**BKJ Home Alarm and Security System**

Software Requirements Specification

Revision History

|  |  |  |  |
| --- | --- | --- | --- |
| **Date** | **Revision** | **Description** | **Author** |
| 02/21/2020 | 1.0 | Initial Version | Bhumi Patel, Justin Mercado, Kanika Dewan |
| 04/04/2020 |  | Redesigning the Client and News classes for a better implementation | Fatemeh Saremi |
| 04/05/2020 |  | Updating the Dispatch to better represent the final implementation | Andrew Lasack Chappel |
| 4/4/20 20 | 2.0 | Revision on Home\_Alarm module All revisions are marked in RED\* | Chad Ingram |
| 4/8/2020 |  | Updating the monitor class to better represent the final implementation | Andrew Lasack Chappel |
| 4/9/2020 |  | Further changes to the monitor class method | Andrew Lasack Chappel |
|  |  |  |  |
|  |  |  |  |
|  |  |  |  |
|  |  |  |  |
|  |  |  |  |
|  |  |  |  |
|  |  |  |  |
|  |  |  |  |
|  |  |  |  |
|  |  |  |  |
|  |  |  |  |
|  |  |  |  |

**1.** **Purpose 4**

1.1. Scope 4

1.2. Definitions, Acronyms, Abbreviations 4

1.3. References 4

1.4. Overview 4

**2.** **Overall Description 5**

2.1. Product Perspective 5

2.2. Product Architecture 5

2.3. Product Functionality/Features 5

2.4. Constraints 5

2.5. Assumptions and Dependencies 5

**3.** **Specific Requirements 6**

3.1. Functional Requirements 6

3.2. External Interface Requirements 6

3.3. Internal Interface Requirements 7

**4.** **Non-Functional Requirements 8**

4.1. Security and Privacy Requirements 8

4.2. Environmental Requirements 8

4.3. Performance Requirements 8

# Purpose

This document outlines the requirements for the BKJ Home Alarm and Security System

## Scope

This document will catalog the user, system, and hardware requirements for the MPC system. It will not, however, document how these requirements will be implemented.

## Definitions, Acronyms, Abbreviations

**1.2.1 Monitor :** Provides a GUI Interface for users to use our system.

**1.2.2 CO Detector :** Detects dangerous levels of Carbon Monoxide in a room.

**1.2.3 Smoke Alarm :** Detects dangerous levels of smoke in a room.

**1.2.4 Window/Door Sensor :** Detects when a door or window is opened or closed.

**1.2.5 Motion Sensor :** Detects motion in the area it is pointed in.

**1.2.6 911 Dispatch :** 911 Dispatch is a call centre that receives all the urgent calls and then checks which type of urgent situation it is and then directs the call to them.

**1.2.7 Fire Department :** Travels to client homes and extinguishes fires.

**1.2.8 Ambulance Station :** Travels to client homes and takes care of client health.

**1.2.9 Police Station :** Travels to client homes and checks client safety from criminals.

**1.3.0 Crime News :** Crime news is a news generator that updates the users about the incidents happening nearby.

## References

* + 1. Refer to HomeAlarmGUI.png in GitHub
    2. Refer to UML Project Design FINAL.pdf in GitHub

## Overview

Our system is an all in one package of sensors and an automated response program that aims to decrease the time it takes to get assistance from emergency services when in an emergency situation.

# Overall Description

## Product Perspective

## 2.1.1 Our system will include an interface that clients can use to interact with their BKJ Home Alarm and Security System. We will provide software to intelligently accept sensor data to contact the correct emergency responders based on the alarm/detector triggered.

## Product Architecture

## 2.2.1 The BKJ Home Alarm and Security System contains major modules: The Home Alarm and 911-Dispatch which will connect directly to the Monitor to receive and send appropriate text back-forth to the ClientDB class in response to triggers given by alarms/detectors.

2.2.1.1 Home Alarm Module: The Home Alarm module will trigger the detectors in case of emergency and alert our client about the situation. This module connects directly to the Monitor and triggers the sensor based on the information received by Client/User.

