A Result Based Leaf Disease Detection Using Image Processing and Machine Learning

Prof. S. M. Rokade[1], Ms. Sonali Sangle[2], Ms. Mayuri Warungase[3], Ms. Sumedha Ugale[4], Ms. Snehal Tajane[5],

Associate Professor, Computer Department, SVIT, Nashik, Maharashtra, India[1]

Student of BE, Computer Department, SVIT, Nashik, Maharashtra, India[2]

Student of BE, Computer Department, SVIT, Nashik, Maharashtra, India[3]

Student of BE, Computer Department, SVIT, Nashik, Maharashtra, India[4]

Student of BE, Computer Department, SVIT, Nashik, Maharashtra, India[5]

Abstract:

In improvement of India agriculture is that the major economic issue. Indian folks square measure extremely smitten by agriculture. In agriculture unwellness detection is one in all the foremost important factors large times yet a skilful labour is required. As we all know the agricultural sector plays associate important role within the economy of a rustic, as their square measure several different types of crops accessible to farmers. However, difficulties occur once the crops get infected by some kind of disease, and also the farmers don't seem to be privy of the unwellness at the correct moment. Farmers don't understand what unwellness they are managing once they sight the unwellness. For this reason, the study of plant disease detection in agriculture could be a fundamental subject of study because it may prove helpful within the observation of large fields of crops. during this paper we tend to square measure going to sight the various diseases occurring on plants victimization image process and machine learning. In image process there are some steps to determined diseases like image collection, image segmentation, feature extraction, classification. And additionally, we tend to square measure about to develop associate application to regulate water pump from the mobile application to avoid overflow of water so water won't be wasted. Using this system, we can remotely handle the water pump and give the water to the crop.

Keywords: *Agriculture, Leaf diseases, Soil-Moisture Sensor, Temperature Sensor, Automatic Irrigation.*

Introduction:

In India agriculture is one the most essential financial aspect due to the fact of most of our Indian human beings are structured on agriculture. In different words, agriculture is aid pillar of our kingdom as nicely as entire world. It is necessary to word that the large populace of the world relies upon fully on agriculture for their financial development. Agriculture performs a key position in the increase of any country, whose GDP relies upon totally on it. In this economy, agriculture has a direct effect on the great and volume of grains and vegetables. However, distinct elements have an effect on the kind and extent of these grains and vegetables. In addition, distinctive climates and stipulations in one of a kind component of the world might also have an effect on these grains and veggies with specific ailments and one of a kind climates. Due to differing climates and stipulations in distinctive places, grains and greens are uncovered to one of a kind disease. Cultivators in any united states that offers with these ailments go through extreme losses. But on occasion farmers have to face plenty of problems like local weather change, unique diseases, scarcity of water and its outcomes into the low productivity and loss of cash and manpower. Due to the illnesses farmers are no longer getting top first-class of plants and true charge in the market. So, there is want to extend the great of vegetation so that farmers will get the proper quantity of market price. Our farmers do now not understand about illnesses which are happens on a plant at proper time. We additionally require large quantity of time and knowledgeable labour. In this paper current a mobile-based utility for detecting illnesses going on plant leaf the usage of photo processing and

laptop learning. In our proposed gadget there are 5 steps as follows Image collection, Image pre-processing, photograph segmentation, characteristic extraction and classification. In photograph series we acquire the pics then we cast off the heritage noise and uneven border and then decision of function and then we use the absolute distance algorithm for classification and regression problem. In addition, we are going to advance a utility to manipulate water pump to keep away from wastage or overflow of water. This water pump will be treated (ON/OFF) remotely from android app. The cell utility has made lifestyles lots simpler for individuals, businesses, and organizations. This contemporary world has allowed for the introduction of an extraordinarily superior water monitoring device via the use of the internet. This can display the water pump ,prepare the water surface, and more. The computerized use of water can be recognized as water automation which is a gadget to make certain the relevant use of water and decrease the human effort. It is used for one of a variety characteristic such as irrigation in the agricultural land, water pump controlling. In this paper, we are going to improve water automation structures for controlling water pumps and slicing water leakage the usage of a range of kinds of hardware and technology. This will contain growing water pump controllers and controlling water leakage. Using the water administration system, user can remotely on/off the motors based totally on the water stage in the tank.

