

## Abstract

Compost fertilizer is an important organic fertilizer for maintaining soil fertility. In the composting process, stable environmental conditions are required to ensure effective decomposition. However, the composting process often faces challenges related to suboptimal temperature and humidity, which can slow down the process. This study aims to design and develop a temperature and humidity monitoring system for the composting process based on the Internet of Things (IoT) using the Support Vector Machine (SVM) method. In this research, IoT technology is utilized by employing the NodeMCU ESP8266 module as the connecting device, integrated with temperature and humidity sensors (DHT22 and Soil Moisture sensor). The data collected from these sensors will be stored in a spreadsheet. Then, the SVM method is applied to predict humidity based on the historical data collected. This study implements K-Fold Cross-Validation, dividing the data into 70% for training and 30% for testing. Grid Search is used to determine optimal parameters such as BoxConstraint (C), KernelScale (gamma), and Epsilon. Once the best parameters are found, the SVM model will use the RBF kernel for analysis and predictions based on the collected data. The implementation of this IoT-based temperature and humidity monitoring system using the SVM method can benefit society by improving the efficiency of composting through remote monitoring of temperature and humidity without the need for constant manual supervision. This study also applies SVM in the processing of temperature and humidity data for agricultural applications, such as composting, using Matlab software.

Keywords: compost, Internet of Things (IoT), Support Vector Machine (SVM), NodeMCU ESP8266, DHT22 sensor, Soil Moisture sensor, BoxConstraint (C), KernelScale (gamma), Epsilon, Matlab.