.3.



Figure 4.2 Login Page

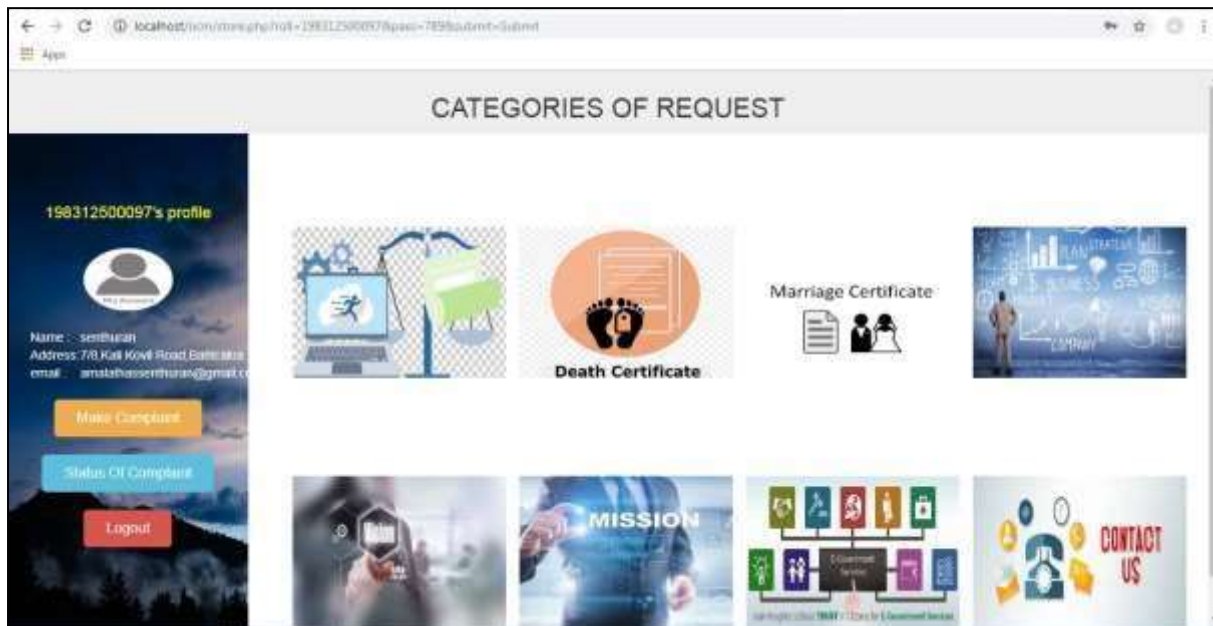
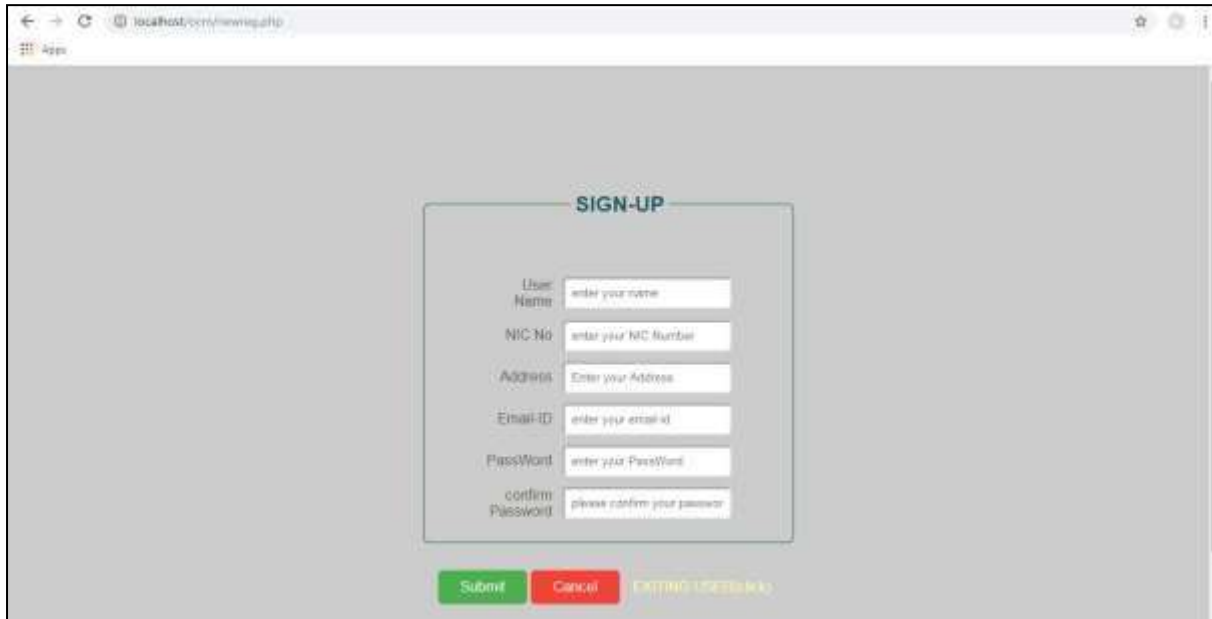


