

A WEB BASED UTILITY NOTIFICATION SYSTEM

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This Report Presented in Partial Fulfillment of the Requirements for the Degree of
Bachelor of Science in Computer Science and Engineering

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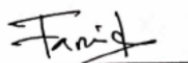
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We hereby declare that, this project has been done by us under the supervision of **Ms. Nazmun Nessa Moon, Assistant professor, Department of CSE** Daffodil International University. We also declare that neither this project nor any part of this project has been submitted elsewhere for award of any degree or diploma.

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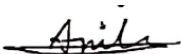
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Abstract

Public utilities are those services which are absolutely necessary for the community. Some of the services are like water supply, gas, electricity, transportation, communication, etc. which cannot be distributed without a serious successful economic living of the community. These services are so essential to the public that any interruption in their supply would throw the normal life of the community out of gear. For avoiding this interruption, we've come with an idea of a "Utility Notification System". This system provide user the essential utility notification or message in their mobile minimum 24 hours before any interruption of utility. It saves a lots of time, money and a huge hassle.

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CHAPTER 1

INTRODUCTION

1.1 Introduction

In our daily life utility (Water, Gas, Electricity etc.) are really very important. We can't imagine a minute without water, gas, electricity. But sometimes for working purpose or some technical issues it needs a long time to stop those facilities. Now, there is a process of announce those issues by mike in advance. But in the end it is not helpful. So, we proposed to make this “Utility Notification System” where people will be notified more effectively than ever.

1.2 Motivation

Every time people suffer a lot for utility disturbance. Recently from Feb18 to Feb 19, the people of Dhaka city had suffered from gas crisis around 26 hours [1]. The sudden outage of gas imposed untold sufferings on the city dwellers as there was no prior announcement from the state-run utility company. And it is more harassing when someone don't listen the mike announcement or can't scroll television earlier due to their absence of home or busy in other necessary work. So, we wish to make a system which can inform everyone in an effective way. We believe that this alert system will be very helpful to all, people will be mentally prepared in advance and reduce harassment. Nowadays everyone uses phone so, it will be a good one to inform people by text.

1.3 Objective

- To notify clients about service interruption.
- To reduce damage of public resource and hassle.
- To save valuable time and money.

1.4 Expected Outcome

Our web app will provide necessary notification before any utility disturbance and other disastrous event. This web app will save a huge damage of our time, money and other resources. On the other hand, user can send admin any complain about their utility system through our user app. This feature makes our app more interactive and user friendly.

1.5 Report Layout

Chapter 1: Introduction

In this section we have discussed about the introduction, motivation, objectives and expected outcome of the project.

Chapter 2: Background

This chapter is about the background of our project. We also talk about the related works, comparison to other systems, the scope of the problem and challenges of the project.

Chapter 3: Requirement Specification

Here we discuss about the requirements like business process modeling (bpm), the requirement collection and analysis, the use case model of the project and their description, the logical data model and the design requirements.

Chapter 4: Design Specification

All the designs of the project. Front-end design, back-end design, interaction design and UX and the implementation requirements are discussed in this chapter.

Chapter 5: Implementation and Testing

This chapter contains the implementation of database, front-end designs, interactions, test implementation and the test results of the project.

Chapter 6: Conclusion and Future Scope

The conclusion and the scope for further developments which pretty much derive about the project is discussed here.

CHAPTER 02

BACKGROUND

2.1 Introduction

A web application is a web based computer program which utilizes web technology to perform web related task over the Internet [2]. We have used Python as the main programming language and also used Django web framework to make this robust interacting web app. Beside we use HTML, CSS and Bootstrap framework to design the user interface of our app. Also used SQLite3 as our primary database. In our project we use “**Twilio sms api**” for our programmable sms which has the features to build quickly and scale to production [3].

2.2 Related Works

We have researched and browsed for a long time but a matter of regret we have failed to found similar apps which has been used for utility notification system. As a result we did not found any app for comparison with our app.

2.3 Scope of the Problem

There are many scopes of this problem such as scarcity of proper utility notification system for the communication between the utility authority and the mass people for this communication gap people have suffered a lot but currently there are not any solution to solve this problem. So, we have decided to make an app which can reduce the communication gap between authority and mass the people.

2.4 Challenges

We have faced a major challenge at the time of making this app. The challenge is, there are lack of professional local sms api in our country. As a result, we have to use a foreign sms api named twilio which is very expensive. So, we have to use trial version of this api instead of paid version.

CHAPTER 3

REQUIREMENT SPECIFICATION

3.1 Business Process Modeling

We have used BPM in our project so that we can provide a better and cost effective application. In this process we can see the admin can send sms to a user to notify about the utility disturbance. Admin need to login then need to find users zone and send them notification through sms [4].

BPM model show in figure 3.1.

