Software Requirements Specification

for

Vaccine Drive Registration System

Version 1.0 approved

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Revision History

Name	Date	Reason For Changes	Version

1. Introduction

The aim of this document is to analyze and give an insight of the complete Vaccine Drive Registration System. The detailed requirements of the Vaccine Drive Registration System are provided in this document. It also provides a description of the design of the Vaccine Drive Registration System which allows the software development team to proceed with an understanding of what is to be built and how it is expected to be built.

1.1 Purpose

The main purpose of this document is to present detailed information of the Vaccine Drive Registration System, its parameters and goals. It will explain the different functional requirements of the system, the interfaces of the system, what the system will do or how the system will interact with the external users, the constraints under which it will operate. It also gives us the view about what are the users expectations. The end users will be able to use this SRS as a tool to see if the constructing team will be constructing the system to their expectations. If the expectations of the end users are not met, modifications can be made to the SRS document according to the preferences of end users.

1.2 Document Conventions

The document is prepared using Microsoft Word 2019 and has used the font type 'Arial'. The fixed font size that has been used to type this document is 13pt with 1.15 line spacing. Sectional headings use ‘Arial’ font with 16pt and sub-sectional titles use ‘Arial’ font with 14pt.It has used the bold property to set the headings of the document and key points in the document as a highlighting option. Standard IEEE template is the template used to organize the appearance of the document and its flow.

1.3 Intended Audience and Reading Suggestions

The intended audience of this document would be the administrators and the project team to refer and analyze the information. Also, it could be used by potential developers, design engineers, testers, etc. Readers are suggested to know basics of SRS and the outline of how the vaccine registration system works. The end users are suggested to use this SRS as a tool to see if their expectations are met and modify if any changes are required by informing the team.

1.4 Product Scope

- This software will be a Vaccine Driver Registration System to manage vaccine registration and allotting vaccine for beneficiaries in nearby vaccine drive center.
- 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 centers.
- Consumers can also view their schedule and manage their schedule for 2nd Dose of Vaccine.

1.5 References

- SRS Template:

  IEEE Template: https://web.cs.dal.ca/~hawkey/3130/srs_template-ieee.doc

- Use case and Data Flow Diagrams:

  - The Unified Modelling Language User Guide, 2nd Edition, James Rumbaugh
  - Object Oriented Analysis and Design with Application, 3rd Edition, Grady Booch

2. Overall Description

2.1 Product Perspective

The Vaccine Drive Registration System is a new system which is different from the existing systems as it merges various scheduling and reservation 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.

2.2 Product Functions

The actors involved in the vaccine drive registration system are Vaccinator and Consumer. The set of functionalities that are supported by the system for each of the actors are given below:

Consumer

- Check vaccine availability
- View nearby vaccination centres
- View predicted crowdness factor at the time of scheduled appointment
- Add the consumer's name, Aadhar ID, mobile number to the database, if new consumer
- Edit the mobile number or name of the existing consumer
- Schedule vaccination appointment
- Reschedule vaccination appointment
- Cancel vaccination appointment
- Download the vaccination certificate, if any

Vaccinator

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

2.3 User Classes and Characteristics

Vaccinator
Vaccinators are the people who administrate vaccine to the registered consumers and confirm the registration of the consumers.

Consumer
Each and every person in the world is a consumer, who can use this application to register themselves for the vaccine administration by providing the required details.

2.4 Operating Environment

- A machine capable of running Windows XP and 512MB free ram after the OS has been started.
- For Linux it is a similar 512MB free ram after the OS has been started.
- The machine must possess a minimum of Pentium 2 266 MHz processor.
- Disk Space: 124MB for JAVA Runtime Environment.

2.5 Design and Implementation Constraints

1. **Memory**: System will have only 10GB space of data server.
2. **Language Requirement**: Software must be only in English.
3. **Budget Constraint**: Due to limited budget, vaccine drive registration system is intended to be very simple and just for basic functionalities. UI is going to be very simple.
4. **Implementation Constraint**: Application should be based on Java only.
5. **Reliability Requirements**: System should sync frequently to backup server in order to avoid the data loss during failure, so it can be recovered.

The following software & hardware equipment are required for implementation and for the design:

- Coding language used is Java.
- NetBeans IDE for front end design
- MySQL for backend database

2.6 Assumptions and Dependencies

- It is assumed that in the vaccine registration system, consumers will make payments on the front desk alone and no online payment methodology is implemented with the system.
- The system is storing all the data at one place but the access is restricted among its vaccinators as per prior knowledge about the requirements.
- The vaccinator has enough trained staffs to maintain and look over the system and staff side security constraints are met.
- Vaccination registration done on any other medium other than the application should also be promptly updated in the database to avoid inconsistency of vaccine details.
- The vaccinator must administrate the vaccination so that vaccination certificate will be made available to the consumer.

3. External Interface Requirements

3.1 User Interfaces

- **Consumer Registration:** A new consumer will need to enter the details such as Name, Aadhar ID, Phone number, Email address, contact address in order to access the application.

