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SHEATH BLIGHT DETECTION AND CLASSIFICATION USING IMAGE PROCESSING AND MACHINE LEARNING

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ABSTRACT:

Sheath blight disease is one of the major problem in all over the agriculture sector of Chhattisgarh the early examination of this feat flight will prevent the major economic loss of the farmer this paper proposes image processing and machine learning algorithm to find the symptoms of sheath blight in the paddy or rice plant.

Automatic automatic detection of of rice plant disease is is carried out by using different algorithms we can also use images of rice plant to find out the the effect of disease on the plant in this case the features are extracted for the the healthy leaves and the disease affected area the total data set which is being used here consists of 500 images and where divided for training and testing purposes

The images which were collected are processed with the method proposed here and leaf is divided into two categories as either healthy or infected the simulation results provide an accuracy of 99% for sheath blight infected images and hundred percent for normal leaf images during the first phase that is training the testing phase accuracy is around 90% and 87% for the infected and healthy leaf images respectively.

Keywords: Rice diseases, Image processing classification, Sheath Blight, Artificial Neural Networks.

Introduction:

In agriculture sector sheath blight disease is one of the major issue which is faced by the farmers of Chhattisgarh plant getting affected by this problem have less ID which led to the development of new technique to detect the disease with the help of the proposed technique we can improve the earned by early detection of the sheath blight disease in India we know that rice is one of the most important cereal crop and farming of rice is considered to be measure economy for agriculture sector at the time of rice growth the diseases that it affects the plant or create measure problems face by the farmer this can create a used loss apart from other problems life pest and environmental factors we have different methods available around us for early disease detection like we have image processing methods remote sensing methods but their accuracy is not good it is quite poor this article proposes technic which is based on image processing and machine learning algorithm to detect the sheath blight disease of paddy crop in an effective way the field is monitored and pictures of paddy crop are captured using camera the features for propose methods are extracted and the images are classified either as healthy or infected using artificial neural networks.

LITERATURE SURVEY

The author Libo Liu et al (2009), proposed the idea of BP neural network classifier to recognize the disease and healthy part of the rice leaves. The rice disease considered here is earthy colored spot. The outcomes shows that the picture investigation and BP neural network are precisely identify the rice earthy colored spot diseasees [1].

The author M. Jhuria et al (2013) proposed the neural network Classifications to distinguish and Identify the disease for the natural products plants from manor to collecting. Complete of three elements vectors were removed which incorporates shading, morphology and surface. The morphology highlights gives 90% of the effectively results when contrasted with other two vectors [3].

The author H. Q. Cap et al (2018) proposed the idea of PC based techniques to identify the plant diseases. This strategy got the 78% of recognition execution in F1-measure at 2.0 fps [4].

The B. S. Ghyar et al (2017), proposed the technique for PC vision way to deal with analyze the disease brought about by bugs in the rice crop. Three highlights were separated for the disease space of the leaf. Hereditary Classification is utilized to choose the pertinent highlights. The ANN and SVM grouping is utilized which gives the exactness of 92.5% and 87.5%. [5].

I. PROPOSED METHOD

From literature survey we can find that the image processing is one of the best and common technique that is used to recognise different kind of disease on the paddy plant it is also understood that the regular digital camera can be used to capture the images and it is the regular operation and is is ideally suited for the primary stage of the research nowadays the automatic plant disease detection is very much improved in agriculture sector the techniques that we use improve the production this article is proposing method that is based on image processing and machine learning technique which can detect the disease Automatically

The Proposed Model of Blast Disease Detection System is shown in Fig 1.

