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IoT BASED PREVENTIVE CROP DISEASE MODEL USING IP AND CNN

Vrushabh Shende[1], Dr. Mahendra Pund[2]

[1]ME, CSE Department, PRMIT&R College, Maharashtra, India
[2]Associate Professor, CSE Department, PRMIT&R College, Maharashtra, India

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Abstract - *Agriculture is the strength of Indian Economy. As agriculture consist almost 70% of the total finance of India. As like any other field, agriculture field also has to face many problems. Agriculture is dependent on many factors like weather, monsoon, financial, etc. the major problem that affects the agriculture is the crop diseases that can cause to reduce its productivity. Preventing crop diseases can help to grow agriculture. There is no specific method to do that. Most of the time, diseases are detected when the harm is done. As this is technological era, many things are depending on technology and technology has better solution on many problems. Agriculture is the field where technology can help a lot. To detect and preventing the diseases can be achieved using technology.*

Key Words: **Technology, Agriculture**

1. INTRODUCTION

Identification of the crop diseases is very main in any field to preventing the losses. Health monitoring and disease detection on crop is very critical for sustainable agriculture. To identify the leaf diseases mean the studies of visually observable patterns seen on the leaf. Leaf disease detection requires huge amount of work, knowledge in the crop diseases, and also require the more processing time. Now a day's technology plays vital role in all the fields but till today we are using some old methodologies in agriculture. If disease is wrongly detected it will leads to a loss of yield, time, production and money. We can use Image Processing techniques and Convolution Neural network together for identification of diseases.

The aim of this proposal is to develop a user friendly system for the farmers that will help farmers in finding out diseases of leaves without bringing an expert to the field. We are providing remedies of diseases to the user. For this purpose we first get the image from user then perform feature extraction on that image. For extracting the features we use color (HSI model). The convolution neural network is use for classifying the diseases. The system can uses one image databases, 80% of the data can use for training the model and 20% of data can use for testing the model.

2. RELATED DATA

This section of Literature Survey eventually reveals some facts of Crop Disease Identification System based on the analysis of many authors work as follows:

R. Newlin Shebiah [1], proposes to develop a system that automatically finding the solutions for plant leaf disease by analyzing the texture of leaf. At the initial stage diseases are analyzed. The identification rate is short which needs to be optimized to avoid the misclassification of the variable symptoms of the plant disease.

Sateesh K.Peddoju [2], aimed to develop a mobile vision based plant leaf recognition system which monitor crop diseases having different patterns. It classifies its suitable class which can be used to help the botanical students in their research work. The feature factor used in the system planned by the author in this work has enormous computation cost. The quality of captured image is affected by the shadow and season.

H. Al-Hiary [3], proposed an improved solution for classification of leaf diseases by using algorithms like k-means and neural networks. Otsu's method are used in segmentation to mark green pixels and then the boundary pixels are removed. In proposed work clustering and classification of diseases is done.

3. PROPOSED WORK

We aimed to develop a system which helps the farmers to identify the diseases of crop. We are using Convolution neural network and Image processing to give accurate and fast result to the farmers. The main objective of this system to detect the disease of leaf and provide the remedies for that disease using image processing technique and convolution neural network technique. The purpose of this system is to provide advanced image processing tools in a format that is easy to use and is cost efficient too. We are using various algorithm and perform various operation for detecting the disease of leaf. Some operation are like converting image format to RGB to HIS, create histogram, perform flood fill algorithm. This operation are used for feature extraction. For detecting the disease, we are using convolution neuron network.

