

Safehome Project

Analysis Model

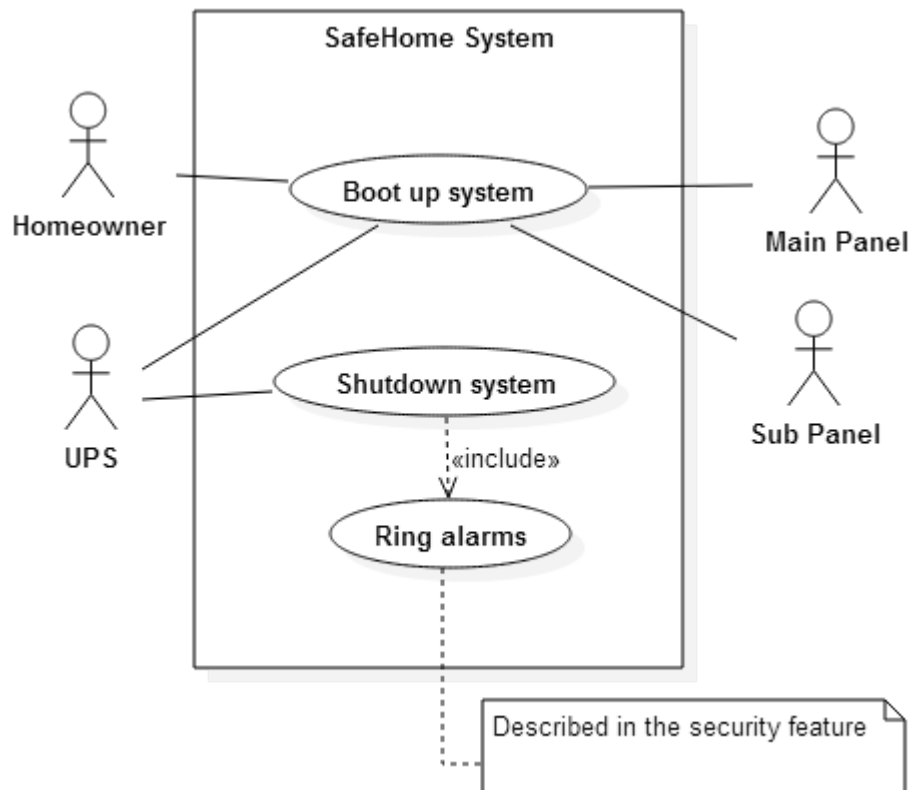
2015.5.6

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<TEAM 6>

KAIST
CS350 Introduction to Software Engineering

1 Bootup Feature

1.1 Use case diagram



Picture 1: Bootup use case diagram

1.2 Use cases

1.2.1 Bootup system

1.2.1.1 Primary actor

Homeowner

1.2.1.2 Goal in context

To start services of the SafeHome system after installation.

1.2.1.3 Preconditions

1. System box must be connected to UPS and receive sufficient power.
2. Sensors, cameras, a main panel, a sub panel and a storage is connected to the system box and working.

1.2.1.4 Trigger

The homeowner finished the system installation and wants to start the SafeHome system.

1.2.1.5 Scenario

1. The homeowner presses "power" button on the system box for 3

seconds.

2. The Safehome system is turned on.
3. The system sets the security mode to “disarm”
4. The system displays the security mode on the main panel and sub panel.

1.2.1.6 Exceptions

1. UPS is not connected or receiving power is not enough – turn off the system.
2. The main panel or the sub panel is not connected – turn off the system.

1.2.1.7 Priority

Very high priority, to be implemented first.

1.2.1.8 Frequency of Use

Very infrequent

1.2.1.9 Channel to actor

Via SafeHome system box

1.2.1.10 Secondary actors

Main panel, Sub panel

1.2.1.11 Related FR

1.2.1.12 Open issues

1. When the system reconfigures sensors and cameras? How to deal with the situation that some sensors or cameras are removed while the system is turned off?

1.2.2 Shutdown system

1.2.2.1 Primary actor

UPS

1.2.2.2 Goal in context

To turn off the SafeHome system safely when UPS power is low.

1.2.2.3 Preconditions

1. System box must be connected to UPS and the UPS has enough battery to execute this use case.
2. The system is started correctly.

1.2.2.4 Trigger

When the UPS has low battery, the SafeHome system is notified to ring an alarm and turn off the system.

1.2.2.5 Scenario

1. The SafeHome system finds out the UPS has low battery through the voltage.
2. The system rings an alarm. (>>>See something<<<)
3. The system saves configurations and shuts down itself.

1.2.2.6 Exceptions

1. UPS is not connected or receiving power is not enough –

1.2.2.7 Priority

High priority, to be implemented with the basic functions.

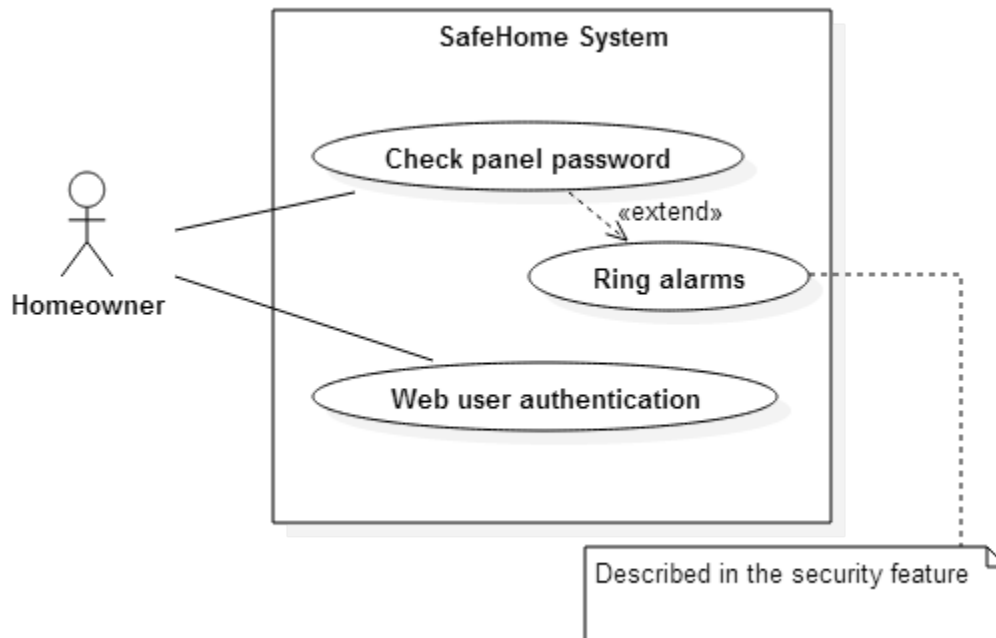
1.2.2.8 Frequency of Use

<Safehome project>

- Very infrequent
- 1.2.2.9 Channel to actor
AC cable
- 1.2.2.10 Secondary actors
None
- 1.2.2.11 Related FR
- 1.2.2.12 Open issues
 - 1. Do we need to check the alarm is correctly working before the shutdown?

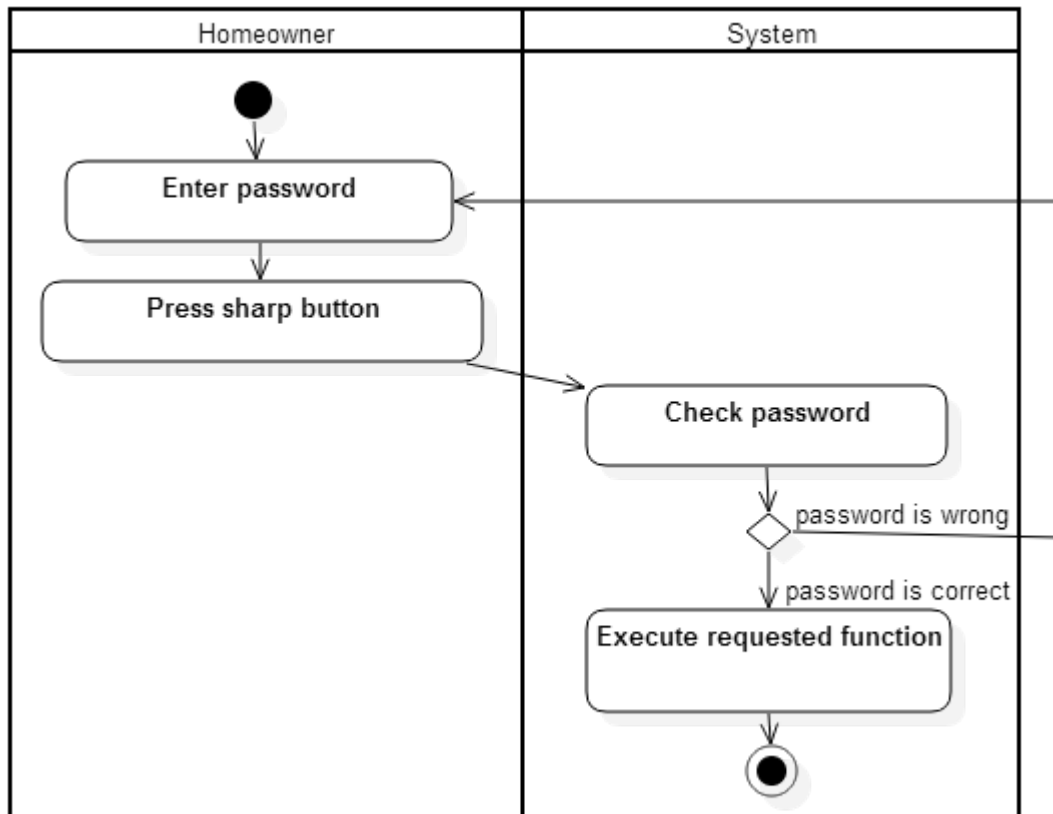
2 Authentication Feature

2.1 Use case diagram



Picture 2: Authentication use case diagram

2.2 Use cases



Picture 3: Check panel password(2.2.1) swimlane diagram

2.2.1 Check panel password

2.2.1.1 Primary actor

Homeowner

2.2.1.2 Goal in context

To prove the homeowner's right to control the system through the main panel or the sub panel.

2.2.1.3 Preconditions

1. System is started correctly.
2. The homeowner requested certain function in the SafeHome system through the main panel or the sub panel.

2.2.1.4 Trigger

The homeowner tries to use certain control function through the main panel or the sub panel.

2.2.1.5 Scenario

1. The homeowner presses the correct panel password through a keypad on the requested panel.
2. The homeowner presses the “#” button
3. The system checks the input password.
4. The system executes a requested function.

2.2.1.6 Exceptions

1. The input password is wrong – make a small beep sound for a

<Safehome project>

notification and ignore requested function.

2. The input password is wrong 5 times sequentially – ring alarms (See xxxx)

2.2.1.7 Priority

High priority, to be implemented with the basic function

2.2.1.8 Frequency of Use

Very frequent

2.2.1.9 Channel to actor

Via the main panel or the sub panel

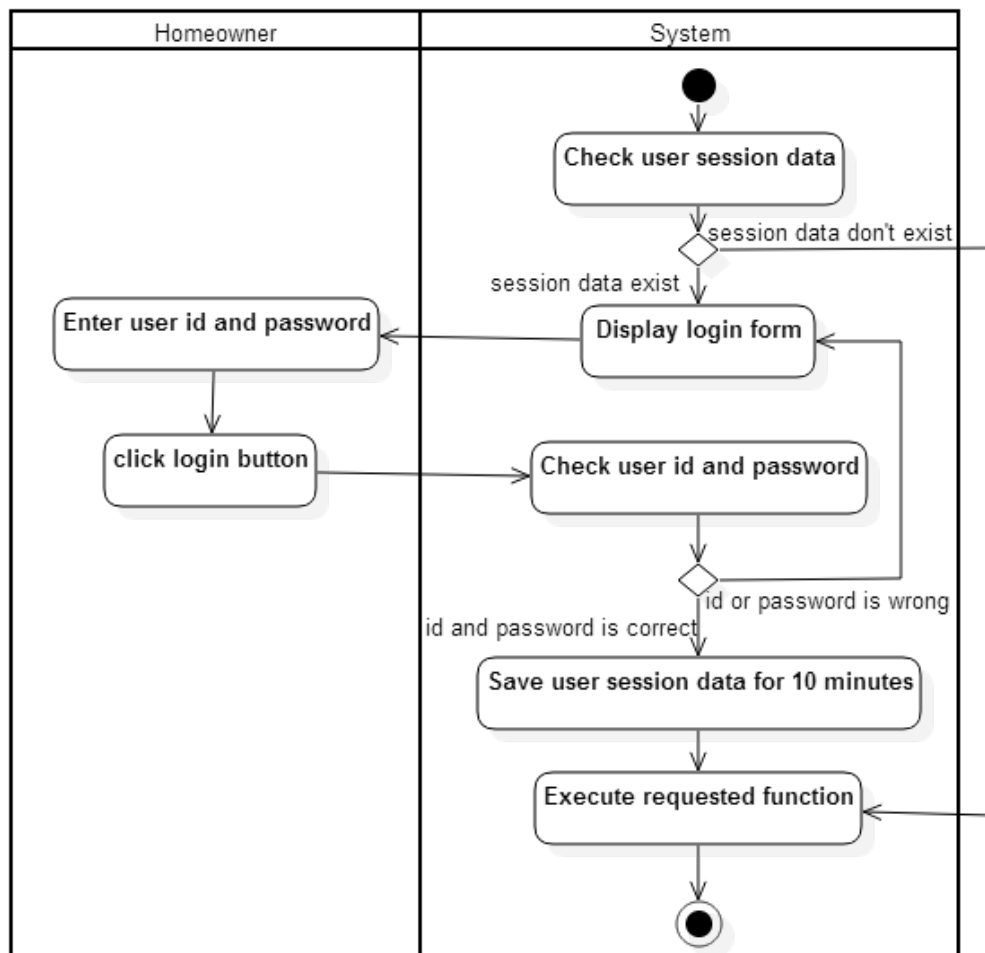
2.2.1.10 Secondary actors

None

2.2.1.11 Related FR

[FR14](#), [FR15](#), [FR16](#), [FR17](#), [FR18](#), [FR20](#), [FR21](#), [FR22](#)

2.2.1.12 Open issues



Picture 4: Web user authentication(2.2.2) swimlane diagram

2.2.2 Web user authentication

2.2.2.1 Primary actor

Homeowner

2.2.2.2 Goal in context

To prove the homeowner's right to access the system through the web browser and the Internet.

