Visitor Tracking and Risk Analytics of Covid-19

TEAM INFORMATION

Faculty advisor

Alma Robinson alrobins@vt.edu Department of Physics

Team members

Yuan Chen cyuan8@vt.edu Software Engineer
Weifan Li weifanli@vt.edu Financial Officer
Yaokun Lai **(Contact PI)** yaokun@vt.edu Project leader
Siyuan Ren justin22@vt.edu Hardware Engineer
Xilei Zhu xileizhu19@vt.edu Data Scientist
Runzhe Liu runzhe@vt.edu Database Engineer

DESCRIPTION:

Application number: 3.4 Tracking Risk and Analytics

GOALS AND OBJECTIVES

Our project will eventually establish a fast affiliates and visitors tracking system on campus. In every place where it is needed, every classroom that needs it has a tracking QR code. When accurate information is needed, another university-based system visualizes wireless network access information as easy-to-track charts. Through this system, the university community will eventually be able to track viruses safely and accurately. At the same time, it can also warn of the possible spread of the virus and warn high-risk groups.

METHODS AND STRATEGIES

A. Change unnecessary entrances and exits of buildings to emergency exits.

More entrances and exits mean a scattered flow of people that is not conducive to tracking. Reducing unnecessary entrances and exits facilitates tracking and reduces the equipment and human resources required. Many public places such as Wal-Mart have already implemented similar programs. Due to the reduction of face-to-face courses, reducing the entrances and exits of university facilities will not likely cause congestion. To ensure that we allow adequate traffic through the buildings, our team would need to cooperate with the University Registrar to estimate the number of people who need access to each building and how many people each building may safely accommodate. We also need to coordinate our efforts with Campus Security and Building Maintenance to conduct on-site inspections of the university's facilities.

B. Tracking by scanning the QR code.

QR codes are available for classrooms entrance and exits, visitors and Virginia Tech affiliates are recommended to scan the QR code to clock in/out the specific location for tracking. This QR code will open a website (https://www.maroonpower.com), allowing people to register. The tracking QR code can be placed wherever needed. Due to the time contained, we demonstrate the building level tracking using Newman Library as an example at this phase (**Figure 1-1**, https://www.maroonpower.com/newman-library). Our poster (**Figure 1-2**)is designed to let users scan QR code while practicing social distance (**Figure 1-3**).

The following are the steps required for QR code registration:

STEP 1: People use their mobile devices to scan codes.

STEP 2: After scanning, the user will enter the check-in and check-out page of the building. Users can also register on this page

STEP 3: By clicking the check-in button, the user name will be asked to complete the sign-in.
STEP 4: After that, the system will enter student data such as location and time into the database. The steps to check out are the same.

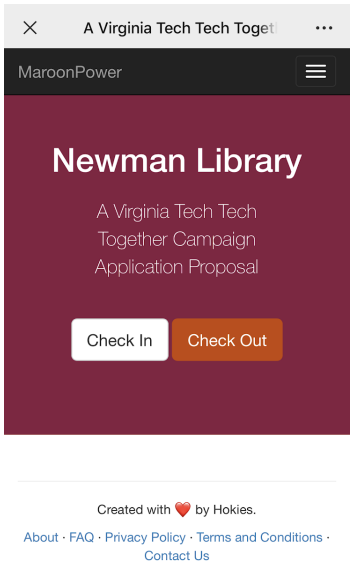

Figure 1-1. Newman Library Clock In/Out

Figure 1-2. Newman Library QR Code Poster

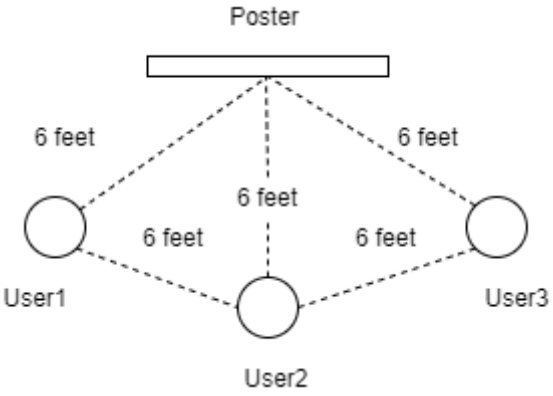

Figure 1-3 QR Code Scanning While Practicing Social Distancing

In order to protect personal privacy, our website will not store any sensitive personal information including email addresses for Virginia Tech affiliates. Users only need to register a username and password to use it. We would tolerate duplicate registration and users need to consciously report their usernames to the university. **When a diagnosed case is reported to us**, we will send the reported username and contact usernames to university health officials for them to identify the personnel diagnosed and exposed to high risks. **When a diagnosed case is reported to University Health Officials**, we expected to receive the diagnosed username for us to practice tracing and send back the usernames in contact back to university officials.

username	location	event	timestamp	status
Hokie	Newman Library	Clock In	2020-07-28T15:01:48.123	Low/High Risk/Diagnosed
Hokie	Newman Library	Clock out	2020-07-28T17:01:48.123	Low/High Risk/Diagnosed

Table 1-1 Our Database

username	pid	status
Hokie	yaokun	Low/High Risk/Diagnosed

Table 1-2 University Health Official Database

C. Record the movement of people through the university wireless network.
The database software used by the university is provided by Elastic Stack, and its supporting open source program Kibana can visualize data. Authorized members of our team have conducted research on the feasibility of data retrieval. Due to permissions and university regulations, we are unable to further demonstrate it here. But once authorized by the university, we can visualize the data with the help of the university's technical department to facilitate tracking.

D. Reward for voluntary temperature measurement.
We realize that this may cause trouble and violate privacy, so we do not insist on doing so. We revised and kept this plan because when we shared our ideas with some lecturers, some of them were very interested and might be willing to do so. We encourage universities to issue coupons that can be used in University Bookstores and Dining Centers for students who measure and report their body temperature every day. Instructors can also decide whether to provide extra credits for temperature measurement based on their actual situation.

PLAN FOR EVALUATING PROJECT SUCCESS
The sign of the success of the project is the completion of the tracking of a group of people and the simulation of warning contacts if one of them is diagnosed. The final product we will deliver includes a website for registration after scanning the QR code and a platform for visual analysis of university wireless network records.

Visitor Tracking and Risk Analytics of Covid-19

BUDGET JUSTIFICATION

Since the bill for renting the server this month has not been billed, we did not spend anything in the first phase. This is also in line with our idea of using existing resources as much as possible. In the next phase, our main expenditures include the actual testing of the QR code design and software development. Considering the layout environment of the QR code, we plan to use waterproof and faded ink. Actual expenditures may vary.

Software:

1. Server and website platform operation $30/month

Total: 30 USD

Supplies:

1. 13" x 19" paper 50 Sheets $23.00
2. 3 Color ink cartridges $29.99*3
3. Black ink cartridges $69.99

Total: 182.96 USD

Available budget: 500 USD (Phase I) + 1000USD (Phase II)
Estimated budget (Phase I to Phase II): 212.96 USD