

A Web-Based Application Public Vaccine Management System (PVMS)

BY

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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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DAFFODIL INTERNATIONAL UNIVERSITY

DHAKA, BANGLADESH

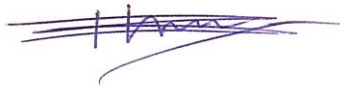
11 September 2021

APPROVAL

This Project/internship titled **Public vaccine Management System**, submitted by **Md. Ashraful Islam**, ID No: **161-15-7254** to the Department of Computer Science and Engineering, Daffodil International University has been accepted as satisfactory for the partial fulfillment of the requirements for the degree of B.Sc. in Computer Science and Engineering and approved as to its style and contents. The presentation has been held on **11 September 2021**.

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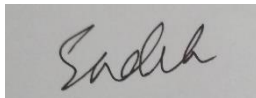
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Finally, I must acknowledge with due respect the constant support and patients of our parents.

DECLARATION

We hereby declare that, this project has been done by us under the supervision of **Md Riazur Rahman, Assistant Professor, and 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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ABSTRACT

The novel Coronavirus, which was first seen in the city of China's Wuhan, and this virus, have terrorized our entire planet. Many people have been infected by covid-19 and 4 million have died. It is mandatory to vaccinate our people for saving their life. In the meantime, many countries and pharmaceutical companies have invented the vaccine and supplied it to many countries and even Bangladesh. Therefore, it is our first duty save our people by vaccinating them, but it is very challenging to vaccinate this huge population properly and keep a record of all the people who have been vaccinated. To do that difficult task we can use a modern and advanced technology Public Vaccine Management System (PVMS) for covid-19. Which can be used for everything from vaccinating citizens to distribution in the city center. In addition, keep their data records very accurately. I hope that this smart Vaccine Management system could be an effective solution now.

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Chapter 1

Introduction

1.1 Introduction:

Vaccine management systems are now one of the most talked-about topics in the world. Our world is now facing a big problem with coronavirus. The virus is spreading very fast, causing many people to die and infecting many more. Mortality and infection rates are rising at an alarming rate. Thus, the fastest vaccination is a mandatory choice to save our human lives.

Vaccinating this population in a short period is very challenging with a proper management system. On the other hand, we cannot help vaccinating those people very quickly. In this regard, technology can help us.

Smart vaccine management can solve the problems mentioned above. All over the world, even in our country, considers the smart vaccine management method as a good solution.

1.2 Motivation:

Immediately vaccinating people is a very important task to save lives, on the other hand, it is important to reduce the extra crowds to keep them safe from being infected with this virus. In addition, we need to store the data of vaccination of this mass population. Because this collection of data is necessary for the future. Recently we have noticed that people in many areas were crowded during vaccination and there were many problems in organizing people because many people came to vaccinate. To overcome or reduce this problem we have tried to create a web-based application that also helps the public and the staff involved in the vaccination process.

1.3 Objectives:

The main objective of our project is to reduce public immunization errors and make it easier for the user and administrator to work. Such as-

User side:

- Easy and verified registration process: Users can register for the vaccine in an easy and comfortable way via an email or OTP verification.
- Creating schedules automatically: It automatically creates schedules like time, date, token, vaccination slot. That is why users can learn all information about his/her vaccination process immediately after completing the registration.
- Creating a PDF file on the registration card: It creates a PDF file with user registration information, and Users can download the file.
- In case the user is absent from the current schedule, the new schedule will be created automatically.
- This allows a user to create a public profile about their health status after being vaccinated.

Administrator side:

- With this system, we can update Automatic vaccine delivery information to all vaccination centers in any area. That is why the administrator updates the total number of vaccines for the city and there is no need to worry about the center.
- This system can reduce overcrowding, misery, as it divides service time, and public arrival time into several slots with scheduled times.
- The complexity of the vaccination process for the staff of the center can be reduced by the system, as they only need to check whether the users are registered at the center.

1.4 Expected outcome:

The use of this application will be widely spread as public and it will be used for various purposes. The main motivation of these projects are to reduce public immunization errors and make it easier for the public and employees to work. Vaccination information records will be stored in an appropriate and organized manner that can be used for a variety of purposes for both administrators and users and gives a view of the outcome of public vaccination in an area.

1.5 Report Layout:

- Introduction
- Background Analysis
- Requirement specification
- System Design and implementation
- Conclusion and future scope
- References

CHAPTER 2

BACKGROUND ANALYSIS

2.1 Introduction:

A vaccine management system is a system that can perform a variety of immunizations. An example would be my created project "Public Vaccine Management System (PVMS)".

The system is a web-based application developed for both the public and administrators. The main features of this system are the automatic updating of the dose number of vaccines in different areas according to priority where the priority is counted the percentage of registered people among the population of an area, easy registration for the vaccine, and automatic scheduling. It helps employees properly. During this coronavirus epidemic, it is only working with the covid vaccine, but it can be used with a variety of vaccines.

2.2 Comparative Studies:

Apart from the fact that vaccination is a sensitive and complex issue, we have to go through many problems in our country. Such as low availability of vaccines, storage problems, lack of public management, and public awareness. Therefore, I had to do many studies for an effective vaccine management system.

Temperature can affect the storage and transport of vaccines. Many reports and research papers have been published on effective vaccination and the storage capacity of vaccines. From that source, I have gathered knowledge to create an effective vaccine management system considering the above issues such as human management and vaccine storage capacity.

An amazing related work has been published in Bangladesh like "Shurokkha" which is official Government website. It allows user to register for vaccine and acknowledged the user by SMS for the time of vaccination. On the other hand, I think if I inform the user about his schedule after registration and create a schedule for specific people for services in a particular slot; it will be helpful for both the user and the administrator.

2.3 Scope of the Problems

There are some problem may be created at the time of implementation. However, those problems can be solved by the sincerity of the users and staff.

- Data connection must be needed
- Must need an android phone or a computer.
- User must be attended in the center for vaccination by the given time date and slot
- The staff who are involved in vaccination process must complete the service of targeted user assign in a slot.
- In this Project I need the NID access of a citizen, which is secured by the government, and it is not permitted for all

2.4 Challenges

We all know that building a successful project is not an easy task. I have to face many challenges to build this project. If I talk about the timeline of this project, I have to say that day after day, I found some things to add to this project as a feature and this feature added some challenges for me.

- As the system will work with mass people so huge capacity of database and server is needed.
- I created this project using Django. As Django is a python based web framework I have to learn python.
- There are many IDE to write python code. In this project, I have used PyCharm, which is an official IDE for python, so I have to install PyCharm.
- The front-end is an important part of a project. If the front-end is attractive, the project will be more attractive to the user. I learned them from a web-engineering course. Here I had to put this knowledge into practice. I have faced a lot of problems and I had to learn a lot of new things.