Figure 4.3 User Page

4.8.3 User signup Page

New users can gain this service by recording the information stated in Figure 4.4. Unless the unknown person has registered as a user, the online registration system of the Divisional Secretariat cannot access.

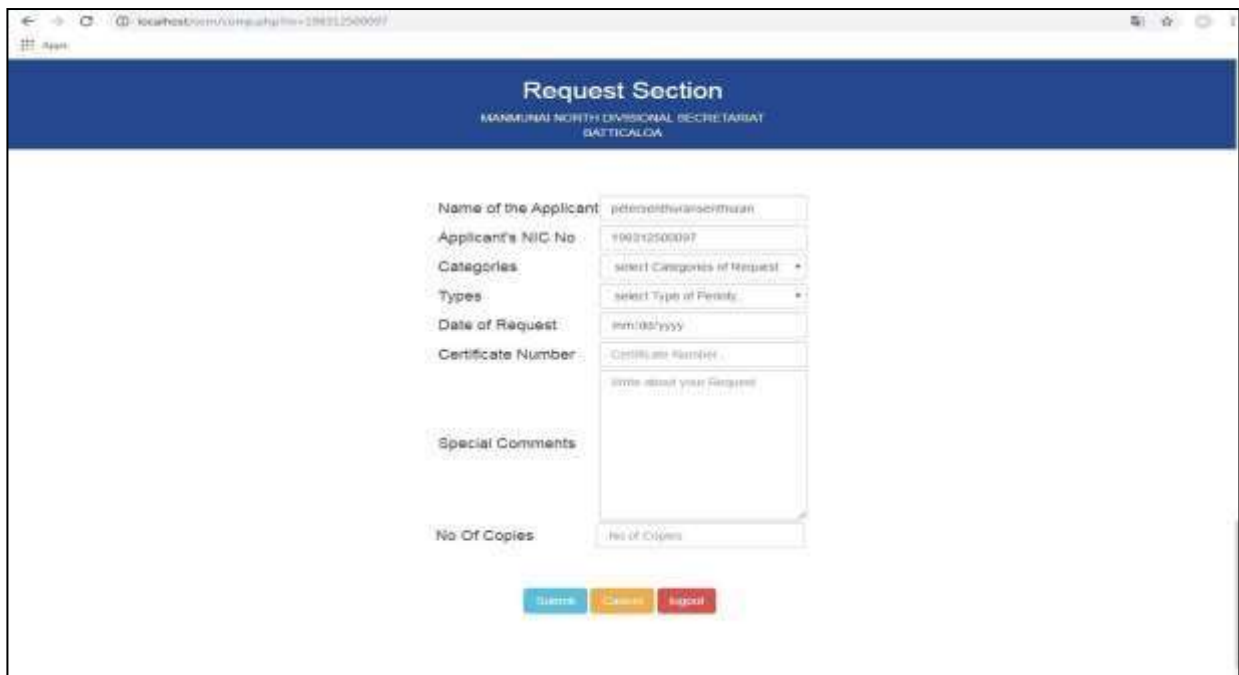


The screenshot shows a web browser window with the URL localhost:3000/newsignup. The page features a central 'SIGN-UP' form with the following fields: 'User Name' (placeholder: enter your name), 'NIC No' (placeholder: enter your NIC Number), 'Address' (placeholder: Enter your Address), 'Email ID' (placeholder: enter your email id), 'PassWord' (placeholder: enter your PassWord), and 'confirm Password' (placeholder: please confirm your password). Below the form are three buttons: 'Submit' (green), 'Cancel' (red), and 'EXITING (PRESSBACK)' (yellow).

