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Survey Paper: Plant Disease Detection using CNN

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Abstract: *"Agriculture provides employment opportunities for village people on large scale in developing country like India. Most of Indian farmers are adopting manual cultivation due to lagging of technical knowledge. In addition that, Plant leaf disease has been one of the major threats to for plants since long ago because it reduces the crop yield and compromises. plant diseases are studied in the literature, mostly focusing on the biological aspects. They make predictions according to the visible surface of plants and leaves. This paper presents a system that is used to classify and detect plant leaf diseases using machine learning techniques. In our work, we have taken specific types of plants; include tomatoes, pepper, and potatoes, asthey are the most common types of plants in the world and in Iraq in particular. Using machine learning algorithms, which comprise procedures like dataset construction, loading images, prepping, segmentation, feature extraction, training a classifier, and classification, it is possible to classify plant diseases. This paper presents a Convolutional Neural Network (CNN) model algorithm based method for Agricultural leaf disease detection and classification. So, the neural networks can capture the colours and textures of lesions specific to respective diseases upon diagnosis.*

Keywords: Disease Detection, Convolutional Neural Network

I. INTRODUCTION

Since the ancient times agriculture has its own importance in human life. plants are the basic source for supply of energy for human body. the agricultural sector is a central pillar of the Indian economy, employing 60 percent of the nation's workforce and contributing to about 17 percent of its GDP. In the agriculture sector farmers have face problems like instability, weather, production loss due to plant disease, and much more. Plant diseases are very important as this can especially imply both the quality and quantity of plant in the developmentof agriculture. Crop diseases cause serious economic losses to farmers. Many computer visionapproaches have been developed over the year for the automatic detection and identification of disease attacks.

Generally, the diseases of plants include fungi, bacteria, viruses, moulds, etc. Recent studies on leaf diseases show how they harm the plants. Plant leaf diseases also cause significant economic losses to farmers. Early detection of the diseases deserve special attention. Plant

diseases are studied in the literature, mostly focusing on the biological aspects. They make predictions according to the visible surface of plants and leaves. Disease detection involves the steps like image acquisition, image pre-processing, image segmentation, feature extraction and classification. Image processing is a branch of signal processing which can extract the image properties or useful information from the image. Machine learning is a sub part of artificial intelligence which works automatically or give instructions to do a particular task. The main aim of machine learning is to understand the training data and fit that data into software models that useful to People in everyday life.

There is a need for solutions that can predict the occurrence of the disease attack before it makeplant dead. Accurate detection of plant disease is needed to strengthen the field of agriculture and economy of our country. Various types of Disease kill leaves in a plant. Farmers get moredifficulties in identifying these diseases, they are unable to take precaution on those plants dueto lack of knowledge on those diseases. There are many researchers have been done every yearin the growing part of image processing and computer vision. In this work, we propose a systemthat detects and classifies plants diseases using a machine learning techniques.

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II. LITERATURE REVIEW

Paper Name: Plant Leaf Disease Detection using machine learning.
The main objective that were focused in this paper is to study different types of diseasesfound in plant leaf and also to study and analyse different which are techniques for plantleaf disease detection using image processing technique and main goal was to propose improvement in existing classification techniques for plant leaf disease detection using machine Learning.

Paper Name: Plant Leaf Disease Detection using image processing.
Agriculture is the mother of all civilizations. The focus is on improving productivity without taking into consideration the environmental effects that have appeared in the degeneration of the environment. Plant diseases are very important as this can especially imply both the quality and quantity of plant in the development of agriculture.

Paper Name: Plant Disease Detection and Classification by Deep Learning
Machine Learning (ML) models have been employed for the detection and classification of plant diseases but, after the advancements in a subset of ML, that is, Deep Learning (DL), this area of research appears to have great potential in terms of increased accuracy.

Paper Name: Android Application for Leaf Disease Recognition
Plants are a major source of food for the world population. Plant diseases contribute toproduction loss, which can be tackled with continuous monitoring. Manual plant disease monitoring is both laborious and error-prone. Early detection of plant diseasesusing computer vision and artificial intelligence (AI) can help to reduce the adverse effects of diseases and also helps to overcome the short comings of continuous humanmonitoring.

III. METHODOLOGY

The system application work flow shown Below diagram. When user is opened the application for the first time, the user will see the front page, which is nothing more than thelanding page, whichshows the small details about the project and also contains the contact section." In the landing we provide login and Register button. If the user is not already registered with the system, he must first register on portal. After clicking on" Register," a registration form will get opened that contains some details like First name, Last name, Email, Password, Mobile, and Aadhar Card No. After submitting this form, an email willbe sent to the user by the system to their registered email address. That email also contains a login form link, or the user can login by simply clicking on" login." After entering the correct details, the user will be directly redirected to the main page. After logging into the application he or she entered into Application main UI. We have provided the Forgot password button for Forgot Password if anyone lost the password. The password will be in Standard Format.

