THE IMPLEMENTATION OF AN IOT- AND WEB-BASED AIR QUALITY MONITORING SYSTEM

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ABSTRACT

Air quality is a critical factor that affects both human health and environmental balance. Air pollution caused by vehicle emissions, industrial activities, and open burning can lead to serious consequences, such as respiratory disorders, cardiovascular diseases, and the acceleration of climate change. To address this issue, a reliable and real-time air quality monitoring system is essential for supporting pollution prevention and control efforts. This study aims to develop an Internet of Things (IoT)- and web-based air quality monitoring system capable of detecting various air pollutants. The system integrates two types of sensors: the MQ-135 sensor, which detects hazardous gases such as carbon dioxide (CO_2), ammonia (NH_3), and volatile organic compounds, and the Sharp GP2Y1010AU0F dust sensor, which measures airborne particulate matter. These sensors are connected to a microcontroller equipped with a wireless communication module to transmit data to a web server. The measured data are displayed on a user-friendly web interface, which also includes a notification feature to alert users when pollutant levels exceed safe thresholds. Test results indicate that the system is capable of monitoring air quality efficiently and in real time. With further development, this system has the potential to be enhanced through artificial intelligence integration to enable predictive analysis and smarter decision-making.

Keywords: Internet of Things (IoT), Monitoring, Air Quality, Web