



PARSHVANATH CHARITABLE TRUST'S

A. P. SHAH INSTITUTE OF TECHNOLOGY

Department of Information Technology

(NBA Accredited)



Agrolife:ML enabled Plant Disease Classification System

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Project Guide and Co-Guide

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1. Abstract

Agrolife aims at detecting whether the plant is diseased or not and if yes, classify the disease caused. Further, the system will provide a gist about the disease with few easy home remedies(if applicable) and guide the user to take proper consultation. Along with this, we are providing crop recommendation and fertilizer recommendation system.

Convolutional Neural Network (CNN), a Deep Learning technique, is used which takes input from the user in the form of image data and displays the type of disease along with some remedies. Also, some other softwares used are Machine Learning(for recommendation system), Tensorflow(for preprocessing of data) and Google cloud server(for deployment). This, thus, would help in preventing the loss of crops resulting in an increase in production.

2. Introduction

- Agriculture is extremely important in developing countries like India, however food security still remains the vital issue.
- Problem Identified :
 - Due to various factors such as temperature, pollution, pests and many more, the plants get diseased.
 - These diseased plants are sometimes not evident enough to identify what kind of disease it has.
 - This results in mass deduction of food production.

- Solution Proposed :
 - This project focuses on studying and identifying whether the plant is diseased.
 - If so, we provide a gist about the disease with some home remedies and guide the user to take proper consultation.
 - Deep learning technique-CNN used here takes input from the user and displays the type of disease with its description and some remedies.
 - This thus, will help in preventing the loss of crops and also elevate growth in production.

3. Objectives

1. To detect the crop disease using Convolutional Neural Network algorithm.
2. To give right knowledge to the users about which disease the crop has using the image classification.
3. To help predict disease and display the actions to be taken at the right time.
4. To give right knowledge to the users about which crop to sow and which fertilizer to use in their field based on the soil data using Machine Learning.

4. Literature Survey

SR. NO.	PAPER NAME	FINDINGS
1.	Marzougui, F., Elleuch, M., & Kherallah, M. (2020). <i>A Deep CNN Approach for Plant Disease Detection. 2020 21st International Arab Conference on Information Technology (ACIT)</i> . doi:10.1109/acit50332.2020.9300072	Applies Deep Learning method- CNN which classifies the input leaf images as diseased or disease-free.
2.	Liu, J., Wang, X. Plant diseases and pests detection based on deep learning: a review. <i>Plant Methods</i> 17, 22 (2021). https://doi.org/10.1186/s13007-021-00722-9	The review provides a definition of plant diseases and pests detection problems, and puts forward a comparison with traditional plant diseases and pests detection methods.

4. Literature Survey

SR. NO.	PAPER NAME	FINDINGS
3.	Saleem, M.H.; Potgieter, J.; Arif, K.M. Plant Disease Detection and Classification by Deep Learning. <i>Plants</i> 2019 , <i>8</i> , 468. https://doi.org/10.3390/plants8110468	Provides a comprehensive explanation of Deep Learning models used to visualize various plant diseases. Additionally, some research gaps are identified from which to obtain greater transparency for detecting diseases in plants, even before their symptoms appear clearly.
4.	L. Li, S. Zhang and B. Wang, "Plant Disease Detection and Classification by Deep Learning—A Review," in <i>IEEE Access</i> , vol. 9, pp. 56683-56698, 2021, doi: 10.1109/ACCESS.2021.3069646.	Provides the research progress of deep learning technology in the field of crop leaf disease identification in recent years and discusses some of the current problems that need to be resolved.

5. Problem Definition

- Farmers' economic growth is determined by the quality of the goods they produce, which is dependent on plant growth and yield.
- As a result, in the field of agriculture, disease identification in plant leaves is important.
- It takes a long time to manually diagnose plant leaves' disease through naked eye.
- Thus, computational methods need to be developed to automate the process of disease detection and classification using leaf image classification.

6. Technology Stack

1. HTML, CSS, Bootstrap for interface
2. Python (version 3.6)
3. Tensorflow for preprocessing the data
4. Deep Learning using CNN model
5. Machine Learning using Random Forest and SVM Model
6. Google Cloud for deployment