2.2.1.2 911-Dispatch Module: The 911-Dispatch module will send external services like alerting police stations, hospitals, and fire departments. These services will be alerted through the home alarm system. This module is connected directly to the Monitor and receives direct information.

## Product Functionality/Features

**2.3.1** The BKJ Home Alarm System is a mobile application and in order to use the system, users/clients need to set a pin password. The following will allow users to either arm/disarm the system according to their choice.

**2.3.2** The heart of the BKJ Home Alarm System is **the Monitor.** The Monitor receives information from all the modules and also acts as an interface interactor between the clients and the system.

2.3.2.1 The Monitor has an interface which allows clients to choose which services they want and keeps client information to make appropriate reports.

2.3.2.2 The Monitor is also responsible for accepting the client’s pin and contacting home alarm to arm the system. It also serves as a mediator between the modules and the services that they provide to the clients by alerting appropriate service.

**2.3.3**

2.3.3.1 Home Alarm: If the Home Alarm module receives the report from the Monitor, it will trigger appropriate sensors i.e, CO, Smoke, Door/Window, and Motion.

2.3.3.1.1 These sensors will check the status of the sensor and get a specific location for the given sensor.

2.3.3.1.2 All the information will then be sent to the Home Alarm and make a report to send to the Monitor. The introduction of pairing up clients and Home Alarm serial/user numbers may be implemented, and another layer of abstraction could be introduced to mitigate, simulate, and filter responses from the home alarm.

2.3.3.1.3 The reports given to the Monitor will be saved in the form of client receipts. Each status will have a report created and logged to the monitor. Bubbling up, the monitor will mitigate correspondence to the dispatch dependent on the received reports.

2.3.3.2 911-Dispatch: If the 911-Dispatch module receives the report from the Monitor or home alarm, requesting on the services i.e. Police Station, Ambulance, or Fire Department. The module then gets ETA from appropriate external services.

2.3.3.2.1 Then with the stimulated ETA generated in each service, they will send it back to the Client via the GUI.

2.3.3.2.2 The Client will have the information and know by what time the service will arrive.

**2.3.4** The system also has a feature of news feed that generates crime news reports by loading nouns and verbs and generating a story. The news feed will keep track of all the reports and serves as a place to keep all the reports for the clients using BKJ Home Alarm System.

## Constraints

* + 1. Since, the BKJ Home Alarm System is a mobile application clients will have to download the app in order to use the features of our system. Moreover, our system is not web-browser based.
    2. The clients of our system have to set-up a pin-password in order to use all the features of the system. The clients will have to request customer service to get in touch with an employee of BKJ Home Alarm system to reset their password. Till then the system will be disarmed by default.
    3. Our system would not be able to be used in rental homes or apartments since the client does not own the property and it would be difficult to transfer ownership of the system to the next renter. Amendment: The model for the home alarm system is now extended to studio apartments, apartments, and single family homes.

## Assumptions and Dependencies

* + 1. In the scope of our project, we will not be using a real news feed database. We will simulate this by randomly selecting a sentence from a predefined list.
    2. In the scope of our we will not be using real sensors/alarms since it will be difficult to debug and test our system in the first prototype. Therefore, we will simulate this by generating a random number between 1-10 and if it equals 5, the detector/alarm will be “triggered”. This will simulate a detector/alarm with a 10% chance of being triggered.
    3. In the scope of our project, we will not be using real police/fire/ambulance department data since it would be difficult to implement a GPS system in the time allotted for the project. Therefore, we will simulate this by generating a random number between 1-120 to simulate estimated time of arrival in minutes from department to client house.

