# Leaf Diseases Prediction by Image Processing

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**ABSTRACT:** Plant disease detection in cultivation is quite challenging. When a diagnosis is wrong, the seed yield and the commercial profit of the company fail tremendously. Detection of leaf diseases calls for a great deal of research, the experience of plant disorders and much more time to process. This paper may also use picture analysis in MATLAB to classify leaf disease. Disease detection continues steps such as loading the file, enhancing contrast, converting RGB to HSI, extracting characteristics and SVM. Seed farming in the agriculture sector has a vital role to play. The lack of food is primarily attributed to contaminated seeds, which decrease development levels reflexively. Plant diseases are not yet investigated at an early stage to classify them. The biggest problem is the decline in pesticide uses in farming and the increase in output levels of quality and abundance. The segmented area is identified and positioned in its correct classes as a color-based segmentation model. A trial study of the time sensitivity and field of the contaminated zone was conducted on sample images. The picture processing methodology can identify plant disorders.

**KEYWORDS:** Images pre-processing, Disease analysis, k mean cluster, Features extractions, Segmentations, SVM.

## 1. INTRODUCTION

India is a farming nation where nearly 70% of the population is agriculture-dependent. In 2017-18, CAI reviewed agricultural yields upward; India, which is the world's largest cotton manufacturer, generates about 6.21 million tons of cotton. The detection of crop pathogens relies mainly on farmers ' manual identification. There are a few issues [1]. The seed infection may erroneously be identified because farmers generally determine the symptoms from memory, on the other, since the specialist or professional is not qualified to identify the disease locally. In fact, the disease cure may be resolved. The disease is primarily attributed to the yarn plants' skin. Around 85 percent of yarn plants sickness are over their bottom. Cotton Corporation, India (CAI) Restricted annual survey reveals that up to 25% of the supply of cotton is decreased due to various illnesses. Where the outbreaks are established in the preliminary stage or where plants obtain immediate fertilizers, 15-20% of plants may be saved from destruction [2]. Cotton is perhaps the most popular crop in the Vidarbha state of Maharashtra. The pictures from this area were taken. The dataset is primarily of contaminated cotton plant leaf images. 40-50 photographs of each illness have been obtained. Leaf diseases including bacterial blight, bladder blot, leaf curl, and others are primarily affected.

Yarn plants diseases may be categorized, seen in Tab. 01. They are defining and classifying the primary crop disorders frequently observed on cotton leaves and stems in the proposed solution.

**Table 1: Types of Diseases**

| Types of diseases | Diseases |
|---|---|
| Bacterial | Bacterial blight, Crown dall, Lint degradation |
| Fungal | Alternaria, Leaf spot, Fusarium wilt, White spot |
| Viral | Leaf curl, Herbicide, Leaf crumple, Leaf roll, Zinc deficiency |
| Due to insects | White flies, leaf insects |

Bacteria blights are bacteria plague of Xanthomonas citri bacteria in the Fig. 1. In contrast to the upper ends these illnesses are more common in lower leaves. This is often referred to as an irregular patch of leaves i.e. in the water originally deep greener and transforms deep greenish khaki [3].

**Fig. 1: Bacterial Blight**

Several papers say that cotton plant leaves are identified and treated. As outlined and addressed below, the research suggested describes different techniques, tools, innovations and numerous approaches to apply them. (Table 2)

## 2. PROPOSED WORK

As seen in figure, there are 5 main measures used to diagnose leaf diseases of cotton plant. The device introduced requires digital camera image processing. Image pre-processing involves the transfer of picture colour, the fragmentation and labeling of the region influenced by the pre-processing file. Throughout the end, pathogens are found on the cotton leaf as shown in Fig. 2. From 1$^{st}$ step, different diseased leaf pictures will be captured of 150×150 digitally saved cameras. Photos are processed in the color space of the RGB system. Files are sorted manually and specific names and percentages have been provided. In the second step, it has to conduct such operations such as noise reduction and context to remove relevant information from pictures. Input RGB contaminated leaf pictures will be translated into L'espace light. RGB implies color space, based on the color of the screen. The room is often common as it is focused on the interpretation of human color. L is an amplitude component, an ital. is a red-or-green spectrum, and b pen is the colorfulness of the yellow or blue material [4].

