Lab 2 Section 3 – Product Requirements

Team Copper

Old Dominion University

CS411W

Professor James Brunelle

April 7th, 2021

Version 2 - Final

Table of Contents

List of Figures

3 Specific Requirements

3.1 Functional Requirements

3.1.1 User Authentication (O: Adegun M: Grissom)

Upon opening the application, the user must be brought to the startup page from which the user can select Login, New User, Resources, Forgot Username, or Forgot Password. The following requirements for Account Creation address the process a new user goes through to make an account when the user selects New User from the welcome page. The following requirements for Login address the process a user goes through to login to their account after selecting Login from the welcome page.

3.1.1.1 Account Creation

3.1.1.1.1 The application must require the user's first and last name.

3.1.1.1.2 The application must require the user to create a unique username between 2 and 20 characters in length.

3.1.1.1.3 The application must require the user to create a password, the requirements for such password are detailed in 3.4.1.1.

3.1.1.1.4 The application must require the user to enter a valid email that may be used for account recovery in the event of a forgotten username or password.

3.1.1.1.5 The application must prompt the user to enter the names and phone numbers of up to three emergency contacts.

3.1.1.1.6 The application must store user credentials in the Care Corner database.

3.1.1.2 Login

3.1.1.2.1 The application must collect the username from the user.

3.1.1.2.2 The application must collect the password from the user.

3.1.1.2.3 The application must confirm the provided username is stored in the database.

3.1.1.2.4 The application must confirm the provided password matches the password associated with the username in the database.

3.1.2 Panic Button (O: Turner M: Carpenter M: Adegun)

User's who have created and logged into their account must have access to the Panic Button. Access to this feature should be located from Care Corner's main startup page, on the Fake Phone Call and Armed Safe Walk page. Upon activation of the Panic Button, the application must:

3.1.2.1 Start a five second countdown timer before the button is activated, with an option to cancel the activation of the button.

3.1.2.2 Activate audio recording (3.1.9).

3.1.2.3 Activate GPS functionality (3.1.10).

3.1.2.4. Activate the Notification functionality (3.1.11).

3.1.2.5 Incident Creation (O: Turner M: Carpenter, M: Prudner)

Upon deactivation of the Panic Button feature through the user ending the audio recording (3.1.9), the user must be prompted to input whether the scenario that caused them to activate the Panic Button was an incident that needs to be recorded, or if the scenario can be disregarded. If the user inputs that this scenario's details should be recorded, then a new incident must be added to Care Corner's cloud database via the Care Corner API. The user is then prompted with a dialogue that has options to go to the journal to write down any details from the incident, or return to the main menu. The incident creation must include the following information to be stored as part of it:

3.1.2.5.1 The user's ID must be stored in the database.

3.1.2.5.2 The time that the Panic Button was activated must be stored in the database.

3.1.2.5.3 The time that the Panic Button was deactivated must be stored in the database.

3.1.2.5.4 The GPS data (3.1.10) from the duration of the Panic Button's activation must be stored in the database.

3.1.2.5.5 The audio recordings (3.1.9) from the duration of the Panic Button's activation must be stored in the database.

3.1.3 Armed Safe Walk (O: Prudner M: Webb M: Adegun)

The Armed Safe Walk functional area provides monitoring of a user's walk and notifies contacts about the progress of the planned path. The following functional requirements must be provided. Upon activating Armed Safe Walk, the application must:

3.1.3.1 Display a prompt to request the user's destination and estimate the time of arrival:

3.1.3.2 Display a captured estimated time of arrival (ETA).

3.1.3.3 Send the destination and ETA to the Care Corner API.

3.1.3.4 Activate GPS functionality (3.1.10).

3.1.3.5 Activate the Notification functionality (3.1.11).

3.1.3.6 Activate audio recording (3.1.9).

3.1.3.7 Provide access to the Panic Button during an Armed Safe Walk.

3.1.4 Fake Phone Call (O: Webb M: Carpenter)

The Fake Phone Call feature provides a way to get away safely from awkward or potentially dangerous situations by simulating a phone call for the user to have an excuse to

leave. The following functional requirements must be provided.

Precondition: Audio message will be manually created for the prototype.

