DETECTION OF DISEASES IN PLANTS USING CNN CLASSIFIER

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Abstract- Agricultural productivity is something in which economy highly depends on. This is the reason that disease detection in plants plays an important role in agriculture field, as having disease in plants are quite natural. If appropriate care is not taken in this area then it causes serious effects on plants and due to which respective product quality, quantity or productivity is affected.For instance a disease named little leaf disease is a hazardous disease found in pine trees in United States. Detection of plant disease through some automatic technique is beneficial as it reduces a large work of monitoring in big farms of crops, and at very early stage itself it detects the symptoms of diseases.Machine learning methods can be used for diseases identification because it mainly apply on data themselves and gives priority to outcomes of certain task.

Index Terms-CNN, Machine Learning, KNN

1. INTRODUCTION-In India, agriculture has become important source of the economic development. Farmer selects the suitable crop based on type of soil, weather condition of the location and economic value. The agriculture industries started searching new methods to increase production of food because of increasing population, changes in weather and instability in politics. This makes researchers to search new efficient and precise technologies for high productivity. Farmers can collect the information and data by use of precision agriculture in in-formation technology to take best decision on high output from the farm. Precision agricultures new technology, which provides advanced techniques to improve farm output.

By utilizing these advanced technologies, it's possible to realize economic process in agriculture. Precision agriculture are often used for several applications like pest detection in plants, weed detection, yield production of crops and disease detection etc. A farmer uses pesticides to regulate pest, prevent diseases and to in-crease crop yield. The diseases in crop are creating problem of low production and economic losses to farmers and agricultural industries. Therefore identification of disease and its severity based as become necessary.

1.1 RELATED WORK:

Recogintion And Detection Of Tea Leaf's Diseases Using SVM-Tea may be a popular beverage all around the world, and in Bangladesh the cultivation of tea plays an impotant role. Many diseases affect the right growth of tea leaves resulting in its reduction, thus hindering of the assembly of tea. However, if the disease is identified at an early age it might solve all the above mentioned problems through the appliance of appropriate treatment, or through the pruning of the diseased leaves to stop further spread of the disease. To unravel this problem image processing is the best choice to detect and diagnose the disease.

The main goal of this research is to develop an image processing system which will identify and classify the two most widespread tea leaf diseases in Bangladesh, namely brown blight disease and the algal leaf disease, from a healthy leaf. Disease identification is that the first step; there are many methods that are used for identifying the plant disease. In this paper, Support Vector Machine classifier (SVM) is used to recognize the diseases. Eleven features are analyzed during the classification. These features are then used to find the foremost suitable match for the disease (or normality) whenever a picture is uploaded into the SVM database. When a new picture is uploaded into the system the foremost suitable match is found and therefore the disease is recognized. The approach is novel since the amount of features compared by the SVM classifier is reduced by three features compared to previous researches, without adversely sacrificing the success rate of the classifier, which retains an accuracy of more than 90%. This also accelerates the identification process, with each leaf image taking 300ms less time interval compared to previous research using SVM, thus ensuring a greater number of leaves are often processed during a given time frame. The proposed solution increases in efficiency of the detection, identification, and classification process will enable the tea industry in Bangladesh to become more competitive globally, by reducing the losses suffered due to

diseases of the leaf and thus increasing the overall tea production rate.