- Some unknown bugs or errors have crashed this project many times. I had to debug many times to create the project.
- As I above mentioned that, the NID is not permitted for all so I created a prototype database as an example of NID for the testing purpose.
- In this project, the distribution data of the total dose of vaccine will be updated among all the areas and all the centers of an area. To do this job I have to found the priority of vaccine for each area. I had to create a template for a mathematical calculation, which results in the priority of vaccine of any area by counting the percentage of registered people among the population of an area. Not only that the priority will be changed for the registration of a user. That is why I have to write some complex code. Moreover, many times results make me disappointed. Finally, I got a satisfactory result.

CHAPTER 3

REQUIREMENT SPECIFICATION

3.1 Business process model:

Business Process Model System (BPMS) represents the graphical view of an organization. It also represents the working process of a company. The Business Process Model is a method of a business process and determines how it works and conducts complete activities to meet the desired goals of an organization.

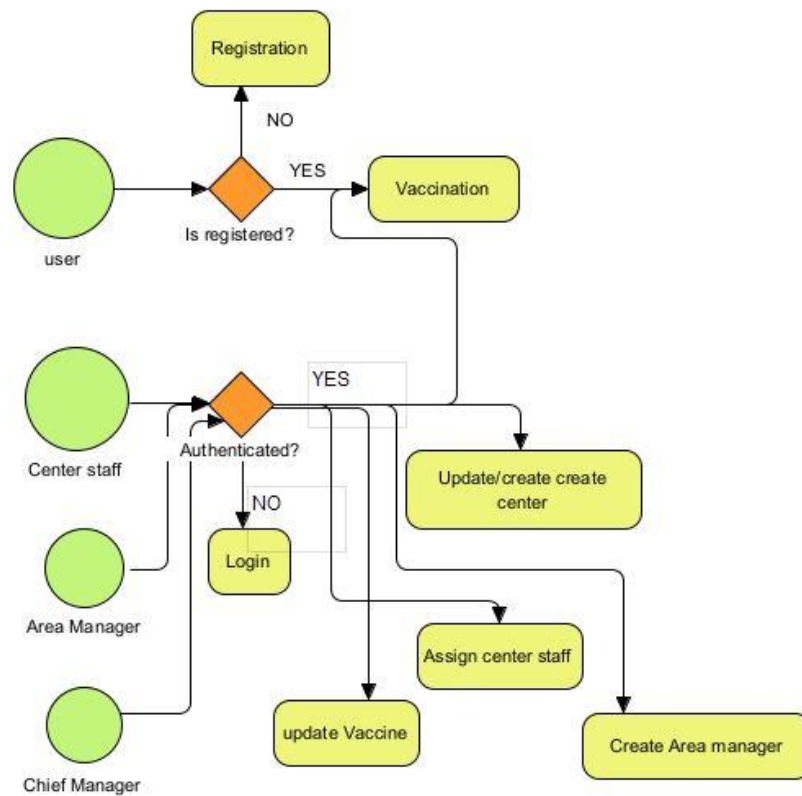


Figure: 3.1 Business Process Model

3.2 Use-case Modeling and description

A use case diagram is a graphical diagram of a user's possible interaction with a system. It shows the different uses of the system and the different types of users. Use case model consist of four types of model components. Where the actor and relationship play an important role. There are three types of actors in my web-based application. In this Use Case model, I have shown that the general public can complete registration in PVMS (Public Vaccine Management System).If the vaccine is not available at the center, the user can still register at the center of his choice but the schedule will be updated later (when staff will update the dose of vaccine at the center) Or one can cancel the registration at the center and select another center where the vaccine is available. It depends entirely on the choice of the public. Then, the user goes to the selected center according to the given schedule along with the registration card for vaccination. The process is initiated by the center staff through a checking process and vaccination is done after the checking is satisfied and the staff like the center staff have to log in to this system who is designated by the area manager at the center. In addition, the Chief Manager assigns the area manager.

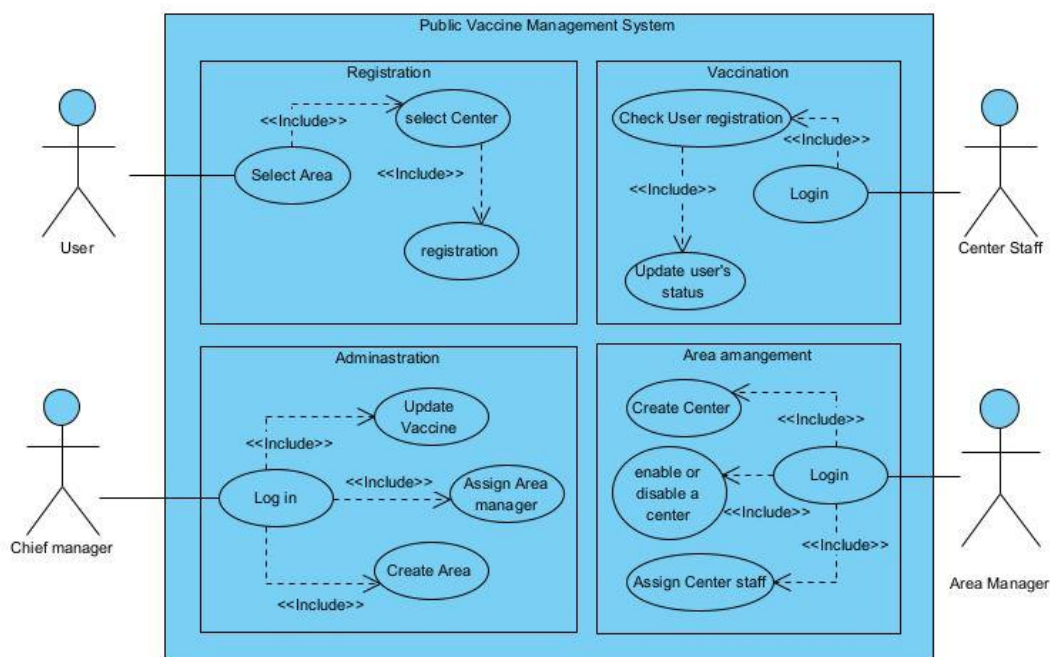


Figure: 3.2 Use-case Diagram for Public Vaccine Management System

3.2.1 Use Case for Registration

A user have to complete the registration by the NID and select any center available in the system. If the vaccine is not available at the center, the schedule will not be created after registration and the schedule will be created after the vaccine is updated at the center.

