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Arduino based Intelligent Home Security System

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ABSTRACT: The Intelligent Building is clearly the building of the future. The goal of having an intelligent building only starts with early planning in the design stage. In many ways, this mirrors the design and fulfillment of many green projects today, but it uses technology to provide for a superior space. The intelligent building uses eco-friendly construction materials with proper water management system provided. In the intelligent building, proper orientation and landscaping is provided. However, other benefits, e.g., reduced staff levels and improved occupant satisfaction, are often overlooked. The degree of confidence in intelligent building technologies is inadequate largely because of a lack of awareness and understanding of its value. There is a lack of properly assessable intelligent building technology reference projects. Intelligent building technologies are generally available, but not yet widely adopted and many changes and initiatives are needed for use of these technologies to become widespread.

Automation in buildings began long before recorded time, with the help of microprocessors. The use of dedicated software for safety and control applications began with the technologicaladvancement. The controlling unit in building management system automation is a PLC. In thecomfort way of human life styles in the building there are many system has automated, with increase the almost all the facility to throughout all the machine with less economics introduces.Car parking facility, light control, fire system,gate open close,door control proposed here. Almost everywhere the parking problem is a big issue in the urban state. In this the parking facility has introduced, by automated. Light control also the big issue, Less Consumption of the energy in the overall building as external light by automated has introduces. Keeping in themind internal facility has also automated, controlling light in buildings should be necessary. Keeping all the things in the mind all the system are introduces automated here.

KEYWORDS: Arduino-based automation**,** RFID gate control**,** motion sensor lighting**,** fire detection with MQ3 sensor**,** GSM alert system**,** keypad-based security**, and** energy-efficient smart building security**.**

I. INTRODUCTION

Introduction

In today's fast-evolving technological landscape, home and building security systems have become an integral part of ensuring the safety and convenience of residents. The proposed Arduino-based smart building or home security system integrates multiple advanced features to address these needs. By utilizing automation and real-time monitoring, the system provides a secure, energy-efficient environment. RFID-based gate access ensures that only authorized individuals, such as homeowners or flat residents, can gain entry to the building, offering an automated and seamless solution to traditional security methods. Additionally, the integration of motion-sensor-based lighting in parking areas enhances both safety and energy conservationby activating lights only when human or vehicle movement is detected.

The system further elevates security with fire detection through the use of an MQ3 sensor, which sends immediate alerts via a GSM module to notify residents in case of smoke or gas detection. This real-time notification allows for prompt action in emergency situations, minimizing potential damage. Moreover, the home door lock and locker system is equipped with a keypad-based security feature, where residents can set personalized passwords for secureaccess. This comprehensive system effectively combines automation, security, and efficiency, making it a modern and reliable solution for enhancing building and home safety.

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The Arduino-based smart building or home security system leverages a range of technologies to deliver enhanced security and automation. It uses RFID (Radio Frequency Identification) technology to control access to the building, allowing only authorized individuals to enter by scanning their unique RFID tags. Motion sensors, such as Passive Infrared (PIR) sensors or ultrasonic sensors, are employed in the parking area to detect the presence of humans or vehicles, triggering the lighting system to turn on automatically, thereby improving energy efficiency. For fire detection, the system integrates an MQ3 gas sensor, which is capable of identifying smoke or gas leaks, signaling potential fire hazards. When a fire is detected, the GSM (Global System for Mobile Communications) module plays a crucial role in sending immediate alerts to the residents or building managers, enabling quick responses to emergencies. Additionally, the system uses a keypad-based interface for secure home or lockeraccess, where users can set and enter a personalized password. The core control of the entire system is powered by an Arduino microcontroller, which acts as the central unit to manage the

II. PROPOSED SYSTEM

Proposed System

The proposed system for an Arduino-based smart building or home security solution is designed to integrate multiple automated features to enhance both security and convenience forits residents. One of its key components is the RFID-based gate control system, which allows only authorized individuals, such as house or flat owners, to access the building premises. When an authorized person's RFID tag is detected, the gate automatically opens, providing seamless and secure entry without manual intervention. This feature ensures that unauthorizedaccess is prevented, bolstering the security of the premises. Additionally, the parking area of the building employs motion sensors to detect the presence of humans or vehicles. When movement is sensed, the lighting system is activated for a specified duration, improving visibility and safety. Once there is no more activity, the lights automatically turn off, thereby conserving energy and reducing electricity costs, making the system both secure and energy- efficient.

Another crucial aspect of the system is its fire detection mechanism, which employs an MQ3 sensor to identify the presence of smoke or gas in the environment. In the event of a fire or gas leak, the sensor triggers an alert that is immediately sent to the user through a GSM module, allowing for swift action to prevent further damage. This prompt alerting mechanism is vital for minimizing risks and protecting both property and lives. In addition to fire safety, the system offers advanced protection for the home door locks and lockers using a keypad-based access system. Users can set a personalized password to open these locks, ensuring that only those with the correct code can gain access. This multi-layered security setup not only safeguards valuables but also provides residents with peace of mind. By combining technologies like RFID, motion sensors, fire detection, and secure keypad access, the system offers a comprehensive, automated solution that effectively addresses various aspects of modern smart building security and management.