2.2.2.3 Preconditions

1. System box must be connected to UPS and the UPS has enough battery to execute this use case.
2. The homeowner requested certain function in the SafeHome system through a web browser.

2.2.2.4 Trigger

The homeowner accessed to the SafeHome web page and tries to use certain function through a web browser.

2.2.2.5 Scenario

1. If the SafeHome web server has a session data for the homeowner, execute requested function and extends session time to 30 minutes.
2. If the SafeHome web server doesn't have a session data for the homeowner, execute a following login sequence.
3. The system displays a login form.
4. The homeowner enters correct user id and password.
5. The homeowner clicks "login" button.
6. The system checks the input id and password.
7. The system saves session data about the homeowner for 30 minutes.
8. The system executes a requested function.

2.2.2.6 Exceptions

1. The input user id or password is wrong – displays an error message and login form again.

2.2.2.7 Priority

High priority, to be implemented with the basic functions.

2.2.2.8 Frequency of Use

Frequent

2.2.2.9 Channel to actor

Via Internet browser and Internet connection

2.2.2.10 Secondary actors

None

2.2.2.11 Related FR

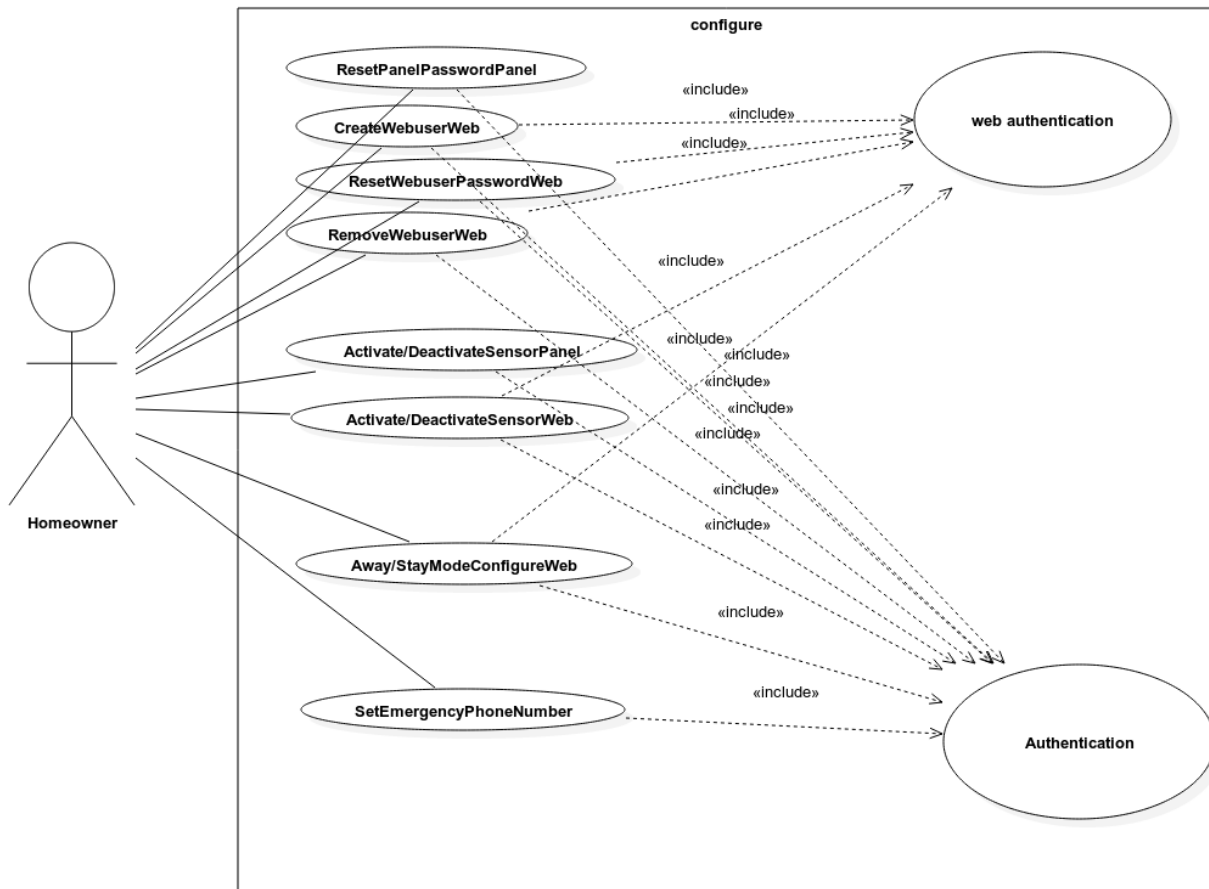
[FR23](#)

2.2.2.12 Open issues

None

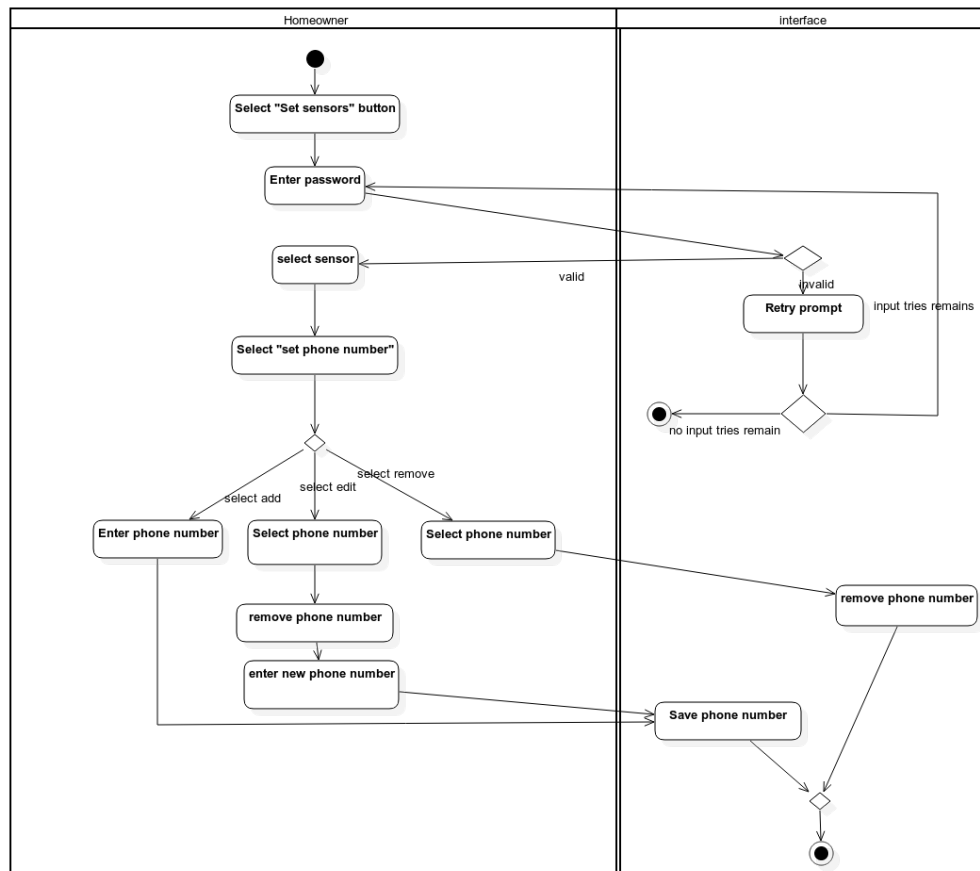
3 Configure Feature

3.1 Use case diagram



Picture 5: Configure use case diagram

3.2 Use cases



Picture 6: Set emergency phone number(3.2.1) swimlane diagram

3.2.1 Set emergency phone number

3.2.1.1 Primary actor

Homeowner

3.2.1.2 Goal in context

Set phone numbers to the sensor which is get message from the system when irregularity are detected by the sensor.

3.2.1.3 Preconditions

System booting and operate well

3.2.1.4 Trigger

Home owner want to change, set, remove phone number to receive the emergency status.

3.2.1.5 Scenario

Homeowner select button which means "set sensors".

System required Authentication.

Homeowner input password to panel.

System display list of sensors with numbering.

Homeowner enter sensor number assigned before step.

System display sensor's status and list which we can set with numbering.

<Safehome project>

Homeowner enter proper number to set phone number.

System show three choices, 1. add, 2. remove, 3. edit.

Homeowner select proper number their want to do.

1 : System required for homeowner to input phone number.

2 :

System display list of phone number to edit with numbering.

Homeowner input assigned numbered to edit.

Homeowner input new phone number.

3 :

System display list of phone number to edit with numbering.

Homeowner input assigned numbered to remove.

System saves changed result.

3.2.1.6 Exceptions

If failed to authentication – refer to authentication use case

If user select invalid number, try again for three times and then failed again go to main

3.2.1.7 Priority

High priority

3.2.1.8 Frequency of Use

rarely used.

3.2.1.9 Channel to actor

Panel

3.2.1.10 Secondary actors

None

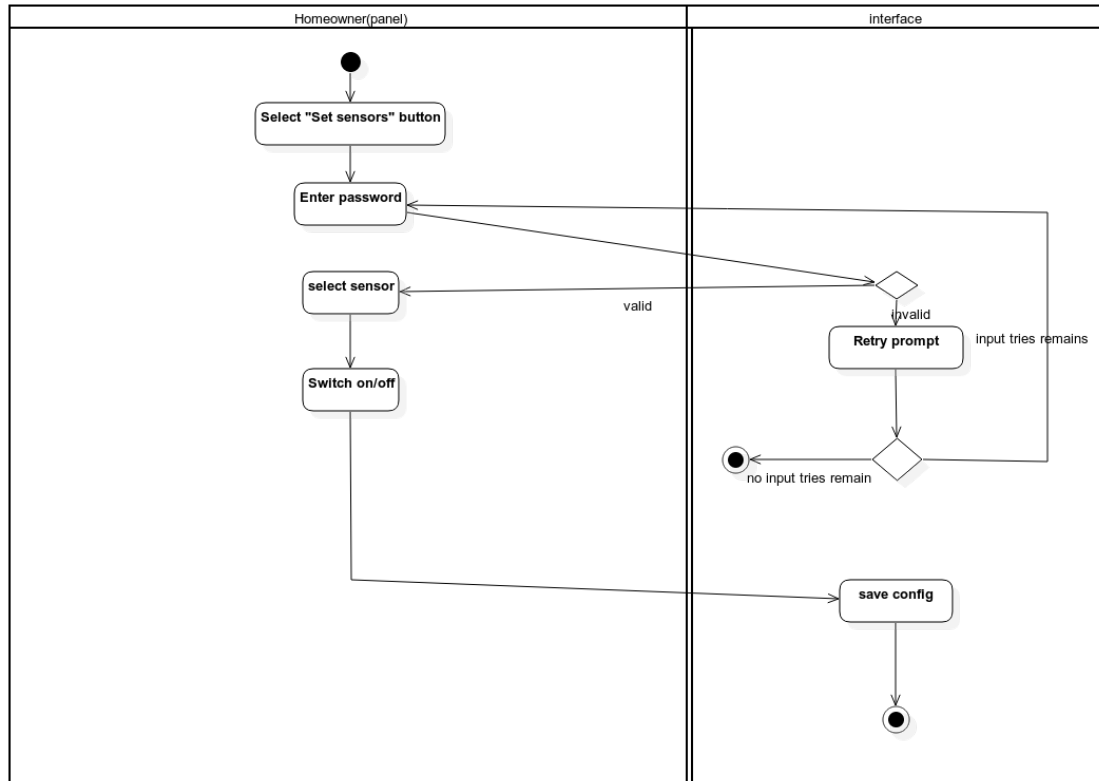
3.2.1.11 Related FR

[FR30](#)

3.2.1.12 Open issues

None

3.2.2 Activate/Deactivate sensor through panel



Picture 7: Activate/Deactivate sensor through panel(3.2.2) swimlane diagram

3.2.2.1 Primary actor

Homeowner

3.2.2.2 Goal in context

Switching on/off the sensor through the panel.

3.2.2.3 Preconditions

System computer booted well and operate without problem.

3.2.2.4 Trigger

Home owner want to enable/disable sensor.

3.2.2.5 Scenario

Homeowner select button which means “set sensors”.

System required Authentication.

Homeowner input password to panel.

System display list of sensors with numbering.