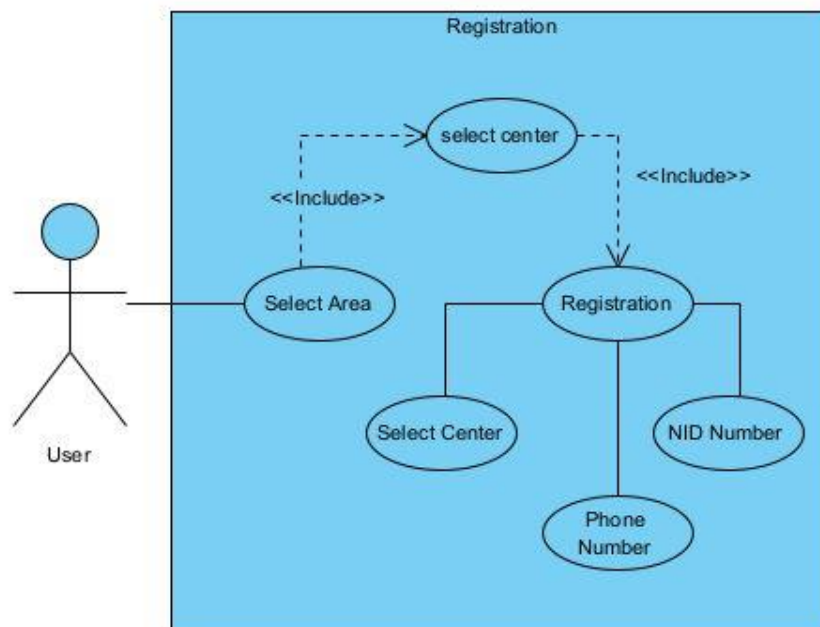


Figure: 3.3 Use-case Diagram for Registration

Use Cases Details

Use Case Name: Registration

Precondition: User

Actor: Public

Primary Path: 1. Enter NID

2. Enter Phone Number

3. Enter Center

5. Click “Submit; button

6. Enter OTP

7. Click “Register” button

Exceptional Path: If the vaccine is not available at the center, it suggests registering at another center. Allows the user to cancel the registration or keep it registered. The user will be notified via SMS to download the registration card after the center is updated.

3.2.2 Use Case for Vaccination

Arrive at the vaccination center with the user registration card and the staff at the center will check if the user is registered. Center staff will update user status after satisfactory results. If this is the user's first doss, the center staff will update that the first doss has been completed, or if it is the second doss, it will be done for the second dose and the user will be vaccinated and a vaccinated certificate will be generated automatically.

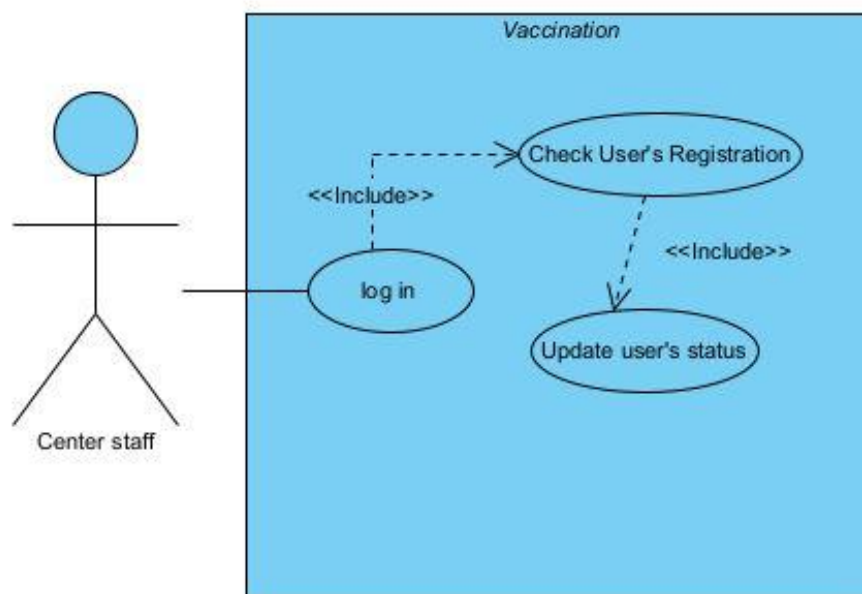


Figure: 3.4 Use-case Diagram for Vaccination

Use Cases Details

Use Case Name: Vaccination

Precondition: 1. User must be registered

2. Center staff must be authenticated

Actor: Center staff

Primary Path: 1. Enter "Employee ID"

2. Enter “Password”
3. Click “Log In”

Alternate Path:

1. Check user’s registration
2. Update user’s status
 - i. If user’s first dose is not done then update first dose is “done”.
 - ii. If user’s first dose is done then update user is “vaccinated”.
3. Click “Submit”

- Exceptional Path:
1. If User is not registered then show Invalid center
 2. If User is registered in other center then suggests going that center.

3.2.3 Use Case for Area Management

The Area Manager can create a vaccination center in a specific area and assign the center staff to that center. The Area Manager can turn off the vaccine at a center, disable the center, or enable the center to run the vaccination process.

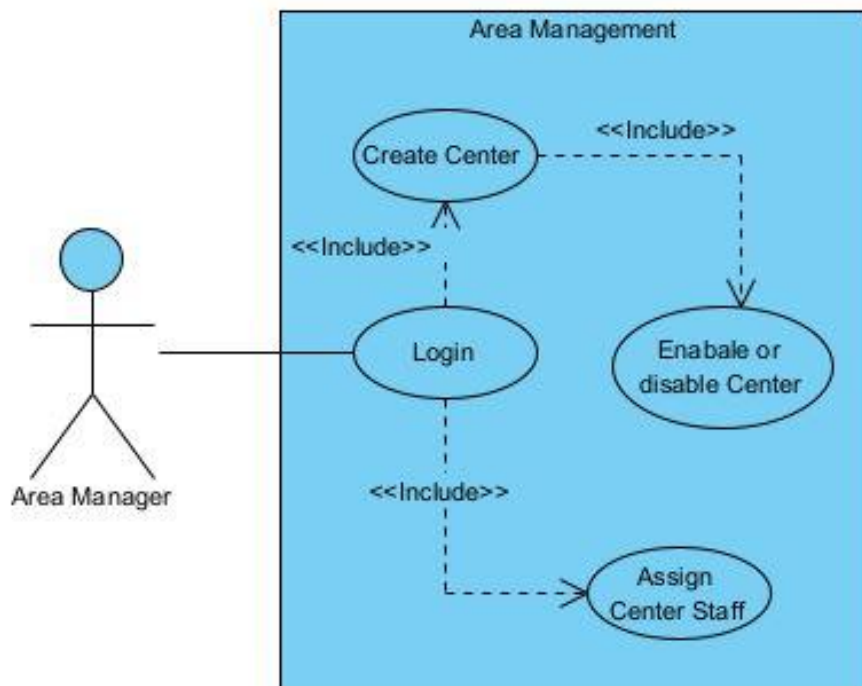


Figure: 3.5 Use-case Diagram for Area Management

Use Cases Details

Use Case Name: Area Management

Precondition: Chief Manager must be authenticated

Actor: Area Manager

Primary Path: 1. Enter “Employee ID”

2. Enter “Password”

3. Click “Log In”

Alternate Path:

1. Create Center

2. Enable or disable Center

3. Create Center Staff

Exceptional Path: Invalid Employee ID, Password then back to step 1 or 2 in primary path.