Upon activating the Fake Phone Call, the application must:

3.1.4.1 Collect what name is pre-set by the user when a Fake Phone Call is received.

3.1.4.2 Collect what phone number is pre-set by the user when a Fake Phone Call is received.

3.1.4.3 Simulate a phone call through initiating a ringer with options to answer or decline the phone call.

3.1.4.4 Simulate a phone call when the answer button is pressed through immediately starting the fake phone call audio.

3.1.4.5 Activate the audio recording (3.1.9)

3.1.4.6 Access panic mode when the end call button is held down for a few seconds.

3.1.4.7 Have multiple fake conversations for the user to choose from on the fake phone call menu for different types of situations that will output from the user's receiver.

3.1.5 Journal (O: Carpenter M: Adegun M: Carpenter)

The Journal functions must provide the user a private place to put their thoughts into words. Access to the Journal screen is found through a button on the Care Corner home screen once the user logs into their account. The following functional capabilities must be provided.

3.1.5.1 The application must keep the Journal protected by providing creation of a personal identification number (PIN) upon initial attempt to access the journal that is unique to the journal feature.

3.1.5.2 The application must provide the user the option of resetting their PIN in case the user forgets their PIN.

3.1.5.3 The application must require the user to authenticate by logging into their Care Corner account again prior to resetting the pin.

3.1.5.4 The application must provide a time-stamped capability to allow the user to:

3.1.5.4.1 Create new entries.

3.1.5.4.2 Edit existing entries.

3.1.5.4.3 Delete existing entries.

3.1.5.4.4 View a list of previously created journal entries.

3.1.5.4.5 Save new entries to the user's device

3.1.5.4.6 Make newly saved entries accessible from the journal homepage.

3.1.5.4.7 Save edited entries to the user's device

3.1.5.4.8 Return to the main menu from the journal homepage.

3.1.6 Mombot (O: Grissom, M: Prudner, M: Prudner)

The Mombot functions must provide the user with helpful advice in response to the user's plans or activities. The following functional requirements must be provided. Precondition: The keywords, contextual advice, and checklists will be populated manually into the database for the prototype.

3.1.6.1 The application must request speech input from the user.

3.1.6.1.1 The application must display a 'Tap on mic to speak' button.

3.1.6.1.2 The application must start receiving speech when pressed.

3.1.6.1.3 The application must state that it is now listening.

3.1.6.2 The application must convert speech to text.

3.1.6.2.1 The application must state that it is "now processing" the speech.

3.1.6.2.2 The application must use the Android Speech API to convert the speech.

3.1.6.3 The application must identify keywords from the input to return the related advice.

3.1.6.3.1 The application must accept a string from the Android Speech API as input.

3.1.6.3.2 The application must send the input to the Care Corner API.

3.1.6.3.3 The Care Corner API must reference a set of keywords from the database.

3.1.6.3.4 The Care Corner API must use lexical analysis to match the set of keywords.

3.1.6.3.5 The Care Corner API must look up advice in the database for the matched keywords.

3.1.6.3.5.1 The advice must consist of textual notes that are specifically related to the matched keywords.

3.1.6.3.5.2 The advice may consist of a set of checklists applicable to the matched keywords.

3.1.6.4 The application must provide the user with textual notes and any suggested checklists for review by the user.

3.1.7 Reporting Assistance (O: Carpenter)

The reporting assistance functions must provide the user with the incidents that have been created from the result of the deactivation of the panic button. The incidents created are stored in the reporting assistance screen for the user to access. The reporting assistance feature will be a screen available from the Care Corner main menu. The following functional requirements must be provided.

3.1.7.1 The application must provide a storage capability to hold the incidents created from the result of the deactivation of the panic button

3.1.7.2 The application must allow the user to select an incident to view its contents

3.1.8 Resources (O: Grissom, M: Prudner M: Carpenter)

The resources function must provide the user with trusted resources related to assault. Trusted resources will be government sources or non-profits. The following functional requirements must be provided.

3.1.8.1 The application must provide the Resources feature without requiring authentication.

3.1.8.2 Upon activating Resources by clicking on the Resources button on the Care Corner main menu, the application must:

3.1.8.2.1 Obtain a current list of resources from the Care Corner API. The API must categorize the lists in order for the exchange of information in the subcategories to function properly.

3.1.8.2.2 Cache the set of resources in local storage for later reference.

3.1.8.2.3 Display a list of resource categories for the user to choose from.

3.1.8.3 When the blog category is selected, the application must provide a listing of resources relating to assault in the form of trusted blogs.

3.1.8.4 When the national hotline category is selected, the application must provide a listing of resources relating to assault in the form of national hotlines.

3.1.8.5 When the government sources category is selected, the application must provide a listing of resources relating to assault in the form of government sources.

