
Software Requirements Specification

for

SafeTouch

Version 1.0 approved

Prepared by

**Megan Taylor, Sumaiya Rashid, Monica Salinas,
Lauren Finley, Daniel Berg**

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1. Introduction

1.1 Purpose

The purpose of this Software Requirements Specification document is to describe, in detail, the functionalities of SafeTouch, a personal safety device paired with a smartphone application. This document will cover the features of the hardware device as well as the Android application that the user will interact with.

1.2 Scope

The SafeTouch system consists of two parts: a small hardware device and a smartphone application that will run on Android devices. The client-side application will allow the user to personalize the actions taken when the button on the hardware piece is pressed and who will receive the notification. The hardware piece will be small and easy to carry. It will have a button on it that will activate an alarm inside of the device when pressed and held down.

1.3 Definitions, Acronyms, and Abbreviations

1.3.1. Definitions

Bluetooth: a standard for short-range wireless interconnection of mobile phones, computers, and other electronic devices

1.3.2. Abbreviations

FR: Functional Requirement

GPS: Global Positioning System

1.4 References

Google Maps API: <https://developers.google.com/maps/>

1.5 Overview

Part 1 consists of an introduction to the SafeTouch system. Readers looking for an overall description should consult part 2 of the document which details functions and characteristics of the system. Part 3 contains the specific requirements of the system including the system features and constraints. References to each section can be found in the table of contents.

2. Overall Description

2.1 Product Perspective

SafeTouch will have an Android application as well as a physical device that connects to a smartphone and can be customized to fit the user in the application.

2.1.1. System Interfaces

This system will interface with the Android operating system on the device and a local database instance to store user information.

2.1.2. User Interfaces

The user interface will follow Android Material design standards.

2.1.3. Hardware Interfaces

This system will have a hardware component. It will be small and easily attachable to a keychain. The hardware piece will have a button on the front. It will also have bluetooth capabilities and a small speaker that will emit an alarm during an emergency.

2.1.4. Software Interfaces

On the user's Android smartphone, an operating system of version 4.4 (KitKat) at the oldest is required. The local database will be a MySQL database that stores user information and configuration options.

2.2 Product Functions

2.2.1. Parent Mode

- While in Parent Mode, the application will require a PIN entry to change any settings or disable the button.
- This mode is intended for parents to set up the device for their child's use, to provide the child with a fast and easy way to contact their parents, as well as a way for parents to monitor their children.
- By default, Parent Mode will have periodic GPS tracking enabled, optional check-ins, and have push notifications, the alarm, and custom text messages disabled.

2.2.2. Personal Mode

- In Personal Mode a PIN entry is not required for any settings changes.
- This mode is intended for all variations of personal use, primarily for users traveling in unsafe areas.
- In this mode the user can optionally utilize the device to "escort" them when they feel unsafe, either by specifying a check-in interval for themselves, or by holding the button down until they feel safe again (device would activate upon button release).

- By default, push notifications will be sent to other nearby users when the button is pressed, along with customizable text messages to the user's specified contacts.
- The alarm is enabled by default and requires a PIN entry to shut off, and GPS tracking is only used when the button is pushed.

2.2.3. Medical Mode

- In Medical Mode, a PIN entry is not required for any settings changes.
- This mode is intended primarily for users with known health issues that can be life-threatening.
- The user may set check-in intervals for themselves to meet, where if they miss a check-in the device will activate.
- The user may set custom messages with details on the nature of their medical condition(s), as well as set their PCP or 9-1-1 as emergency contacts.
- In this mode, push notifications and the alarm are disabled by default.

2.3 User Characteristics (Interviews)

2.3.1. Parent Mode

Name: Al Rashid

Age: 34

1. Do you own any personal safety devices (pepper spray, taser, etc)? Please state the kind of device if answered yes.

- No

2. If answered no on question 1, why not?

- I think my cell phone can be used to call 911 if needed

3. If answered yes on question 1, did this device ever make you feel safer in certain situations? If so, what is it about the device that made you feel safer?

