

## ABSTRACT

*Every day the air quality in Indonesia is decreasing. To increase public awareness, evidence is needed that there is a decrease in air quality in Indonesia. However, the number of air pollution monitoring systems in Indonesia is still minimal. This causes uneven data collection of air pollution. In the city of Bandung, there is only one tool to monitor air pollution so the data obtained does not really represent the air quality of the entire city.*

*In this research, a system will be designed and built to monitor air pollution. The system built will use a power-efficient microcontroller based on ESP32. The power-efficient system was chosen because this system will be used in areas that are not reachable if it has to use power from the electricity network. The measured air quality is air quality using ISPU standards with 3 samples, namely ozone gas, carbon monoxide and PM10 particulates. Sensors for monitoring are also arranged with a wireless sensor network to get a wide range.*

*In this final project, a system has been designed and built in the form of a prototype of a wireless sensor. Wireless sensors created using a wireless mesh network. Sensors are installed not too far away about 1 meter for each node to get better sensor readings. The data obtained by the sensor is not only read by the PC, but a special coordinator node is also designed for integration with machine learning models.*

*The results of this study are to determine the effect of a wireless sensor network system formed using a mesh network. From the test results of data transmission from wireless sensors using a wireless mesh network, it was found that the packet loss rate is still very good. From the data obtained, that is 0.07115%, compared to other forms of wireless sensor networks, namely star is at 12.87%. The power used also varies depending on the sensors installed in each node. At the wireless sensor node the particle is 795.8mW hours while at the wireless gas sensor node it is 1702mW hours.*

**Keywords:** *ISPU, Wireless Sensor Network, Air Pollution, Low Power Sensor*