VACCINE DRIVE REGISTRATION SYSTEM

Software Design Document

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1. INTRODUCTION

1.1 Purpose

The aim of this SDD is to develop a systematic analysis of the procedure involved in the registration for vaccination drive. The SDD enables the users to take advantage over the various features of the software in an effective way. Software means establishment of sound and in-depth development of a task using high-level language that results in well-equipped, economical software, which is reliable. The introduction may be divided into various steps based on the developer and depending upon the operation to be performed, using the software. The project developed is a “VACCINE DRIVE REGISTRATION SYSTEM” build upon relevant technologies. The main aim of this project is to develop the software for the process of making registrations for vaccinating people with increased efficiency and reduced drawbacks which prevail in the current procedure of vaccine registration. The software should be error controlled semantically. The features deal with the different operations involved in the process of “VACCINE REGISTRATION”.

1.2 Scope

- This software will be a Vaccine Driver Registration System to manage vaccine registration and allotting vaccine for beneficiaries in nearby vaccine drive centre.
- This system will be designed in such a way that the vaccinators can keep track on the number of vaccines and also confirm the administration of the vaccine to the consumer.
- It mainly focuses on scheduling and vaccine registration management at vaccine centres.
- Consumers can also view their schedule and manage their schedule for 2nd Dose of Vaccine.
- Overall, this product scope is restricted in the vaccine drive related services and the stakeholders associated with the particular system.

1.3 Overview

The VDRS is a new system which is different from the existing systems as it merges various scheduling and registration systems as one single system. It is a JAVA application executed on a JAVA API and connected to MySQL databases. VDRS accepts and processes requests from three kinds of users: end users (beneficiaries), vaccinators and system administrators. The local server database is used for storing registration records.

The system is expected to have a JAVA user interface for users and an authenticated JAVA interface for administrators. It has merits of being consistent, efficient and precise in searching availability of vaccine doses and making registrations.

1.4 Reference Material

- SDD Template: IEEE Template
- Roger S Pressman, Software Engineering - A Practitioner ‘s Approach, McGraw Hill International Edition, Singapore, 2015.
- SDD Development Guiding steps from the following website – Software Design Document: What, Why and How?
- Data Flow diagrams using - draw.io
- EER Diagram using – draw.io

1.5 Definitions and Acronyms

- **SDD** - Software Design Document
- **VDRS** – Vaccine Drive Registration System
- **IDE** - Integrated Development Environment
- **Consumers/Beneficiaries** – People who wish to book an appointment for vaccination
- **Vaccinators/Vaccination Centre Admins** – People who vaccinate consumers and verify and update doses and administration.
- **EER -** Extended Entity Relationship
- **SQL -** Structured Query Language
- **DBMS -** Database Management System
- **DFD -** Data Flow Diagram
- **IEEE -** Institute of Electrical and Electronics Engineers

2. SYSTEM OVERVIEW

The Vaccine Drive Registration System is a modification over the existing system which differs in certain aspects as it merges various scheduling and registration systems as one single system and provides a reliable and essential service to all beneficiaries and vaccinators with all the required functionalities. This product is totally self-contained. The purpose of developing the specified software is to describe the analysis involved in the registration of vaccines.

- **FUNCTIONAL ANALYSIS**

  Input: The beneficiary details, preference of vaccination centre, dose and type.

  Output: Appointment Schedule and Certificate after successful vaccination.

- **PROCESS**

  Consumer:

  - Register and add the consumer's name, Aadhar ID, mobile number to the database, if new consumer.
  - Login
  - Edit the details of existing consumers.
  - View nearby vaccination centres
  - View predicted crowdness factor at the time of scheduled appointment.
  - Schedule vaccination appointment
  - Reschedule/Cancel vaccination appointment
  - Download the vaccination certificate, if any
  - Log out

  Vaccinator:

  - Login
  - Update vaccine count
  - Confirm administration of vaccine to the consumer
  - View vaccination appointments
  - Logout

- **EXISTING SYSTEM**
  - In the existing system there is no facility for knowing the crowd at a given vaccination center.
  - There is no option for cancelling a vaccination appointment.
  - There is no facility to alter a scheduled appointment.

- **PROPOSED SYSTEM**

  The main implementation requirements for this project are
  - Provides facility for the user to view all scheduled appointments.
  - Provides facility for user to cancel a scheduled appointment.
  - Provides facility for the user to reschedule appointments.
  - Provides facility for the admin/vaccinators to review registrations and make primary changes if necessary.
  - Provides facility for the vaccinator to update vaccine dose count.