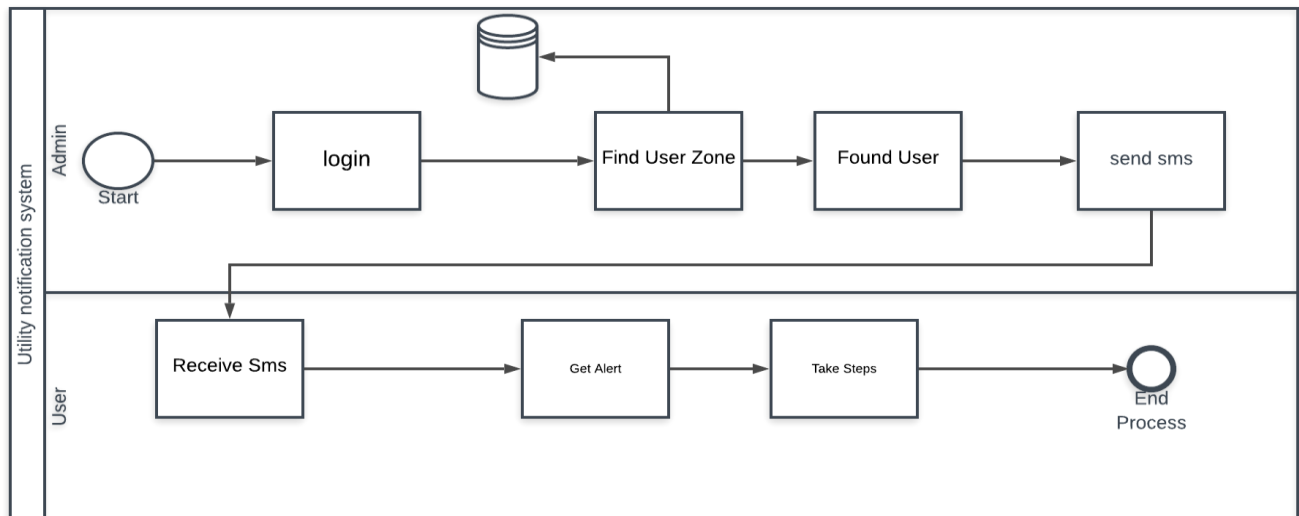


Figure 3.1: BPM of Utility Notification System

3.2 Requirements Collection and Analysis

We have collected our utility information from the user and analyze them for the sake of our project. We have collected the information from user end and use it for developing our project. We also search data for water, gas and electricity disturbance and use it to developed an optimized web application. A web app requirement could be software wise or hardware wise. Our application required a lot of time and logics to finish. So, the usual requirements that needed to full fill my applications were,

- Coding language
 - Python
 - Html, CSS
 - RDBMS
 - Django Web Framework
- Software
 - Pycharm IDE
 - Twilio Sms Api
- Hardware
- Any mobile phone

3.2.1 Analysis

After a lot of research, we didn't find any proper application or any solution to solve this issue. So we've decided to hack the problem with our best possible solution. Since then we worked hard and developed this "Utility Notification System".

3.3 Use Case Modeling and Description

In our use case model there are two actors admin and user .Admin has four tasks to do and user has to do two tasks only. Use case model show in figure 3.2.

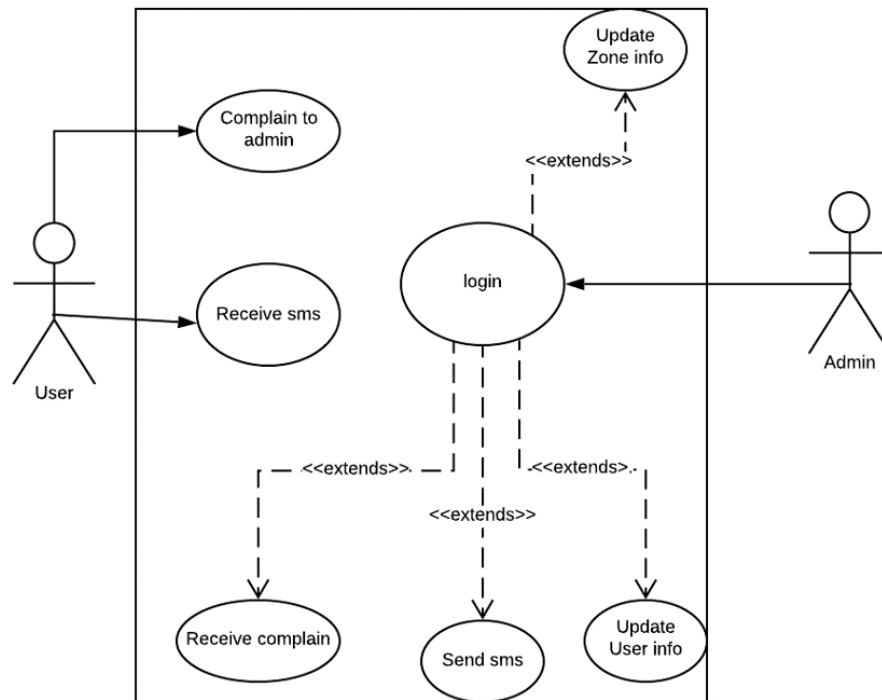


Figure 3.2: Use case diagram of Utility Notification System

Use Case Description of Utility notification app

Use Case: Admin

Actor: Administrator of public utility

Pre-condition: NULL

Primary Path

- Fill the data fields
- Click the login button
- Take to the Dashboard page

Alternate Path

- Didn't choose sign up as user
- Data field is empty
- Connection error

Post-condition

- If login successful
- If home page is loaded

Use Case: User

Actor: General people

Pre-condition: null

Primary Path

- Check the message
- Take necessary steps

Alternate Path

- Connection error
- Didn't check the message or notification

Post-condition

- If message is read successfully
- If steps are immediately

Use Case: See user list

Actor: Administrator of public utility

Pre-condition: Login

Primary Path

- Choose list tab

Alternate Path

- Didn't choose list tab
- Connection error

Post-condition

- If list was loaded

Use Case: Search affected zone

Actor: Administrator of public utility

Pre-condition: Login

Primary Path

- Choose search button
- Type address or subject or name

Alternate Path

- Didn't choose search button
- Didn't typed address or subject or name
- Typed wrong type of search
- Connection error

Post-condition

- If search is successful

Use Case: Write a message

Actor: Administrator of public utility

Pre-condition: Login

Primary Path

- Find message option
- Click on the tab

Alternate Path

- Didn't found message option
- Didn't click on the tab

Alternate Path

- Didn't choose sign in page
- Data field is empty
- Connection error

Post-condition

- If log in successful
- If home page is loaded

3.4 Logical Data Model

We have used logical data model for representing data architecture and organization in a graphical way. We have used user, sms, admin and zone model for designing logical data model.

