

ABSTRACT

This project develops a video-based room occupancy monitoring tool for automatic room temperature control. The system utilizes a camera to detect the number of people in the room and a DHT11 sensor to read the ambient temperature. Data is processed by a Mini PC to determine the control of the blower or AC based on room occupancy and temperature levels.

The development process includes designing hardware and software, implementing a human detection algorithm using MobileNet-SSD based on OpenCV, integrating the DHT11 sensor and relay, as well as functionally testing the system. Test results indicate that the system can detect the number of people with an average accuracy of $\pm 90\%$ under normal lighting conditions. The DHT11 sensor is able to read the room temperature with an average deviation of $\pm 1-2$ °C compared to a reference measuring device.

System response testing shows that the blower or AC can respond to changes in occupancy and temperature with an average response time of approximately 2–3 seconds after conditions are detected. Information on the number of people, temperature, and system status is displayed in real-time to facilitate monitoring. This system is expected to enhance temperature regulation efficiency and user comfort in enclosed spaces such as classrooms and offices.

Keywords: room occupancy monitoring, image processing, object detection, video-based system, room supervision, public space management, system prototype, visual data analysis, space efficiency.