3. SYSTEM ARCHITECTURE

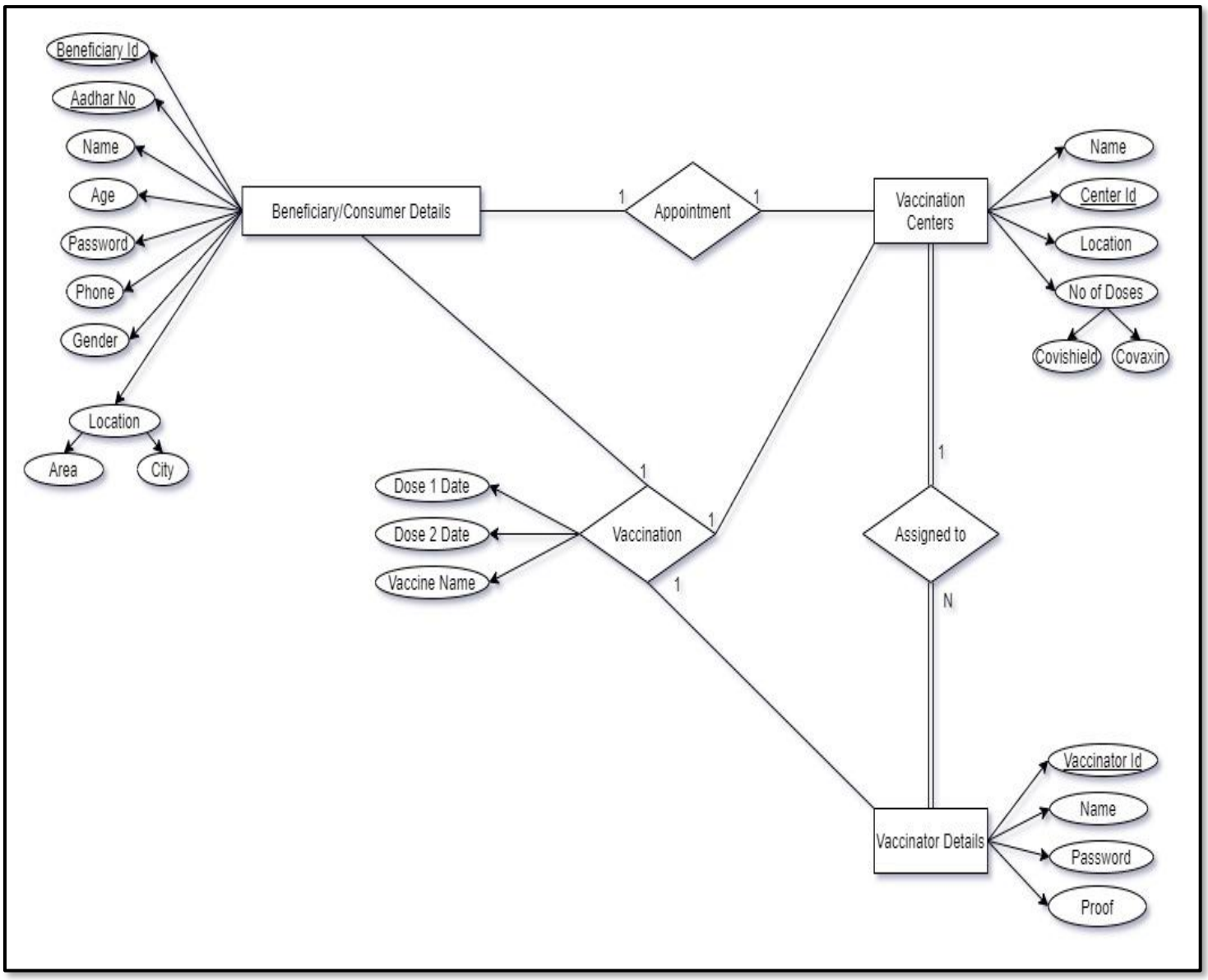
3.1 Architectural Design

- **Database architecture:**

  The local server database is used for storing reservation records and all other details to be stored as entities with relationships among them. The architecture of the database is represented by the EER Diagram given below.

Entity Types
Beneficiary/Consumer Details
Vaccination Centres
Vaccinator Details

Relationships
Beneficiary **Vaccination** at Vaccination Centre by Vaccinator
Beneficiary **Appointment** at Vaccination Centre
Vaccinator **Assigned to** Vaccination Centre



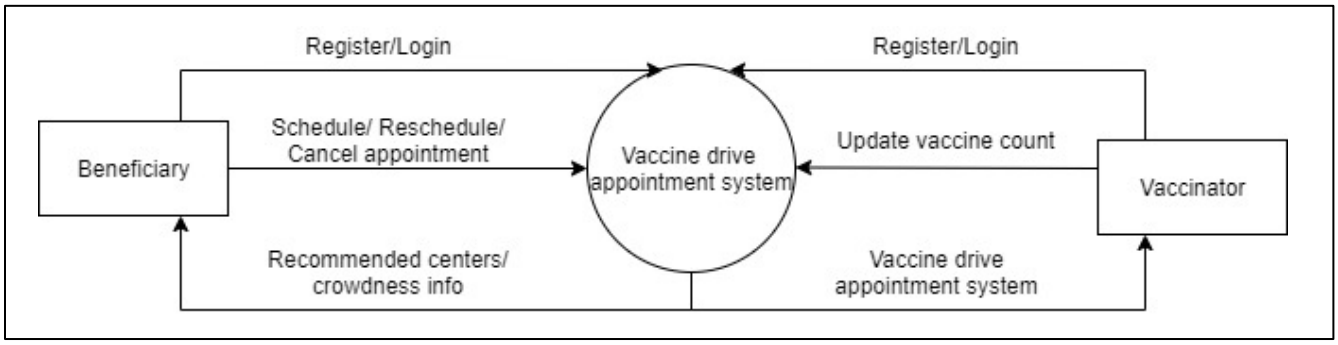
Entity Relationship Diagram for Vaccine Drive Registration System

- **Modules:**
  - **Login Module:** An existing consumer/vaccinator
  - enters the login credentials and logs in to the system after validation of credentials.
  - **Beneficiary Registration Module:** A new consumer can enter required details and his/her details are stored in a database. Further login credentials are generated and redirected to the login module.
  - **Edit Profile Module:** Consumer details given during registration can be edited if required and the changes are updated in the database.
  - **Delete Profile Module:** If a consumer wishes to delete his/her profile, this module enables to perform the action and the changes are updated in the database.
  - **Book Appointment Module:** This module gets consumer's preference of the vaccination centre, date of appointment, vaccine type based on the crowdness factor (Obtained from Compute Crowdness Factor Module) and number of doses available and returns the appointment schedule if successful.
  - **Compute Crowdness Factor Module:** This module uses analysis features and shows the crowdness factor of vaccination centres which can help consumer to choose a vaccination centre.
  - **Update Vaccine Count Module:** Vaccinator after logging in can update the number of available vaccine doses for each type of vaccine using this module.
  - **Confirmation of Administration Module:** This module allows the vaccinator to approve the administration of vaccine to a consumer and this in turn helps in generation of details for the certificate.
  - **Download Certificate Module**: This module shows the available certificates for the consumer after administering vaccine and allows him to download it for his reference.
  - **Logout Module**: This module enables the user to end the session and exit the system, redirecting to login module.

3.2 Decomposition Description

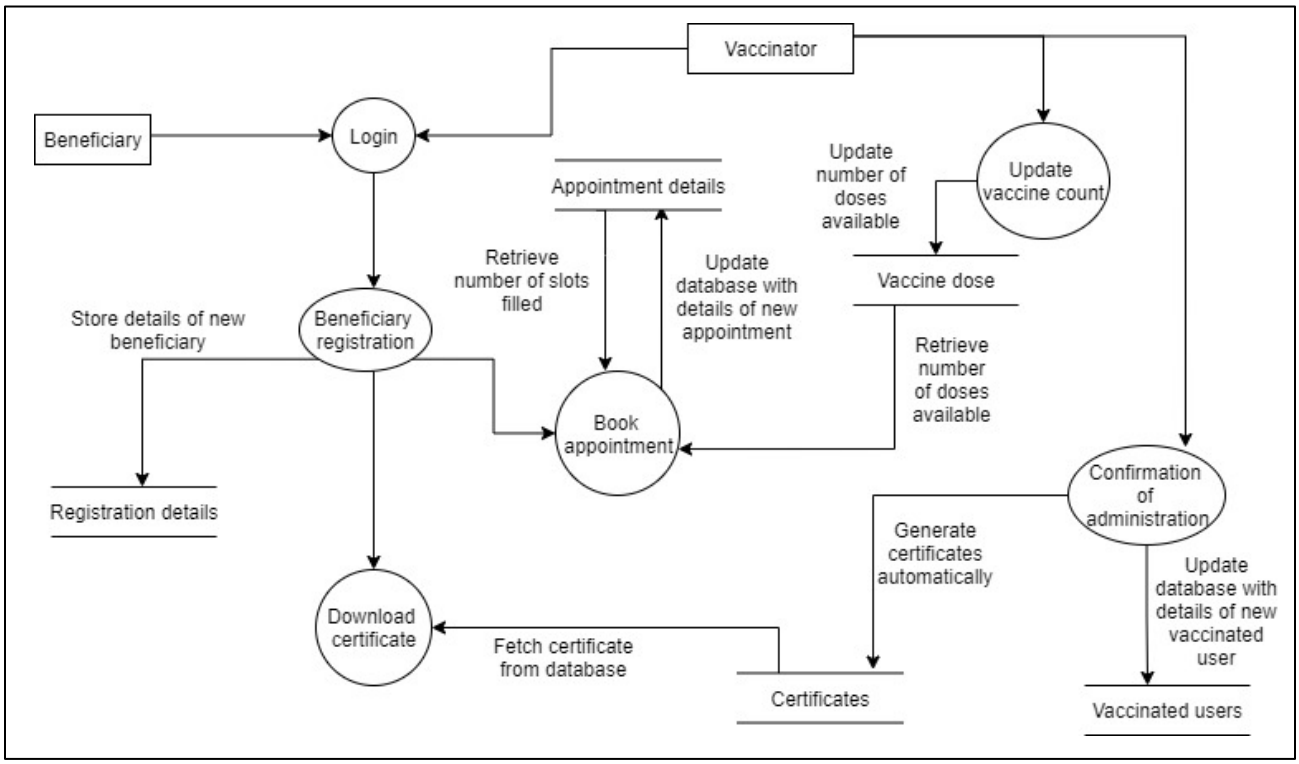
- **General Description with Level 0 DFD:**

