

ReActify

Keeps your homes safe!

Presented by: Rania Mustafa, Madison Cassley, Alexander Burlec



Context

Natural disasters such as floods, fires, and earthquakes are becoming increasingly unpredictable due to climate change. Many homes and buildings lack an integrated system to detect early signs of these hazards. Our project proposes a smart disaster alert and response system that uses environmental sensors to monitor conditions and automatically alert users through a mobile app when danger is detected. This system aims to reduce damage, improve response time, and increase safety for both homeowners and emergency responders.



USER NEEDS

1. As an emergency responder, I want access to sensor data across multiple homes or buildings so I can identify which areas are in immediate danger.

2. As an emergency responder, I want to receive alerts when severe environmental readings are detected so that I can plan and prioritize emergency interventions.



1. As a resident, I want to be notified immediately when a fire, flood, or earthquake is detected near or inside my home, so that I can respond quickly and stay safe.

2. As a resident, I want to monitor temperature humidity, and water levels from my phone so that I can check my home's environment even when I'm away.





The resident is the main user of the disaster alert system installed in their home. They rely on the system to monitor environmental risks like sudden temperature spikes, flooding, or earthquakes.

Their priority is to be alerted as soon as danger is detected so they can act quickly to protect themselves and their home.

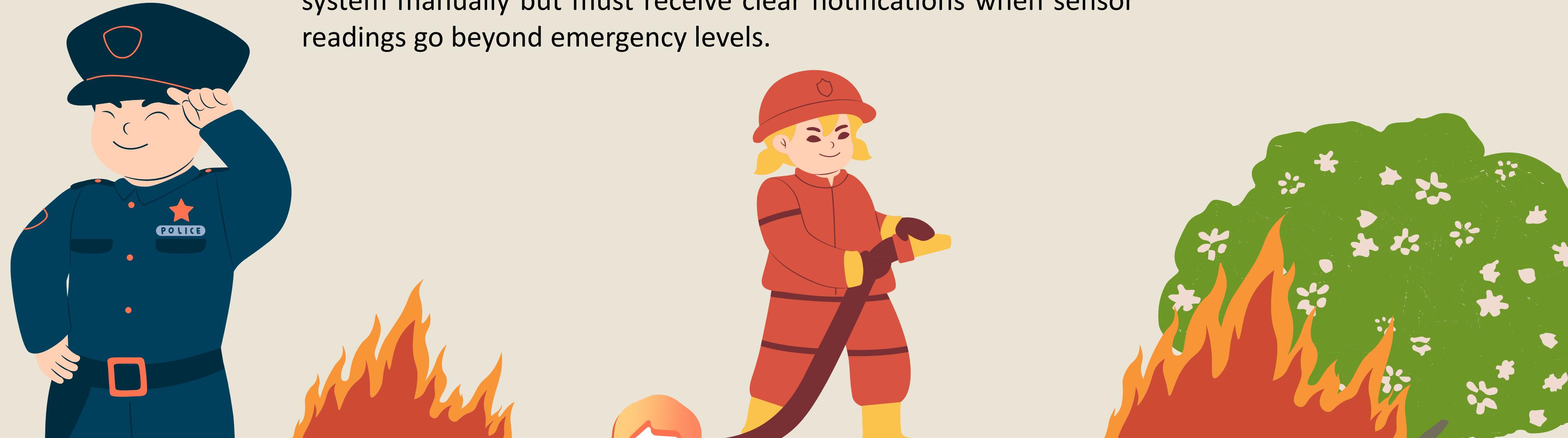
Most residents are not tech-savvy, so they need a simple mobile interface that shows current sensor readings, alert history, and system status. They also expect to receive push notifications when any thresholds are passed, even when they're away from home.



The emergency responder uses the system to monitor environmental data across multiple sites or neighborhoods. Their goal is to stay informed about real-time hazard activity and identify where intervention is needed.

They may be fire department staff, civil protection workers, or disaster relief teams.

This user profile requires more detailed access to sensor data, alert logs, and possibly GPS data to assess severity and respond efficiently. Unlike the resident, they don't need to control the system manually but must receive clear notifications when sensor readings go beyond emergency levels.



Design Overview

The app includes two user roles: **Resident** and **Emergency Responder**.

Residents view their own home status, live sensor values, and past events.

Responders access a dashboard showing all affected zones and hazard levels.

Each screen is adapted to the user's role, with simple navigation and alert visibility.

Sensor data is uploaded to the cloud and synced with the app via Azure IoT Hub.

SOLUTION

Functional Overview

The system detects environmental hazards like fire, flood, and earthquake using real-time sensor data.

Residents receive alerts via mobile app when danger is detected near their home.

Emergency responders monitor conditions across multiple homes and zones.

The system triggers actuators like fans, buzzers, and lights to respond automatically when danger levels are high.



Flood & Water Level Detection Subsystem

This subsystem monitors soil moisture and water level to detect potential flooding. It automatically triggers drainage via servo and provides audible alerts.



