Corona Management Application

Software Engineering

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Corona Disease Management

1. Introduction

1.1 General Idea

Currently, the government uses the general idea to track COVID-19, where they request COVID-related information from users in papers and then predict outcomes on the basis of these collected statistics. This method might be slow and prone to errors.

The main idea behind the Corona Disease Management application is to track COVID-19 outbreaks digitally. It requests personal information i.e. Name, address, contact details from normal visitors, and assigns them a unique personal id number. The application also provides an interface through which the visitors can scan QR codes to enter hotels, restaurants, malls, etc. The establishment owners have to register to the application to generate the QR code.

If a person scans a QR code, the application will store the personal id, entry date, and time on the database. The application also utilizes the location information of the user to get more accurate data. The hospitals will also have an active role to specify if any person is COVID-19 positive or negative.

1.2 Goal and Objective

The main goal of the application is to make a system that can be used by policymakers to predict COVID-19 outbreaks. And on the basis of the statistics produced the policymakers can force new rules like mask requirements, vaccination requirements, etc. The application can also be used to inform individuals if they are exposed to COVID-19 and if they have to take precautions.

Requirements

2. Requirements

2.1 User Requirements:

Based on our application interface there are four major users:

1. Visitors
2. Establishment owners
3. Evaluation clients
4. Medical Centers

2.1.1 Visitors (People who visit into diffrent establishment locations)

- Visitors shall have the privilege to add their demographics.
- One visitor shall have no more than one user account.
- Visitors shall scan the QR code while entering into a certain establishment, and press the check out button on the application after exiting the place.
- Visitors shall have a unique QR code for their device to identify them.
- Visitor information shall only be used as the zero-knowledge proof for our analysis.
- Visitors shall have a smartphone that can scan the QR code.

2.1.2 Establishment owners (Hotel, Park, Supermarket owners)

- Establishment owners shall have the privilege to add their establishment name, address, and contact.
- One establishment owner shall have no more than one user account for a single establishment.
- The establishment owner shall be provided with unique QR code(s) for their establishment(s).

- Establishment information shall only be used as the zero-knowledge proof for our analysis.
- Establishment owners shall scan the QR codes of visitors who visit their establishment.

2.1.3 Evaluation clients (Policymakers, Statistician...)

- Evaluation clients are allowed to access the data for which visitor was in which establishment and for what time duration.
- Evaluation client shall access the status of the client's corona status provided by the hospital.
- Evaluation clients are not allowed to interact with visitors by any means. They are only here to perform analysis.

2.1.4 Medical centers (Hospitals, test centers...)

- Medical centers shall mark a visitor infected or uninfected according to the visitor’s test results.
- Medical centers shall be able to change the infection status of the visitor anytime.
- Medical centers are allowed to email the visitor about the visitor’s infection status.

2.2 System Requirements

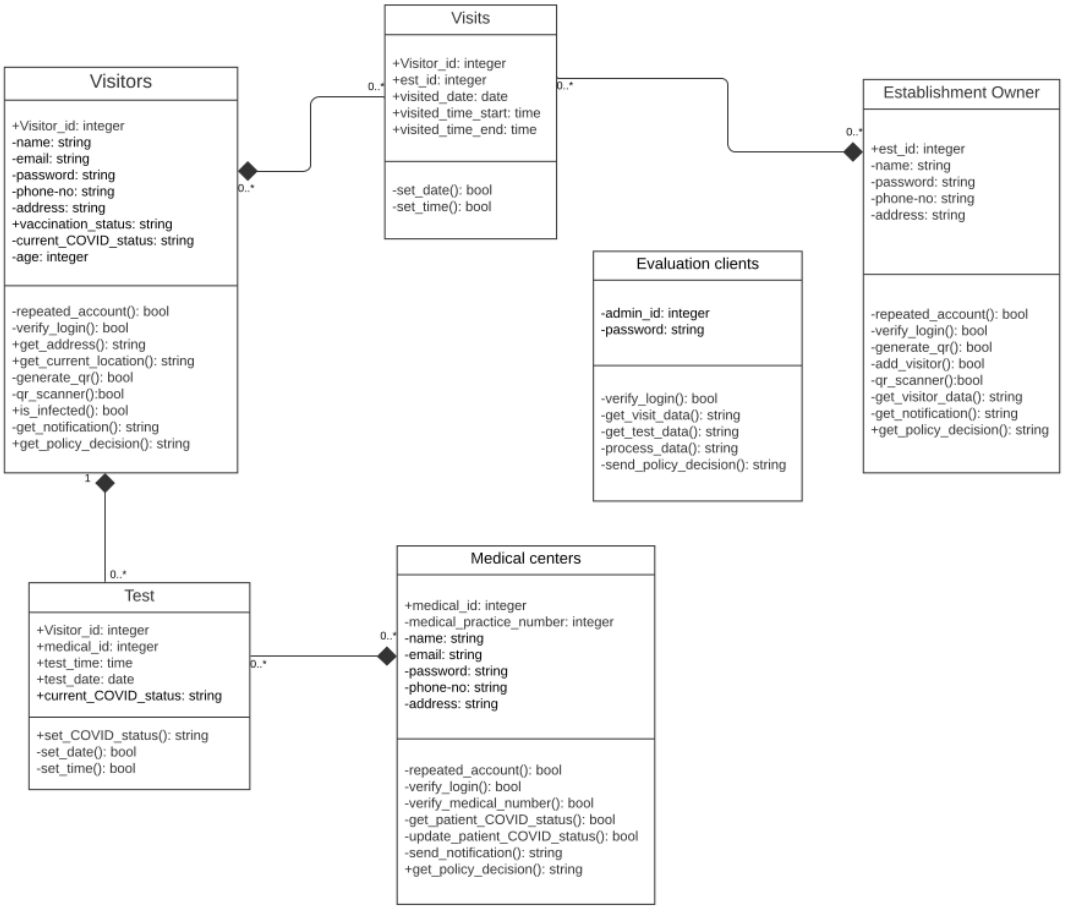
Following are the list of the system requirements that needs to be complied with. There might other requirement as well, but these are the major ones.

