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Night Patrolling Robot

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Abstract: This paper presents the design and implementation of a smart surveillance and monitoring system using the ESP32-CAM module, integrated with a piezoelectric buzzer for real-time alerting. The ESP32-CAM, a compact low-power device with built-in Wi-Fi and Bluetooth capabilities, is equipped with an OV2640 camera and microSD support, making it ideal for intelligent IoT applications such as wireless video streaming, image capture, and face detection. The system leverages the Arduino IDE for firmware development and employs an FTDI programmer to facilitate code uploading via serial communication, with detailed steps to handle hardware-specific issues, including bootloader burning for ATmega328 variants. Real-time video is streamed over the local network, and face recognition is implemented through onboard image processing. A piezoelectric buzzer is interfaced using a transistor driver circuit to produce audio alerts upon detecting specific events, adding a layer of security. The design addresses key hardware-software integration challenges and provides an efficient, cost-effective solution for smart surveillance applications with features such as remote access, real-time alerts, and flexible system expansion

Keywords: ESP32-CAM, IoT surveillance, face recognition, Arduino IDE, piezoelectric buzzer



