

Lab 1 - Care Corner Description

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February 18, 2021

Version 4 - Final

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1 Introduction

Across the world, women live with a constant fear that they will be attacked at some point in their life. This fear is illustrated through walking in parking garages with keys in-between knuckles, always traveling in groups when possible, and making sure to never wear or say anything that might give someone else the wrong implications. This fear is rightly justified because one in three women are a victim of rape or attempted rape (*What is Sexual Abuse?*, n.d.). There are three immediate issues surrounding the topic of sexual assault.

The first problem is feeling unsafe in normally safe situations. Growing up, women are taught to have a plan of defense and escape in case they are in an uncomfortable situation or assaulted. Seven out of ten women say that their phone is always prepared when they are walking alone (Journalist, 2019). Having a phone “prepared” could mean having a text already ready to be sent in case something happens, calling a friend during the walk so there is someone who would immediately know if something were to happen, or sharing location with their closest friends. This is the reality that, unfortunately, the vast majority of women have to live with daily.

The next problem involves the process of the assault victim finding appropriate help for their situation. Studies show that one in three women are a victim of rape or attempted rape, but only one-fifth of those cases are ever reported (*What is Sexual Abuse?*, n.d.). There is a huge disconnect between an assault happening and the victim actually reporting the crime. Many victims are left confused after an assault on how to report the crime. Reasons for not reporting include fear of judgement, confusion about what happened, fear of not being believed, lack of evidence, and not knowing who or how to tell (*The US System Didn't Protect these Women*, n.d.).

The last problem surrounds the overall knowledge about sexual assault. Across communities, sexual assault is recognized as a major problem. The actions that individuals can personally take to combat sexual assault, however, can always be learned and improved. Men, for example, can learn what to watch out for when they are at a bar with their female friends. Women can learn about tricks that predators may try to use on them and ways to get out of those situations. Parents can learn how to talk to their children about the topic of sexual assault.

All three of these topics are serious problems that can be greatly improved. Care Corner is a bridge to the solution of these problems. Care Corner is a mobile application that provides safety features for responding to potentially unsafe situations, aids in the fight against sexual assault, and assist victims in determining how to find resources and report the crime.

2 Product Description

The goals of Care Corner can be summarized into the following three words: safety, resources, and education. In terms of safety, Care Corner aims to give another security option to women in the form of features readily available on their phone. These features can be used in uncomfortable situations to possibly prevent an assault from occurring, preparation before going out for the night, or finding resources.

The second objective of Care Corner is resources. A key feature of Care Corner is to provide direct access to resources for reporting and dealing with instances of sexual assault. This feature is created with the intent of improving the current low reporting rate of sexual assaults. Users who download the application will already be aware of the resources available if a sexual assault occurs. This gives the user a confidential way to get the help they need.

The last important objective of Care Corner is to aid in the fight against sexual assault through education. As more individuals learn about predators, how to spot when someone needs

help, and how to appropriately talk to someone about sexual assault, society as a whole will benefit by raising awareness and understanding about the role that every individual has in the fight against sexual assault.

2.1 Key Product Features and Capabilities

Care Corner aids in the fight against sexual assault through providing safety features for responding to potentially unsafe situations through the use of a panic button and fake phone call. The panic button is a clickable button on the application that, once triggered, will activate panic mode. Panic mode sends an alert and shares the location to the user's preset contacts, begins recording audio and video, and time-stamps when the button is pressed. This feature gives the user a sense of relief for their safety. The pre-set message will alert the user's chosen contacts that the panic button has been pressed by the user, and the selected contacts should make sure the user is okay. The user can choose how many people they want to send the message to. Additionally, recording audio and video will help the user build confidence in their evidence to lead to reporting the crime.

The fake phone call feature is a pre-recorded "phone call" that the user will appear to receive on their phone. The user can answer the phone call while they are walking alone to create another person that might scare off an attacker, or it could be a fake emergency to get out of an uncomfortable situation. For example, if a woman is stuck on a date with someone that is making her uncomfortable, she can press the fake phone call button, and the feature will work to appear as if she is receiving a normal phone call that she has to answer. Once she answers the call, it will be a recording on the other end making up some fake emergency that will cause her to have to leave the situation. There are different conversations available for the user to choose the one

that best fits their situation. Additionally, a key phrase can be pre-programmed by the user that, once said, activates panic mode.