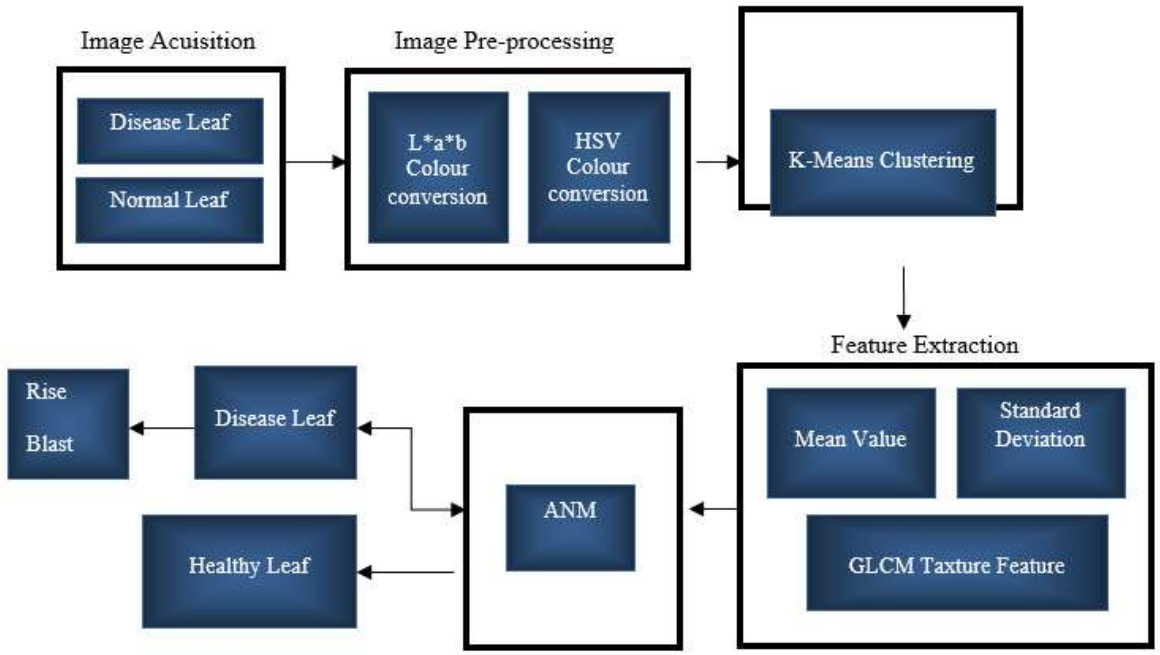


Fig.1.Proposed Blast Disease Detection Method

Initially the pictures of rice plant are taken using camera these pictures or images are passed with suitable preprocessing and segmentation mechanism the features which wire required for ore classification are extracted from the treated images and dwin tu UN artificial neural network structure the artificial neural network classify the image as healthy or disease infected we have following methods proposed for image processing

A. Image acquisition

At this stage the images are acquired from the field total 500 samples are taken for both healthy and infected part of the field images were captured using real MI 8 pro camera with high resolution and then resized into 256 into 256 pixels the typical disease affected image is shown here
The regular disease impacted picture is displayed in the Fig 2.

Fig.2. Blast disease affected Leaf

B. Image pre-processing

This is the second stage and at this stage the RGB images are are converted ine to hsv images the working with hsv is easy in comparison with RGB to separate the colours the hsv ful form is hue saturation and value these are different part of the images

The means of different picture pre-handling are displayed in the Fig 3.

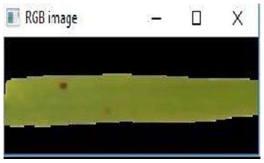


Fig. 3.a Rgb Image

Fig 3.b Rgb to HSV

Fig.3.c Hue part

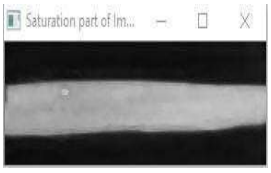
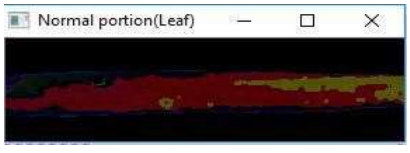


Fig.3.d Saturation part

C. Image Segmentation

The third stage is image segmentation. At this stage k means clustering is used for segmenting the images the selection of of k values are quite important in this clustering technique out of the values given or selected using trial and error method the value 3is is fixed for ke results of k-means clustering is given here



After effects of k-implies bunching is displayed in the Fig 4.

Fig.4. Results of K-Means Clustering

D. Feature extraction

Feature extraction is a stage at which the features and different things related to images are considered every crop has its own feature and every disease has its own symptoms in this phase the statistical features like mean value standard deviation and glcm are are computed for both the leaf healthy and infected the mathematical equations are given below

- Mean Value for Image

The average color value of the image are calculated using this formula [2]

$$\text{Mean} = Ei \sum_{j=1}^{N} Pij \quad (1)$$

- Standard Deviation

$$S.D = \sqrt{\frac{1}{N} \sum_{j=1}^{N} (Pij - Ei)^2} \quad (2)$$

- GLCM Texture Feature Classifications

The following GLCM Texture feature are calculated using[7],

$$\text{Energy} = \sum_{i,j=0}^{N-1} (Pij)^2 \quad (3)$$

$$\text{Homogeneity} = \sum_{i.j=0}^{N-1} \frac{Pij}{1+(i-j)^2} \quad (4)$$

$$\text{Contrast} = \sum_{i,j=0}^{N-1} Pi\,j(i-j)^2 \quad (5)$$

$$\text{Correlation} = \sum_{i.j=0}^{N-1} \frac{Pij(1-\mu)(1-\sigma)}{\sigma^2} \quad (6)$$

II. CLASSIFICATION

The artificial neural network ANN is computational based model that is based on the structure and methods of of biological neural networks a neural network took the knowledge through learning. So so the neural network has to be trained to find the the accuracy of classification.