  The VDRS is initially decomposed into 6 major modules and the beneficiaries and the vaccinators interact with the system and results in the required functionality and offering the completeness of the system.

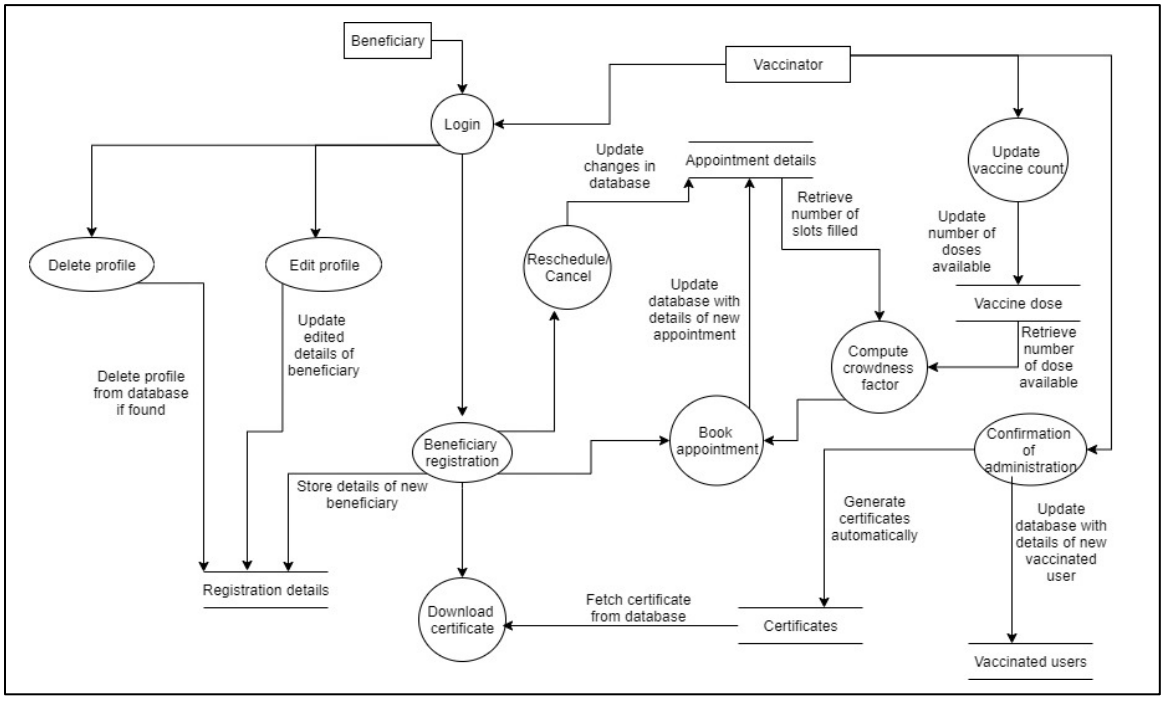


- **Sub-System Description with Level 1 DFD:**

  The VDRS process is further decomposed into processes related to authentication (Login/Signup), scheduling appointments, certificate download for consumers and authentication, updating dose count and confirming administration for the vaccinator side. They in turn communicate with their appropriate data stores.



- **Specific and Detailed Description with Level 2 DFD:**
  - The consumer uses his/her login credentials to enter into the system through “Login module” and new beneficiary registration is done using “Beneficiary Registration module” and details are stored in the “Registration Details data store”. Any further changes in profile can be made using “Delete profile” and “Edit profile” modules and are also updated in the same data store.
  - Beneficiary checks vaccine availability and makes preferences based on the crowdness (“Compute crowdness factor module”), distance, and vaccine count and book an appointment using “Book Appointment Module” and the details are stored in “Appointment details Data Store”. Any rescheduling or cancellation is done using “Reschedule/Cancel module” and the same Data store is updated.
  - After administration of the vaccine consumer can download certificate using “Download certificate module” which uses details from “Certificates Data Store” which in turn is updated by vaccinator after successful administration of vaccine to the consumer using “Confirmation of administration module” (“Vaccinated Users Data Store” is also updated).
  - On the other hand, Vaccinator can login using the “Login Module” and update the available vaccine count using “Update vaccine count module” and “Vaccine Dose Data Store” is updated.



3.3 Design Rationale

- The Database architecture was planned in such a fashion that the data stored in the individual relations(tables) are less redundant and also in a manner that searching the details becomes easy with uncomplicated queries.

- The modules of the VDRS were designed in a manner that modules were able to perform their execution without data or processing from other modules to the maximum extent possible.

4. DATA DESIGN

4.1 Data Description

All vaccination records and all other details related to users, vaccinators etc. are stored in the VDRS Database (Local Server Database). Varied attributes of each type of entities stored with appropriate data types and the relations in the database are normalized so that data redundancy and further anomalies can be reduced to the maximum extent possible. All the entity types, relations and attributes are stored in related tables for easy retrieval and access using appropriate queries.