7. Proposed System Architecture/Prototype

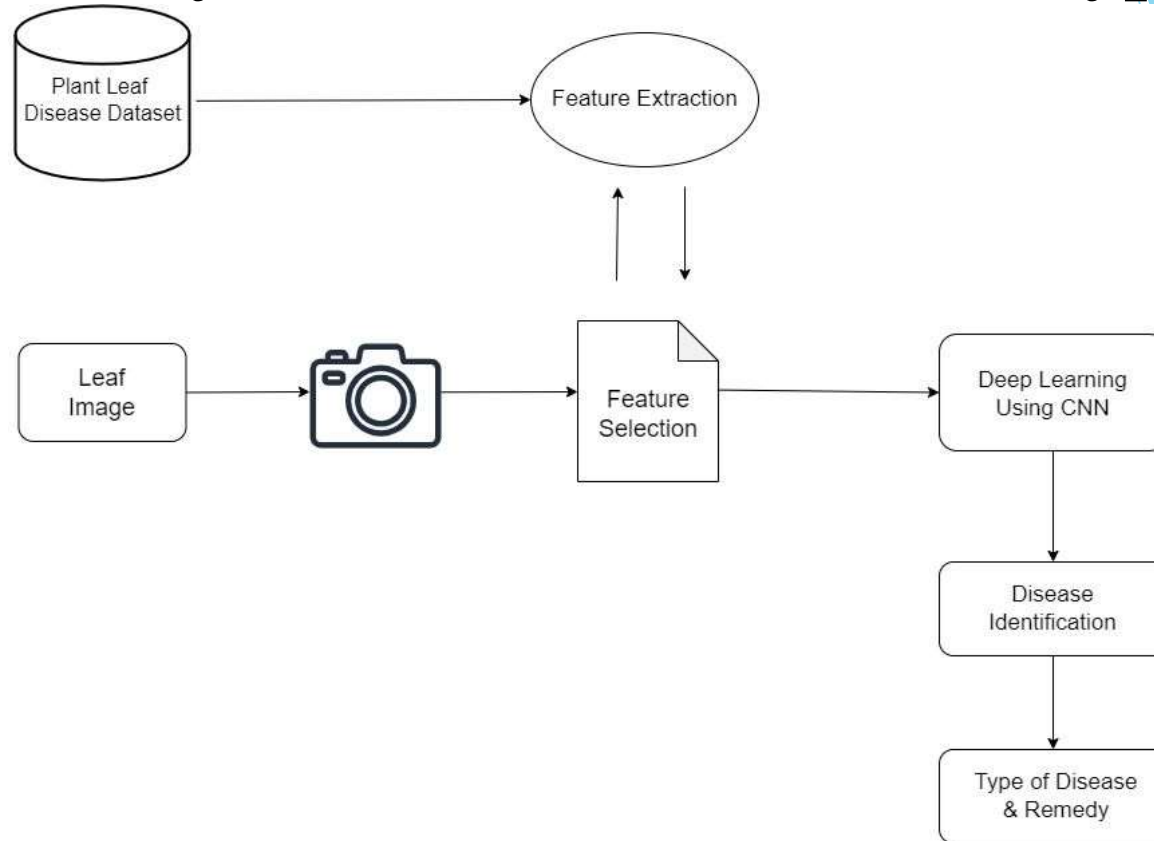


Fig 7.1 : Disease Prediction System