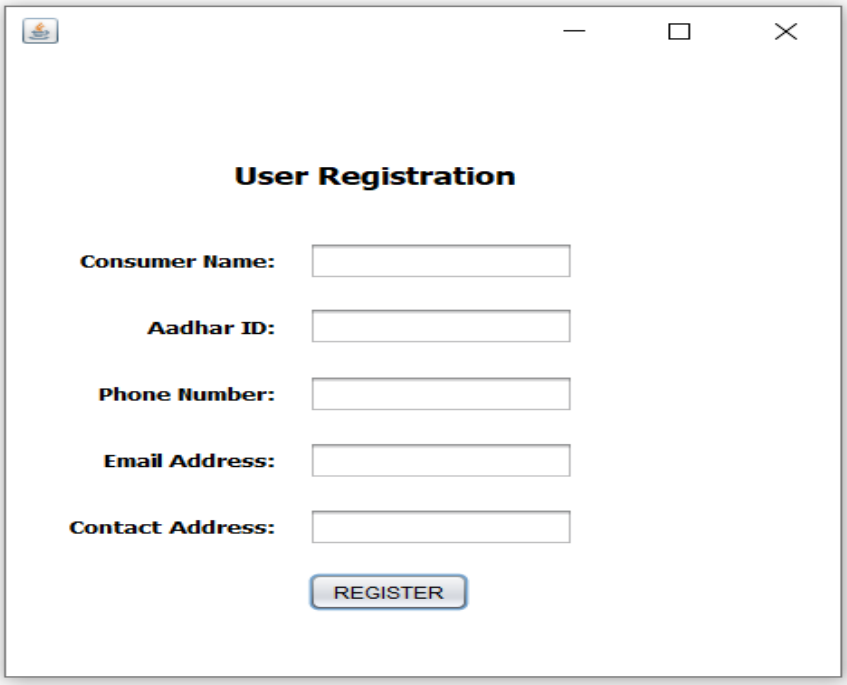


Figure 1: User Registration

- **Schedule Appointment:** The consumer chooses from the list of vaccination centres available on the specified date and clicks on the “Confirm Appointment” button to schedule an appointment at the selected vaccination centre.

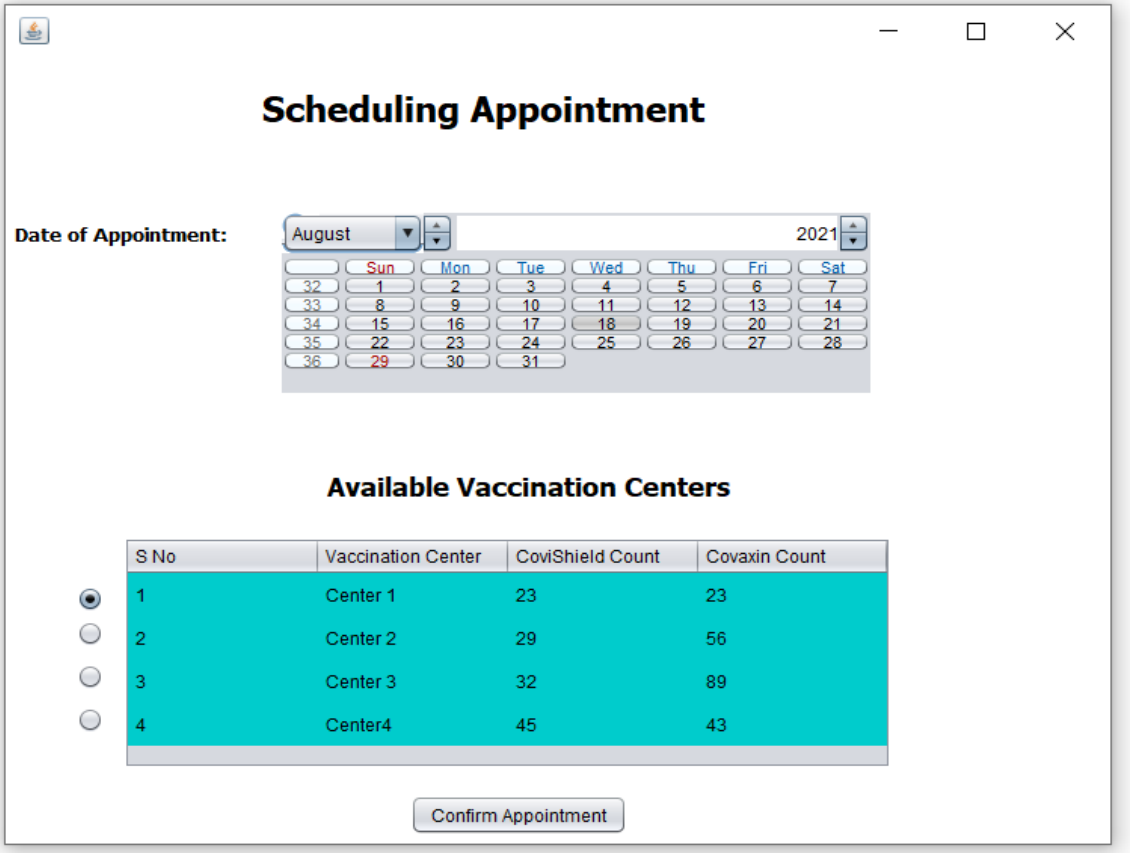


Figure 2: Scheduling Appointment

- **Update Vaccine Count:** The vaccinator logs in to the application and based on the available vaccine count for each type at the vaccination centres, he/she will update the database.