4.2 Data Dictionary

Table Name: REGISTARTION DETAILS

Attribute	Data type	Description	Example
Id	Long Integer	Stores the unique ID of the customer	7172345
Name	String	Stores consumer name	“Ajith”
Age	Integer	Stores age of the customer	18
Gender	Character	Stores gender of the customer	‘M’/’F’
Aadhar number	Long Integer	Stores the 16-digit Aadhar number	1234 5678 9234 5462
Location	String	Stores the customer residential city	“Coimbatore”
Phone	String	Stores the email ID of the customer	9361379934
Password	String	Stores the password	“ajith2001”

Table Name: VACCINATED USERS

Attribute	Data type	Description	Example
Id	Long Integer	Stores unique consumer Id	7198653
Vaccine name	String	Stores the vaccine name	Covishield
Dose 1 centre Id	Long Integer	Stores the centre id of dose 1 vaccination	1771862
Dose 2 centre Id	Long Integer	Stores the centre id of dose 2 vaccination	1771862
Dose 1 date	Date Time	Stores date of dose 1 vaccination	22/03/21
Dose 2 date	Date Time	Stores date of dose 2 vaccination	23/03/21

Table Name: VACCINATION CENTERS

Attribute	Data type	Description	Example
Id	Long Integer	Stores unique booking id	1771862
Name	String	Stores Centre name	PSG Hospital
Location	String	Stores location of centre	Coimbatore
Number of doses	Integer	Stores the number of vaccines available	100

Table Name: APPOINTMENT DETAILS

Attribute	Data type	Description	Example
Id	Long Integer	Stores a unique appointment Id	6541726
Beneficiary Id	Long Integer	Stores the id of the beneficiary	7172345
Centre Id	Long Integer	Stores the id of centre	1771862

Table Name: VACCINATOR DETAILS

Attribute	Data type	Description	Example
Vaccinator_Id	Long Integer	Stores a unique ID of vaccinator	757243829
Proof	Long Integer	Stores the qualification proof of vaccinator	775278325
Username	String	Stores username for vaccinator	“Ajith”
Password	Integer	Stores the password created by the vaccinator	“ajith2001”
Center Id	Long Integer	Stores the id of the vaccinator’s corresponding center	1771862

5. COMPONENT DESIGN

A summary of the algorithm for each function as a pseudocode is given below.

5.1 Consumer Registration and Login Module

a) Login

```
Input Phone Number/email ID and password;
Check authentication details with ‘User Register’ Database;
If (password matched):
        Redirect to home page;
Else:
        Display “Username and password don’t match”;
```

b) Beneficiary Registration

```
Input user details like name, aadhar_number, age, etc;
Input password and check validity;
If (password & details are valid):
        Input ‘confirm_password’;
        if(password == confirm_password):
                Create Profile;
                Update in ‘User Register’ Database;
        Else:
                Display “Passwords don’t match”;
Else:
        Display “Entered details aren’t valid”;
```

c) Edit Profile

```
Input Phone Number/email ID and password;
Check authentication details with ‘User Register’ Database;
If (password matched):
        Input the fields to be edited;
        Input new_data;
        If (new_data is valid):
                Update in ‘User Register’ Database;
        Else:
                Display “Entered details aren’t valid”;
Else:
        Display “Username and password don’t match”;
```

d) Delete Profile

```
Input Phone Number/email ID and password;
Check authentication details with ‘User Register’ Database;
If (password matched):
        Input final_confirmation;
        If (final_confirmation == yes):
                Delete profile from ‘User Register’ Database;
        Else:
                Display “Your profile wasn’t deleted”;
Else:
        Display “Username and password don’t match”;
```

5.2 Scheduling Appointment Module

a) Book Appointment

```
Display ‘Available vaccination centers and inoculations in stock’;
Input preferred_vaccination_center;
Input preferred_time_slot;
Check validity of input;
if(preferred_appointment_details are valid):
        Reserve preferred slot;
        Update in ‘Appointment Details’ database;
        Update in ‘Vaccine Dose’ database;
Else:
        Display “Invalid Input was entered”;
```

b) Reschedule Appointment

```
Choose appointment to be rescheduled;
Input new vaccination center and time slot;
If (shots available at newly entered source):
        Input password;
        Check ‘user register’ database for authentication;
        if(password matched):
                Change appointment;
                Update in ‘Appointment Details’ database;
                Update in ‘Vaccine Dose’ database;
        Else:
                Display ‘Incorrect Password’;
Else:
        Prompt to cancel_appointment;
```

c) Cancel Appointment

```
Choose appointment to be canceled;
Confirm cancellation;
If (confirmed):
        Input password;
        Check ‘user register’ database for authentication;
        if(password matched):
                Update in ‘Appointment Details’ database;
                Update in ‘Vaccine Dose’ database;
                Display ‘Appointment Canceled’
        Else:
                Display ‘Incorrect Password’;
Else:
        Display ‘Cancellation process halted’;
```

5.3 Centre Recommendation and Crowdness Predictor Module

a) Compute Crowdness Factor

```
Input prefered_vaccination_center;
Fetch ‘Appointment Details’ database;
Fetch ‘Vaccine Dose’ database;
Fetch ‘User Register’ database;
Check unvaccinated users in the vicinity;
Check number of available doses not reserved for appointments;
Check number of people visiting on appointment;
Compute Crowdness factor using above factors;
```

b) View Recommended Centres

Input users' willingness to travel;
Fetch 'Appointment Details' database;
Fetch 'Vaccine Dose' database;
Fetch 'User Register' database;
Compute crowdness factor for centers in requested vicinity;
Check availability of vaccination shots;
Sort centers based on the above factors;

5.4 Vaccinator Certificate Download Module

a) Download Certificate

Display consumer vaccinated using current account;
Input consumers whose certificate must be downloaded;
Fetch 'Certifcates' database;
Generate requested certificate(s);
Provide Download option;

5.5 Vaccination Centre Updates Module

a) Login

Input Vaccination_Center_ID and password;
Check authentication details with 'Center_Register' Database;
If (password matched):
    Redirect to Center_Application page;
Else:
    Display "ID and password don't match";

b) Confirmation of Administration

Input Aadhar number of consumer;
Input Dose 1/Dose 2;
Update 'Appointment Details' database;
Update 'Vaccinated Users' database;
Update 'Certificates' database;
Call Update_Vaccine_Count Function;

c) Update Vaccine Count

Input number of shots provided;
Input Center_ID and password;
Check authentication details with 'Center_Register' Database;
If (password matched):
    Update in 'Vaccine Dose' database;
Else:
    Display "ID and password don't match";

6. HUMAN INTERFACE DESIGN

6.1 Overview of User Interface

The user interface consists of several pages that helps the user to interact with the system effectively and easily make or view or cancel an appointment and in an easy vaccination process. The pages in the VDRS are listed with their short description below

- **Login Page:**
  - Enter username and password
  - Change password if forgotten
  - Register if a new user

- **Consumer Registration Page:**
  - If new user, Enter the details such as Name, Aadhar ID, Phone number, Email address, contact address.
  - Generate Login Credentials.

- **Profile Page/Vaccination Status Page:**
  - Displays the current consumer details.
  - Displays vaccination status of consumer.
  - Enables to download vaccination certificate if any.
  - Shows number of days pending for Dose 2 after administering Dose1.
  - Enables to move to schedule appointments page.
  - Enables to edit and update any details if any or even delete the profile.
  - Shows scheduled appointments**.**
  - Allows to reschedule or cancel appointments.

- **Schedule Appointments Page:**
  - Enter Date of appointment
  - Shows choice of vaccination centres with number of doses for each type

- **Update Vaccine Count Page:**
  - Enables the vaccinator the update the number of available doses of vaccines of each type.

