IoT-Based Face Recognition AI Robot for Intelligent Surveillance

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Abstract: *With the rapid advancement of Artificial Intelligence (AI), the Internet of Things (IoT), and embedded systems, intelligent surveillance solutions have become increasingly important. This paper presents the design and implementation of an IoT-based face recognition AI robot for intelligent surveillance and human–robot interaction. The system integrates ESP32-CAM for real-time image acquisition, Python-based AI algorithms for face detection and recognition, and Arduino-controlled robotics for motion and interaction. Facial landmark-based encoding is employed to achieve reliable recognition with low computational overhead. Experimental results demonstrate recognition accuracy exceeding 90% with response times below two seconds, validating the suitability of the proposed system for real-time embedded surveillance applications.*

Keywords: *Face Recognition, Internet of Things, ESP32-CAM, Robotics, Embedded Systems, Surveillance*

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