

List of Smart Home Scenarios

We describe below, some of possible scenarios in smart home system. In each scenario, we describe the required sensors, actuators and controller.

1. House lighting. User can command or set the lighting system to operate automatically.
 - a. For example, the lamp will be turn on when there is no light or light intensity goes down below visibility or turn off when there is sufficient light.
 - i. Sensors: light detection sensor
 - ii. Actuators: electricity supply regulator
 - iii. Device (Object): lamp
 - b. Light intensity of lamp goes up or down when it senses the environment is too dark or too bright.
 - i. Sensors: light detection sensor
 - ii. Actuators: light intensity regulator
 - iii. Device (Object): lamp
2. Fire detection and automatic watering. When the system detects the intense smoke and raised-temperature, the watering system activates.
 - i. Sensors: smoke detection sensor and temperature sensor
 - ii. Actuators: watering system regulator.
 - iii. Device (Object): watering equipment
3. Automatic heat control. When system senses the environment is uncomfortable, heating system is regulated accordingly.
 - i. Sensors: temperature sensor
 - ii. Actuators: heat regulator
 - iii. Device (Object): heater
4. Automatic window control. When there is not sufficient or too much air flows, window is opened or closed automatically.
 - i. Sensors: pressure and air flow control sensors
 - ii. Actuators: window monitoring regulator.
 - iii. Device (Object): Window
5. Smart door. Door is closed or opened when house owner arrives or leaves. If it is left open, door is closed automatically.
 - i. Sensors: remote user identity detector
 - ii. Actuators: door controller
 - iii. Device (Object): door
6. Video surveillance with smart environment. The video camera is activated when there is the abnormal movement in the house. The video stream flow is also sent to house owner.
 - i. Sensors: CCTV and movement detection sensor
 - ii. Actuators: electricity supply regulator, video camera wake/sleep regulator, video stream regulator
 - iii. Device (Object): video camera
7. Automatic plant watering system. When sensor senses that there is lack of water for the houseplants, the watering system activates.
 - i. Sensors: humidity sensor
 - ii. Actuators: watering system regulator
 - iii. Device (Object): plants

List of Scenarios in Smart Healthcare System

We describe below, some of possible scenarios in smart healthcare system. In each scenario, we describe the required sensors, actuators and controller.

1. Auto-care. The system used to take care old age people who stay home alone unattended by their relatives. The system will detect the abnormal behaviour and send the alarm to hospital or concerned person. For example, when person falls down and becomes unconscious.
 - iv. Sensors: CCTV, movement detection sensor with behaviour analysis.
 - v. Actuators: Warning regulator.
 - i. Device (Object): video camera
2. Auto-health-control. The system observes the health condition of the person through different type of health related sensors (e.g. blood pressure, heart rate, blood sugar, temperature and exercise control). When system detects the abnormal thing, it generates recommendations/advice to that person automatically.
 - vi. Sensors: health related sensors
 - i. Actuators: health recommendation regulator
 - ii. Device (Object): messages and instructions (end-user device)
3. In case of serious case like heart attack or hypertension, the system automatically alerts patient and recommends the closest hospitals or healthcare institutions.
 - vii. Sensors: health related sensors
 - i. Actuators: alert message regulator and hospital location information regulator.
 - ii. Device (Object): messages and instructions (end-user device)
4. Exercise control. System will alert the person who does not do routine exercise or alert the person when concerned person does not do exercise.
 - viii. Sensors: Movement detection sensor or fall control sensor
 - i. Actuators: alert messaging regulator.
 - ii. Device (Object): messages (end-user device).
5. Unconscious-auto-help. The system detects the unconscious person and sends an alert to designed person or hospital for assistance.
 - ix. Sensors: video camera+ behaviour analysis, heart rate sensor and other health related sensors.
 - i. Actuators: message alert regulator.
 - ii. Device (Object): messages (end-user device)
6. Automatic drowning detection and rescue. The system installed at the swimming pool observes the swimming people and if he/she drowns, it sends the alert message to concerned people or an alarm goes off.
 - x. Sensors: video camera+behavior analysis
 - i. Actuators: message/alert or alarm regulator.
 - ii. Device (Object): messages (end-user device)