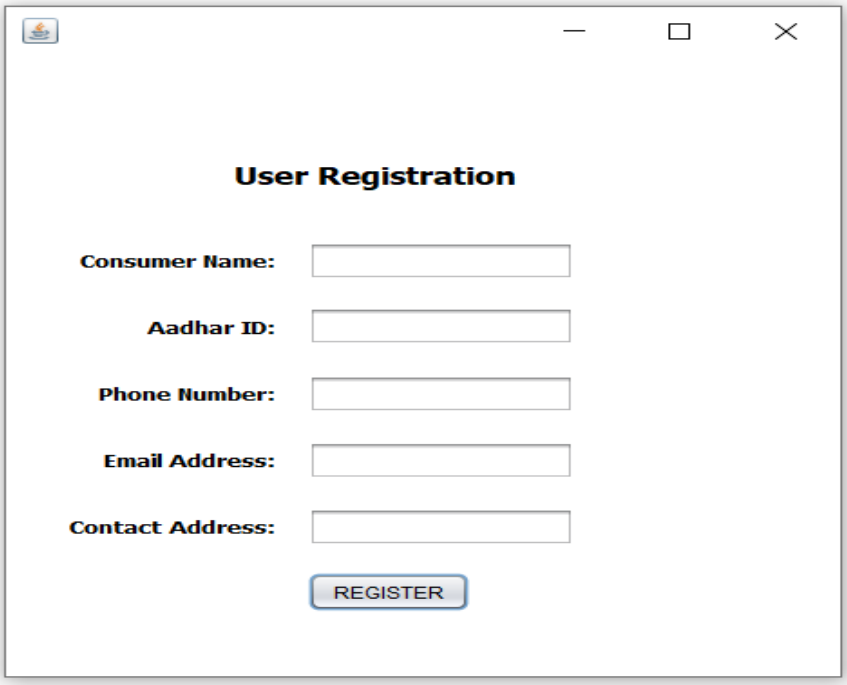
- **Vaccination Statistics Page:**
  - Displays the vaccination statistics categorized by state, age and date.
  - Displays usage statistics of vaccine types.

6.2 Screen Images

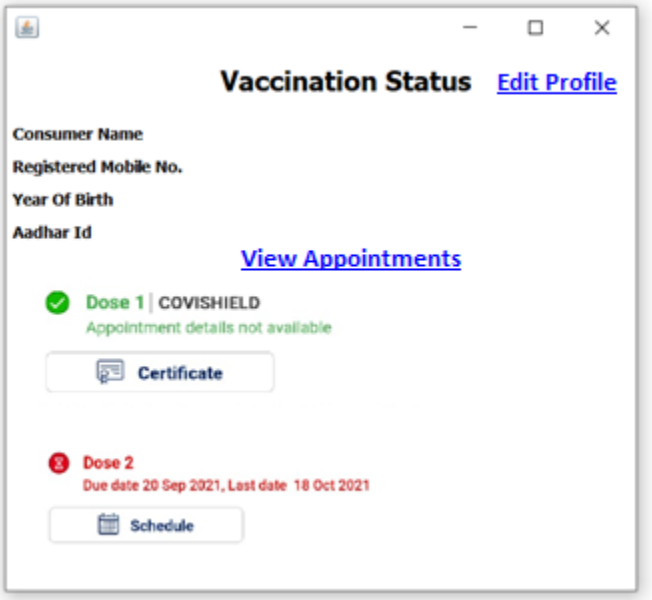
Some of the user interface screen snippets are displayed below.

- **Login Page:**

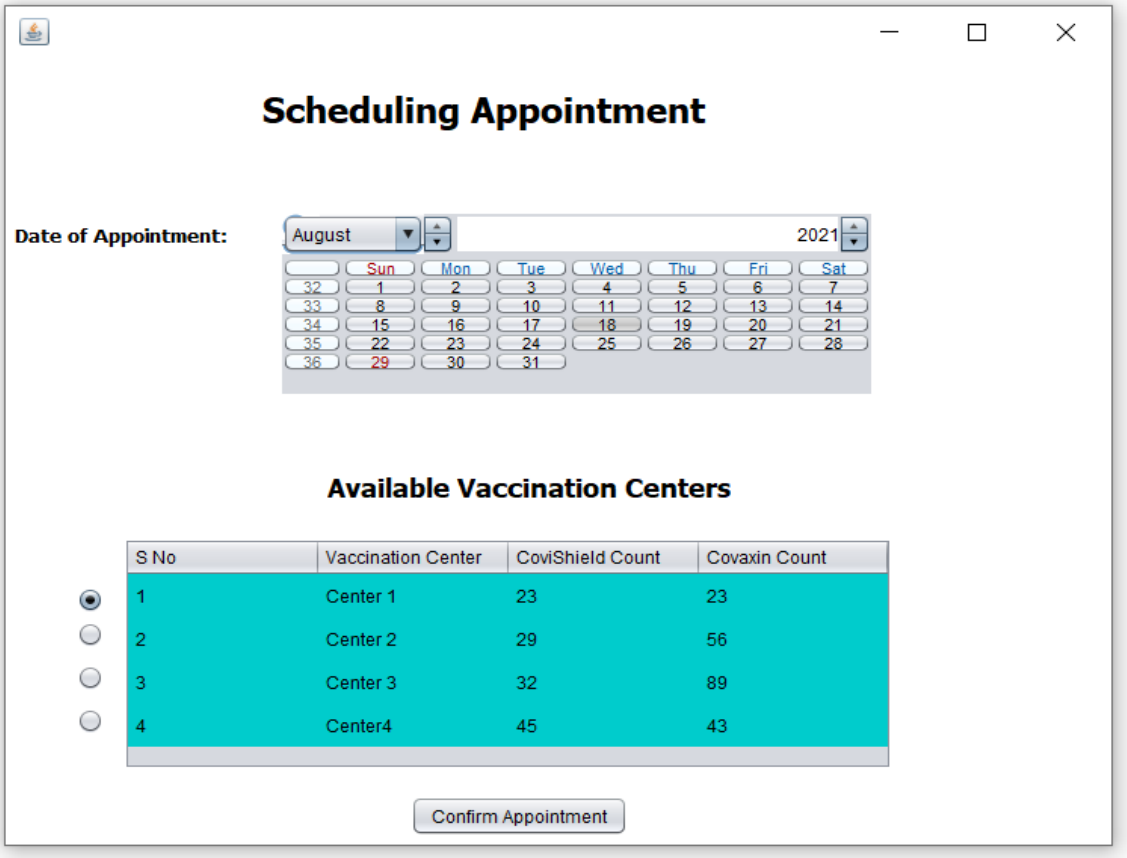
- **Consumer Registration Page:**



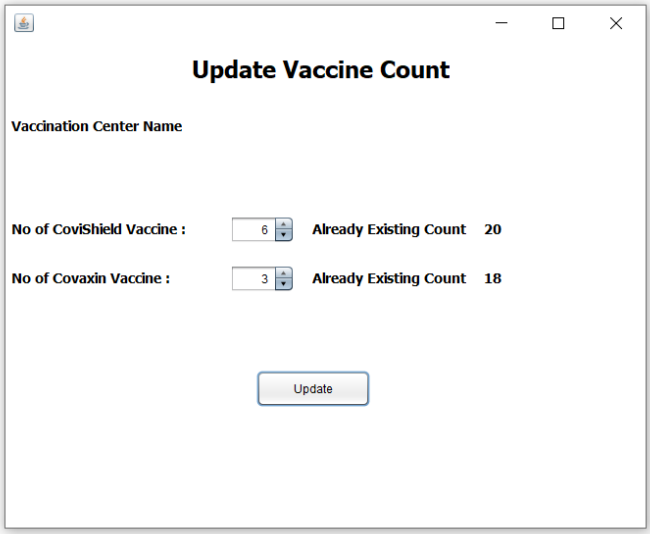
- **Profile Page/Vaccination Status Page:**



