Developing a Campus Safety App Accessible to All
A Technical Report submitted to the Department of Computer Science

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On my honor as a University Student, I have neither given nor received unauthorized aid on this
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ABSTRACT

In January 2022, UVA was not part of the top 25 college campus safety index. As a countermeasure, a group of UVA students gathered to design an application for security. The brainstorming process began with my team and I finding an improvement that can be integrated into the local college campus which proceeded into narrowing down the scope of our theme to something that develops situational awareness to the public as a preventive. We built a prototype; then followed it with a survey of user feedback on the app in general. We found that it was relatively easy to use, and most students surveyed stated they would rely on the app for walking back home from late nights, we are continuing to work on the app, which needs additional improvements to consolidate the security measures.

1. INTRODUCTION

Ensuring students' safety while pursuing their education could easily be the first thought on every parent's mind. "Safety" could include anything that involves protecting a certain entity from adversity; cybersecurity, physical defenses, and job/food security are examples of how varied our product could be. After considering all of these possibilities, my group and I have devoted our project to an app that keeps students safe when traveling, especially on foot.

Our project delves into the process and development of our app, UVASAFE, and its features. Had similar applications been implemented previously, certain events might have been prevented due to a higher priority on safety protocols. Such protocols are the main purpose behind our app.

We initially intended to base our product around all UVA students, but research indicated that there were more problems surrounding the safety of women across all walks of life than for the student body as a whole. Increased crime negatively affects all students at UVA. There are 19.67 crime incidents per 1000 students. Of these crime incidents, there are 2.40 arrests for violence against women per 1,000 students (College Factual, 2023). Additionally, one in three women worldwide have experienced physical or sexual violence in their lifetimes (World Health Organization, 2021).

The University of Virginia must provide a safe campus for all of its students to create a productive working environment. Failing to do so not only tarnishes the reputation of the school, but simultaneously puts students' lives at risk.

2. RELATED WORK

Similar applications have been developed in the past, but we quickly noticed the design, features and/or relevancy was questionable in some way. One example is CampusSafe which has features that we also integrated into our app. However, a design that is clunky and not necessarily visually appealing could lead some to make assumptions about its usability based on aesthetic factors (campussafe.app/campus-safety, n.d.).

Rave Guardian is another example of a pre-existing app resembling UVASAFE. While it looks generally modern, it does not provide all the same features as CampusSafe or UVASAFE's exclusively built-in functions such as "Summoning an Ambassador" for purposes of walking a student back to their residential area (ravemobilesafety.com, n.d.).

TapShield incorporates additional safety features but compromises on other factors such as keeping the user safe through use of a more covert approach. It does not include social groups or communication between other users who may potentially share schedules, routines, hobbies, etc. (Finnegan, 2013)

3. PROCESS DESIGN

UVASAFE is a proposed multi-use security product designed to enhance the safety of students navigating the University of Virginia and the larger Charlottesville area. It includes three modes: Traveling Mode, Forum Mode, and BAC/Reagent Mode. Traveling Mode allows users to view and upload local crime data, search through previous crime data, and share their location with a predefined contact list. It also has Ambassador features that enable users to summon an Ambassador of their specified gender to walk them home. Forum Mode is dedicated to user feedback and education, providing a platform for students to discuss the "safe" and dangerous areas of Charlottesville, send feedback to make UVASAFE more user-friendly and efficient, and learn about what is considered prohibited and consensual behavior. BAC/Reagent Mode involves an external hardware device that connects to the app via Bluetooth. It allows users to check their blood alcohol content and test their drinks for the presence of date rape drugs.

When a user launches the app, the initial screen they see is the home page of the Map Mode, which displays a map of the surrounding area and recent local crime events nearby. Users can click on red circles to view more information about local crime events and access different features, including uploading information about a crime, searching for a specific crime, entering Ambassador mode, and sharing their location. The app also has a search feature that allows users to search for specific crimes by keywords or toggle different types of crimes on and off. In Ambassador mode, users can see their current location, set the location of their "home," and summon an Ambassador to walk them home. Ambassadors are not part of the UVASAFE app; instead, the app texts their phone numbers to connect with them.