Hardware Requirements	Purpose
Water Level Sensor	To monitor rising water levels
Soil Moisture Sensor	To detect ground saturation
MG90S 180° Micro Servo	To control drainage (open/close gate)
reTerminal's Built-in Buzzer	To emit sound alerts during floods



Earthquake & Structural Response Subsystem

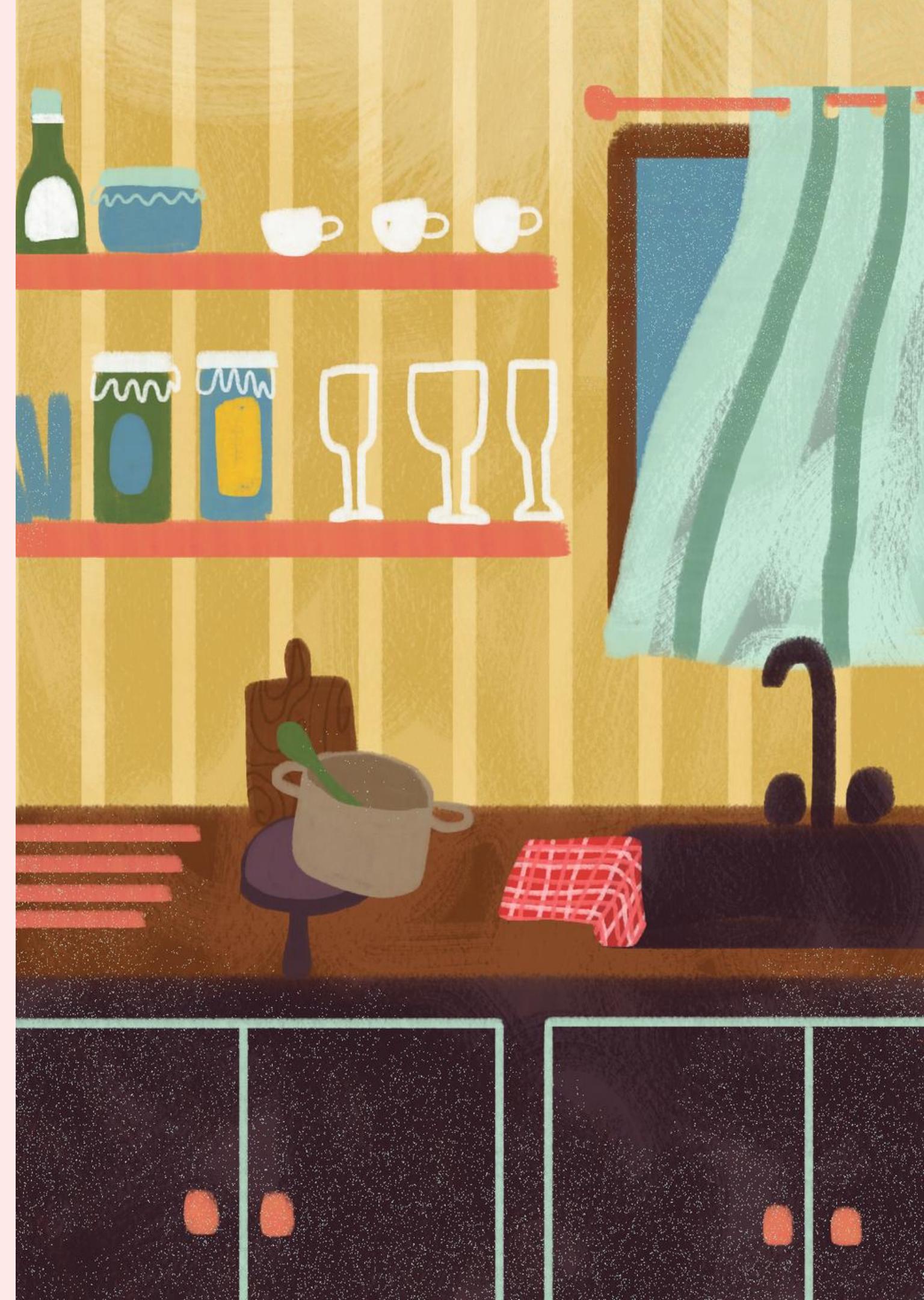
This subsystem detects motion and strong vibrations to signal possible earthquakes. It triggers door locks and warning lights for safety.

Hardware Requirements	Purpose
reTerminal's Built-in Accelerometer	To detect vibration intensity
PIR Motion Sensor	To detect sudden movement
Magnetic Door Sensor (Reed Switch)	To monitor door open/close status
RGB LED Stick	To flash emergency lights

Fire & Air Quality Monitoring Subsystem

This subsystem is responsible for detecting high temperatures and abnormal sound levels, often associated with fire or poor air quality. It responds with visual warnings and activates a cooling fan when needed.

Hardware Requirements	Purpose
AH20 Temp & Humidity Sensor	To measure temperature and humidity.
Sound Sensor / Noise Detector	To detect loud sounds (e.g. smoke alarms)
Cooling Fan	To control fan state (on/off)
RGB LED Stick	To provide visual alerts (flashing red)



Mobile App – Wireframe