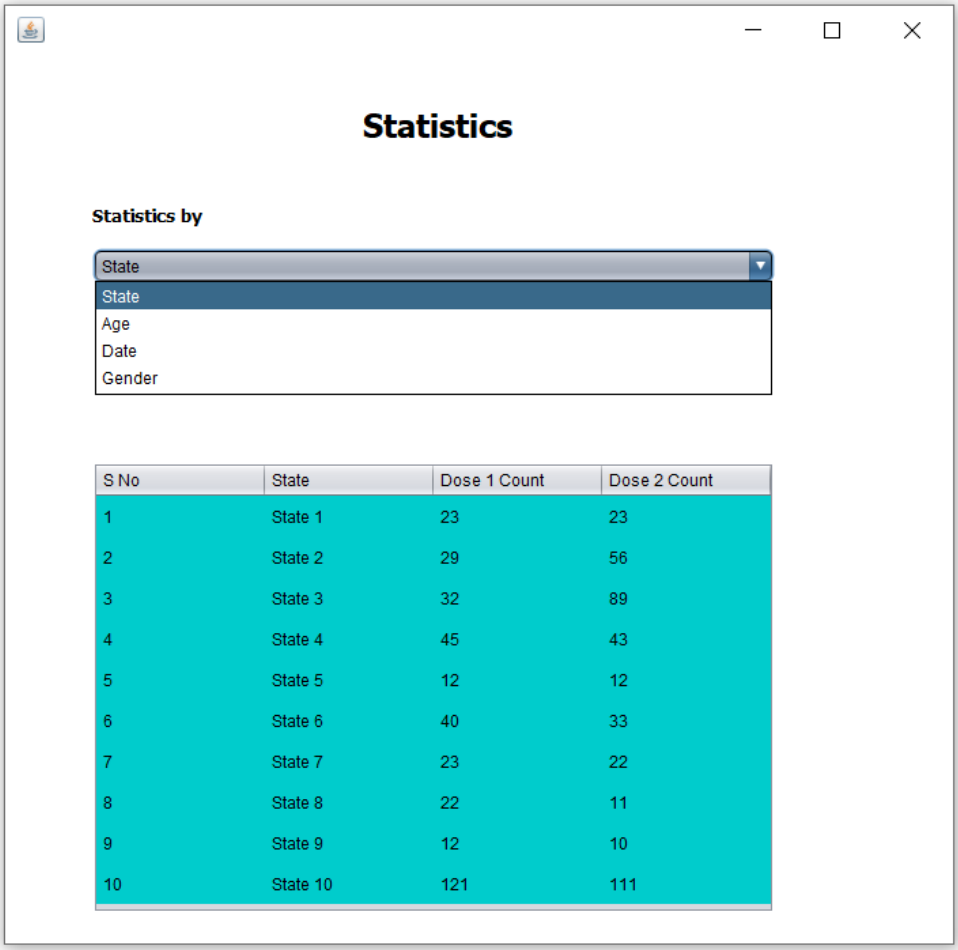
- **Schedule Appointments Page:**



- **Update Vaccine Count Page:**



- **Vaccination Statistics Page:**



6.3 Screen Objects and Actions

Some of the objects in the screen along with related actions and functionality are described below

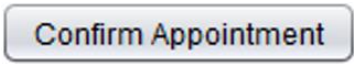
- **Login Page:**
  Login Button: It redirects to vaccination status page if the entered username and password is correct.

- **Consumer Registration Page:**
  Register Button: Saves the entered details, generates login credentials and redirects to Login Page.

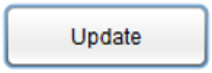
- **Profile Page/Vaccination Status Page:**
  Certificate Button: Shows the certificate after administering vaccine and enables to download if required

  Schedule Button: Redirects to schedule appointment page.

- **Schedule Appointments Page:**
  Confirm Appointment Button: Schedules an appointment and shows appointment details to consumer.



- **Update Vaccine Count Page:**
  Update button: Allows to update the count of vaccines available to the set value.



