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DOMOTICS FOR FOLK HOMES

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ABSTRACT
This research explores the development of a smart home system specifically designed to improve the safety, comfort, and independence of elderly individuals. By integrating technologies such as motion detectors, intelligent lighting, voice assistants, and remote monitoring, the system enhances day-to-day living and personal security for senior residents.

Keywords:
Mq-4 Sensor, Mq-135 Sensor, Flame Sensor, Esp32-Cam Module, Microcontroller (Esp32), Voice Activation, Embedded Programming, Natural Language Processing

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INTRODUCTION

As the global elderly population rises, there is a growing demand for technological solutions that support aging in place. Smart home innovations offer practical answers by integrating automation with healthcare and security functions. These solutions assist elderly users in maintaining autonomy by handling routine tasks, safeguarding their environment, and promoting well-being. Smart systems may include features like adaptive lighting, climate control, real-time video surveillance, and AI-powered voice assistants. These tools reduce accident risks, improve energy efficiency, and support health management by sharing critical data with caregivers. Utilizing IoT, AI, and data analytics, such systems can respond intelligently to user behavior, ensuring personalized and proactive support for senior users.

OBJECTIVES

This project aims to create a smart home system focused on enhancing the safety, comfort, and independence of elderly individuals. It seeks to integrate affordable technology such as environmental sensors and voice-activated controls to assist with daily activities. A key goal is to ensure the system is user-friendly and accessible, especially for those unfamiliar with modern devices. The design emphasizes compatibility with traditional and rural homes, preserving cultural aesthetics. Energy efficiency and low maintenance are also prioritized to suit areas with limited resources. The system is intended to adapt to the lifestyle and environment of its users. Overall, the objective is to deliver a practical and respectful solution that supports aging in place.

METHODOLOGY

To develop an effective smart home system for elderly users in rural and traditional homes, a combination of field research, technical design, and cultural analysis was used. Initial steps involved conducting interviews and surveys with residents to understand their daily routines, challenges, and openness to using smart technologies. An environmental assessment was carried out to evaluate climate conditions, power

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availability, and housing materials common in the target areas. A cultural study was also conducted to ensure that the system design respects and fits within traditional lifestyles and aesthetics. Based on this data, components such as gas, air quality, and flame sensors were selected for integration. The ESP32 microcontroller and ESP32-CAM module were used for processing sensor data and enabling real-time video streaming. Voice command features were included to enhance ease of use. A mobile application was developed for remote monitoring and control. Finally, the prototype was tested in real-world settings to assess performance and user satisfaction.

RESULTS AND DISCUSSION

The prototype domotics system was successfully deployed using an ESP32 controller. Sensors (MQ-4, MQ-135, and flame detectors) were integrated to ensure environmental monitoring. The ESP32-CAM module enabled seamless video streaming to a mobile application over a local network. Gas and flame detection provided alerts within three seconds, offering critical safety functionality. Voice commands were used to control home appliances with a success rate exceeding 90%. Rural users found the interface intuitive and effective. The entire system functioned reliably and showed promise for implementation in heritage-style homes without disrupting their cultural value.

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CONCLUSION

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