Logical data model is giving below in figure 3.3.

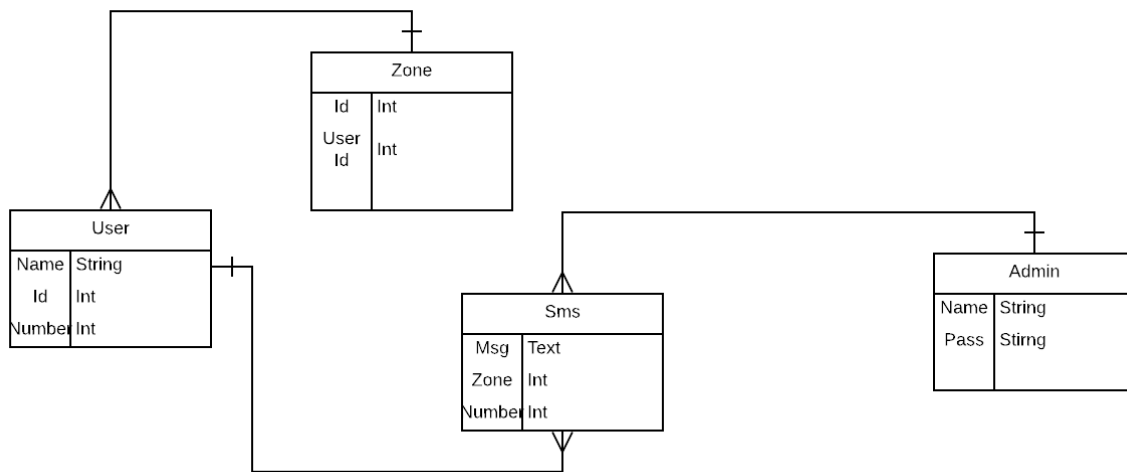


Figure 3.3: ER Diagram of Utility Notification System

Description of Logical Data Model

There are two users in this system. One is admin and another one is mass people. Admin can send sms to a user to notify about the utility disturbance. A user can also submit any problems in complain section.

3.5 Design Requirements

The tools we needed for designing the system:

Make System Simple and Flexible for Users

The system is very flexible and easy for admin.

Make the System Compatible

The system is compatible, future maintenance and enhancement must less.

Efficiency

We developed an efficient system. But we've to work more on this topic.

CHAPTER 4

DESIGN SPECIFICATION

4.1 Front-End Design

Front-end design is the one of the important part of our project. We have used html, css and bootstrap framework for our frontend. There, while developing the app we tried to make it user-friendly so that the user can easily interact with it.

Home page

Home page is the first page that appears upon opening a web browser. In the figure 4.1 shows the home page of our project where have home, about, admin portal, and complaint section for user.

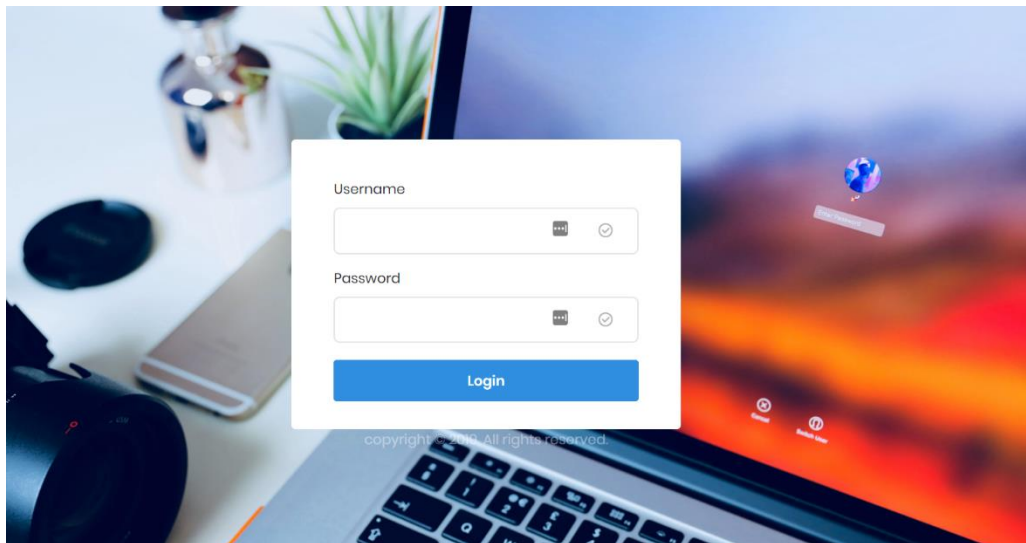


Figure 4.1: Home Page

Dashboard

Dashboard is the page that shows the analysis of the application's data, trends, summaries etc. In our case our admin can observe user list, zone list and send sms through this dashboard. In the figure 4.2 shows our dashboard, where admin can easily access user's info and can control over other info easily.

