[NFC interacted contact tracing system]

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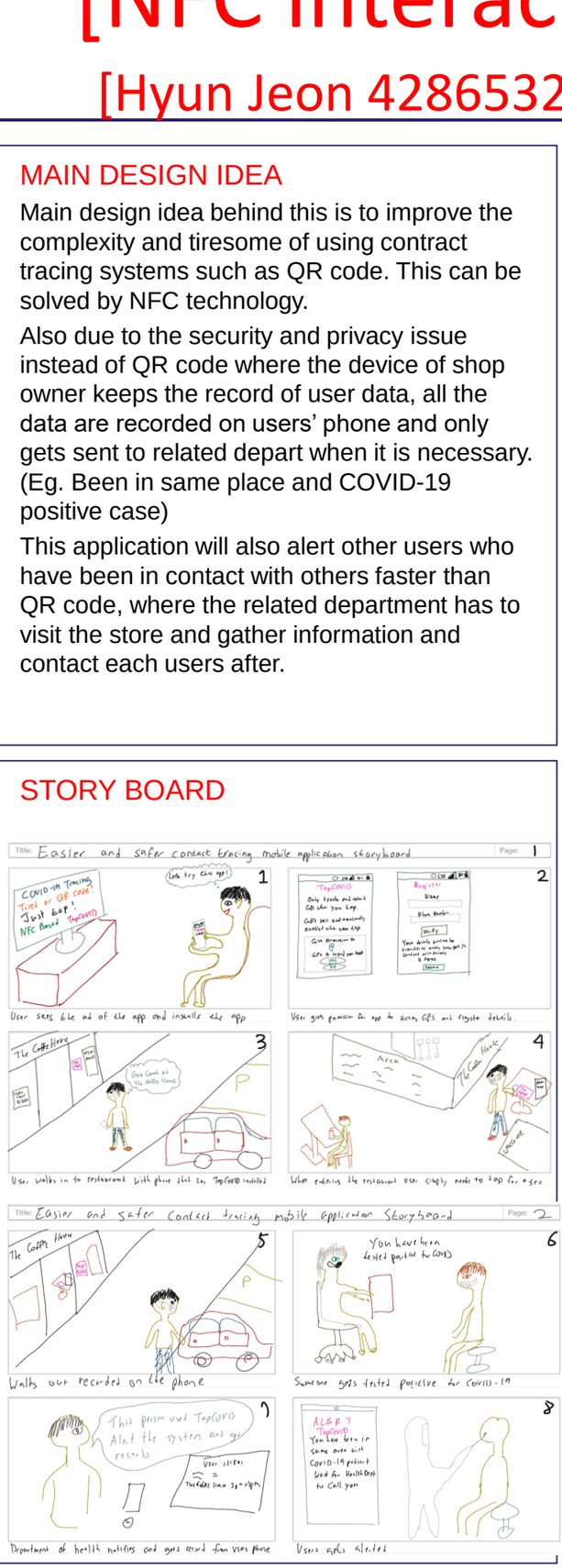
MAIN DESIGN IDEA

Main design idea behind this is to improve the complexity and tiresome of using contract tracing systems such as QR code. This can be solved by NFC technology.