1. When first opening app user (who could either be a visitor, establishment owner, evaluation client, or medical center) should be presented with the options to login or to register.
2. The system should not allow a certain user to access none other than their own user portal.
3. The system should not allow any user to login multiple account at the same time and interface.
4. The system should not allow a visitor to scan unknown QR code that is not generated by the establishment owner application.

5. The system should not allow a certain establishment owner to see any other user data than the ID and corona infection report of a certain visitor.
6. The system should notify establishment owner if a visitor is checking in his/her establishment.
7. The system should notify visitor when after their test result is uploaded by the medical center.
8. The system should send visitor an email if their test result is positive.
9. The system should provide process data to statistician so they could create a viable report for policy makers.
10. The system should provide the evaluation client to track the user activity and a warn other visitors and establishment owner about the potential risk.
11. The system should circulate Policy makers decision to all visitors and establishment owners.

3. Design

3.1 UML Class Diagram



Design

3.2 Use Case Diagram

3.2.1 Use case diagram for the Visitor

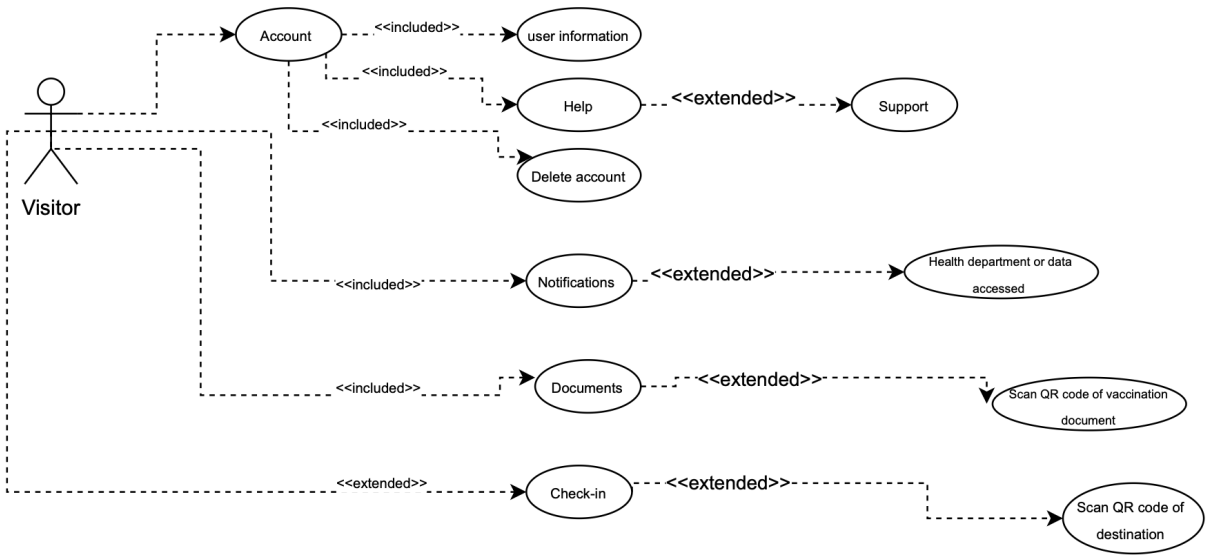


Figure 1: Use case diagram for the Visitor

The above use-case diagram gives an overview of the functionalities that the web service offers to the visitor. It includes actions like check-in, documents for vaccination, a notification from the health department, and a QR scanner to check in to different places.