BAC/Reagent Mode involves an external hardware device with an intake hole and a chemical probe that connects to the app via Bluetooth. Users can blow into the intake hole to test their blood alcohol content and check their drinks for the presence of date rape drugs. The app shows the resulting BAC and provides information about impairment and how to proceed. UVASAFE aims to create a community that prioritizes the safety and health of all users and reduces violence against students on the grounds and in the larger Charlottesville area.

4. RESULTS

We evaluated multiple users of age groups between 18 to 26 as our target demographic for our prototype campus safety app. The findings are better understood through Figures 1 and 2 below. Our initial predictions were underestimated compared to our results from the benchmarks; however, this worked in our favor. The tasks were broken into two groups: new users and experienced users. New users are the freshly pooled users. Experienced users are associates of the developers, which in this case, is my team and I, who already tested the prototype in the beta phase and answered surveys.
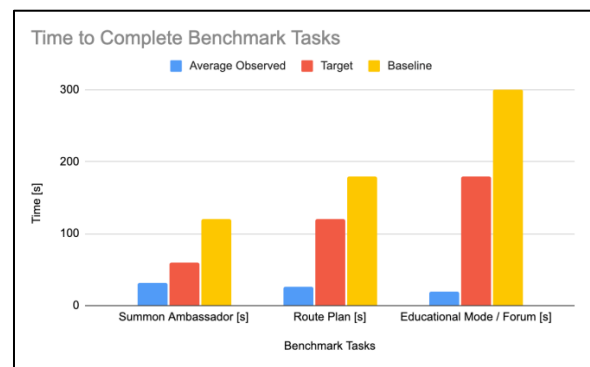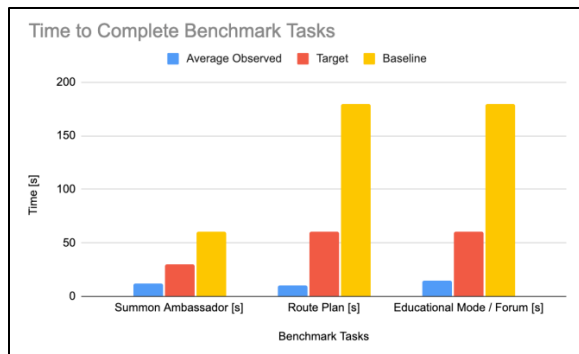

Figure 1: New User

Figure 2: Experienced User

5. CONCLUSION

UVASAFE uses security measures to keep communities assured and safe. The Technical proposal goes into clear detail about most of the main features it has to offer such as avoiding high-risk areas, informing friends and or relatives of a user's whereabouts, spreading general knowledge for the safety of the public, etc. The STS project's previous findings substantiate that a safety app is necessary for anyone in a moment of vulnerability.

User Configuration played a vital role in what users need from our app. Since the worst-case scenario is to assume the user is in danger, this led us to always have the initial screen be in Map Mode to request assistance immediately (a ride home or call local law enforcement). Other User Configurations encapsulate other ideas, as well, whether it be adding a feature to accommodate certain situations or integrating basic safety functions to all general safety apps.

6. FUTURE WORK

Moving forward, there are several areas of improvement and expansion that we plan to pursue for UVASAFE. One of the top priorities is to continue improving the user interface and experience of the app, based on feedback from our user surveys. This includes making the app more intuitive and user-friendly, as well as incorporating additional features that enhance the user's

sense of safety and security. Another key area of focus will be expanding the user base of the app beyond the University of Virginia. While our initial research indicated a need for improved safety measures specifically for UVA students, we believe that the app could be valuable to a wider audience of individuals looking to stay safe while navigating their environment.

We plan to conduct further market research to identify potential target markets and tailor the app's features accordingly. In addition, we are exploring partnerships with local law enforcement agencies and other organizations to improve the accuracy and scope of the crime data used in the app. This will help to ensure that UVASAFE users have access to the most up-to-date and relevant information to make informed decisions about their safety.

All in all, we are committed to continuously improving UVASAFE and making it a valuable tool for individuals looking to stay safe in their communities. We believe that our app can make a meaningful impact in preventing violence and increasing situational awareness, and we are excited to continue developing and refining it in the years to come.

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