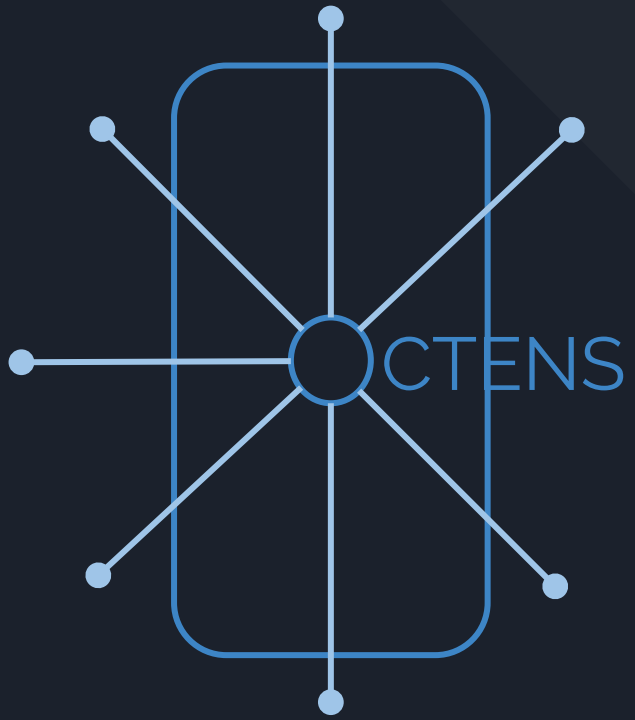


On-Campus Tracking and Exposure Notification System

INTRODUCTION

RATIONAL:

- The COVID-19 pandemic has caused universities across the country to transition to remote learning
- To ensure a safe transition to on campus learning, it is essential to develop a notification system that monitors the spread and streamlines the delivery of information regarding developing COVID-19 cases on college campuses
- There are **no known systems** **in operation** that automate personalized notification of potential exposures to COVID-19 within a campus community

Table 1. Comparison of Current Contact Tracing Methods and Frameworks Available

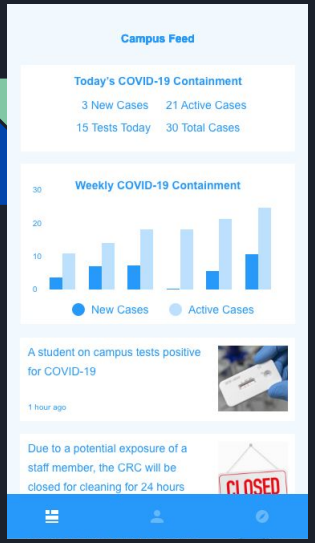
Methods		Automation	Standalone Functionality	Benefits & Limitations
1	Traditional Contact Tracing	✗	✓	• Identifies potential individual exposure • Privacy maintained • Labor Intensive and time consuming • May fail to alert all potential contacts
2	Webpage Based Notification Systems	✗	✓	• Exposure information publicly available • Privacy maintained • Requires manual updates • Time consuming
3	Apple & Google Application Programming Interface (API) Exposure Notification System	✓	✗	• Efficiently automates delivery of exposure information • Provides accurate exposure • Prioritizes privacy protections • Quantifies relative exposure risk • Does not function on its own

INTRODUCTION

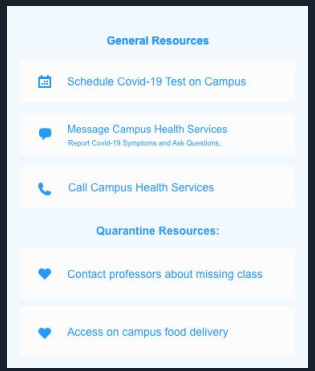
PURPOSE:

- To create a novel contact tracing system that **r**educes the transmission of COVID-19 by integrating university health services with Apple & Google's API to:
  - **Optimize the delivery of information** regarding potential exposure to COVID-19 to students, faculty, and staff
  - **Quantify relative exposure risk** to individuals in a campus community
  - **Provide ease of access** to campus health services
  - Maintain a **balance of patient privacy** protection and **general welfare** of a campus community