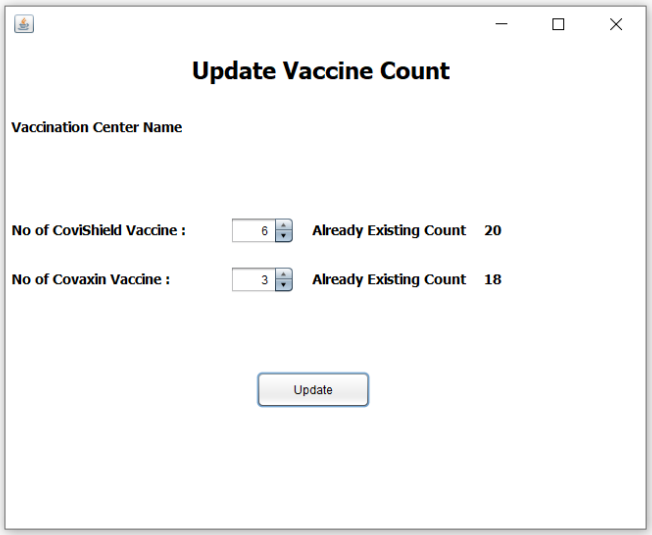


Figure 3: Update Vaccine Count

- **Vaccination Status Page:** The consumer can check his/her vaccination status and due date for the next dose of the vaccine (if already vaccinated with dose 1) and the last date for the next dose of the vaccine. The consumer is also provided with an option to download the vaccination certificate in pdf format.

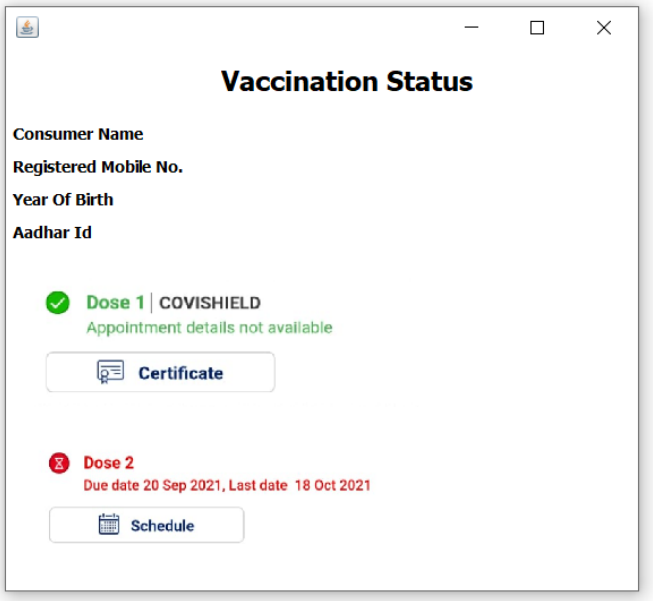


Figure 4: Vaccination Status

- **Vaccination Statistics Page:** This page displays the statistics of the number of people vaccinated categorized by state, age, and date. It also displays the usage statistics of the vaccination types (Covaxin and Covishield).