- N/A

4. What qualities do you look for in a safety device?

- May be a wearable device that can be used to send signals

5. Would you use an easy to carry device to discreetly contact your friends/family or the police when you are in danger?

- Yes

6. For the device, would you like the option to sound an alarm to deter attackers and alert others of your danger?

- No, it may make the attacker shoot me in panic

7. Would you like this device to be able to connect to your smartphone with an application with options to view/change your emergency contacts?

- Yes

8. For the application, would you like to be alerted when others around you are in danger?

- Yes, maybe

9. For the application, would you like your GPS location to be sent to your emergency contacts so they know where you are when in danger?

- Yes

10. For parents: Would such a device and application make you feel that your child is safer than without or with another safety device?

- Yes

11. Do you have any concerns with the application or device?

- No

12. Any additional comments or suggestions:

- Good Initiative

2.3.2. Personal Mode

Name: Annie Vo

Age: 25

1. Do you own any personal safety devices (pepper spray, taser, etc)?

Please state the kind of device if answered yes.

- Yes, pepper spray, Swiss knife, and a taser

2. If answered no on question 1, why not?

- N/A

3. If answered yes on question 1, did this device ever make you feel safer in certain situations? If so, what is it about the device that made you feel safer?

- Yes (especially when traveling abroad), because I could knock anyone out in a matter of seconds

4. What qualities do you look for in a safety device?

- Something legal that is effective enough to deter attackers

5. Would you use an easy to carry device to discreetly contact your friends/family or the police when you are in danger?

- Yes

6. For the device, would you like the option to sound an alarm to deter attackers and alert others of your danger?

- Yes

7. Would you like this device to be able to connect with your smartphone with an application with options to view/change your emergency contacts?

- Yes

8. For the application, would you like to be alerted when others around you are in danger?

- Yes

9. For the application, would you like your GPS location to be sent to your emergency contacts so they know where you are in danger?

- Yes

10. For parents: Would such a device and application make you feel that your child is safer than without/with another safety device?

- N/A

11. Do you have any concerns with the application or device?

- Violation of my location privacy

12. Any additional comments or suggestions.

- Make the device into a ring or other form of wearable device

2.3.3. Medical Mode

Name: Ann Taylor

Age: 87

1. Do you own any personal safety devices (pepper spray, taser, etc)?

Please state the kind of device if answered yes.

- I've never owned pepper spray. I had a home security system installed when I was living alone in a house.

2. If answered no on question 1, why not?

- I never owned pepper spray because when I was younger the world felt a lot safer. Now I don't have a need for it because I'm never far from my home alone.

3. If answered yes on question 1, did this device ever make you feel safer in certain situations? If so, what is it about the device that made you feel safer?

- Yes, the home security system made me feel safer and I liked that a real person would call and check up on me. I didn't like that I had to pay a subscription for the service.

4. What qualities do you look for in a safety device?

- I want to feel safe and have something that is easy to use because my eyesight is not as good as it used to be.

5. Would you use an easy to carry device to discreetly contact your friends/family or the police when you are in danger?

- Yes

6. For the device, would you like the option to sound an alarm to deter attackers and alert others of your danger?

- Yes

7. Would you like this device to be able to connect with your smartphone with an application with options to view/change your emergency contacts?

- Yes, but I don't want to have to use the app too much.

8. For the application, would you like to be alerted when others around you are in danger?

- No, I can't see my phone too well and don't like too many notifications.

9. For the application, would you like your GPS location to be sent to your emergency contacts so they know where you are in danger?

- Yes, I think Jim [her son] would like that.

10. For parents: Would such a device and application make you feel that your child is safer than without/with another safety device?

- N/A

11. Do you have any concerns with the application or device?

- No

12. Any additional comments or suggestions.

- No

2.4 Constraints

Constraints to the system include the following:

- Bluetooth connectivity must be established with the hardware device.
- The battery on device must not be dead.