3.2.4 Use Case for Administration

The chief manager can create an area and assign an area manager to that area. Only he can update the number of vaccines. Accordingly, the distribution data will be updated on a priority basis among all areas and between all centers in an area

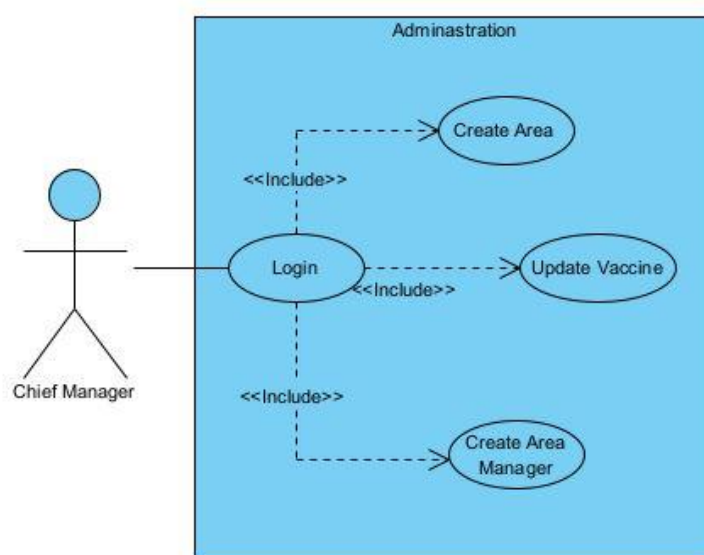


Figure: 3.6 Use-case Diagram for Administration

Use Cases Details

Use Case Name: Administration

Precondition: Area Manager must be authenticated

Actor: Chief Manager

Primary Path: 1. Enter “Username”

2. Enter “Password”

3. Click “Log In”

Alternate Path:

1. Create Area

2. Update the doses of Vaccines.

3. Create Area Manager.

Exceptional Path: Invalid Username, Password then back to step 1 or 2 in primary path.

3.3 Implementation Requirements

Each project has certain requirements, it is mandatory to meet the requirements to run the project; otherwise, the program will not run properly and will crash. In this way, this project also has some requirements.

User requirements

- The User need internet permission
- The User need to be citizen of Bangladesh
- The User must do registration for vaccination

Staff of center Requirements

- Staff must need internet permission
- Staff must be assigned for the center or are by super staff
- Staff must do login permission

Area Manager Requirements

- Area Manager must need internet permission
- Area Manager must be assigned by the super staff
- Area Manager must do login permission

Chief Manager Requirements

- Chief Manager must need internet permission

- Chief Manager must do registration and login permission

Software Requirements:

- Django Framework.
- PyCharm IDE.
- Database: PostgreSQL
- Database server: pgadmin4
- Operating system: Window

Hardware Requirements:

- Python SDK and Django supported device
- Configure configuration
- Ram-4GB (min)
- SSD-150GB (min)
- Processor-1.5GHz (min)

3.4 Analysis

Since we need internet permission. Therefore, the user must allow the Internet. Users must enter a valid NID and phone number and select any center available in the system for vaccination. The user then has to enter the OTP (One Time Password) which is sent to the contact number of the user. He can then complete the registration process. It is normal that sometimes the vaccine cannot be found at a specific center. In that case, the user can cancel the registration at that center and select another center or the user can register at that center but he has to wait for the vaccine till the next update from the chief manager. It is the job of the staff at the center to check the user registration process for the ticker, to update the staff login and user status. Center staff cannot allow users to be vaccinated at the center without registering at the center. The Area Manager will create the center in a particular area and also can enable or disable the center. The Chief Manager is the powerhouse of the system who can update the number of doses of vaccine, can create an Area manager.

3.5 Logical Data Model

This Logical Data Model or ER Diagram of this Web-application, which represents the relationship among the entities. In this project, The Entities are Login, Create center, Create area, Create Staff, Registration.

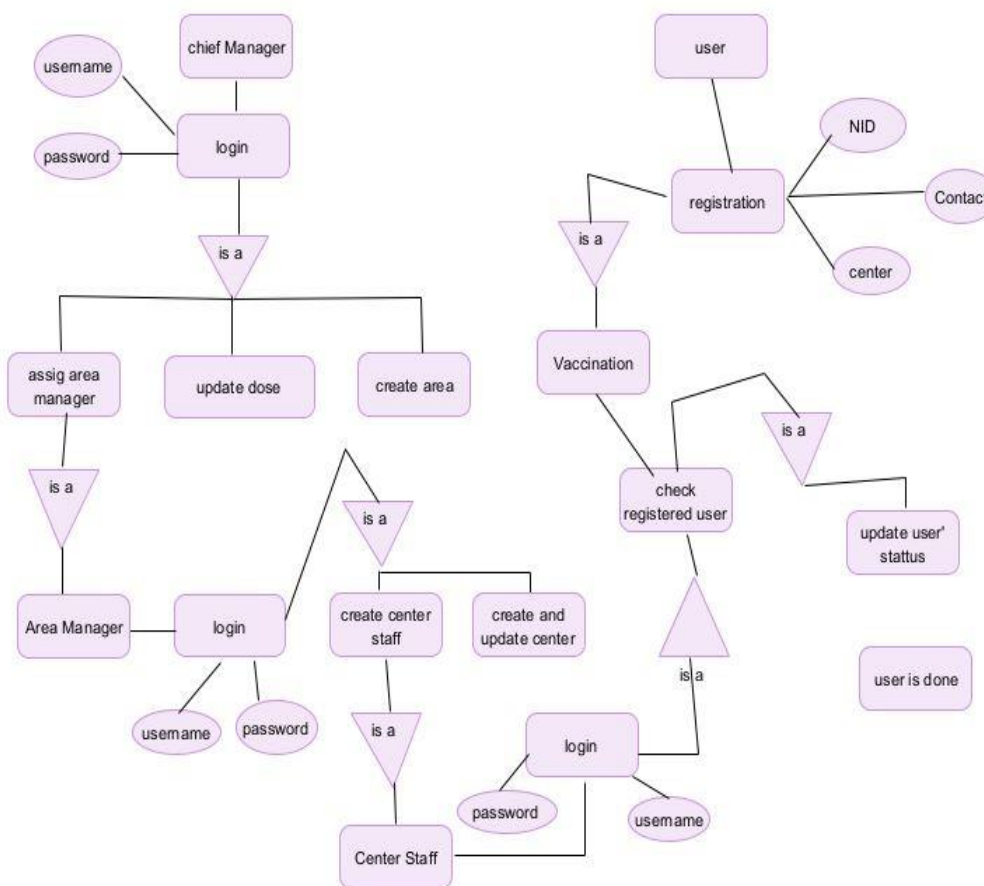


Figure: 3.7 ER Diagram of “Public Vaccine management” web-application

Chapter 4

DESIGN SPECIFICATION

4.1 System Environment

In this system, if the user has an internet connection, the user can request registration for the vaccine and provide the required information. All information will be uploaded to the database. The user has to be present at the vaccination center as per the schedule given on the registration card. Otherwise, the user's absence will be added to the delay queue, where the user can get the vaccine but will have to wait. Center staff will update the user's status and this information will be uploaded to the user's database and area database. After receiving the second dose of the vaccine the user is vaccinated and a vaccination certificate will be created. The Area Manager creates a center, assigns center staff to that specific center, and enables and disables the center. If the center is enabled, the vaccine information will be updated in the center's database when the chief manager updated the vaccine information.