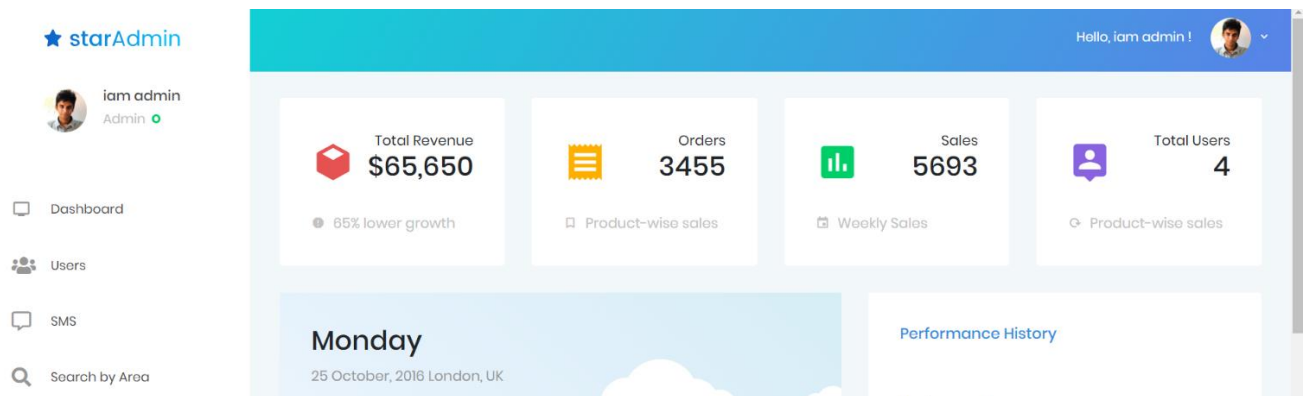


Figure 4.2: Dashboard

User List

In the given figure 4.3 we shows that here, we can found user list with their proper info and with postal –code. It helps us to navigate the user info properly.

The screenshot shows the starAdmin user list page. The sidebar is the same as in Figure 4.2. The main content area has a top header with 'Hello, iam admin!' and a user profile. Below this is a table with the following data:

User	Full name	Number	Postal Code
	iam admin	+8801756870767	1209
	serajush salekin	+8801710923272	1208
	Michel Richard	01122233322	1208
	mshassan.dhk313@gmail.com	None	None

Figure 4.3: User List

Search Option

Here, we have also added search option to find the users with the help of their zone. It's also easier and time consuming for the admin user. Figure 4.4 shows the search option.

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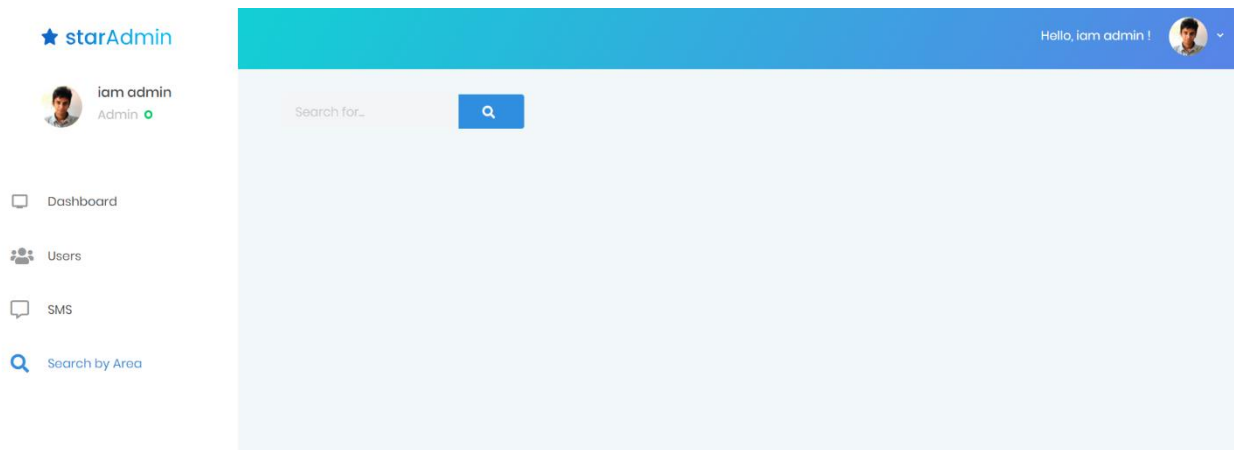


Figure 4.4: Search Option

Utility Component

Here, we have also added three utility component side by side. So, any admin user can easily navigate which utility component he/she wants to use for sending message. If anyone needs to send to all user they can do it easily with the all options. Figure 4.4 shows the utility option.

