Radio Frequency Contact Tracing System (R.F.C.T.S.)
Team 9 – Spring 2021

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PROBLEM STATEMENT

To aid with contact tracing among medical staff and patients in a close proximity environment through wearable tags (Fig 1), and a central receiving unit that communicate through radio frequency waves (Fig 2 below).

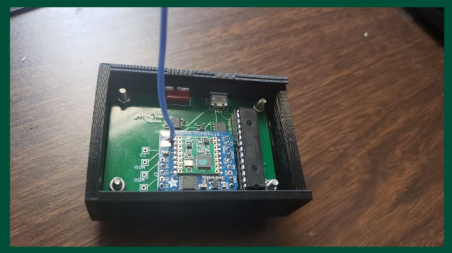

Figure 1: Wearable Tag with Casing

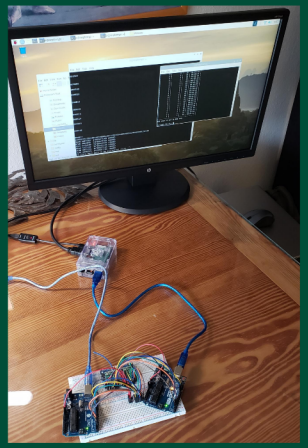

Figure 2: Central Receiving Unit

BACKGROUND

With the onset of the COVID-19 pandemic, contact tracing has become even more integral in tracing and mitigating the infection rate. Our prototype can aid in this process by maintaining a small (but scalable) radio frequency contact tracing system. Drawing inspiration from the major tech companies' application in April 2020, we are aiming to implement a system of contact tracing that can be used in any environment with minimal resources, while being effective in the tracing of a deadly illness. We incorporate those features with additional consideration towards privacy.

SUMMARY OF WORK

Our Central Receiving Unit was created by using a Raspberry Pi, an Arduino Uno board, and a radio transceiver. The tags included the Atmega328p microcontroller to handle proximity data locally on the tag itself, a battery charging module, and a radio transceiver to send information. For the software we created a complex database and SMS text messaging scripts to text individuals when they have encountered an infected individual. We have included encryption on all the information stored on the database, further protecting contact tracing data.

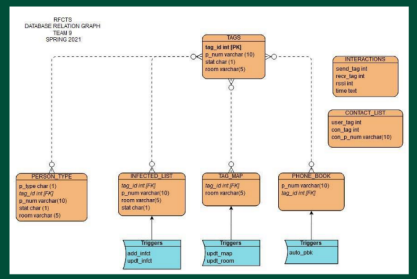

Figure 3: Database Concept Diagram

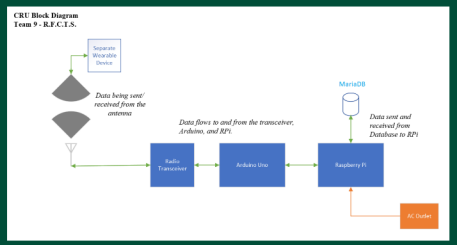

Figure 4: CRU Hardware Diagram

IMPACT ON COMMUNITY

- This product could be used in different medical settings ranging from hospitals to emergency medical triages to universities due to its compact size, low cost, and scalability.
- Because the system is self-containing, our product can help create a sense of ease and trust with the general public by being focused on privacy.
- Ideal market would include hospitals, health-based non-profits, emergency medical associations, and federal health departments (CDC).