Another feature of Care Corner is to provide a directly accessible, interactive tool to help educate its users on their responsibility in the fight against sexual assault. Mombot is the feature for this goal; it is an Alexa-type of bot that communicates with the user. The user will be able to tell Mombot their plans for the night and in return get advice from the bot about signs to look out for and a checklist of what to do before leaving. For example, if someone tells Mombot that they are going to a bar with friends, Mombot may tell them to never accept a drink from someone they weren't watching get poured. The general checklist that comes up on the screen may involve information such as sharing location with at least one person before leaving for the night or creating a plan with friends of where they will meet up later in the night. Mombot also gives advice for watching out for friends, and signs of what to look out for in others when out for the night.

Care Corner also provides directly accessible information such as resources, journals, and reporting features. The resources section contains location-based help including hotlines, help-sites, police stations, hospitals, and more. Additionally, general knowledge from official trusted websites is given. Users are provided a private, secured journal to talk about their road to recovery. This gives the user a safe, protected space to talk about what they are going through. Finally, the reporting section of the feature includes education on the different ways that there are to report, the results of reporting at different places, and how to begin the reporting process.

There are two user groups in Care Corner: registered users and guests. Registered users have access to all of the features described above while guests only have access to the resources and education sections. If the guest chooses to create their free account, then they will have

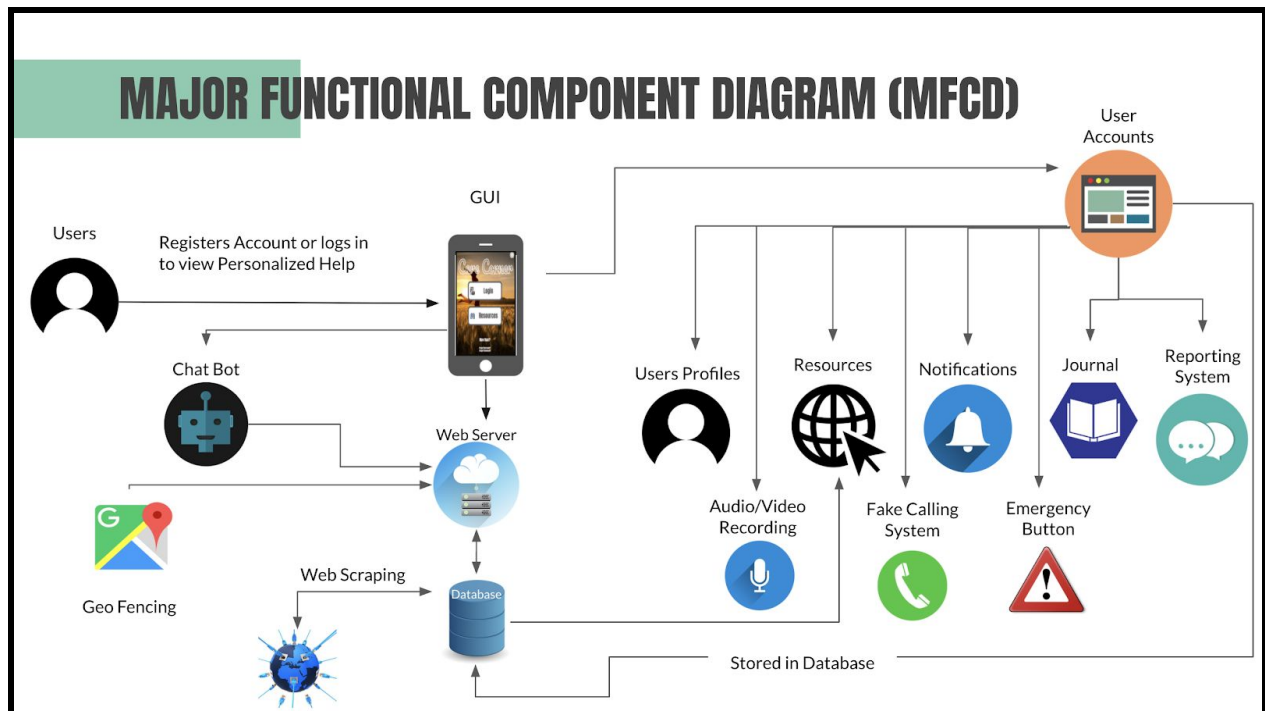
access to all the features. By creating an account, the application will be able to save their old journal entries, have a record of the audio and video recordings, and will save the user’s pre-set contacts.