Literature Survey:

1) In the research paper "GLCM Based Plant Leaf Disease Detection Using Multiclass SVM", says that farmers are using expensive fertilizers for controlling various leaf diseases which are occurs on the plant's leaf and if will be wastage of money as well as fertilizers, if fertilizers are used without identifying the diseases. So, for disease detection they have used multiclass SVM for classification and GLCM for feature extraction. [1]

2) In 2020, in the paper, "Disease detection of plant leaf using image processing and CNN with preventive measures", Husnul Ajra uses CNN technique for detection of plant diseases and he says that the performance of CNN classifiers and its visualization for detection of leaf diseases is based on training and testing datasets which are presented in tabular form as a confusion matrix. In this paper, they have mentioned that the leaf diseases problem of grains and vegetables which are harmful for agricultural sector and they suggested a significant diagnostic approach of tomato and potato plant. [2]

3) In 2021, Pranesh Kulkarni and team in the paper, "Plant disease detection using image processing and machine learning", that they have successfully developed a Leaf Disease Detection Using Image Processing and Machine Learning (IJSRD/Vol. 10/Issue 1/2022/028) All rights reserved by www.ijsrd.com 98 computer vision based system for plant disease detection with average 93% accuracy and 0.93 F1 score. [3]

4) Sakshi Raina and Dr. Abhishek Gupta says in the paper, "A Study on Various Techniques for Plant Leaf Disease Detection Using Leaf Image", that they have presented basics of plant diseases detection techniques used by various researches. They have used GPDCNN for disease detection and says it has higher recognition rate and learning rate. In this paper we found that it requires many guidelines to obtain satisfying results. [4]

5) In the paper "Automated Water Management System", Rakib Ahemed and Mahfida Amjad have provided a system which can observe water tank and take action if water surface is high or low, it can automatically turn ON/OFF motor. But we decide to implement this method for automatic irrigation for plants or crops. Using this method, we have decided to supply water automatically i. e. from the mobile app we can operate the water motor easily and it will save the time as well as reduce the wastage of water also.[5]

Methodology:
- Leaf Disease Detection
- Water Pump Controlling
- Android Application
- IOT
- Control Application

System Architecture:
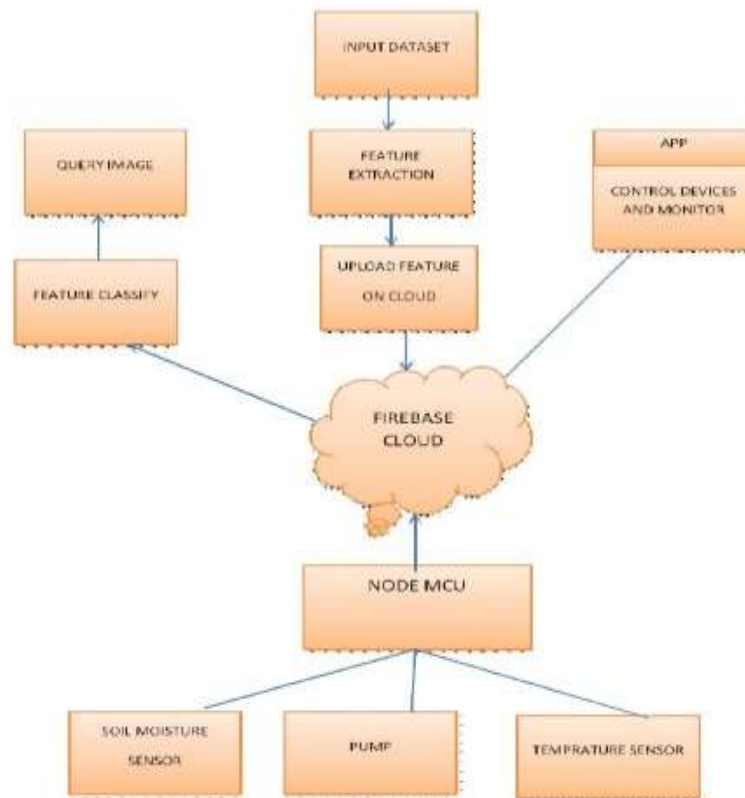
Fig -1: System Architecture