3.1.8.6 When the shelters or counselors category is selected, the application must capture a geofence of the user's current location.

3.1.8.6.1 The application must ask permission to capture the user's location. The application must request permissions to access fine location and background location capture.

3.1.8.6.2 The application must guide the user to their setting page to set the location permissions for the Care Corner application. Android API level 30 and up requires setting background location permissions via the user's setting instead of a dialog when basic location settings.

3.1.8.6.3 When the user permits sharing location, the application must create a geofence using the Android GeoFence API with a 90 miles radius.

3.1.8.7 When the shelter category is selected, the application must provide contact and location information for shelters based on the user's geofenced location.

3.1.8.8 When the counselors category is selected, the application must provide contact and location information for counselors based on the user's geofenced location.

3.1.9 Audio Recording (O: Turner, M: Carpenter, M: Prudner, M: Turner)

The application must begin recording audio when the Panic Button (3.1.2), Armed Safe Walk (3.1.3) or Fake Phone Call (3.1.4) is activated.

3.1.9.1 The audio must be captured using the Android Media Recorder.

3.1.9.2 The application must ask permission the first time to record audio.

3.1.9.3 The application must remember the user's permission choice.

3.1.9.4 The application must begin recording audio when appropriate function is called. .

3.1.9.5 The application must store the audio to a local file store when the calling function is stopped.

3.1.9.6 When the user confirms they want to backup their audio or the user indicates an incident has occured (3.1.2.1):

3.1.9.1.1 The application must stream the audio to the API.

3.1.9.1.2 The API must store the audio file in a AWS S3 bucket.

3.1.9.1.3 The API must record the timestamp, file location, and name of the audio.

3.1.10 GPS (O: Turner, O: Prudner, M: Carpenter, M: Webb, M: Turner)

The application must begin recording the user's location when the Panic Button (3.1.2) or Armed Safe Walk (3.1.3) is activated.

3.1.10.1 The location must be captured using the Android GPS API.

3.1.10.2 The application must ask permission to access the user's location.

3.1.10.3 When the user permits sharing location:

3.1.10.3.1 The application must send a location message to the Care Corner API.

3.1.10.3.2 The API must record in the database the start of the Panic Button (3.1.2) or Armed Safe Walk (3.1.3), recording the location and timestamp.

3.1.10.4 When the Panic Button (3.1.2) or Armed Safe Walk (3.1.3) is activated, the user's GPS location must be shared with the user's in-app contacts.

3.1.10.5 The GPS data must be tracked from the time the Panic Button (3.1.2) or Armed Safe Walk (3.1.3) are activated until they are deactivated.

3.1.10.6 The GPS data must be stored locally until the user responds to the prompt indicating whether the scenario that caused them to activate the Panic Button (3.1.2) was an Incident (3.1.2.1) or not.

3.1.10.7 The GPS data must be stored remotely in Care Corner's cloud database via the Care Corner API if the user responds to the prompt that the activation of the Panic Button (3.1.2) was an Incident (3.1.2.1).

3.1.10.8 The GPS data must be removed from the user's device if the user responds to the prompt that the activation of the Panic Button (3.1.2) was not an Incident (3.1.2.1).

3.1.11 Notifications (O: Turner, O: Prudner, M: Webb, M: Carpenter, M: Turner)

The application must notify the user's in-app contacts via SMS when the Panic Button (3.1.2) or Armed Safe Walk (3.1.3) are activated. The user's emergency contacts can be added during Account Creation (3.1.1.1) or by accessing them through the Settings Page.

3.1.11.1 The application must send a location message to the Care Corner API at which time the API must:

3.1.11.1.1 Read the list of the user's contacts from the database.

3.1.11.1.2 Use Twilio to send an SMS to each contact in the list that contains a message with:

3.1.11.1.2.1 The user's name (potentially anonymized)

3.1.11.1.2.2 The current location of the user.

3.1.11.1.2.3 A current timestamp of the user.

3.1.11.1.2.4 The estimated time of the user's arrival.

3.1.11.2 The application and API must send a SMS message every 3 minutes with the user's updated location

3.1.11.3 When the user arrives at the destination or the Panic Button (2.1.2) is deactivated, the API must send an SMS message that includes:

3.1.11.3.1 The user's name (potentially anonymized)

3.1.11.3.2 The current location of the user

3.1.11.3.3 A note that the user reached their destination or that the Panic Button (2.1.2) was deactivated.

3.1.11.3.4 The time of the user's arrival at their destination ro the time that the Panic Button (2.1.2) was deactivated.

