

AI-Based Fertilizer Recommendation System Using Machine Learning for Precision Agriculture

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Abstract

The agricultural sector holds significant importance when it comes to food production and economic development. The improper use of fertilizers and non-scientific nutrients lead to poor soils, nutrient deficiencies, low yield crops, and unnecessary expenses on crop farming. Moreover, conventional approaches to the recommendation of fertilizers can be inaccurate and inefficient at times. This paper presents an innovative solution in the form of an AI Based Fertilizer Recommendation System Using Machine Learning approaches. The system takes into account various agricultural as well as environmental factors such as crop type, soil type, temperature, humidity, rainfall, soil moisture, pH value, nitrogen (N), phosphorous (P), and potassium (K). After analyzing all these factors, the system recommends the most suitable fertilizer containing these elements along with the quantity of the fertilizer. Random Forest algorithm has been chosen due to its excellent precision and ability to deal with complicated data. The results have shown that our model has achieved about 94 percent accuracy rate in predicting the right fertilizer.

Keywords

Artificial Intelligence (AI), Machine Learning, Precision Agriculture, Random Forest Algorithm, NPK Fertilizer Prediction, Soil Analysis, Crop Recommendation.