Semi-Automatic Leaf Disease Detection And Classification System For Soyabean Culture-Development of automatic disease detection and arrangement is significantly explored in precision agriculture. within the past few decades, researchers have studied several cultures exploiting different parts of a plant. an identical study is performed for Soybean using leaf images. A rule based semi-automatic system using concepts of k-means is meant and implemented to differentiate healthy leaves from diseased leaves. Additionally a diseased leaf is assessed into one among the three categories (downy mildew, frog eye, and Septoria leaf blight). Experiments are performed by separately utilising colour features, texture features, and their combinations to coach three models supported support vector machine classifier. Results are generated using thousands of images collected from Plant Village dataset. Acceptable average accuracy values are reported for all the considered combinations which also are found to be better than existing ones. This study also attempts to get the simplest performing feature set for plant disease detection in Soybean. The system is shown to efficiently compute the disease severity also visual examination of leaf samples further proves the suitability of the proposed system for detection, classification, and severity calculation .**Grape Leaf Disease Detection And Classification Using SVM-** In the age of technology burst and usage of software as an alternate for the manual involvement for deciding , every field is trying to seek out its own comfort and price cutting solutions in replacing software methods for absolute best expert opinion.SVM, is initially proposed for binary classification technique, with simple manipulation are often used for a multiple class case. This project tries to aim for improvement in classifying the leaf diseases. Most of the work so far involves extracting statistical features of RGB signal converted into LAB form. HSI image features a reputation that the hue doesn't change even when the background light over the image changes. Hence few of the properties of HSI image are added to the database SVM is applied for classification for a bigger space points.

Detection Of Potato Diseases Using Image Segmentation And Multiclass SVM- Modern phenol typing and disease detection provide promising step towards food security and sustainable agriculture. especially , imaging and computer vision based phenol typing offers the power to review quantitative plant physiology. On the contrary, manual interpretation

requires tremendous amount of labor, expertise in plant diseases, and also requires excessive time interval .During this work, we present an approach that integrates image processing and machine learning to permit diagnosing diseases from leaf images. This automated method classifies diseases on potato plants from a publicly available plant image database called Plant Village. Our segmentation approach and utilization of support vector machine demonstrate disease classification over 300images with an accuracy of 95%. Thus, the proposed approach presents a path toward automated plant diseases diagnosis on a huge scale.

Digital Image Processing Technique For Palm Oil Leaf Disease Detection Using Multiclass SVM Classifier-Disease in feather palm sector is one among the main concerns cause it effects the assembly and economy losses to Malaysia. The matter of disease that a rises in feather palm plantation. Nowadays plant diseases detection has received tons of attention in monitoring the symptoms at earlier stage of plant growth. This work presents the utilization of digital image processing technique for detection and classification of feather palm plant disease symptoms. Here, the disease detection used k-means clustering and multiclass SVM classifier to work out two vegetable oil diseases supported the symptoms of the disease through its leaf. By using k-means clustering technique, thirteen sorts of features are extracted from the leaf images. The classification of the disease is administered by using multiclass SVM classifier. The detection shows that SVM achieves accuracy of 97% for Chimaera and 95% for Anthracnose. **SVM Classifier Based Grape Leaf Disease Detection-** Agriculture is that the mother of all cultures. it's played a crucial role within the development of human civilization. the main target on enhancing the productivity, without considering ecological impacts has resulted into environmental degradation. With the none adverse consequences, improvement of the productivity are often wiped out a sustainable manner. Plants exist everywhere we live, also as places without us. Many of them carry significant information for the event of human society. As diseases of the plants are inevitable, detecting disease plays a serious role within the field of Agriculture Plant. Plant disease is one among the crucial causes that reduces quantity and degrades quality of the agricultural products. Currently chemicals are applied to the plants periodically without knowing the need of plants. **Diagnosis Of Pomegranate Plant Diseases Using Neural Network-** Pomegranate may be a fruit which grows with a really high yield in many nations of India and one among