Figure 4.4 User Signup Page

4.8.4 Application Page

Applicants can request a certificate managing this page. The applicant can execute the query by filling out the enquiry information in Figure 4.5.



The screenshot shows a web browser window with the URL localhost:3000/newsignup/req=256312500097. The page has a blue header with the text 'Request Section' and 'MANMURAI NORTH DIVISIONAL SECRETARIAT, BATTICALOA'. The main content area contains a form with the following fields: 'Name of the Applicant' (value: pteerodthwaaserthuan), 'Applicant's NIC No' (value: 990312500097), 'Categories' (dropdown: select Categories of Request), 'Types' (dropdown: select Type of Permit), 'Date of Request' (value: mm/dd/yyyy), 'Certificate Number' (placeholder: Certificate Number), 'Special Comments' (text area: write about your Request), and 'No Of Copies' (placeholder: No of Copies). At the bottom are three buttons: 'Submit' (blue), 'Cancel' (orange), and 'Request' (red).

.Figure 4.5 Request Page

4.8.5 Administrator Page

The login page for the administrator has shown in Figure 4.6. If you enter a username or password or both by mistake, the following message will appear; "Invalid UserID or Password". The operation page will appear, as shown in Figure 4.7 when login using this admin page.




Figure 4.6 Admin Page



Figure 4.7 Operation Page

4.8.6 Applications Status page

An applicant may clarify the status of his application. Figure 4.8 demonstrates the status of applications.