Homeowner enter sensor number assigned before step.

System display sensor's status and list which we can set with numbering.

Homeowner enter proper number to activate/deactivate Sensor.

System display result on the panel.

3.2.2.6 Exceptions

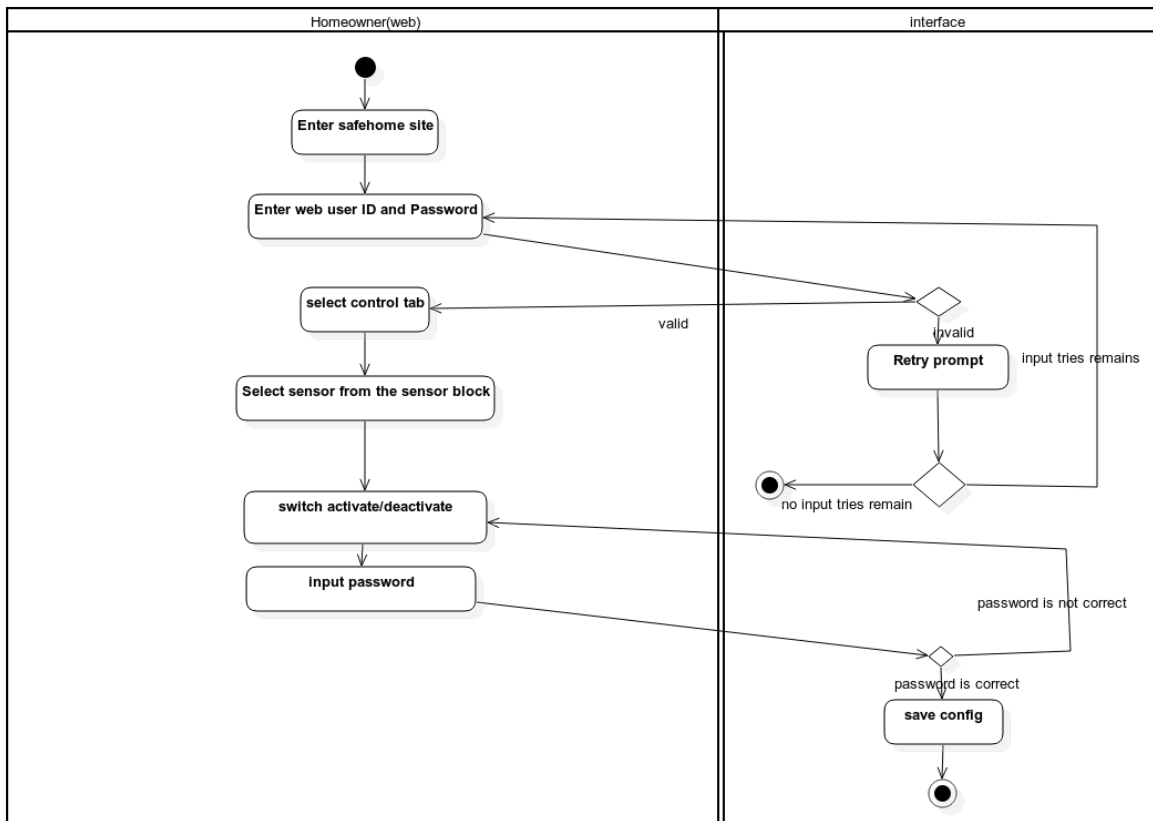
If failed to authentication – refer to authentication use case.

If user select invalid number, try again for three times and then failed again go to main.

<Safehome project>

- 3.2.2.7 Priority
moderate priority.
- 3.2.2.8 Frequency of Use
rarely used
- 3.2.2.9 Channel to actor
panel
- 3.2.2.10 Secondary actors
None
- 3.2.2.11 Related FR

- 3.2.2.12 Open issues
None



Picture 8: Activate/Deactivate sensor through web(3.2.3) swimlane diagram

3.2.3 Activate/Deactivate sensor through web

- 3.2.3.1 Primary actor
Homeowner
- 3.2.3.2 Goal in context
Switching on/off the sensor through the web.
- 3.2.3.3 Preconditions
System must provide webserver.
- 3.2.3.4 Trigger
Home owner want to enable/disable sensor through web.
- 3.2.3.5 Scenario

<Safehome project>

Homeowner enters safehome web site.
Homeowner inputs user ID and password and click login button
System displays website interface.
Homeowner selects control tab.
System displays setting-page.
Homeowner selects the sensor to change status in the set-sensor block.
System gets status of the sensor.
System displays current status of the sensor with input form or switch.
Homeowner switches power element on/off.
System requires password to configure.
System changes status of the sensor.

3.2.3.6 Exceptions

If homeowner inputs wrong id or password – refer to web authentication use case.

If homeowner inputs wrong password to configure – refer to authentication.

3.2.3.7 Priority

Moderate priority.

3.2.3.8 Frequency of Use

Rarely.

3.2.3.9 Channel to actor

Web interface

3.2.3.10 Secondary actors

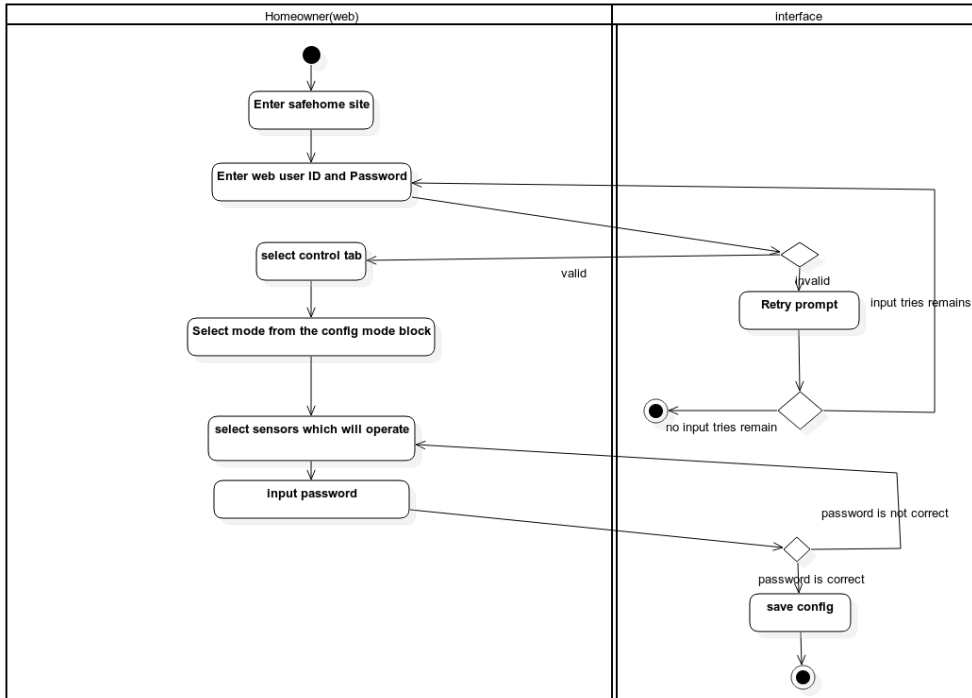
None

3.2.3.11 Related FR

[FR27](#), [FR29](#)

3.2.3.12 Open issues

None



Picture 9: Away/Stay mode configure through web(3.2.4) swimlane diagram

3.2.4 Away/Stay mode configure through web

3.2.4.1 Primary actor

Homeowner

3.2.4.2 Goal in context

Select sensors to operate when away/stay mode.

3.2.4.3 Preconditions

System must provide webserver.

3.2.4.4 Trigger

Homeowner wants to make sensors exclude/include in away/stay mode.

3.2.4.5 Scenario

Homeowner enters safehome web site.

Homeowner inputs user ID and password and click login button.

System displays website interface.

Homeowner selects control tab.

System displays setting-page.

Homeowner selects away/stay mode from “config mode” block.

System display current settings for away/stay mode and input box or switch with current values.

Homeowner changes settings.

System requires password to apply.

System changes settings for away/stay mode.

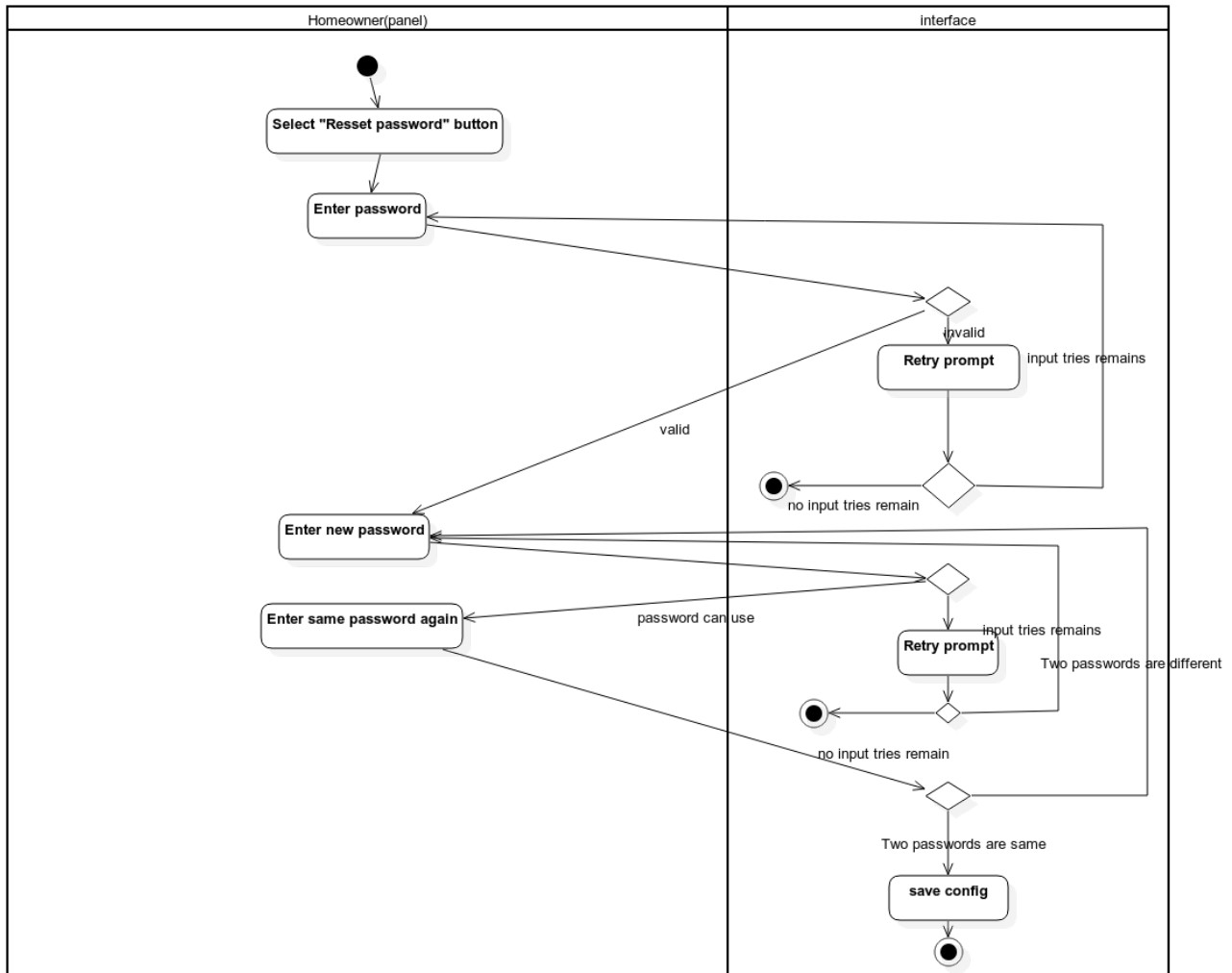
3.2.4.6 Exceptions

If homeowner inputs wrong id or password – refer to web authentication use case.

<Safehome project>

If homeowner inputs wrong password to configure – refer to authentication.

- 3.2.4.7 Priority
Moderate priority.
- 3.2.4.8 Frequency of Use
Rarely.
- 3.2.4.9 Channel to actor
Web interface
- 3.2.4.10 Secondary actors
None
- 3.2.4.11 Related FR
FR30
- 3.2.4.12 Open issues
None



Picture 10: Reset panel password(3.2.5) Swimlane diagram

3.2.5 **Reset panel password**

3.2.5.1 Primary actor

Homeowner

3.2.5.2 Goal in context

To change password with new password for safety.

3.2.5.3 Preconditions

System boot well and operate without error.

3.2.5.4 Trigger

Homeowner thinks he/she need to change the password of the panel.

3.2.5.5 Scenario

Homeowner pushes reset password button.

Homeowner inputs password.

System displays message “input new password” to panel

Homeowner inputs new password twice.

System displays done message and return to main.

3.2.5.6 Exceptions

If password is not correct – see authentication use case

Two new passwords input are not same – system displays fail message and go to the main.

3.2.5.7 Priority

Moderate priority.

3.2.5.8 Frequency of Use

Rarely.