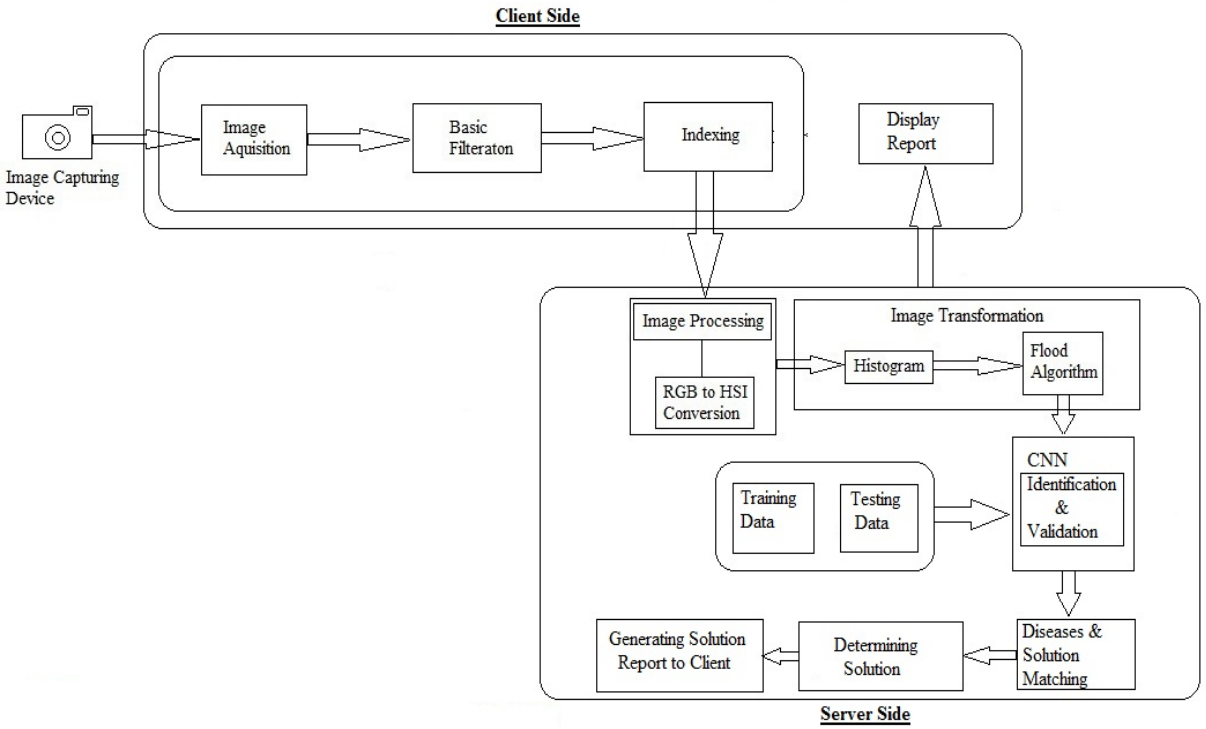

Fig-1: System Service Diagram

3.1 Methodology:

3.1.1 Features Extraction:

Conversion from RGB to HIS model and flood fill algorithm is use for feature extraction.

A. Conversion from RGB to HIS model:

Basically the input image is in format of RGB model. The RGB model, which encodes by their intensity of color of Red, Green, and Blue. Each color red, green and blue defines their intensity of color by an integer value between 0 to 255. The HSI model, which encodes colors according to their **H**ue, **S**aturation, and **I**ntensity. The HIS model is used by some graphics software and image monitoring system alongside the RGB Model.

B. Flood Fill Algorithm:

For segmentation purposed flood fill algorithm is very important. Flood fill algorithm is also called region growing algorithm. At a first view, it looks very simple algorithm to implement but it has very interesting implementation for segmenting the image. Flood fill algorithm finds the same color area from starting point to last point with same color. Flood fill algorithm includes 4 or 8 direction of neighbors that check for condition to same area color and perform the operation recursively for neighbors in case they passed that condition.

3.1.2 Role of CNN in image classification:

After performing the features extraction, training the database images is very important phase in Convolution neural network. After training the module, we test the module by 20% of images in database to check the accuracy of the module. The accuracy of the model is depend on the size of database, higher the size of database higher the accuracy of the model. So if the accuracy is low, increase the database size. Convolution neural network accept all the new images for image classification and for that there is no need to train the model every time. CNN has a different layers of receptive fields. For detect the disease of leaf we provide the image to train model by convolution neural network and model predict the disease of leaf. After finding the disease, we provide the remedies of this disease.

3.2 System Components:

The system components are as follows:

1. Data acquisition subsystem then converting to required format
2. Image processing and filtration thus identification of data to be extracted

3. Train and Test the data for CNN
4. Identification process(CNN)- Existence of types of diseases
5. Matching with symptoms database and providing solution
6. Sending data to Farmer through web technology

4. CONCLUSION

In this paper, we study the system which can automatically recognize, identify and detect crop diseases. Sensor device such as camera or smartphone has a key role in collecting pictures of plants for the checking scheme. This work will help farmer to utilize their time and work. And can reduce the efforts of farmer. Proposed work can expressively support a correct detection of leaf infections in a little computational strength.

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