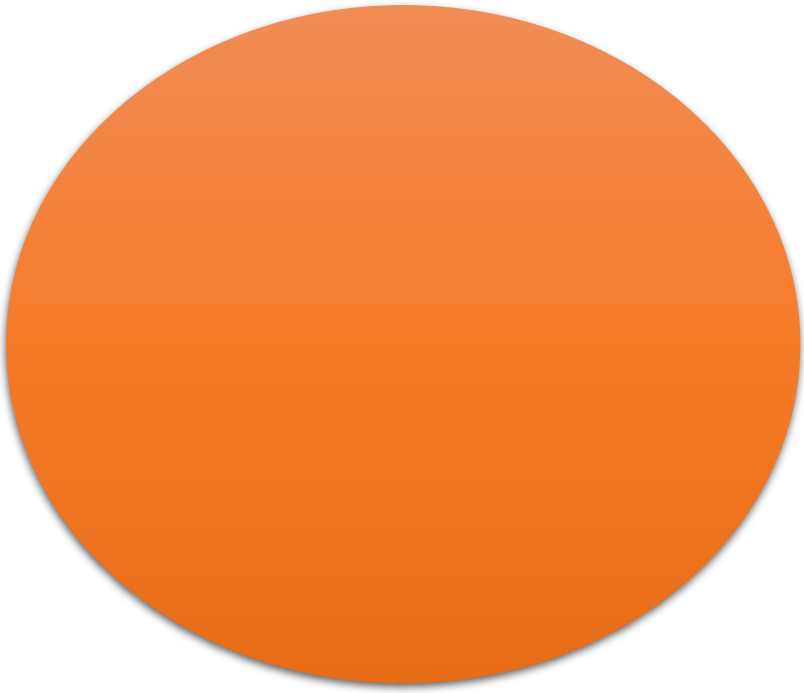

Fertilizer & Crop Disease Analysis and solutions using Machine Learning

PROJECT SYNOPSIS

OF MINOR PROJECT

BACHELOR OF TECHNOLOGY

BRANCH : COMPUTER ENGINEERING

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ABSTRACT :

In country like India, majority of the population is dependent on agriculture for their livelihood. Many new technologies, such as Machine Learning and Deep Learning, are being implemented into agriculture so that it is easier for farmers to grow and maximize their yield. Farming is one of the major sectors that influences a country's economic growth. Farmers are growing same crop in the season rather than growing different varieties in various seasons, also applying more quantity of fertilizers without knowing actual contents and quantity. So we have designed a recommendation model based on machine learning , describes the best suitable crop to be grown and fertilizer to be seeded depending on soil and weather conditions. Hence by utilizing our system, farmers can grow new crops in different seasons and benefit a better profit, avoid soil pollution.

KEYWORDS: Crop Disease Detection, Fertilizer Recommendation Model, Logistic Regression, SVM

INTRODUCTION :

I. Problem Statement

In India, farming plays a predominant role in economy and employment. The mutual problem. There are Indian farmers who, for their soil needs, choose the right crop. The patterns in agriculture have. Due to globalization, water can be improved using the soil humidity sensor to a large extent, increasing crop yield and the measurement of soil moisture content by field and by field. Where, Data mining plays an important role in agricultural estimation yield analysis of an area. Machine learning helps predict unknown values. The cost-effective Home kits help in data processing for farmers from diverse demographic dimensions It allows farmers to have access to real time. Weather forecasting, soil scanning, and Internet of Things for data processing. The farmers, therefore, could use the information obtained from the sensors, strategies accurately calculate the Measures to improve fertilizer effectiveness.

Purpose and Scope

Krushi Mitra is a platform that provides a better platform for all farmers by providing solutions on fertilizer recommendation and crop disease detection analysis based on images, soil and temperature.

These assist farmers in detecting the disease and recommending the fertilizer based on NPK(Nitrogen, Phosphorus & Pottasium) values.

So, the goal is to design a crop disease detection and fertilizer recommender system on the plants, crops and fruits. The system will be composed of server-side components and client side components. The server-side component will manage the database operations and algorithms that produce recommendation results. The client-side components will be graphical interfaces that are integrated into corresponding larger systems.

LITERATURE SURVEY :

1. Cotton Leaf Disease Identification using Pattern Recognition Technique

Authors: P. R. Rothe and R. V. Kshirsagar

Reference Link: https://ieeexplore.ieee.org/document/7086983

"Cotton Leaf Disease Identification using Pattern Recognition Technque" which Uses snake segmentation, here Hu's moments are used as distinctive attribute. Active contour model used to limit the vitality inside the infection spot, BPNN classifier tackles the numerous class problems. The average classification is found to be 85.52%.

2. id3 algorithm for getting improved and great quality of crop yield of Tomato

Authors: CH. Vishnu VardhanChowdary, Dr.K.Venkataramana

Reference Link: https://www.ijert.org/research/efficient-crop-yield-prediction-in-india-using-machine-learning-techniques

Existing Work

They developed id3 algorithm for getting improved and great quality of crop yield of Tomato and is executed in Php platform and datasets are used as csv. Temperature, area, humidity and the production of tomato crop are the different parameters used in this study.

3. SVM for crop yield prediction of rice

Authors: N. Gandhi, L. J. Armstrong, O. Petkar and A. K. Tripathy

Reference Link: https://ieeexplore.ieee.org/document/7748856

Existing Work

In this method, dataset used consists of different parameters such as place, temperature, precipitation and manufacturing. On this dataset, the implemented classifier is sequential minimal optimization. They prepared the dataset through Weka tool to manufacture the set of rules on current dataset. In python, by using SVM algorithm outcomes were produced.