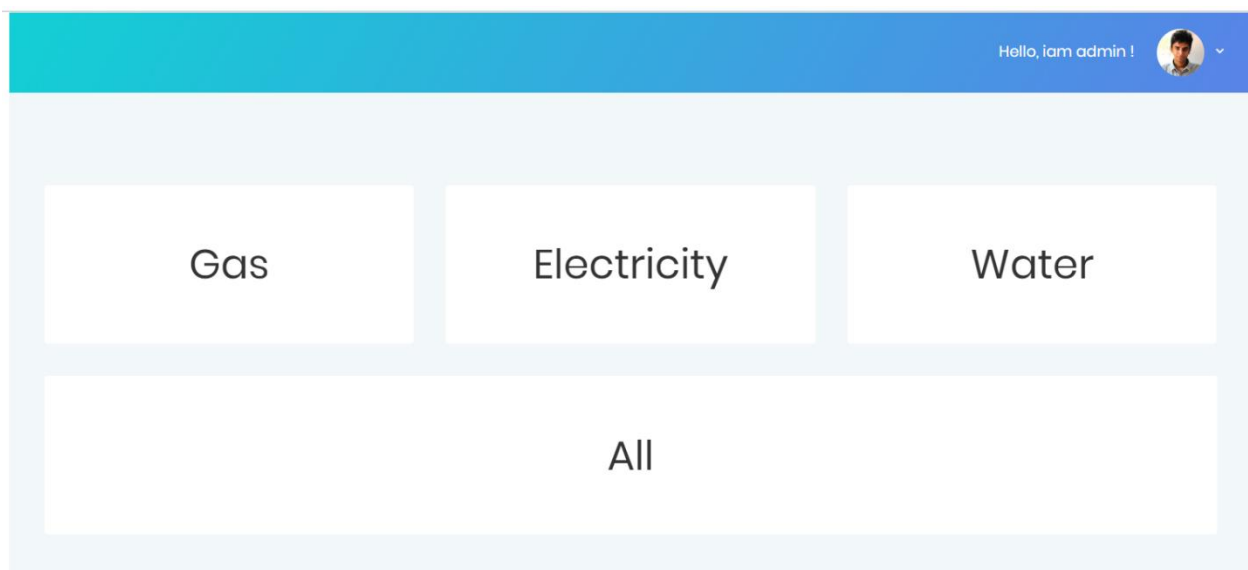
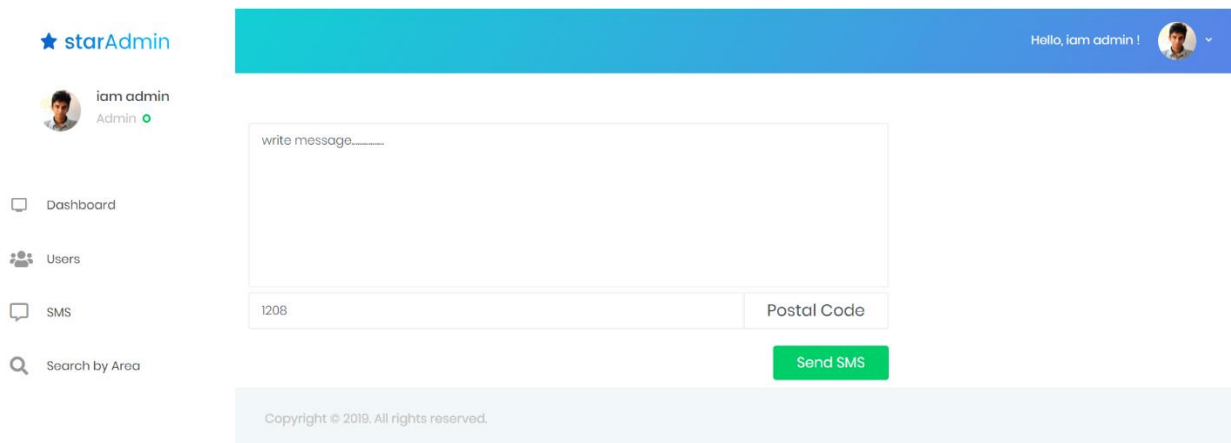


Figure 4.5: Utility Option

Send message

After entering in any component admin can write the message in the text box and select the required postal code for any place and send the message to the users of those area. Figure 4.6 shows the search option.

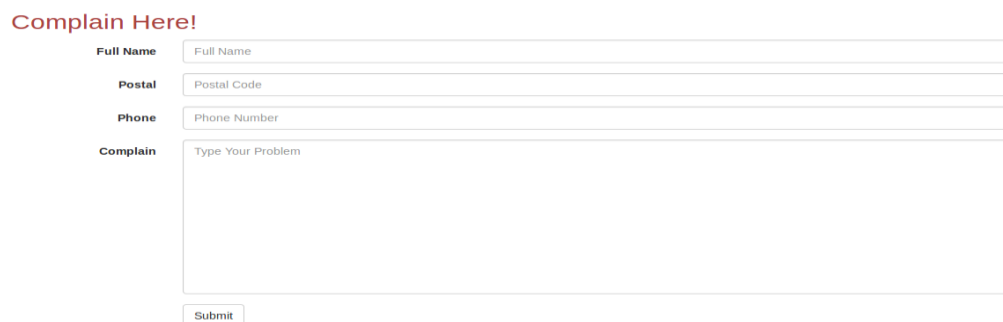


The screenshot shows the 'Send Message' interface within the 'starAdmin' dashboard. On the left is a sidebar with navigation links: 'Dashboard', 'Users', 'SMS', and 'Search by Area'. The main content area features a large text box labeled 'write message.....'. Below this is a 'Postal Code' input field with the value '1208' and a green 'Send SMS' button. The top right of the dashboard shows a user profile for 'iam admin' with the text 'Hello, iam admin !'. The footer contains the copyright notice 'Copyright © 2019. All rights reserved.'

Figure 4.6: Send Message

Complaint box

We have developed a complain box where user can complain about their utility problems to the authority. As a result, authority can take necessary steps to solve the problem as early as possible. Figure 4.7 shows the complaint option.



The screenshot displays the 'Complain Here!' form. It includes four input fields: 'Full Name', 'Postal Code', 'Phone Number', and a large text area for 'Type Your Problem'. A 'Submit' button is located at the bottom left of the form. The form is titled 'Complain Here!' in red text.

Figure 4.7: Complaint Box

4.2 Interaction Design and UX

UX Design is the one of the important part of our project. We have used our previous user experience for developing this apps. We have developed our UI through user research and analysis.

4.3 Implementation Requirements

Utility notification system is a web app. We have used software and use different kind of languages. In this project we have integrate a sms api service also.