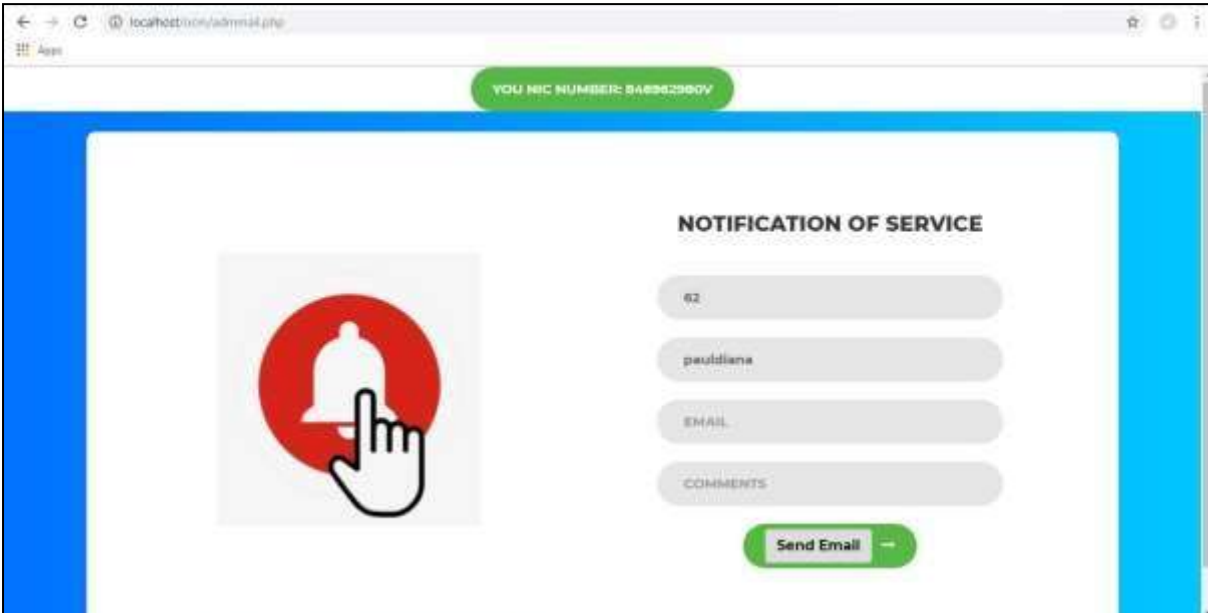


Yours Request No	Name of the Applicant	Applicant's NIC No	Categories of Request	Type of Request	Date of Request	Applicant's Address	Description	No of Copies	Action
57	petersenthuransenthuran	198312000097	BIRTH	Normal	2019-09-08	4368	pay	3	NotYet
56	petersenthuransenthuran	198312000097	BIRTH	Normal	2019-09-08	7741	pay	2	NotYet
55	petersenthuransenthuran	198312000097	BIRTH	Normal	2019-09-08	7741	pay	2	NotYet
53	petersenthuransenthuran	198312000097	BIRTH	Normal	2019-09-08	4562	payment	2	NotYet
54	petersenthuransenthuran	198312000097	BIRTH	Normal	2019-09-08	7741	pay	2	NotYet
52	petersenthuransenthuran	198312000097	BIRTH	Normal	2019-09-08	4562	payment	2	NotYet
51	petersenthuransenthuran	198312000097	BIRTH	Normal	2019-09-08	4562	payment	2	NotYet
50	petersenthuransenthuran	198312000097	BIRTH	Normal	2019-09-08	4562	payment	2	NotYet
49	petersenthuransenthuran	198312500097	BIRTH	Normal	2019-09-08	8569	payment		NotYet
48	petersenthuransenthuran	198312500097	BIRTH	Normal	2019-	8569	payment		NotYet

Figure 4.8 Request level page

4.8.7 Notice Page

The administrator may forward emails to inform the applicant of the request. This process has shown in Figure 4.9.



YOU NIC NUMBER: 84882980V

NOTIFICATION OF SERVICE

62

pautdiana

EMAIL

COMMENTS

Send Email

Figure 4.9 Notice page

4.9 Summary

This chapter justifies the technique adopted to develop the system. The user interface and design method have also stated. The technologies have described; required to design the system. The tools of the development, hardware and software specifications and a screenshot of the user interface have also mentioned.

Chapter 5: Evaluation And Results

This system has tested to prove its usefulness and expected characteristics. This system has tested using the downstream approach. The upper-level components have tested after the lower-level components of the system have tested separately, the lower-level pieces have combined. The ultimate system has evaluated.

It is impossible to perform all the related testing manually or automatically. The strategy used here was combining automated testing and manual testing. The testing strategy is semi-automated. The testing mainly focuses more on functional testing than the unit testing.

5.1 Test Plan and Results

The main plan is to create a testing framework and automating the testing. Some testings have done manually. Test drivers and testing tools also used. The results of the test have mentioned below.

1. Testing case results of logging public, as shown in Table 5.1.

Id	Test Case	User Input	Pass Criteria
User_1	Login	The user enters the ID & password for login.	If the data is correct, redirects to the dashboard. If incorrect, "Incorrect username & password".
User_2	Invalid password	The user enters an invalid password.	On the login page, the message appears as "Incorrect username & password".
User_3	User signup	A new user, entering to enter all mandatory fields.	If registration has succeeded, The Welcome page appears.

Table 5.1: The user test case results

2. Testing case results of logging the staff, as shown in Table 5.2.

Id	Test Case	User Input	Pass Criteria
Staff-1	Login	The staff enters his ID & password for login	If the data is correct, redirects to the dashboard. If incorrect, "Incorrect username & password".
Staff-2	Invalid password	The staff enters an invalid password.	On the admin page, the message appears as "Incorrect username & password".

Table 5.2: The staff test case results

3. Testing case results of generating the reports by the staff, as shown in Table 5.3.

Id	Test Case	User Input	Pass Criteria
Report_1	The report generation	The user selects the report criteria for report creation.	The information has displayed according to the report in the proper criteria report.
Report_2	Print	The user clicks on the Print button.	The report has printed.

Table 5.3: Test case results of The report generation.

4. The test case results are shown in Table 5.4 when the public requests their applications.

Id	Test Case	User Input	Pass Criteria
Up_1	The request has applied.	The user will enter the application description by selecting the application type.	It is necessary to fill out all the fields to apply.
Up_2	Status of the application	The user can check the status of the application.	The status of the user application is visible.
Up_3	Confirmation of the request.	When the submit button has pressed, the notification is received.	Then submit the request.

Table 5.4: Test case results of The public requests.

5. The test case results have shown in Table 5.5, where an officer processes the applications.

Id	Test Case	User Input	Pass Criteria
Prg_1	Provide after viewing request.	After verifying the details of the applicant, issue the certificate.	All fields are necessary
Prg_2	Alert	The message goes through the email when you hit the notification button.	Email to the applicant is necessary.

Table 5.5: Test case results of The request processing.

5.2 Performance Testing

The performance of the system has tested using Google developer tools. The Network panel, Audit panel and Timeline panel were used to monitor the performance. These tools provided information related to the acting and suggestion for performance optimisations.