**Table 2: Literature Survey**

| Paper | Features extraction | Feature extraction technique | Classifier |
|---|---|---|---|
| Amar Kumar Dey et al. | 1.Color | Histogram | Otsu thresholding |
| Elham Omrani et al. | 1. Color<br>2. Shape<br>3. Texture | Wavelet transform, SGDM and CCM | Support vector regression (SVR) |
| P. Revathi et al. | 1. Edge<br>2. CMYK color<br>3. Texture | Enhanced PSO and GA algorithm. | SVM, BPN, Fuzzy |
| S. Arivazhagan et al. | 1. Color<br>2. Texture | Color-co-occurrence methodology(CCM). | SVM |
| Haiguang Wang et al. | 1. Color<br>2. Texture<br>3. Shape | Principal Component Analysis (PCA) | BPNN, RBFNN, GRNN and PNN |
| Dheeb Al Bashish et al. | 1. Color<br>2. Texture | CCM | ANN |
| V. A. Gulhane et al. | 1. Color<br>2. Shape of holes | Unsupervised self organizing feature map. | ANN |

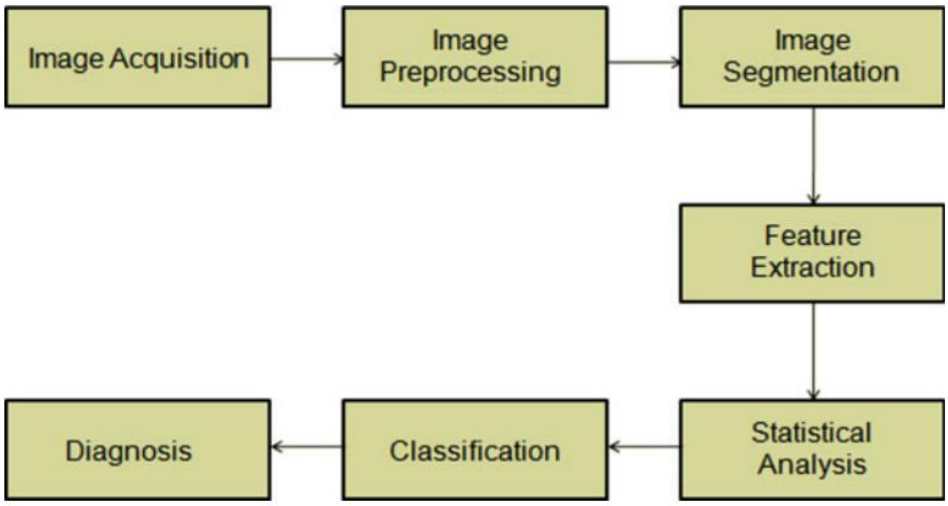


**Fig. 2: Proposed system**

K-mean categorization is an essential technique for geographic segmentation in order to locate the infected field [1]–[9]. It categorizes artifacts into k class numbers (pixels). K-mean grouping is used to reduce the sum of the squared between the items and the respective cluster by Geometrical distance formulas. The collection of features is derived after differentiation to identify the infected region. Significant aspects are extracted and can be used for deciding the importance of a specific picture in this phase. Color and texture attributes are commonly used with picture applications.

## 3. RESULT AND DISCUSSION

In Java both possible algorithms were introduced. For deployment, the Netbean IDE 6.8 was used. Three separate aspects of the predicted structure can be shown: Input Set Cotton plant for the suggested

experiment was mentioned. 40–50 pictures of growing disease have been taken. A set scale of 150×150 is accessible to the photographer. The statistical color characteristics such as probability, deviation and skews were determined with the color co-occurrence matrix 8. The texture accuracy of the GLCM matrix was also determined. Statistical features including uniformity, strength, entropy, comparison, symmetry are viewed as such characteristics. Such determined functional value was stored to each infection for 3 pathogens via note pad files including description, like 1 to 3. The initial step is to pick the file. When using the image preprocessing method, the leaf needs to be diagnosed whether it was disturbed or unchanged. Instead you have to section the picture and classify the name of the illness. This proposal offers a mechanism for the total number of infected leaves and their local environment for the management of leaf diseases. Fig. 3 illustrate the RGB conversion in proposed system.

