An Undergraduate Internship/Project on SAWRP II Database

By

Uzma Chowdhury

Student ID: **1610491**

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Supervisor:

Ajmiri Sabrina Khan

Lecturer

Department of Computer Science & Engineering

Independent University, Bangladesh

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Dissertation submitted in partial fulfillment for the degree of Bachelor of Science in Computer Science

Department of Computer Science & Engineering

Independent University, Bangladesh

Attestation

*** Write about the originality of your work ***

Signature

Date

Write Your Name Here

Name

Acknowledgement

I would firstly like to thank The Almighty Allah for giving me the endurance and the ability to work hard, for giving me the ability to write this report to and for giving me the chance to be able to do my internship at Dcastalia Limited. Also, my parents for their unconditional love and support that have sustained, nurtured, and got me ready for this challenge.

I would like to thank my honorable faculty and supervisor Ms. Ajmiri Sabrina Khan, Lecturer, Department of Computer Science Engineering, Independent University, Bangladesh, for her invaluable guidance, patience, time, constructive criticism and thoughtful advice regarding various aspects of my internship and preparation of this report.

I would like to thank my senior coworkers Anjan Dutta, and all the others who made me feel at home from day one in the company and helped me navigate throughout the projects. And I would like to thank Taposhi Rabea for the sincere guidance in the project. I am thankful for the continuous guidance and support along with the vast pool of knowledge which was key for the completion of the project.

Lastly, I would like to acknowledge my external supervisor and my mentor Mr. Khairul Hasan for appointing me as an Intern for Dcastalia limited and include me to be a part of this company. Without his extreme energetic support and guidance, I could not finish the project successfully.

Letter of Transmittal

14 January 2021
Ajmiri Sabrina Khan
Lecturer,
Department of Computer Science and Engineering,
Independent University, Bangladesh
Subject: Letter of Submission for Internship Report, Summer 2020

With due honor and respect, I, Uzma Chowdhury, from Autumnr 2020, Section 12, would like to submit my Internship report. This report is written to kindly inform you that I have completed my internship program and its report. My internship was conducted from 1st November to 20 January 2021. I completed my internship at Techdojo Limited.

This report is based on my experience and the work I did at Dcastalia Limited during my internship. The primary goal for my internship was to gain experience in all the different technology related fields of the company, including research and development, documentation, software development, and to get acquainted with software development processes and practices with emphasis and priority on understanding how a software is being built rather than what is being built.

Over the period of my internship at Dcastalia Limited, I found out that I learned and applied a lot of new skills and technologies. The company comprises of a small team of software craftsmen who learn, collaborate, and innovate together.
I hope the following report can achieve your approval and is up to the mark. Sincerely,
Uzma Chowdhury, 1610491
Email: uzma7nc@gmail.com

Evaluation Committee

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Signature

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Name

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Supervisor

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Signature

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Name

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Internal Examiner

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Signature

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Name

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External Examiner

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Name

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Convener

Abstract

In the South Asian Wash Rehabilitation (SAWRP II) I was assigned to do three different parts of the project. The Data Importer, the database of weekly database and baseline database.

In the data importer a CSV File will be uploaded and imported to the database. Here I had to convert the CSV file and send it to the My SQL database; in order to so I used PHP plug ins such as PHP Office and PHP Spreadsheet in order to convert the data of the CSV file and save it in the database.

For the databases of weekly database there is an advance search option which was set in the pop up form and when the information are input according to specifics, the desired report gets displayed on the screen. In order to make this function work I had to set the get method action as a parameter which calls an URL in the query to fetch the required functions and displays them from the database.

The baseline database had all the same actions such as the weekly database just without the searching option as the data for baseline data is fixed.

The reporting section displays all the data that was input in the database in graphical format. The php data is converted in order to display in google charts by usng the Json function and then generated in the PDF format.

Chapter 1

Introduction

1.1 Overview/Background of the Work

Hygiene and sanitation have been a big factor regarding the health of the people of Bangladesh, especially in rural areas. These unhygienic and unsanitary habits have led to a lot of diseases and deaths revolving around these subjects. Plan International Bangladesh (PIB) has taken the initiative to identify the root cause of this problem by first surveying and then providing the necessary things needed to create a hygienic countryside in Bangladesh.

To try to resolve such a situation we, a community of developers in Dcastalia partnered with PIB and agreed to develop a database application called SAWRP II. The idea of the application is for people of rural areas who are misinformed about the basic sanitary benefits and need to be educated regarding this matter.

The application has many users who are divided into sub-categories to collect and gather information and upload it to the database every alternate week. The facilitators, who are the entry-level users collect data by conducting a survey with a set pattern of questions and go from door-to-door to the houses and ask them these questions. Then inform them about the benefits of sanitation and hygiene. These facilitators then again go to their designated houses and ask the same questions and collect data and input it. The application then generates a weekly progress report to show if the informative survey has helped the people in any way.

1.2 Objectives

Sinks the data of the cloud to the database application: The application serves as a medium for people/facilitators to input the recorded data of the survey.

Controls and accesses the survey information: The application serves as a medium for the admin to control and access the input information provided by the facilitators in

order to monitor their work

Generates and monitors the progress reports: The application will let the admin identify the trend/progress of how much improvement has occurred after the survey was conducted in comparison with the initial data

1.3 Scopes

Features available to the user after the development of this web application: • Dashboard • Data Importer • Weekly Data Report • Baseline Data Report • Entry-wise Report • Trend Report • User Access Control • Vast User Management System

Chapter 2

Literature Review

2.1 Relationship with Undergraduate Studies

Independent University, Bangladesh, offers an array of courses that have helped in the SAWRP creation process. The courses, in no particular order, are as follows: -

CSE 203, Data Structures: This is the most simple course that has helped with the concepts and implementations of many data structures. Since SWARP contains several complex data structures, the skills learned from this course made it much simpler to manage them.

CSE 303, Database Management: Database ManagementThis was the first course that taught how a project is built and planned. Common planning and strategy practices such as the Life Cycle of System Growth, Rich Picture, Requirement Analysis, Entity Relationship Diagram, Business Process Model, and Notation Diagram SQL, MySQL, and many more were covered. This application was heavily based on the learnings and projects that we have covered in this course. My basics in this course have helped me grasp the ideas and workings of this project.