The expected outcome of the proposed Arduino-based smart building or home security systemis to significantly enhance the security, convenience, and energy efficiency of residential environments. By implementing RFID-based gate control, the system will ensure restricted access to the premises, allowing only authorized house or flat owners to enter, thereby preventing unauthorized entry and enhancing overall safety. In the parking area, the integration of motion sensors will lead to optimized energy use by automatically activating lights only when human or vehicle presence is detected, reducing unnecessary power consumption. The fire detection mechanism using the MQ3 sensor is expected to provide rapid alerts to residentsvia the GSM module, allowing for swift action in the event of a fire or gas leak, which could potentially save lives and minimize property damage. Moreover, the keypad-based system for home door locks or lockers is designed to offer robust security by allowing access only to thosewho know the designated passcode, thereby safeguarding valuable possessions. Overall, the system aims to deliver a seamless and automated security experience, combining multiple layers of protection, prompt notifications, and energy-efficient operations to create a safer and smarter living environment for residents.

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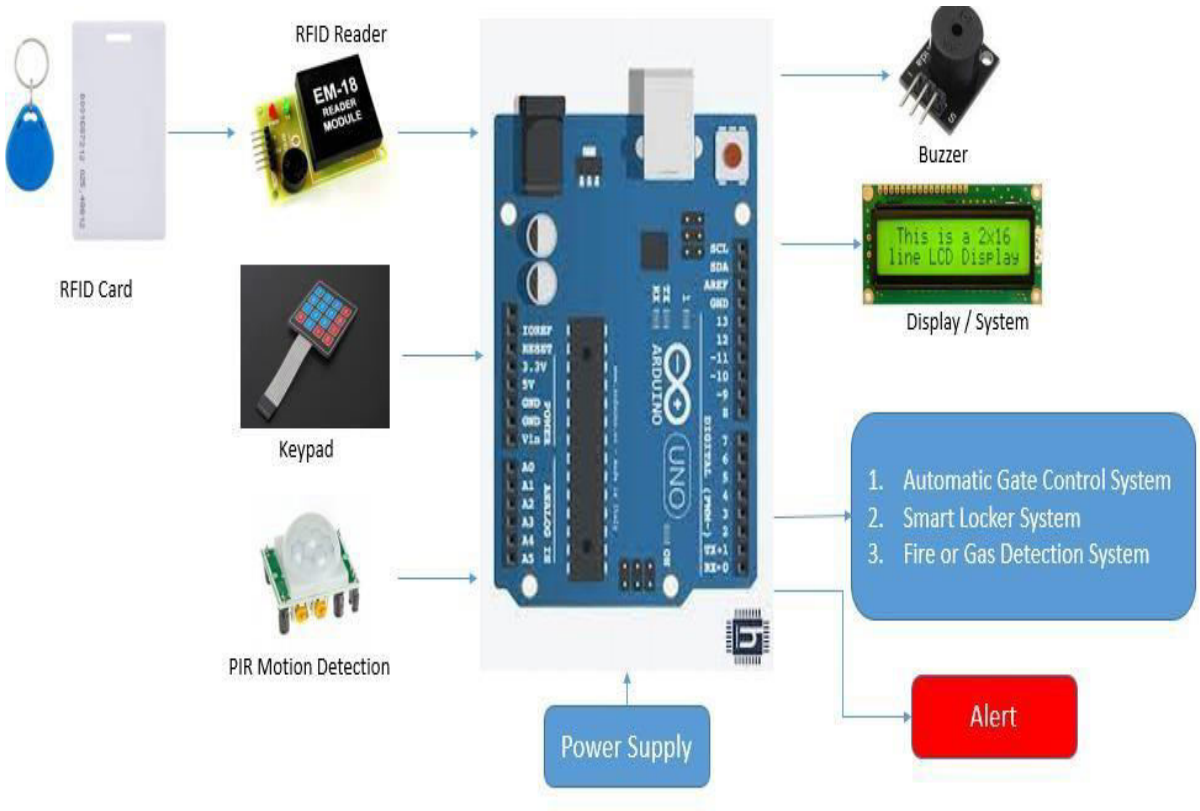

Architecture of Proposed Work Flow

III. CONCLUSION

In conclusion, the Arduino-based smart building or home security system offers a robust and multifaceted approach to enhancing safety and convenience for residents. By integrating features such as RFID-based gate control, motion-activated lighting, fire detection using an MQ3 sensor, and a keypad-locked system, the solution addresses various aspects of modern security needs. The RFID system ensures that only authorized users can enter the premises, thereby reducing unauthorized access, while the motion sensors in the parking area provide illumination that enhances safety without wasting energy. The fire detection capability serves as a critical safety feature, enabling immediate alerts through the GSM module, which can significantly reduce response time in emergencies. Furthermore, the keypad-based locker system adds an additional layer of security for personal belongings, allowing users to maintain privacy and control over their valuables. Overall, this proposed system not only prioritizes user safety and convenience but also reflects the increasing trend towards smart technology in residential spaces, making it an essential project for addressing contemporary security challenges.

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