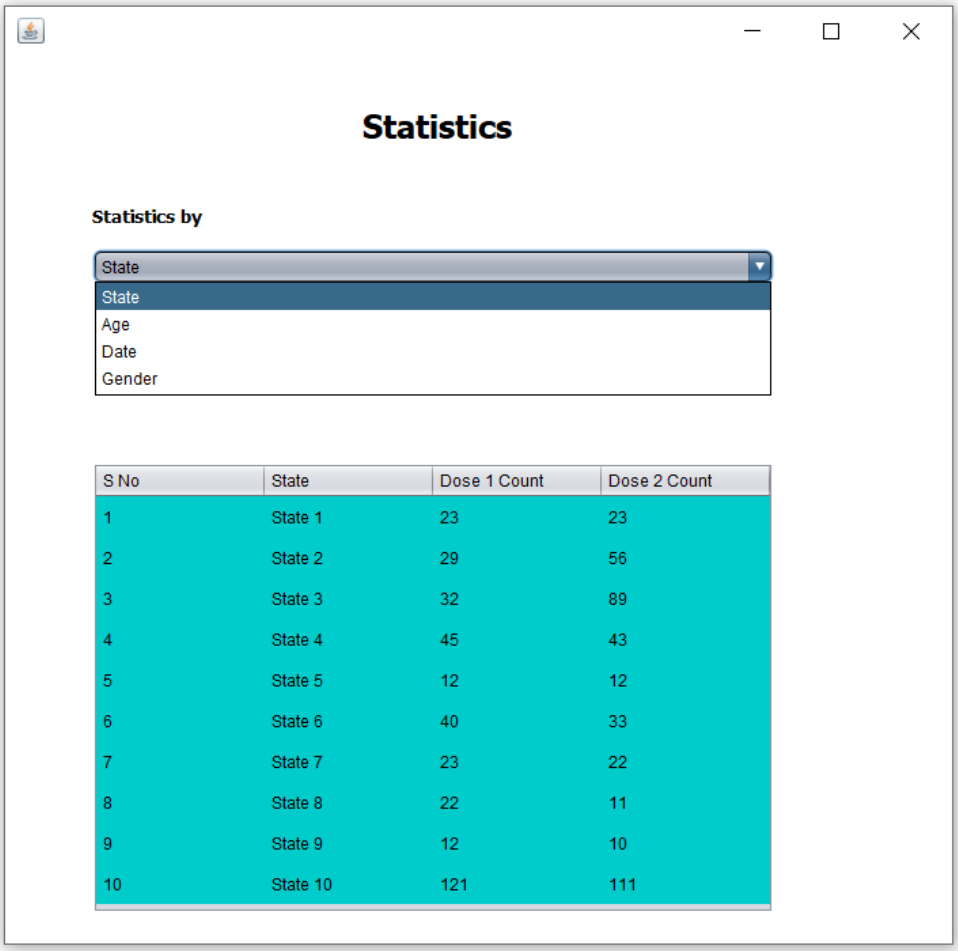


Figure 5: Vaccination Statistics

3.2 Hardware Interfaces

- A basic computer with at least 4 GB of RAM, and decent Intel/AMD/Apple Silicon Chip would be required for both of the end user.
- Minimum of 2.5 GB Free Hard Drive Space is required.
- Intense graphical performance isn't required. Any good integrated graphic card would be able to render the frontend smoothly.
- The interactions or controls would be primarily be via keyword strokes and mouse clicks.

3.3 Software Interfaces

- Operating system – **Windows (8 or later versions) or MacOS (Mojave or later versions)**
- Database - **MySQL** database.
- Java Programming Interfaces – **NetBeans (8.2 or later versions)** and **IntelliJ** IDE.
- Various APIs and JAR files including *maps.googleapis* has been used in the program and the executing system must be compactable to each one of them.

3.4 Communications Interfaces

- The system communication will be developed using Structure Query Language (SQL).
- The relational database was adopted because is made up of a group of logically connected tables (data that has a relationship to other data).
- Establishing a relational database management system is a great way to increase data integrity, efficiency, ask questions, sort and filter data, provide stronger security, and share information, ease of use, data independent among others.

4. System Features

The following are the important system features for the Vaccine Drive Appointment System. The System features are categorized further as Consumer-end features and Vaccination Centre-end features.

4.1 Consumer Registration and Login:

4.1.1 Description and Priority

This system feature allows the consumer to register to the application by filling in various details. The user will be required to enter his/her Aadhar number during the registration process for future verifications. The user will be allowed to add a maximum of five people to his profile to book for an appointment. Once the registration process is successful, the user can then sign in to his/her profile using his/her email ID or phone number. On doing so, the user will be provided with various features like booking an appointment, editing/deleting profile etc. The system feature has high priority as it serves as the base of the entire system.

4.1.2 Stimulus/Response Sequences

The user will be required to enter details such as,

- Name
- Email ID
- Phone Number
- Aadhar Number
- Password
- Date of Birth
- Address

The users on successful registration and login will we allowed to add members to their profiles and schedule an appointment.

4.1.3 Functional Requirements

4.1.3.1 Consumer Login

This functionality enables the consumers to login using their mobile number or email ID in the application. The login information entered by the user will then be cross referenced with the user register database. Once the authentication process is successful the user will be allowed to proceed further, else corresponding error will be prompted to the user.

4.1.3.2 Consumer Registration

This functionality enables the consumer to register themselves foe the vaccination appointment application. The consumer must provide that required details such as Aadhar number, date of birth etc. in order to complete the registration process. In case, any of the enter details does not match the required format, the user will be prompted about the error. Once all the details entered are verified, the user's profile will be constructed and the entered details will be committed to the user register database.

4.1.3.3 Edit Profile

This functionality enables the consumers to edit the details provided during registration and also allows the user to add members before scheduling the appointment. Details like Aadhar number, name, and date of birth will be required for each member to be included for the appointment booking. The new details entered will again be verified and changes will be made in the database.

4.1.3.4 Delete Profile

This functionality enables the user to delete their registration for vaccines. The consumer will be required to re-enter the password for confirmation. The user will not be allowed to delete the profile, if the consumer has already administered Dose 1 or Dose 2 vaccine. The deletion of profile removes the details from the user register and details of all members added in the profile will also be deleted.

4.2 Scheduling Appointment

4.2.1 Description and Priority

Consumers can select a nearby available vaccination center and the timing slot at which the person can get vaccinated. If needed, the person can also re-schedule or cancel his/her appointment. The consumer will also be allowed to view the recommended centers based on distance from user and the number of available inoculation shots before scheduling the appointment. The user can also use the crowd predictor to assure that the vaccination center will not be over crowded before headed towards appointment. The system is provided a medium priority as the people registering to the application may not book an appointment using the app.

4.2.2 Stimulus/Response Sequences

The consumer will be required to enter the appointment details such as,

- Dose count
- Preferred vaccine
- Vaccination center
- Slot timing
- Number of members

The details of the members to be vaccinated must be entered prior to scheduling appointment. Once the details entered are valid and the slots and vaccines requested are available, the consumer will be confirmed an appointment at the requested slot. The consumer can further alter the details and reschedule the appointment and can even cancel the appointment.