CSE 307, System Analysis and Design: This course provides an overview of the various SDLCs and how the project can be adopted by each of them.

CSE 309, Web Application and Internet: This is the course where the development of web applications was taught. It covered very important technologies that are highly in demand in the industry, such as HTML, CSS, JavaScript, jQuery, View Engines (Handlebars and embedded JavaScript), Node.js, Express.js, MongoDB, and deployment with Heroku.

2.2 Related works

Database for One-Stop Crisis Center

The One-stop Crisis Center (OCC) is part of the Multi-Sectoral Program on Violence

against Women, a project of the Bangladesh Ministry of Women and Children's Affairs.

National Forensics DNA Profiling Laboratory

NFDPL, founded at Dhaka Medical College, is the country's first-ever forensic DNA profiling laboratory. We created an intuitive application for the database that records all case profiles with supporting documentation, enabling users to prepare a different collection of running reports.

Chapter 3

Project Management & Financing

3.1 Work Breakdown Structure

1. SAWRP II

Development of the Software Requirement System (SRS) of the system.

Development of the overview of the system. Development of monetization plans. Design and development of Data Flow

Development and finalization of Security Requirements Development and finalization of Quality and Testing Requirements

Design and resource gathering phase

Gather UX and UI inspirations and plan UX and UI Wireframing the app using the UX and UI inspirations Finalize UX and UI

Development of Data Models

Bug fixing and issue resolution Finalize Development and UT

Testing and integration of all modules

Integration of all modules Configuration of the modules Operational, functional, and integration testing cycles Coordination of bug-fixing/issue resolution Finalize Testing of features

Deployment and Publishing of app

Production Deployment Publishing formalities Release the version

Project Support

Future planning Future review meetings Progress Reporting

3.2 Gantt Chart

Development Process Months & Weeks		Month 1				Month 2			
		1	2	3	4	5	6	7	8
		1-5	6-10	11-15	16-20	21-25	26-30	31-35	36-40
+	**Requirement Finalization**								
+	**Technical Understanding**	10 work-days							
	Codebase & Platform								
	Identify Risks & Complexity								
	Dependencies & Assumptions								
	Sitemap Development & Sign Off								
+	**Design Documents**								
	Database Design								
	System Architecture								
+	**Layout Finalization**	10 work-days							
	Project Listing								
	Project Details								
	Search								
+	**Core Development**		25 work-days						
	Content Management System								
	ER-Diagram Planning & Dev								
	General Pages								
	Reporting Module & Details								
	UAT Feedback Implementation								
+	**Data Presentation**				15 work-days				
	Finalized Data From Client								
	Data Optimization & Entry								
+	**Quality Assurance**								
+	**Deployment & Handover**								
	Final UAT & Feeback Implementation								
	Training on CMS								
	Deployment on Client's Server								
	Sign Off Process								
	Week Start Date								
	Week End Date	4 Nov	14 Nov	27 Dec					

Chapter 4

Methodology

Database Management System

A database is a list of associated knowledge that illustrates some part of the real world. For a certain mission, a database system is designed to be installed and filled with data. Database Management System(DBMS) is software for storing and retrieving data from users while taking necessary security measures into consideration. It consists of a group of programs that are tampering with the database. The DBMS acknowledges an application's request for data and instructs the operating system to include particular data. A DBMS allows users and other third-party applications in large systems to store. DBMS Provides security and eliminates redundancies and has many benefits over the conventional flat-file management framework. The categories of users who access a DBMSS are end-users, application programmers, and database administrators.

Database Application

Database applications are software programs designed to effectively capture, handle, and disseminate information. Many small business owners build simple databases with easy-to-use tools such as Microsoft "Access" and "FileMaker Pro." such as customer contact and mailing lists. "Oracle," "SQL Server," and "FoxPro" are examples of advanced programming-language database applications. In order to search, sort, measure, report, and exchange information, database applications are used. Databases that also contain code for conducting mathematical and statistical data calculations to support users' queries. By restricting access to data based on user names and passwords, database applications provide protection. Using database programming, most database programs are personalized.

Chapter 5

Body of the Project

5.1 Work Description

SWARP II is a database application that was a project in collanoration with Plan Internation Bangladesh, an initiative to collect all data regarding the sanitary and hygiene situation in Bangladesh. The datbase application allows the data inputed in the cloud to be imported in CSV file and then generate PDF report inorder to show the stats of the existing situation and track the improvement. The team at Dcastalia wanted to create a platform that makes importing and sorting the data useful, effective and efficient.

5.2 System Analysis

5.2.1 Six Element Analysis

Six element Analysis:

Process	System Roles					
	Human	Non computing hardware	Computing hardware	Software	Database	Comm. & Network
View Login Panel	User	N/A	laptop/desktop/smartphone	Web browser	MySQL Database	WAN/ LAN
Log in	User	N/A	laptop/desktop/smartphone	Web browser	MySQL Database	WAN/ LAN
Import CSV File	User	N/A	laptop/desktop/smartphone	Web browser	MySQL Database	WAN/ LAN

Table 5.1: Six Elements Analysis of "SWARP II"

Process	System Roles					
	Human	Non computing hardware	Computing hardware	Software	Database	Comm. & Network
View All Data	Admin	N/A	laptop/desktop/smartphone	Web browser	MySQL Database	WAN/ LAN
Search for Organization & Upazila	Admin	N/A	laptop/desktop/smartphone	Web browser	MySQL Database	WAN/ LAN
View User activity	Admin	N/A	laptop/desktop/smartphone	Web browser	MySQL Database	WAN/ LAN
View entry-wise report	Admin	N/A	laptop/desktop/smartphone	Web browser	MySQL Database	WAN/ LAN
View trend report	Admin	N/A	laptop/desktop/smartphone	Web browser	MySQL Database	WAN/ LAN
View Progress report	Admin	N/A	laptop/desktop/smartphone	Web browser	MySQL Database	WAN/ LAN

5.2.2 Feasibility Analysis

Both human and environmental health variables are included in the feasibility analysis of SAWRP II. The comparative approach considers all possible options and then assesses them against particular parameters in order to eventually find the best one. In general, the climate conditions in a specific area/region have a direct effect on an enterprise's life. Therefore, the viability of the ecosystem needs to be assessed as well.