3.2.5.9 Channel to actor

Panel

3.2.5.10 Secondary actors

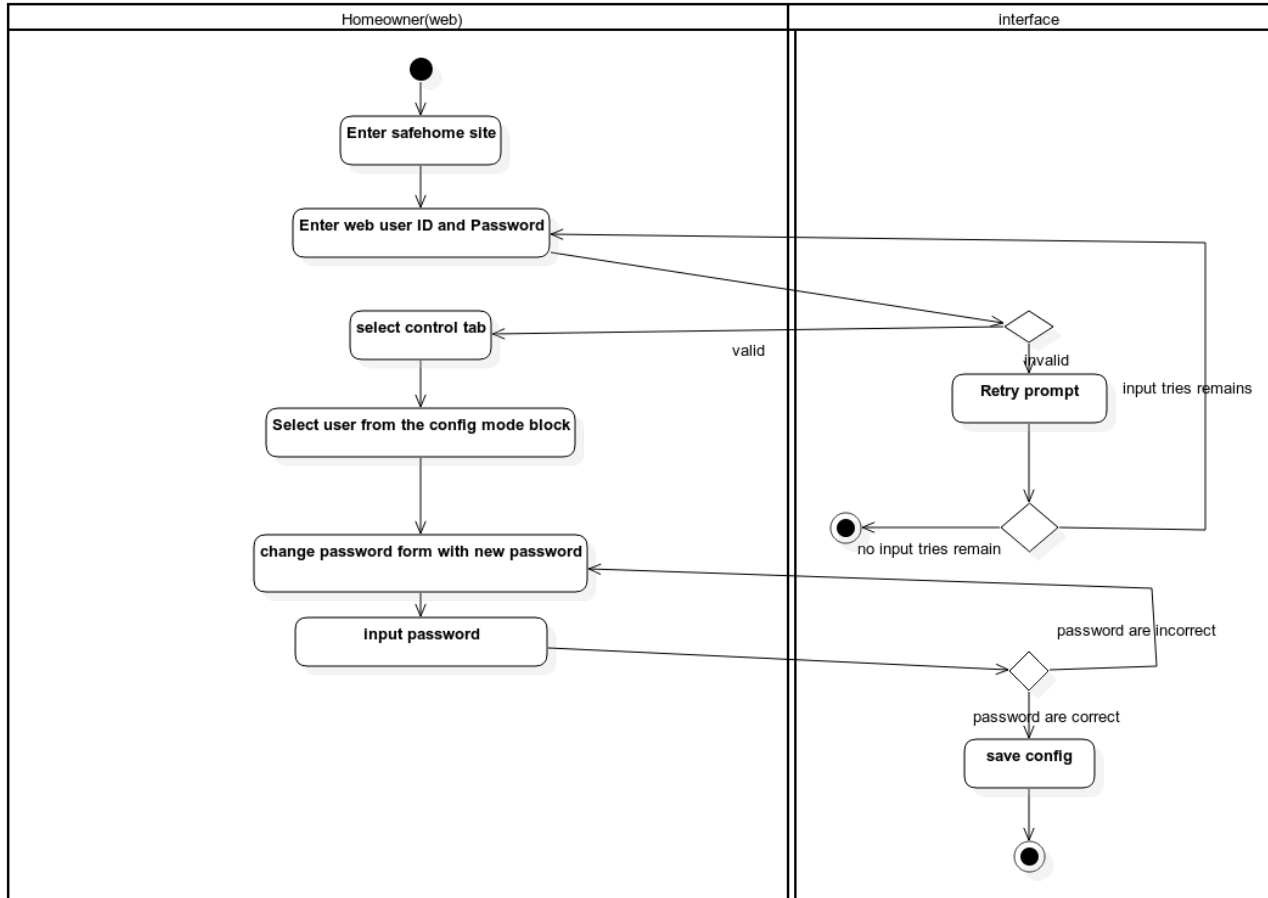
None

3.2.5.11 Related FR

[FR14](#)

3.2.5.12 Open issues

None



Picture 11: Reset web user password(3.2.6) swimlane diagram

3.2.6 Reset web user password

3.2.6.1 Primary actor

Homeowner

3.2.6.2 Goal in context

To change web user's password with new password for safety.

3.2.6.3 Preconditions

System must provide web server.

3.2.6.4 Trigger

Homeowner thinks he/she need to change the web user 's password.

3.2.6.5 Scenario

Homeowner enters their safehome website.

Homeowner inputs their web user's ID and Password and clicks login.

System displays website interface.

Homeowner selects control tab.

System shows setting-page.

Homeowner change user's password from users block having input boxes which contain user ID and password with "*" .

System checks password validity.

<Safehome project>

If homeowner want to change other users password
System require authentication to configure.
Else want to change current user.
Require current user password
System saves changed password.

3.2.6.6 Exceptions

If homeowner inputs wrong id or password – refer to web authentication use case.

If homeowner inputs wrong password to configure – refer to authentication.

3.2.6.7 Priority

Moderate priority.

3.2.6.8 Frequency of Use

Rarely.

3.2.6.9 Channel to actor

Web interface

3.2.6.10 Secondary actors

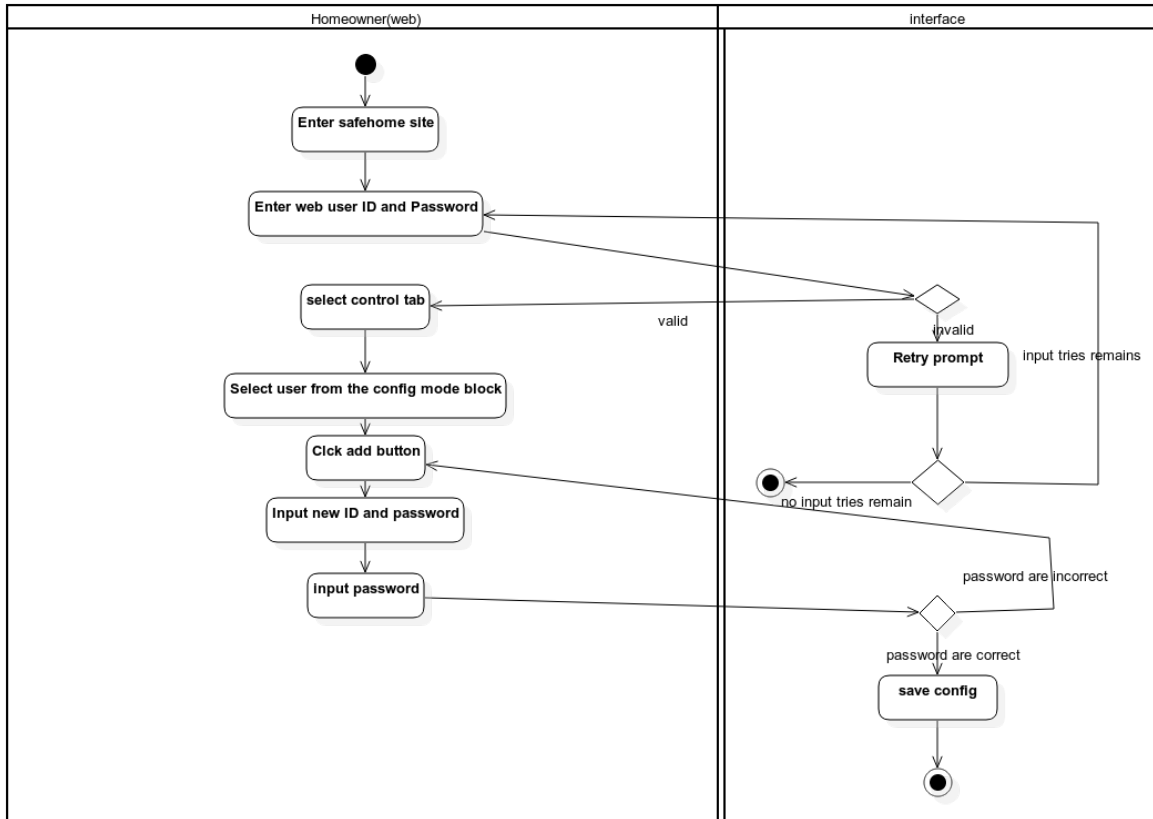
None

3.2.6.11 Related FR

[FR24](#), [FR25](#)

3.2.6.12 Open issues

None



Picture 12: Create web user(3.2.7) swimlane diagram

3.2.7 Create web user

3.2.7.1 Primary actor

Homeowner

3.2.7.2 Goal in context

To make new ID for accessing to the web interface.

3.2.7.3 Preconditions

System must provide web server.

3.2.7.4 Trigger

Homeowner thinks he/she need to make new web user.

3.2.7.5 Scenario

Homeowner enters their safehome website.

Homeowner inputs their web user ID and password and clicks log in.

System displays website interface.

Homeowner selects control tab.

System shows setting-page.

Homeowner click add button from user block.

System creates new row with two blank form labeled "id" and "password" and one button to save.

Homeowner inputs new id and new password in each form and click save.

System checks user id and password validity.

System requires password to configure.

<Safehome project>

System creates user.

3.2.7.6 Exceptions

If homeowner inputs wrong id or password – refer to web authentication use case.

If homeowner inputs wrong password to configure – refer to authentication.

3.2.7.7 Priority

Moderate priority.

3.2.7.8 Frequency of Use

Rarely.

3.2.7.9 Channel to actor

Web interface

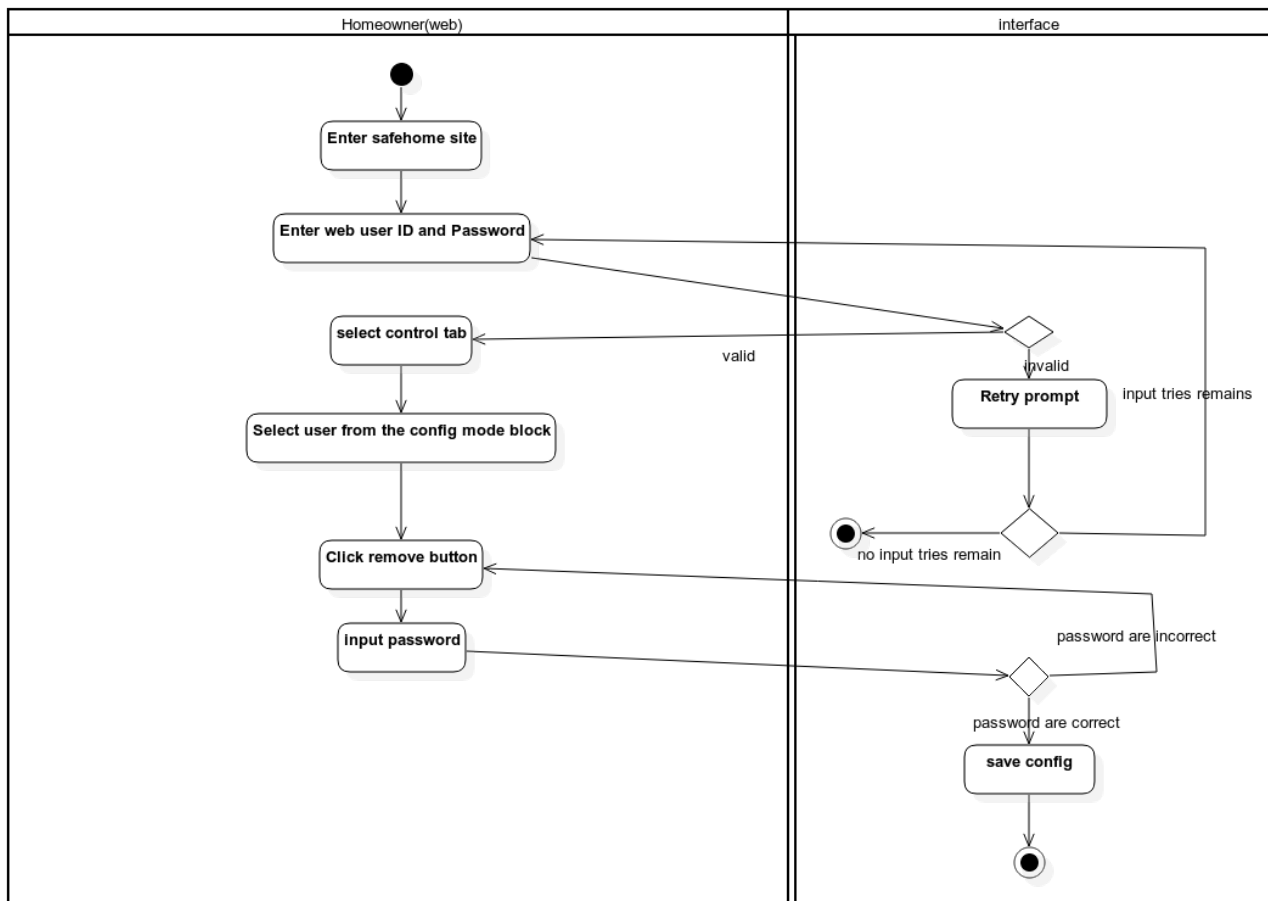
3.2.7.10 Secondary actors

None

3.2.7.11 Open issues

3.2.7.12 Open issues

None



Picture 13: Remove web user(3.2.8) swimlane diagram

3.2.8 Remove web user

3.2.8.1 Primary actor

Homeowner

3.2.8.2 Goal in context

To delete web user for denying access.

3.2.8.3 Preconditions

System must provide webserver.

3.2.8.4 Trigger

Homeowner think he/she think that the web user doesn't need any more.

3.2.8.5 Scenario

Homeowner enters their safehome website.

Homeowner input their web user ID and Password and click Login.

System displays website interface.

Homeowner selects control tab.

System shows setting page.

Homeowner selects a user row to delete from user block.

System displays delete button on the user row.

Homeowner clicks delete button

System require password to configure.

System remove that user from database.