4.2 Front-end Design

Since the “front-end” design makes a website attractive to the user. So I had to pay more attention to this part. I have created a user interface, center staff interface, area manager interface, and chief manager interface on this website and I have used various technologies to make the front-end attractive to the user.

4.2.1 User Interface

The user interface contains homepage user registration, OTP verification form, registration card. Users need to complete a few steps to register and in each step, the user will see the specific interface for the specific step.

Homepage

On the homepage, it displays news of the Corona epidemic worldwide and from Bangladesh. It displays the previous day's statistics. A free API help me to attach the news.

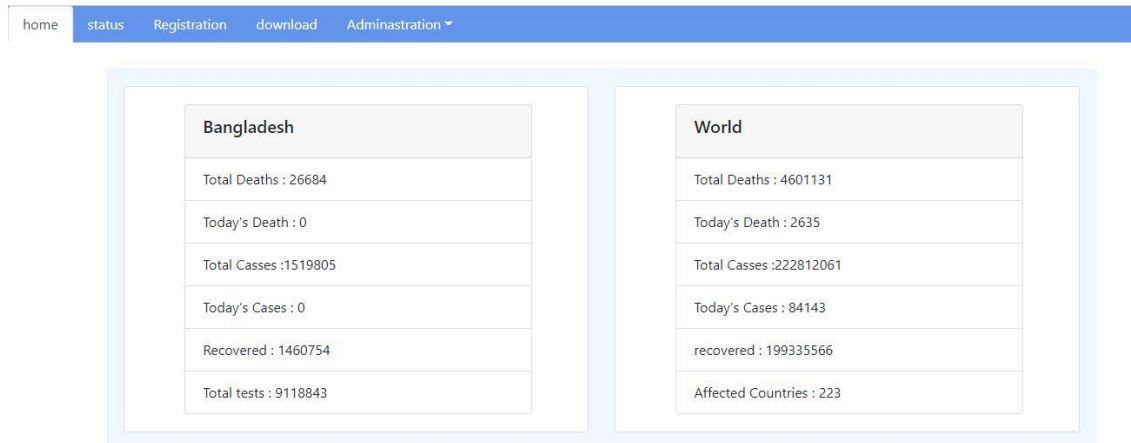


Figure: 4.1 home page

Area selection For Registration

The user must select any area to register on this page.

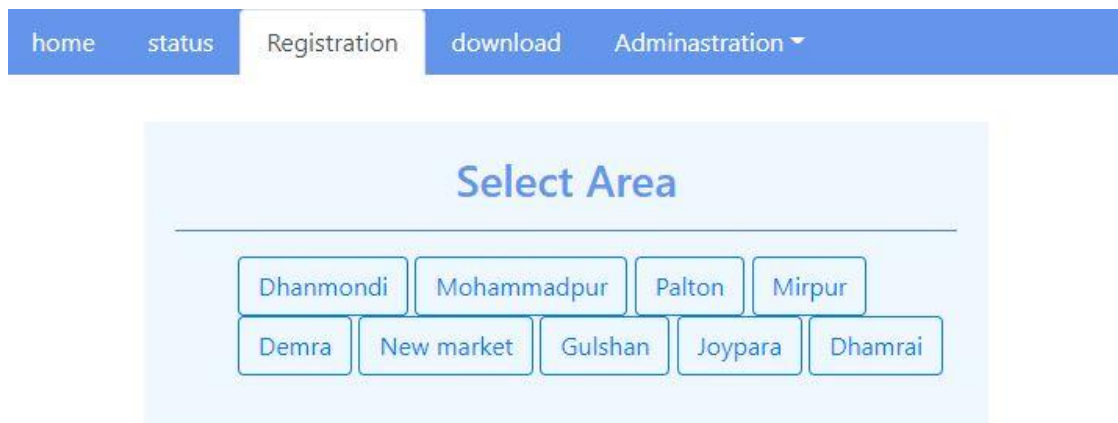
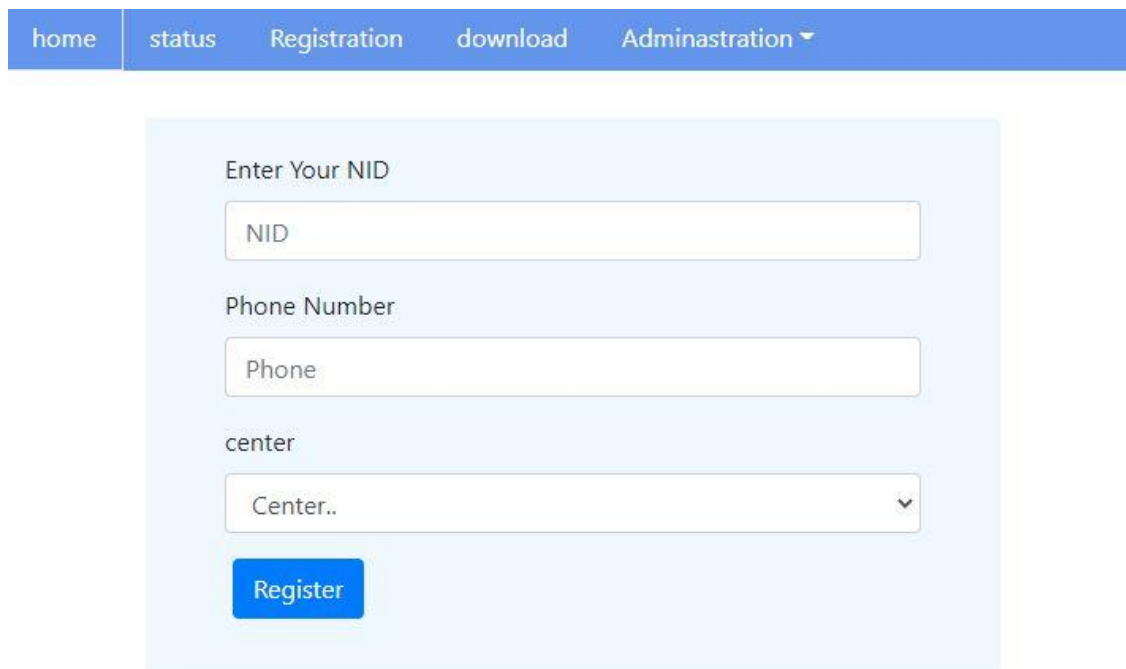


Figure: 4.2 Area selection page for registration

Registration Form

User needs to register by inserting some useful Information in the registration form:

- 1) NID(National Identity)
- 2) Phone Number
- 3) Select Center



The image shows a user registration form for a vaccine system. At the top, there is a blue navigation bar with the following links: 'home', 'status', 'Registration', 'download', and 'Adminastration'. Below the navigation bar, the registration form is displayed on a light blue background. The form consists of three input fields: 'Enter Your NID' with a text box containing 'NID', 'Phone Number' with a text box containing 'Phone', and 'center' with a dropdown menu showing 'Center..'. A blue 'Register' button is located below the fields.