3.2.Performance Requirements

3.2.1 Application Performance

3.2.1.1 The application must be written efficiently enough to land the user on the home screen of the application within 5 seconds of opening it. (O: Turner M: Grissom)

3.3.Assumptions and Constraints

3.3.1 The application requires internet access to store and retrieve data and files from the cloud servers and database. (O: Carpenter M: Adegun M: Carpenter) If this constraint turns out to be false, it would affect the requirements by limiting the functionality of the application. Data will be stored locally on the user's device so previously located resources can still be accessed and the user can still record their trips with audio.

3.3.2 The application requires Android KitKat (4.4) OS or higher. (O: Adegun M: Grissom)

3.3.3 The application requires access to a functioning microphone on the user's device. (O: Grissom, M: Prudner) If this constraint turns out to be false, it would affect the requirements by limiting the functionality of the application. Audio will no longer be recorded and stored.

3.3.4 The application requires location sharing to be enabled in order for geofencing and location reporting capabilities(O: Carpenter). If this constraint turns out to be false, it

would affect the requirements by limiting the functionality of the application through not being able to find local resources or sending location information to the user's trusted contacts.

3.4.Non-Functional Requirements

3.4.1 Security

3.4.1.1 Passwords (O: Prudner M: Webb)

Passwords must be used to secure protected areas of the application.

A personal identification number (PIN) must be used to access the journal area of the application.

3.4.1.1.1 Protection of account

3.4.1.1.1.1 The application must require a password to access an account.

3.4.1.1.1.2 When accessing an account, an authentication form will be presented for the user to enter a password.

3.4.1.1.1.3 The application must prompt for a password when a user is logging in or a session has timed out.

3.4.1.1.2 Protection of journal

3.4.1.1.2.1 The application must require a PIN when accessing the journal.

3.4.1.1.2.2 When accessing the journal, a form must prompt the user to enter a valid PIN.

3.4.1.1.3 Password complexity requirements

Passwords must follow the Open Web Application Security Project (OWASP) guidance for complexity:

3.4.1.1.3.1 A password must be a minimum of 8 characters.

3.4.1.1.3.2 A password must be a maximum of 64 characters.

3.4.1.1.3.3 The application must allow usage of all characters for passwords.

3.4.1.2 Care Corner API (O: Turner M: Grissom)

The Care Corner API will be managed through the AWS API Gateway. The Care Corner API will be RESTful and will conform to the REST architectural style.

3.4.1.2.1 API Keys (O: Turner M: Grissom)

The API Gateway will be designed to require that the appropriate API keys be included for any Care Corner API requests passed to the server.

3.4.2 Maintainability (O: Carpenter)

Care Corner has a low-maintenance procedure to keep updated through allowing an easy update and maintenance of system servers. Additionally, Care Corner follows internet security protocols and information security guidelines. Maintenance procedures also include verifying that websites and phone numbers stay up-to-date. These maintenance procedures are conducted semiannually.

(This space is intentionally left blank)

3.4.3 Reliability (O: Adegun)

Reliability for the Care Corner mobile application will focus on the real world application since this will not be feasible on the prototype due to the fact that the prototype is mainly for proof of concept. This section will discuss the requirement for application reliability.

3.4.3.1 Fault Tolerance

Care Corner application shall take advantage of the fault tolerance built into AWS and the Android operating system to help users recover information in the event of a down time due to faulty devices. Likely fault would include hardware failure, like Smartphones being stolen, lost or completely damaged. Users can download the Care Corner application again and login with prior credentials after acquiring a new phone and still have access to their information. For instance, the journal entries would be kept on the server for up to six months and this could be downloaded through the Care Corner API after proper authentication.

3.4.3.1.1 AWS Serverless

Serverless service offers developper the opportunity to build and run applications without having to manage servers. Applications can be packaged into a container and deployed directly to clients. Care corner mobile application would take advantage of AWS serverless service to take care of application reliability

3.4.3.1.2 Five nines: 99.999%

One of the measures put in place by the care Corner application to meet the five nines is through the mom bot which runs some checks on the background whenever users interact with it. It checks the battery level on the phone and gives

feedback to the user if charging is necessary prior to an outing, it also checks the location permission and data on the phone to ensure both are not turned off. if any is turned off, it gives a gentle warning to remind the user to turn features on.