4.2.3 Functional Requirements

4.2.3.1 Schedule Appointment

This functionality enables the consumers to schedule an appointment for the vaccine administration in the preferred vaccination center at the desired time slot. The consumer will be displayed with the locations and number of doses (both Dose 1 and Dose 2) of various vaccines available in each vaccination center. He/She can choose the preferred the vaccination center, preferred time slot and proceed further. Choosing of contradicting options or unavailability of vaccine at the requested center will result in an error prompt. It also checks if the person has is eligible for each of the dose taking into consideration the age and date of first dose.

4.2.3.2 Rescheduling Appointment

This functionality enables the consumers to reschedule appointment booked by them at a particular vaccination center. The allows the consumer to change the date and time of already booked appointment at the selected vaccination center. If no shots are available at the newly requested slot the consumer has to cancel his appointment and look for the inoculation shots at other vaccination centers.

4.2.3.3 Cancel Appointment

This functionality enables the consumers to cancel an appointment booked by them at a particular center. If the conformation to cancel the appointment is not granted, the cancellation process will not be completed. Doing so will result in removal of appointment details from the database for the consumer and the member in the profile of the consumer. The number of available doses at the particular vaccination center will also be modified accordingly.

4.3 Center Recommendation and Crowd Predictor

4.3.1 Description and Priority

The feature recommends various vaccination centers to the consumer while scheduling the appointment. This feature operates alongside the 'scheduling appointment' feature and filter the available vaccination center based on the consumers choices. The consumer can choose if he/she is ready to travel farther to get vaccinated or wait to get vaccinated in a nearby center. The consumer will also be able to receive an approximate crowd status at various center, if he/she is willing to visit a center without an appointment. This system feature has a low priority as it is just an additional feature to enhance the choices provided to the consumer. It makes the application user-friendly.

4.3.2 Stimulus/Response Sequences

The consumer will be required to enter the filtration details such as,

- Scale of willingness to travel
- Scale of willingness to wait
- Filter with crowd
- Filter with distance
- Sort on recommendation

Choosing one or more filters from the above provides the user with the various vaccination center with the consumer's expectations. The consumer can then provide the necessary details for booking the appointment as mentioned in the earlier system features.

4.3.3 Functional Requirements

4.3.3.1 View Crowdness at Centers

This functionality enables the consumers to view the possible crowd that may be present at a vaccination center. In case the user wants to visit a vaccination center without an appointment, the feature would be handy. Consumers booking appointments online can also use it prior to booking the appointment or rescheduling the appointment based on the possibility of overcrowding. It takes into consideration various features like number of people unvaccinated or eligible for second dose in the nearby locality, number of people interested in the center, space for vaccination area in the center and number of available doses to determine the crowd possible at a vaccination center.

4.3.3.2 View Recommended Centers

This functionality enables the consumers to view the most recommended vaccination centers among the various available. The consumer will be allowed to choose from the recommended center rather that searching for a single center. The various centers will be recommended to the consumer based on the willingness to travel, number of vaccinations not booked during the particular day, possibility of crowd and so on. The recommendation also works alongside various filters requested by the consumer.

4.4 Vaccination Certificate Download

4.4.1 Description and Priority

After the administration of the vaccine, the person can download the certificate which acts as a proof that he/she has administered vaccine. Certificates for Dose 1 and Dose 2 can be obtained separately. The certificate can be downloaded after signing in into the profile. The feature cannot be claimed if the person has not been vaccinated with at least one dose. The feature can be categorized as a low priority feature as the person being vaccinated may have the necessity to produce a certificate anywhere.

4.4.2 Stimulus/Response Sequences

In order to obtain the vaccination certificate, the person must be vaccinated and the vaccination center in which the specific person took the shot must have verified the vaccination process. The certificate can be downloaded as a PDF.

4.4.3 Functional Requirements

4.4.3.1 Certificate generation and Download

Once the person is vaccinated and the process is verified the specific vaccination center, the certificate of the person and certificate the members booked by the consumer will be available in the consumer’s profile and the certificate for each dosage can be downloaded desperately.

4.5 Vaccination Center Updates

4.5.1 Description and Priority

This system feature includes the various activities performed by vaccinator or the vaccination center, such as vaccine count updation and verification of the vaccination process for various beneficiaries. The vaccinator will be required to sign in first using the authentication details. Once the login is successful, vaccinator will be able to perform the aforementioned actions. This system feature has a high priority, as the role of the vaccinators or the vaccination center is extremely important in maintaining the applications integrity.

4.5.2 Stimulus/Response Sequences

The vaccinator of the vaccination center admin will be required to enter details such as:

- Center ID
- Password
- Number of doses arriving each day
- Number of people inoculated each day
- Approval of verification

The center ID and password is required for the authentication process, during each sign in. Further, the vaccination center also has access to update number of doses for their center and insertion of details of the consumers vaccinated.

4.5.3 Functional Requirements

4.5.3.1 Vaccinator Sign In

This functionality enables the vaccinator or vaccination center admin to sign in to the vaccination center profile provided by the application builders. The process can be executed using the unique center ID and the authentication key provided to the center. On successful login, the center admin will be able to carry out the various available operation and receive information about the people who have booked for appointments at their center. In case, the authentication details provided are incorrect, corresponding error message will be prompted to the user.

4.5.3.2 Update Vaccine Count

This functionality enables the vaccination center admin to increment the doses arriving each day. The vaccinators must also update the doses left after vaccinator every single beneficiary. The correct flow in the number of available vaccinations (by performing constant updates) help to run the entire prediction algorithm flawless.