The initial loading time of each module has monitored. At that point, the time conducted for CRUD operations has also observed. Some components of the have removed based on the suggestions such as unused files, plug-in, unwanted request from the client and broken links.

5.3 Security Testing

A password login has implemented. This method is complex to spot by other users or hackers. The usage of the password policy (change user password periodically) will more significantly enhance security. All roles have proved by creating dummy users and tested the login function.

5.4 Cross Browser Testing

Cross-browser testing has done in the major and mostly used open-source browser. It is Google Chrome. The key features like HTML5 elements, jQuery functions and mobile browser compatibility have tested. Since the system is HTML5, Google Chrome has recommended, because Google Chrome provides more support for HTML5 tags and elements.

5.5 Usability and Evaluation

User Selection Criteria

Forty users have selected for usability evaluation. Only one of them is the staff of the office. Others were randomly selected users, who passed some IT skills. All these users can handle word processing, spreadsheets, Emails and some of them use some other existing software.

The usability test could not be able to do at the Divisional Secretariat Office due to the following reasons:

1. The daily work at the office would be disturbed by the session.
2. Some of the staffs were not at the office, had gone for official visits.
3. The time and the schedule have not matched.

The evaluation process with the staff was able to manage by using Team Viewer remote sessions. All the other users were directly involved in the evaluation process.

Methodologies Used

The methodology has used to evaluate the users is questionnaire; a simple and, closed type. The user feedback has collected using this questionnaire.

Areas Focused

The user should consider the following when using the system: Look and Feel, Navigation, Understability, Consistency, Dashboard, Fill the form, System feedback and satisfaction of the entire system.

Table 5.6 and Figure 5.1 show user evaluation results and analysis, respectively. Appendix A is the questionnaire for this evaluation.

Question Number	Features	Points		
		Bad	Average	Good
01	Look and Feel	0	1	5
02	Navigation	0	2	3
03	Understandability	0	2	3
04	Consistency	0	1	3
05	Dashboard	0	2	4
06	Fill the form	0	2	2
07	Feedback	0	2	2
08	Satisfaction	0	2	4
	Total	0	14	26
	Percentage(%)	0	35	65

Table 5.6 User Evaluation Results

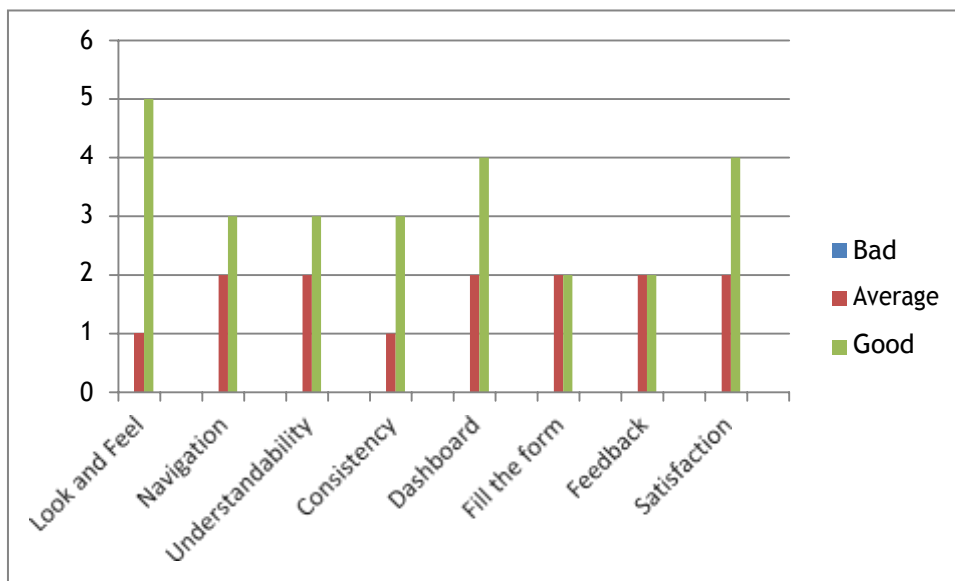


Figure 5.1 User Evaluation Analysis

Process

The process has done individually for each user, because of the time convince. The purpose of the system has introduced first. And then a brief demonstration has given to the users about the system. Additionally, allow them to perform tasks.

The suggestion of the users

Some users who have selected for the evaluation provided a few suggestions for the system after completing the assessment. The recommendations have added sounds for the message when a pop-up message arises, avoids the form expansion in its height validation message, has shown below the text boxes and adds user images and increases the attractiveness of the system like Facebook or Twitter.