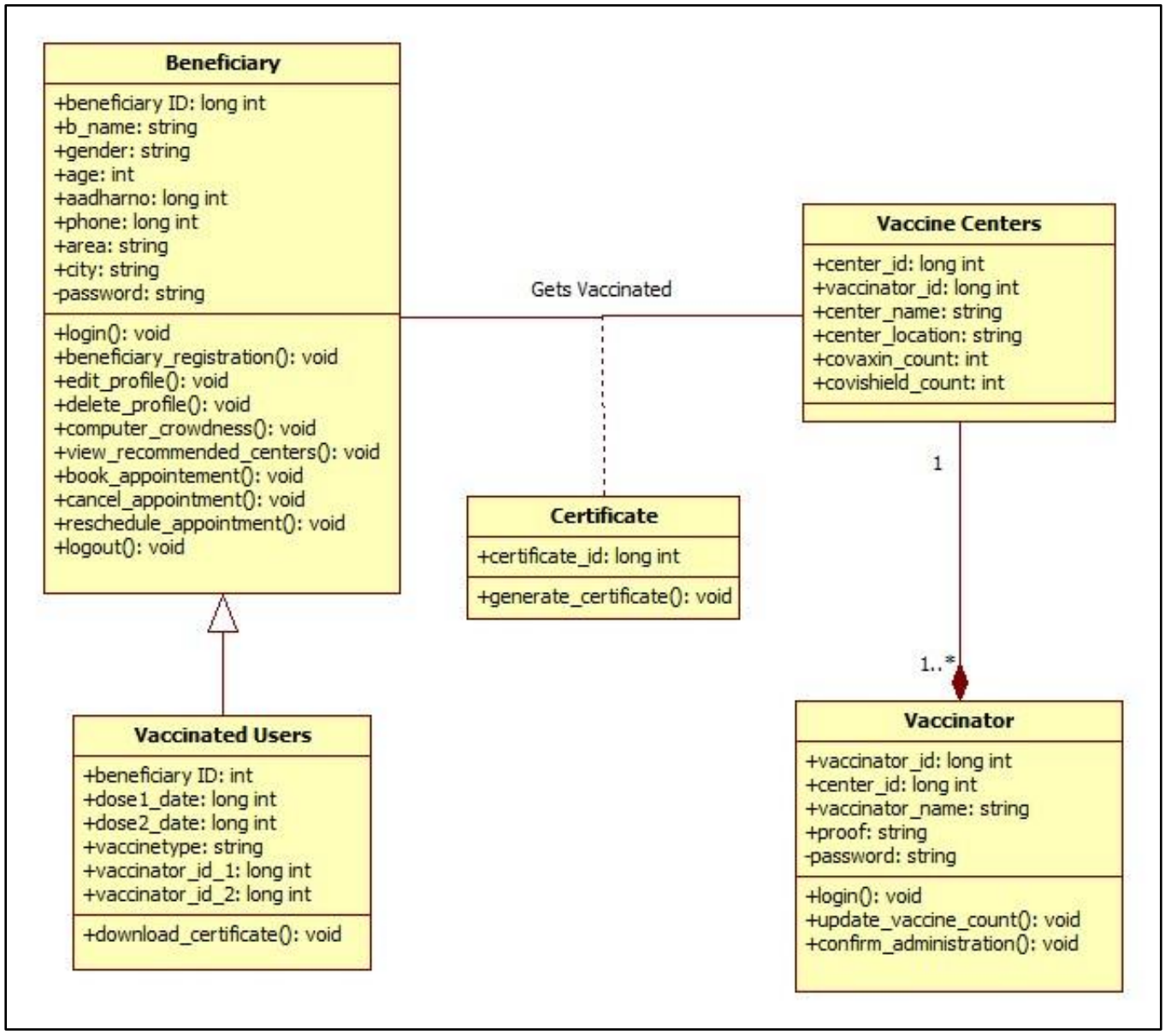
7. REQUIREMENTS MATRIX

This section provides cross-references that traces component modules and data structures to the functional requirements specified in the Software Requirements Specification document.

Reference number (SRS)	Functional Requirement	Component Modules	Data Structures	Design Reference number
4.1	Consumer Registration and Login	Login Module Beneficiary Registration Module Edit Profile Module Delete Profile Module	Registration Details Database	5.1.a 5.1.b 5.1.c 5.1.d
4.2	Scheduling Appointment	Book Appointment Module Reschedule/Cancel Module	Appointment Details Database	5.2.a 5.2.b,5.2.c
4.3	Centre Recommendation and Crowd Predictor	Compute Crowdness Factor Module	Appointment Details Database Vaccine Dose Database	5.3.a,5.3.b
4.4	Vaccination Certificate Download	Download Certificate Module	Certificates Database	5.4.a
4.5	Vaccination Centre Updates	Login Module Confirmation of Administration Module Update Vaccine Count Module	Vaccinated Users Database Certificates Database Vaccine Dose Database	5.5.a 5.5.b 5.5.c