profits gaining fruit within the market. But thanks to various conditions, the plants are suffering from various diseases which destroy the whole crop leaving very less product yield. So, the work proposes a picture processing and neural network methods to affect the most problems with physiopathology. i.e Disease detection and classification. The Pomegranate fruit also because the leaves are suffering from various diseases caused by fungus, bacteria and therefore the climate . These diseases are like Bacterial Blight, Fruit Spot, Fruit root and Leaf spot. The system uses some images for training, some for testing purpose then on. The colour images are pre-processed and undergo K-means clustering segmentation. the feel features are extracted using GLCM method, and given to the synthetic neural network. the general accuracy of this method is 90%. The results are proved to be accurate and satisfactory in contrast to manual grading and hopefully take a robust rise in establishing itself within the market together of the foremost efficient process. **Groundnut Leaf Disease Detection Using Back Propagation Algorithm-** Many studies show that quality of agricultural products could also be reduced from many causes. One among the foremost important factors contributing to low yield is disease attack. The disease like fungi, bacteria and viruses. The leaf disease completely destroys the standard of the leaf. Footing nut disease is cercospora. it's one among the kinds of disease in early stage of ground nut leaf. The upgraded processing pattern comprises of 4 leading steps. Initially a color renovation constitute intended for the input RGB image is made , This RGB is converted into HSV because RGB is for color generation and color descriptor. subsequent step is plane separation. Next performed the colour features. Then using back propagation algorithm detection of plant disease is completed .**An Artificial Neural Network Approach To Identify Fungal Diseases Of Cucumber Plants Using Digital Image Processing -** Nowadays, AI solution like digital image processing and artificial neural networks (ANN) became important applicable techniques in Photo monitoring and plant health detection systems. during this research, an autonomous device was designed and developed for detecting two sorts of fungi(Pseudoperonosporacubensis, Sphaerothecafuliginea) that infect the cucumber (Cucumis sativusL.) plant leaves. This device was ready to recognise the fungal diseases of plants by detecting their symptoms on plant leaves (downy mildew and powdery mildew).For leaves of cucumber inoculated with different spores of the fungi, it had been possible to estimate the amount of Hour Post

Inoculation (HPI) by extracting leaves image parameters. Device included a dark chamber, a CCD camera, a thermal camera, a light-weight dependent resistor lightening module and a private computer. The proposed programme for precise disease detection was supported a picture processing algorithm and ANN. Three textural features and two thermal parameters from the obtained images were measured and normalized. Performance of ANN model was tested successfully for disease recognition and detecting HPI in images using back propagation supervised learning method and inspection data. Such this machine vision system are often utilized in robotic intelligent systems to realize a contemporary farmers assistant in agricultural crop field.

A Framework For Detection And Classification Of Plant Leaf And Stem Disease-We propose and evaluate a framework for detection of plant leaf/stem diseases. Studies show that counting on pure naked-eye observation of experts to detect such diseases are often prohibitively expensive, especially in developing countries. Providing fast, automatic, cheap and accurate image processing-based solutions for that task are often of great realistic significance. The proposed framework is image-processing based and consists of the subsequent main steps; within the initiative the pictures at hand are segmented using the K-Means technique, within the second step the segmented images are skilled a pre-trained neural network. As a tested, we use a group of leaf images taken from Al-Ghor area in Jordan. The developed Neural Network classifier that's supported statistical classification perform well and will successfully detect and classify the tested diseases with a precision of around 93%.

3. CNN Algorithm: Convolutional Neural Network Classification methods utilized in detection of plant diseases and its efficiency. Detection of diseases on citrus trees which include grapefruit, lemons, lime and oranges leaf attack by canker and anthracnose diseases.Proposed an algorithm for identification of disease in sugarcane culture. Image processing algorithms are used for feature extraction .It secured an accuracy of 95% for scorch disease detection in sugarcane leaf. The classification of healthy and unhealthy leaves found with accuracy of 88% and recognition of disease accuracy is 56%.Proposed a model to detect healthy leaves and 13 different diseased leaves of every , cherry, pear, Apple and Grapevine using CNN classification technique. Plant diseases are often detected by image processing technique. Disease detection involves steps like image acquisition, image pre-processing, image segmentation

feature extraction and classification.

Advantage

The main advantages of our solution include high processing speed and high classification accuracy. A plant disease recognition system can work as a universal detector, recognizing general abnormalities on the leaves, such as mold. Convolutional Neural Network gives high accuracy and detects more number of diseases of multiple crops**.** It is used to detect the plant diseases and provide solutions to get over the disease.

