

Lab 1 – Care Corner Product Description

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1. Introduction

Far too often women feel unsafe and uncomfortable when they are in situations where they are alone, and some may live with a constant fear of being attacked (Ballard, 2019). To make matters worse, when women are attacked, they can be unsure how to go about getting help and how to begin their recovery (“*After Sexual Assault*”, n.d.). There is more that can be done to improve this reality that the majority of women have to live with daily.

More than fifty percent of women do not feel comfortable walking alone at night; this is a fear that only sixteen percent of members of the opposite sex share (Ballard, 2019). This trend continues with each everyday activity surveyed: from riding a bus to going on a first date (Ballard, 2019). Women may arm themselves with defensive weapons from mace, tasers, or even car keys between their knuckles to feel prepared for a possible threat (Runyan, 2007). Some women find themselves in uncomfortable situations on dates from which they need a way out with little to no confrontation. All of these worries which the majority of women live with daily exemplify how this issue burdens women much more than men (Ballard, 2019).

In an attack or a potential attack, a woman can find herself limited in her options for help: she can fight, she can run, and she can scream for help. In a threatening or uncomfortable situation or faced with a potential attack, options for mitigating the situation or avoiding it altogether are limited to things like running away, calling for help, or attempting to make a phone call. Police or other emergency services are an option, but more women are becoming hesitant to reach out to them (Schreyer, 2018). There needs to be a discrete and readily accessible way to notify friends or family of a situation, record events as they unfold, and notify police or first-responders if necessary.

After an attack women can be unsure what to call what they have just experienced; sexual assault, sexual abuse, sexual harassment, and rape can be difficult to distinguish and can only be more challenging after being in a traumatic state (*The US System Didn't Protect these Women*, n.d.). Women may also be hesitant to report the crime of which they have been a victim of due to four things: confusion, lack of evidence, being afraid of judgement, and not knowing who or how to share their experience (*The US System Didn't Protect these Women*, n.d.). Making evidence collection easier and more education could reduce hesitation to report the crimes (*The US System Didn't Protect these Women*, n.d.).

There is currently no application available to women to try and ease the burden of these issues addressed. Care Corner fills this void by offering a platform that has features for getting users out of uncomfortable situations; easily and quickly alerting trusted friends and family members; quickly recording audio and video; as well as offering educational resources on how to get help, where to get help, and what the reporting process is like.

2. Product Description

Care Corner is a mobile application that provides tools for reducing the likelihood of sexual assault and provides resources to help users understand what to do in the event that a sexual assault does occur. The application works to reduce likelihood of sexual assault, reduce severity of situations, and make recovery resources more accessible.

2.1 Key Product Features and Capabilities

The key features of the application are the Armed Journey Mode, Fake Phone Call, Panic Button, Mombot, Journal, Resources, and Education. A few ways in which the overall application could aid the user: a potential predator could be deterred by the Fake Phone Call

feature, alerted friends and family could quickly respond to the situation leading towards a hopefully less severe situation, and educational material and resources make help one click away rather than time wasted trying to find resources.

The Armed Journey Mode feature provides a set of tools that can be used in uncomfortable situations. It provides a user the capability to directly communicate location information and scripted messages to selected contacts. A Panic Button is available which, when activated, initiates audio and video recording and the capability to immediately notify selected contacts. The user is able to decide how much information they share. The user must be able to quickly share this alert because time is very important in these situations. This feature fulfills the product goal of giving the user a tool to quickly alert a pre-selected group.

The Fake Phone Call feature provides a set of tools that can be used in unpleasant situations. It provides a user the capability to activate or schedule a fake call to their phone so that they can excuse themselves from a situation when needed or seem to be on the phone with a friend. These fake calls can be programmed to occur at specific times, appear to come from a specific person, and to be able to say a key phrase to the fake call to activate the Panic Button. This feature achieves the product goal of providing the user with a tool to easily excuse themselves from a situation minimizing the chance of unwanted confrontations or deter potential attackers by appearing to be on the phone with a friend.

The Panic Button feature provides a set of tools that can be used in uncomfortable, unsafe, or threatening situations. It provides a user the capabilities to quickly message preselected contacts, share GPS location with preselected contacts, and prepare a call to 911 or campus police. The Panic Button also begins recording video and audio, GPS location, and takes

a timestamp of the button's activation. This feature accomplishes the product goal of providing the user with a tool to quickly alert and begin gathering possible evidence to help the user.

The Mombot feature provides a tool to be used before entering a potentially unsafe situation. It provides the capabilities for a user to verbalize their plans then receive helpful mom-like feedback or advice as well as reminding the user of the option to schedule a Fake Call or start an Armed Journey. An example of the way the Mombot works is the user states to the Mombot that they will be going to a bar tonight; the Mombot then advises the user to be sure to watch their drink being poured and not to leave their drink unattended. This feature fulfills the product goal of providing the user with a tool to remind the user of things to be alert of to help the user stay safe.

