

CO 3302 Computer Engineering Project

Emergency Informer

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Abstract—The Health system in Sri Lanka has some room for improvement in some fields. In this project, we are addressing the following issues. According to Sri Lanka's current health system. They used the "1990" application as a "SUWASARIYA" service. In the current service if the patient lost the patient's medical records. the patient couldn't recover their own medical records. Without the patient's past medical reports doctors couldn't make critical decisions about the patient's future medication process. In my mobile application and IoT application, we have introduced a solution to the above-mentioned issues and some further functions. By using the Emergency Informer application, patients can inform their emergency to the health provider. especially this application provides the ability to inform their emergency when the patient stays in the weak signal area. Another option this application provides the ability to store the patient's personal records and when the doctor wants to treat the patient, the doctor can access the above database. So, then the doctor can some sort of understanding about patient past treatment details. Therefore, If the patient had to admit to the hospital without past medical reports. the patient hasn't to worry about it. I hope to upgrade this application using further implementations.

Index Terms— SDK-software development kit, API - Application Programming Interface, IOT – Internet of Things.

1 BACKGROUND

Due to modernization, the current human being prefers a solitary life. Therefore, in case of an emergency, attracting the attention of other people is minimal. Normally in Sri Lanka, people tend to get advantages from call centers like 1990 would only be provided to a précised location. But if the patient is in a solitary place where he would not be able to provide his required information to relevant health services, the staff members of the health services would face several issues in providing proper healthcare facilities. In order to overcome those obstacles, this application would be a massive advantage. And also, due to the prevailing embedded radio signal transmitter and the receiver, it would help to provide necessary aids and helps the patient if he is out of the coverage.

This methodology would help to ensure the protection of the patient and would facilitate the health care professionals to provide necessary treatments to the patient. Because the details of the patient would be handed over to the medical staff before any treatment commencing.

What happens in the application is the transmission of the radio signals to the radio signal receiver and determine the proper location of the patient even if the patient is not within the coverage region. Thereby the app works like it is within the coverage and directs the information of the patient to relevant health care service. So, the patient needs not to be excited even if he is trapped in a pot or on top of the mountain. In some cases where people misplace their medical reports and documents, this application would be their right to help the medical staff to overcome the critical challenges.

2 METHODS

Step 01 Requirement specification: The requirement analysis system was to analyze the project objectives and its audience should be understood by gathering information and doing specifications on them. Here, the first stage is completed by gathering useful information about patients' basic requirements and getting a better understanding of the project objectives. as a second step gathered the information about 2G and 3G signal coverage areas of Sri Lanka.

Step 02 Design: The requirement specifications from first phase are studied in this phase and system design is prepared. System Design helps in specifying hardware and system requirements and also helps in defining overall system architecture.

Step 03 Implementaion: After the designing stage was complete begin the actual development of the system. The project is a mobile application for users and Ambulance drivers and a web application for the administrator part. Now the designed project will be developed. This phase consists of three main tasks.

1. Mobile application development.
2. Back-end development.
3. IoT and embedded development

This mobile application is developed using the Flutter framework and the Dart language. The Android app allows users to send the current location to the medical providers. The app connects to a database created using Google's Firebase services. Users and ambulance drivers can create an account on the first use, sign in, and connect to the device. Web design will be done using JavaScript, Dart language. Embedded and IoT design will be done by using Embedded C.