# Specific Requirements

## Functional Requirements

### Common Requirements:

* + - 1. **Monitor Module Requirements**
         1. Users should be able to enter a 4 digit combination password into the monitor interface to validate identity.
         2. Users should be able to enter a 4 digit combination password into the monitor interface and arm or disarm the home alarm module.
         3. Users should be able to see sensor information on the monitor interface when a sensor/alarm is triggered.
         4. Users should be able to see the estimated time of arrival of the emergency responder.
         5. Users should be able to see the status of the home alarm system, which is either armed, disarmed.
         6. Users should be able to view the news on the monitor interface.
         7. The monitor should be able to generate and send emergency reports with data from the Home Alarm Module and send it to the 911 Dispatch module.
         8. Users should be allowed to setup a client profile that includes, name, address, number of household members, number of floors in the house, and one emergency contact name.
      2. **Home Alarm Module Requirements**
         1. Home Alarm System should monitor all sensors or alarm within the house and respond appropriately when a sensor or alarm is triggered. Appropriately:
         2. If smoke alarm is triggered a certain amount of times and without pin validation, then set mode to EMERGENCY. EMERGENCY report to dispatch911 to Fire, and Police.
         3. If Window and Door sensors are triggered when alarm mode is set to ‘Guard’ after a certain amount of time-- without pin validation, then dispatch police. Send EMERGENCY report to dispatch. Set mode to EMERGENCY
         4. If CO2 sensor is triggered over a certain amount of time, then dispatch911 to Police and Ambulance. Send EMERGENCY report to dispatch. Set mode to EMERGENCY.
         5. If smoke alarm is triggered, then send a warning report to be displayed on monitor. Set mode to WARNING.
         6. If C02 sensor is triggered, then send a warning report to be displayed on monitor. Set mode to WARNING.
         7. If WindowDoor sensor is triggered: (meaning something is open) and mode is set to SAFE: If trying to set mode to Guard, all errors in WARNING report must be addressed
         8. Home Alarm System should validate the user’s safety by prompting for a password on the monitor when a sensor or alarm is triggered.
         9. Various detectors and alarms should know where it is located in the house.
         10. Various detectors and alarms should send triggered and not triggered statuses.
         11. CO Detectors, Window Door Sensors, Smoke Alarms, and Motion sensors should be supported.
      3. **911 Dispatch Module Requirements**
         1. The module should be able to convert the report that comes from monitor, or home alarm, into a format for emergency responders.
         2. Report format.[ Mode:TypeOfSensor: Location] for example: EMERGENCY:SMOKEALARM:Kitchen
         3. The module should be able to identify the correct emergency service needed per case.
         4. The module should get the estimated time of arrival for monitor display from the requested emergency responders.

## External Interface Requirements

* + 1. The system must process data from multiple sensors/alarms that are strewn about in a house. The sensors and alarms are dependent on external factors such as human triggers and chemical triggers such as a human opening a door or smoke presence.
    2. The system must process data from multiple external news sources that are constantly generating news stories

## Internal Interface Requirements

* + 1. **Monitor Module** should have a GUI interface that displays the following
       1. Home Alarm Status (armed or disarmed)
       2. Emergency Service en-route (Fire, Police, or Medical)
       3. Emergency Estimated Time of Arrival (1-120 minutes)
       4. Triggered alarm (kind and location)
       5. Prompt and password countdown
       6. News
    2. **Monitor Module** should have a GUI interface that accepts the following inputs
       1. Arm (Home Alarm System)
       2. Disarm (Home Alarm System)

# Non-Functional Requirements

## Security and Privacy Requirements

* + 1. The system will store the data.
    2. Environmental Requirements
    3. System mobile application must be downloaded on a tablet or smartphone.
    4. Sensors must be installed by a professional BKJ Technician to ensure efficient placement of sensors and alarms throughout a client household. Home alarm setup will be simulated in predefined options, option will be for the user to enter a location for a fixed amount of locations.
    5. Third-Party sensors must be pre approved by BKJ to ensure quality and reliability against sensor false positives and malfunctions.
    6. Our BJK system might not work in all geographical locations, so the location should be checked before installing.

## Performance Requirements

* + 1. System must be inspected and maintained by a BKJ technician every 2 years to ensure quality and reliability against system false positives and malfunctions.
    2. System must be tested when first installed to ensure connection between system and 911 local dispatch.