

Lab 2 – Care Corner Product Specification

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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.

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.

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.

1.1 Purpose

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.

The product will provide the user with tools to aid in the fight against sexual assault. The product will also provide safety features that provide information for helping to avoid sexual assault situations, as well as features that make it easier for the user to collect potential evidence and alert trusted contacts easily. Although Care Corner provides many helpful features, Care Corner will not be able to protect the user from sexual assault.

1.2 Scope

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.

To achieve the goals of the product, the prototype will implement Armed Journey, Fake Phone Call, Mombot, Journal, and Resources.

1.3 Definitions, Acronyms, and Abbreviations

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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1.5 Overview

This product specification provides the hardware and software configuration, external interfaces, capabilities, and features of the Care Corner prototype. The information provided in the remaining sections of this document includes a detailed description of the hardware, software, and external interface architecture of the Care Corner prototype; the key features of the prototype; the parameters that will be used to control, manage, or establish that feature; and the performance characteristics of that feature in terms of outputs, displays, and user interaction.

2 General Description

The Care Corner prototype will be deployed as a mobile application using common mobile architecture. The algorithms used within Care Corner include geofencing and Mombot algorithms. The key features from the real-world product will be developed in the prototype to demonstrate Care Corner's usefulness.

2.1 Prototype Architecture Description

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

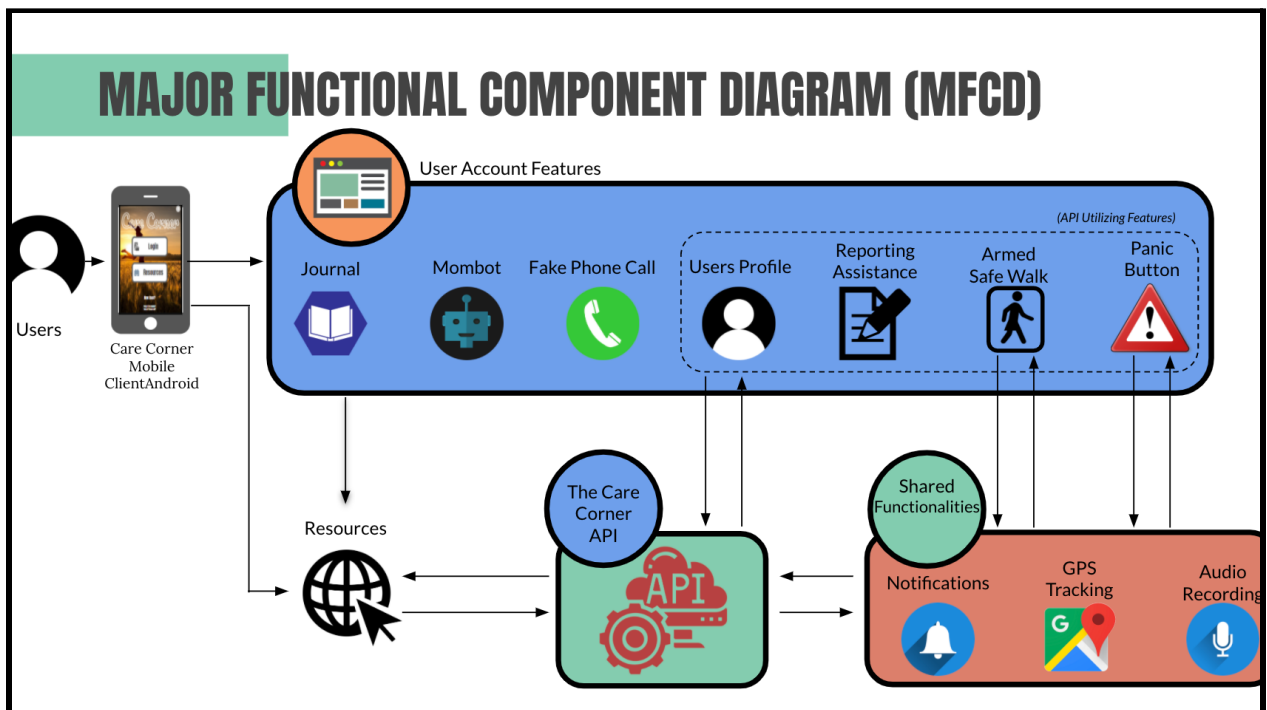
The Care Corner prototype will have the following hardware requirements: a file server, a web server, a cloud based database server, as well as an Android with connection. There is a need to backup important and sensitive information that could potentially be used as evidence of a crime. Care Corner's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

