

ABSTRACT

LPG gas leakage is a serious issue that can trigger fires and endanger the safety of occupants. The declining quality of gas cylinders increases the risk of undetected leaks. This study designs an LPG gas leak detection system using the Fuzzy Mamdani method to determine the level of hazard based on gas concentration detected by the MQ-6 gas sensor. The sensor data is processed by the NodeMCU ESP8266 microcontroller and translated into fuzzy logic decisions to activate a buzzer alarm, a blower, and send notifications via the Telegram platform. The implementation of the Fuzzy Mamdani method in this system enables efficient data processing and provides relevant decisions to reduce the risks caused by LPG gas leaks. The results show that the gas leak detection system on sample 5, with an ADC sensor value of 718 and an output voltage of 2.32V, was categorized as a medium-level leak (1299.90 ppm) and required 37 seconds for the blower to reduce the gas concentration in the room. Meanwhile, on sample 1 with an ADC value of 1023 and an output voltage of 3.3V, categorized as a high-level leak (3873.62 ppm), it only took 25 seconds. These findings indicate that the gas detection system functions effectively and responds appropriately based on the level of danger. System testing shows that gas level control and notification are carried out automatically, providing an early mitigation solution for LPG gas leaks with a fast response.

Keywords: *LPG, Gas Leakage, MQ-6, Fuzzy Mamdani, Telegram*