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[Skip to Main Content](#)



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Patent Search

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Abstract:

The invention discloses an intelligent fire detection and notification system utilizing fuzzy logic-enhanced multi-sensor fusion. The system integrates smoke, temperature, flame, and gas sensors interfaced with a microcontroller executing a fuzzy inference algorithm to evaluate fire-risk probability in real time. Upon exceeding a defined threshold, the system activates audible, visual, and digital alerts through GSM or IoT communication. The fuzzy logic framework interprets uncertain or nonlinear sensor data, minimizing false alarms while maintaining high sensitivity. The invention provides an adaptive, energy-efficient, and scalable solution suitable for residential, commercial, and industrial fire-safety applications.

[Complete Specification](#)

Description:FIELD OF THE INVENTION

[001] The present invention relates to the domain of intelligent safety and monitoring systems, and more specifically to a multi-sensor fire detection and notification system that employs fuzzy logic-based decision-making for accurate and real-time fire detection. The invention integrates data from multiple environmental sensors—such as temperature, smoke, flame, and gas sensors—through a fuzzy inference mechanism to classify fire risk levels with high accuracy. The system lies at the intersection of embedded systems, sensor fusion, and artificial intelligence, and is particularly applicable to industrial, commercial, and residential fire-safety environments where early detection and rapid notification are critical.

BACKGROUND OF THE INVENTION

[002] Fire hazards remain one of the most critical safety challenges affecting human life, property, and industrial infrastructure worldwide. Conventional fire detection systems predominantly rely on single-parameter sensing mechanisms, such as smoke detection or temperature threshold monitoring. While these systems provide basic warning capabilities, they frequently exhibit delayed response, reduced sensitivity, and an unacceptably high rate of false alarms when deployed in dynamic or noisy environments. Such limitations substantially diminish their reliability, especially in complex industrial settings or large-scale residential installations where multiple variables influence fire onset and propagation.

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