2.2 Major Components (Hardware/Software)

Care Corner is configured for a mobile environment through the use of the following hardware and software requirements. For software, the language is Java, and the IDE and UI/UX is Android Studio. The database is MySQL, and the build manager is Gradle. Version control is through GitLab, project management is through Jira, and the testing framework is JUnit. The web programming utilized in Care Corner is HTML, CSS, JS, and PHP. The operating systems that are used are Windows, Linux, Android, and iOS.

Figure 1

Care Corner Major Functional Component Diagram



The hardware requirements are a web server, database server, file server, and an Android smartphone. All of the hardware requirements utilize AWS. AWS S3 is the cloud server for the web, AWS RDS is the database server, and AWS FSx is the file server. The Major Functional Component Diagram, Figure 1, shows that once a user logs into their account, they get access to their profiles, resources, notifications, journal, reporting system, audio and video recording, fake calling system, and the panic button. The Mombot utilizes a chat bot and resources utilize geofencing and web scraping. These are all connected to the web server.

3 Identification of Case Study

This product is being developed for women of any age at ODU. Although the application can be used by groups who are not women, they will be the main group using the product at its deployment and will provide feedback on the application. The group will use the application before they go out for the night. The case study will last three months during summer months. They will utilize the Mombot feature to explain where they are going and follow the checklist to receive the tips and useful information. While they are out for the night, they can pull up the application anytime they feel like they might be in an unsafe or uncomfortable situation. If they want to get out of a potentially unsafe conversation, for example, they can press the fake call button and use that as a means to leave the situation.

For future deployment, the design of Care Corner is applicable to anyone who feels like they need more protection in a situation. For example, members of the LGBTQ+ community may also find the application useful to them to make them feel safer in similar situations through using some of the safety features. Future deployments of the application will add additional resources and education that tailors to these particular situations.

4 Care Corner Product Prototype Description

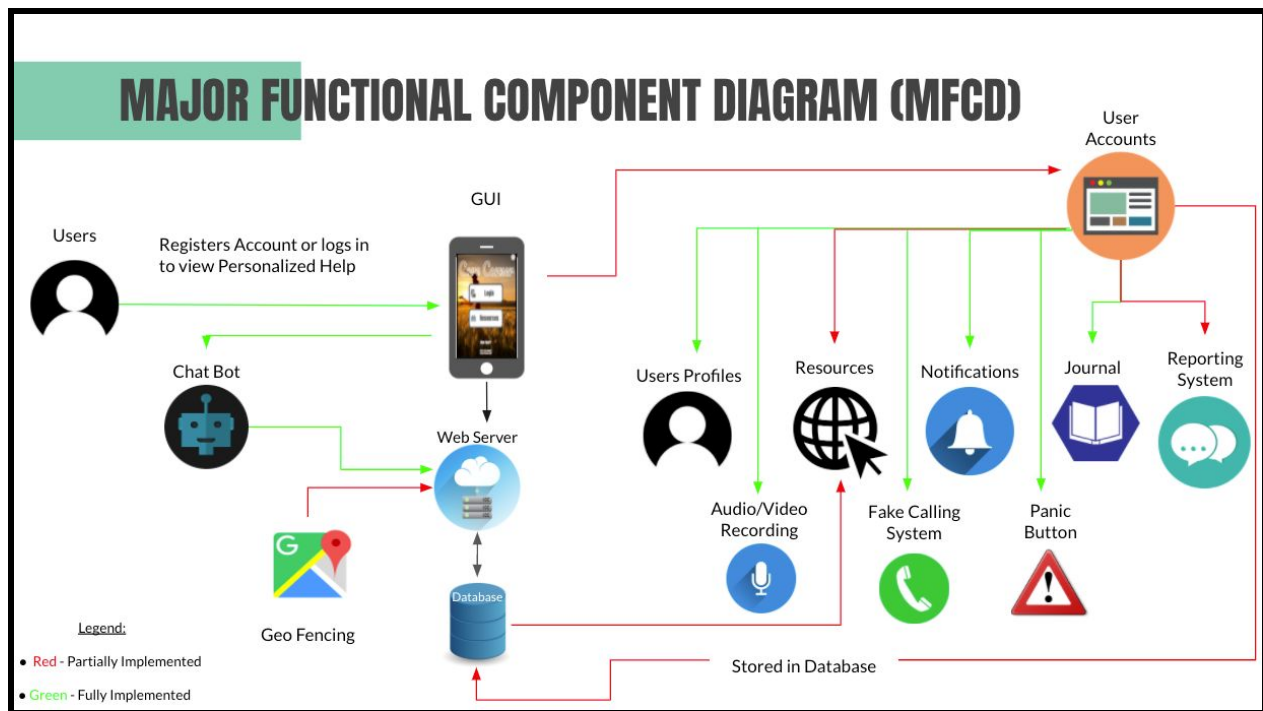
The prototype of Care Corner will partially implement the features described in the real world product enough to show a functional system and proof of concept.

