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Extraction of Crop Cycle Parameter from Multi-Temporal Data

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Abstract –**This work aims to point the simplest way to manage heterogeneous information and data coming from real datasets that collect physical, biological, and sensory values. As productive companies—public or private, large or small—need increasing profitability with costs reduction, discovering appropriate ways to require advantage of information that are continuously recorded and made available are often the proper choice to achieve these goals. The agricultural field is barely apparently refractory to the digital technology and also the "smart farm" model is increasingly widespread by exploiting the online of Things (IoT) paradigm applied to environmental and historical information through time-series. the most target of this study is that the look and deployment of practical tasks, ranging from crop harvest forecasting to missing or wrong sensors data reconstruction, exploiting and comparing various machine learning techniques to suggest toward which direction to use efforts and investments. The results show how there are ample margins for innovation while supporting requests and desires coming from companies that wish to use a sustainable and optimized agriculture industrial business, investing not only in technology, but also within the knowledge and in skilled workforce required to want the only out of it.**

Keywords– **Tensor flow, CNN Algorithm.**

I. INTRODUCTION

India is a cultivated country and about 70% of the population depends on agriculture. Large range of diversity for selecting various suitable crops and finding the suitable pesticides for plants is found. Disease on plant leads to the significant reduction in both the quality and quantity of overall agricultural products. The studies of plant disease refer to the visually observable patterns on the plants. Monitoring of diseases on plant plays an important role in successful crop cultivation. In early days, the monitoring and analysis of plant diseases were done manually by the expertise person in that field. This process requires tremendous amount of work hence requires excessive processing time. The plant disease detection can be done effectively with the help of various image processing techniques. Nowadays the agricultural yield is affected by global change factors such as: new varieties in the crops, changes in consumer taste, natural causes, and/or anthropogenic events.

In this sense, the agricultural is exposed to global change effects, where its vulnerability depend of factors such as abiotics, biologics, socioeconomics and regional's , thus different land areas on earth are potentially vulnerable to climate change and direct and indirect productivity loses, contributing also to the occurrence of diseases and pest . On the other hand exist an area of machine learning, which builds models for regression and classification named supervised learning.

II. LITERATURE SURVEY

Crop diseases have the potential to cause devastating epidemics that threaten the world's food supply and vary widely in their dispersal pattern, prevalence, and severity. It remains unclear what the impact disease will have on sustainable crop yields in the future. Agricultural stakeholders are increasingly under pressure to adapt their decision-making to make more informed and efficient use of irrigation water, fertilizers, and pesticides.

They also face increasing uncertainty in how best to respond to competing health, environment, and (sustainable) development impacts and risks. Disease dynamics involves a complex interaction between a host, a pathogen, and their environment, representing one of the largest risks facing the long-term sustainability of agriculture. The feasibility of this approach is investigated involving model and data selection.. In the future, a model-based forecasting approach, if supported with an airborne surveillance monitoring plan, could be made operational to provide agricultural stakeholders with reliable, cost-effective, and near-real-time information for protecting and sustaining crop production against multiple disease threats.

Agriculture is the basic occupation of all Indians. Farmer is said to be man of nation. We consider this as our responsibility to explore this occupation and take it to a higher level from technology point of view. The basic purpose for developing this system is crop disease prediction using various data mining techniques. Our project describes a new approach to crop disease prediction which helps to prevent future economical losses. This project emphasizes on every single concept related to crop diseases. This is accomplished by building a web platform in which farmers can interact with expert, share their experiences and knowledge. This results in a dynamically-growing online survey, which ultimately helps in data collection that can be used to identify various crop diseases and helps to prevent them.

The climate change has caused threats to agricultural production; the extremes of temperature and humidity, and other abiotic stresses are contributing factors to the etiology of disease and pest on crops. About the matter, recent research efforts have focused on predicting disease and pest crops using techniques such as supervised learning algorithms. Therefore in this paper, we present an overview of supervised learning algorithms commonly used in agriculture for the detection of pests and diseases in crops such as corn, rice, coffee, mango, peanut, and tomato, among others, with the aim of selecting the algorithms that give the best performance for the agricultural sectors.

