

CEN 5035 Principles of Software Engineering, Fall 2019

Group 5 - The Smart Security System

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1 Revision History

Description	Date	Revision number
Initial proposal submission	9/27/2019	v1

2 Executive Summary

Our group project during the Fall 2019 semester in CEN 5035 Software Engineering will be a Smart Security System. We have found there is a lack of flexibility to set up schedules for a security system which lead us down this path. We are looking to solve this problem by having an easily configurable way to schedule when the alarm should be enabled or disabled. This system will also have the standard features of a typical alarm system.

The Smart Security System breaks away from the competition by it will have the ability to connect up with the owner's digital calendar to automatically create a detection schedule. This system will also have voice controlled activation and when the system has been triggered it can be disarmed using an Alexa or Google home device, a modifiable monitoring schedule, or disarm the alarm system when triggered where the owner is present. To reduce the risk of this failing, the system will also have a backup keypad to enable or disable the detection system in the event that voice was not sufficient.

This security system will include the cutting edge Passive Infrared motion sensing technology to be able to detect any movement in the desired location. To ward off intruders alarm warning system that will announce that a break-in has been detected and the authorities have been notified. For added security, the system will capture images, video and audio to relay back to the system owner and or authorities should a break-in occur. The system will also have the ability to confirm if an event was real or not using SMS text and/or phone call notifications. The owner will have a short time frame to disregard the event or the authorities will be notified.

Finally the system will have a password secured web interface to be able to view and update the monitoring schedule. The web system will provide the user the ability to activate or disarm the alarm and view a live stream of their camera at any given time.

Our target audience will be for anyone who wants to have a security system that has a busy schedule where they might be traveling often. This will help ensure that the alarm system will always be active when the home owner is away.

3 Competitive Analysis

	ADT Pulse	Vivint	Ring Alarm	FrontPoint	SimpliSafe	Smart Security System
24/7 Monitoring	X	X	X	X	X	X
Live Alerts	X	X	X	X	X	X
Motion Detection	X	X	X	X	X	X
Voice Control	0	X	X	X	X	X
Arm/Disarm Remotely	X	X	X	X	X	X
Schedule sync	0	0	0	X	0	X

An advantage that our Smart Security System is that the system will be able to connect up with the owner's digital schedule. There is only one other system that has that capability, FrontPoint. The advantage our system has over FrontPoint, along with the other systems, is the ability to receive these alerts quick enough in order to determine whether the alert was real or not. Our system will be able to notify authorities quickly enough after confirmation.

4 Data Definition

- Enable/arm - Turning the system on to monitor for intruders
- Active - Currently monitoring for intruders
- Disable - The system inactive and not monitoring for motion
- Disarm - The act acknowledging the system of a false alarm
- Notification - sending an alert to the system owner
- System owner - User in control of the system who can enable/disable the system
- Detect - System has found a disturbance
- Monitor - the act of checking the sensors to see if the signals are out of normal range
- Record - capturing video and or pictures

5 Overview of Scenarios and Use Cases

Use Case: Enable Alarm

Brief Description : System owner arms the monitoring service

Basic Flow :

1. System owner chooses to enable monitoring service
2. System asks for code to arm monitoring service
 - System verifies that system owner would like to arm monitoring service
 - Once verified, system arms monitoring service
3. System Owner is notified that monitoring service has been armed on user interface

Alternate Flow :

1. System Owner chooses to enable monitoring service
2. System asks for code to arm monitoring service
 - Code provided is incorrect, system allows for another try
 - Code provided is incorrect, system is locked
3. System Owner must verify identity to unlock system

Use Case: Disable Alarm

Brief Description : System owner disarms monitoring service

Basic Flow :

1. System owner chooses to disable monitoring service
2. System asks for code to disarm monitoring service
 - System verifies that system owner would like to disarm monitoring service
 - Once verified, system disarms monitoring service
3. System Owner is notified that monitoring service has been disarmed on user interface

Alternate Flow :

1. System Owner chooses to disable monitoring service
2. System asks for code to disarm monitoring service
 - Code provided is incorrect, system allows for another try
 - Code provided is incorrect, system is locked
3. System Owner must verify identity to unlock system

Use Case: Disable False Alarm

Brief Description : System owner disarms monitoring service after an incident

Basic Flow :

4. System owner is notified of possible disturbance
5. A video/picture is sent to system owner
 - If disturbance occurs outside of normal range
 - i. System owner can choose to dispatch authorities
 - ii. Or system owner can choose to disable alarm
6. System owner chooses to disable monitoring service
7. System asks for code to disarm monitoring service
 - System verifies that system owner would like to disarm monitoring service
 - Once verified, system disarms monitoring service
8. System Owner is notified that monitoring service has been disarmed on user interface

Alternate Flow :

9. System Owner chooses to disable monitoring service
10. System asks for code to disarm monitoring service
 - Code provided is incorrect, system allows for another try
 - Code provided is incorrect, system is locked, authorities are dispatched
11. System Owner must verify identity to unlock system

Use Case: Notify System Owner

Brief Description : System notifies system owner if monitoring service was triggered

Basic Flow:

1. Monitoring service is triggered
2. Monitoring service takes video/picture of surrounding area
3. Monitoring service sends an SMS to system owner that the service was triggered
4. If disturbance occurred outside of range of camera but within range of motion sensor
 - System owner is given option to dispatch authorities or disable alarm
 - If user chooses to dispatch authorities
 - i. User then has option to contact authorities
 - If user chooses to disarm the alarm
 - i. See **Use Case Disable False Alarm**