4.5.3.3 Verify and Update Vaccine Administration

This functionality enables the vaccinators to update the details of the various beneficiaries who have been taking the vaccines. Updating such information, provides details regarding the date of second dosage and other processes like certificate generation can be performed upon verification of the beneficiaries.

5. Other Nonfunctional Requirements

5.1 Performance Requirements

- **Speed** - The application usage experience should be smooth and fast. Increase in the number of users should not affect the speed of the system. Search and loading functionalities should be fast facilitating a better end-user experience. The system's response time should also be very short for the user's data access requests.
- **Scalability** - The system should be scalable to support a large user base.
- **Cost Consistency** - Under all circumstances, the maximum cost payable as submitted by the user will be the maximum cost charged to the user.
- **Performance statistics** - Both sides of the system, have a single screen populated by simply test fields. Performance for data entry is dependent upon the programming language used and the machines implementing the application. This should be negligible. The biggest drag on performance will be accessing the database. We are keeping our queries simple to counter the slow execution of queries.

5.2 Safety Requirements

Users may not fill the required fields with the correctly specified data type (Date of appointment of type Date, Email of proper format, Mobile number which is valid, etc.). In order to prevent any data integrity constraints that may lead to small crashes or wrong results from the system, proper safety measures like validation mechanisms must be included in the system.

5.3 Security Requirements

Security is used to ensure login details as confidential and is not stored anywhere. The only location any user data is visible is when users enter in their information. System Administrators should be trained on customer privacy.

5.4 Software Quality Attributes

- **Correctness:** Satisfy the normal regular Vaccine Registration System operations precisely to fulfil the end user objectives.
- **Efficiency:** Enough resources to be implemented to achieve the particular task efficiently.
- **Flexibility:** Flexible enough to provide space to add new features and to handle them conveniently.
- **Integrity:** Focus on securing the customer information and avoid data losses as much as possible
- **Portability:** Should be able to have modifications to support the software run in machines that have any environment (operating system).
- **Usability:** Provide user manual to every level of users.
- **Quality Assurance:** We will all be responsible for quality assurance. We will cross-analyse the system implementation with the System Requirements to verify system accuracy.
- **Maintainability:** After each revision the system will be analysed and compared with the system requirements designated by the client. We will than try to break the program with test cases.
- **Testability:** Able to be tested to confirm the performance and specifications.

- **Robustness:** Strength of the system to handle the system functions accurately and maintain the database without facing unexpected failures.

- **Reliability:** Specify the factors that are required to establish the reliability of the software system at the time of delivery.

- **Availability:** The system shall be available during normal Vaccine Registration System operating circumstances.

- **Reusability:** What is the ability to use the available components of the system in the other system as well.

- **Documentation:** All final documents will be reviewed for spelling errors, broken links, and any other issues that affect the quality of the document. Any errors found in either the system or supporting documents will be fixed at the time errors are found.

5.5 Business Rules

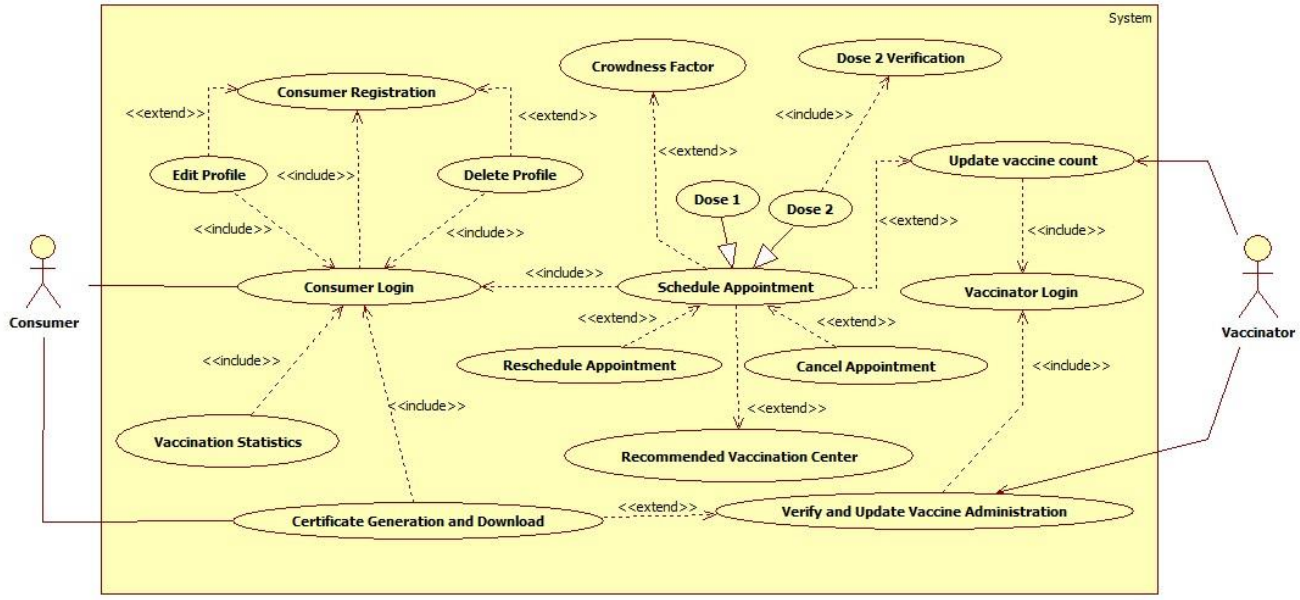
- Each consumer/beneficiary cannot be administered with more than two doses of vaccines.
- Each consumer/beneficiary can be administered with Dose 2 only after a recommended period after Dose 1.
- Each registration pertains to only one consumer/beneficiary.
- Each and every update to the database must be verified and carried out only by the vaccinator/vaccination center administrator.
- Once an appointment is done, the status (Either the consumer got vaccinated or the consumer did not turn up) must be properly updated in the database.
- Any other special cases must be promptly discussed with the project development team.