3.2.8.6 Exceptions

If homeowner inputs wrong id or password – refer to web authentication use case.

If homeowner inputs wrong password to configure – refer to authentication.

3.2.8.7 Priority

Moderate priority.

3.2.8.8 Frequency of Use

Rarely.

3.2.8.9 Channel to actor

Web interface

3.2.8.10 Secondary actors

None

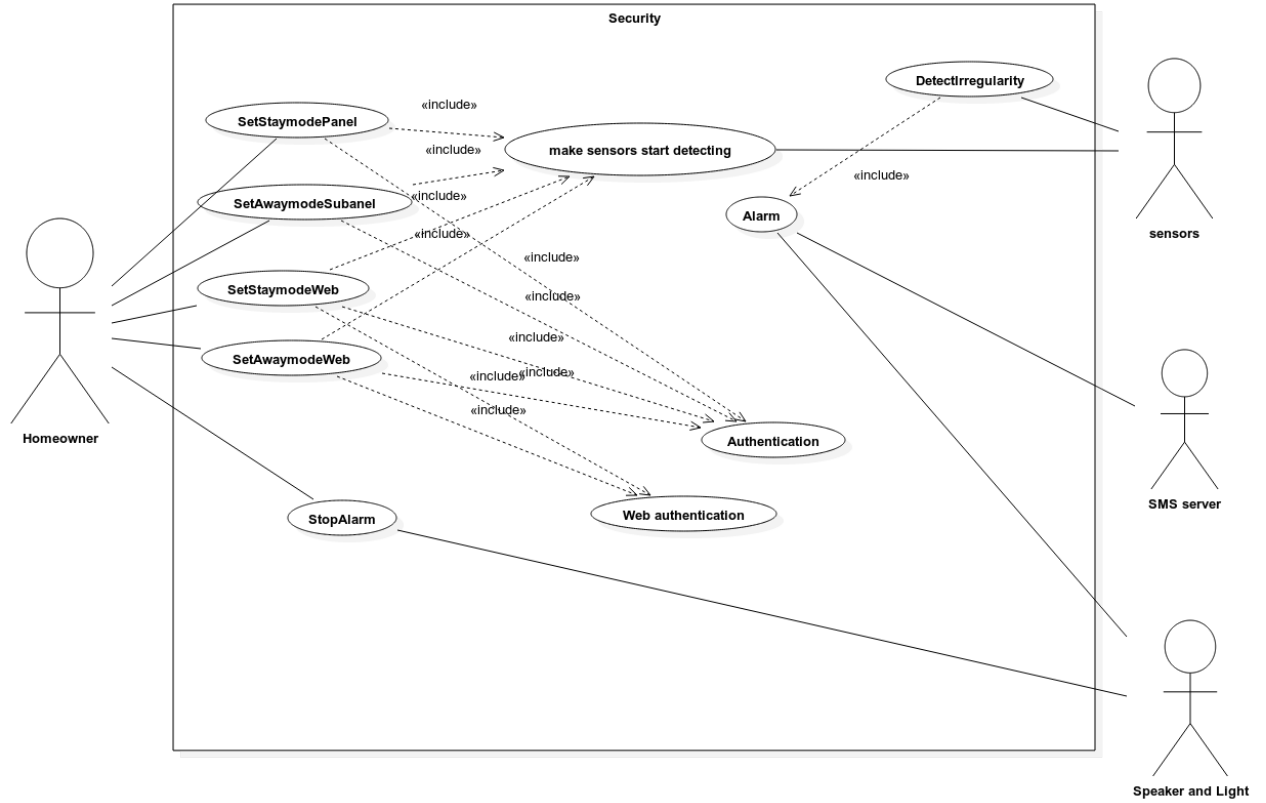
3.2.8.11 Related FR

3.2.8.12 Open issues

None

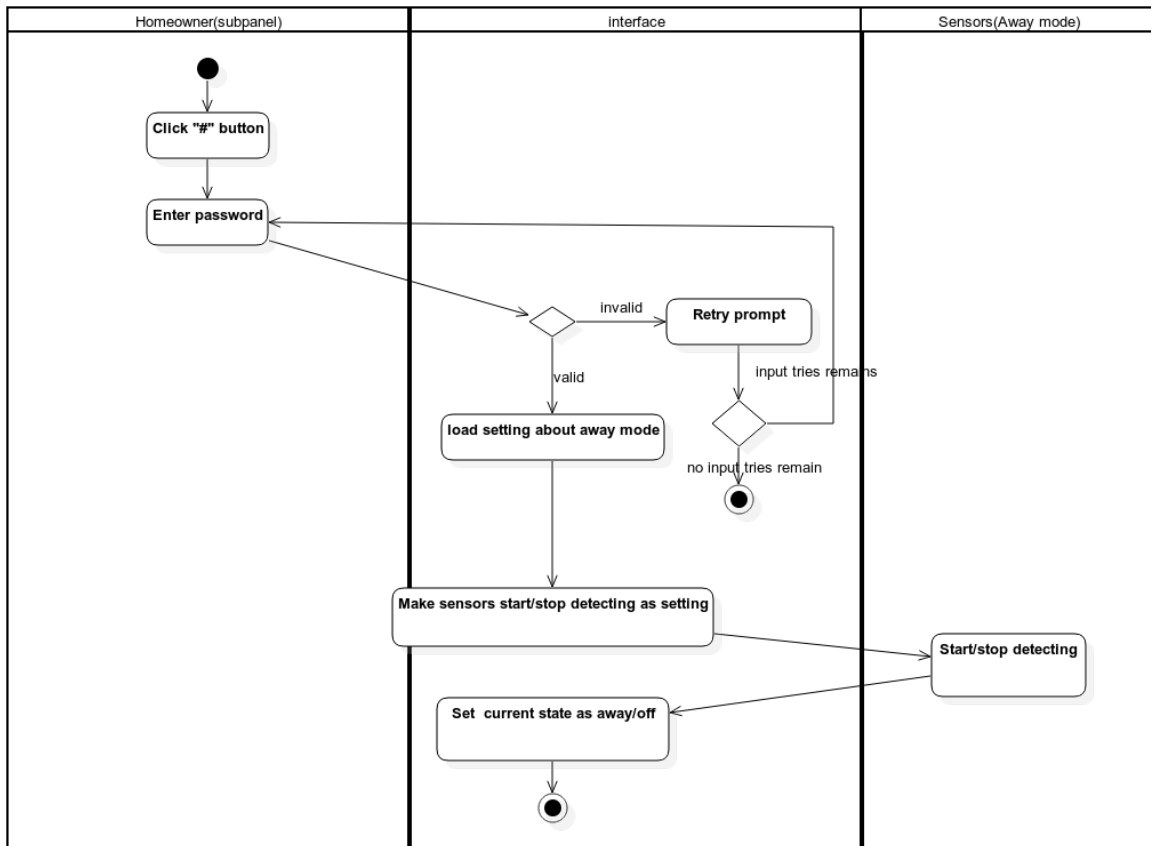
4 Security Feature

4.1 Use case diagram



Picture 14: Security use case diagram

4.2 Use cases



Picture 15: set(unset) away mode(4.2.1) swimlane diagram

4.2.1 Set(Unset) away mode

4.2.1.1 Primary actor

Homeowner

4.2.1.2 Goal in context

To operating away mode through sub-panel.

4.2.1.3 Preconditions

System must be booted well and operate without error.

4.2.1.4 Trigger

Homeowner wants to set "Away mode" Because Homeowner need to go out.

4.2.1.5 Scenario

Homeowner pushes "#" from sub panel.

Homeowner inputs password and push "#" again.

System loads settings for away mode from database.

System enables/disables sensors following the settings.

4.2.1.6 Exceptions

Password is not correct – see use-case "authenticate"

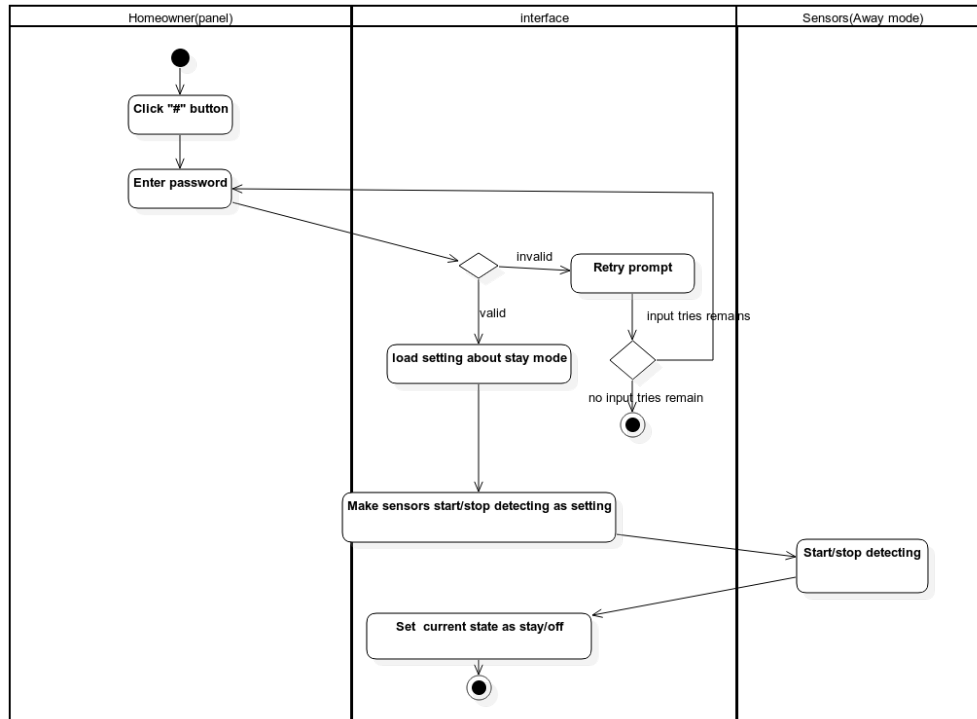
4.2.1.7 Priority

High priority.

4.2.1.8 Frequency of Use

<Safehome project>

- Very frequently
- 4.2.1.9 Channel to actor
- Sub panel interface
- 4.2.1.10 Secondary actors
- Sensors.
- 4.2.1.11 Related FR
- [FR19](#), [FR20](#), [FR21](#)
- 4.2.1.12 Open issues
- None



Picture 16: Set(unset) stay mode(4.2.2) swimlane diagram

4.2.2 Set(Unset) stay mode

- 4.2.2.1 Primary actor
- Homeowner
- 4.2.2.2 Goal in context
- To operating stay mode through panel.
- 4.2.2.3 Preconditions
- System must be booted well and operate without error.
- 4.2.2.4 Trigger
- Homeowner wants to set "Stay mode".
- 4.2.2.5 Scenario
- Homeowner pushes "#" from panel.
- Homeowner inputs password and push "#" again.
- System loads settings for stay mode from database.
- System enables/disables sensors following the settings.

<Safehome project>

4.2.2.6 Exceptions

Password is not correct – see use-case “authenticate”

4.2.2.7 Priority

High priority.

4.2.2.8 Frequency of Use

Very frequently

4.2.2.9 Channel to actor

Panel interface

4.2.2.10 Secondary actors

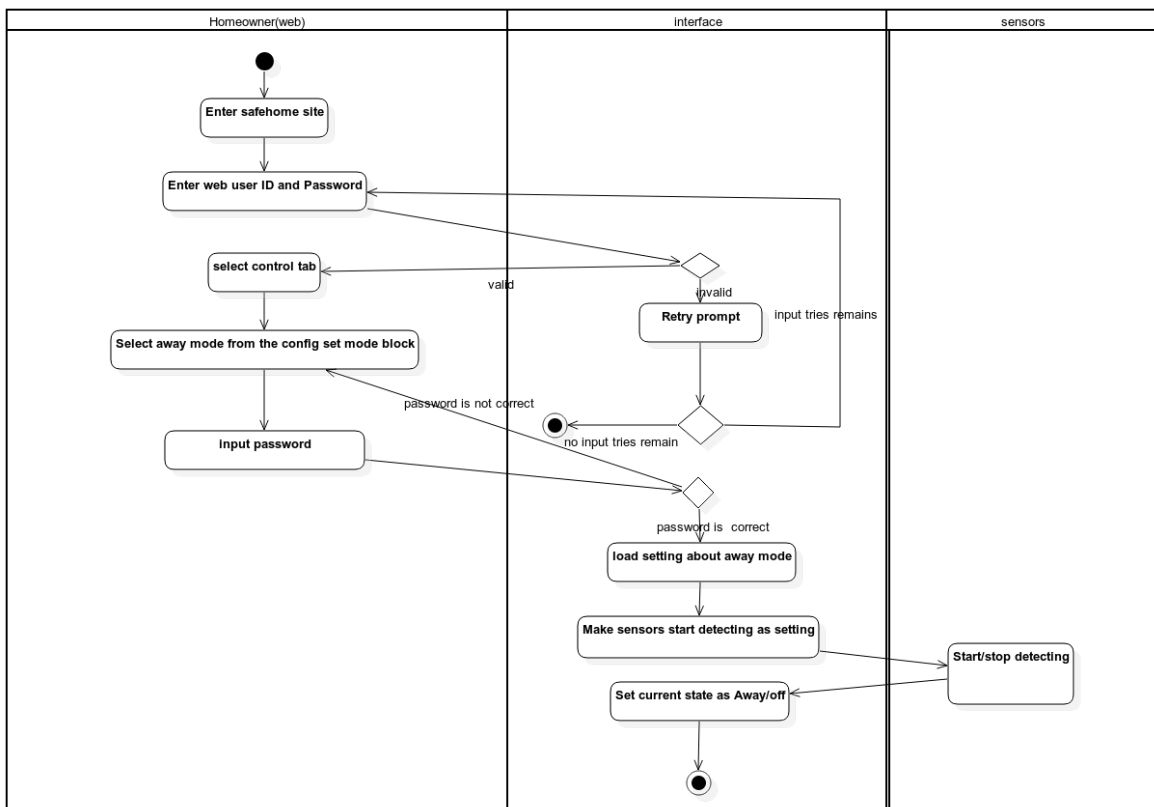
Sensors.