III. EXISTING SYSTEM

This describes a new approach to crop disease prediction which helps to prevent future economical losses. This project emphasizes on every single concept related to crop diseases. This is accomplished by building a web platform in which farmers can interact with expert, share their experiences and knowledge. In Agriculture sector plants or crop cultivation have seen fast development in both the quality and quantity of food production, however, the presence of pests and diseases on crops especially on leaves has hindered the quality of agricultural goods. There is therefore a need to identify these diseases at an early or superior stage and suggest solutions so that maximum harms can be avoided to increase crop yields.
Test data acquisition module: Test data acquisition module is test data acquisition or Data selection as the process of determining the appropriate data type and source, as well as suitable instruments to collect data. Data selection precedes the actual practice of data collection. This definition distinguishes data selection from selective data reporting (selectively excluding data that is not supportive of a Developing an Agricultural Portal for Crop Disease Prediction and interactive/active data selection When the user uses his android phone and gets a snap of the image, the features of query image are first extracted using CBIR. The images in the database are first grouped with respect to the features of images like colour, texture, shape. Features which are extracted from the query image are compared with the clusters and a set of images are produced. Iimages matching nearest to the query image are generated. Finally, result is returned to the user.
Data mining module : Data mining is the process of extracting valid information from large databases. Data mining used in many research areas. Data mining is widely used in agricultural data processing. There are many techniques of Data mining which are developed for decision making (DSS). If proper decision making techniques are applied on data then these data are stored in data bases. These data are used to understand the hidden correlation between crop-pest and disease parameters . Result analysis And testing : Plant disease forecasting models must be thoroughly tested and validated after being developed. Interest has arisen lately in model validation through the quantification of the economic costs of false positives and false negatives, where disease prevention measures may be used when unnecessary or not applied when needed respectively. The costs of these two types of errors need to be weighed carefully before deciding to use a disease forecasting system.

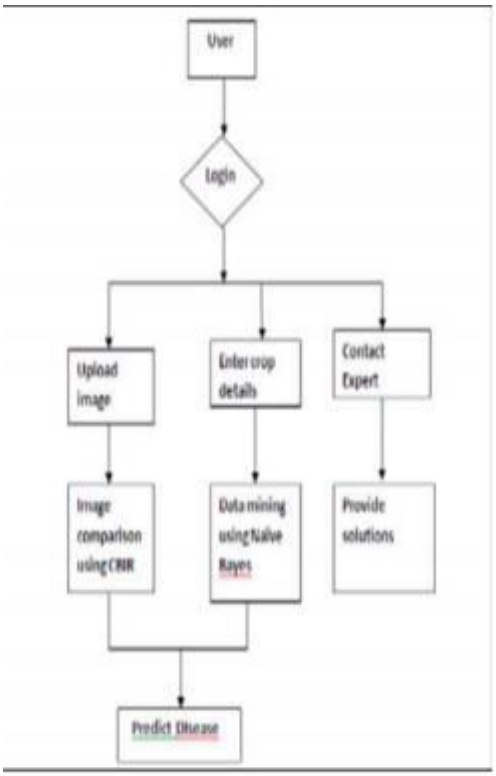


Fig.3.1. Interactive portal flowchart.

This figure3.1 shows an interactive portal where farmer needs to register his details. After successful login he will be given access to multiple options like upload image, enter crop details and contact expert. User can upload

single or multiple images of affected crop . The images uploaded by user will be compared with images present in database using CBIR(Content Based Image Retrieval) Technique. The user can enter crop details like soil quality, sunshine hours, temperature, humidity, rain-fall, Developing an Agricultural Portal for Crop Disease Prediction (IJIRST/ Volume 3 / Issue 11/ 025) All rights reserved by www.ijirst.org 146 pesticides, fertilizers, seed variety, area .

IV. PROPOSED SYSTEM

The proposed system consists of sensors which are to monitor the leafs of the crop that suffers with the diseases or not. The detailed explanation is given via flow chart(Figure 2)and are as follows:
There are 5 components in the system. They are (i) Image Acquisition (ii) Image Pre-processing (iii) Image Segmentation (iv) Feature Extraction (v) Classification. In Image Acquisition, real-time paddy leaf images from the fields nearby are captured. It consists of both healthy leaf images as well as diseased leaf images. Diseases like Brown Spot and Leaf Blast are considered. The captured images are cropped to a specific size. The cropped RGB images are converted to greyscale in Image Pre-processing. Image Segmentation is the third component. It consists of segmenting the converted greyscale images using K-Means Clustering. This helps to get rid of problems like backgrounds, illumination of light, etc. Feature Extraction is extracting or showing the diseased portion of the leaf so that classification becomes easy. The last module includes the classification in which Tensor Flow and ANN algorithm is used

1. Tensor Flow

Tensor Flow is an open source Deep Learning library developed by Google that is used to perform complex numerical operations and several other tasks to model Deep Learning models. It's architecture allows easy deployment of computations across multiple platforms like CPU's, GPU's, etc. An interface for expressing machine learning algorithms and an implementation for executing such algorithms; A framework for creating ensemble algorithms for today's most challenging problems.

