

## ABSTRACT

According to the Ministry of Environment and Forestry (2021) motor vehicle emissions contribute 70% to the pollution of Nitrogen Oxides (NO<sub>x</sub>), Carbon Monoxide (CO), Sulfur Dioxide (SO<sub>2</sub>) and Particulates (PM) in urban areas. This research aims to measure air quality and monitoring of carbon monoxide gas and ammonia gas in the form of an IoT-based air pollution detection and monitoring device.

This research uses system engineering research methods, namely literature study, needs analysis, system design, hardware development, software development, component integration, trial and evaluation, data analysis and conclusions. This tool uses MQ-135 as an ammonia gas detector, MQ-7 sensor as a carbon monoxide gas detector. Arduino Uno as a place for incoming and outgoing query data and ESP8266 as a tool connected to the internet and connected to telegram software. The data obtained from the sensor is sent to Arduino Uno, then to ESP8266 wirelessly. The measurement data is displayed in the telegram software chat bot column.

The tool has been tested, namely monitoring in a closed room with a carbon monoxide gas value range of 4 ppm - 6 ppm and ammonia gas range of 1.72 - 2.42 ppm, monitoring in an open space with a carbon monoxide gas value range of 5 ppm - 8 ppm and ammonia gas range of 2.90 - 19.06 ppm. Sensor trials with various objects, namely vehicle fumes obtained carbon monoxide gas 43 ppm and ammonia gas 33.6 ppm, electrocigarette smoke obtained carbon monoxide gas 35 ppm and ammonia gas 12.4 ppm, tobacco cigarette smoke obtained carbon monoxide gas 13 ppm and ammonia gas 30.3 ppm, perfume obtained carbon monoxide gas 12 ppm and ammonia gas 23.7 ppm. Test the distance between the sensor and the object of stationary conditions obtained 3 cm to 21 cm the sensor can detect gas.

**Keywords:** Gas, Air quality, *MQ-135 Sensor*, *MQ-7 Sensor*