Appendix A: Glossary

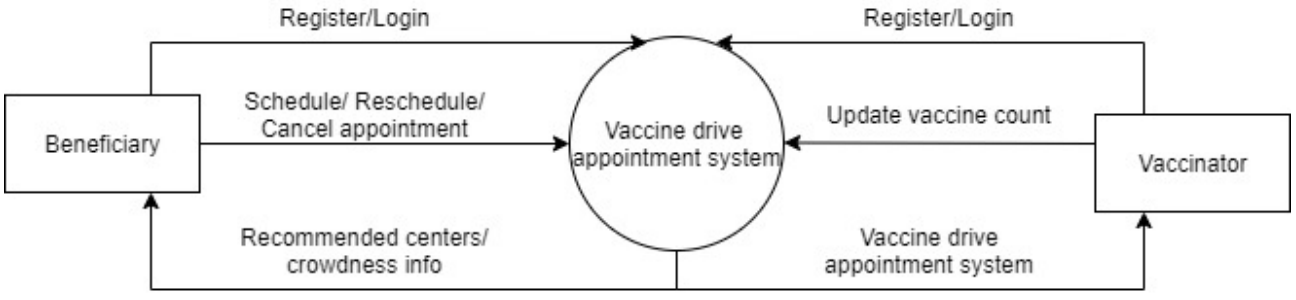
- **SRS** – Software Requirements Specifications
- **IDE** – Integrated Development Environment
- **Consumers/Beneficiaries** – People who wish to book an appointment for vaccination
- **Vaccinators/Vaccination Centre Admins** – People who vaccinate consumers and verify and update doses and administration.
- **OS** – Operating System
- **SQL** – Structured Query Language
- **GB** – Giga Bytes
- **JAR** – Java Archive
- **IEEE** – Institute of Electrical and Electronics Engineers