The Journal feature provides a tool to be used in safe situations. It provides the user a secure journal or diary to use as the user would like and could possibly aid in recovery if the user were to go through something traumatic. This feature is similar to having a paper diary but on the user's device. The Journal is password protected to keep the user's entries secure. This feature completes the product goal of providing the user with a tool to aid in recovery though it also serves other benefits outside of that goal as the user may use it outside of recovery.

The Resources and Education feature provides a tool to be used in safe situations. It provides the user with quick and easy access to resources from a national level or a local level through the use of geofencing. Reading material is from government or official documents to trusted blogs or national hotlines. Geofenced resources are shelters, nonprofits, counselors, and campus police. Websites offered are from government websites as well as trusted non-profit organizations. The user is offered educational material to inform them of what the reporting

process is like as the more comfortable they are with the process, the more likely they may be to report.

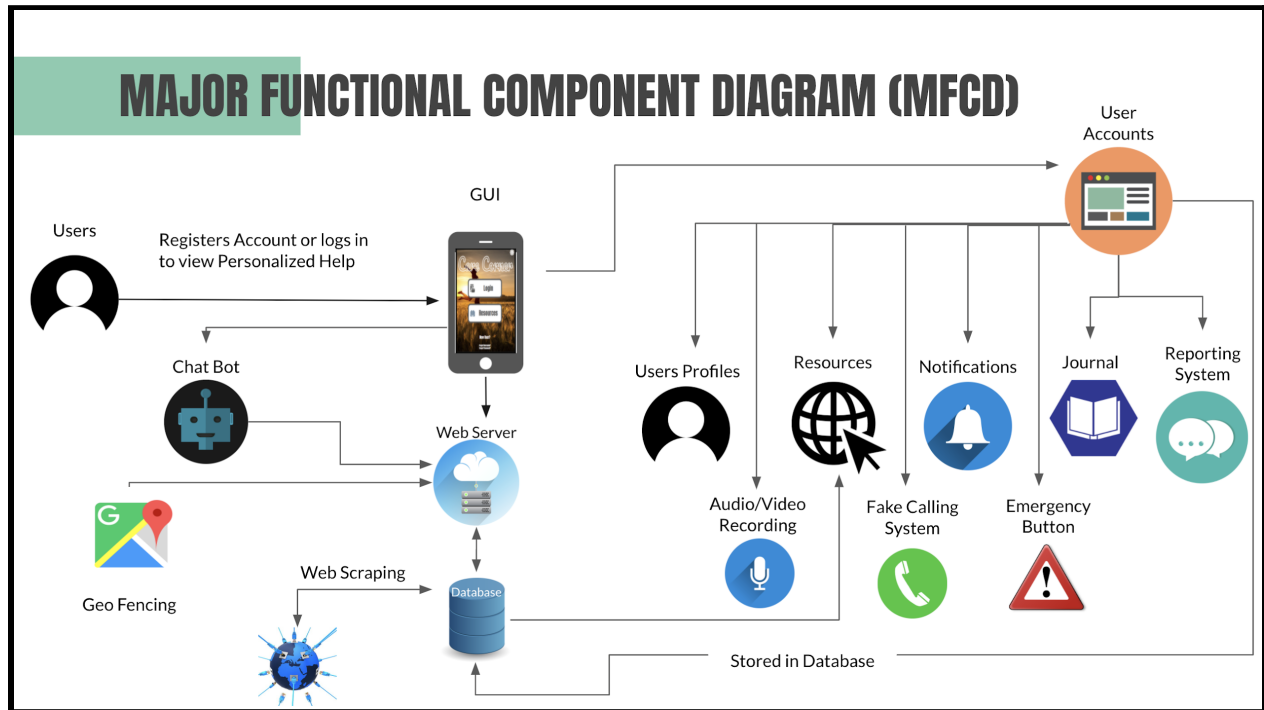
2.2 Major Components (Hardware/Software)

Care Corner is a mobile application which will need internet connection, camera permissions, microphone permissions, and access to contacts.

Care Corner has the following hardware requirements: a file server, a web server, a cloud based database server, as well as an Android or iOS phone with connection. There is a need to backup important and sensitive information that could potentially be used as evidence of a crime. Care Corner's server infrastructure is based on Amazon Web Services. The web server and file server are maintained on AWS-S3 web service, and the database is maintained on AWS-RDS with MySQL.