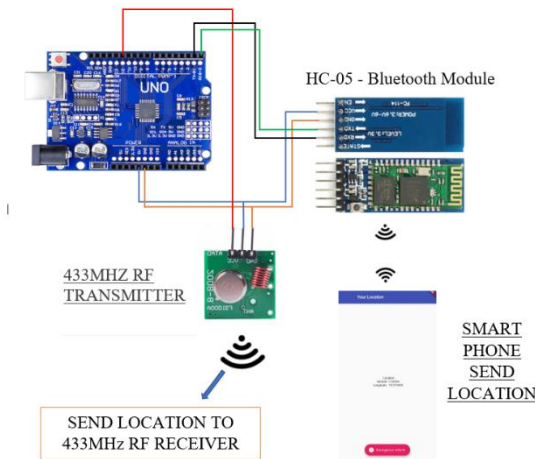


Fig. 1. 433 MHz transmitter diagram

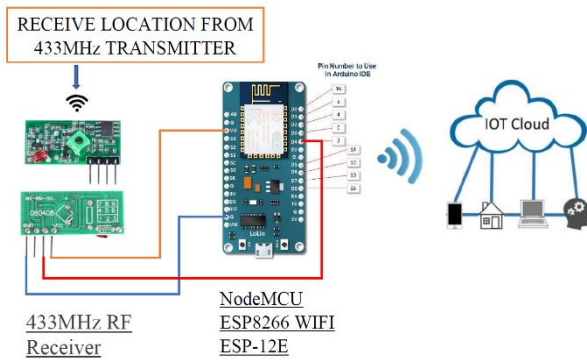


Fig. 2. 433 MHz receiver diagram

Step 04 Testing: When the system development starts from the mobile application test cases was be designed and documented. After every unit is built and unit tested, each system that needs to be integrated was be subjected to integration testing. This was a process that takes place throughout the project timeline in the system building phase. When the system is finalized, it was being subjected to system testing with various test cases that were designed in the case study phase.

Step 05 Publishing: After completely finalized the initial release of the application, this application will be published and available on a website that anyone can access.

3 CHALLENGES

While I am doing the project, there were continuous SDK updates. I had to avoid those updates. Because sometimes the app worked for the previous version. But it didn't work for the new update. So, I had to face many kinds of difficulties. Also, there was a lack of developer community for flutter development. Unlike Java or swift based android development, the flutter being a new SDK for Android development is still at its infancy stage.

As well as, when created the Arduino part it's very difficult to connect the transmitter and Receiver. Because it's difficult to find out whether the problem is in the transmitter or receiver. Also, created a circuit using a bread-board without soldering is sometimes give wrong results.

When used the Google map API and direction APIs there were some limitations, because when does a lot of requests to the Google cloud platform, I had to pay for more requests. that was a limitation when doing the testing of this project. When used in the android studio there were a lot of extensions and plugins, then considers these things, there are version comparison is very difficult.