3.2.2 Use case diagram for the Establishment

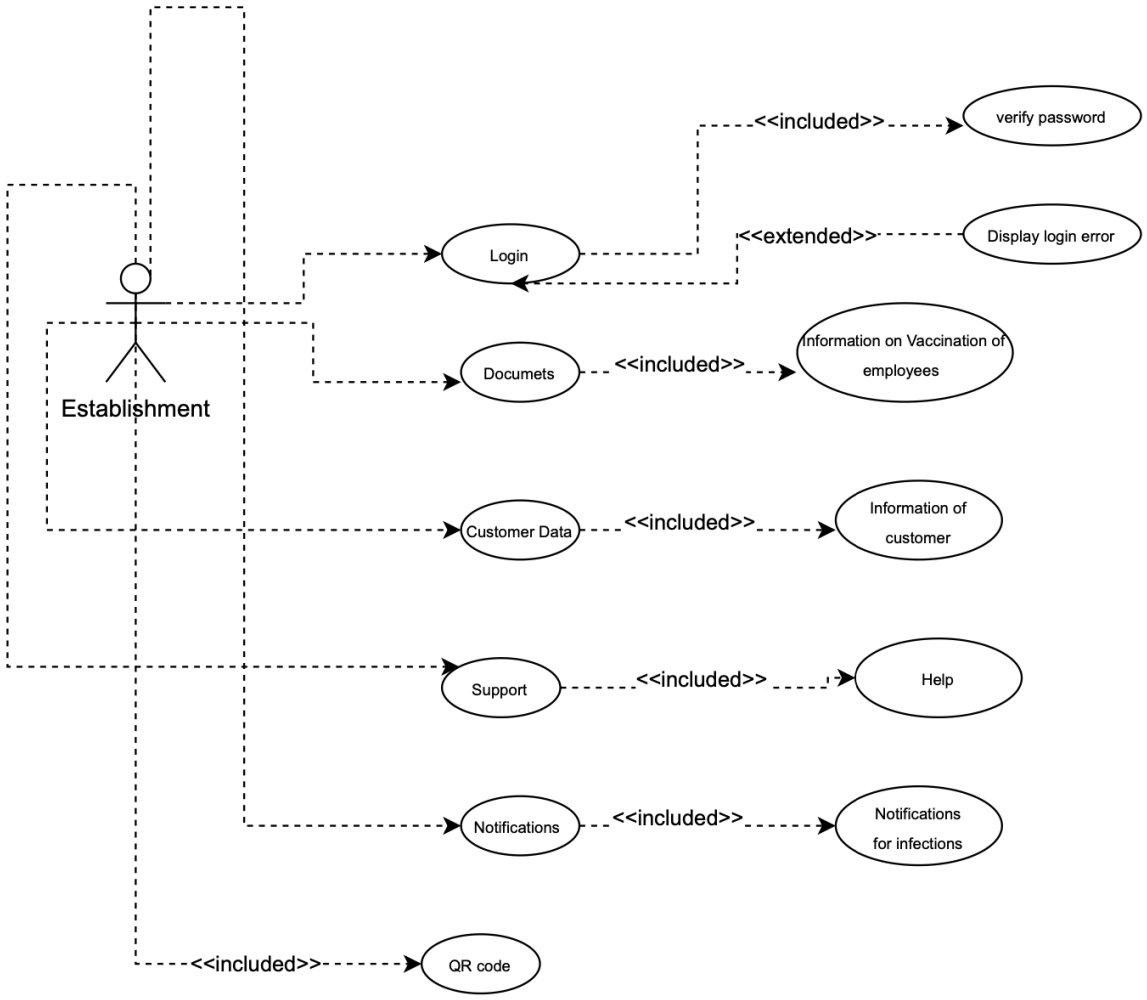


Figure 2: Use case diagram for the Establishment

The above use-case diagram provides a comprehensive overview of what an establishment can do using the web application, from logging in to the application to show user data. It also contains the QR code of the establishment.

