**Assumption**

* A1 : No concurrent user accesses. e.g.
	1. Access through a control panel and access through a web page are exclusive; both cannot happen at the same time.
	2. Only one control panel is installed in a house
* A2 : Internet connection between a homeowner (i.e., homeowner’s smartphone or notebook) and the SafeHome system is always available.
* A3 : All devices including cameras, sensors, and the SafeHome main system communicate using IEEE 802.11x protocol.

**Functional Requirements**

1. SafeHome bootup/shutdown service
	1. Self-diagnosis – check whether connected sensors and cameras are ok.
	2. Initialize/finish sensors
	3. Initialize/finish cameras
2. Configuration service
	1. Password
		1. Type of password
			1. Control panel - digits
			2. Web access – alphabets and digits
		2. Length of password
			1. Control panel – 4 digits
			2. Web access – at least 8 characters
	2. Floor plan
		1. Floor structure
			1. Distance scale
			2. Wall
			3. Door
		2. Registering new devices
		3. Relocating devices
	3. Security zone – a set of devices (e.g., sensors and cameras) which are manipulated as a group
	4. Backup plan for power off – Which devices could be turned off? Which devices should be turned on?
	5. Session timeout – See [5.A Athentication.session](#_Hlk418156511).
3. Real-time security service
	1. Arming the entire SafeHome system
	2. Disarming the entire SafeHome system
	3. Arming device(s)
	4. Disarming device(s)
	5. Alarming methods – Sound alarm, SMS, smartphone push alarm, and so on.
	6. Enabling travel mode – Turning lights on/off
	7. Sensor
		1. Types
			1. Motion detector
			2. Window sensor
			3. CO2 sensor
			4. Fire sensor
			5. Doggie angst sensor
		2. Output data format – binary, real number, or complex data?
	8. Camera
		1. Recording
			1. Format of movie – H264, MPEG, and so on
			2. Quality of movie – minimum required FPS issue
		2. Viewing
			1. A single camera
			2. All cameras through thumbnail view
		3. Controlling
			1. Zooming
			2. Panning
		4. Movie storage
4. User-requested information retrieval service
	1. Finding ID/Password
	2. Reporting system usage pattern
	3. Reporting web page access history
	4. Replaying recorded movie
5. Authentication
	1. Session
		1. Closing a session after certain timeout; See [2.E Session timeout](#_Hlk418156781).
	2. Control panel
		1. Input control panel password e.g. 4-digits password
		2. Access permission is granted to only one session. See [Assumption A1](#_Hlk418156474)
	3. Webpage
		1. Input ID and password(s) e.g. ID and two passwords
		2. Access permission is granted to only one session. See [Assumption A1](#_Hlk418156474)
6. User interface
	1. Control panel
		1. Input device – Keypad (12 keys)
		2. Output device
			1. LED notification (arm on/off and power on/off status)
			2. LCD display description
	2. Web page
		1. Configuration features. See [2. Configuration service](#_Hlk418157040).
		2. Real-time security features; See [3. Real-time security service](#_Hlk418157017).
		3. Reporting service features; See [4. User-requested reporting service](#_Hlk418156992).
		4. Web page should be designed mobile-friendly.

**Nonfunctional Requirements**

* SafeHome system should respond to sensor events in real-time.