5.2.3 Problem Solution Analysis

The google column charts did not display the percentages that were strictly put as a requirement by the client

Solution- we had to set a parameter by using javascript in order to set the percentages so that when the reports are viewed the percentages were displayed while generating the report

The client had provided the color scheme for each of the columns in the report which was not recognized by google charts and hence was providing a wrong/darker color.

Solution- we had to set a parameter by using javascript in order to set the color or each bar that was briefed by the client so that when the reports were being viewed; the right and bright colors were displayed

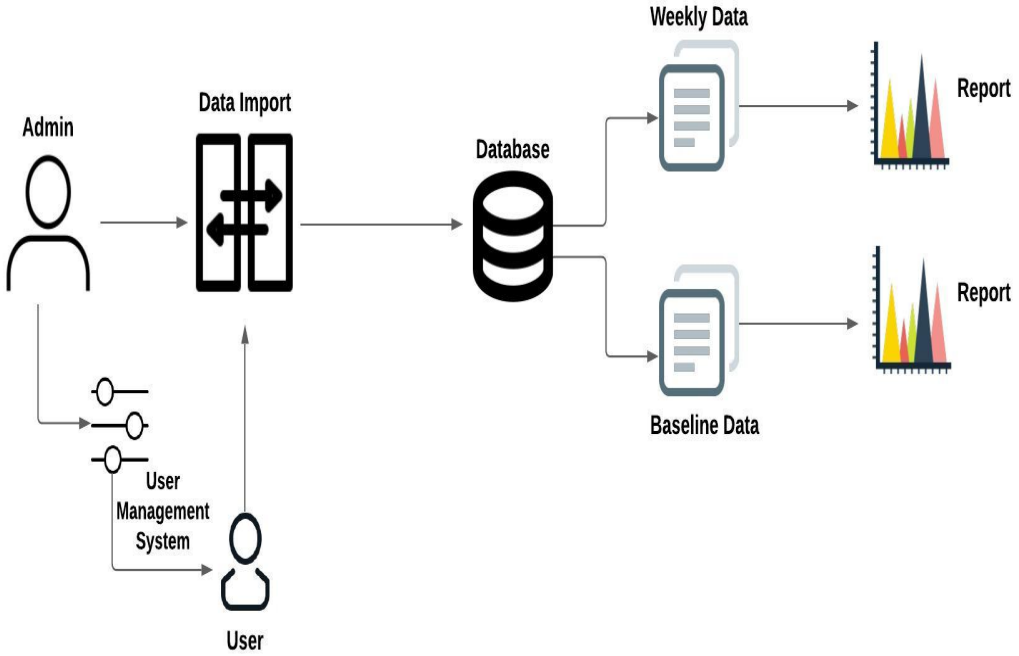
The client wanted to get the whole entry-wise report in one pdf file and generating all the data from the report to pdf was almost logically unfeasible at the beginning.

Solution- We suggested them to generate the pdf in chrome browser so that they can customize the width of the pdf and display all the data in one pdf.