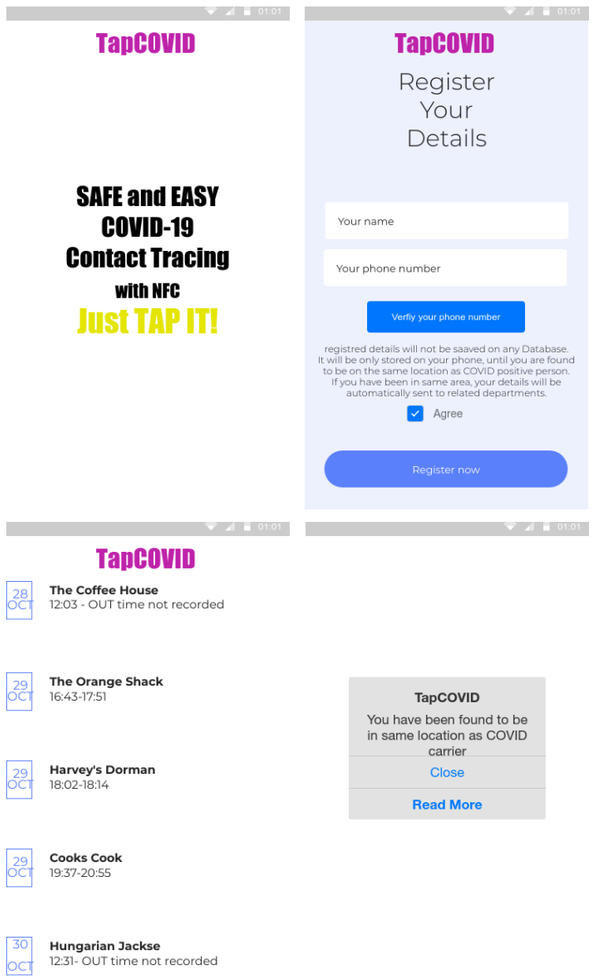
Also due to the security and privacy issue instead of QR code where the device of shop owner keeps the record of user data, all the data are recorded on users' phone and only gets sent to related depart when it is necessary. (Eg. Been in same place and COVID-19 positive case)

This application will also alert other users who have been in contact with others faster than QR code, where the related department has to visit the store and gather information and contact each users after.

STORY BOARD



PROTOTYPE



First page will be just basic information.
Second page will ask the user to register. Once user register, the data will be kept, so the user does not have to login again, and this page will not be shown again.

Third page will show recorded data of the user with Date, Time, Location.
Last page is alert system, when the user gets notified of being in contact with positive case, they will receive this message on their phone, if the app is still installed.

DESIGN RATIONAL

In this application, Near Field Communication (NFC) technology is used to make the contact tracing process much easier than current system. Instead of creating random QR code that lasts for few second and having to repeat this same process repeatedly at same location, NFC technology can be used, to just tap over a certain area and the phone will read the data and record the detail.

The application will only read the NFC, but not write it. Also NFC can read from 10cm away, so it will reduce any direct contact with surface.

Also for privacy issue, as most NFC can not store much data and can not be re-written it will not steal or breach user's data.

However, NFC can still contain viruses, if someone changes the NFC, and if the system is not perfectly run, it can become more complicated to trace users, as the data are only stored on users' side.

CONNECTION WITH PAPER

In the user research our team has conducted, users knew that contact tracing is important and scanning QR code is important, they thought it was inconvenient and tiresome as they had to repeat the process at every shop everyday. This was resolved by using NFC technology, where users just have to tap without need to turn the screen on.

Also, most people did not experience breach in security with QR Code, but they were still afraid that they might as QR code can give information to shop owners. If NFC only reads the data and not give, it will not give the shop owner or other person about their details.

The application only collects name and phone number, which is least amount of personal information and this will be encrypted.

USER EVALUATION

Two users have tested the prototype of application.

Users had prototype loaded on a phone and were asked to think the room was a shop or restaurant. Users were given 6 tasks to do and these activities were timed.

1. Open the app and register.
2. Enter the shop and locate TapCOVID sign.
3. Tap your phone over the tap sign area for about 1 second with 5~10cm away from the surface.
4. Sit at chair for 10 seconds
5. Leave the room and before leaving the room tap the phone again over the TapCOVID sign
6. Open the app and check the record

Similar process has been repeated with QR code instead of TapCOVID.

First user (potential user) finished the process with TapCOVID in 35 seconds whereas QR Code took 62 seconds.

Second user (peer) finished process with TapCOVID in 32 seconds whereas QR Code took 51 seconds.

With the internet connectivity issues and such QR Code took longer time to open, and users had to locate the application to start. This clearly proved QR Code is much inconvenient and time consuming.

Users evaluated the prototype after.

Both potential user and peer described that the app was very simple and liked how there were not much information necessary. Also they both said that the process was much easier and faster and less troublesome. Potential user described "It was like using goCard, tapping on and off". All feedbacks were positive and they were satisfied.