4 GRAPHICAL USER INTERFACES

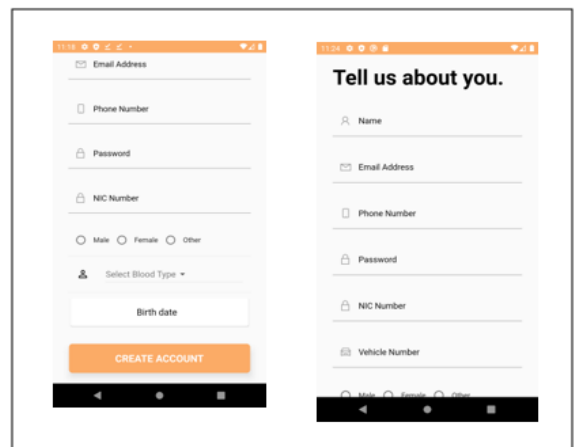


Fig. 3. Registration Pages

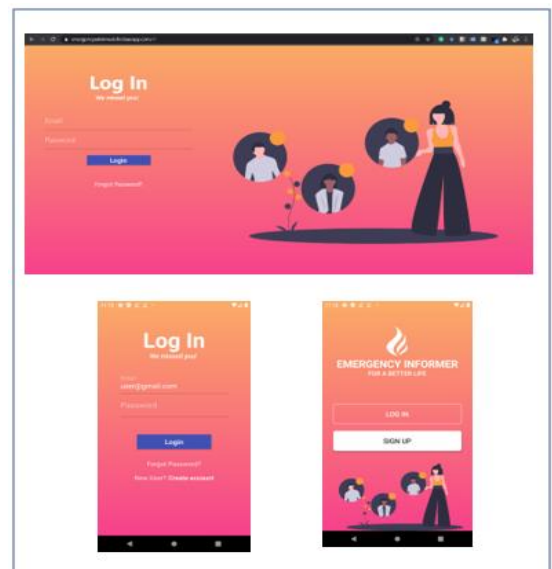


Fig. 4. Home & Login Pages

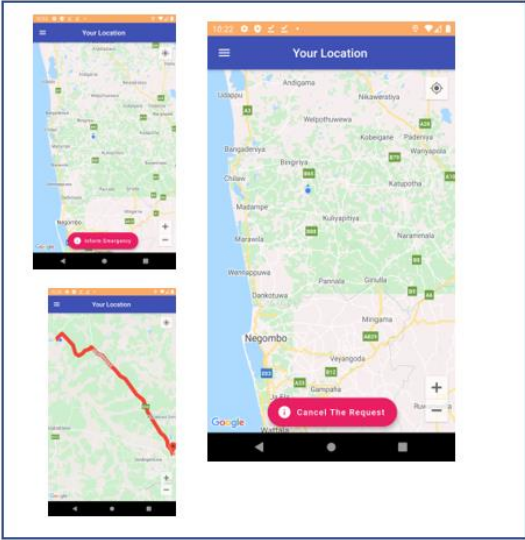


Fig. 5. User Emergency Requesting Pages

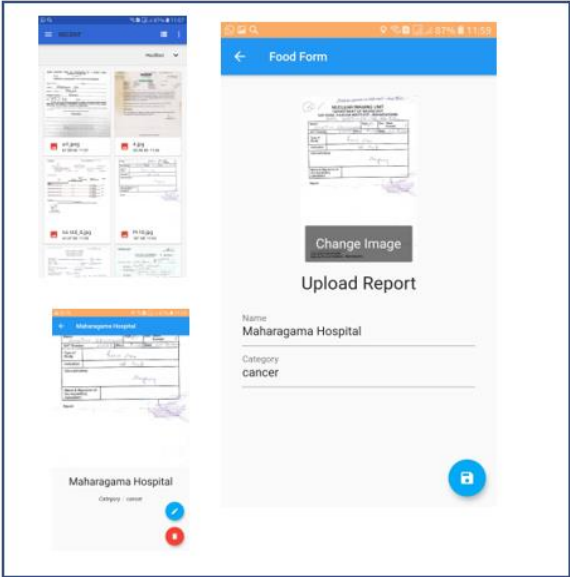


Fig. 8. Patient's Reports Pages

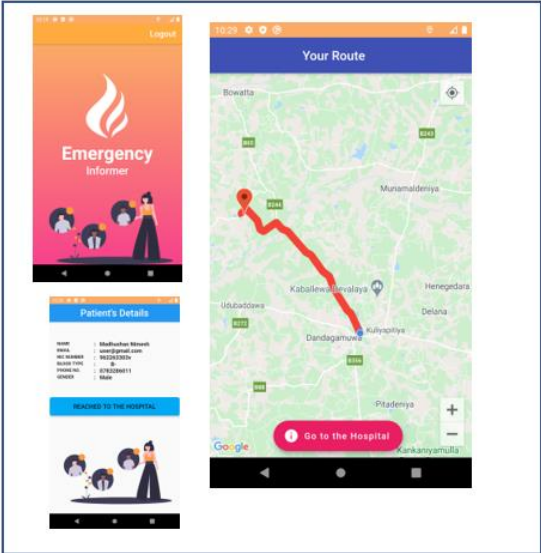


Fig. 6. Driver Request Accepting Pages

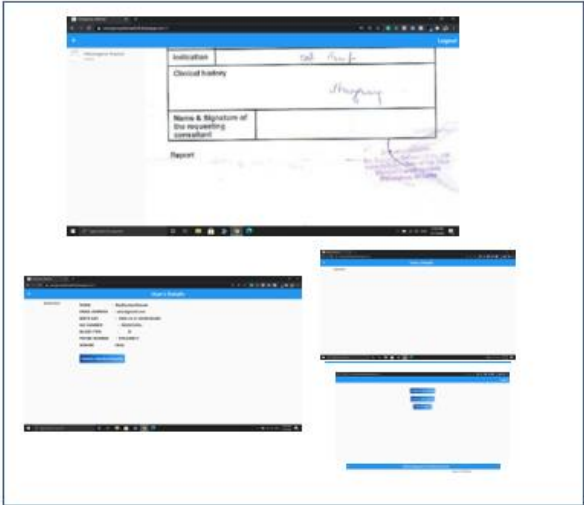


Fig. 9. Administrative Web Pages

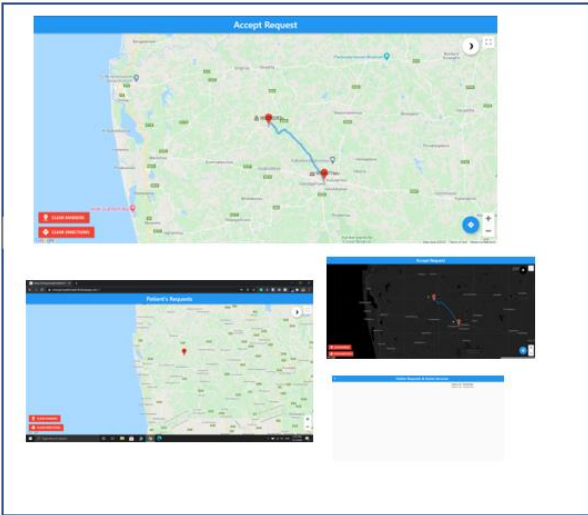


Fig. 7. Administrator Service Web Pages

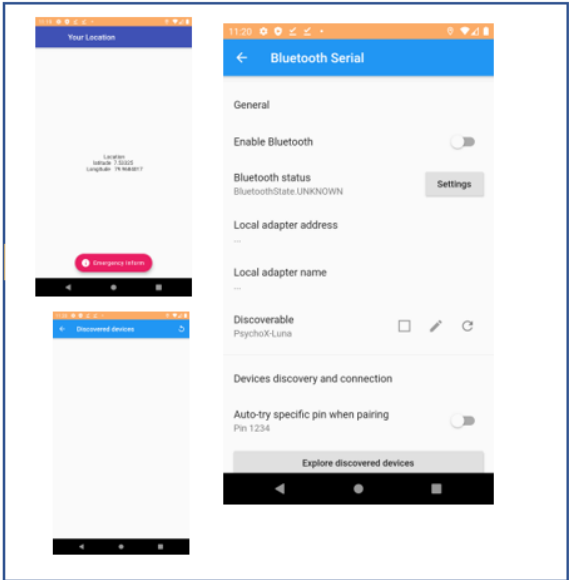


Fig. 10. Bluetooth Module Connecting Pages

5 FUTURE DEVELOPMENT

- Updating day to day treatment.
- Future diseases prediction
- Prediction of the type of issue, the patient is facing with respect to the location.
- This web application can be developed by adding more security features. This does not secure the passwords by encrypting. Therefore, a password can be encrypted in the future to developments.
- Development to connect many transmitters for one receiver.
- Develop high performance and long-range transmitter and receiver modules.

6 CONCLUSIONS