SOLUTION



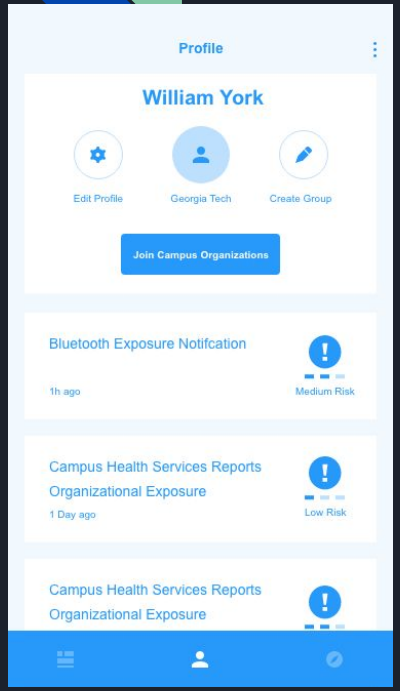
Campus Feed within the app



Example Resources Page

- Our app would streamline the process giving University medical centers, administration, students, and faculty instructions on next steps if they have been exposed to someone who has tested positive
- Provide a central location for all COVID-19 related information and communication from a University to its students, faculty, and staff
  - Community / Campus Feed
    - School data relating to campus-wide COVID-19 news
    - New communications from the University regarding the pandemic
  - Personal Feed
    - Using Apple and Google's Exposure Notification API, the personal feed would notify you if you have been in close proximity with someone who has tested positive
    - Notify the user if anyone in organizations they follow has been exposed and/or tested positive for COVID-19
  - Campus Resources:
    - Schedule an on campus COVID-19 Test
    - Message or call campus healthcare personal with questions about symptoms, testing, and notifications
    - Quarantine based resources such as campus food delivery or online course transitions

IMPLEMENTATION PLAN



Example Personal Feed within the app

Apple and Google Bluetooth Exposure Notifications API:

- Every 20 minutes, a phone's bluetooth key is changed to a new randomized number[6]
- Every 5 minutes, each user's phone detects the bluetooth keys of all of the phones in a close proximity[6]
- These collected keys are stored by the user's app for 2 weeks[6]
- If a tested individual consents to release of their bluetooth keys, each user's app will look for the released keys in their stored set, alerting the user if there is a match and evaluating relative risk based off of proximity of the phones when the key was detected and how long the phones detected each other's keys

Organization Based Exposure Notifications:

- Organizational exposure notification will occur when the user is in a group or shares a schedule with another member who has just been diagnosed with COVID-19 and has consented to sharing their information with corresponding groups

IMPACT

- Provides necessary precautions to allow for on-campus activities to resume
  - On-campus activities could otherwise lead to rampant, uncontrolled, and unmanageable spreading of COVID-19
  - Would offer more detailed and extensive coverage of students and staff than currently available
- Returning to in-person instruction offers:
  - Higher quality education
  - Monitors adherence to academic honesty and honor codes[3]
  - Extracurricular activities and outside resources that allow students to maximize their potential
  - Resumption of research
  - Return to normalcy
- Offers the ability to manage outbreaks for all of campus while maintaining privacy
  - Including students, professors, and other staff
  - Can also help protect the staff and students that are still on campuses
  - Only functions within constraints of user's consent and doesn't share any identifiable information

REFERENCES

1. Apple Inc. (n.d.). Exposure Notification Addendum. Retrieved from https://developer.apple.com/contact/request/download/
2. COVID-19 Exposure and Health Alerts. (n.d.). Retrieved from http://health.gatech.edu/coronavirus/health-alerts
3. Downey, M. (2020, May 4). Georgia Tech warns physics students who cheated: Admit it or risk failing. Retrieved from https://www.ajc.com/blog/get-schooled/georgia-tech-warns-physics-students-who-cheated-admit-risk-failing/3iQOCvBiwuqEXQivS63VqK/
4. How far has coronavirus spread? This test is a first step in trying to get back to normal life. (2020, April 10). Retrieved from https://www.latimes.com/california/story/2020-04-10/coronavirus-antibodies-testing-los-angeles-county
5. Live Updates: Latest News on Coronavirus and Higher Education. (n.d.). Retrieved from https://www.insidehighered.com/news/2020/05/09/live-updates-latest-news-coronavirus-and-higher-education
6. Privacy-Preserving Contact Tracing - Apple and Google. (n.d.). Retrieved from https://www.apple.com/covid19/contacttracing
7. Sarwari, K. (2020, April 8). Public health authorities need help responding to COVID-19. Students are answering the call—by picking up the phone. Retrieved from https://news.northeastern.edu/2020/04/08/public-health-authorities-need-help-responding-to-covid-19-students-are-answering-the-call-by-picking-up-the-phone/
8. Stankiewicz, K. (2020, May 1). University of California president: Campuses must have contact tracing, testing plans to reopen. Retrieved from https://www.cnbc.com/2020/05/01/university-of-california-president-janet-napolitano-on-fall-classes.html
9. University urges students, faculty and staff to notify University Health Services of all COVID-19 tests by any health care provider in any jurisdiction. (2020, March 18). Retrieved from https://www.princeton.edu/news/2020/03/18/university-urges-students-faculty-and-staff-notify-university-health-services-all
10. 11, F. (2020, April 30). College students frustrated over remote learning. Retrieved from https://www.foxla.com/news/college-students-frustrated-over-remote-learning