Design:

Design is the one of the most important part for viewing the out loos of any application. Because when any user or client uses the application they have to feel comfort and easy to handle when they interact with the application. We used html as a markup language for structuring the layout of our web application. For make colorful and increase the prettiness of apps we used the updated css framework bootstrap . It makes our apps more responsive and beautiful. For creating an interacting design we've used scripting language javascript known as JS.

Backend:

For make this application faster, dynamic and efficient we've used Django web framework as our backend. For setting this framework behind the scene, we don't need to tense about security. Because Django resolves security issue out of the box. Django is a python language based framework.

CHAPTER 5

IMPLEMENTATION AND TESTING

5.1 Implementation of Database

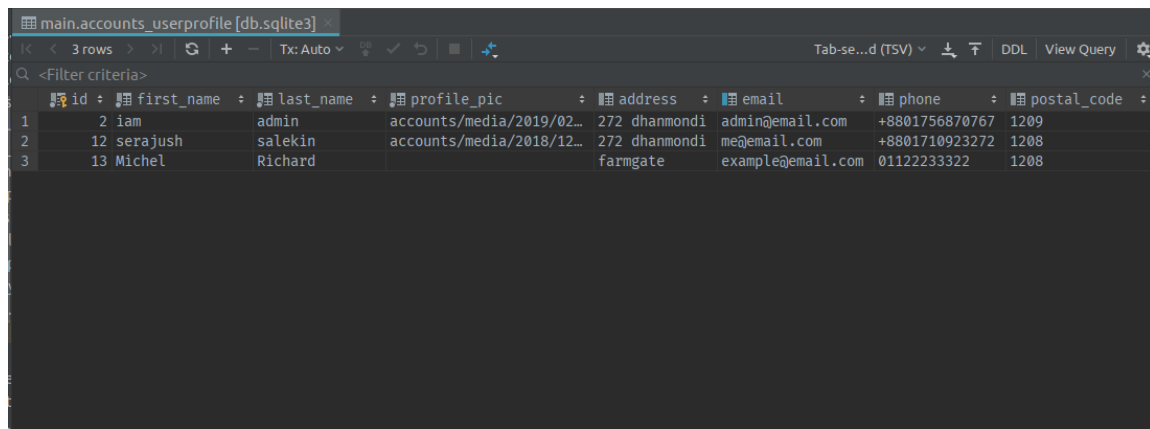
Database implementation is one of the important part of our backend part. We have used SQL database for storing data.

Database Table

We have used admin, user and complaint table for our database management system. They have one to many relationships among them. Every table has column and row for storing data.

Database for Admin

In the figure 5.1 show the admin's database. It reserves all the information about the admin who controls the app.



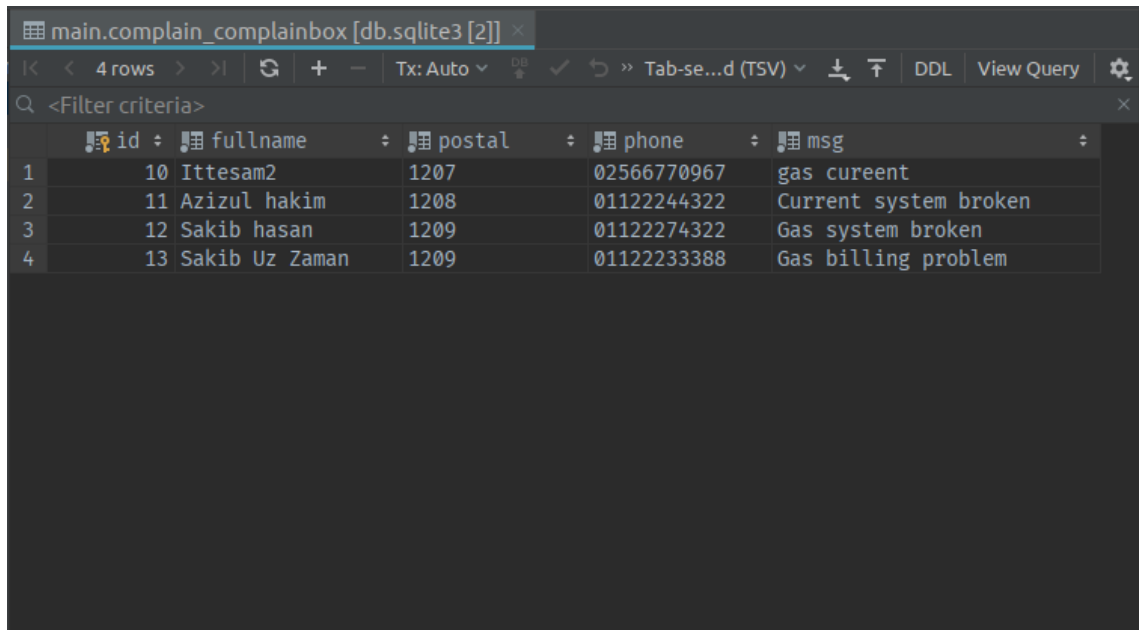
The screenshot shows a SQLite database viewer interface. The title bar indicates the database is 'main.accounts_userprofile [db.sqlite3]'. The interface includes a toolbar with navigation and query tools. Below the toolbar, a table with 8 columns is displayed: 'id', 'first_name', 'last_name', 'profile_pic', 'address', 'email', 'phone', and 'postal_code'. The table contains 3 rows of data. The first row has an 'id' of 2, 'first_name' of 'iam', 'last_name' of 'admin', and a 'profile_pic' path. The second row has an 'id' of 12, 'first_name' of 'serajush', 'last_name' of 'salekin', and a 'profile_pic' path. The third row has an 'id' of 13, 'first_name' of 'Michel', 'last_name' of 'Richard', and a 'profile_pic' path. The 'address', 'email', 'phone', and 'postal_code' columns contain contact information for each user.

id	first_name	last_name	profile_pic	address	email	phone	postal_code
2	iam	admin	accounts/media/2019/02...	272 dhanmondi	admin@email.com	+8801756870767	1209
12	serajush	salekin	accounts/media/2018/12...	272 dhanmondi	me@email.com	+8801710923272	1208
13	Michel	Richard		farmgate	example@email.com	01122233322	1208

Figure 5.1: Database for admin

Database for Complain

In the figure 5.2 shows complain database table. Here user have id, user name, postal code contact no and their demand or complain.