According to this year, every country has got a clear idea about the importance of the health system because of the coronavirus effect. when considering the current situation, patients couldn't attend to the hospital. Therefore, Digitalization is needed for the health system. Lots of future developments of this project can be carried out such as increasing the security, new features and convert it to the user friendly.

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REFERENCES

- [1] Dart packages. 2020. *Dart Packages*. [online] Available at: <<https://pub.dev/>> [Accessed 3 November 2020].
- [2] Google Cloud. 2020. *Cloud Computing Services / Google Cloud*. [online] Available at: <<https://cloud.google.com/>> [Accessed 6 May 2020].
- [3] Firebase.flutter.dev. 2020. *Migration Guide / Flutterfire*. [online] Available at: <<https://firebase.flutter.dev/docs/migration/>> [Accessed 8 June 2020].
- [4] "Web Hosting - Amazon Web Services (AWS)", Amazon Web Services, Inc., 2020. [Online]. Available: <https://aws.amazon.com/websites/>. [Accessed: 2- Nov- 2020].
- [5] "Arduino and HC-05 Bluetooth Module Tutorial - HowToMechatronics", *HowToMechatronics*, 2020. [Online]. Available: <https://howtomechatronics.com/tutorials/arduino/arduino-and-hc-05-bluetooth-module-tutorial/>. [Accessed: 17- Apr- 2020].