# Project Description (Brief introduction, objectives, expected outcomes)

**Project Description** Our proposed IoT-driven Smart Home Automation System integrates safety, efficiency, and convenience within a modern residential setting. By employing an Arduino UNO and an array of sensors—such as smoke detectors and PIR motion sensors—the system intelligently responds to environmental conditions. It detects smoke levels and promptly alerts occupants, while also leveraging motion data to activate lights and fans only when rooms are occupied, thus conserving energy. All sensor readings and system states are continuously transmitted to the ThingSpeak platform for real-time monitoring, data visualization, and remote control. The key objectives are to enhance home safety against fire hazards, improve energy efficiency, and offer a seamless, user-friendly interface for household management.

**Application Requirements** **Problem Statement:** Contemporary homes require heightened safety measures, efficient resource utilization, and convenient user experiences. Without an integrated, automated solution, residents may face delayed responses to fire hazards, waste energy on lighting and ventilation in empty rooms, and lack effective remote monitoring and control. This project addresses these challenges by creating a smart, responsive environment:

1. **Smoke Detection & Alerts:** Continuously monitor smoke levels and trigger immediate alarms or notifications when thresholds are exceeded.
2. **Occupancy-Based Control:** Activate lights and fans only in occupied rooms, optimizing energy usage and occupant comfort.
3. **Real-Time Data Integration:** Utilize ThingSpeak’s IoT platform for live data visualization, analysis, and remote system management, accessible through a user-friendly dashboard.
4. **Scalability & Future Expansion:** Ensure modularity and compatibility for adding more sensors or integrating with other smart home solutions as user needs evolve.

# Application Requirements

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# Detail of sensors and related electronic equipment

# Detail description of power consumption of every sensor should be included and the approach that can be used for the optimal consumption of power should be described.

# Details of communication technology and protocols used at physical, internet and application layers. Please also discuss possible network topologies if the system needs to be scaled up.

# Tools and technologies required for project development

# Expected impact of the project on society and the environment

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