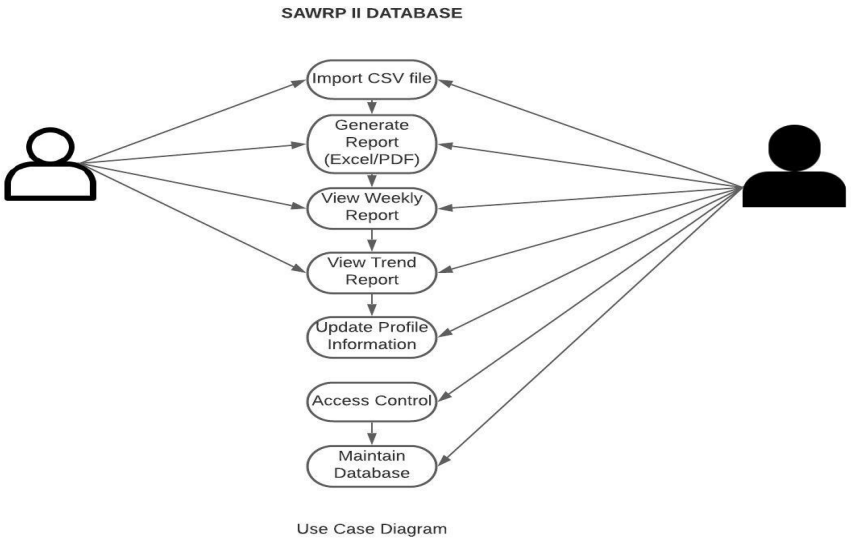
*** You can add more if needed ***

5.3 System Design

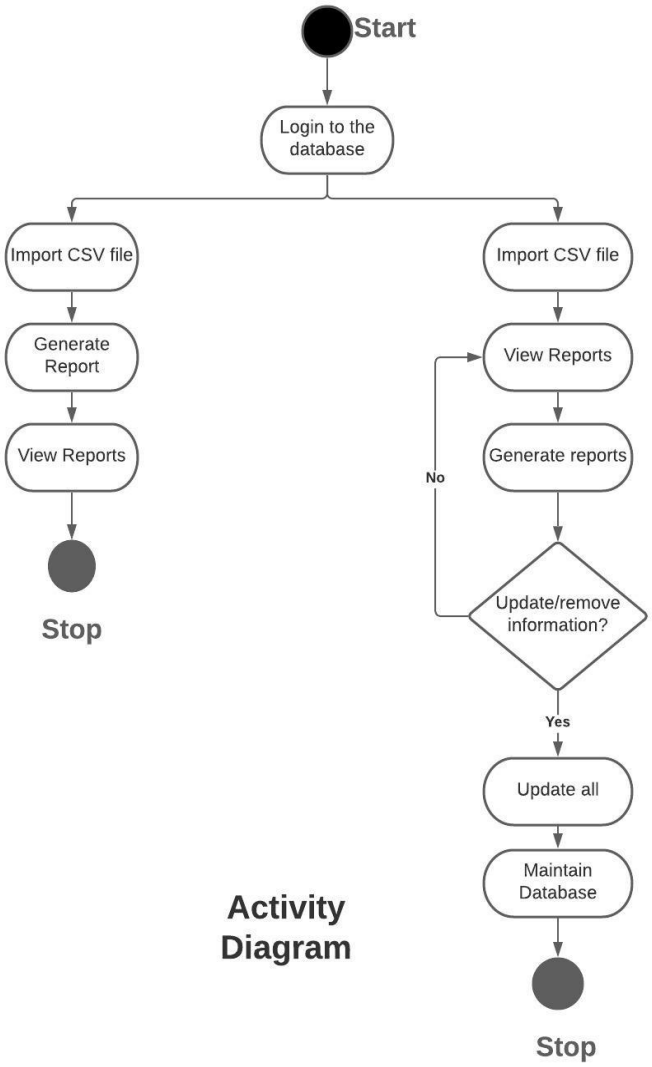
5.3.1 Rich Picture



5.3.2 UML Diagrams



Use Case Diagram



Activity Diagram

5.3.3 Functional and Non-Functional Requirements

Functional Requirements

Function: Must be responsive across all types of screen sizes		
Input: N/A	**Process:** Application must be developed in a common development environment	**Output:** The application can be viewed by using any sort of devices
Precondition: User must have a device with an Internet Connection		
Postcondition: Everyone can use this application from any devices with different screen sizes		

Table 5.3: Functional Requirement 1: Responsive

Function: User must be able to log in		
Input: Username and password	**Process:** Call a login function	**Output:** User will be logged in
Precondition: User must be connected to the internet		
Postcondition: User will be redirected to the dashboard		

Table 5.4: Functional Requirement 2: Log in

Function: Import CSV file		
Input: CSV File containing the survey data	**Process:** Call the import function to import the data in the server database	**Output:** Data will be saved
Precondition: User must be connected to the internet and be on the input form		
Postcondition: Imported data will be saved in the database		

Table 5.5: Functional Requirement 3: Import function

Function: Search for a facilitator		
Input: Search for a specific facilitator	**Process:** Call data search function to the server to search for a specific facilitator	**Output:** Searched facilitator will be viewed
Precondition: Admin must be connected to the internet and be on the dashboard		
Postcondition: Admin will view their searched facilitator		

Table 5.6: Functional Requirement 4: Search function

Function: Search/View report		
Input: Search for the specific report (Progress/Trend/Entry-level)	**Process:** Call the report search function server to search for the report	**Output:** The searched report will be viewed
Precondition: User must be connected to the internet and be on the dashboard		
Postcondition: User will view their searched report		

Table 5.6: Functional Requirement 5: Search Report function

Non-Functional Requirement

Performance: It reflects the consistency of the framework that is needed to demonstrate and to fulfill the needs of our client. The acceptable throughput rate and acceptable response time are defined by efficiency. The data input system has done wonders for the research and data collection methods of the client and made an accessible and efficient system.

Information Efficiency: It describes important and relevant information to users in terms of content, timeliness, precision, and format. Information relates to the inputs and outputs needed and how they will be handled, the types of data required to be processed, how information is actually stored in the system, how external system interfaces will operate, etc. The ability of the mechanism to create outputs with minimum waste is efficient. We attempted to eliminate unnecessary steps in the processes and to make better use of resources.

Security: For any system, protection and management are still an issue. Both server-side and client-side information is protected. In order to be able to specifically modify some kind of information, only admin and developers have access to the application's core code. The office database has many different layers of protection in order to create a more controlled and secured system.

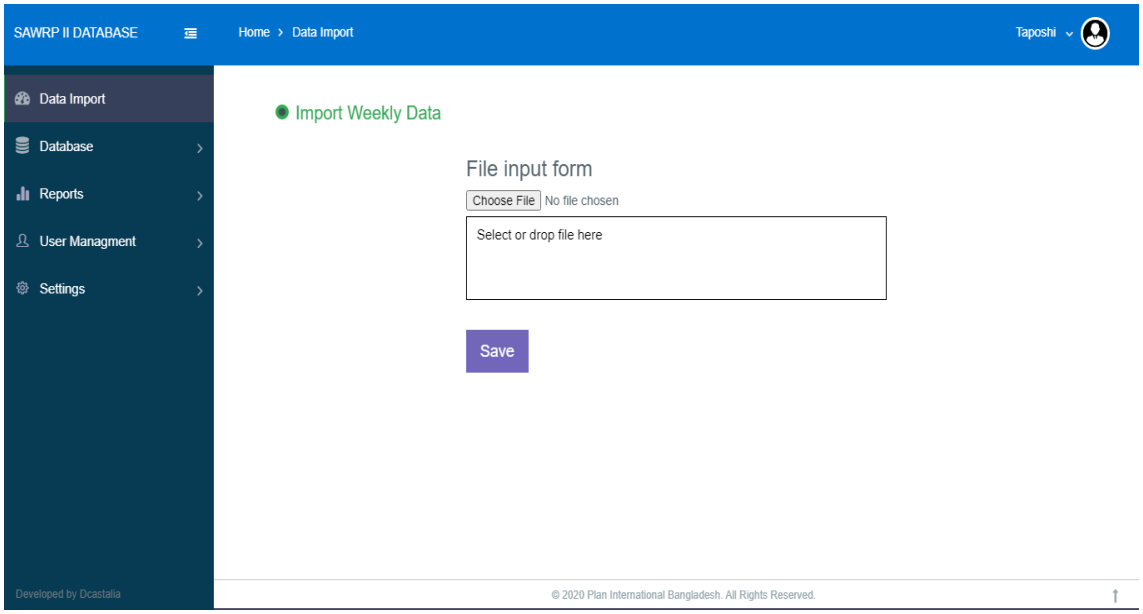
Maintenance: The size of the file will both expand and shrink. Any time more space is needed for the file, it grows by a certain increase and as data is updated weekly to the database, it is stored in any place that has enough memory to store the chunk. Data compassion is used because it not only groups data together, but will also free up space within the register, which can then be retrieved as free storage space on the hard disk by the operating system.