3.2.3 Use case diagram for the Medical Centers

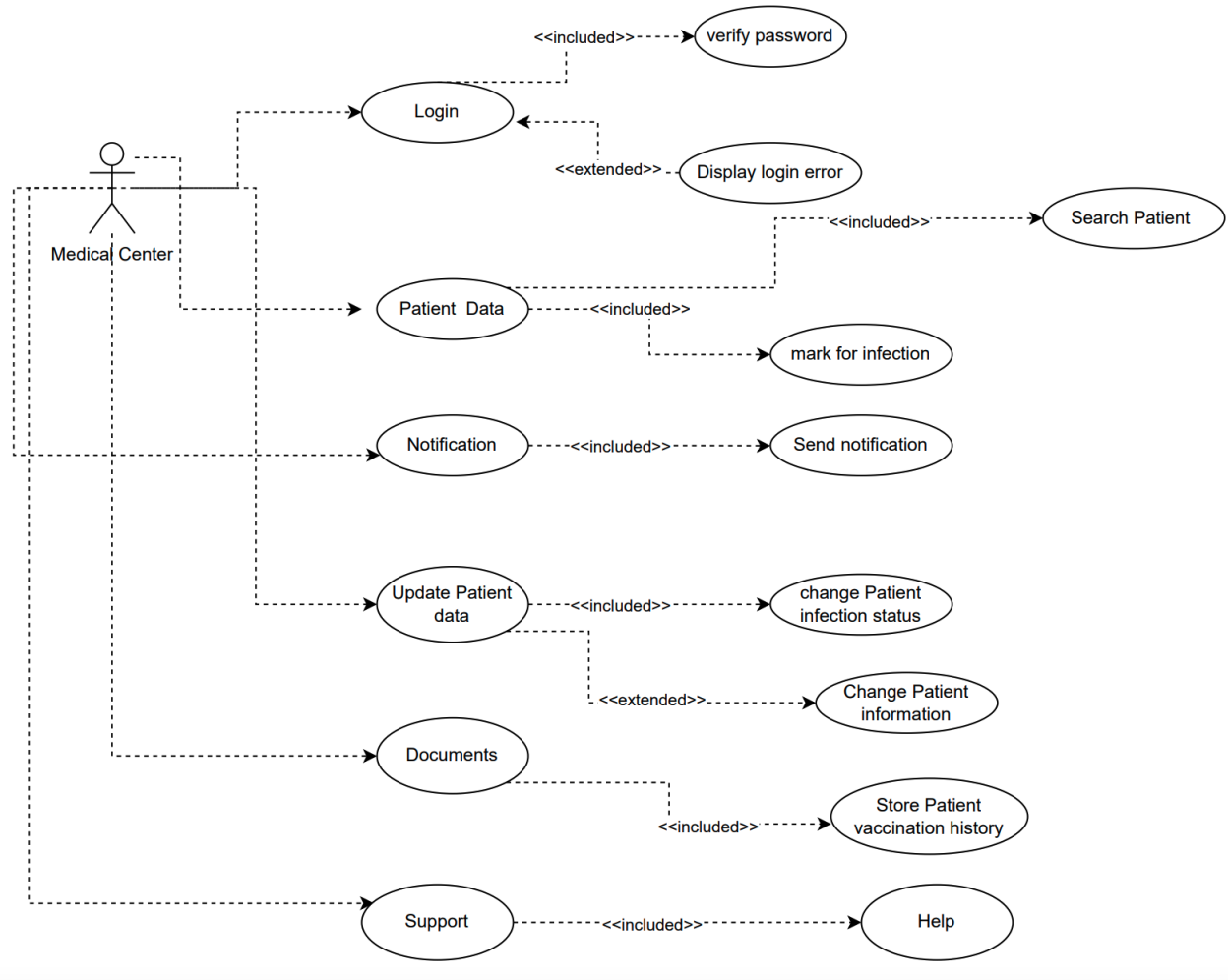


Figure 3: Use case diagram for the Medical Centers

The above use-case diagram provides a comprehensive overview of what a hospital can do using the web application, from logging in to the application to track down the patients. Hospitals can also change a patient's status as well the data if some error.