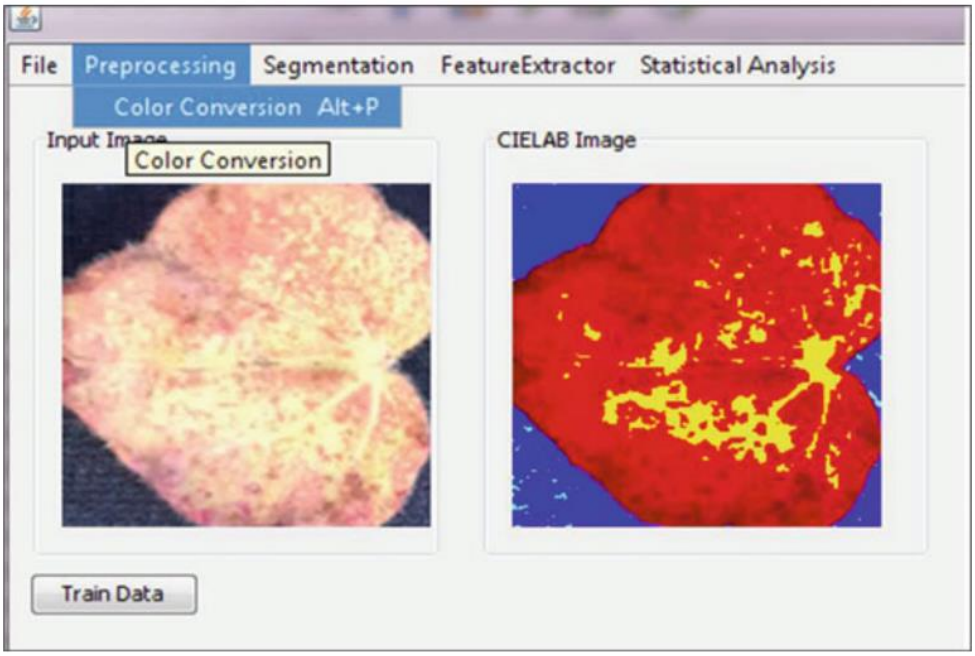


**Fig. 3: RGB conversion in proposed system**

A minimum of 250 pictures have been split into preparation and evaluation sets. Training: test ratios have been changed to verify the classification accuracy. The recognition precision of the classifiers is measured in Fig. 4. For contrast are being used three classificatory, ANN, KNN and SVM. SVM received an overall precision of 95. 33%. The precision of classification can be shown to improve with the rising number of training samples. SVM provided overall precision of 98.42 percent for trainings: analysis ratios of 75.0:25.0 as shown in Fig. 4.

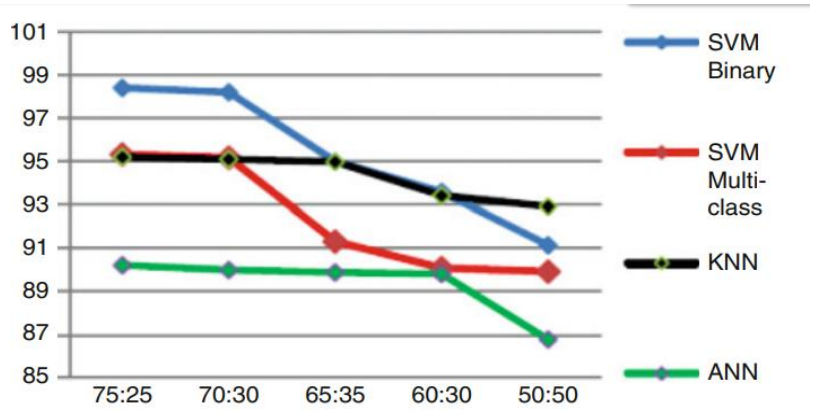


**Fig. 4: Classification accuracy of classifiers**

## 4. CONCLUSION

Three diseases, mainly affecting the yarn plants, like Bacteria Blights, Leaf's Spots for Circospora, Leaf's Spots on Alter-naria, have been evaluated to identify automatic diseases in cotton fiber. The tainted pictures were then pre-processed by the K-mean methodology and segmented. Features of texture and color were extracted and transferred through vector support machines. We gather details on disease signs, fertilizers and treatment upon identification of pathogens. The 94 percent accuracy of the SVM classifier is the best score. The key purpose in research always to contribute to an automatic choices sustenance systems, which will deliver farmers with assistance over the network so that existing decision support systems would solve their drawbacks. The device was checked on photographs of soybean leaves but can be applied to other crops. Future research will depend on how to use the new software to help identify different crop disorders.

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