Figure: 4.3 User Registration form for vaccine

OTP Verification Form

After entering that valid information in the form, a verification code will be sent to the user's contact or email. By inserting the Valid OTP verification code the registration has been completed successfully, and the user is the registered user of the system. And a SMS is sent to the user contact to acknowledge that the registration has been successful.

Figure: 4.4 OTP verification form

Registration Card

After successful registration, the user can view his registration card. There is a download option, the user can download the registration card, and with this registration card, the user will go to the vaccination center. If the vaccine is not available at the center, it is indicated on another page. Users can cancel the registration and select another center.

Period	Slot	Date	Time	Status
First Doss	B	Sept. 8, 2021	10:00:00 am - 11:00:00am	Pending
Second Doss	B	Oct. 8, 2021	10:00:00 am - 11:00:00am	Pending

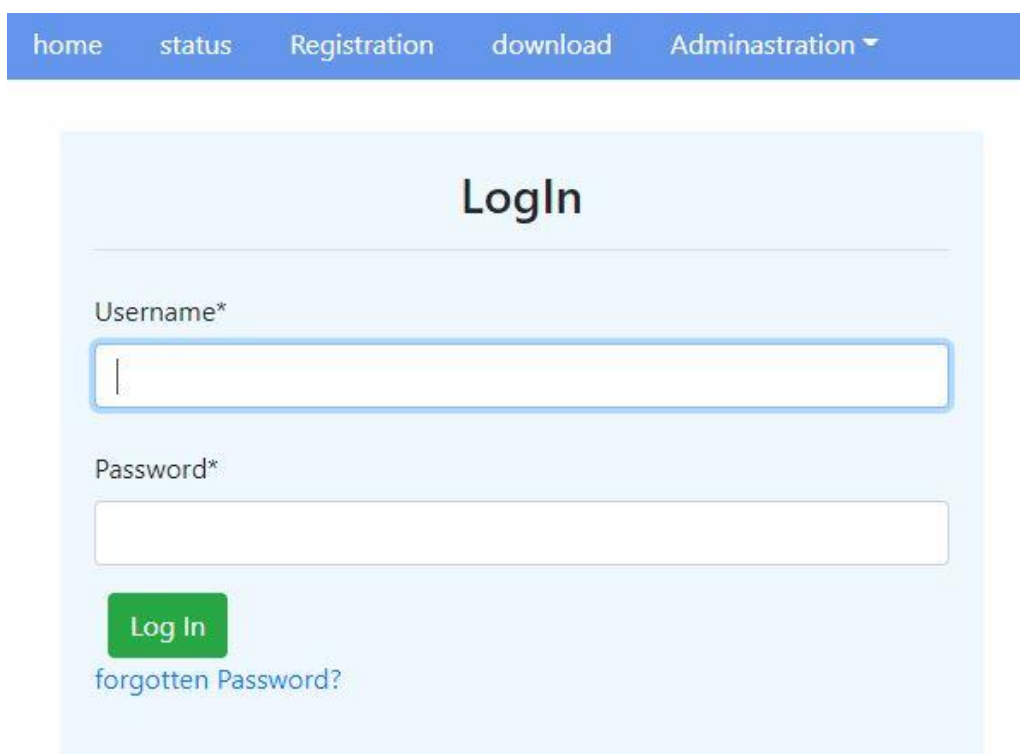
Figure: 4.5 Registration Card After user’s successful Registration

4.2.2 Administrator Interface

It is the administrator part and in this part, I had to design different types of Interface for different types of admin such as Login page, Chief Manager Interface, Area Manager, and Center staff.

Login Page

All employees must enter valid information to access the system on this page.



The image shows a screenshot of a web application's login page. At the top, there is a blue navigation bar with links for 'home', 'status', 'Registration', 'download', and 'Adminastration' (with a dropdown arrow). Below the navigation bar is a light blue login form titled 'LogIn'. The form contains two input fields: 'Username*' and 'Password*'. Below the password field is a green 'Log In' button and a link for 'forgotten Password?'.

Figure: 4.6 Login Form

4.2.3 Chief Manager Interface

After logging in, the chief managing staff can create the area and update the total dose of the vaccine. In addition, the chief manager can see the status of any area and can create in area list page, Can Update dose in vaccine Updating Form and can assign area manager in area Manager Creation Form

Area List and Area Creation Form

home Create staff staffs update Area List Administration ▾

List Of All Area

Thana ▾

Population

Submit

Name	Population	Total doss	Pending doss	Total Registered	Total Vaccinate	Centers	Is working	Priority	#
Dhanmondi	500	56	56	0	0	2	True	50.1%	Delete
Mohammadpur	500	56	56	2	0	2	True	49.9%	Delete
Lalbag	500	0	0	0	0	0	False	0.0%	Delete

Figure: 4.7 Area list Table and Area creation Form

Vaccine Updating Form

home Create staff staffs update Area List Administration ▾

Update Total Doses

Update total doses

Update

Figure: 4.8 Vaccine Updating Form

Area manager Creation Form

home Create staff staffs update Area List Administration ▾

Create Area manager

Fullname*

Username*

Required. 150 characters or fewer. Letters, digits and @/./+/-/_ only.

Staff status
Designates whether the user can log into this admin site.

Active
Designates whether this user should be treated as active. Unselect this instead of deleting accounts.

Is area manager

Password*

- Your password can't be too similar to your other personal information.
- Your password must contain at least 8 characters.