3.2.4 Use case diagram for the Evaluation Client

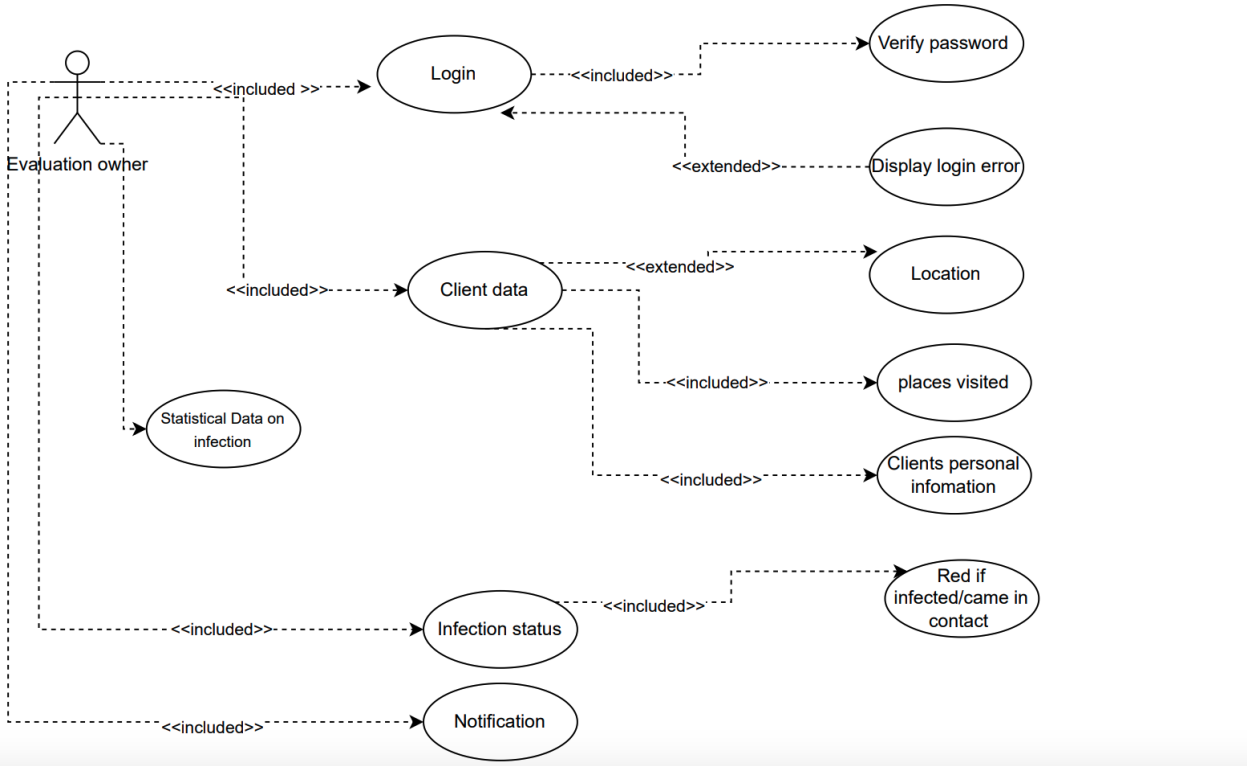


Figure 4: Use case diagram for the Evaluation Client

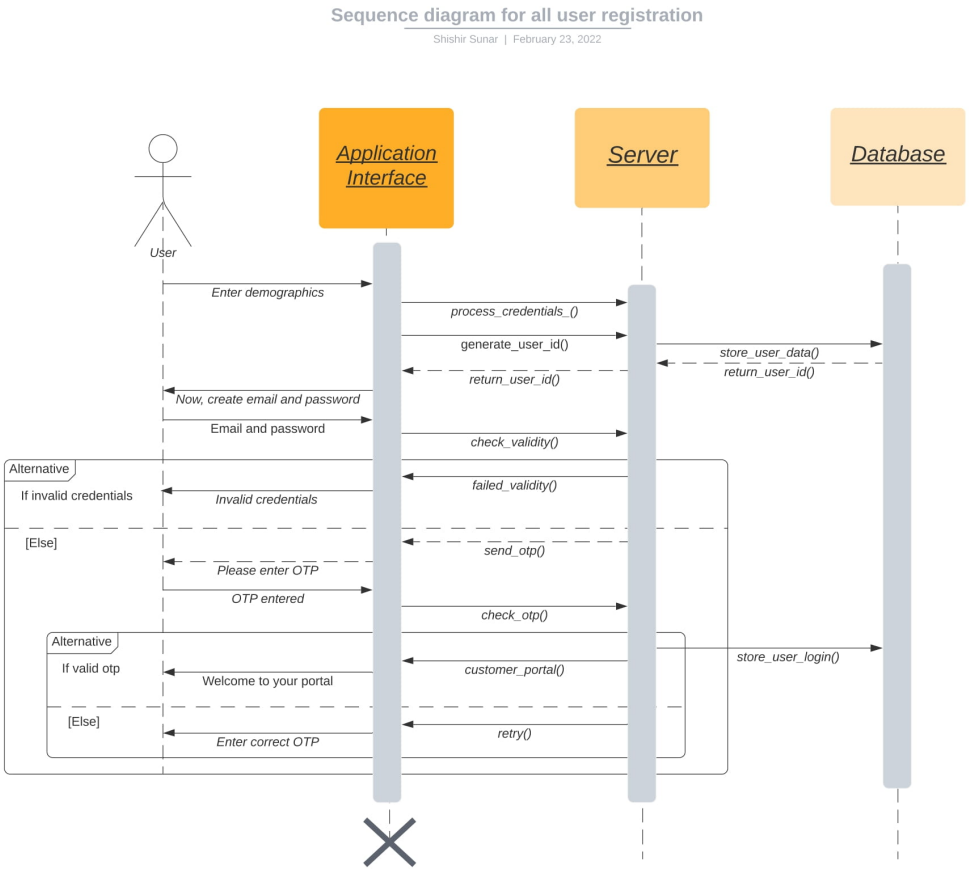
The above use-case diagram provides a comprehensive overview of what an evaluation client can do using the web application, from logging in to the application to track down the patients, inform people who visited that place or were in the same location.