5.6 System Evaluation

System evaluation has conducted to prove that the system has enough qualities to function in the given environment. These qualitative attributes have used as criteria for system evaluation. The system has evaluated at design time and runtime.

Chapter 6: Conclusion

There is no similar system currently operated at the Divisional secretariats in Sri Lanka. This system is the first system of its kind. The system has also intended to provide a comprehensive solution to manage public submission requests.

This system will endure a standard one for all the Divisional Secretariats in Sri Lanka. It will link them and develop a network among them to handle the entire requests of the people across the island. All the Divisional secretariats will come under one umbrella to serve the people effectively.

The public can get error-free service without unnecessary delay. Also, users do not have to go to the Divisional Secretariat to get the service. There is no need for a public person to face such problems as harassment, corruption and theft of documents. This process is quick and easy.

The accuracy of information is high, and coordination with other government departments is steady and rapid. Interference of brokers and document fraud can be minimized or eliminated. Bribery and corruption will be reduced or eliminated. When providing information, it is safe, and privacy is maintained.

The email will notify the public of their respective request status. A small amount of training, with limited computer knowledge for employees, is an easy and straightforward experience of the system.

Even though there are numerous other systems in operation for workflow management, they have not designed for Divisional Secretariats in Srilanka. This system is a customized solution for Divisional Secretariats, and this can also use for other government departments which have a similar workflow. This system has integrated with another system with ease. It has smoothly integrated with the existing system.

Mobile-First and web-based technology have used to develop this system. This system is one of the most recent technologies and widely used in the software industries. It is equally convenient for the staff member of the Divisional Secretariat to operate as can carry out operations using mobile phones. The public has to clarify their status.

The development of this system is cost-effective and affordable as the open-source technologies have used to the maximum. The financial allocation will not be a burden.

Finally, if this system has deployed at the client site properly, as mentioned in the guidelines, it will take the public service to a whole new level bring about efficiency and effectiveness.

6.1 Achievements of Objectives

Objective 1:

To process more requests than the current system, within the period.

The system has computed, saving and retrieving details is quick and easy. The dashboard of the staff member shows brief information about the status at a glance. Therefore, the staff could check the details about requests and will place them for the process. Since this a mobile-first, web-based system the applications have accepted in one place; the process has done at the Divisional Secretariat office at the same time. And the system additionally provides the status of the requests. The staff could attend to particular appeals and complete them faster.

Objective 2:

To reduce the time of locating records and maintaining records related to the request processing.

The system provides features such as filtering requests and its stages. The history of records could also be filtered and checked quickly. These are useful to reduce the time taken in locating status and history. Objective two has achieved using this feature of the system.

Objective 3:

Applications are being processed even under challenging circumstances. (Tsunami, Floods)

The staff has sent to the positions with the smartphone or tabs, wherein case inevitable disasters take place. The staff of the office could enter requests concurrently from the respective site. The applications have processed at the office simultaneously. The concurrency control feature of the system helps to achieve this objective.

Objective 4:

Employee practice has improved by reallocating more employees to provide one day service.

Staff can monitor the number of opened requests and their statuses on his/her dashboard. The officer could manage the workload and can also efficiently use the work. This system will cause to reduce wastage which will help reduce costs.

Objective 5:

Supervision of all processing can be done anywhere and at any time.

It is a mobile-friendly web-based system. The administrator can view his dashboard anytime, anywhere using a smartphone or tab.

Objective 6:

To provide adequate documentation.

The system provides adequate documentation implicitly by saving the details related to the request. These data have adequated for documentation concerning the process. These data have retrieved in future when the requirement arises.

Objective 7:

To improve communication and coordination among staff.

The system will have information about all staff members who have handled a particular request at any stage. The staff has made to coordinate and communicate among themselves to successfully and efficiently complete requests.

Objective 8:

Improving Satisfactory Relationships Between Public and Office Employees.

Request submitted by the public to enter into the system. Therefore, this brings about transparency. The staff could visit the office any given point and obtain the up to date status of their requests. A better relationship has cultivated. Further, there are options to satisfy the public about status through email service.

6.2 Future Work

Applications of the public have made within time, providing a period for processing. The rest will show the timeline of the work. The summary and reminders of a period have sent to the administrator via SMS. The system has integrated between the document management system and the human resource management system.

