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RESEARCH ARTICLE

Accelerating Crop Yield: Multisensor Data Fusion and Machine Learning for Agriculture Text Classification

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ABSTRACT Sensors are now used by farmers and agronomists to help them improve their operations. They use sensor data transmitted via IoT to remotely monitor their crops. Farmers today manage crops in a controlled environment to increase yields in the name of modern farming. Crop productivity, on the other hand, is influenced by the severity of the weather and disease variations. The primary objective of this paper is to present a novel Multisensor Machine-Learning Approach (MMLA) for classifying multisensor data. The fusion strategy supports high-quality data analysis in agricultural contexts for cultivation recommendations. Based on the proposed recommendation system, eight crops were classified: cotton, gram, groundnut, maize, moong, paddy, sugarcane, and wheat. Crop species were classified using three machine learning algorithms: J48 Decision Tree, Hoeffding Tree, and Random Forest. To evaluate the performance of the proposed multi-text classifier, only the top eight classes were investigated. The classifier's performance is measured in terms of precision, recall, F-measure, MCC, ROC Area, and PRC Area class, and the results are compared with the state-of-the-art classifiers. The Random forest algorithm has the lowest error measure of RMSE at 13%, RAE at 38.67%, and RRSE at 44.21%, demonstrating effectiveness in classifying the agriculture text. Thus, the use of a multisensor data fusion approach based on crop recommendation provides greater precision in prediction, resulting in a significant increase in crop yield while also creating awareness in the condition-based environmental monitoring system.

INDEX TERMS Agriculture, crop yield, cultivation recommendation, farmers, multisensor, machine learning.

I. INTRODUCTION

A large portion of Asian countries is reliant on agriculture. The expansion of agricultural-based enterprises lacks quality assurance [1]. In the name of modern farming, farmers today manage crops in a controlled atmosphere to increase yield. However, the severity of the weather and the variability in disease are impacted by crop productivity. Consequently, a novel monitoring and information technology-based application, such as the Internet of Things (IoT), is required. Decisions about irrigation, climate change, soil nutrition, etc., may be managed once the precise status of crops is understood. This significantly raises the production of crops whose quality deteriorated as a result of environmental effects [2].

Farmers and agronomists employ a sensor today, which helps them improve their operations. They remotely monitor

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