

Executive Summary

Our mission is to create a device that speeds up the process for assisting patients in critical condition. We believe in this mission because we feel there is a delay in getting important medical information when treating incapacitated patients.

Medi ID is a bracelet with an NFC tag built into the bracelet that stores the user's medical information.

This is useful for first responders that give aid to a person who is physically unable to document their medical information.

A verified EMT or first responder can scan the bracelet and use the Medi ID progressive web application to view that person's medical background and insurance information.

Access to this information can be crucial and potentially life-saving for a person who is in an emergency situation.

Background

Current models of the Medical ID bracelet use a QR code to scan and open a webpage with the user's information on it.

The problem with the QR code method of retrieving the user-stored data is that the QR code on current models is facing the user's wrist and the user's sweat over time fades the QR code out.

These bracelet types do not have substantial security.

NFC does not fade out and can be read using a phone just like a QR code, this would not change the technology needed to read the information and would enhance the technology currently used.

We will add a layer of verification where the user has to log in before exposing the user's information to ensure that only the allowed users are accessing the medical information, which mitigates the problem of insufficient security.

Software Design

Bracelet was 3D printed for accessibility and flexibility (provided by CSE Department)

Hosted on 000webhost to test live product with small sample set

Developed with PHP since it is a good scripting language for developing flexible web applications.

Project Requirements

The primary operational aspects of the product are from the perspective of end users, maintainers, and administrators. The key features and functions found in the product, as well as critical user interactions and user interfaces, are described:

Table 1. Requirements Table

Number	Requirement	Priority
1	Durable Bracelet that can hold an NFC chip	Critical - Group
2	All user types can login on the web interface	Critical - Collective
3	User can add/ delete/update their own medical info	Critical - Sponsor
4	The web application must be always accessible to all users	Critical - Collective
5	A database must be created to support the data of all users that access the web application	Critical - Collective
6	NFC chip must be stored inside the bracelet, with a unique key that belongs only to one user	Critical - Group

System Overview

The medical identification diagram has three main layers the first layer is the tap function, once a phone taps the NFC chip in the medical identification bracelet it will redirect the user to our website and ask them for their credentials.

This directs the user to the next layer which interacts with the cloud or database, this is where all the user's information will be stored.

The final layer is the user interface layer; this is where all the user's data will be displayed to either the user or the medical professional.