4. PERFORMANCE AND RESULT:

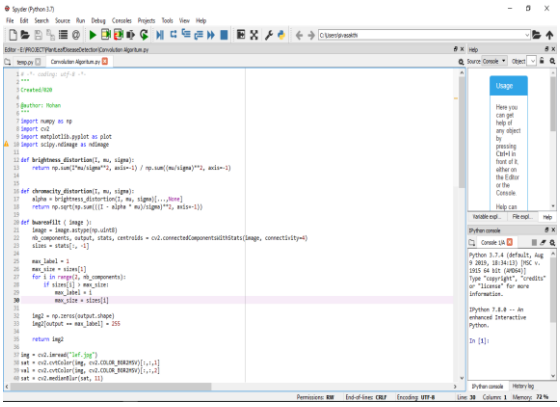

Fig 4.1 Image acquisition

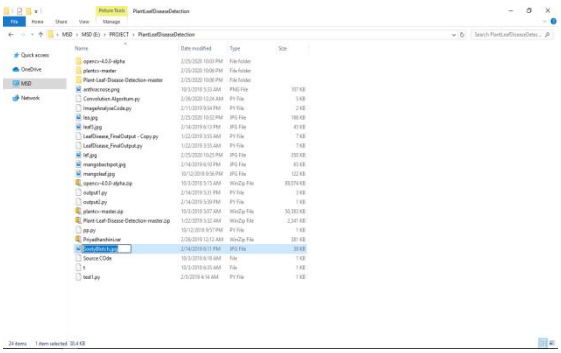

Fig 4.2 Select image

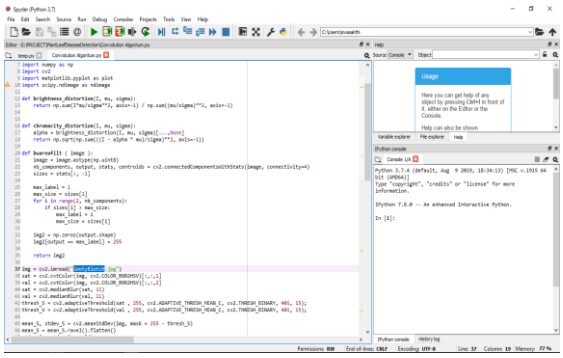

Fig 4.3 Image pre-processing

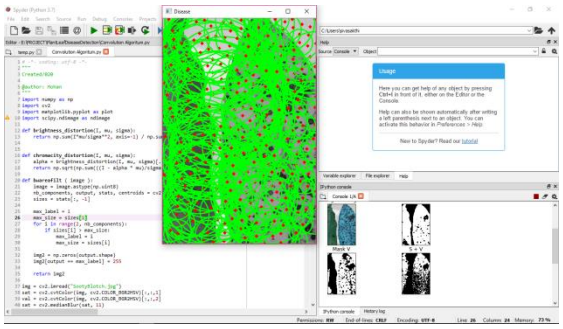

Fig 4.4 CNN analysis

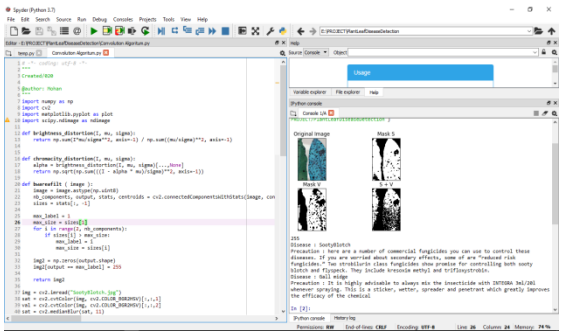

Fig 4.5 Disease Prediction

5. CONCLUSION: This five types of machine learning classification techniques for recognition of plant disease is completed during this review. SVM classifier is used by many authors for classification of diseases in comparison with other classifiers. The result shows that CNN classifier detects more number of diseases with high accuracy. In future,

other classification techniques in machine learning like decision trees, Naïve Baye's classifier could also be used for disease detection in plants and in the sense of helping farmer an automatic detection of all kinds of diseases in crop to be detected.

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