4.1 Prototype Architecture (Hardware/Software)

The prototype will be developed and deployed using the same hardware and software as the real world product. For software, the language will be Java, and the IDE and UI/UX will be Android Studio. The database will be MySQL, and the build manager will be Gradle. Version control will be through GitLab, project management will be through Jira, and the testing framework will be JUnit. The web programming utilized in Care Corner will be HTML, CSS, JS, and PHP. The prototype will run on an Android device. AWS Services will be hosted on a Linux VM.

Figure 2

Care Corner Prototype Major Functional Component Diagram



The hardware requirements are a web server, database server, file server, and an Android smartphone. All of the hardware requirements will utilize AWS. AWS S3 is the cloud server for the web, AWS RDS is the database server, and the file server is AWS FSx.

Figure 2, the Prototype Major Functional Component Diagram (MFCD), illustrates what will change from the real-world MFCD to the prototype. Due to development environment limitations, the user accounts, resources, reporting system, geo fencing, and database will all be partially implemented.

4.2 Prototype Features and Capabilities

Care Corner's prototype will implement the majority of the real world product features. Some features have been eliminated due to limitations in the prototype development and demonstration environment, available development resources, or because they do not contribute to the key proof of concept. As described in Table 1, the prototype will only be available on Android devices. The databases will work properly, but they will be pre-loaded with test data for demonstration purposes only. A preset MMS message will be sent when pressing the panic button instead of a personalized one. The key phrase that the user can say to activate the panic button will be eliminated. In the Mombot, the responses will be in text form, but the user will still be able to talk to the Mombot through speech. The resources will be an unfiltered list of online resources only. The website resources will be minimal for testing purposes. These features are going to be removed from the prototype as they are not necessary to prove proof of concept. The fully functional features of the prototype will show success of the prototype goals.

Table 1

Care Corner RWP vs Prototype Features

Functional Element	RWP	Prototype	
Safe Walk (armed) mode			
Notify contacts via MMS	Fully Functional	Fully Functional	
Customize MMS messaging	Fully Functional	Eliminated	MMS messages will be preset
Send location/destination to contacts	Fully Functional	Fully Functional	
Audio Recording & Storage on Server	Fully Functional	Fully Functional	
Video Recording & Storage on Server	Fully Functional	Fully Functional	
GPS data Recording & Storage on Server	Fully Functional	Fully Functional	
If Location/Destination is sent	Fully Functional	Eliminated	Location will automatically be sent to all of user's in-app contacts
Panic Button			
Send location	Fully Functional	Fully Functional	
Send pre-set message	Fully Functional	Fully Functional	
Start recording audio	Fully Functional	Fully Functional	
Start recording video	Fully Functional	Fully Functional	
Dial out to pre-set contacts	Fully Functional	Eliminated	
Timestamp location and time of panic	Fully Functional	Fully Functional	
Fake Phone call			
Start recording audio	Fully Functional	Fully Functional	
Start recording video	Fully Functional	Fully Functional	
Activate Panic	Fully Functional	Fully Functional	
User can say key phrase to activate panic button	Fully Functional	Eliminated	
Include fake voice	Fully Functional	Fully Functional	
Mombot			
Write plans and receive advice in response	Fully Functional	Partially Functional	The responses will be a small sample size
Verbalize plans and receive verbalized advice in response	Fully Functional	Partially Functional	Talk-to-text will convert input. Response will be in text form, not verbalized.
Journal			
Can record in/ view Journal	Fully Functional	Partially Functional	
Journal will be encrypted	Fully Functional	Eliminated	
Educational Readings			
Govt/Official documents (just main sites like RAINN)	Fully Functional	Partially Functional	*Web scraping will not be implemented
Trusted blogs	Fully Functional	Partially Functional	Minimal resources for testing will be available
National hotlines	Fully Functional	Partially Functional	Minimal resources for testing will be available
Geofenced Resources			
Shelters	Fully Functional	Partially Functional	Unfiltered online resources only
Non-Profits	Fully Functional	Partially Functional	Unfiltered online resources only
Counselors	Fully Functional	Partially Functional	Unfiltered online resources only
Campus Police	Fully Functional	Partially Functional	Unfiltered online resources only
Websites			
Govt Official Sites	Fully Functional	Partially Functional	Minimal resources for testing will be available
Trusted non-profits/ other	Fully Functional	Partially Functional	Minimal resources for testing will be available
General			
Cross-Platform Support	Fully Functional	Partially Functional	Prototype will only be developed on Android
Authentication			
User account creation	Fully Functional	Partially Functional	Account creation will omit surveys and school data
User Credential Authentication	Fully Functional	Partially Functional	Credentials will not be encrypted when stored in the Database
Password Recovery	Fully Functional	Eliminated	
File Server			
Audio/Video/GPS data stored	Fully Functional	Fully Functional	
Database			
User/Contacts	Fully Functional	Fully Functional	
Incident/Audio/Video/Journey	Fully Functional	Fully Functional	
School/Resources	Fully Functional	Partially Functional	These DBs will be functional, but only test data will be present
Mombot Advice	Fully Functional	Partially Functional	This DB will be functional, but only minimal test data will be present