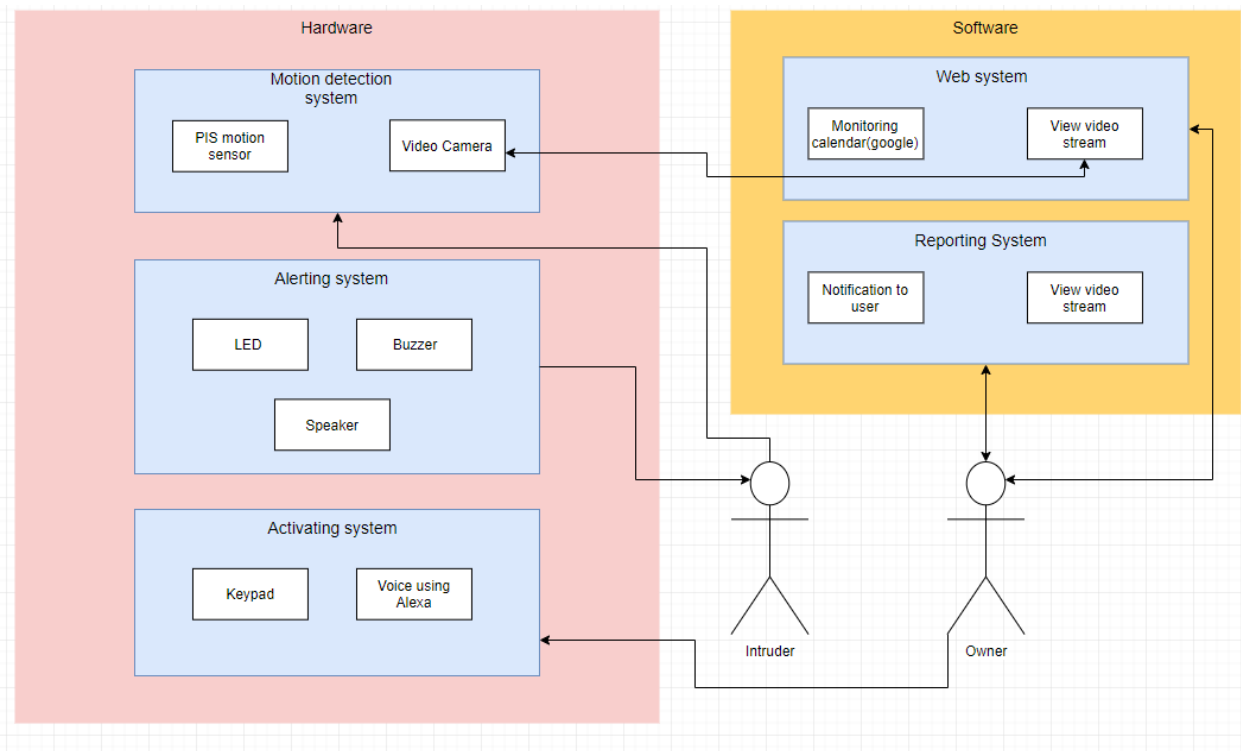
6 Initial list of High-Level functional requirements

1. **Detection System.** The system will monitor user designated areas for any signs of movement when the system has been armed.
2. **Automated Monitoring Calendar.** The system will provide the user with a calendar that can be utilized to schedule times when the system should arm and disarm automatically.
3. **Recording System.** The system will stream video, and audio from an area designated by the user. The system will capture pictures and record audio/video when the system has been armed and triggered.
4. **User Interface.** The system will provide the user an interface for viewing pictures and video recordings. In addition, the interface will provide the user the ability to view and edit the monitoring calendar. Finally, the system will provide the user with the ability to arm and disarm the system.
5. **Alert System.** The system will audibly notify the user and the surrounding area when the system has been armed and triggered.
6. **Reporting System.** The system will send messages to the user when the system has been armed and triggered. Additionally, it will take user feedback in the event the trigger was a false alarm.

7 List of non-functional requirements

1. Users must create an account before being able to access picture, video, audio, and calendar features.
2. The system should report and handle when any and all components are disconnected or unavailable.
3. The system should handle erroneous inputs from the user.
4. The system should be secure and enforce secure password requirements on the user.
5. The system should be easy to learn, taking no more than 15 minutes for new users to start utilizing all of the system's features.
6. The user interface should be capable of being accessed from any device with internet access.
7. The system should be able to recover from a temporary total power loss.
8. The system should restrict read/write/modify access to video/audio streams, pictures, video/audio recording to the owning user.
9. The system should respond to user reporting feedback within 60 seconds.
10. The system shall store 1GB of video recordings and 250MB of pictures.

8 High-Level System Architecture



Link: <https://www.draw.io/#G1RfKGCpj4uxjit77ksxuVJuZhFB1gMUyB>

List components and tools we might use:

- Raspberry Pi
- PIS motion sensor from the sensor kit
- Playstation Eye as the video camera
- Flask to develop web interface
- MotionEyeOS as a monitoring system - <https://github.com/ccrisan/motioneyeos>
- PrivateEyePi as monitoring system - <http://projects.privateeyepi.com/home/home-alarm-system-project>
- Python, HTML, PHP

9 Team

1. Adam Corbin: Product Owner
2. Malia Kency: Individual Contributor
3. Stincy Dumerjean: Individual Contributor
4. Jared Peterson: Scrum Master

10 Check list

For each item below you must answer with only one of the following: DONE, ON TRACK (meaning it will be done on time, and no issues perceived) or ISSUE (you

have some problems, and then define what is the problem with 1-3 lines)

1. Team decided on basic means of communications. DONE - Using Slack
2. Team found a time slot to meet outside of class - On Track - Checking the Slack channel every 24-48h to stay up to date with the team

3. Skills of each team member defined and known to all. DONE - We had introductions on the skill set
4. Team lead ensured that all team members read the final Project 1 and agree/understand it before submission