METHODOLOGY :

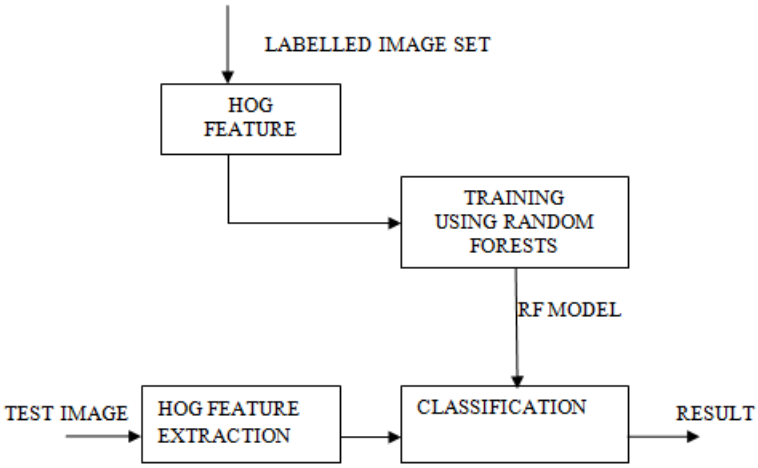
To find out whether the leaf is diseased or healthy, certain steps must be followed. i.e., Preprocessing, Feature extraction,Training of classifier and Classification. Preprocessing of image, is bringing all the images size to a reduced uniform size. Then comes extracting features of a preprocessed image
which is done with the help of HOG .

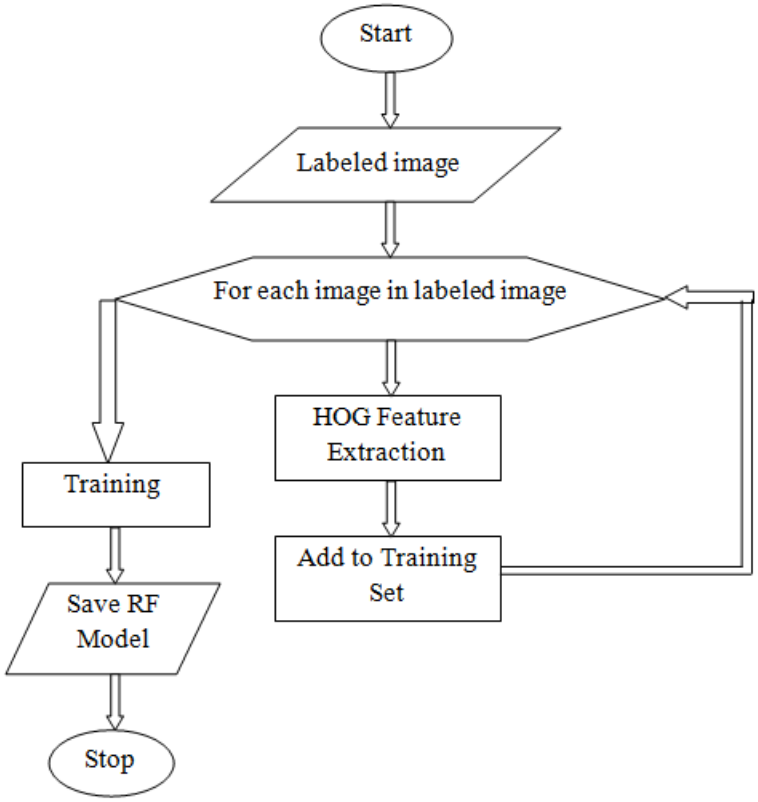
I. **Hu Moments –** Image moments which have the important characteristics of the image pixels helps in describing the objects. Here Hu Moments helps in describing the outline of a particular leaf. Hu moments are calculated over single channel only. The first step involves converting RG to Gray scale and then HU moments ae calculated. This step gives an array of shape descriptions.

II. **Haralick Texture –** Usually the healthy leaves and diseased leaves have different textures. Here we use Haralick texture features to distinguish between textures of healthy and disease leaf. It is based on adjacency matrix which stores the position of (I,J). Texture is calculated based on the frequency of pixel I occupying the position next to pixel J. To calculate Haralick texture it is required that the image be converted to gray scale.

III. **Color Histogram -** Color Histogram gives the representation of the colors in the image. RGB is first converted to HSV color space and the histogram image to HSV since HSV model aligns closely with how human eye discerns the colors in an image. Hstogram plot provides the description about the number of pixels available in the given color ranges.

Architecture of the proposed model for crop disease detection and fertilizer recommendation


LABELLED IMAGE SET
HOG FEATURE
TRAINING USING RANDOM FORESTS
RF MODEL
TEST IMAGE
HOG FEATURE EXTRACTION
CLASSIFICATION
RESULT


Start
Labeled image
For each image in labeled image
HOG Feature Extraction
Training
Add to Training Set
Save RF Model
Stop

CONCLUSION :

As recommendation of fertilizers and crops is important for farmers in farming decision making. Recommendations of suitable crop in the field and fertilizers for crops to farmers are provided with the help of data stored in ontology. Proposed model provides crop recommendation based on region, type of crop and fertilizer recommendation based on NPK content of soil, available on their mobile phones. Thus aim of this model is to increase the production of crops by recommending correct crop and fertilizer. The performance evaluation shown that the accuracy of developed system is reasonably high. In future we will added more crops and fruits for disease detection. We will add more regions for fertilizer recommendation based on NPK content of soil, temperature.

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