FERTILIZER RECOMMENDATION SYSTEM FOR DISEASE PREDICTION

LITERATURE SURVEY

INTRODUCTION:

In our country agriculture is the main occupation. Most of the people who lead their life from the agriculture field fully rely on agricultural products. If any plant is carrying disease, then it causes reduction in both quality and quantity of agricultural crops. Hence it is necessary to detect and analyze disease. Recognition of crop disease plays an important role in adequately regulating and inhibiting disease for feasible agriculture and food preservation. Thus, detection and diagnosis of disease at the right time is essential to the farmer.

Farmers face several challenges when growing crops like scanty rainfall, poor soil quality, lack of soil nutrients, infestations, etc. Moreover, crop failure due to various diseases causes a significant loss to the farmers, as well as the consumers.

A user-friendly web application is essential to address some of these issues which may help improve crop yield. This study supports plant disease prediction and fertilizer recommendation. In addition, we also use interpretability techniques in an attempt to explain the prediction made by our disease detection model.

LITERATURE SURVEYS:

[1] Dhruvi Gosai, Binal Kaka, Dweepna Garg, Radhika Patel, Amit Ganatra, “Plant Disease Detection and Classification Using Machine Learning Algorithm”, 2022
https://ieeexplore.ieee.org/document/9726036

In this paper, the researchers have trained a model to recognize some unique harvests and 26 diseases from the public dataset which contains 54,306 images of the diseases and healthy plant leaves that are collected under controlled conditions. This paper worked on the ResNets algorithm.

[2] Shloka Gupta, Nishit Jain, Akshay Chopade, Aparna Bhonde, "Farmer's Assistant: A Machine Learning Based Application for Agricultural Solutions", 2022
https://arxiv.org/pdf/2204.11340.pdf

In this paper, the researchers proposed a system which helps farmers detect plant disease, recommend the ideal crop for their soil and recommend fertilizers for them to get the best yield possible. They used the EfficientNet deep learning model, which achieves 99.8% validation accuracy on the choice of dataset for plant disease detection. Random Forest model for crop recommendation based on the soil (N, P, K, pH) and weather features, and a rule-based classification system for fertilizer recommendation

[3] Humberto M. Beneduzzi , Eduardo G. de Souza , Wendel K. O. Moreira, "Fertilizer Recommendation Methods For Precision Agriculture – A Systematic Literature Study", 2022
https://www.scielo.br/j/eagri/a/9PXBwFNVkxVvSSz6gkDSFVg/?format=pdf&lang=en

In this paper, the researchers studied and worked on the fertilizer recommendation methods used in site-specific nutrient management and the calculation methodologies for N, P, and K recommendations. For this purpose, a systematic literature study (SLS), consisting of systematic literature mapping, snowballing, and systematic literature review was performed. The analyzed studies were grouped into five domains (precision agriculture, soil fertility, site-specific nutrient application, fertilizer recommendation methods, and recommendation software for site-specific nutrient application). As a result, the SLS identified 12 methods for recommending N, nine for recommending P, and six for recommending K, in addition to five computer programs for precision agriculture that perform fertilizer recommendations at varying rates.

[4] Senthil Kumar Swami Durai, Mary Divya Shamili, "Smart farming using Machine Learning and Deep Learning techniques",
Decision Analytics Journal, Volume 3, 2022, 100041, ISSN 2772-6622,
https://www.sciencedirect.com/science/article/pii/S277266222200011X

In this research paper, the researchers have identified the insects and pests present in farms and also have suggested pesticides for the predicted insect. To predict the Weeds RESNET 152 V2 pre-trained algorithm was used. It resulted in an accuracy of 0.98. As the epochs increased the accuracy also increased and also the loss decreased. This showed that the model learned progressively as the epochs increased.

[5] Anis Ahmad, Dharmendra Saraswat, Aly El Gamal, "A Survey On Using Deep Learning Techniques For Plant Disease Diagnosis And Recommendations For Development Of Appropriate Tools, Smart Agricultural Technology", Volume 3, 2023, 100083, ISSN 2772-3755,
https://www.sciencedirect.com/science/article/pii/S277237552200048X

This study presents a comprehensive overview of several studies on deep learning applications and the trends associated with their use for disease diagnosis and management in agriculture. The review is focused on providing a detailed assessment and considerations for developing deep learning-based tools for plant disease diagnosis.

REFERENCES:

[1] J. Liu, X.Wang, "Plant diseases and pests detection based on deep learning: a review", Plant Methods 17, 22 (2021).
https://plantmethods.biomedcentral.com/articles/10.1186/s13007-021-00722-9

[2] A. V. Panchal, S. C. Patel, K. Bagyalakshmi, P. Kumar, I. Raza Khan, M. Soni, "Image-based Plant Diseases Detection using Deep Learning" (2021)
https://www.sciencedirect.com/science/article/pii/S2214785321051403?via%3Dihub

[3] Sharma Abhinav, Jain Arpit, Gupta Prateek, Chowdary Vinay,
"Machine Learning Applications for Precision Agriculture: A Comprehensive Review", IEEE (2020)
https://ieeexplore.ieee.org/abstract/document/9311735

[4] Neethu K.S1, P .Vijay Ganesh, "Leaf Disease Detection and Selection of Fertilizers using Artificial Neural Network" (2017)
https://www.irjet.net/archives/V4/i6/IRJET-V4I6354.pdf

[5] Paustian Margit, Theuvsen Ludwig, "Adoption of Precision Agriculture Technologies by German Crop Farmers", Springer (2016)
https://link.springer.com/article/10.1007/s11119-016-9482-5