Cloud Based E-Commerce Application For Organic Fertilizers, Pesticides And Other Products And Crop Disease Identification Using Computer Vision

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Abstract— **Agriculture is the backbone of India. The Indian Agriculture board provides so many options to farmers in order to stop the growth of farming through chemical fertilizers and pesticides. But it has not reached the farmers in an effective way. Since, India is developing digitally , there is a solution which can be provided digitally to this problem. Organic pesticides and fertilizers can be sold to farmers through online and post guideline instructions videos on using organic pesticides and fertilizers.**

Keywords- convolutional neural network, deep learning, crop disease, pesticides sale, node js, react js, mongo db.

I. INTRODUCTION

Agriculture is that the first occupation of man because it embraces the planet and it's the inspiration of all other occupation. But it is not an easy occupation and it requires experience since the needs of the crops has to be satisfied on time. Modern Agriculture provides features to get high yield. At the same time, it makes the soil infertile and it is not safer for farmers as well as consumers. Due to modern agriculture, people need to face different health issues including chronic diseases. In order to avoid health issues due to these chemical products, the method of organic farming is suggested. But it has not reached the farmers in an effective way. According to the Survey, about 2.78 million hectare of farmland was under organic cultivation out of 159.7 million hectares agricultural land which is only 17% of it. Another Important problem faced by farmers is related to health of the crop. Many farmers could not identify the disease in crop which leads to loss of yield. In order to overcome these issues, the proposed system provides a user friendly and easily accessible application for detecting disease of the crop and an e-commerce portal for buying and selling organic products including seeds, fertilizers and pesticides. Computer vision helps in getting and processing image of the crop and using Convolutional Neural Network, disease in crop can be identified. With MERN Stack, a web application can created for farmers, which involves selling and buying organic products and crop disease detection.

II. EXISTING SYSTEM

There is no complete portal to help organic farmers. There are many separate portals for selling chemical fertilizers and pesticides and also few portals for selling organic farming products. Many other e-commerce websites also has organic manure and fertilizers. But organic seeds are not available at large scale. The customers are not provided with the details of the product they buy and they may not have the knowledge on these things. Crop disease detection is done by sensors or Raspberry pi cameras are required for it. High resolution cameras are required for disease identification

III. PROPOSED SYSTEM

The proposed system makes the farmers to learn completely on the product and make their purchase more comfortable. The Sellers are provided with the facility to explain the product along with a demo video for easy understanding of farmers. Since it is a cloud implementation, the process of ordering and launching products at large scale is very comfortable. The implementation is done using MERN Stack and the application is deployed using AWS cloud services. An user interface is provided to scan and upload photo for disease identification. Using convolutional neural network, crop's problem is detected

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and solution is provided.

IV. Proposed System Modules

Organic Product Selling

This module deals with e-commerce web application built using MERN Stack. Since it is a cloud implementation, the process of ordering and launching products at large scale is convenient.

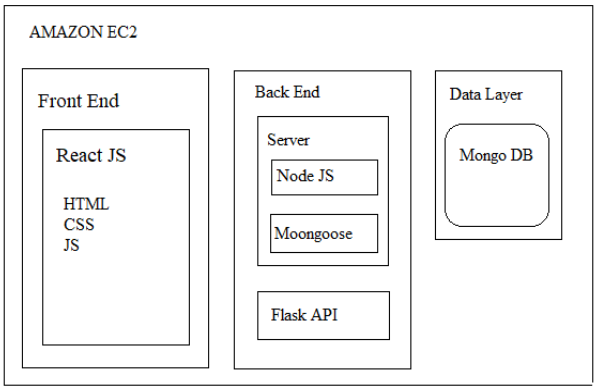

Fig.1 . Architecture diagram of proposed web application

A. Registration/Login

There is a separate registration for farmers and sellers. Authentication and sign in is provided to ensure security through a user friendly platform. Sellers must register themselves with relevant seller identification. Any user can register them as customer.

B. Seller 's Market Place

The seller can upload the images of the products and demonstration video of product usage with description for the product. These products are displayed at market place which customer can buy.