2. CNN Algorithm

A convolutional neural network (CNN) is a specific type of artificial neural network that uses perceptions, a machine learning unit algorithm, for supervised learning, to analyze data. CNNs apply to image processing, natural language processing and other kinds of cognitive tasks. CNNs are a fundamental example of deep learning, where a more sophisticated model pushes the evolution of artificial intelligence by offering systems that simulate different types of biological human brain activity.

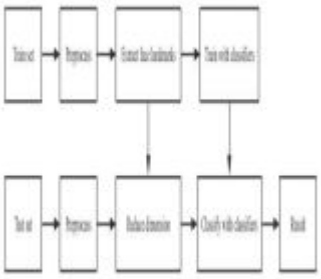


Fig.4.1. CNN Dataflow.

- **Steps for Proposed System**

1. **Image Acquisition-** The images of the plant leaf are captured through the camera. This image is in RGB (Red, Green, and Blue) for color transformation structure for the RGB leaf image is created, and then, a device-independent color space transformation for the color transformation structure is applied.
2. **Image Pre-processing -**To remove noise in the image or other object removals, different pre-processing techniques is considered. RGB to Gray Converter-Weighted method or luminosity method-You has seen the problem that occurs in the average method. The weighted method has a solution to that problem. Since red color has more wavelength of all the three colors, and green is the color that has not only less wavelength than red color but also green is the color that gives a more soothing effect to the eyes.

It means that we have to decrease the contribution of red color, and increase the contribution of the green color, and put blue color contribution in between these two.

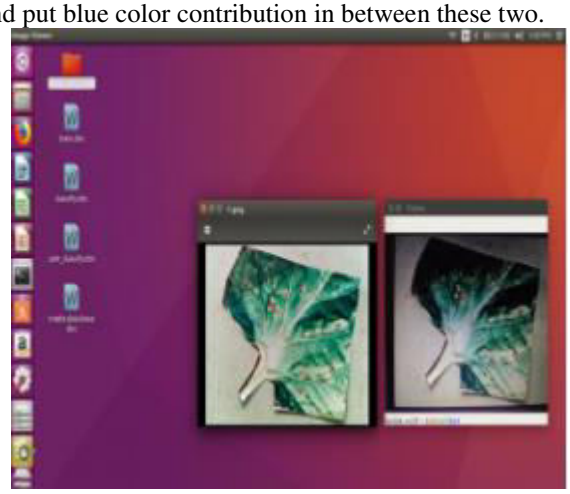


Fig.4.2. Image captured to identify the disease

V. RESULTS

Image is captured through the mobile camera.
captured image is uploaded to the local server using android application.

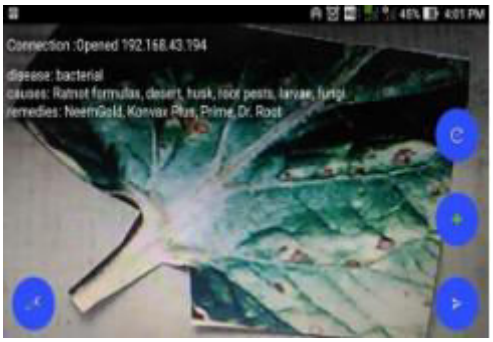
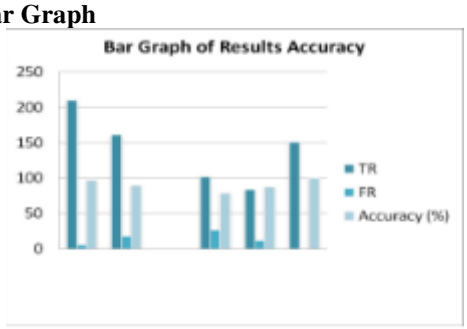


Fig.5.1. Results in mobile.

Image undergoes various image processing algorithms at the server to determine the disease.

The determined disease is sent back as a result on the mobile application.

- **Bar Graph**



Bar Graph of Result Accuracy.

VI. CONCLUSION

The use of automated monitoring and management systems are gaining increasing demand with technological advancement. In agricultural field loss of yield mainly occurs due to widespread disease. Mostly the detection identification of the disease are noticed when the disease advances to the severe stage. Therefore, causing the loss in terms of yield, time and money. The proposed system is capable of detecting the disease at the earlier stage as soon as it occurs on the leaf. Hence saving the loss and reducing the dependency on the expert to a certain extent is possible. It can provide help for a person having less knowledge about the disease. Depending on these goals, we have to extract the features corresponding to the disease.

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