4.2.2.11 Related FR

[FR11](#), [FR15](#), [FR16](#)

4.2.2.12 Open issues

None



Picture 17: Set(unset) away mode through web(4.2.3) swimlane diagram

4.2.3 Set(Unset) away mode through web

4.2.3.1 Primary actor

Homeowner

4.2.3.2 Goal in context

To operating away mode through web.

4.2.3.3 Preconditions

System must be booted well and operate without error.

<Safehome project>

System must provide web server.

4.2.3.4 Trigger

Homeowner wants to set “away mode” with web interface.

4.2.3.5 Scenario

Homeowner enters their safehome website.

Homeowner inputs their web user ID and password and clicks login.

System displays website interface.

Homeowner selects control tab.

System shows setting-page.

Homeowner chooses “away mode” from set mode block.

System loads setting for away mode.

System enables sensors following the settings/disable sensors.

4.2.3.6 Exceptions

If homeowner inputs wrong id or password – refer to web authentication use case.

If homeowner inputs wrong password to configure – refer to authentication.

4.2.3.7 Priority

High priority.

4.2.3.8 Frequency of Use

Very frequently

4.2.3.9 Channel to actor

Web interface

4.2.3.10 Secondary actors

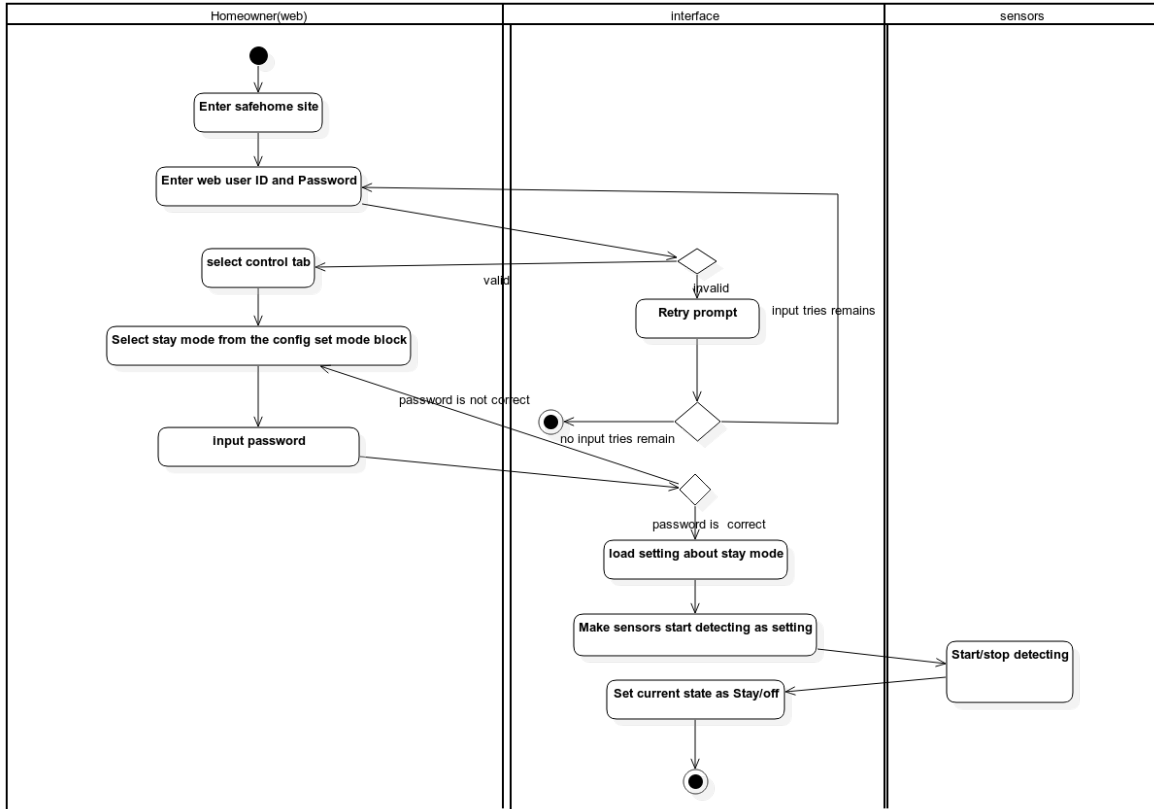
Sensors.

4.2.3.11 Related FR

[FR31](#)

4.2.3.12 Open issues

None



Picture 18: Set(unset) stay mode through web(4.2.4) swimlane diagram

4.2.4 Set(Unset) stay mode through web

4.2.4.1 Primary actor

Homeowner

4.2.4.2 Goal in context

To operating stay mode through web.

4.2.4.3 Preconditions

System must be booted well and operate without error.
System must provide web server.

4.2.4.4 Trigger

Homeowner wants to set "Stay mode" with web interface.

4.2.4.5 Scenario

Homeowner enters their safehome website.
Homeowner inputs their web user ID and password and clicks login.
System displays website interface.
Homeowner selects control tab.
System shows setting-page.
Homeowner chooses "Stay mode" from set mode block.
System loads setting for Stay mode.
System enables sensors following the settings/disable sensors.

4.2.4.6 Exceptions

If homeowner inputs wrong id or password – refer to web authentication use case.

<Safehome project>

If homeowner inputs wrong password to configure – refer to authentication.

4.2.4.7 Priority

High priority.

4.2.4.8 Frequency of Use

Very frequently

4.2.4.9 Channel to actor

Web interface

4.2.4.10 Secondary actors

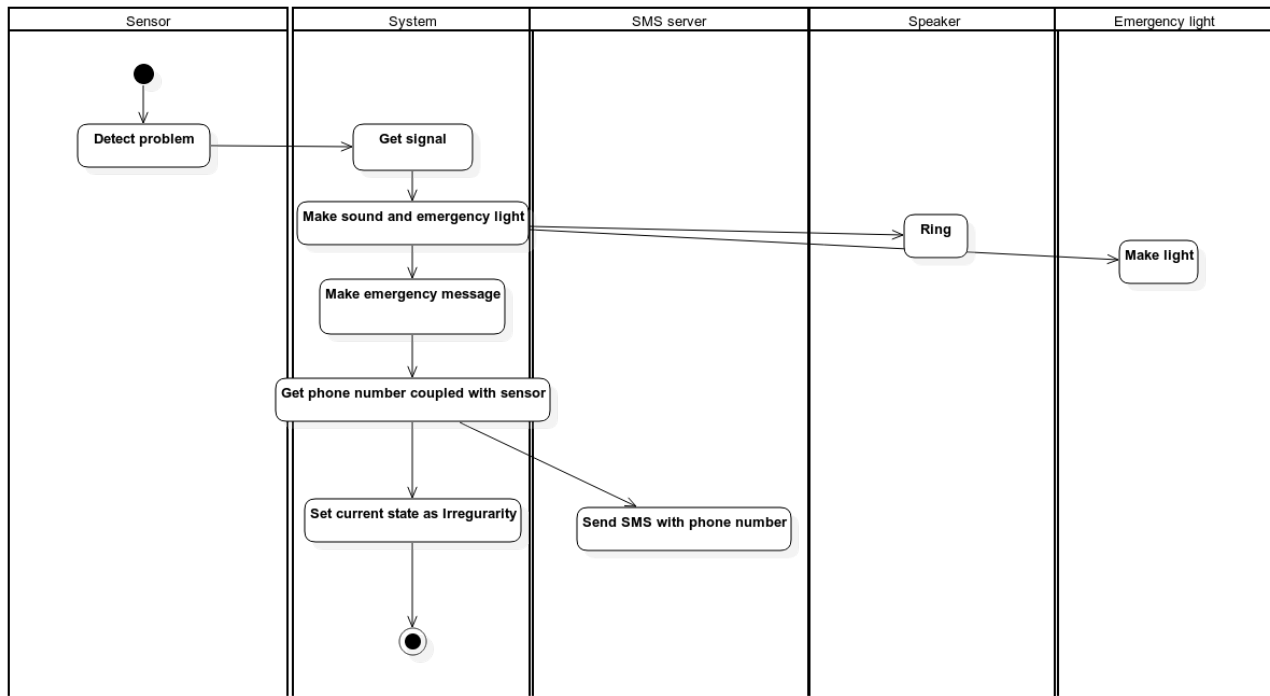
Sensors.

4.2.4.11 Related FR

[FR31](#)

4.2.4.12 Open issues

None



Picture 19: Detect irregularity(4.2.5) swimlane diagram

4.2.5 Detect irregularity

4.2.5.1 Primary actor

Sensors

4.2.5.2 Goal in context

if sensors detect some problem, system make noise and send SMS to the phone.

4.2.5.3 Preconditions

System must be booted well and operate without error.

4.2.5.4 Trigger

Sensors detect some problem.

<Safehome project>

4.2.5.5 Scenario

The sensor which is activated and run detecting detects some problem.
The sensor gives signal through network. Systems does Alarm use case.

4.2.5.6 Exceptions

If SMS server is prepared, cannot send SMS.

4.2.5.7 Priority

High priority.

4.2.5.8 Frequency of Use

Rarely (we hope)

4.2.5.9 Channel to actor

Wireless connection

4.2.5.10 Secondary actors

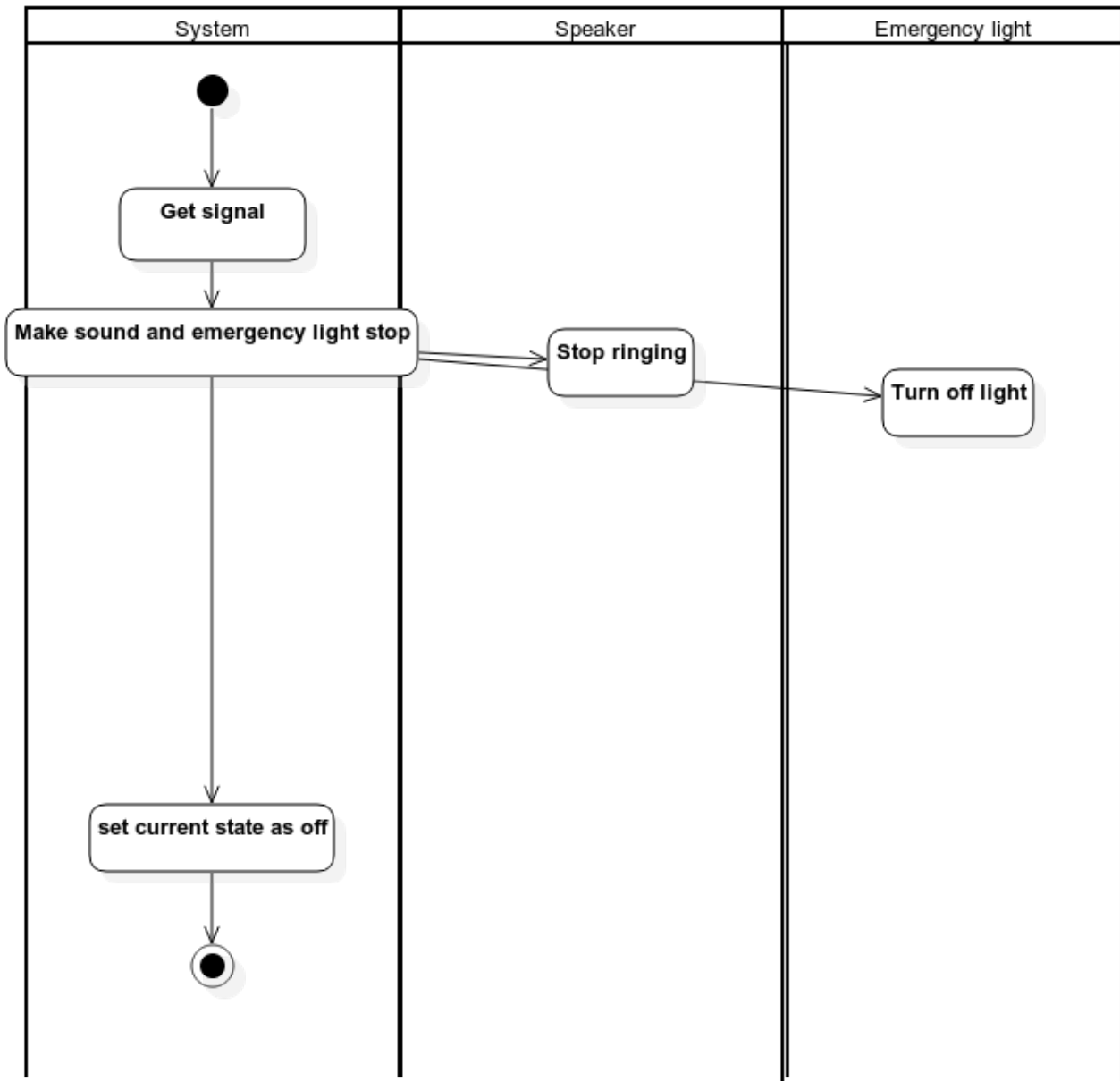
SMS server

4.2.5.11 Related FR

[FR1](#), [FR2](#), [FR3](#), [FR4](#), [FR8](#)

4.2.5.12 Open issues

None



Picture 20: Alarm(4.2.6) swimlane diagram

4.2.6 Alarm

4.2.6.1 Primary actor

SMS server(system)

4.2.6.2 Goal in context

To make noise and sends SMS to proper phone number through SMS system.