Service: represent needs to make the system reliable, flexible, and expandable. It deals with:

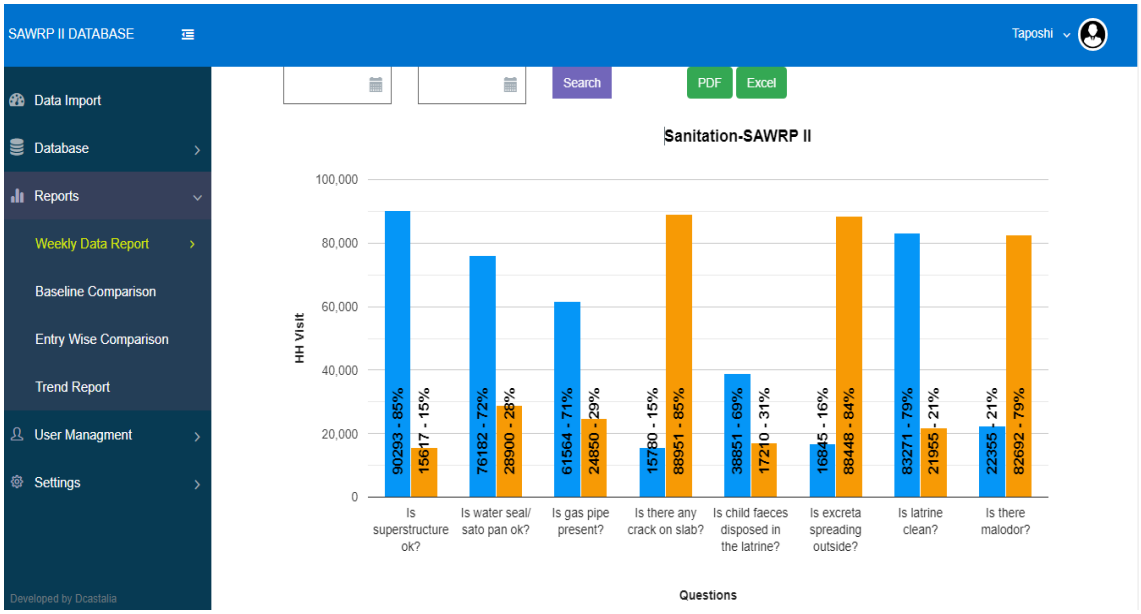
* Who will use the system and where they are located?
* How many types of users will be in this system?
* Reliability/availability requirements
* How the system will be distributed
* What types of documentation is required