The public can clarify the status of their applications through SMS. Divisional Secretariat Officers can direct their responses via SMS.

6.3 Knowledge gained

The knowledge gained through this project is valuable. This system provided a comparable experience from feasibility studies to the development. The project provided an opportunity to test and implement the most principles and techniques learned through the MIT degree program.

It also encouraged them to learn new and updated technologies that are genuinely interesting to improve system performance. The particular efforts have made to practise the design of MVC.

It was an opportunity to develop technical skills and intellectual abilities by collaborating with many people from many disciplines. During this project, the most important aspects of time management and planning became known. The tasks have done on time.

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Appendix A-Usability Evaluation Questionnaire

This survey has carried out for the project. The information it collects is maintained confidential. It has only used for the project.

Your age.....

Your profession.....

Your answer to the questions below:

1. The external appearance of this system(Look and Feel)
 - a. Bad
 - b. Average
 - c. Good
2. Navigation of the design -
 - a. Bad
 - b. Average
 - c. Good
3. Understandability on this website.
 - a. Bad
 - b. Average
 - c. Good
4. Consistency of the system
 - a. Bad
 - b. Average
 - c. Good
5. The satisfaction level of the dashboard
 - a. Bad
 - b. Average
 - c. Good
6. Easy to fill the form
 - a. Bad
 - b. Average
 - c. Good
7. The feedback of the system
 - a. Bad
 - b. Average
 - c. Good
8. The satisfaction of the entire system
 - a. Bad
 - b. Average
 - c. Good

Thank you for your cooperation

Appendix B- Local Server Specifications

Wamp server

WAMP is a purely Windows-based OS. It installs and configures Apache web Server, MySQL Database Server, PHP Scripting Language, phpMyAdmin and SQLite Manager. WAMP has designed to provide a convenient way to install Apache, PHP, and MySQL. It has effortlessly compiled to use setting up the app as an alternative to the establishment and configure.phpMyAdmin has utilized to manage MySQL databases and, SQLite manager has used to SQLite database.

This WAMP has easily installed. The main page of this internal server has shown in Figure B.1. Developers have installed on a personal computer and used for development.

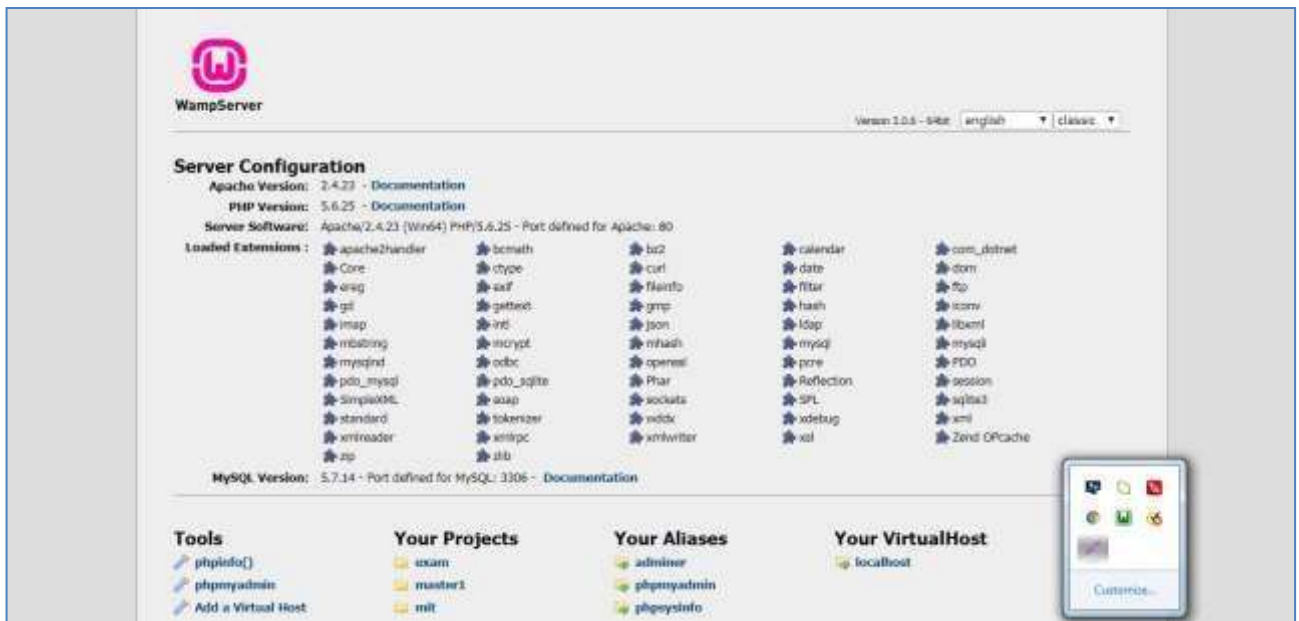


Figure B.1-Local Server Page

This service has the following features;

