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## Crop Recommendation and Early Detection of Lack of Nutrients Using Machine Learning and Image Processing

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**Abstract:** In a country where farming is still the most common vocation and conventional agricultural practises are still used, farmers can only expect a limited amount of crop yields, which is ultimately less advantageous for them than the inputs they provide. So, in order to maximise crop yields for a given input, we are demonstrating various techniques that will be helpful to create a recommendation system for smart farming. Agriculture has never been a lucrative industry in India despite being a big industry and major occupation there. We suggest a system that would evaluate soil properties (pH value, soil type, and nutrient concentration) as well as environmental factors (temperature, rainfall, and geographic location in terms of state) before advising the user on the best crop to plant. The numerous data mining approaches are discussed in this work along with how they relate to soil fertility, nutrient analysis, and rainfall forecasting. Using decision trees, classification can be accomplished in data mining. One of the major problems that farmers confront is diseases that are affected on plant leaves, especially rice leaves. As a result, it is very challenging to deliver the amount of food required to feed the world's expanding population. Diseases affecting rice have reduced production and cost the agricultural industry money. Image acquisition, picture pre-processing, image segmentation, feature extraction, and classification are processes in the disease detection process. The techniques for identifying plant diseases using photographs of their leaves were covered in this essay. The segmentation and feature extraction algorithms utilised in the identification of plant diseases were also covered in this research.

Keywords: Crop.

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