Design

3.3 Sequence Diagram

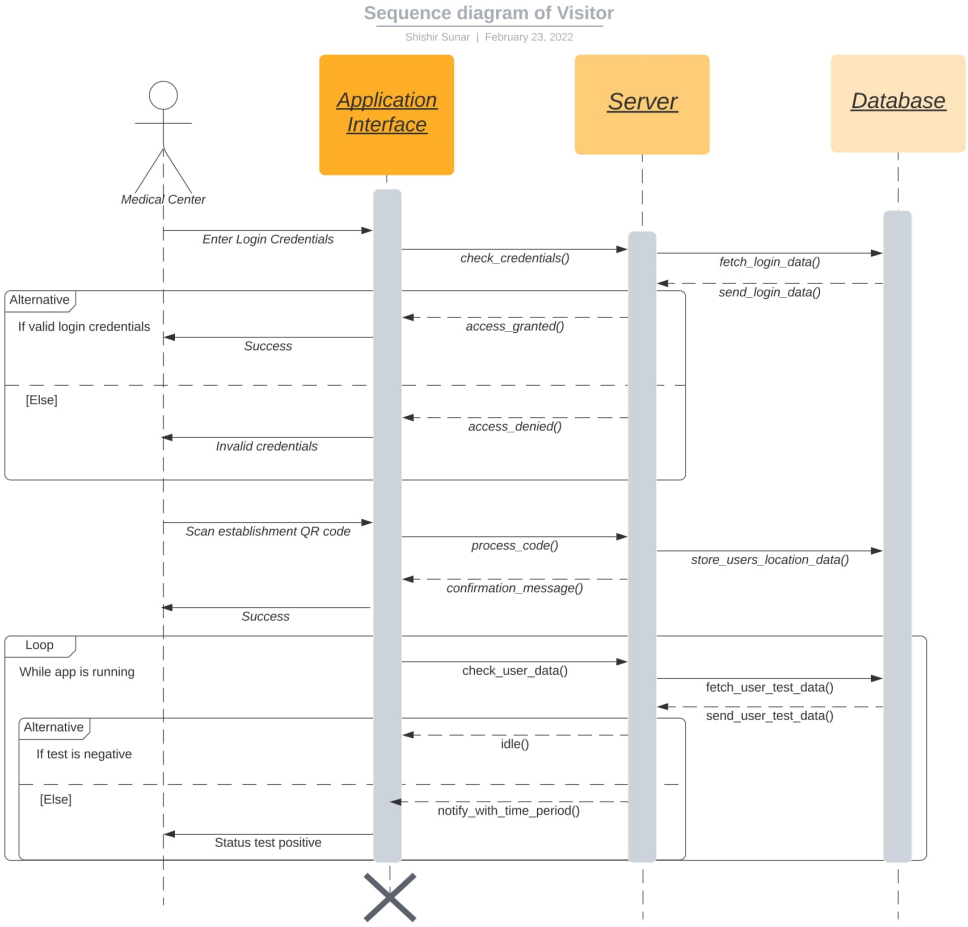
3.3.1 Registration

Below is the sequence diagram for all user registration.



