

EXECUTIVE SUMMARY

AlertSense addresses a critical challenge faced by individuals with hearing impairments and heavy sleepers during nighttime emergencies. The product offers a unique solution to the lack of effective alarm systems tailored to this specific demographic. Existing alarm systems primarily rely on audible alerts, rendering them ineffective for those with hearing impairments or extremely deep sleepers. AlertSense fills this gap by incorporating a multi-faceted approach, utilizing visual signals, vibrations, and smart technology to ensure individuals are promptly alerted to potential dangers such as fires, gas leaks, or intruders without relying on traditional auditory cues. This innovative design showcased in Figure 1 seeks to enhance the safety and well-being of users who cannot rely on conventional emergency alert systems.

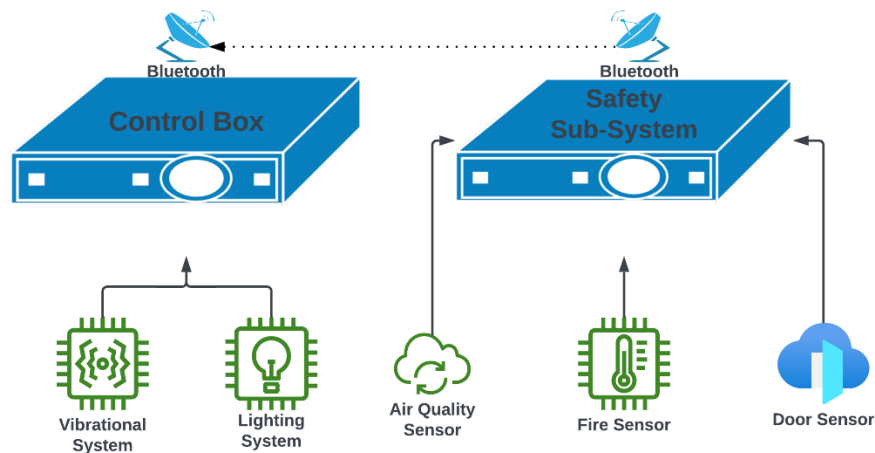


Figure 1: AlertSense High-Level Diagram

AlertSense addresses the core requirements of seamless integration into the user's environment, delivering timely and clear alerts about threats like fires, intruders, and gas leaks while prioritizing comfort. The system meets high-reliability standards and adheres to safety and accessibility norms. Key constraints encompass considerations of size, weight, and cost to maintain practicality and affordability, ensuring alignment with industry standards for assistive devices. Operating in less than 1 second underscores its commitment to user safety. The product complies with significant standards, such as the National Fire Protection Association's 70 Articles 240 and 300 and Bluetooth Core Specification Version 5.2.

The core approach to the AlertSense system centers around a fusion of hardware and software components. At its center is the Arduino Uno WiFi Rev 2 microprocessor, chosen for its processing power, connectivity capabilities, and cost-effectiveness. This central processing unit orchestrates communication and coordination among subsystems, including the Vibrational, Lighting, and Safety systems. The software infrastructure employs HTML, CSS, and JavaScript to craft a user-friendly web application. This interface empowers users to set alarms, configure system parameters, and interact with the AlertSense system effortlessly. The selection of these technologies aligns with AlertSense's commitment to accessibility and ease of use.

In conclusion, AlertSense pioneers an effective emergency alert solution for individuals with hearing impairments and heavy sleepers. The design integrates vibrational, visual, and auditory cues, laying a strong foundation. Future improvements involve Bluetooth integration and web application improvements. By providing discreet and tailored notifications, AlertSense enhances safety and peace of mind.