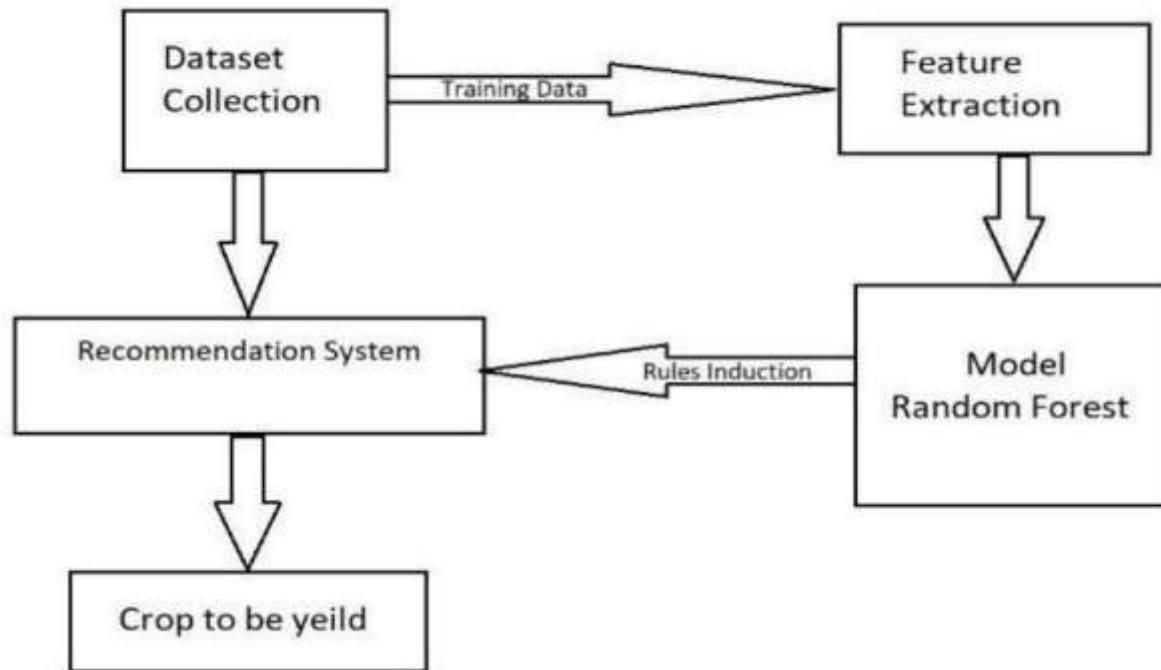


Fig 7.2 : Crop Recommendation System

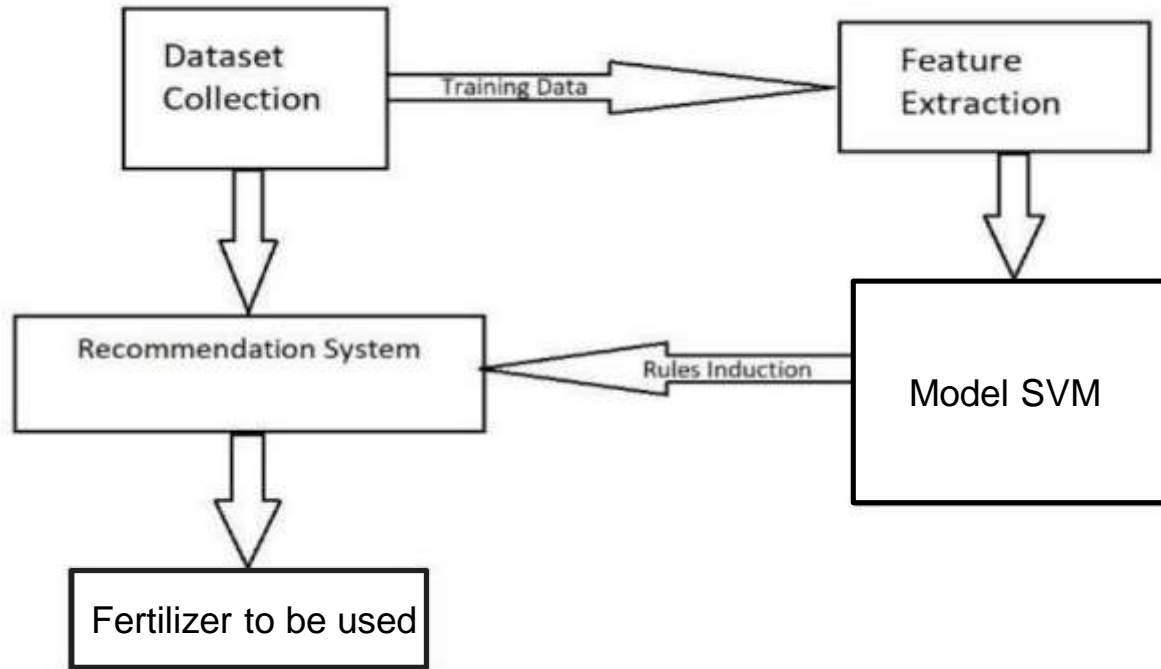
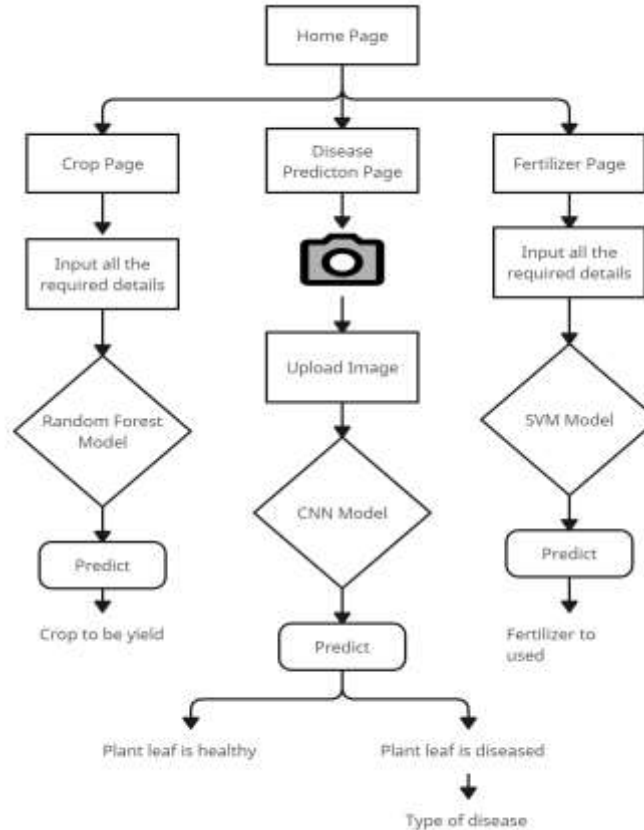


