Trace Alert

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Introduction

This project is developed on the IOS platform due to the current COVID-19 global epidemic. The main function of the software is to locate and track users' contacts in real-time through mobile devices, report the total number of current contacts with different risks, and notify users of high-risk contact information. The database will register the user's contact information in the past two weeks to create a contact tree. The software can issue an alert when high-risk contacts appear in the contact tree.

Used Software & Tools

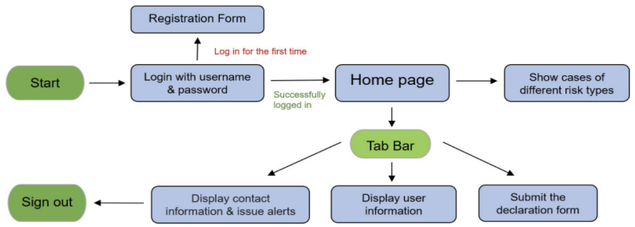
Swift:
A powerful and intuitive programming language for IOS development
Xcode IDE:
A unified workflow for user interface design, coding, testing, and debugging
DB Browser for SQLite:
A lightweight and visual tool for creating, designing and editing database files compatible with SQLite

Milestone

Milestone1
·Construction of integrated development environment
·Debugging of the application service architecture
·Non-functional development of all APP process pages
·Part of the iOS front-end function development

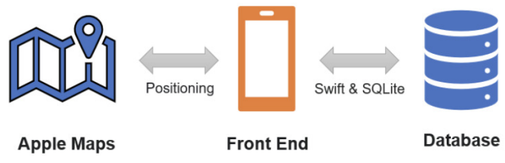
Milestone2
·Back-end database construction and development (SQLite)
·Further optimize and develop the main functions of the App’s front-end, including the alerting function, contact tree function, tracking and positioning functions, user login and registration functions
·Joint debugging and testing of the front-end and back-end of the App
·Verification & Validation of user requirements

Key Concept



·New users launch the app through the registration form
·If the login is successful, the user will be directed to the “Home” page under the tab bar, containing 6 pieces of information, confirmed cases, suspected cases, close contact, high risk, low risk and healthy, with numbers and detailed descriptions
·If the user wants to report a case, the declaration icon could be clicked to submit declaration forms
·If users allow the app to track their contact location and time, the "Contact" page can display a graph of contacts in the last 14 days
·Users can check their personal information, current language and contact tree, receive alerts, and seek external help on the “Me” page

System Architecture



When new users click the "sign up" button on the login interface, they will be directed to a form to fill in the relevant registration information. The app completes the transmission of user data from the front-end interface to the back-end database through the click event of the "register" button. Meanwhile, the SHA-256 encryption algorithm is introduced to encrypt the registered user information to protect user privacy. The user can then log in with the username and password to access all the functions in the application. Users can easily switch and browse various functional pages of the app through the tab bar.

The framework and all functions of the application are written by Swift, and SQLite assists in registering and reading user information. In addition to registration information, the user's contact information for the past two weeks is tracked and stored in the "Daily Contact" table of the database. All the information stored in the database is displayed in the three pages of contact time, contact tree and information.

Achievement

Planned outcomes	Actual outcomes
Show the contact tree and issue an alarm when high-risk contacts appear in the contact tree	Same as planned
Store all user input securely in the database	Only user registration data is encrypted
Display daily contact information as a table	Display the contact information in the past two weeks in a line chart
Automatically change language for all elements in the app with Google translation	Manually change language with crucial information

Extension

The UI will be improved, more functions including editing the user information will be implemented, and solutions to record and analyze user declaration data will be found in the future
Plan to apply the program in/with other platforms and devices, such as Android, website, QR code and Bluetooth
Plan to publish this app to the App Store

Conclusion

The app has achieved most of the basic requirements, it is operated in an Xcode simulator and enables users to receive alerts when high-risk contacts appear in the contact tree. Users can sign up and then log securely in the app to check the latest information of Covid-19 and submit reports to declare potential cases. However, we plan to optimize the functionality and performance of the current app and improve the UI in the future.