The screenshot shows a database viewer interface for a SQLite3 database. The table 'main.complain_complainbox' is displayed with the following data:

	id	fullname	postal	phone	msg
1	10	Ittesam2	1207	02566770967	gas cureent
2	11	Azizul hakim	1208	01122244322	Current system broken
3	12	Sakib hasan	1209	01122274322	Gas system broken
4	13	Sakib Uz Zaman	1209	01122233388	Gas billing problem

Figure 5.2: Database for Complain

Super Admin Control System

A super admin can control the sub-admin panel through this process. A super admin can easily add or remove any sub-admin if he/she wishes. So all sub-admin will be under controlled by a super admin. It makes the system more secure.

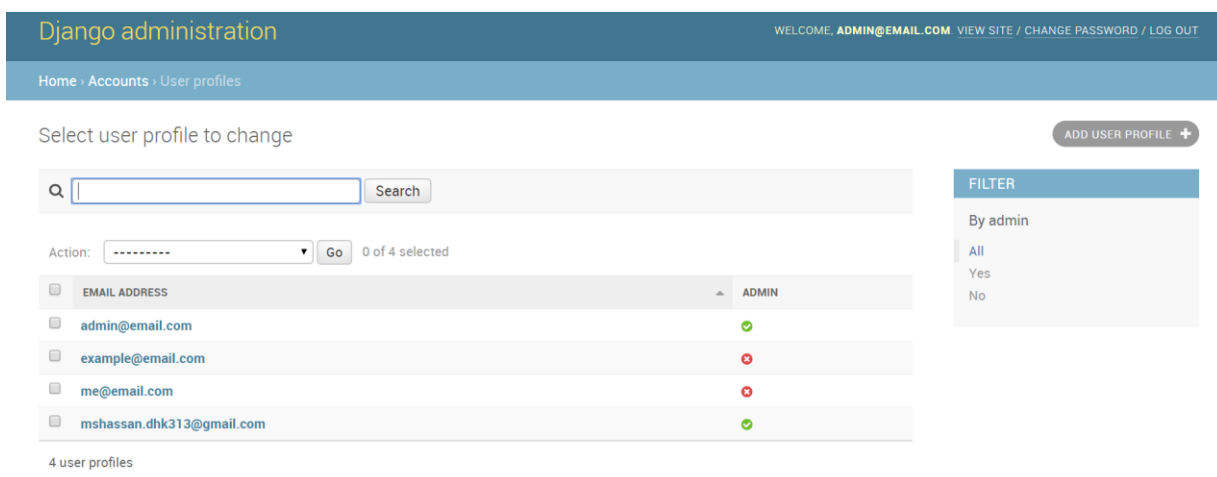


Figure 5.3: Database for Super Admin Control System

Admins Profile

We have used admins profile in database. In the figure 5.4 shows the Database for admin.

The screenshot displays a web form for an Admins Profile. It is divided into two main sections: 'Personal info' and 'Permissions'. The 'Personal info' section contains several input fields: 'First name' with the value 'Michel', 'Last name' with 'Richard', 'Profile pic' with a 'Choose File' button and 'No file chosen' text, 'Address' with 'farmgate', 'Phone' with '01122233322', and 'Postal code' with '1208'. The 'Permissions' section shows a single entry 'Admin' with a checkbox. At the bottom, there are three buttons: 'Delete' (red), 'Save and add another' (light blue), and 'Save and continue editing' (medium blue), followed by a 'SAVE' button (dark blue).

Personal info	
First name:	Michel
Last name:	Richard
Profile pic:	Choose File No file chosen
Address:	farmgate
Phone:	01122233322
Postal code:	1208

Permissions	
☐	Admin

Figure 5.4: Database for Admins Profile

5.2 Implementation of Front-end Design

We have used html, css and bootstrap for implementing our frontend design. We also used javascript as a frontend programming language. Besides we use our user experience to develop the UI more interactive.

There are two factors of implementing the front -end design

- There will be two types of users like admin and user.
- Admin must be login by filling up the required information fields.

5.3 Implementation of Interactions

There are two part of the project. This is admin and user. In this project, admin can control whole system. In this project admin sends alert message to user. Admin can see user details. User only receive sms ask question. After finish admin will receive a successful confirmation. We think in this project admin and user will connect with each other.

5.4 Test Implementation

Our goal is to design a series of test case that have a high likelihood of finding errors. To uncover the error software techniques are used. These techniques provide systematic guidance for designing. In the table 5.1 shows the test implementation.