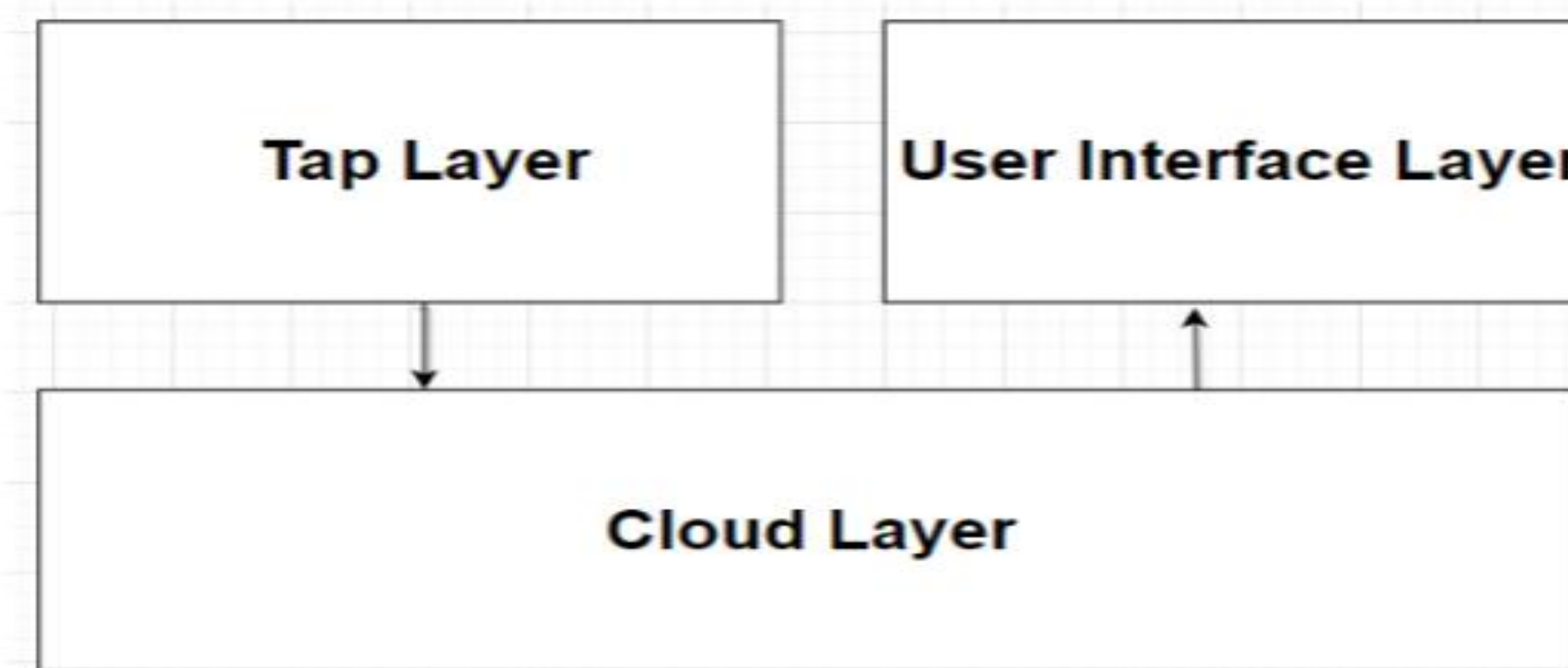


Figure 1: Architectural layer diagram

Feedback

After meeting with various industry professionals, we concluded that our idea may help EMT workers quickly obtain information from patients who may be unable to provide certain medical details.

Blood type, medications, medical history, insurance information, and other details are considered by these professionals to be crucial pieces of information when dealing with patients in critical care. The physical prototype is also of concern as well as the EMT's accessibility to login.