4.2.6.3 Preconditions

Signal is arrived from the sensor.

4.2.6.4 Trigger

Sensors make signal.

4.2.6.5 Scenario

System makes speaker ringing for a minute.

System makes emergency light emit light.

System finds phone number from database with sensor code which make signal.

System sends SMS containing with alert message contains status of system through SMS system .

System displays status on the panel.

System maintains irregularity.

4.2.6.6 Exceptions

If SMS server is prepared, cannot send SMS.

4.2.6.7 Priority

High priority.

4.2.6.8 Frequency of Use

Rarely(we hope)

4.2.6.9 Channel to actor

Internet

4.2.6.10 Secondary actors

Speakers and Emergency light

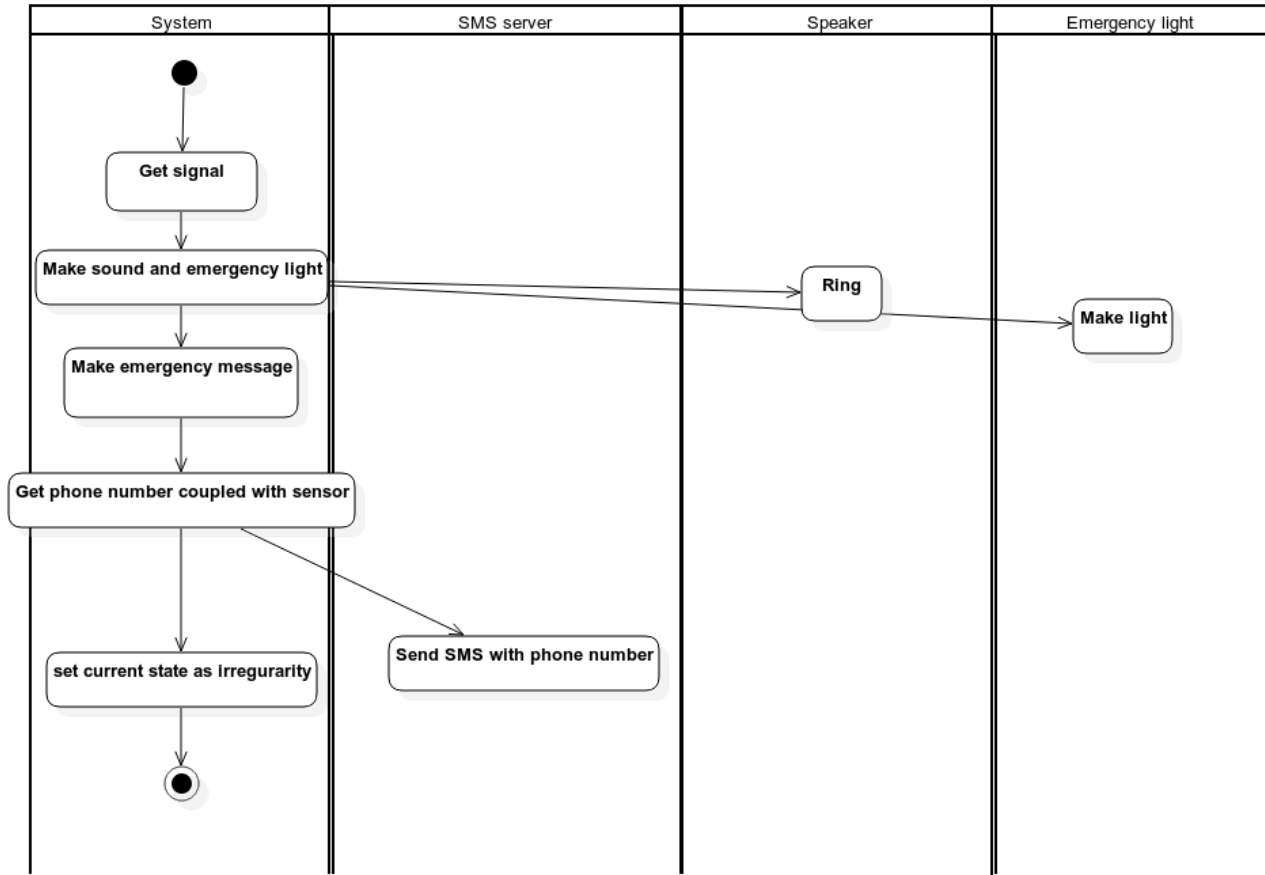
4.2.6.11 Open issues

[FR7](#), [FR10](#), [FR37](#), [FR38](#)

4.2.6.12 Open issues

None

<Safehome project>



Picture 21: Stop alarm(4.2.7) swimlane diagram

4.2.7 Stop alarm

4.2.7.1 Primary actor

Homeowner

4.2.7.2 Goal in context

To stop alarm

4.2.7.3 Preconditions

Alarm executed

4.2.7.4 Trigger

If sensors malfunction or homeowner judges that alarm status no more needs, homeowner can turn off the alarm.

4.2.7.5 Scenario

Homeowner pushes “#” from panel or sub panel.

Homeowner inputs password panel or sub panel and inputs “#”.

System makes speaker stop ringing.

System sets to regular status.

4.2.7.6 Exceptions

If password is not correct – refer to authenticate use case

4.2.7.7 Priority

High priority.

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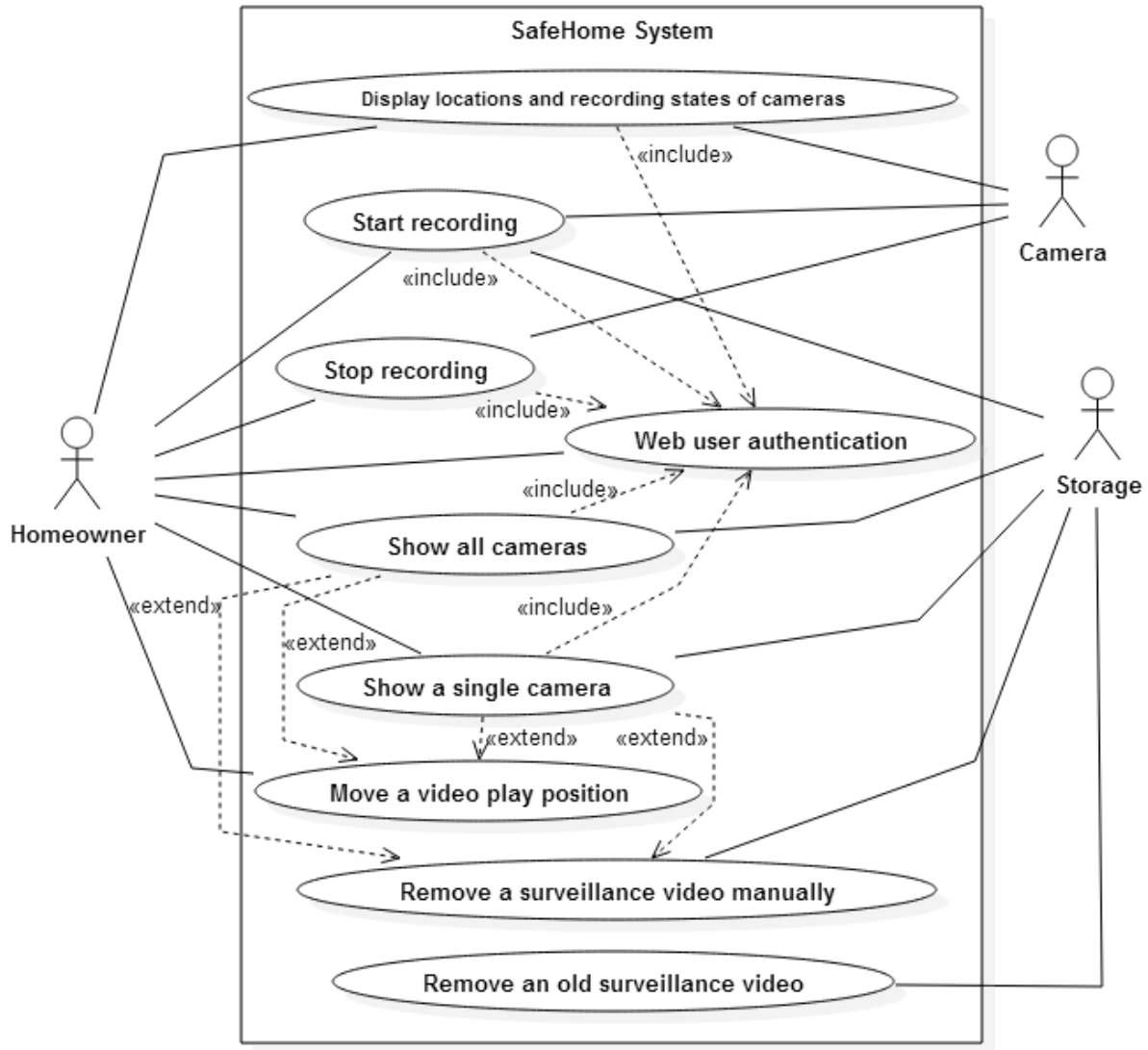
- 4.2.7.8 Frequency of Use
Rarely
- 4.2.7.9 Channel to actor
Panel
- 4.2.7.10 Secondary actors
Speakers and Emergency light
- 4.2.7.11 Related FR
[FR9](#), [FR17](#)
- 4.2.7.12 Open issues
None

4.2.8 Execute alarm

- 4.2.8.1 Primary actor
Homeowner
- 4.2.8.2 Goal in context
To manually make irregularity status..
- 4.2.8.3 Preconditions
None
- 4.2.8.4 Trigger
If homeowner is facing danger, homeowner make alarm be executed.
- 4.2.8.5 Scenario
Homeowner push emergency button.
System do "Detect Irregularity usecase".
- 4.2.8.6 Exceptions
None
- 4.2.8.7 Priority
High priority.
- 4.2.8.8 Frequency of Use
Rarely
- 4.2.8.9 Channel to actor
Emergency button
- 4.2.8.10 Secondary actors
Speakers and Emergency light
- 4.2.8.11 Related FR
[FR8](#)
- 4.2.8.12 Open issues
None

5 Surveillance Feature

5.1 Use case diagram



Picture 22: Surveillance use case diagram

5.2 Use cases

Moderate priority, to be implemented after basic functions.

5.2.1.8 Frequency of Use

Infrequent

5.2.1.9 Channel to actor

Via Internet browser and Internet connection

5.2.1.10 Secondary actors

None

5.2.1.11 Related FR

FR26, FR28

5.2.1.12 Open issues

None

5.2.2 Start recording

5.2.2.1 Primary actor

Homeowner

5.2.2.2 Goal in context

To start the surveillance video recording.

5.2.2.3 Preconditions

1. System is started correctly.
2. Surveillance cameras and the system are connected and communicates each other.

5.2.2.4 Trigger

The homeowner decides to record surveillance videos to check the house any location and time.

5.2.2.5 Scenario

1. The homeowner logs in to the SafeHome web page. (See <<<<<<)
2. The system displays menu buttons.
3. The homeowner clicks "surveillance" button.
4. The homeowner clicks "start surveillance recording" button.
5. The surveillance cameras start recording.
6. The system receives and stores surveillance videos in the storage.

5.2.2.6 Exceptions

1. No camera is connected – displays an error message.
2. Storage is full or not connected – See UC???
3. Some cameras are recording already – don't change states of recording cameras.

5.2.2.7 Priority

High priority, to be implemented with the basic functions.

5.2.2.8 Frequency of Use

Infrequent

5.2.2.9 Channel to actor

Via Internet browser and Internet connection

5.2.2.10 Secondary actors

Cameras, Storage

5.2.2.11 Related FR

FR5, FR32, FR39

5.2.2.12 Open issues
None

5.2.3 Stop recording

5.2.3.1 Primary actor
Homeowner

5.2.3.2 Goal in context
To stop the surveillance video recording.

5.2.3.3 Preconditions
1. System is started correctly.
2. Surveillance cameras and the system are connected and communicates each other.

5.2.3.4 Trigger
The homeowner decides to stop recording surveillance videos to keep privacy.

5.2.3.5 Scenario
1. The homeowner logs in to the SafeHome web page. (See <<<<<<)
2. The system displays menu buttons.
3. The homeowner clicks “surveillance” button.
4. The homeowner clicks “stop surveillance recording” button.
5. The surveillance cameras stop recording.
6. The system stops receiving and storing surveillance videos in the storage.

5.2.3.6 Exceptions
1. No camera is connected – displays an error message.
2. Some cameras are stopped already – don’t change states of stopped cameras.

