

DESIGN AND BUILDING OF A HOME SECURITY MONITORING SYSTEM WITH PIR SENSOR, FLAME SENSOR, AND MQ-135 BASED ON ESP32-CAM MICROCONTROLLER WITH TELEGRAM NOTIFICATION

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ABSTRACT

The development of the home as an important place for family and individual development as well as a place to store valuables has encouraged innovation in more effective security solutions. Although traditional solutions such as CCTV and security guards have been widely implemented, this technology has proven to be less efficient, especially for small homes and is unable to detect non-visual threats such as fires and gas leaks. Therefore, the system created is "Home Security Monitoring System with PIR Sensor, Flame Sensor, and MQ-135 Based on ESP32-Cam Microcontroller with Telegram Notification" is a promising alternative. The PIR sensor detects human movement via infrared at a distance of around 10 meters and will take pictures with a camera with an error accuracy of 14.2%, the flame sensor provides early detection of the risk of fire at a distance of less than 105 cm for small fires, and the MQ-135 gas sensor will detect gas leaks with ppm at 235 and above, while the ESP32-CAM with camera features, Bluetooth, WiFi, and microSD slot allows real-time visual monitoring. The integration of this solution with the Chat Bot service on Telegram enriches the system's response to emergency situations.

Keywords: CCTV, ESP32 CAM, PIR sensor, Flame sensor, MQ-135 Gas Sensor.