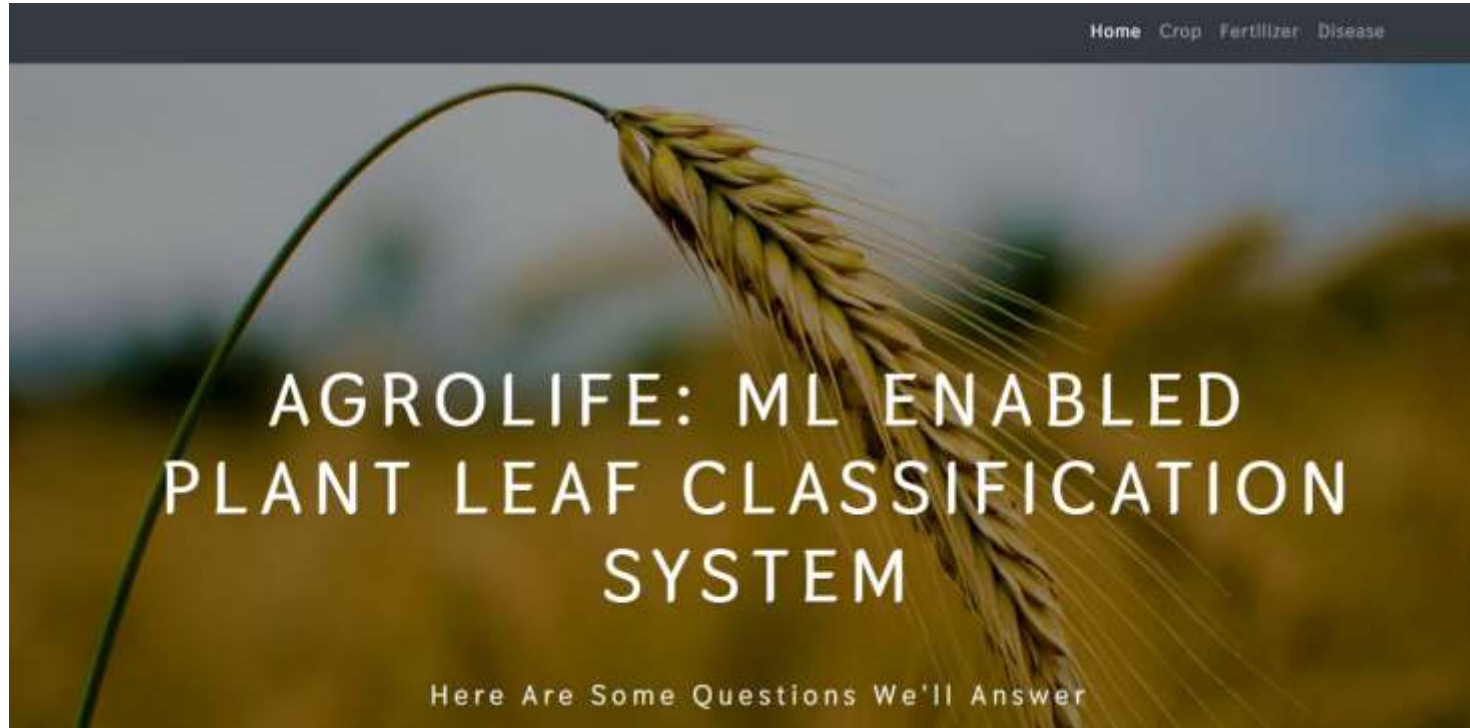
Fig 7.3 : Fertilizer Recommendation System

8. Workflow Architecture



9. Implementation

A] Home Page



B] Crop Recommendation Page

Find out the most suitable crop to grow in your farm

Nitrogen

Phosphorous

Pottasium

ph level

Rainfall (in mm)

C] Fertilizer Recommendation Page

Get informed advice on fertilizer based on soil

Nitrogen

Phosphorous

Potassium

Temperature

Humidity

D] Disease Prediction Page

Find out which disease has been caught by your plant

Please Upload The Image

Choose File No file chosen

Predict

10. Conclusion

In a modern environment with less knowledge of agriculture, it is important to have knowledge and an understanding of the factors that affect the cultivation before selecting any crop. In our website we have proposed an innovative approach for smart agriculture using Deep Learning and Machine Learning technology. Thus this system will be used to reduce the difficulties faced by the farmers and will increase the quantity and quality of work done by them. Thus the farmers can plant the right crop increasing his yield and also increasing the overall productivity of the nation. Our future work is aimed at an improved data set with a large number of attributes and also implements yield prediction.

Thank You...!!