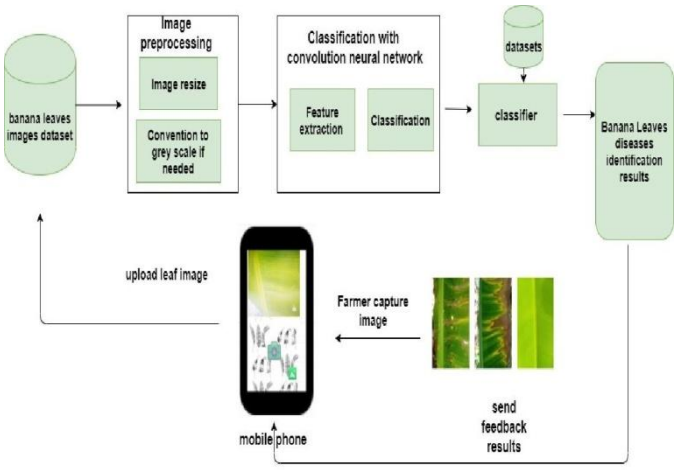

Fig 1: Normal Workflow of System

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After successful login, the user will be redirected to the main page, which contains the dashboard, including home, upload images, and history. After clicking on the upload image option, the user will see options like" capture" or" upload." After submittingthe image, a result will be generated and shown on the same page, which includes stage of the disease, impact of disease on the pand what care the farmer needs to take. Our system helps farmers better understand the amount of pesticide they need to use for plant health. It also informs the farmer whether or not the disease can be treated with organic fertilizer. If possible, which fertilizer is beneficial should also be mentioned.

IV. PROPOSED SYSTEM

In this part, we present a computer vision system to identify plant leaf disease system.

4.1 Image Acquisition

The plant leaves disease pictures have been obtained from the Plant Village) treasury from the collected dataset comprises of around 20636 images relating to 15 differentclasses. The dataset comprises images of all main kinds of leaf diseases that could influence the three types of plant its tomato, pepper, and potato crops which were chosen because it is of the most famous types of plants in the world in general and inIraq also.

4.2 Image Preprocessing

This procedure is a readiness procedure to get plant leaf pictures. The RGB shading pictures of plant leaf are captured utilizing a digital camera, with pixel goals 568x1020.There have been gathered 75 information tests. It comprises five types of diseases which affected the plants.

4.3 Image Segmentation

Image segmentation is a technique for dividing a digital image into multiple" image segments." It enables the image's complexity to be reduced in the future, allowing for simpler image processing or analysis. Rather than processing the entire image, a portionof the image selected by the segmentation algorithm can be fed to the detector. [18] It helps in processing only the damaged area of an image rather than the entire image.

4.4 Feature Extraction

Diverse features are picked to depict the distinctive properties of the leaves. A few leaves are with a particular shape, some have distinctive surface examples, and someare described by a mixture of these properties.

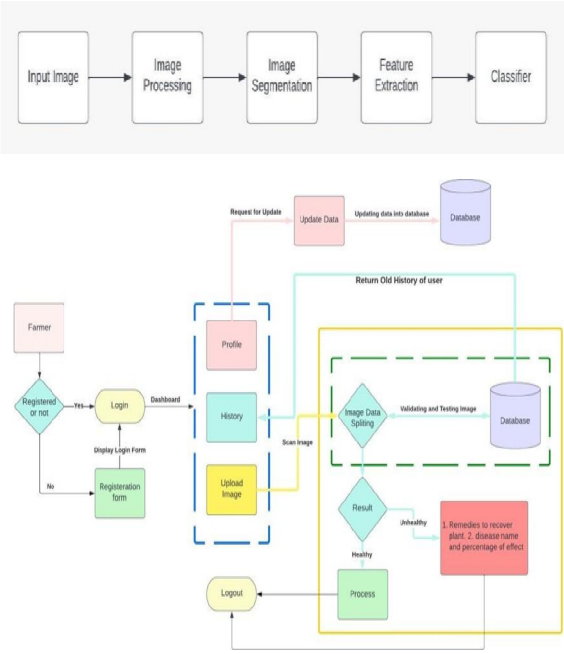

Figure 2: System Architecture

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V. CONCLUSION

This paper proposes a CNN based method for plant disease classification using the leaves of diseased plants. this research proposed a robust methodology to detect and classify these diseases with accurate and fast rsults based on Mobile app facilities and Machine learningand Deep Learning Techniques. In this paper, our main goal was to propose improvement existing classification techniques for plant leaf disease detection using machine learningand that is proved using CNN classifier. the result of proposed model is compared with existing models. It is observed that, the accuracy of Proposed model provides better accuracy compared to the other existing models.

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