The Care Corner prototype will have 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 Major Functional Component Diagram (See Figure 1) shows that the Mombot, GUI, and geofencing will work directly with the web server, though the geofencing will be simulated in the prototype. The web server will work to feed the Mombot information as well as allow the Mombot to perform properly, though the complexity of Mombot will be reduced in the prototype.. Also, the web server will allow the geofencing API to work properly for the application’s needs of finding nearby resources, though this will be simulated in the prototype.

Figure 1

Care Corner Major Functional Component Diagram

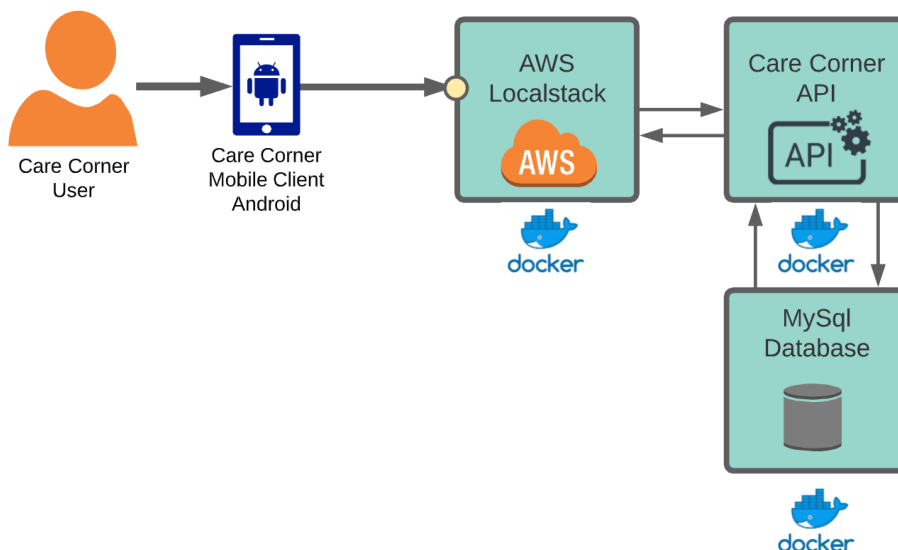


The GUI will work with the web server to display all the information on the mobile application. The web server will work with the database to retrieve and send data ranging from account information to videos that have been recorded. The database will work with the web scraper, accounts, and resources to ensure the resources listed stay up to date, but the web scraper will be simulated for the prototype. Finally the MFCD shows the User Accounts will 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.

The Docker Diagram (See Figure 2) shows that the user works with the mobile client, then the client packages information to Localstack to interact with the Care Corner API which in some cases uses that data to interact with the database. This diagram is a more in depth view of the Figure 1 “The Care Corner API” section.

Figure 2

Care Corner Docker Diagram



The docker is important to allow the emulated client to locally connect to AWS, the API, and the database.

2.2 Prototype Functional Description

Some of the features of Care Corner will have limited usability in the prototype. Some features will be simulated while others features will be demonstrated using sizable materials. A comparison of each feature can be seen in Table 1.