Figure: 4.9 Area Manager Creation Form

4.2.4 Area Manager Interface

Area manager create center in any particular area, enable or disable area, and create center staff

Center Creation form

The screenshot shows the 'Center Creation form' for the 'Dhanmondi' area. At the top, there is a navigation bar with 'home', 'Area List', and 'Adminastration' (with a dropdown arrow). Below the navigation bar, the title 'Dhanmondi' is displayed. The form contains two input fields: 'Name*' and 'Working time*'. The 'Working time*' field has a date format 'dd----yyyy' and a calendar icon. A green 'Submit' button is located below the input fields. Below the form, there is a table with the following data:

Center Name	Pending doss	Updated Dosses	Available Dosses	Doss Per Day	#	#	#
Labaid Hospital Ltd.	0	28	28	4	Enable/Disable	Delete	create staff
Care Hospital	0	28	28	4	Enable/Disable	Delete	create staff

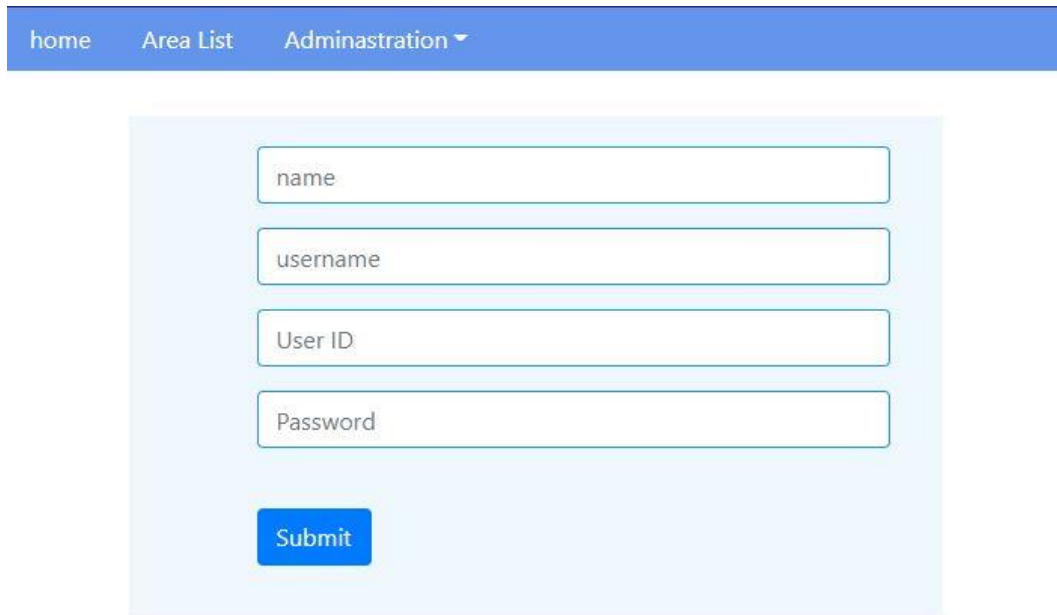
Figure: 4.10 Center creation Form

Enable or disable a center

The screenshot shows the 'Enable or Disable Center' form for the 'Labaid Hospital Ltd.' center. At the top, there is a navigation bar with 'home', 'Area List', and 'Adminastration' (with a dropdown arrow). Below the navigation bar, the title 'Enable or Disable Center' is displayed. The form shows the center name 'Labaid Hospital Ltd.' and a teal 'Disable' button.

Figure: 4.11 Center enable or disable

Center staff Creation form



home Area List Adminastration ▾

name

username

User ID

Password

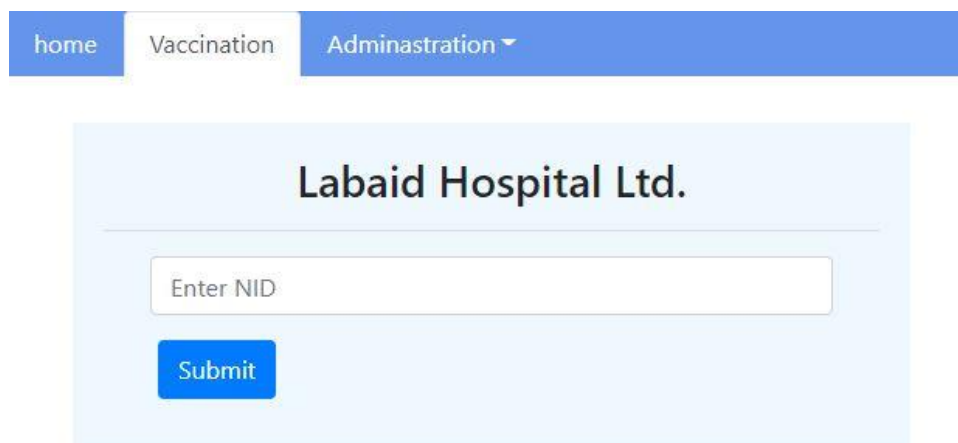
Submit

Figure: 4.12 Center staff creation form

4.2.5 Center staff Interface

In this page, the Center Staff can check the user's registration or status and update the user's status.

User's registration checking form



home Vaccination Adminastration ▾

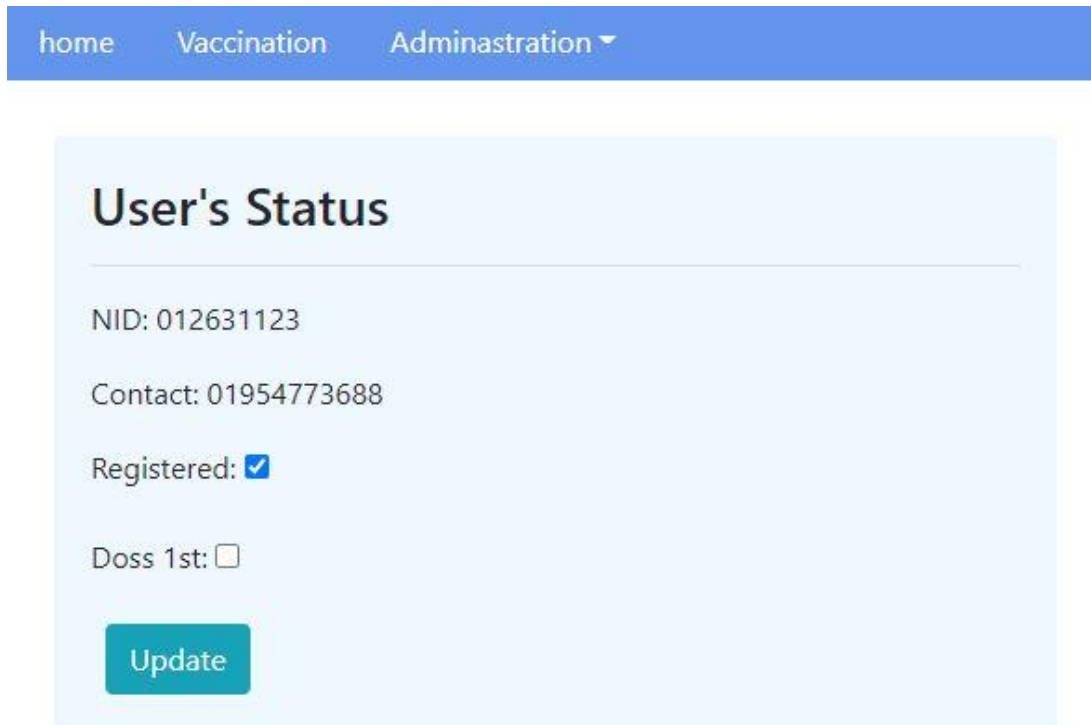
Labaid Hospital Ltd.