Working:

For leaf disease detection, we have trained our application with Kaggle dataset which contains leaf with diseases and their names. To detect the disease on any leaf, we have to take an image of that defected leaf and upload that image to the application. That image will undergo into pre-processing phase which has three steps i.e., image resizing, enhance contrast and image conversion. in pre-processing phase, the background noise or blur image get removed to improve the quality of that image. Next phase after pre-processing is image segmentation and for that we have used K-Mean Cluster Algorithm which divides the image into different clusters or subgroups from which one or more cluster may contain diseases which says that leaf is infected by disease. After that we have used GLCM i.e., Gray Level Co-occurrence Matrix for feature extraction. In GLCM, image texture is considered and get converted in grayscale. After the feature extraction, we have used absolute distance algorithm classifier to get affected area of diseased leaf.

Similarly, we have added automatic irrigation method for that we have used soil-moisture sensor which sense the humidity or moisture of soil, temperature sensor which senses the temperature of soil as well as the climate and water pump which can be remotely operatable means from some distance we can ON or OFF that water pump. Basically, soil moisture sensor senses the moisture of soil and if the moisture is very less and temperature is more, there is a need of irrigation to the crops. So, we have used automatic irrigation method for giving water to the field or crop.

Result:
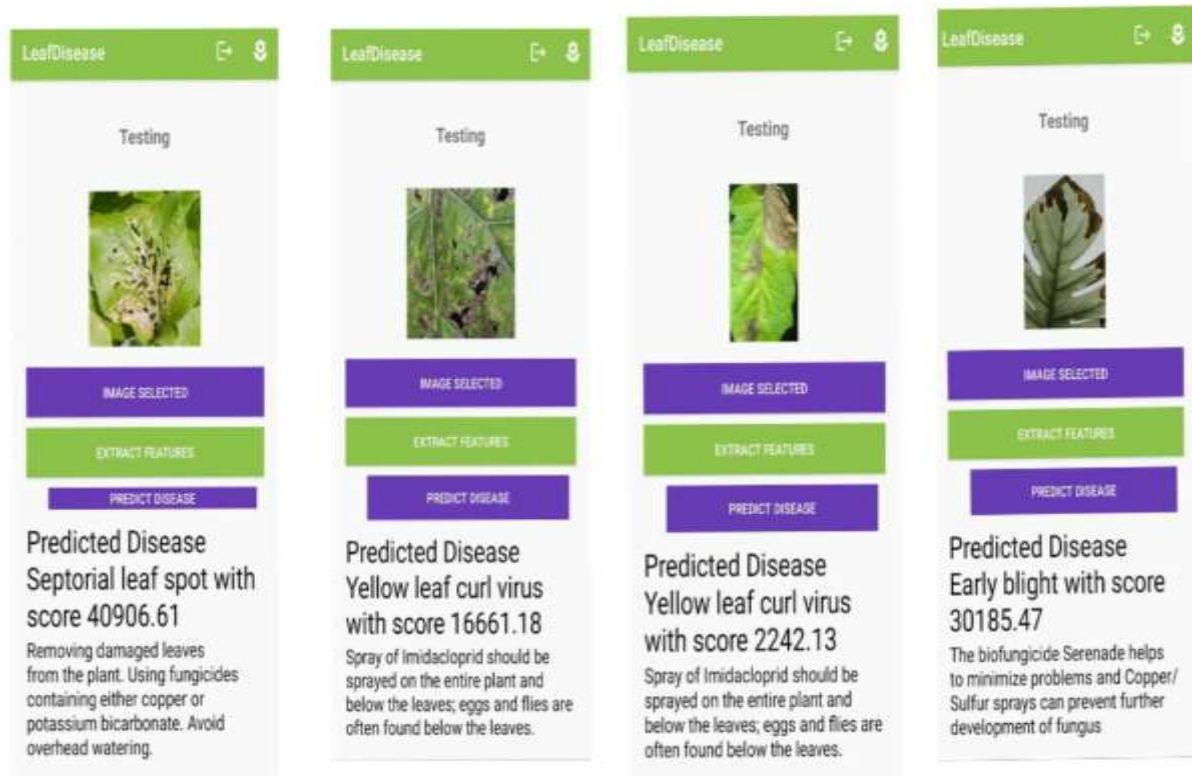
Fig -2: Leaf Disease Detection Result