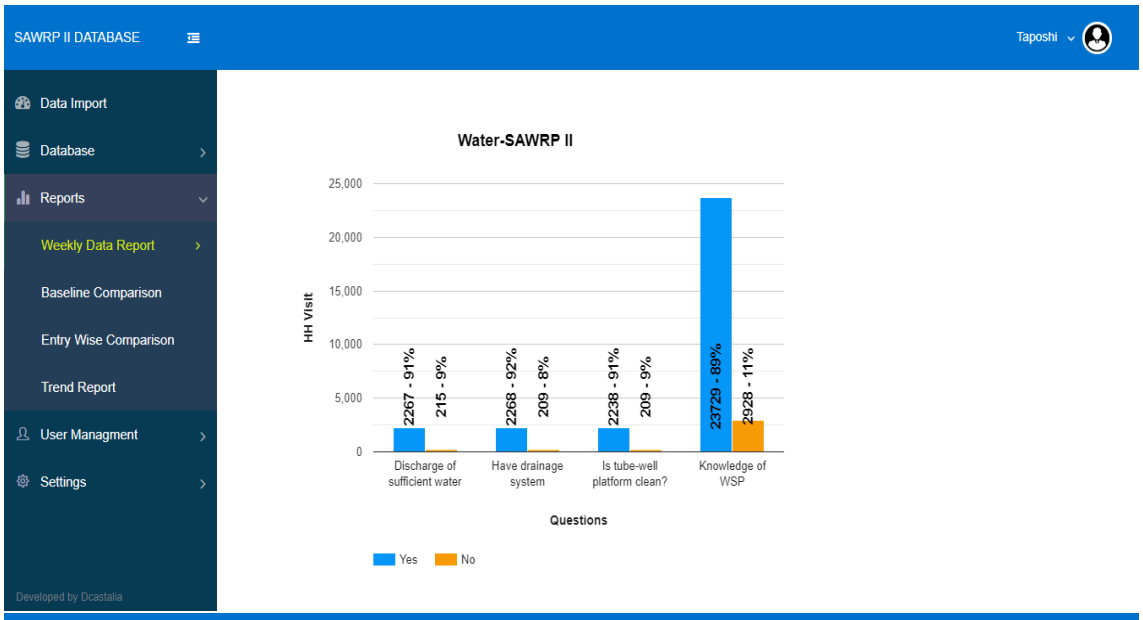
5.4 Product Features

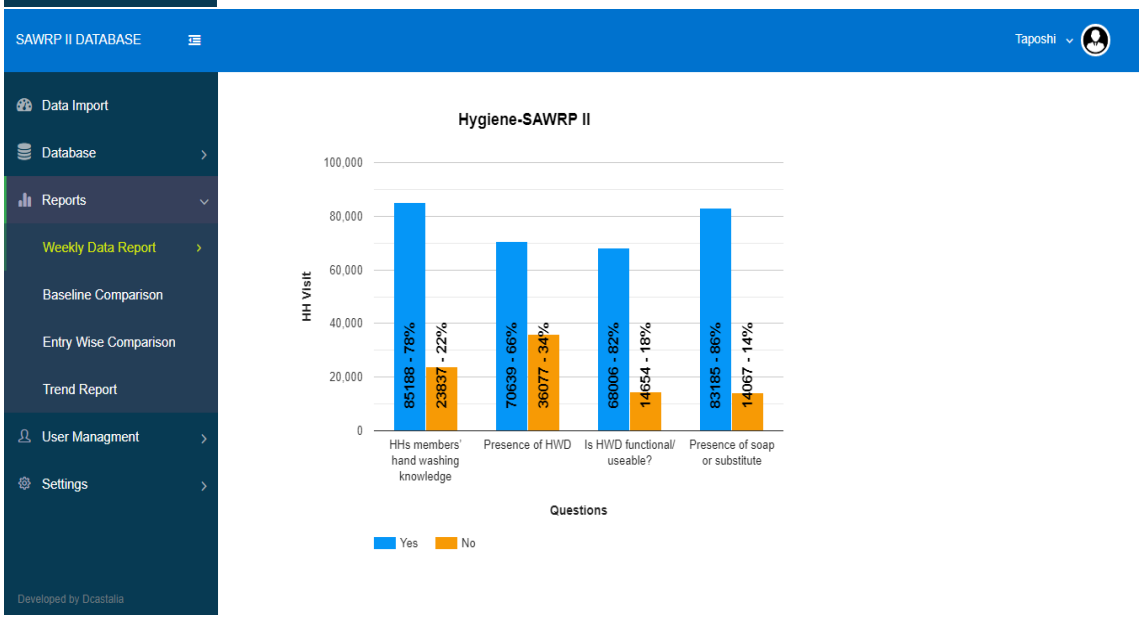
5.4.1 Input



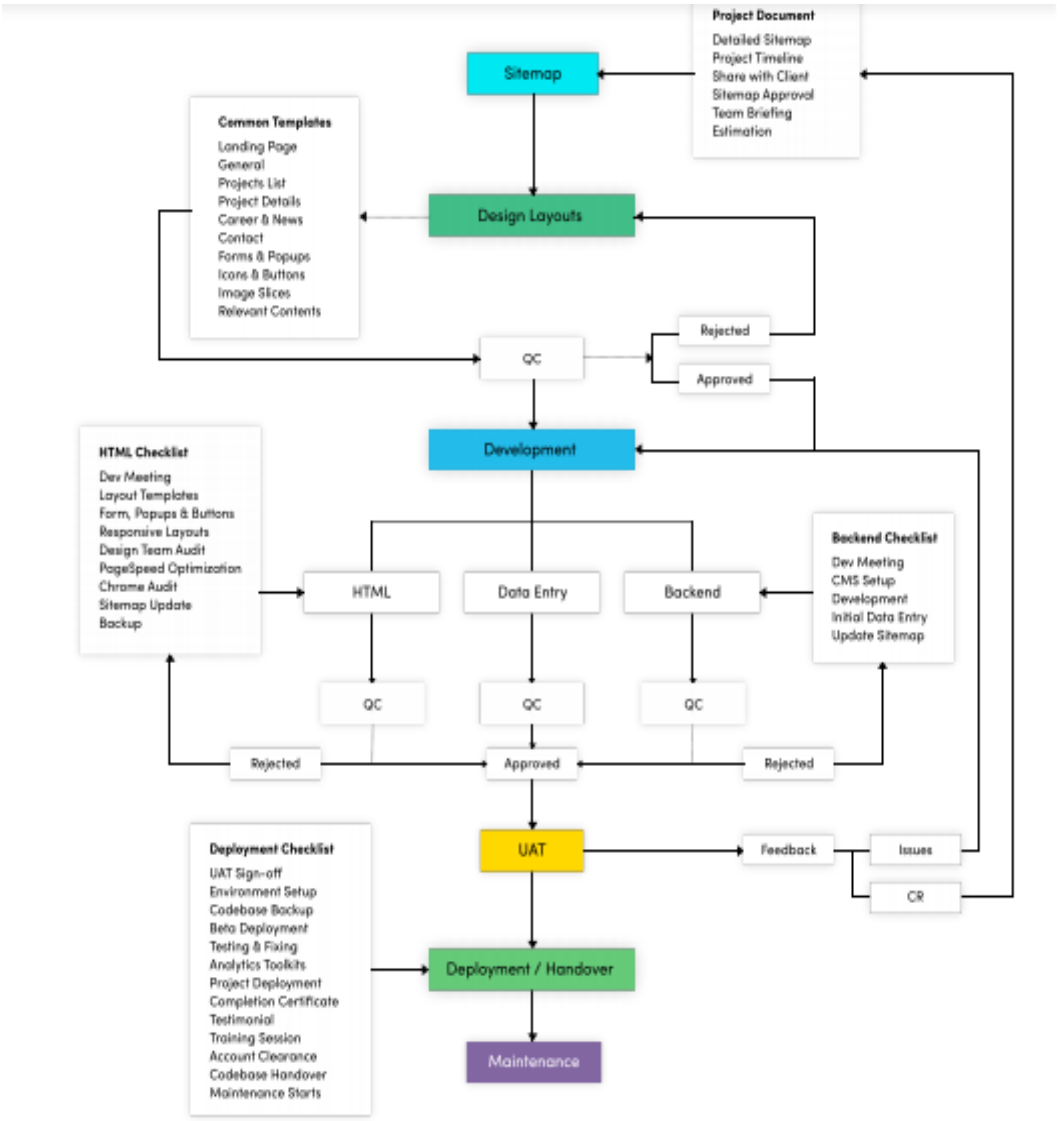
5.4.2 Output




SAWRP II DATABASE
Taposhi
Data Import
Database
Reports
Weekly Data Report
Baseline Comparison
Entry Wise Comparison
Trend Report
User Managment
Settings
Developed by Dcastalia
Water-SAWRP II
HH Visit
25,000
20,000
15,000
10,000
5,000
0
2267 - 91%
215 - 9%
2268 - 92%
209 - 8%
2238 - 91%
209 - 9%
23729 - 89%
2928 - 11%
Discharge of sufficient water
Have drainage system
Is tube-well platform clean?
Knowledge of WSP
Questions
Yes
No


SAWRP II DATABASE
Taposhi
Data Import
Database
Reports
Weekly Data Report
Baseline Comparison
Entry Wise Comparison
Trend Report
User Managment
Settings
Developed by Dcastalia
Hygiene-SAWRP II
HH Visit
100,000
80,000
60,000
40,000
20,000
0
85188 - 78%
23837 - 22%
70639 - 66%
36077 - 34%
68006 - 82%
14654 - 18%
83185 - 86%
14067 - 14%
HHs members' hand washing knowledge
Presence of HWD
Is HWD functional/ useable?
Presence of soap or substitute
Questions
Yes
No