- The user must have an Android smartphone capable of running Android 4.4 (KitKat) and above.
- The device must only be paired with one smartphone at a time.
- The smartphone must be charged and functioning.
- The smartphone must have Bluetooth and GPS capabilities that are enabled.
- The smartphone must have cellular or wifi data enabled.
- The smartphone must be within a coverage area provided by the user's data plan.
- All permissions for the app are granted.

2.5 Assumptions and Dependencies

The following assumptions are made about the users of this device:

- The user has the app downloaded and has successfully paired it with the device.
- The user keeps the device within a range of 10 meters of their phone.
- The user has a data plan for their smartphone to be able to receive data coverage.
- The user's emergency contacts have all accepted to be emergency contacts.

3. Specific Requirements

3.1 System Features

3.1.1. Parent Mode

- The system shall allow the user to select GPS tracking.
- The system shall allow the user to set a time interval for the GPS location information.
- The system shall not allow the user to set the time interval to be more than six hours.
- The system shall allow the user to set up a six digits pin code.
- The system shall require the pincode to disable GPS tracking.
- The system shall require the pincode to edit the emergency contact list.
- The system shall allow the parent to require that the button is pressed by the child at predetermined intervals.
- The system shall allow the parent to customize the interval length.
- The system shall notify the child when a check in interval is approaching.
- The system shall notify the parent if the child misses a check in button press via text message.
- The system shall notify the child if the child misses a check in button press via a push notification.

3.1.2. Personal Mode

- The system shall allow the user to set up a 6 digit pin code.
- The system shall allow the user to change the 6 digit pin code anytime.
- The system shall allow the user to select to keep call 9-1-1 turned off.
- The system shall allow to user to set up a text message.
- The system shall not allow the text message to be more than 150 character long.

- The system shall allow the user to edit the text message anytime.

3.1.3. Medical Mode

- The system shall allow the user to activate a mode that will send a notification to the designated emergency contact if the button is not pressed after a certain time period.
- The system shall notify the user if they have not pressed the button within the check in time window.
- The system shall allow the user to set up a custom text message that will be sent to the designated emergency contacts upon the button press.
- The system shall allow the user to edit the text message anytime.

3.1.4. Additional Features

- The system shall allow the user to create a list of emergency contacts.
- The system shall not allow the user to add more than six people to the emergency contact list.
- The system shall allow the user to edit the emergency contact list at any time.
- The system shall allow the user to disable the alarm.
- The system shall allow the user to assign actions to the preset button press configurations.
- The system shall allow the user to select to disable the button.
- The system shall allow the user to activate escort mode, where the user will press and hold the button and if the button is released before disabling escort mode the emergency contacts will be contacted.
- The system shall send a notification to nearby users of the application if another user activates the device.
- The system shall not allow the text message to be more than 150 character long.

3.2 Potential System Features

This is a list of potential additions to the system that we would like to add in the future.

3.2.1. Social Media Integration

- The system will allow the user to connect their social media accounts to allow the app to post to.

3.2.2. Chat Capability

- The system will have the ability to host chat rooms between two users that allow them to send private messages during an emergency.

3.2.3. Fingerprint Scanner

- The system will have a fingerprint scanner that will prevent others from operating the device if it becomes lost or stolen.

3.2.4. Voice Recognition

- The system will have voice recognition to send an emergency alert.

3.3 Non-functional Requirements

3.3.1. Performance Requirements

- **NFR 1.1:** The system shall not take longer than 30 seconds to process that the button was pressed and take the necessary actions (based on the settings and the pattern in which the button was pressed).
- **NFR 1.2:** When bluetooth on the phone is on and the device is set up, the connection should be reliable 98% of the time.

3.3.2. Security Requirements

- **NFR 2.1:** Location data stored on the device shall be encrypted.

3.3.3. Safety Requirements

- **NFR 3.1:** The system shall have guards against accidental calls being made to authorities.