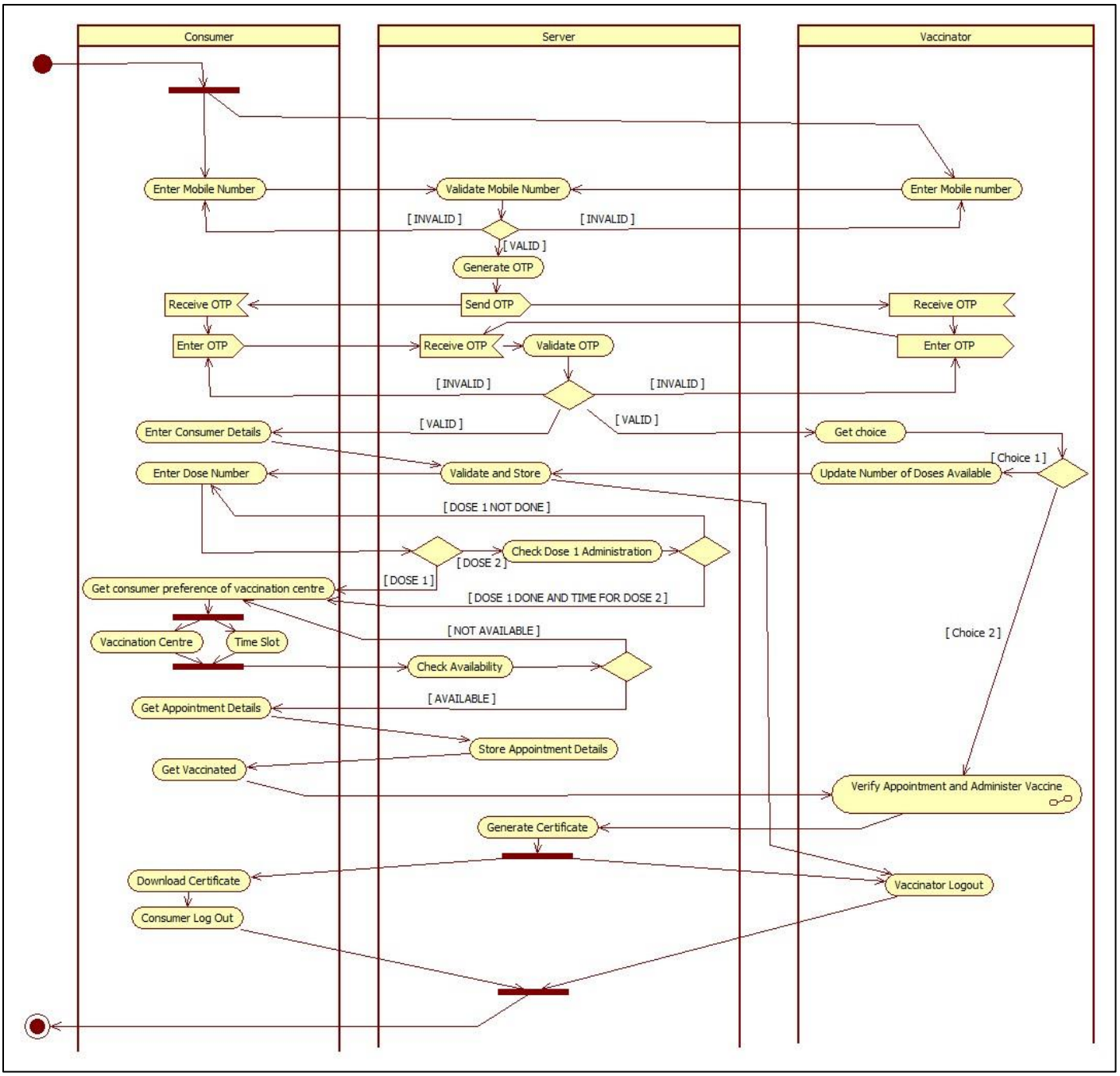
8. UML DIAGRAMS

8.1 Structural Diagram – Class Diagram

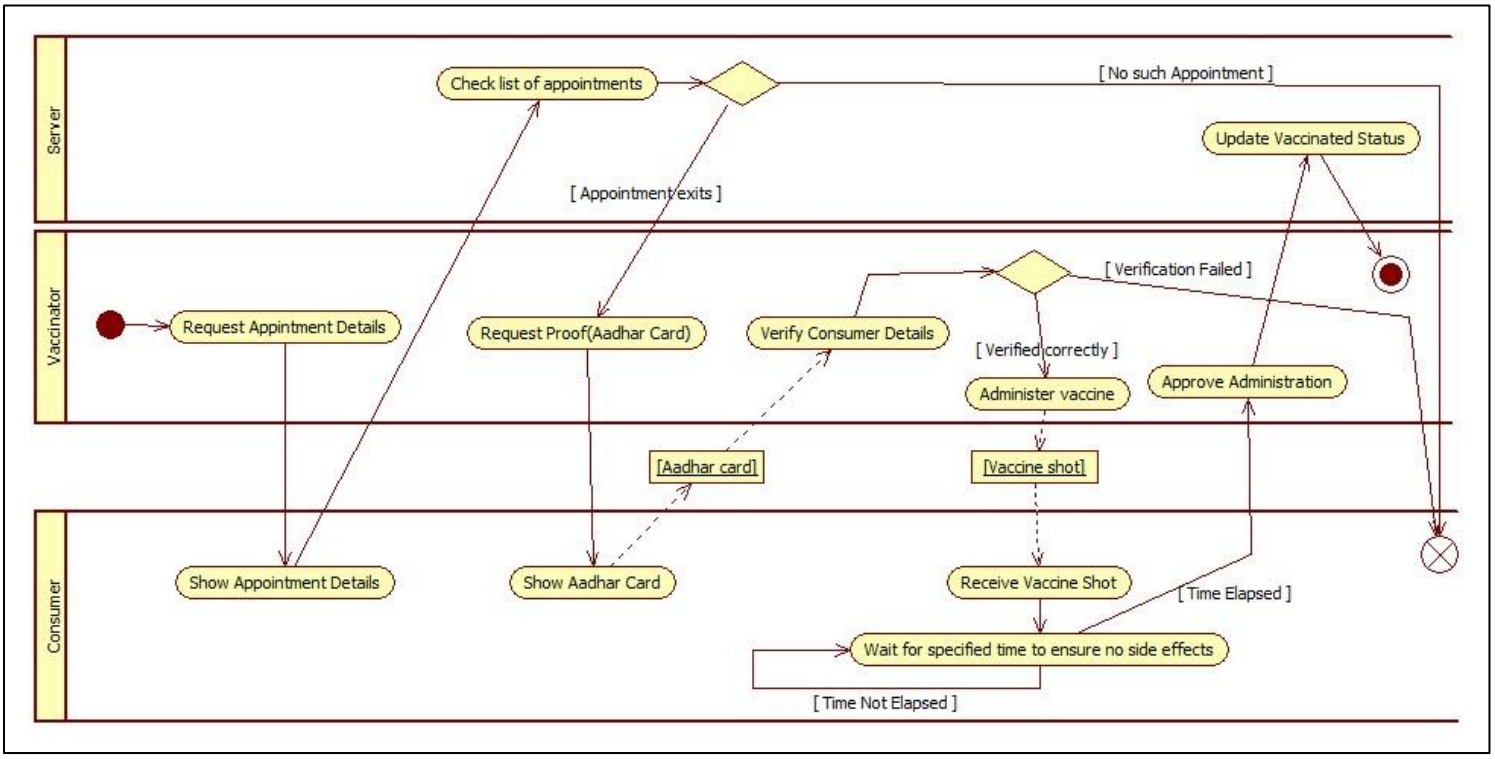


Class Diagram for Vaccine Drive Registration System

8.2 Behavioural Diagram – Activity Diagram



Activity Diagram for Vaccine Drive Registration System



Sub-Activity Diagram for Verify Appointment and Administer Vaccine

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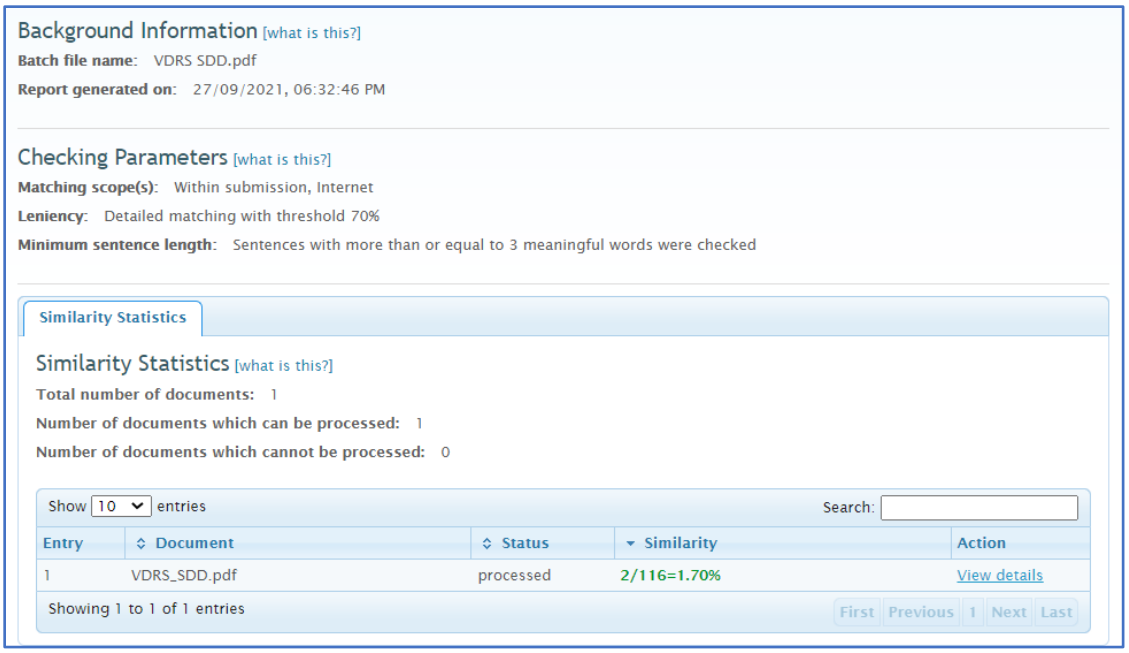

Background Information [what is this?]

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Report generated on: 27/09/2021, 06:32:46 PM

Checking Parameters [what is this?]

Matching scope(s): Within submission, Internet

Leniency: Detailed matching with threshold 70%

Minimum sentence length: Sentences with more than or equal to 3 meaningful words were checked

Similarity Statistics

Similarity Statistics [what is this?]

Total number of documents: 1

Number of documents which can be processed: 1

Number of documents which cannot be processed: 0

Show 10 entries Search:

Entry	Document	Status	Similarity	Action
1	VDRS_SDD.pdf	processed	2/116=1.70%	View details

Showing 1 to 1 of 1 entries First Previous 1 Next Last