5.4.3 Architecture



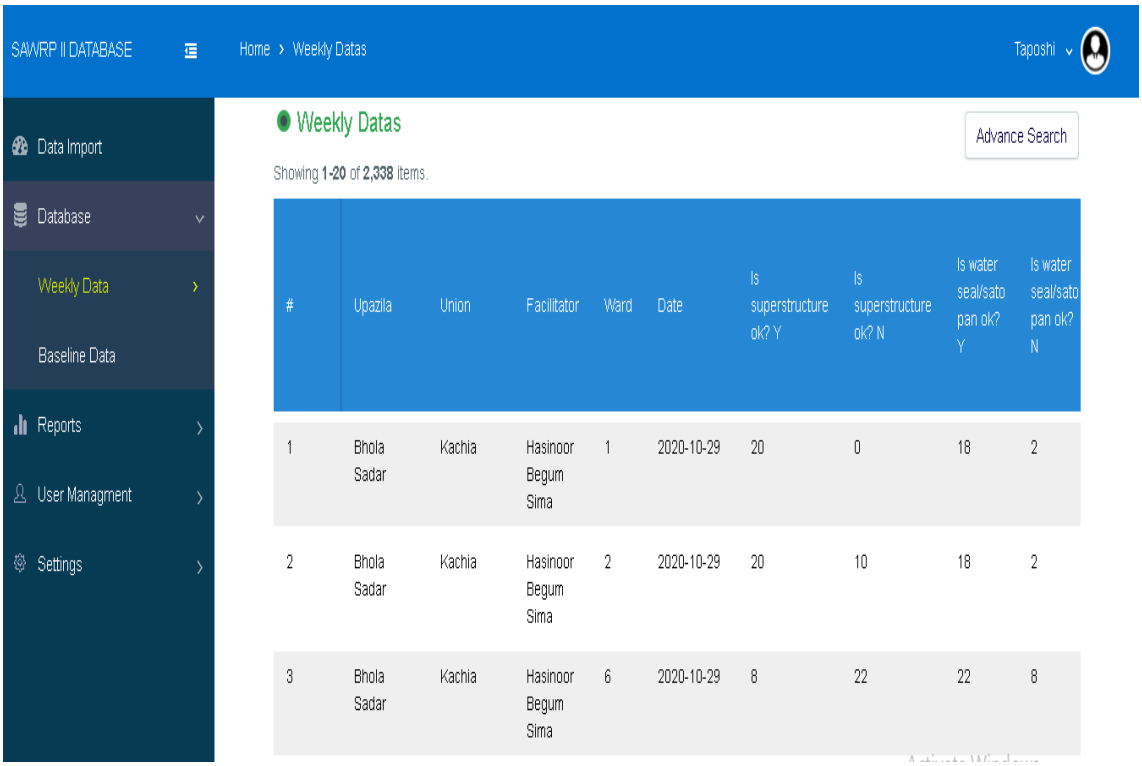
Chapter 6

Results & Analysis

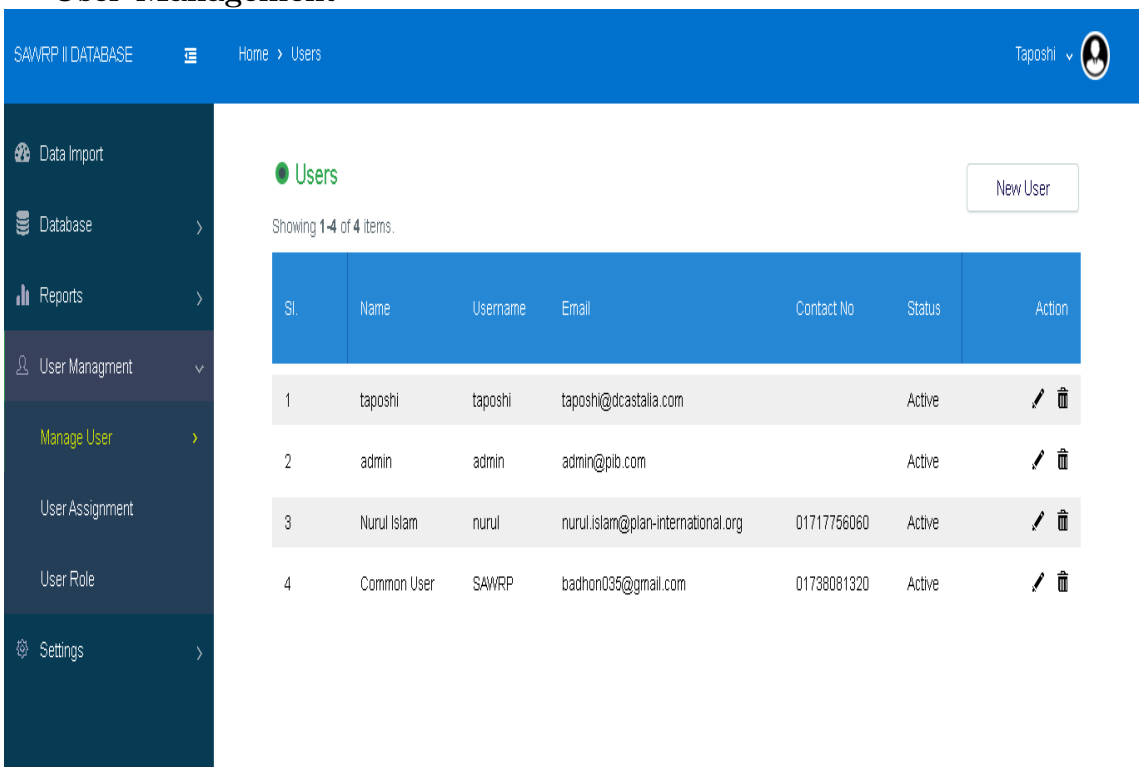
As previously mentioned in Chapter 3, the application, SWARP II, is a full database application developed using a MySQL. The MYSQL application is designed to make the development process smoother and easier. This powerful technology provides an end-to-end framework for the developers to work in and each of these technologies play a big part in the development of database applications. This chapter contains screenshots of the application so it can be seen about how the actual application looks like:

Login

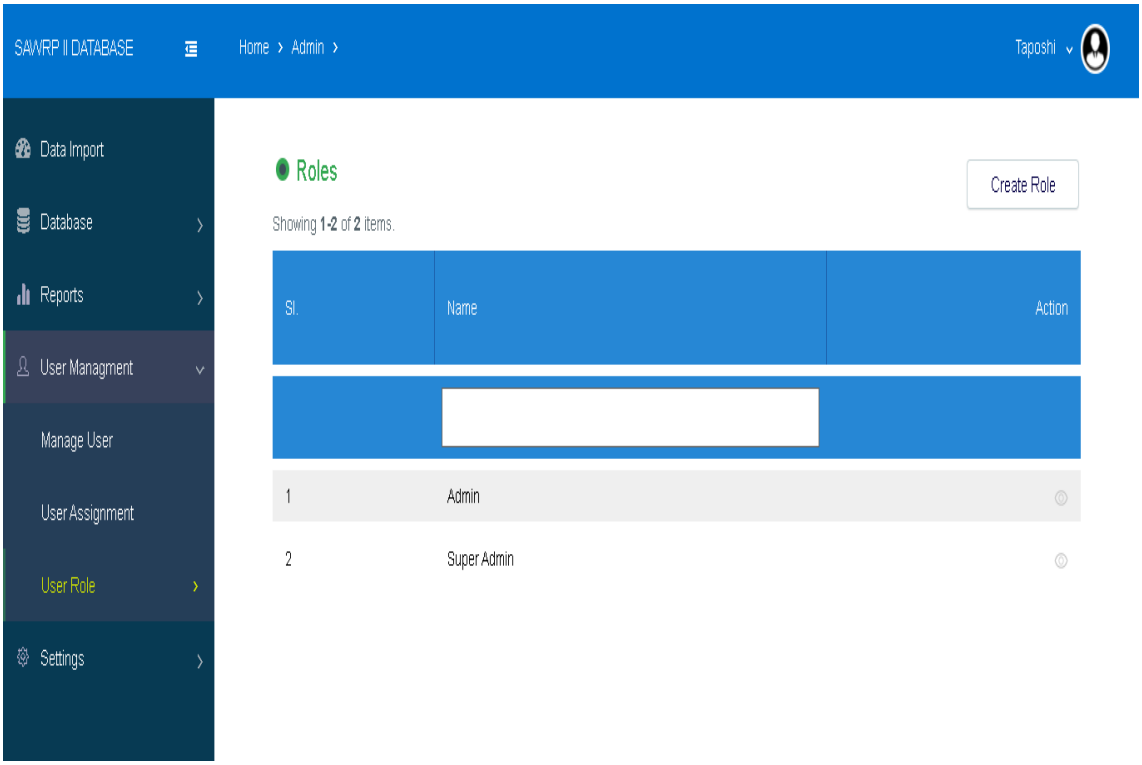
Weekly Datas



User Management



Admin Role


SAWRP II DATABASE
Home › Admin ›
Taposhi
Data Import
Database
Reports
User Managment
Manage User
User Assignment
User Role
Settings
Roles
Create Role
Showing 1-2 of 2 items.
Sl.
Name
Action
1
Admin
2
Super Admin

Chapter 7

Project as Engineering Problem Analysis

7.1 Sustainability of the Project/Work

Sustainability relates to the capacity of the application to be maintained and modified. In the real world, every project or application being launched needs to be retained and constantly modified for its user base. Project importance, acceptability, political expediency, feasibility, and adaptability of the project can be assessed by sustainability analysis.

A project can be sustainable in three main categories:

Community Sustainability

There are many other forms of this kind of support, such as uploading and updating the program via the application.

After the deployment and official release of the application SAWRP II, it's performance was highly praised by our clients at PIB as this application was of great help and had proven to be effective and efficient. As the user base grows so will the community and hence it can be said that it is Sustainable in terms of Community

Financial Sustainability

This applies to how the operating expense of the project will be sustained after it has been launched and whether adequate income will be generated as an acceptable benefit. The operating expense of an application covers database costs, storage costs for the servers, etc.

SAWRP II has helped PIB to cut down their expenses of managing a full cloud hosting platform; rather the application had helped them both organize and efficiently compile all the reports and send them to their desired places with moderately low costs.

Organizational Sustainability
It refers to how, following the release of the submission, the company can continue to function. Typically, after the release of an application, the company retains the application by its original staff, an expanded team or a new team. Organizations also upgrade their project by adding additional elements to it, and organizations can pivot to other projects, grow teams, build new ones, and
The team of web developers in Dcastalia that delivered SAWRP II has many more future planned features to be worked on and released. Since it is a unique application, the project will be maintained and updated after its release as per the requirement set by our clients at PIB.

7.2 Social and Environmental Effects and Analysis

Social Effect:

The database application of SAWRP II aims to get more people interested in trying to make a change in Bangladesh and hopes to develop a community of more informed and aware people so that they can do something for our country. In uncomplicated terms, SAWRP II will help mend the bad health and hygiene situation in the rural areas of Bangladesh.

Environmental effect:

The data collected and information provided during the survey for SAWRP II is someday going to change the sanitation and health condition of the rural areas of Bangladesh. The project uses resources in such a way that the needed resources will never disappear. More often, the environmental effect will be impactful and great for our country.

7.3 Addressing Ethics and Ethical Issues

There are some unspoken principles and ethical standards that need to be followed when focusing on designing and launching an application in the world of smartphones with too much data gathering, theft, cybercrime, etc. The developers of SAWRP II claim that the application would not break any code of ethics for the production and production of the application because all of them have been deeply involved. Some of them are:

*** Collecting only relevant User data: The app does collect user data, but those are strictly and only relevant for the app. The only data that is being collected are the information that was required by the survey and preferences information that the people will only provide on their own accord.**
*** Not Sharing or Selling any User data: Even though the data collected may not be of any privacy concern for most rural people, the app does not let any service, any application, or any third party have access to the data collected.**
*** Data Storage Security: Only the lead developers and the owner of SAWRP has access to the server and the database. Since they are hosted in the company database sysytem and can only be accessed via lead developers and the owner's login credentials; the data stored can be deemed as safe and secure.**
*** Clear Promotion: SAWRP II only intends to promote the company that created it, itself, and people's health. Other than what has been mentioned, SAWRP II has no intention of promoting anything or anybody else.**

Chapter 8

Future Work & Conclusion

8.1 Future Works

The users go through a two-step process while entering or importing the data in SAWRP II database. In future the data can directly be imported to the database and the process will take less time.The data collection process will be easier and more accessible than before.This will in turn demand for a more enhanced database and the SAWRP II will be ready to deliver. Time tracking format can be introduced too so that which user imported the data when could be traced at all times. All these features can be added in the future by hiring more developers.

8.2 Conclusion

It was a wonderful experience working with the Dcastalia family as an intern. During the internship period I have learnt and applied a great deal. I was introduced to new cutting-edge technologies like React, Node.js and Angular.js.I have learned a lot about the development of various forms of software and even about different styles of development. I have been forced to quickly respond to developments and come up with rational ideas. I worked with my advisors

Bibliography