Table 1

Table of Comparison Between RWP and Prototype

Feature	Description	Prototype Implementation
Safe Walk (armed) mode		
Notify contacts via MMS	The user's contacts will be notified via multimedia messages (MMS).	Fully Functional
Send location/destination to contacts	The location and destination of the user will be sent to their emergency contacts.	Fully Functional
Audio Recording & Storage on Server	Audio is captured and stored on the server when the user chooses to back up their audio.	Fully Functional
Video Recording & Storage on Server	Video is captured and then stored on the server when the user chooses to back up their video.	Fully Functional
GPS data Recording & Storage on Server	The users GPS location during the armed mode will be stored on the server	Fully Functional
Panic Button		
Send location	The user's location will be sent to emergency contacts when the panic button is activated.	Fully Functional
Send preset message	The user's preset message is sent out to their emergency contacts when the Panic Button is activated.	Fully Functional
Start recording audio	The phone captures the audio surrounding it	Fully Functional
Start recording video	Video is captured when activated.	Fully Functional
Timestamp location and time of panic	That phone will capture and save user's coordinates, time and date when Panic Button is activated	Fully Functional
Fake Phone call		
Start recording audio	Audio capture starts until deactivation.	Fully Functional
Start recording video	The back camera turns on and begins recording until deactivation	Fully Functional
Activate Panic	When the End Call Button is held for 5 seconds, the panic feature is activated.	Fully Functional
Include fake voice	Depending upon the user's choice of fake phone call voice, that voice clip will play when the Fake Phone Call is started.	Fully Functional
Pre-program what name the call appears to come from	The user can enter into a text box what name they want to appear when the fake phone call is activated	Fully Functional
Mombot		
Write plans and receive advice in response	User can text Mombot what their plans are and receive general advice in return	Partially Functional - the prototype will only provide general advice and feedback
Verbalize plans and receive verbalized advice in response	User can verbally express their intent to visit a location or attend an event. In response, the Mombot will provide appropriate safety tips and feedback	Partially Functional - the prototype will not feature an algorithm to appropriately provide feedback from Mombot based on user input. Instead, feedback will be generic
Journal		
Can record in/ view Journal	The user can create new, edit, and delete journal entries	Partially Functional - Speech parsing is not functional
Password Protected	A PIN is used to protect the Journal from prying eyes.	Partially Functional - The PIN is hardcoded for the prototype.
Educational Readings		
Govt/Official articles (just main sites like RAINN)	Users will be provided a collection of government/official sites that have been gathered via web scraping and RSS feeds.	Partially Functional - The prototype will only feature a few Government/Official Websites in order to show proof of concept. No web scraping or RSS feeds will be implemented.
Trusted blogs	Users will be provided a collection of readings from trusted blogs that have been gathered via web scraping and RSS feeds	Partially Functional - The prototype will only feature a few blogs in order to show proof of concept. No web scraping or RSS feeds will be implemented.
National hotlines	Users will be given a list of national hotlines they can call	Partially Functional - The prototype will only feature a few National Hotlines in order to show proof of concept

(Figure continued on next page)

Feature	Description	Prototype Implementation
Geofenced Resources		
Shelters	Returns a geofenced list of shelters close to user's location	Partially Functional - The prototype will only have an unfiltered list of shelters
Non-Profits	Returns a geofenced list of nonprofits close to the user's location.	Partially Functional - The prototype will only have an unfiltered list of nonprofits
Counselors	Returns a geofenced list of counselors close to the user's location	Partially Functional - The prototype will only have a small selection of counselors as test data to show proof of concept.
Campus Police	Returns the campus police information based on user's location	Partially Functional - The prototype will only have a small selection of campus police as test data to show proof of concept.
Websites		
Govt Official Sites	A list of clickable .gov websites that handle sexual assault policies.	Partially Functional - The prototype will only have a small selection of unfiltered sites.
Trusted non-profits/ other	A list of links to trusted non-profit sites or articles providing support to sexual assault victims.	Partially Functional - The prototype will only have a small selection of unfiltered sites.
Reporting Assistance (Partial)		
Time/location stamp at any time	Care Corner will store the time and location when using the Panic Button or Armed Safe Walk Mode in case this information is needed for a future reporting	Fully Functional
Assistance reporting via preset questions	All incidence created in the database through Car Corner API with specific user credential can be accessed to generate a report and used as necessary	Partially Functional - The reporting assistance for the prototype uses a limited set of prepopulated questions.
Authentication		
User account creation/ authentication	A new user can create an account and the information is stored in the Care Corner Database. The user can then login to Care Corner through this account.	Partially Functional - The prototype will allow users to create new accounts and store the information but the user cannot login using this newly created account.
User Credential Authentication	A user credential is authenticated to allow access to the application.	Partially Functional - The username/password is hardcoded for the prototype, only one user account is supported.
Password Recovery	A user can recover a forgotten password using some info store on the database at time of account creation	Fully Functional
File Server		
Audio/Video/GPS data stored	Audio, video, and GPS data collected by the user will be saved in the Care Corner Database.	Fully Functional
Database		
User/Contacts	User data such as name, email, username, password, and emergency/trusted contacts are stored in the Database. The name and phone number of the contacts are stored as well.	Fully Functional
Incident/Audio/Journey	Metadata from an Incident, including the server location of the associated audio file and GPS journey file.	Fully Functional
Resources	Data for vetted resources can be stored in the DB for faster user access.	Fully Functional
School	Data for US Colleges/Universities and their campus police can be stored for faster user access.	Fully Functional