C. Purchasing Products

The farmer can purchase the organic products by searching the product name, or by features or by sorting the price or by searching through location. Suggestions are also displayed based on the history of customers.

D. Delivery of Organic products

After confirming the booking of products, all the fertilizers and pesticides will be delivered to the farmer's location. The payment mode can either be on the delivery time or can be previously paid through internet.

E. Identifying Fertilizer and medicine for crop

A separate module consists of web camera which allows to capture images of plants. The images are uploaded and using flask API, the disease is found. The medicines for disease is suggested to the user using collaborative filtering.

Plant Disease IDentification

Apart from providing the essentials for the crop, the applications ensure the better health of the crop. Using neural network, the crop disease is identified using image processing and relevant fertilizer is suggested to the customer.

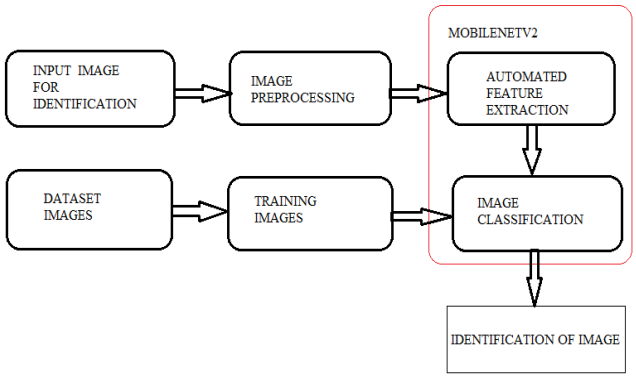

Fig.2. Block diagram of Image Classification for disease identification

A. Datasets

To train the model for classifying the images, large amount of image dataset is required for disease classification. The dataset is collected from Plant Village website which contains healthy as well as affected plant dataset of different crops.

B. Training Images

The images available in the dataset are reduced to similar and standard resolution for efficient training. The collected images are classified and labeled based on its properties. These images are trained using jupyter notebook.

C. Input image from User

Using the computer vision feature available in the Node JS, user can give the image of the plant. Thus image is reduced to required resolution and passed to flask API.

D. Image Preprocessing

The input image is processed using open computer vision and tensor flow. The unwanted noises including background of crop, reflection are removed and intensity is normalized for feature extraction.

E. Feature Extraction

The pixels of the input crop image which are required for detection and identification are extracted using python. The values are feed to the trained model for comparison.

F. Image Classification

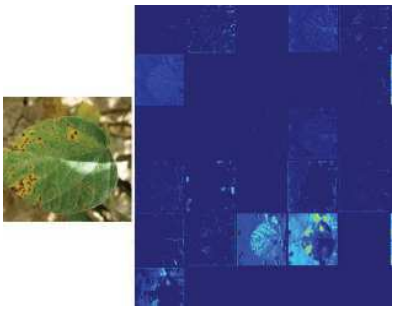

Fig 3. Feature extraction from a input image of affected leaf

Using the features identification of affected crops from deep learning, the values extracted from input image are compared. Mobile Net V2 architecture consists of difference pooling layers which clustered images and identified parameters which is relevant to particular diseases. Based on the difference in parameters, the label consisting corresponding clustered image is returned as disease of given input image.

V. IMPLEMENTATION

a. React JS
b. Node JS
c. Mongo DB
d. AWS
e. Tensorflow
f. Keras
g. Flask

The Front-end implementation is done using React JS and back end implementation is done by Node JS. The Products and user data are stored in Mongo DB which can be accessed by the proposed application using mongoose server. The application is deployed using AWS cloud services for providing high scalable application. The Crop Disease identification module is implemented in CNN and image processing using Tensor Flow. The accuracy of the trained model is approximately 97.6%. The application is deployed as Flask API which can be used in Amazon EC2 as a RESTful web service.

CONCLUSION

Ultimate goal of each technology is helping the human kind. The proposed application easily provides better results in identifying disease using deep learning and image processing. The web application provides a better user interface for customers and cloud implementation provides scalable environment for real time usage .With the proposed application, we hope that we can build a healthy environment for future generation.

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