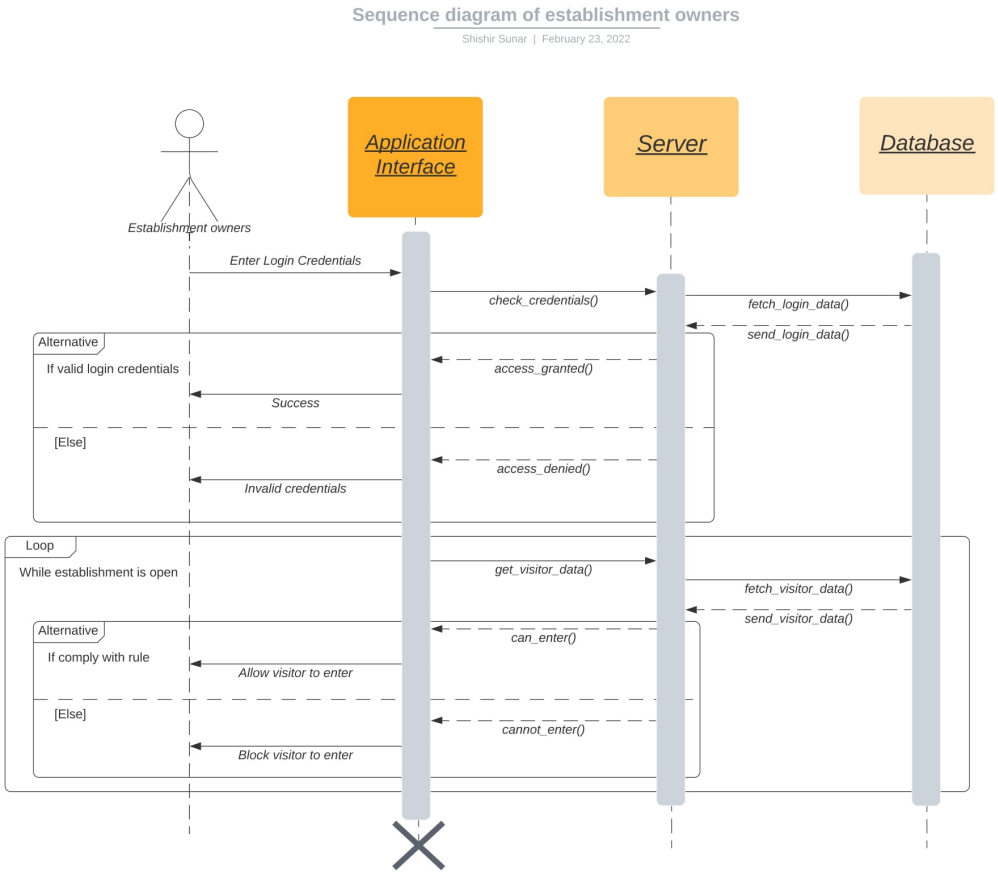
3.3.2 Visitors

Below is the sequence diagram for visitors while entering an establishment.



