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Pesticide Indicator: A Smart Pesticide Assistance for Farmers in Agriculture Field using Cloud Framework

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Abstract— The lives of farmers can be enhanced by using the technology and applying it efficiently. The best suitable example is mobile technology which is globally available and reachable to most of the population. In this regard mobile application called Pesticide Indicator is proposed that aids farmers in identifying the specific pesticides to be used for the crop. The proposed scheme consists of four main steps as follows, intake of cropped form of RGB, transformation of input, image compression, and forwarding information to farmer. Initially farmer captures image of the leaves using smart phone and sends this image to server after cropping for further processing. Central server then process the retrieved image based on stored information. Database holds samples obtained from botanical experts. The retrieved image and data samples are compared. After processing, the additional information pertaining to input image is then forwarded to farmer's smart phone.

Keywords— Mobile Technology, Pesticide Indicator, Transformation of input, Image compression

I. INTRODUCTION

Information and communication are the essential part of human life. The demand for food, cloth, etc. is increasing with respect to the increasing population, to which researchers and scientists are trying to find innovative solutions. In India, the major source of income is the agriculture itself hence its known as "land of agriculture". Ever since people learned to grow crops, harvest them and sell them to market, they have tried to increase the profit by seeking information from others. But the

information gained by farmers over the centuries is not adequate to grow crops in the varying weather condition, soil fertility, pests and diseases. This has raised the need for the latest information which allows the farmers to deal with these changes smoothly.

There is a huge demand in the market for web services based on agriculture. The applications with varying requirements help the agriculturist to do several jobs like designs, decision making, chemical analyses, and GPS centred services etc. Portable devices provide an appropriate information entry point and are convenient to be carried everywhere.

Developments in cloud computing has significantly helped in recent years. Based on their requirements the services can be accessed by the users regardless of how the services have been delivered and where the services have been hosted. Several computing models have assured to deliver the value of computing visualization that include clustering, Grid computing, and Cloud computing which is most recently used.

The organizations and users are able to access applications from anywhere in the world, this infrastructure is referred as cloud framework. Rather than running the service on the individual computers, the computing environment has developed software for thousands and millions of users. Instead of accessing and storing, the data and programs in the computer's hard drive, the information is present in the internet which is referred to as cloud computing. Cloud Technology has established as a scientifically, commercially and industrially important technology worldwide on the basis of its huge storage capacity and scalability.

Thus seeing the various prospects, the paper proposes a mobile application with a cloud oriented back-end which is feasible. The standalone architecture handles every activity of the application on the pesticide data management on the mobile. However, the size of the data and the associated several queries can become burdensome for the mobile CPU. The main purpose of this work is to facilitate easy access to pesticide information which might be needed by the farmers. A mobile application called Pesticide Indicator is developed which contains the information about the pesticides related to the diseased crops. Firstly the farmers need to send the request about the diseased crops in the form of image or just request the crop information. This is then extracted in the application and sent to the cloud storage where it is processed and compared. And the related information about the pesticides is displayed for the farmers.

II. RELATED WORK

This chapter gives the details of the various works which were carried out for detecting crop disease.

Prof. Sanjay D. Jondhale1 *et al*. [2], introduced a database for the agriculturists which helps them to store the appropriate up to date information through which the farmers can access the relevant information. The problem in this is, there is lots of information which can cause storage problems when it comes to caching on the mobile phone. The researchers introduced dual caching procedure at real time which resulted in updating the information in the mobile.

A.S Deokar *et al*. in [5] introduced that farmers are the main element of Agriculture. Farmers are not able to cope up with complications occurring due to crop diseases. They have to depend on Plant Biologist to resolve these problems. Examining the plant affected by disease through a Plant Biologist manually is a time consuming process. Plant affected by the disease is not diagnosed within time then it can affect the quality of the plant. A System can be provided which can involuntarily obtain significant features of the plant affected by disease and computing the uploaded diseased plant image. It will easily help the Plant Biologist to diagnose the disease of plant and provide the farmers to take initial precautionary measures.

In [6], Al-Bashish D *et al*. proposed image-processing-based software which is the solution for classification and automatic detection of plant leaf diseases. The task can be of great realistic consequence by providing firm, automatic, inexpensive and exact image-processing-based results. The approach of the suggested solution is image-processing-based and it is self-possessed of four main segments; in the first segment is to create a colour conversion structure for the RGB leaf image and then, for the colour conversion structure applying the device-independent colour space conversion. Next, in the second segment, the images are segmented using the K-means clustering method. In the third segment, texture features for the segmented diseased objects are calculated. Lastly, in the fourth segment the features that are extracted are passed through a pre-trained impartial network. The established Neural Network classifier which is based on statistical arrangement performs fine in all experimented types of diseased leaves and it can be able to detect the disease.