Appendix B: Analysis Models

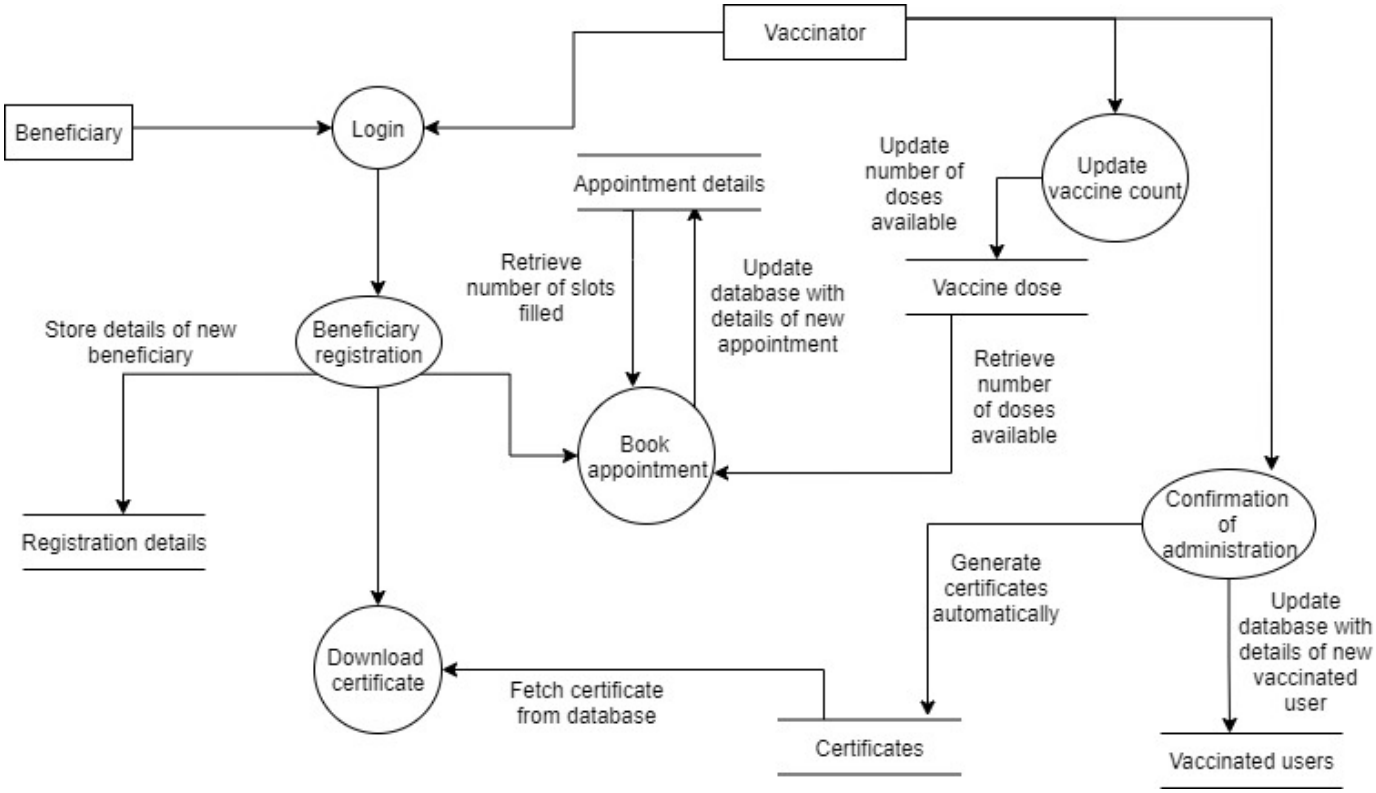
USE CASE MODEL



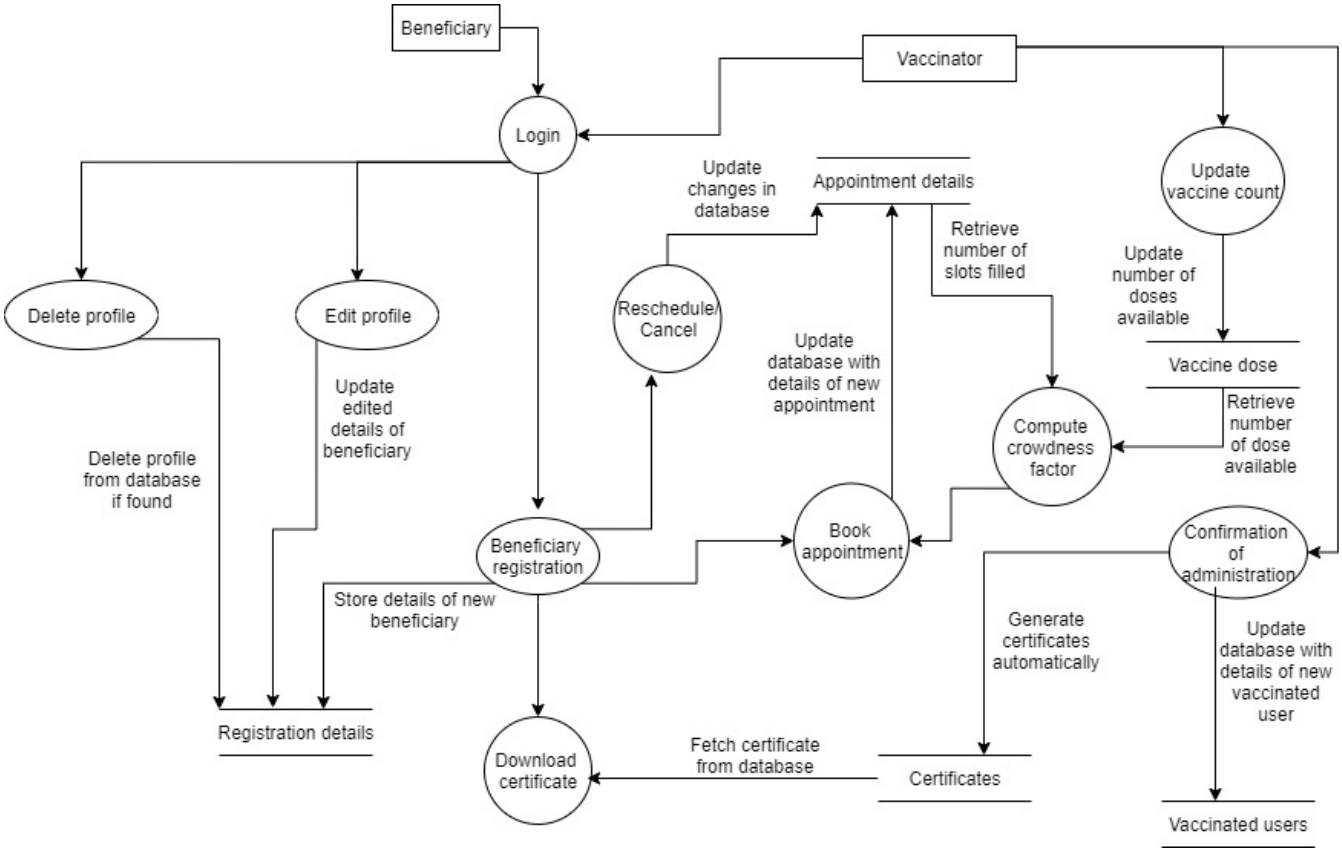
LEVEL 0 DATA FLOW DIAGRAM



LEVEL 1 DATA FLOW DIAGRAM



LEVEL 2 DATA FLOW DIAGRAM



Appendix C: To Be Determined List

1. The time for which registration details is to be recorded and maintained in the database.

2. Frequency of backing up data of the database for safety purposes.

3. Memory size of the database – May vary according to the number of users of the vaccine registration system.

PLAGIARISM REPORT:

Plagiarism Percentage: 0.85%