

ABSTRACT

Smoking in a closed room is very dangerous because the toxic particles from cigarette smoke are a source of spreading disease. The risk of smoking indoors is higher than smoking outdoors. Therefore, this system is designed to provide early warning and control cigarette smoke by activating the exhaust fan automatically or manually via Blynk. This system uses the MQ-135 sensor to detect CO₂ from cigarette smoke, which will be processed by the NodeMCU ESP8266. The system provides three levels of indication with LEDs: green (safe), yellow (CO₂ 750 > < 1200 ppm, with notification and command to turn on the exhaust fan via the Blynk application), and red (CO₂ above 1200 ppm, exhaust fan turns on automatically). The results of testing the CO₂ monitoring system based on the MQ-135 and Blynk sensors are able to detect changes in CO₂ levels in closed rooms both in clean air conditions and polluted by cigarette smoke. The test results showed that after calibration, the MQ-135 sensor provided readings consistent with commercial devices at low CO₂ levels (400–750 ppm) with small differences (1–19 ppm) and low error rates (0.23%–4.63%). However, at high concentrations due to cigarette smoke accumulation (>1200 ppm), the MQ-135 sensor showed significant deviations (differences up to 451 ppm, errors up to 34.83%), which were likely influenced by sensitivity to other gases. The indicator and actuator systems such as LEDs and exhaust fans functioned according to the threshold, and Blynk notifications worked well in providing warnings. Thus, the system is considered effective for CO₂ monitoring in the range of 10–1000 ppm, but less appropriate for high accuracy above that limit.

Keywords: *Blynk, Cigarette Smoke, Exhaust Fan, LED, MQ-135, NodeMCU ESP8266*