Complete Design

Figure 2: Medi ID Bracelet



Figure 3: User Interface Design Layout

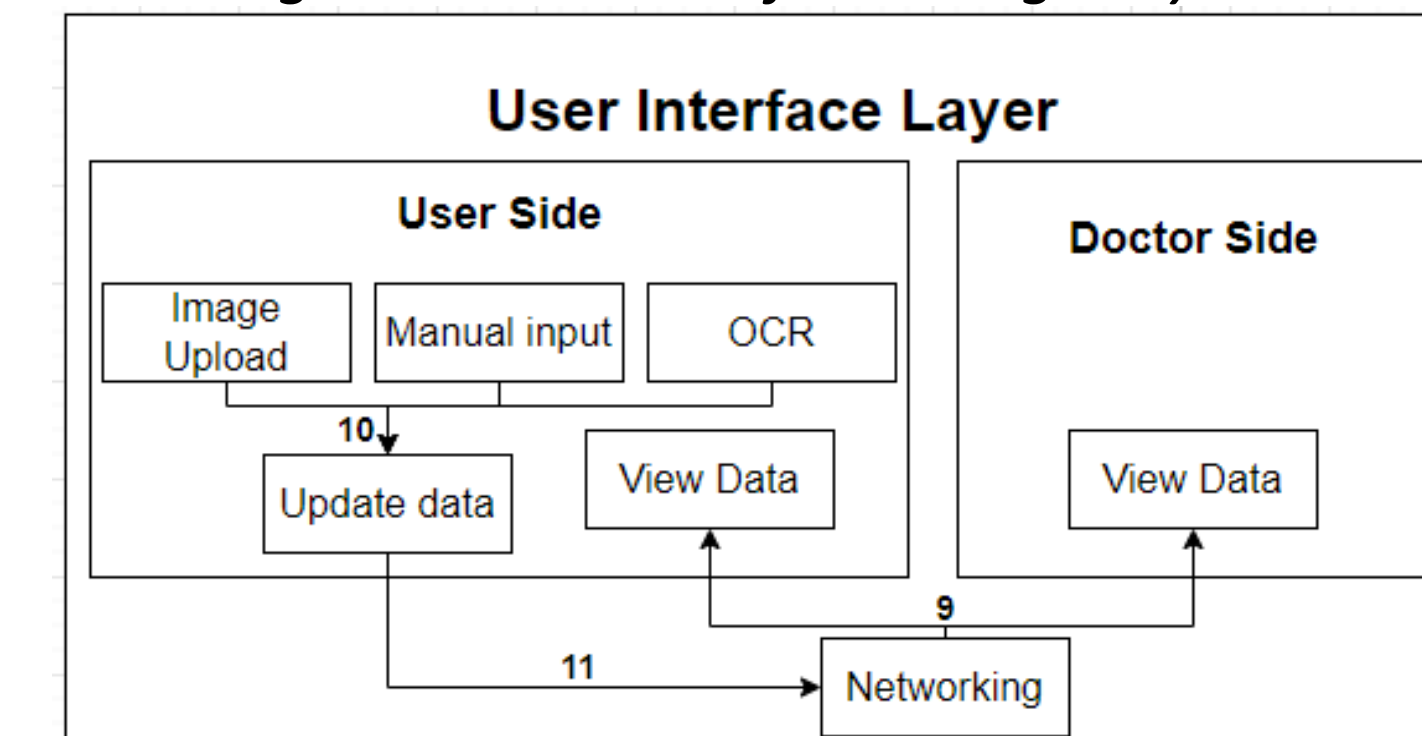
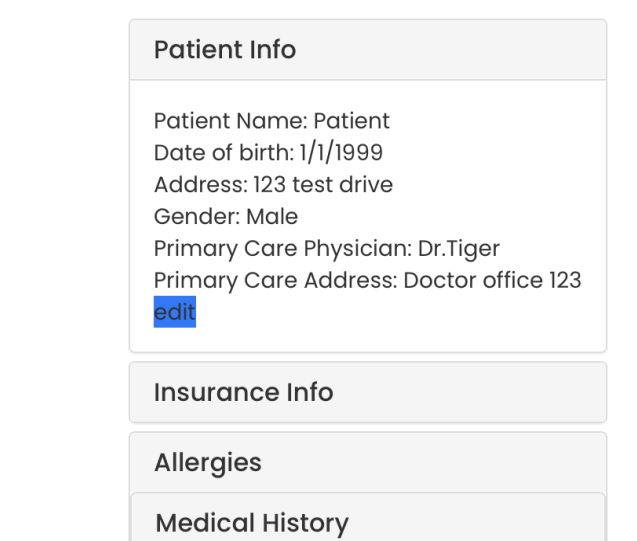


Figure 4: Homepage View Data



Conclusions & Future Development

- Our finished product of the Medi ID Bracelet matched the general requirements specified by the sponsor and intended users. The hardware matches the requirements declared by our group, and the software development matched the overall system layout that we designed in our ADS and DDS layouts.
- During this project, we learned the beneficial process of designing products using Agile methodology, which includes working through sprints and documenting the design process. This improves customer interaction, flexibility, productivity, constant development rates, and overall risk reduction.
- Future Requirements: Introducing Optical Character Recognition to the patient info portal to add images of medical documents. Another requirement would be designing the user manual for the bracelet and setting up an automatic registration system for new users. Product packaging and secure sign-on methods (Face ID, Touch ID) have also been considered as future requirements.

References

- Bai RMF Resource Center. <https://rmf.org/wp-content/uploads/2017/10/CNSSI-4009.pdf>.
- "IEC/IEEE 82079-1:2019." ISO, 20 May 2019, <https://www.iso.org/standard/71620.html>.
- "ISO 18530:2021." ISO, 27 Jan. 2021, <https://www.iso.org/standard/77333.html>.
- "ISO 20302:2022." ISO, 17 Jan. 2022, <https://www.iso.org/standard/79931.html>.
- Jethanandani, Mahesh, et al. "RFC 9314." RFC 9314: YANG Data Model for Bidirectional Forwarding Detection (BFD), <https://www.rfc-editor.org/rfc/rfc9314.html>.
- "NIST Special Publication 800-63B." Pages.nist.gov, <https://pages.nist.gov/800-63-3/sp800-63b.html>.