Air Quality Classification System for Sheep Manure Waste Pollution Using Naïve Bayes Method

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ABSTRACT

This study aims to classify air quality in sheep farming environments based on gas emissions from manure waste, specifically ammonia (NH3), methane (CH4), and carbon dioxide (CO₂), using the Naïve Bayes method. The research is motivated by the importance of monitoring air quality in livestock areas, which can impact the health of animals, the environment, and surrounding communities. The data were collected directly using an IoT-based ESP32 device equipped with gas sensors, and labeled according to threshold values from validated references. The dataset consists of 2000 records, with 90% used for training and 10% for testing. The classification model was trained using the Gaussian Naïve Bayes algorithm and evaluated using performance metrics such as accuracy, precision, recall, and F1score. The evaluation results showed that the model achieved an accuracy of 99.75%, demonstrating its effectiveness in classifying air quality levels. The system is implemented using a Python-based model integrated into a Flask API, which connects to a Laravel-based website, enabling real-time classification and display of gas data from IoT devices. This system is expected to assist farmers and relevant stakeholders in monitoring and managing air quality in livestock environments more efficiently and responsively.

Keywords: Naïve Bayes, IOT, Air Quality