Care Corner will have some risks in the deployment of the prototype. From a customer risk perspective, the user could run out of battery while using the application. To mitigate this risk, Care Corner will provide battery warnings prior to setting armed mode on. From a technical risk perspective, external dependencies could become unavailable, or there could be a database failure. To mitigate these risks, Care Corner will limit external dependencies by storing relevant data in the database for users to access. If there is a database failure, relevant data will be stored on the user's device to retain information. From a security risk perspective, the database could be attacked. To mitigate this risk, Care Corner will control access to the database and it will be regularly monitored.

4.3 Prototype Development Challenges

The main development challenge will be collaboration. Although the developers are using Scrum and Trello to organize the product, this will be the first time utilizing these tools for the majority of the developers. Learning how to properly and efficiently collaborate on these tools will be a challenge.

Another challenge for the prototype development is the inexperience of the developers. For the majority of the developers, this prototype is the first mobile application they will have created, so there will be a learning curve for every developer when it comes to utilizing APIs, AWS, and Twilio.

Another challenge for the creation of the prototype development is that there is only one developer who is a woman, so only one developer has a complete understanding of the need for the creation of the application and the lived experience that the problem details.

The final challenge for the prototype development will be learning how to synchronize the way the developers code into a working product. Being able to understand everyone's code will be a skill that every member of the team will actively have to participate in.

5 Glossary

Agile: Set of frameworks and practices where solutions evolve through collaboration between self-organizing cross-functional teams

AWS (Amazon Web Services): Cloud computing platform provided by Amazon

Android: Mobile operating system primarily developed by Google

API (Application Programming Interface): A set of functions that allow one program to access data and interact with an external program

Client-server: Computer system where a central server provides data to a number of networked workstations

Cloud Based Database Server: Virtual infrastructure that performs application and information-processing storage

Data Retention: Storage of an organization's data for compliance or business reasons

Database: Structured data held in a computer

File Server: Controls access to separately stored files

Geofencing: Using GPS to create a virtual geographic boundary

GitHub: Web-based collaboration platform for software developers

GPS (Global Positioning System): Provides users with positioning and navigation information

Gradle: Build automation tool for multi-language software development

GUI (Graphical User Interface): The set of interactive visual components in software to improve the user experience

HTML (Hypertext Markup Language): Standard markup language for documents designed to be displayed in a web browser

iOS: Mobile operating system developed by Apple

JavaScript: Object-oriented computer programming language commonly used to create interactive effects within web browsers

Jsoup: Open source Java library used mainly for extracting data from HTML

Kotlin: Object-oriented programming language initially designed for Android and Java Virtual Machine (JVM)

Linux: Unix-like, open source operating system for computer, servers, mainframes, etc

Multimedia Messaging Service (MMS): A standard way to send messages that include multimedia content to and from a mobile phone over a cellular network

MySQL: A freely available open source relational database management system that uses structured query language (SQL)

PHP (Hypertext Preprocessor): General-purpose scripting language suited to web development

RSS Feed (Really Simple Syndication Feed): Set of instructions on the computer server of a website. The feed tells the reader when new material has been published on the website

Scrum: A process framework used to manage product development and other knowledge work

Stakeholder (direct): Those involved in the company's day-to-day activities

Stakeholder (indirect): Those more interested in the result of the problem

Twilio: A developer platform for communication

UI / UX (User Interface/User Experience): The graphical layout of an application which includes components such as buttons, navigation bars, etc

Web Scraping: Extracts and scrapes data from websites

Web Server: A computer that runs websites

Windows: Series of operating systems developed by Microsoft

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