Care Corner has the following software requirements: web programming on HTML, CSS, JS, and PHP; operating systems on Windows, Linux, Android, and iOS; Github for collaborative development and software version control; Build Manager of Grade; Workflow of Gitlab. All are standard for cross development and teamwork. HTML enables the upkeep of the website. Operating systems enable both development and maintenance of site and mobile application. Build Manager and Gitlab aid development and maintenance.

The MFCD (See Figure 1) shows that the Chatbot, GUI, and geofencing work directly with the web server. The web server works to feed the Chatbot information as well as make the Chatbot perform properly. Also, the web server allows the geofencing API to work properly for the application's needs of finding nearby resources.

Figure 1*Care Corner Major Functional Component Diagram*

The GUI works with the web server to display all the information on the mobile application. The web server works with the database to retrieve and send data ranging from account information to videos that have been recorded. The database works with the web scraper, accounts, and resources to ensure the resources listed stay up to date. Finally the MFCD shows the User Accounts work with the GUI and the database to ensure proper mobile application functionality as well as personalization and profiles. The User Accounts can be broken down into many different nodes which have corresponding data being stored: profiles, recording, resources, notifications, Fake Call, Journal, Panic Button, and reporting system.

3. Identification of Case Study

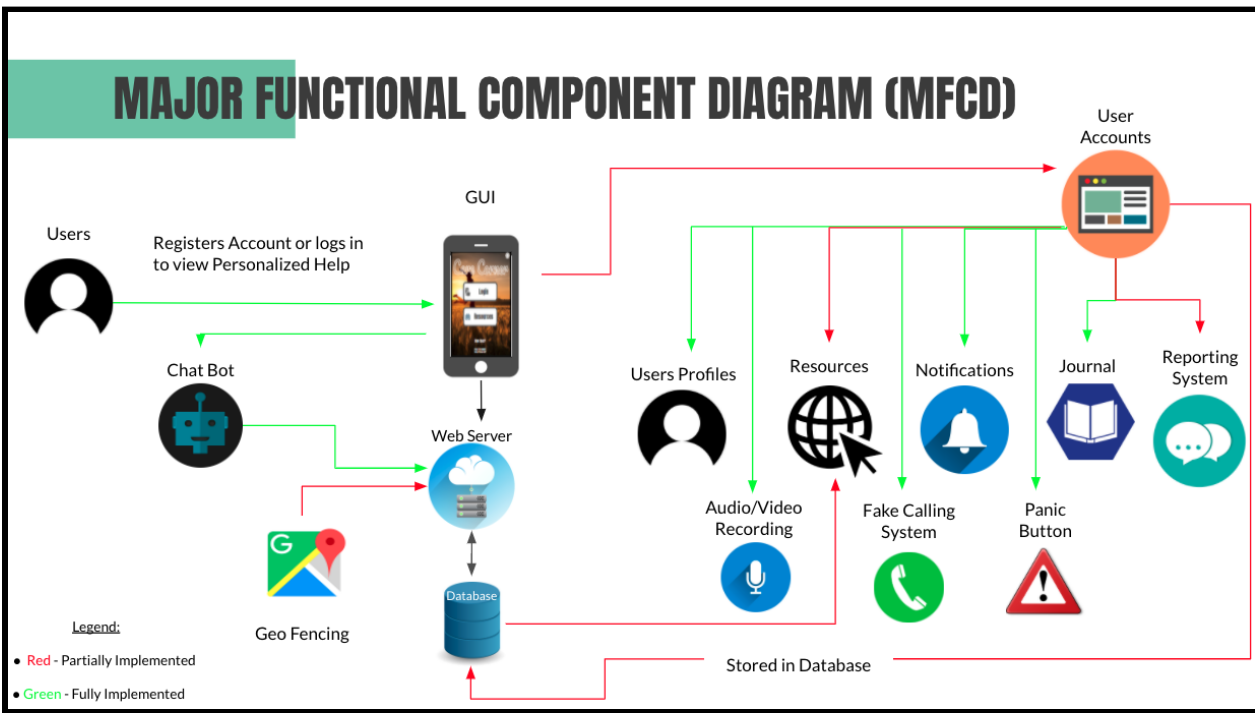
The main target of the product would be women though Care Corner can be used by anyone. The initial user base would be English speaking women in the United States. This is because women are the main target of the product, the early implementation will not support other languages, and the mapping API will be United States restricted. A Case Study for initial deployment of Care Corner would be to provide the product to a small group of women to gather user feedback and evaluate the performance of the product. The users would be encouraged to stage scenarios where the features could be exercised. Users that are comfortable with the product performance could also consider it for daily use. Care Corner could make a significant positive impact on the LGBTQ+ community as well.