Artificial neural network has three layers vichar connected with each other the first layer is known as input neurones that transfers the data to the second layer which is also known as hidden layers the second layer or hidden layer transfer the propose data to the output neurones or the third layer.

Hindi algorithm proposed here the three hidden layers are chosen with numbers of input layers where the value of an lies from 1 to 8 the output layer give the the result of classification as healthy and blight infected leaf image if the value that is predicted is larger than 0.5 then leave is is classified as healthy leaf as it is classified as affected the schematic diagram is given below

The schematic graph in Fig.5 show the proposed work for neural network model.

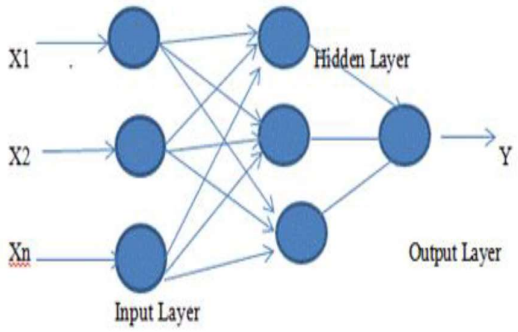


Fig.5.Neural Network Model

The Standard Deviation of the image are calculated using this formula

III. EXPERIMENTAL RESULTS

After taking out the features from the pictures artificial neural network classified it as healthy or for infected leaf the two tables given below table 1 and 2 2 shows the accuracy for the two stages that is training and testing at the time of training 280 sample images where used while for testing 220 images where used.

Table 1. Training accuracy

Classification	Accuracy
Blast Leaf	99%
Normal Leaf	100%

Table 2. Testing accuracy

Classification	Accuracy
Blast	90%
Normal	86%

Fig 1 and 2 shows that the ANN gives the better precision to both disease and ordinary piece. Preparing our ANN model is quick and required just 3 minutes on our current circumstance Intel I-3 CPU, 4GB RAM and 1 TB hard circle. The impact disease exactness acquired in preparing is almost all the way and testing is 90%. The precision diagram is displayed in the Figure 6a and 6b.The Graph addresses the exactness with X-pivot and Y-hub showing ordinary and Blast contaminated leaf precision, in the [0.0 , 1.0].

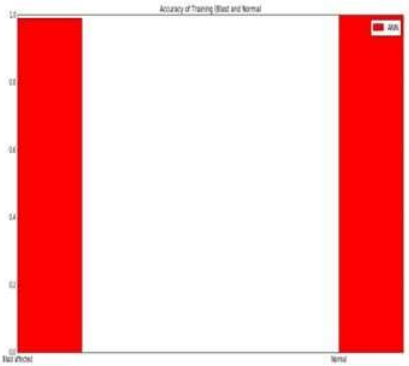


Fig.6a.Training Accuracy

From the chart portrayed in figure 6.a, it tends to be seen that close to 100% and 100% precision is acquired for impact and sound leaf during preparing.

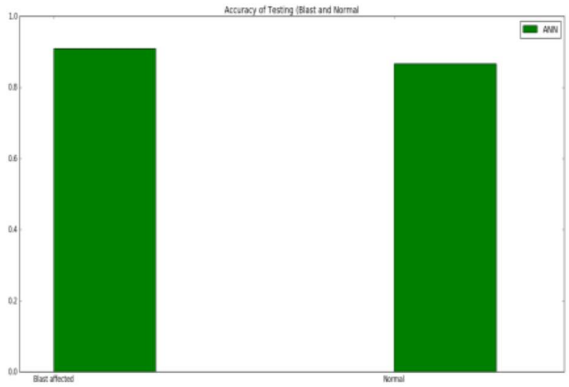


Fig.6b. Testing Accuracy

From the chart portrayed in figure 6.b, it tends to be deduced that 90% and 86% precision is acquired for impact and sound leaf during testing.

CONCLUSION

In view of the AI Classification, the proposed framework identifies the disease precisely for the rice crop. The leaf region was caught from a distance of 25cm of the noticeable area. The leaf was caught for both healthy and infected part utilizing Realme 8 Pro camera with high pixel power. By the above proposed strategy farmers can protect their yields from diseases. This strategy gives an disease free climate and increases the amount of the harvest. At last it would be proposed that the Indian farmers can follow this technique to keep away from the disease spreading in the harvest and settle on choice whenever to further develop the harvest yield and improve conservative advantages.

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