B Aldrich *et al*. explained about the application of the SGLD (spatial grey level dependence) methods to mammograms in [7], although it is exhaustive in nature computationally, and it has the capacity of revealing extra information to the physician probably improving his analytical ability. The information delivered by these procedures can be used in the improvement of computer aided diagnostics, (CAD), in mammography. One of the purposes in this improvement includes enlightening elucidation and highpoints the regions that show irregular features. Documentation of important features looks the radiologists in the presentation of a study which is one of the main tasks, so it is important to aim these features for separation and enrichment when seeing the growth of these tools. The growth of CAD includes the separation of a amount of displays and future resolves will be focused towards comprising additional constraints improving the classification of normal and abnormal matter.

III. SYSTEM ARCHITECTURE

The general architectural diagram of *Pesticide Indicator* is shown in the Figure 1. This design consists of three layers, first is the mobile devices possessed by the farmers, second a cloud presented database server and finally a cloud presented middleware.

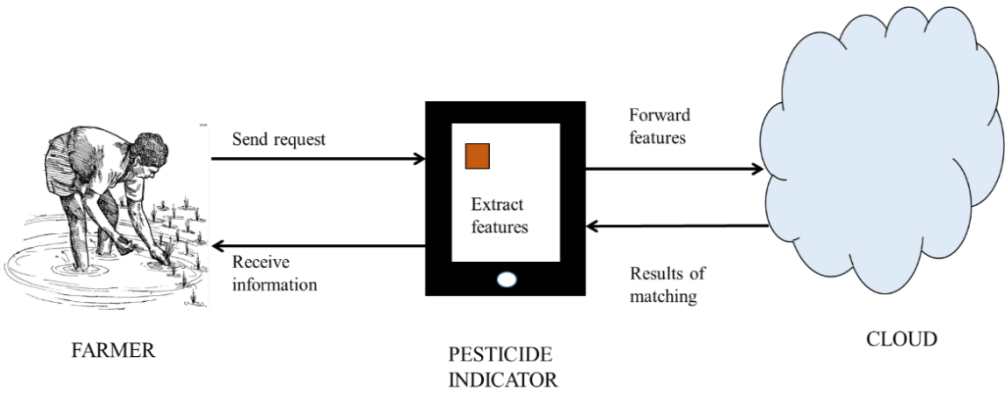

Figure 1: Architecture diagram of Pesticide Indicator

Totally transportations amongst these database and mobile devices are directed through the middleware or by the middleware.

Here, when farmer wants to know about the disease of specific crop, the picture of that crop has to be uploaded on the mobile application. Then all the features of that image will be extracted. These extracted features are compared with the data stored in cloud-hosted database server. The cloud-hosted database server stands as the central source of storage where the complete data about the pesticides are retained. Once these data is compared and if the match is found, the information will be sent to the farmer, otherwise invalid message is sent. This application will also provide general information of specific crops that are stored in the cloud-hosted database server.

IV. IMPLEMENTATION

In Figure 2, the user opens the mobile application and he has two options either he can upload the picture and get the information related to the picture or select a crop from the list and get the pesticide information. Once the picture has been uploaded, the features have to be extracted and compared with the database features. The result of the comparison has to be displayed.

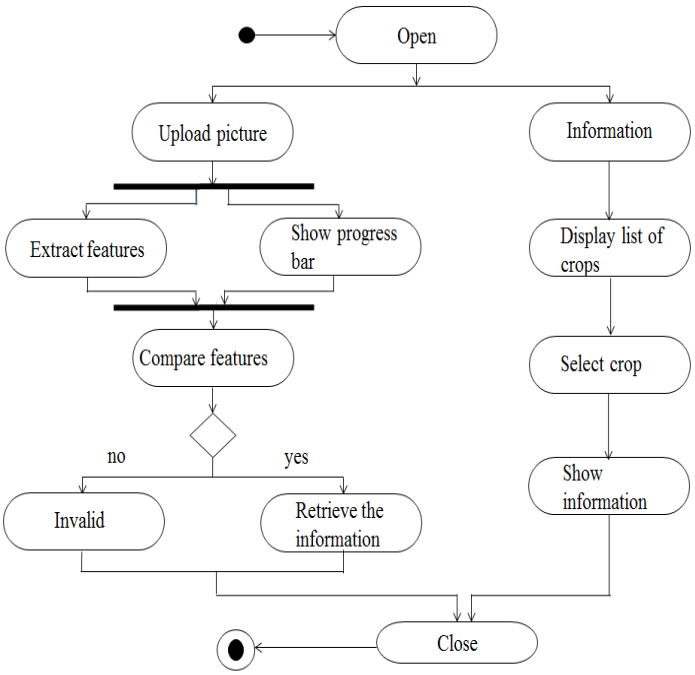

Figure 2: Sequence of processes in Pesticide Indicator

PSEUDO CODE:

```
Begin
    i=1
        Repeat
            Get the image of the leaf sample i
            Crop the desired part of the image
            Send the image to the server
            Start performing processing of image
```


Find the clusters of the image

Find the defective percentage for image i

Find the disease details of that leaf i

Return the results to the called interface

End.

V. RESULTS AND ANALYSIS

The parameters for analyzing and measuring the performance of pesticide indicator are as follows:

- **Uploading Time:** The time taken by the request to reach the server (in seconds).
- **Processing Time:** The time required for carrying out processing stages of pesticide indicator (in seconds).
- **Display Time:** The time taken by the server to send reply to the request (in seconds).

