Agriculture Innovation with Technological Efforts

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Abstract - Our aim is to detect diseases occurred in plants/trees and provide disease information to the farmer and suggest the pesticides that are used to reduce the diseases in farming. For this we can gather information from trees and plants by using drone technology using camera and by analyzing that data/information using image processing. By observing the collected data, we can conclude the disease occurred in respective plant. And we will provide disease information and respective pesticide information to the farmer that are required to cure respective disease occurred in plants/trees.

Keywords – diseases, plants/trees, pesticides, farming, camera

I. INTRODUCTION

Detection of diseases in plants/trees currently requires more time for direct observation, this can vary in accuracy depending on the level of observer. The development of drones may provide a method to detect disease in crops. However, there is still we need a method that efficiently processes the collected data for better result. In this method, a drone with high accuracy camera travels around a field, periodically taking images of individual plants in a crop. These images are then analyzed by an efficient software which has been trained to identify disease in certain plants, providing information about the presence and location of disease in the crop. As such, this technology can observe and study the plant disease and more helpful for large commercial farming operations, reducing costs and enhancing food security.

II. LITERATURE REVIEW

1. **"Jayme Garcia Arnal Barbedo"** proposed that the wide-ranging variety of plants/trees are difficult to analyze in his article **"Digital image processing techniques for detecting, quantifying and classifying plant diseases"** published on **06 December 2013.**
2. **"Sachin D. Kihirade, A.B.Patil"** proposed that it is very difficult to monitor manually and detect the plant/tree diseases manually. In his article "Plant Disease Detection Using Image Processing" **published in** "IEEEXplore" on 16 July 2015.
3. **"M.Mialathi, K.Aruli, S.Mohamed Nizar, A.Sagaya Selvaraj"** proposed that all the disease cannot be detected using single method or mechanism. in his article **"A Survey on Plant Leaf Disease Detection Using Image Processing Technologies"** published in **"International Research Journal of Engineering and Technology (IRJET)"** on **09th Dec-2015.**
4. **"Anupma Mishra, Nishchol Mishra"** proposed that early detection of leaf disease is useful to knowvarious diseases caused by fungi, bacteria, nematodes etc. in his article **"A Literature Survey on Detection of Leaf Disease in Plants"** published in **"IEEE Xplore"** on **December 2016.**
5. **"Gouitum Kambale, Dr. Nitin Bilgi2"** proposed that machine learning methods help agricultural experts in detection of disease in the plant in regular intervals, and then the experts will suggest the medicines to the farmer in his article. **"A Survey Paper on Crop Disease Identification and Classification Using Pattern Recognition and Digital Image Processing Techniques"** published in **"IOSR Journal of Computer Engineering (IOSR-JCE)"** on **January 2017.**
6. **"Sandesh Raut, Kartik Ingole"** proposed thatusing image processing method will be easy to detect the leaf diseases can be identified at its early stage in his article **"Reviewson Leaf Disease Detection Using Image Processing Techniques"** that is published in **"International Research Journal of Engineering and Technology (IRJET)"** on **04th Apr -2017.**

III. EXISTING SYSTEM

Based on various literature reviews mentioned above the existing systems describes that plant disease diagnosis is limited by the human visual capabilities because most of the first symptoms are microscopic, [2]it is very difficult to monitor manually, [1]as capability of detecting disease in wide range area is difficult. So, for

improving recognition rate, most of researchers used artificial neural networks and classifiers like ANN, SVM and Machine learning methods help agricultural experts in detection of disease in the plant in timely fashion, and then the experts will suggest the medicines to the farmer.

IV. PROBLEMS IN EXISTING SYSTEM

There are some disadvantages in existing systems which cause complexity while going through processing like:

- **Man power**-We require more man power to for processing the image manually.
- **Limited area**- Capability of detecting disease in wide range area is difficult and It is difficult to monitor the plant diseases manually
- **Time consuming**- All the disease cannot be identified using single method. So, we require more methods to compute the image processing and consume more time.
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V. PROPOSED SYSTEM

Image Processing is a fundamental technique to analyze raw images received from cameras/sensors placed on drones and pictures taken in normal day-to-day life for various applications. By using this image processing technology and drones we capture the leaves of plants/trees and gather information from trees and plants and we will process the data by using image processing and mat-lab, then by analyzing that data/information, by observing the collected data, we can conclude the disease occurred in respective plant. And we will provide disease information and also provide pesticide information required to cure respective diseases occurred in plants/trees.

Here we provide inputs as raw defected images to classify under CNN classifier. For that first we need to train the data sets based on the features that having with the disease occurred leaf and healthy leaf.

VI. Result:

Our system gets more accuracy to detect leaf and it is shown in a graphical representation format having accuracy rate and loss of leaf rate due to disease that occurred to it and it shows the accurate time to be taken to train the dataset, the graph is shown below.

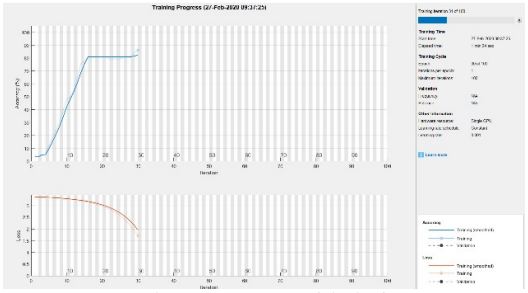

Figure 1: Accuracy of the leaf

VII. SYSTEM REQUIREMENTS

All system needs certain hardware components or other software resources to be present on a system. These pre-requirements are known as **system requirements** and are often used as a guideline as opposed to an absolute rule.