Enter NID

Submit

Figure: 4.13 User's registration checking form

User's status updating form



The screenshot shows a web interface for updating a user's status. At the top, there is a blue navigation bar with links for 'home', 'Vaccination', and 'Adminastration' (with a dropdown arrow). Below this is a light blue box containing the form. The form has a title 'User's Status' followed by a horizontal line. The fields are: 'NID: 012631123', 'Contact: 01954773688', 'Registered: [checked]', and 'Doss 1st: [unchecked]'. A teal 'Update' button is located at the bottom left of the form area.

Figure: 4.14 User's status Updating Form

After updating the user's status, the vaccination process for the first or second doss has been done for a user. If the user received the first dose in the previous, the center staff will see the checkbox for the second dose.

4.3 Back-end Design

The back-end is part of the project that does such important work, but the user cannot see. Back-end converts a static website into dynamic.

4.3.1 Back-end Code

I have used the Django Python-based web framework, and I have used Python as a backend language. I have a simple interaction with the database using ORM (Object Relational Mapping), which helps me with database insertion queries and manipulation.

```

130     obj2.total_vaccinated += 1
131     obj2.save()
132     return reverse_lazy('vaccinate')
133
134
135 def reg(request, pk):
136     obj_period = schedule.objects.all()
137     u = people.objects.get(id=pk)
138     c = center_name.objects.get(id=u.center_id)
139     obj1 = area.objects.get(name=c.area_name)
140     obj = obj1.center_name_set.all()
141
142     if 'submit' in request.POST:
143         code = request.POST['code']
144         if code == u.code.number:
145             if c.available_dosses == 0 and c.pending_doss_center == 0:
146                 pending = Registration_pending(nid=u.nid, center_id=c.id, registered=False)
147                 pending.save()
148                 p = Registration_pending.objects.get(id=pending.pk)
149                 return HttpResponseRedirect(reverse('cancel_registration', args=(p.pk,)))
150             else:
151                 try:
152                     Registration_pending.objects.get(nid=u.nid)
153                     return HttpResponse("Your registration is pending on another center")
154                 except:
155
156                     x1 = (c.updated_dosses // c.doss_per_day) - (math.ceil(c.available_dosses / c.doss_per_day))
157                     if x1 < 0:
158                         x1 = c.updated_dosses // c.doss_per_day
159                     if c.available_dosses == c.updated_dosses and c.updated_dosses % c.doss_per_day == 1:
160                         c.num_of_dosses = c.doss_per_day + 1
161                         c.save()
162
163     <lat name_start_end = counter!(c.doss_per_day, c.num_of_dosses, 4)
164
165     reg() if 'submit' in request.POST if code == u.code.number else except try

```

Figure: 4.15 Backend Code

4.3.2 Database for the Public Vaccine Management system

It is essential to store all user, area, center and vaccine information. This is the most sensitive and important part of my project. I used PostgreSQL database and pgadmin4 server to do this.

User's Table

	nid	contact	doss_1st	doss_2nd	registered	vaccinated	center_id	period_id
ring (120)	character varying (14)	boolean	boolean	boolean	boolean	boolean	integer	integer
	4252	5525	false	false	true	false	6	4
	11323	01954773688	false	false	false	false	6	5
	012631123	01954773688	true	false	true	false	9	6
	4783492744	01963380125	false	false	true	false	6	7
	747634734	01732363547	false	false	true	false	7	8

Figure: 4.16 user's Table (PostgreSQL Database)

Vaccine Updated Table

The screenshot shows the PostgreSQL Query Editor interface. The query editor contains the following SQL query:

```
1 SELECT * FROM public."City_dosses_for_dhaka"
2 ORDER BY id ASC
```

The results are displayed in a table with the following columns: id, doses, updated_at, and created_at.

id	doses	updated_at	created_at
1	2	2021-09-07 21:04:02.478239+06	2021-09-07 21:04:02.478239+06
2	3	2021-09-07 21:04:33.814695+06	2021-09-07 21:04:33.814695+06

Figure: 4.17 Total dose Updated Table (PostgreSQL Database)

Area Table

The screenshot shows the PostgreSQL Query Editor interface. The query editor contains the following SQL query:

```
1 SELECT * FROM public."City_area"
2 ORDER BY id ASC
```

The results are displayed in a table with the following columns: id, name, population, total_vaccinated, priority, total_registered, doss_1st_done, and available_d.

id	name	population	total_vaccinated	priority	total_registered	doss_1st_done	available_d
1	10 Mohammadpur	500	0	49.85	4	0	0
2	11 Dhanmondi	500	0	50.15	1	1	1
3	14 Palton	5000	0	0	0	0	0

Figure: 4.18 Area Table (PostgreSQL Database)

Center Information Table

public.center_center_name/pvms24/postgres@PostgreSQL 11

```

1 SELECT * FROM public.center_center_name
2 ORDER BY id ASC
    
```

id [PK] integer	name character varying (120)	updated_dosages integer	available_dosages integer	doss_per_day integer	num_of_dosses integer	updated_time date	working date
1	6 NITOR	28	28	25	4	1 2021-09-07	2021-07
2	7 NHDC	28	28	27	4	3 2021-09-07	2021-07
3	8 Care Hospital	28	28	28	4	4 2021-09-07	2021-07
4	9 Labaid Hospital Ltd.	28	28	27	4	3 2021-09-07	2021-07

Figure: 4.19 Center Information Table (PostgreSQL Database)

User is Schedule Table

public.center_schedule/pvms24/postgres@PostgreSQL 11

```

1 SELECT * FROM public.center_schedule
2 ORDER BY id ASC
    
```

id [PK] integer	slot character varying (2)	targetUser integer	num_user integer	date date	second_date date	start_time time without time zone	end_time time without time zone
1	4 A	2	2	1 2021-09-..	2021-10-08	09:00:00	10:00:00
2	5 B	2	2	1 2021-09-..	2021-10-08	10:00:00	11:00:00
3	6 A	2	2	1 2021-09-..	2021-10-09	09:00:00	10:00:00
4	7 C	2	2	1 2021-09-..	2021-10-08	11:00:00	12:00:00
5	8 A	2	2	1 2021-09-..	2021-10-10	09:00:00	10:00:00

Figure: 4.20 user Schedule Table (PostgreSQL Database)

Chapter 5

CONCLUSION AND FUTURE SCOPE

5.1 Conclusion

"Public Vaccine Management System" can play a vital role in an effective vaccine management system. Though it is not easy to start, I hope this web application can be a good option for both the user and administrator for a comfortable vaccine management system. I hope both parties will be satisfied using this application. In the future, I will try to improve some features to make it more user-friendly.

5.2 Future Scope

Some features may be upgraded in the future so that users can use this web application as a better solution for all types of vaccine management, not just for covid vaccines.

1. Users can create a profile. Which will be considered as the user's health profile so that the user has all the health information.
2. Information on various vaccines and the latest news will be updated on the homepage.
3. Doctor appointment features will be added.
4. The requirement of an OTP verification code will be added for the administrator to log in to ensure system security.

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