For leaf disease detection, we have used different techniques and algorithms. Using that we got the appropriate result with the maximum accuracy. We got the result which is shown in above figure i.e., fig -2.
Also, it shows the all information about that disease and remedies for that. Also, we have observed that we can operate our automatic irrigation system from anywhere i.e., remotely.

Conclusion:

In this paper, it has been mentioned the leaf diseases problem of crops or plants which are harmful aspects for farmers in the agricultural sector. This paper has suggested a significant diagnostic approach of varies plant leaf diseases using image processing and Absolute distance algorithm. Image processing technique is performed on Kaggle datasets of different leaves through the operation of image pre-processing, image segmentation and image extraction to investigate the symptoms of unhealthy leaf. In addition, this paper analyses the overall classification accuracy of leaf diseases. So, it is feasible to demonstrate the graphical layout for leaf disease detection with preventive measures.

Reference:

1) Glcm Based Plant Leaf Disease Detection Using Multiclass
2) SVM by Shobana D, Shanthi T, Priya p, Anand R (Department of Electronics and Communication Engineering, Sona College of Technology, Salem, Tamil Nādu, India-637502).
3) Disease Detection of Plant Leaf using Image Processing and CNN with Preventive Measures. Husnul Ajra Department of Computer Science and Engineering Bangabandhu ,Sheikh Mujibur Rahman Sci.&Tech. University Gopalganj, Bangladesh (husnul5606ice@gmail.com), Mst. Khairun Nahar Department of Computer Science and Engineering Bangabandhu ,Sheikh Mujibur Rahman Sci. & Tech. University Gopalganj, Bangladesh (jakiabsmrstucse05@gmail.com), Lipika Sarkar Department of Computer Science and Engineering Bangabandhu ,Sheikh Mujibur Rahman Sci. & Tech. University

    Gopalganj, Bangladesh (lipika.cse15@gmail.com), Md. Shohidul Islam Faculty of Computing University Malaysia Pahang Kuantan, Malaysia (msi.ice.ru@gmail.com). 2020 Emerging Technology in Computing, Communication and Electronics (ETCCE).

4) Plant Disease Detection Using Image Processing and Machine Learning Pranesh Kulkarni1, Atharva Karwande1, Tejas Kolhe1, Soham Kamble1, Akshay Joshi1, Medha Wyawahare1 Department of Electronics and Telecommunication, Vishwakarma Institute of Technology, Pune, India.

5) A Study on Various Techniques for Plant Leaf Disease Detection Using Leaf Image Sakshi Raina Department of Computer Science and Engineering SMVDU, Katra Jammu, India (sakshi22513.cse@gmail.com), Dr. Abhishek Gupta Department of Computer Science and Engineering SMVDU, Katra Jammu, India (abhishek.gupta@smvdu.ac.in).

6) Automated Water Management System (WMS) Rakib Ahemed [a] , Mahfida Amjad[b],[a] B. Sc student of CSE, Stamford University Bangladesh, Bangladesh [b] Senior Lecturer, Department of CSE, Stamford University Bangladesh, Bangladesh