- **Drone:** Requires Drone to capture images.
- **Interface:** Initially we require the interface to connect with the user.
- **Interaction:** Client/User needs to connect with the interface individually or with the help of social services centers.
- Processing the application to further steps that the user needs.
- **Communication:** Establishing communication between user and service provider.
- **Capturing:** Capturing the images with the help of drones.
- **Image processing:** Analyzing the images that are captured by the drones.
- Providing the disease is detected to the user.
- **Database:** Extracting the pesticides information relevant to the respective disease.
- Submitting the report to the user.
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VIII. MODULE DESCRIPTION

There are 3 modules in our project:

- Technical Management
- Software Management
- Database Management

Technical Management:

Here we will gather images of plants/Trees by capturing images with the help of drones. When the user applied for our service, our executive person will reach the users field to detect the disease by operating drone.

Software Management:

After successfully operating drone by the executive. Our software will process the image through following steps:

- Image Acquisition
- Image Pre-processing
- Image Segmentation
- Feature Extraction
- Classification

Database Management:

After successfully detecting the disease through Image Processing, based the range/level of the disease, we provide the required pesticides to cure the Plants/Trees from the dangerous diseases.

IX. FLOW CHART

A **flowchart** can also be defined as a pictorial representation of an algorithm in a step-by-step approach to resolve a task.

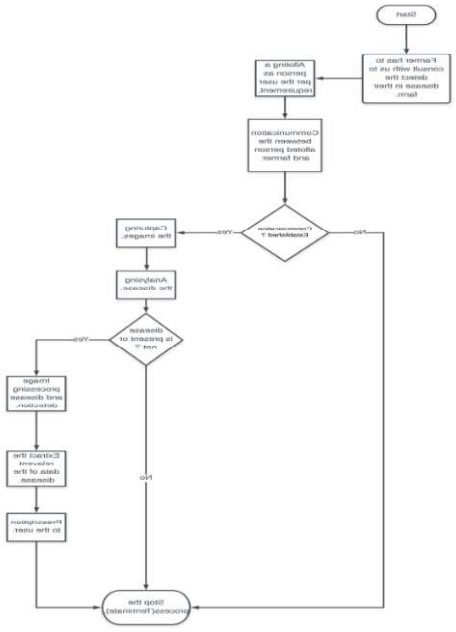


Figure 2: Flowchart of the proposed model

X. STRUCTURE CHART

A **Structure Chart** is a **chart** which shows the system working and provides the breakdown of the existing system to its manageable levels.

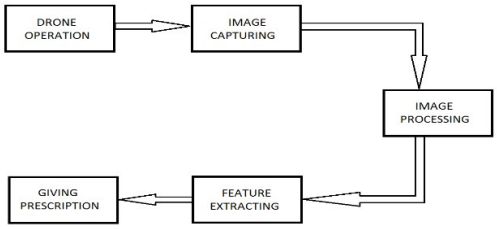


Figure 3: Structure chart of the described system

XI. USECASE DIAGRAM

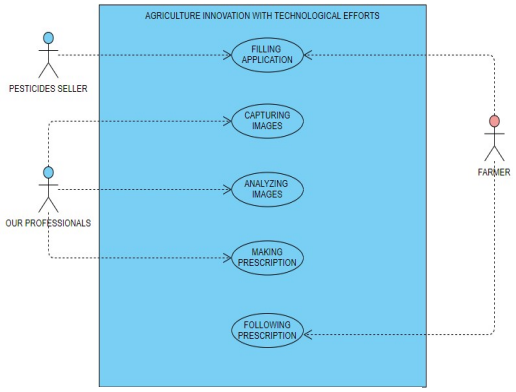


Figure 4: Use case diagram of the system

XII. SEQUENCE DIAGRAM

A sequence diagram shows object interactions that are arranged in time sequence.

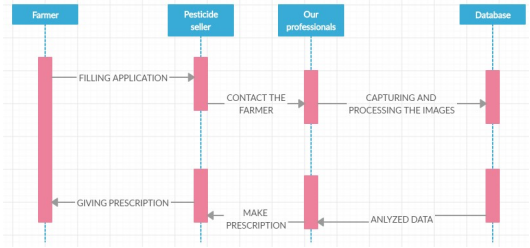
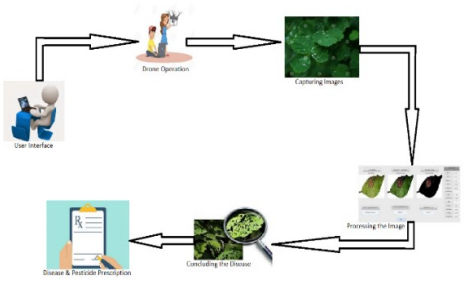


Figure 5: Object interactions is identified by using sequence diagram

XIII. BLOCK DIAGRAM

Block diagram is high level flow chart diagram that is frequently used in engineering culture that is represented by a block's showing functionalities of our proposed



project.

Figure 6: Block diagram of the proposed model

XIV. BENEFITS IN PROPOSED SYSTEM

There are some advantages in proposed system which have been overcome the existing systems like:

- Less time consuming- It takes less time to capture and pre-process the images of trees.
- Easy approach-We can easily detect the disease occurred in plants and can easily predict the damage occurred by using image processing.

Good guidance-Provides good guidance in order to know about the disease occurred and the precautions should take to cure the disease through fertilizers.

XV. CONCLUSION

Based on the many existing systems, we can only find weather the leaf is having disease or not, but with the help of our proposed system we can easily find weather the leaf or plant is having disease or not and also the name of the disease with high accuracy and in addition to that we are also providing the pesticide prescription to the user.

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