The Armed Safe Walk will provide a user the capability to directly communicate location information and scripted messages to selected contacts, as well as quick access to the Panic Button. The Fake Phone Call will provide 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. The Panic Button will provide 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 Mombot will provide 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. The Journal will provide the user a secure journal or diary to use as the user would like and could aid in recovery if the user were to experience something traumatic. Resources will provide the user with quick and easy access to reliable resources from a national level or at a local level through the use of geofencing.

The Care Corner prototype will have many limitations. Account creation will accept and store information but the user will not be able to login by the newly created account as the login will be hardcoded and only support the single account. The Mombot algorithm will be simplistic, only providing general advice. The Journal will not have speech parsing and the PIN protection will be hardcoded. The Resources page will be minimal without web scraping, RSS feeds, or filtering.

From the welcome screen the user will be able to select Login, Forgot Password, Forgot Username, New User, or Resources. After logging in, the user will be able to access Armed Journey, Panic Button, Mombot, Fake Phone Call, Journal, or Resources from the homepage. Both Armed Safe Walk and Fake Phone Call will link to the Panic Button. No other direct links will be made; back buttons will be available for the user to easily return to the homepage and select a different feature.

2.3 External Interfaces

As a mobile application, Care Corner will use common hardware and software interfaces to allow users to access and utilize the mobile user interface. Care Corner will also make use of multiple APIs for location sharing and geofencing.

2.3.1 Hardware Interfaces

The Care Corner prototype will be hosted on Amazon Web Services (AWS) utilizing many serverless services to provide access to virtualized hardware and databases.

2.3.2 Software Interfaces

The Care Corner prototype will work with several software interfaces to provide functionality. The Android SDK will be used to enable standard application features. The Android GPS API will be used to manage the user's geographical location. The Android Media Recorder will be used to record audio and video. Twilio will be used to provide SMS functionality. The Localstack and Serverless Framework with Docker will be used to emulate an AWS development environment.

2.3.3 User Interfaces

The Care Corner prototype will be accessed using an Android Mobile device. The Care Corner application will consist of a welcome page, a login page, a settings page, forgot username or password pages, a homepage leading to major features, as well as pages for each major feature.

2.3.4 Communications Protocols and Interfaces

The Care Corner prototype will use the REST application level protocol to communicate between the mobile application and the API. All traffic will be managed over HTTP/1.1 and SSL/TLS 1.2. The data format will be in JSON which requires the Content-Type HTTP header to be set. An API key is used to provide access in a HTTP header.

3 Product Requirements

Care Corner's requirements will be included in a separate document titled "Lab 2 Section 3 – Product Requirements." The document will include the key functional requirements of the product as well as illustrations to expand on the concepts. In addition to the functional requirements, the performance requirements of Care Corner will be included in the document. The performance requirements will be expressed in specific, measurable terms. Assumptions and constraints for Care Corner will be described, and the non-functional requirements will be outlined.