Development of a Rapid, Accurate, and Private Contact Tracing System Utilizing Smartphone Proximities

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In epidemiology, Contact Tracing, the process of identifying and isolating contacts of infected individuals through manual interviewing, is the primary technique used to control the spread of highly infectious diseases. However, its manual nature makes it inherently laborious, inaccurate and slow. Our project aims to develop a cost-effective, private, faster and accurate method of Contact Tracing by automating the process and leveraging the ubiquitous smartphone. We have developed a Contact Tracing application that records a list of contacted individuals by scanning for nearby Bluetooth devices and calculating proximity using received signal strength (RSSI). When users or medical authorities report infected individuals, the system alerts all previously contacted persons, allowing them to be quickly isolated. Our algorithm computes ‘contact’ as function of proximity and duration. Proximity is computed using RSSI and duration is recorded by our application. Our proximity function was developed using a best fit curve on RSSI values collected under varying measured distances. Testing was performed on various real world situations such as outdoors, indoors, in crowded places and small rooms. The system detected ‘contact’ lasting at least ten seconds 96% of the time. Privacy was ensured by keeping all contacts locally on the phone. Battery impact was measured and found to be minimal. Tests confirmed the viability of an automated Contact Tracing System that is rapid, cost-effective and accurate compared to traditional methods. The widespread availability of smartphones allows our system to significantly curb an epidemic thereby saving millions of lives every year.

Awards Won:

Third Award of $1,000