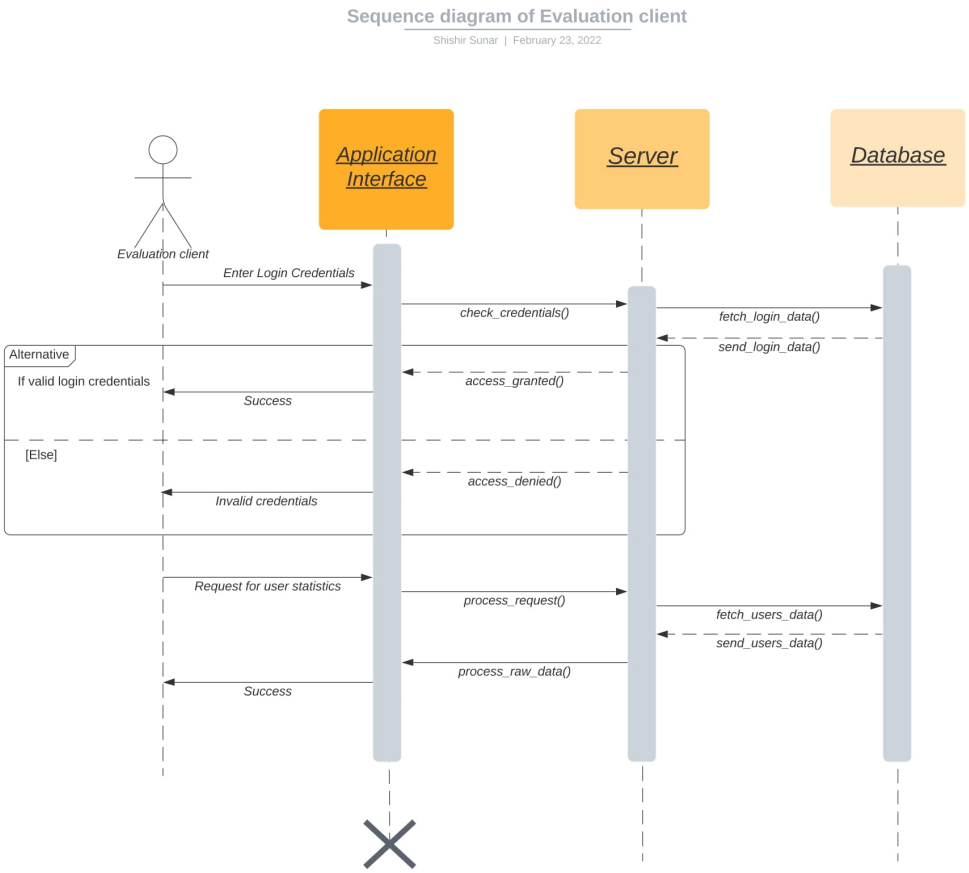
3.3.3 Establishment Owners

Below is the sequence diagram for establishment owners while a visitor is entering in their establishment.



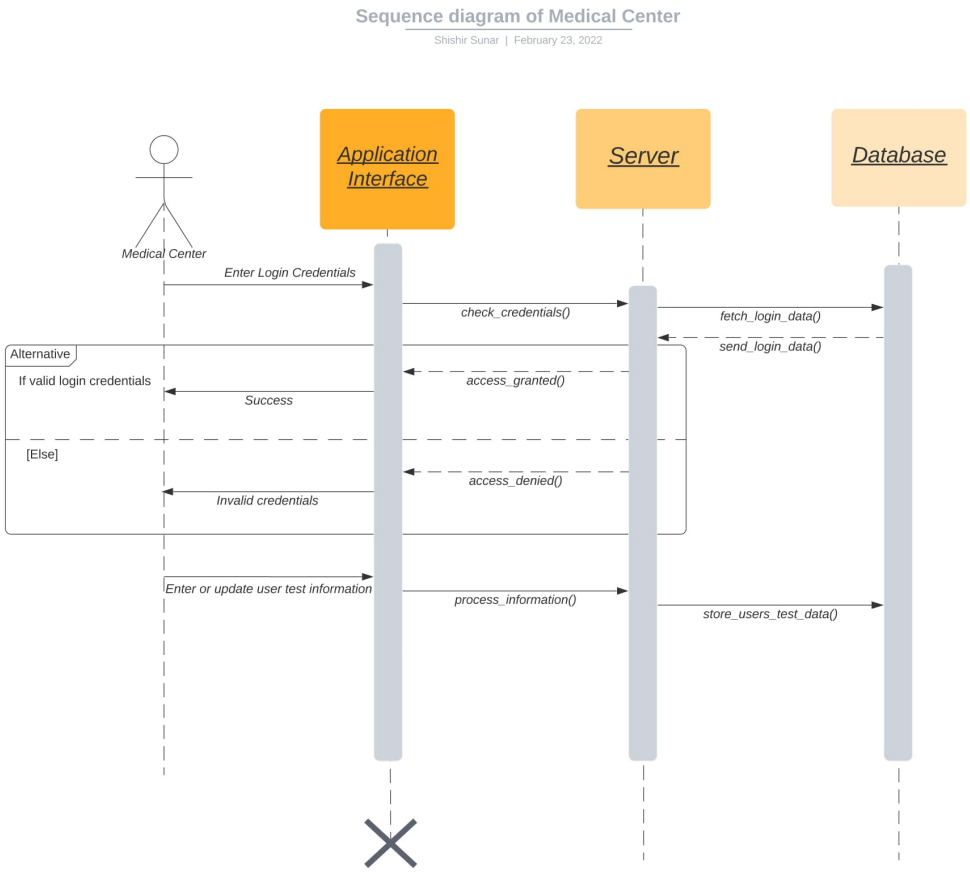
3.3.4 Evaluation client

Below is the sequence diagram for evaluation clients



3.3.5 Medical Center

Below is the sequence diagram for medical centers.



4. Conclusion

The goal of this application is to automate the identification of contact persons for venues, restaurants, and locations and ease the health department’s identification of possible contact persons of infected persons. This application will help the government identify and prevent the coronavirus from spreading.

The purpose of this document is for developers to have a guideline to follow and know procedures about how to do your coding instead of just starting from scratch. The ideas presented above teach you general conceptual modeling of the structure of the application, and for detailed modeling translating the models into programming code.

5. References

1.https://www.peter-baumann.org

2.https://drwa.io/

3.https://lucidchart.com

4.https://en.wikipedia.org/wiki/COVID-19_apps