Measuring Parameters →	Uploading Time	Processing Time	Time Taken to Display Results
Image of the Defected crop	2s	5s	3s

Whenever a new image of the crop disease is obtained, its features should be extracted and stored in the database. The time taken to load those images for feature extraction varies with respect to their number of images as shown in below figure.

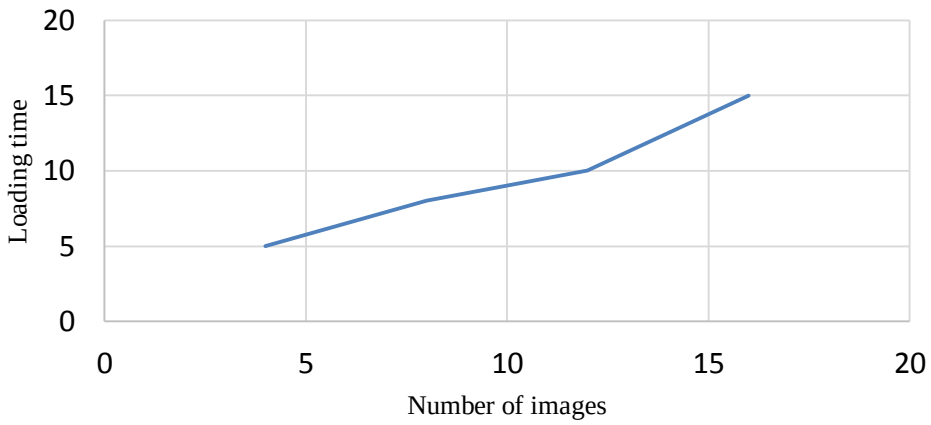

Figure 3: Loading time for Feature Extraction of images

VI. CONCLUSION AND FUTURE ENHANCEMENTS

The proposed application introduces a K-means clustering algorithm for agricultural plant disease detection. The application will take the images of the plant leaf which is taken as the input. The information about the disease, medication will be retrieved from the database in to the server through image processing.

The proposed application restricts the background colour of the image to be black. In future, image of the diseased leaf can be identified under any background colour. The proposed system uses only the leaf to find the disease of the plants. In future any part of the plant like stem or root can be taken to find the disease.

REFERENCES

[1] Richard K. Lomotey, Yiding Chai, Kazi A. Ahmed and Ralph Deters "Web Services Mobile Application for Geographically Dispersed Crop Farmers" IEEE 16th International Conference on Computational Science and Engineering, 2013.

[2] Prof. Sanjay D. Jondhale, Aman Gill, Kiran Jarhad, Prakash Ambekar, Shriram Koradkar, "Cloud Based Advisory System for Supporting Farmers" Vol-2 Issue-2 2016.

[3] X. Zhang, A. Kunjithapatham, S. Jeong, and S. Gibbs, "Towards an Elastic Application Model for Augmenting the Computing Capabilities of Mobile Devices with Cloud Computing", 270-284, June 2014.

[4] P. Bahl, R. Y. Han, L. E. Li, and M. Satyanarayanan, "Advancing the state of mobile cloud computing," In Proceedings of the third ACM workshop on Mobile cloud computing and services , New York, NY, USA, 21-28,2014.

[5] A.S Deokar, Akshay Pophale, Swapnil Patil, Prajakta Nazarkar, Sukanya Mungase "Plant Disease Identification using Content Based Image Retrieval Techniques Based on Android System", International Advanced Research Journal in Science, Engineering and Technology, February 2013.

[6] Al-Bashish D., M. Braik and S. Bani-Ahmad, "Detection and classification of leaf diseases using K-means based segmentation and neural-networks-based classification", October 2010.

[7] B. Aldrich, M. Desai "Application of spatial grey level dependence methods to digitized mammograms," Image Analysis and Interpretation, Proceedings of the IEEE Southwest Symposium on Image Analysis and Interpretation, April 1994.

[8] Monica Elliott, Ken Pernezny, Aaron Palmateer, and Nikol Havranek, "Guidelines to Identification and Management of Plant Disease Problems: Part I. Eliminating Insect Damage and Abiotic Disorders".

[9] Hrushikesh Dattatray Marathe, Prerna Namdeorao Kothe, "Leaf Disease Detection Using Image Processing Techniques", International Journal of Engineering Research &Technology, Vol.2, Issue 3, March 2006.

[10] G. T Hariharan, G.P.S Hariharan, R. Vijay Anandh,"Crop Disease Identification Using Image Processing", International Journel of Latest Trends in Engineering and Technology, Vol. 6 Issue 4, March 2005.

[11] Jayme Garcia Arnal Barbedo, "Digital image processing techniques for detecting, quantifying and classifying plant diseases", 2005.

[12] Sujeet Varshney ,Tarun Dalal, "Plant Disease Prediction using Image Processing Techniques", International Journal of Computer Science and Mobile Computing, Vol.5, Issue.5, May 2000.