5.2.3.7 Priority
High priority, to be implemented with the basic functions.

5.2.3.8 Frequency of Use
Infrequent

5.2.3.9 Channel to actor
Via Internet browser and Internet connection

5.2.3.10 Secondary actors
Cameras

5.2.3.11 Related FR
FR6, FR32

5.2.3.12 Open issues
None

5.2.4 Show all cameras

5.2.4.1 Primary actor
Homeowner

5.2.4.2 Goal in context
To watch a recorded surveillance video of every location.

5.2.4.3 Preconditions

1. System is started correctly.
2. The storage and the system are connected and communicates .each other.

5.2.4.4 Trigger

The homeowner decides to watch a recorded surveillance video of every location.

5.2.4.5 Scenario

1. The homeowner logs in to the SafeHome web page. (See <<<<<<)
2. The system displays menu buttons.
3. The homeowner clicks “surveillance” button.
4. The system displays every current surveillance videos in a thumbnail view.

5.2.4.6 Exceptions

1. No camera is connected – displays an error message.
2. Some of the camera is not recording but has recorded videos – displays a last recorded image for those cameras.
3. Some of the camera has no recorded videos – displays a warning image for those cameras.

5.2.4.7 Priority

High priority, to be implemented with the basic functions.

5.2.4.8 Frequency of Use

Frequent

5.2.4.9 Channel to actor

Via Internet browser and Internet connection

5.2.4.10 Secondary actors

Storage

5.2.4.11 Related FR

[FR33](#)

5.2.4.12 Open issues

None

5.2.5 Show a single camera

5.2.5.1 Primary actor

Homeowner

5.2.5.2 Goal in context

To watch a recorded surveillance video of certain location.

5.2.5.3 Preconditions

1. System is started correctly.
2. The storage and the system are connected and communicates .each other.

5.2.5.4 Trigger

The homeowner decides to watch a recorded surveillance video of certain location.

5.2.5.5 Scenario

1. The homeowner logs in to the SafeHome web page. (See <<<<<<)

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2. The system displays menu buttons.
3. The homeowner clicks “surveillance” button.
4. The system displays every current surveillance videos in a thumbnail view.
5. The homeowner clicks one of the videos.
6. The system displays only the surveillance video in a bigger form.

5.2.5.6 Exceptions

1. No camera is connected – displays an error message.
2. The camera is not recording but has recorded videos – displays a last recorded image for the camera.
3. The camera has no recorded videos – displays a warning image for the camera.

5.2.5.7 Priority

High priority, to be implemented with the basic functions.

5.2.5.8 Frequency of Use

Frequent

5.2.5.9 Channel to actor

Via Internet browser and Internet connection

5.2.5.10 Secondary actors

Storage

5.2.5.11 Related FR

#FR34

5.2.5.12 Open issues

None

5.2.6 Move a video play position

5.2.6.1 Primary actor

Homeowner

5.2.6.2 Goal in context

To watch a past recorded surveillance video of all or certain location.

5.2.6.3 Preconditions

1. System is started correctly.
2. The system is displaying all or certain surveillance videos.

5.2.6.4 Trigger

The homeowner decides to watch a past recorded surveillance video of all or certain location.

5.2.6.5 Scenario

1. The system plays all or certain surveillance videos (See <<<<<<)
2. The homeowner drags and drops current play position marker.
3. The system plays the videos from the new position.

5.2.6.6 Exceptions

1. Some of the camera is not recording but has recorded videos – displays a last recorded image for those cameras.
2. Some of the camera has no recorded videos – displays a warning image for those cameras.

5.2.6.7 Priority

High priority, to be implemented with the basic functions.

5.2.6.8 Frequency of Use

Frequent

5.2.6.9 Channel to actor

Via Internet browser and Internet connection

5.2.6.10 Secondary actors

None

5.2.6.11 Related FR

FR35

5.2.6.12 Open issues

None

5.2.7 Remove a surveillance video manually

5.2.7.1 Primary actor

Homeowner

5.2.7.2 Goal in context

To remove a part of the surveillance videos in the storage.

5.2.7.3 Preconditions

1. System is started correctly.
2. The storage and the system are connected and communicates .each other.
3. The system is displaying all or certain surveillance videos.

5.2.7.4 Trigger

The homeowner decides to remove a part of recorded surveillance videos in the storage for privacy.

5.2.7.5 Scenario

1. The system plays all or certain surveillance videos (See <<<<<<)
2. The system pauses a video playing.
3. The homeowner clicks “remove” button.
4. The homeowner drags and drops a start marker and an end marker.
5. The homeowner clicks “ok” button.
6. The system removes a part of the videos between a start marker and an end marker from the storage.

5.2.7.6 Exceptions

1. The part has no recorded videos – displays an error message.
2. Encounters storage error (bad sector or etc) – displays an error message and do nothing.

5.2.7.7 Priority

High priority, to be implemented with the basic functions.

5.2.7.8 Frequency of Use

Infrequent

5.2.7.9 Channel to actor

Via Internet browser and Internet connection

5.2.7.10 Secondary actors

Storage

5.2.7.11 Related FR

FR36

5.2.7.12 Open issues

None

5.2.8 Remove an old surveillance video

5.2.8.1 Primary actor

Storage

5.2.8.2 Goal in context

To remove an old part of the surveillance videos in the storage when the storage is full.

5.2.8.3 Preconditions

1. System is started correctly.
2. The storage and the system are connected and communicates .each other.
3. The storage has no more space for recording.

5.2.8.4 Trigger

The storage has no more space for recording and needs to remove a part of recorded surveillance videos automatically.

5.2.8.5 Scenario

1. The storage system has no more space for next 24 hours.
2. The system removes a part of the recorded videos from the oldest until the free space is enough for next 24 hours.

5.2.8.6 Exceptions

1. Encounters storage error (bad sector or etc) – remove a next part to get enough free space.

5.2.8.7 Priority

High priority, to be implemented with the basic functions.

5.2.8.8 Frequency of Use

Frequent

5.2.8.9 Channel to actor

SATA Cable

5.2.8.10 Secondary actors

Storage

5.2.8.11 Related FR

FR40

5.2.8.12 Open issues

1. We need to decide the period of this process.
2. How much free space is required to prevent loss of recordings?

Appendix A. Glossary

Homeowner : People who use our safehome system.

Activate/Deactivate: Activate/Deactivate sensor means that sensor can/can't be detect mode when we set mode.

Away mode: Away mode is one mode which is supported by our system. It is kind of “arm mode” of original project in the textbook.

Stay mode: Stay mode is one mode which is supported by our system. It is kind of “arm mode” of original project in the textbook.

Appendix B

FR1: Detect a fire in the house.

If the flame detector detects a fire in the house, the flame detector sends an emergency message to the central system.

FR2: Detect a gas leak in the house.

If the gas detector detects a gas leak in the house, the gas detector sends an emergency message to the central system.

FR3: Detect a movement in the house.

If the movement detector detects a movement in the house during the security mode is “away”, the movement detector sends an emergency message to the central system.

FR4: Detect a door/window opening in the house.

If the door/window sensor detects a opening in the house during the security mode is “away” or “stay”, the movement detector sends an emergency message to the central system.

FR5: Start video recording.

If the camera receives a recording message, then starts video recording and sends the video data to the central system.

FR6: Stop video recording.

If the camera receives a stop message, then stops video recording and sending data.4.3 Alarm Feature RF7.

FR7: Ring an alarm.

If the central system sends emergency messages, make speakers ringing and warning lights flashing.

FR8: Ring an alarm manually.

If the homeowner pushes an emergency button, sends an emergency message to the central system.

FR9: Cancel an alarm by the central system.

If the central system sends cancel messages, make speakers and warning lights to stop ringing and flashing.

FR10: Cancel an alarm automatically.

If the alarm is not canceled for 15 minutes, make speakers and warning light to stop ringing and flashing.

FR11: Display the security mode.

The homeowner can check the security mode with the main panel display.

FR12: Display the alarm operation state.

The homeowner can check the alarm operation state with the main panel display. If the alarm is set, the main panel displays the error code based on the sensor and situation.

FR13: Display the current time.

When the main panel has nothing to display except the security mode, it displays the current time.

FR14: Reset the panel password.

For security reasons, the homeowner can reset the panel password with the main panel. After push the “reset” button, the homeowner should enter the current panel password, the “#” button, the new panel password, the “#” button, the new password again, and the

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‘#’ button. Then the panel password is set to the new password. During this process, the mainpanel display shows the instruction and entered password length. If the password is wrong, use FR18.

FR15: Set the security mode to “stay”

When the homeowner wants to set the security mode in the house, the homeowner can set the security mode to “stay” with the main panel. After push the “set” button, the homeowner should enter the panel password, and the “#” button. Then the security mode is set to “stay”.

If the password is wrong, use FR18.

FR16: Unset the security mode.

The homeowner can unset the security mode in the house with the main panel. After push the “set” button, the homeowner should enter the panel password, and the “#” button. Then the security mode is set to “unset”. If the password is wrong, use FR18.

FR17: Cancel an alarm manually.

The homeowner can cancel an alarm manually with the main panel. After push the “cancel” button, the homeowner should enter the panel password, and the “#” button. Then the main panel sends a cancel message to the central system. If the password is wrong, use

FR18: Wrong password alarm.

If the password is wrong 5 times sequentially, then send a warning SMS message to the registered phone number. If the password is wrong 10 times sequentially, then send an emergency message to the central system.

FR19: Show the security mode.

The homeowner or other visitors can check the security mode with the LED lamp on sub panel. If the security mode is “away” or “stay”, the LED lamp is turned on. Otherwise, the LED lamp is turned off.

FR20: Set the security mode to “away”.

When the security mode is not “away”, the homeowner can set the security mode to “away” with the sub panel. After push any button, the homeowner should enter the panel password, and the “#” button. Then the security mode is set to “away”. If the password is wrong, use FR22.

FR21: Unset the security mode.

When the security mode is not “unset”, the homeowner can set the security mode to “unset” with the sub panel. After push any button, the homeowner should enter the panel password, and the “#” button. Then the security mode is set to “unset”. If the password is wrong, use FR22.

FR22: Wrong password alarm.

If the password is wrong 5 times sequentially, then send a warning SMS message to the registered phone number. If the password is wrong 10 times sequentially, then send an emergency message to the central system.4.6

Web Server Feature

FR23: Verify the web user.

The web server requires the web user to enter user id and user password. If the id and password are correct, then allow the web user to use other functions.

FR24: Change the web user password.

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For a security reason, the web user can change user password. The web user should login to use this function. In this function, the web user has to enter current password once and new password twice.

FR25: Reset the web user password.

When the web user forgot the user password, the web user can request to reset the password without login. The web user should enter user id. If the user uses this function, the web server sends the request to the SafeHome company server. If the SafeHome company approves the reset, then the user password is set to random string. The web user should get the password from the company by a phone call or other methods.

FR26: Display locations of every sensor and camera.

After successful login, the web user can see locations of every sensor and camera in the house. The figure of house, and locations of sensors or cameras are set by employees of SafeHome at install time.

FR27: Display activation states of every sensor.

After successful login, the web user can see activation states of every sensor. This information is displayed together with the figure in FR26.

FR28: Display recording states of every camera.

After successful login, the web user can see recording states of every camera. This information is displayed together with the figure in FR26.

FR29: Change an activation state of each sensor.

After successful login, the web user can change an activation state of each sensor. Each sensor has its activation button and the button is displayed together with the figure in FR26.

FR30: Register emergency SMS of each sensor.

After successful login, the web user can register phone numbers to send emergency SMS messages. The web user can use different phone numbers and messages for each sensor. Each sensor can have many phone numbers with different messages. Each sensor has its register button and the button is displayed together with the figure in FR26.

FR31: Display and change the security mode.

After successful login, the web user can see and change the security mode. The security mode has 3 states – “away”, “stay”, “unset”.

FR32: Change a recording state of each camera. After successful login, the web user can change a recording state of each camera. Each camera has its recording button and the button is displayed together with the figure in FR26.

FR33: Play every surveillance videos.

After successful login, the web user can see every surveillance videos together. By default, the play position is current time. If the web user clicks a video, the web server shows only that video in bigger form with FR34.

FR34: Play one surveillance video.

After successful login, the web user can play only one surveillance video. By default, the play position is same as the play position of FR33.

FR35: Move a video play position.

After successful login, the web user can move a video play position. By moving the play

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position, the web user can watch past videos.

FR36: Remove a surveillance video manually.

After successful login, the web user can remove a surveillance video manually. This function provides partial remove of a certain time period of certain cameras.

FR37: Send an emergency message and a cancel message to the alarms.

When the central system gets an emergency message from sensors, the central system determines to ring an alarm based on the security mode and setting. If the central system determined to ring an alarm, then sends emergency messages to the alarms and the main panel. When the central system gets a cancel message from the main panel, then sends cancel messages to the alarms and the main panel.

FR38: Send emergency SMS messages

When the central system gets an emergency message from sensors, the central system determines to send emergency SMS messages based on the security mode and setting. If the central system determined to send SMS messages, then sends the messages to the registered emergency calls.

FR39: Save surveillance videos.

If the surveillance cameras operate, the central system receives surveillance videos. The central system stores all surveillance videos to an internal file system.

FR40: Remove old surveillance videos.

File system in the central system has a size limit. Therefore the central system removes the oldest part of surveillance videos when it reaches to the limit.

Appendix C Who did what list

1. Bootup Feature	Donghan Jang
2. Authentication Feature	Donghan Jang
3. Configure Feature	Inyoun Kim
4. Security Feature	Inyoun Kim
5. Surveillance Feature	Donghan Jang