TABLE 5.1: TEST IMPLEMENTATION

Test Case	Test Input	Expected Output	Actual Output	View	Date
1.Display the application pages	Tested browsers- Firefox, Safari Google Chrome, Opera.	To display the page Successfully	Display the page successfully	Successful	22-03-19
2. Username	Blank or Incorrect username	To warn that username or correct username must enter	Show the warning	Successful	25-03-19
3. Password	Blank or Incorrect username	To warn that password or incorrect	Show the warning	Successful	27-03-19
4. Home	Click on the home button	To show the home page	Show the home page successfully	Successful	30-03-19
5. Admin Portal	Log into the admin dashboard	To see the pending request	Showed the user pending request	Successful	30-03-19
6. logout	Click on the logout button	To logout from that account	Logout successfully	Successful	30-03-19

5.5 Testing Result and Report

In our web apps if admin uses wrong password or user name, he/she cannot login. If admin use correct user name and password then he/she can login. Only admin can login in admin panel. After login user can search option. Then he/she can see particular problem, information and solution. User must need to select search and select. Then he /she get information. He/she can also see the recent update.

CHAPTER 6

CONCLUSION AND FUTURE SCOPE

6.1 Discussion and Conclusion

Utility notification app is a way to make an interactive communication between the mass people and the utility authority. For any emergency, development or for any other disastrous event if the utility problems are held authority can send an alert to the people so that they can prepare for the coming situation. A sms can save their valuable time and money. On the other hand, user can send their any complain or recommendation through the complaint box. It helps the authority to improve their service in future.

6.2 Scope for Further Developments

We would like to continue developing this app to add:

- Continuous development of the user interface to improve user experience
- Stability improvements.
- Giving more accurate and scalable facility.

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- [4] “What is BPM”. [Online]. Available: <https://www.aiim.org/What-is-BPM#>. [Last accessed Feb 15, 2019].

APPENDIX

APPENDIX A: PROJECT REFLECTION

The purpose of this appendix is about project reflection. From summer 2018 semester we have started journey to make this application. The main feature of my application is sending an alert notification to the Utility user.

Also using this application one user can easily contact with utility authority and can complaint about their issue. Firstly, we build a model for our project then we implemented the idea step by step. After many hard work and spending a lot of time finally we are able to reach the goal.

We hope that this application can reduce the hassle of the user and save their valuable time and money as well.

PLAGIARISM REPORT

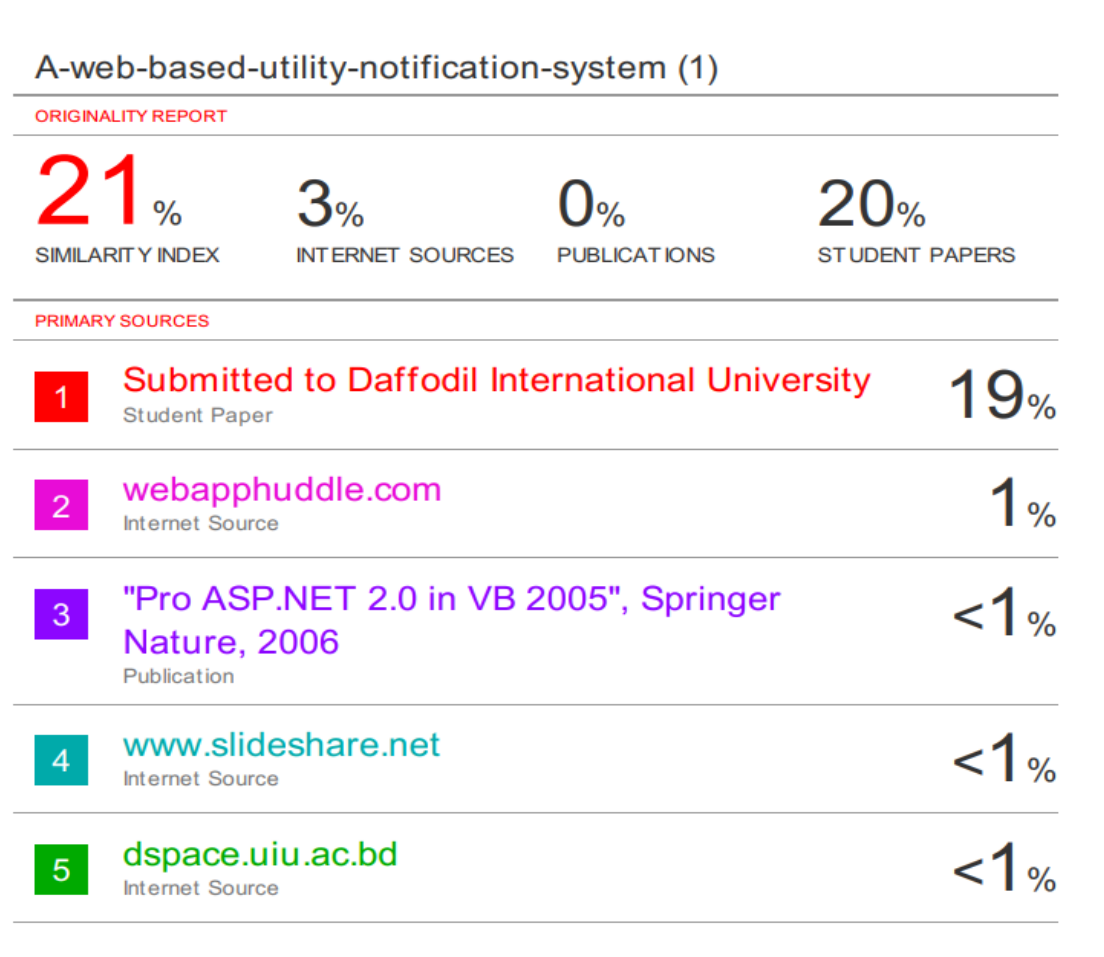


Fig: Plagiarism Report