4. Care Corner Product Prototype Description

The purpose of Care Corner is to reduce both the likelihood and severity of sexual assault as well as make resources more accessible. The objective of the Care Corner prototype is to demonstrate the key features of the product as a proof-of-concept implementation. This prototype will not include all functions and features of the real-world product. Omitted features will not be necessary to demonstrate the key capabilities of the Care Corner solution.

4.1 Prototype Architecture (Hardware/Software)

The Care Corner prototype will be developed using the expected hardware and software of the real world product. The application's components are laid out in the MFCD with note to partial or full implementation.

Figure 2*Care Corner Prototype Major Functional Component Diagram*

The hardware requirements are a web server, database server, file server, and an Android smartphone. Each of the hardware requirements will use AWS. The cloud server will be AWS S3, the database server will be AWS RDS, and the file server will be AWS FSx. The software will be developed on Android Studio in Java with version control through GitLab as well as using Gradle for build management. The database will be MySQL. The web programming will be implemented through HTML, CSS, JS, and PHP.

4.2 Prototype Features and Capabilities

All of the main features of the Care Corner real-world application are implemented in the prototype. These features are not as detailed as the real world prototype; for example certain features may have reduced customization, but the real-world products's features are adequately demonstrated in the prototype. The features to be implemented are detailed in the figure.

Figure 3

Care Corner Feature Real-World Product vs Prototype

	RWP	Prototype
Safe Walk (armed) mode		
Notify contacts via MMS	Fully Functional	Fully Functional
Customize MMS messaging	Fully Functional	Eliminated
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/Destiantion is sent	Fully Functional	Eliminated
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
Pre-program what name the call appears to come from	Fully Functional	Fully Functional
Mombot		
Write plans and recieve advice in reponse	Fully Functional	Partially Functional
Verbalize plans and recieve verbalized advice in reponse	Fully Functional	Partially Functional
Journal		
Can record in/ view Journal	Fully Functional	Partially Functional
Journal will be encrypted	Fully Functional	Eliminated
Password Protected	Fully Functional	Fully Functional

(Figure continued on next page)

Educational Readings		
Govt/Official documents (just main sites like RAINN)	Fully Functional	Partially Functional
Trusted blogs	Fully Functional	Partially Functional
National hotlines	Fully Functional	Partially Functional
Geofenced Resources		
Shelters	Fully Functional	Partially Functional
Non-Profits	Fully Functional	Partially Functional
Counselors	Fully Functional	Partially Functional
Campus Police	Fully Functional	Partially Functional
Websites		
Govt Official Sites	Fully Functional	Partially Functional
Trusted non-profits/ other	Fully Functional	Partially Functional
Depression/PTSD Counselor		
Reach a counselor via MMS	Fully Functional	Eliminated
Reporting Assistance (Partial)		
Time/location stamp at any time	Fully Functional	Fully Functional
Assistance reporting via preset questions	Fully Functional	Partially Functional
General		
Cross-Platform Support	Fully Functional	Partially Functional
Authentication		
User account creation/ authentication	Fully Functional	Partially Functional
User Credential Authentication	Fully Functional	Fully Functional
Password Recovery	Fully Functional	Fully Functional
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	Fully Functional
Mombot Advice	Fully Functional	Fully Functional

The Safe Walk mode, Panic Button, and Fake Phone call features will demonstrate the key features associated with responding to threatening situations. Mombot, Journal, and Resources and Education are partially implemented to demonstrate how information can be made accessible to the users. The prototype will achieve most of the real-world product goals while

being achievable by the set of constraints. The feature components that have been reduced or eliminated are not crucial for the prototype to adequately demonstrate the real-world product.

Care Corner will have risks in the prototype. From a security risk perspective, the database could be attacked. To mitigate this risk, Care Corner will restrict access to the database and traffic will be monitored. From a technical risk perspective, any external dependencies could become unavailable. To mitigate this risk, Care Corner will limit external dependencies by storing relevant data in the database for users to access. 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 activating Armed Mode.

4.3 Prototype Development Challenges

The development of the Care Corner prototype has many challenges. The prototype has a strict time constraint of needing to be developed in less than four months with many technologies the team has never worked with before. The use of new languages and frameworks to develop and deploy Care Corner will be the largest challenge as it will take time from the already strict time constraint. The developers must work hard to overcome this obstacle.

Another challenge for the creation of the prototype is that the developers lack experience for the most part. The developers will need time to get collaboration on track. As long as the developers stay organized with both the Scrum methods and a Trello board this should ease these challenges.

The final and largest challenge for the creation of the prototype is the implementation of the APIs, AWS, and Twilio needed for our prototype as these are not things the developers have done before. Communication and collaboration will help the developers overcome this challenge

as well as reaching out to the many resources available. Laying out the algorithms needed in the previous semester will also help the developers overcome this challenge.

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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