- i. phpMyAdmin
- ii. Apache Server
- iii. SQLite manager

Handling the database

phpMyAdmin is a free software tool written in PHP. It has intended to handle the administration of MySQL. phpMyAdmin supports a wide range of functions with MySQL. The home page has shown in Figure B.2.

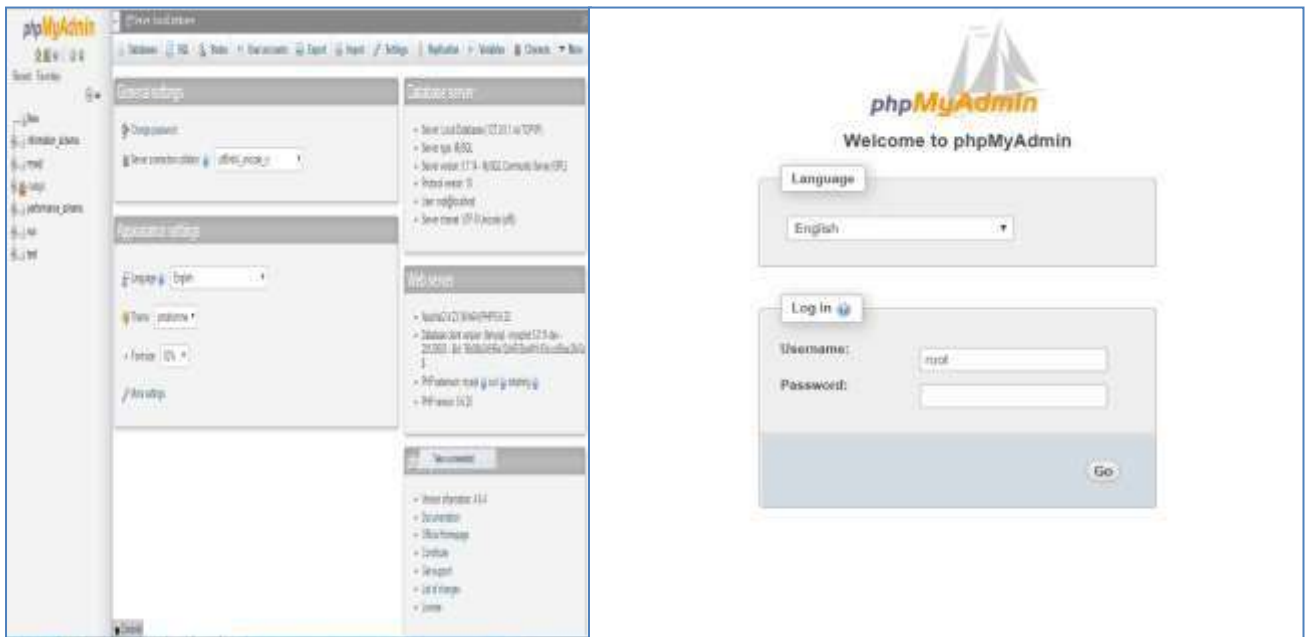


Figure B.2- Home Page

Appendix C. Pact Analysis Questionnaire

Questionnaire for PACT Analysis

Online Registration System of Divisional Secretariat

Please circle the correct answer

1. Your Computer Skills

- a. Not Good
- b. Good

2. What is your typing speed in word per minute? Around

- a. 20wpm
- b. 30wpm
- c. 40wpm

3. Have you used browsed web on a desktop or a laptop?

- a. Yes
- b. No

4. Computerizing your work will reduce your workload. Do you agree?

- a. No. Do not agree
- b. Agree
- c. Strongly agree

5. Have you browsed the web on a smartphone?

- a. Yes
- b. No

6. Which one is convenient to perform your work?

- a. Desktop
- b. Smart Phone
- c. Tablet PC(Tab)