Implementation of Monitoring and Prediction of Humidity, Temperature, and Light Using Artificial Neural Networks for Green House Orchids in Lembang

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Abstract*— This paper focuses on the application of Artificial Neural Networks (ANN), which are parallel distributed processing units designed to store data from experience and facilitate various processes. The ANN consists of interconnected layers, including the input, hidden, and output layers. In this study, the DHT11 sensor is utilized for data collection, specifically for temperature and humidity measurements. The choice of this sensor is attributed to its ease of use, availability, and relevance to the parameters investigated. The paper aims to test and predict the accuracy of a prototype designed to measure temperature, humidity, and light, which significantly impact plant growth in Green Houses or greenhouses located in the valley. The analysis reveals the prediction error rates for the train and test data. The train data exhibits an RMSE of 1.76% and a MAPE of 0.0493%, while the test data shows an RMSE of 1.43% and a MAPE of 0.240%. These metrics are computed based on a total dataset of 13,112 instances, with 19% allocated for training and 16% for testing purposes. These results provide a comprehensive evaluation of the model's performance in predicting temperature, humidity, and light measurements. The obtained prediction error rates validate the accuracy of the prototype, showcasing its potential for monitoring and controlling environmental conditions in Green Houses. By harnessing ANN technology, precise measurements and predictions can be achieved, contributing to enhanced agricultural practices and optimal plant growth in controlled environments.

Keywords: Temperature, humidity, light

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