3.4.3.1.3 Multi-region

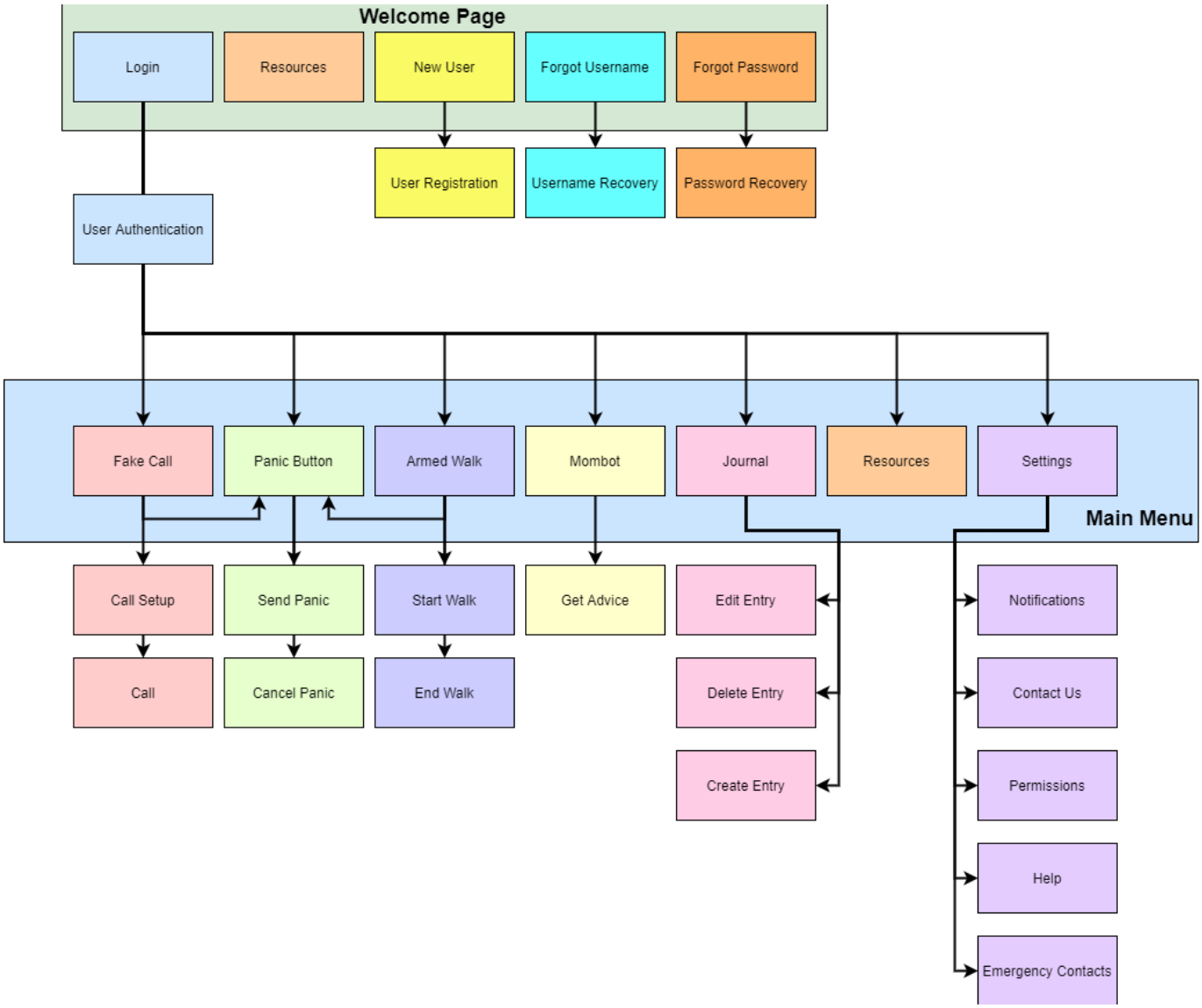
The real world application takes advantage of the google map API to make Care Corner multi-region compliant. Users in various region would not need to make any settings adjustments to use the mobile application

3.4.3.2 Database backups

All user credentials will certainly remain permanently in the Care Corner database system except a user specifically requested to be deleted. All journal and audio recording files will be backed up for up to six months for ease of retrieval when the need arises.

(This space is intentionally left blank)

Appendix A - Site Map (O:Grissom)



(This space is intentionally left blank)

Appendix B - Entity Relationship Diagram(O:Turner, M:Turner)