1. Detect Fire

Scope: Smart Fire Alarm System

Level: Sub-Functional

Intention: The system detects fire using smoke detectors, heat detectors, and carbon monoxide detectors.

Multiplicity: The system can detect multiple fires simultaneously.

Primary Actor: None

Secondary Actors: Smoke Detector, Heat Detector, Carbon Monoxide Detector

Main Success Scenario:

Smoke Detector, Heat Detector, or Carbon Monoxide Detector detects a fire hazard.

Sensor sends a signal to the central processing unit.

Central processing unit verifies the signal and confirms a fire event.

Extensions:

1a. Sensor detects a false alarm.

1a.1. System logs the event as a false alarm.

1b. Sensor malfunctions.

1b.1. System logs the error and sends a notification to the User.

2. Alert User

Scope: Smart Fire Alarm System

Level: Sub-Functional

Intention: The system alerts the User about a detected fire through their smartphone app.

Multiplicity: The system can alert multiple Users simultaneously.

Primary Actor: None

Secondary Actors: Communication Module, User

Main Success Scenario:

System confirms a fire event.

System sends a fire notification to the User's smartphone app through the communication module.

User receives the notification and acknowledges it.

Extensions:

2a. Communication module fails to connect to the User's smartphone.

2a.1. System logs the error and attempts to reconnect.

2a.2. System sends a notification to the User's emergency contact.

2b. User does not acknowledge the notification within a specified time.

2b.1. System sends a notification to the User's emergency contact.

3. Alert Emergency Contact

Scope: Smart Fire Alarm System

Level: Sub-Functional

Intention: The system alerts the User's emergency contact if the User does not acknowledge the fire notification.

Multiplicity: The system can alert multiple emergency contacts simultaneously.

Primary Actor: None

Secondary Actors: Communication Module, Emergency Contact

Main Success Scenario:

System fails to receive an acknowledgment from the User within a specified time.

System sends a fire notification to the User's emergency contact through the communication module.

Emergency Contact receives the notification and acknowledges it.

Extensions:

3a. Communication module fails to connect to the Emergency Contact's smartphone.

3a.1. System logs the error and attempts to reconnect.

4. Alert Fire Department

Scope: Smart Fire Alarm System

Level: Sub-Functional

Intention: The system alerts the fire department about a detected fire through the communication module.

Multiplicity: The system can alert multiple fire departments simultaneously.

Primary Actor: None

Secondary Actors: Communication Module, Fire Department

Main Success Scenario:

System confirms a fire event.

System sends a fire alarm signal to the fire department through the communication module.

Fire Department receives the alarm signal and dispatches firefighters to the User's location.

Extensions:

4a. Communication module fails to connect to the fire department.

4a.1. System logs the error and sends a notification to the User.

4a.2. System sends a notification to the User's emergency contact.

5. Initiate Sprinkler System Activation

Scope: Smart Fire Alarm System

Level: Sub-Functional

Intention: The system lowers the temperature threshold for the sprinkler system to trigger a faster response.

Multiplicity: The system can initiate sprinkler system activation for multiple locations simultaneously.

Primary Actor: None

Secondary Actors: Sprinkler System

Main Success Scenario:

System confirms a fire event.

System sends a signal to the sprinkler system to lower the temperature threshold.

Sprinkler System receives the signal and adjusts its activation threshold.

Extensions:

5a. Sprinkler System fails to receive the signal.

5a.1. System logs the error.

6. Monitor System Status

Scope: Smart Fire Alarm System

Level: Sub-Functional

Intention: The system monitors the status of its components, including battery levels and sensor functionality.

Multiplicity: The system can monitor multiple components simultaneously.

Primary Actor: None

Secondary Actors: Smoke Detector, Heat Detector, Carbon Monoxide Detector, Communication Module

Main Success Scenario:

System regularly checks the status of its components.

System logs any detected issues, such as low battery or sensor failure.

Extensions:

6a. System detects a low battery or sensor failure.

6a.1. System sends a notification to the User.

7. Send System Status Notifications

Scope: Smart Fire Alarm System

Level: Sub-Functional

Intention: The system sends notifications to the User about low battery or sensor failure.

Multiplicity: The system can send multiple notifications simultaneously.

Primary Actor: None

Secondary Actors: Communication Module, User

Main Success Scenario:

System detects a low battery or sensor failure.

System sends a notification to the User's smartphone app through the communication module.

User receives the notification and acknowledges it.

Extensions:

7a. Communication module fails to connect to the User's smartphone.

7a.1. System logs the error and attempts to reconnect.

8. Configure Alarm Settings

Scope: Smart Fire Alarm System

Level: User Goal

Intention: The User configures the alarm settings, such as sensitivity levels and notification preferences.

Multiplicity: Many Users can configure their alarm settings simultaneously.

Primary Actor: User

Secondary Actors: None

Main Success Scenario:

User accesses the smart fire alarm system's settings through their smartphone app.

User adjusts the alarm settings, such as sensitivity levels, notification preferences, and emergency contact information.

System saves the updated settings.

Extensions:

8a. User enters invalid settings.

8a.1. System displays an error message.

8a.2. Use case continues at step 2.

9. Manually Turn Off Alarm

Scope: Smart Fire Alarm System

Level: User Goal

Intention: The User manually turns off the alarm if it was triggered by a false alarm.

Multiplicity: Many Users can manually turn off their alarms simultaneously.

Primary Actor: User

Secondary Actors: None

Main Success Scenario:

User receives a fire notification and determines it is a false alarm.

User accesses the smart fire alarm system's control panel through their smartphone app.

User manually turns off the alarm.

System confirms the alarm is turned off.

Extensions:

9a. User is unable to access the control panel.

9a.1. User contacts support for assistance.

9a.2. Use case ends in failure.