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Detection of Plant Leaf Disease Using Image Processing Techniques (Segmentation Algorithm)

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ABSTRACT
Our country "India", is a country that's depending on their agriculture productivity. In India there's diversity within the religions also as there's diversity within the crops also . As our country India is rich within the production of wheat, rice, cotton, jawar-bajra etc. Maximum people use farming as their primary source of earning their livelihood. About 70% of individuals from India that are depending only on farming as their economic source. As we are having diversity in crops there's diversity in diseases also. Diseases can destroy the entire crops but sometimes it can hamper the standard and quantity of the productivity and hence affect the economy of India. The proper detection of different diseases in different types of crops is impossible by human eye. Relative methods for the detection of disease is, we call the expert who gives suggestion about the sort of disease and what are the methods for cure it. But sometimes the eye observation can get false and unnecessary fertilizers get spread on leaf having no effect on leaf. to unravel this sorts of problems, we will accurately detect disease by using Digital Image Processing which give accurate information about causes, effects and fertilizers got to spread. during this project classification of disease is predicated on neural network. Different MATLAB preprocessing algorithms are used for detecting the disease. After completing the successful classification and detection of plant disease, we can spread corresponding and suitable fertilizers with the help of . wired robot.

KEYWORDS: Neural Network, MATLAB.

I. INTRODUCTION

The position of any country within the planet depends on its economy and thus the economy of most of the countries depends on agricultural production. Production gets suffering from diseases of the crop. The diseases on cotton plants can be called as pathogens, deficiency of nutrients, fungi etc. Detection and identification of such sorts of diseases requires an expert system, which also describe the tactic of prevention and treatment. Identifying the disease isn't easy task. It takes a good experience and knowledge about plants and their corresponding diseases. This will be often check the error system which needs many iteration which needs continuous watch farm. To unravel this problem we are using image processing and a couple of MATLAB classification tools. During this research we are detecting, classifying and identifying various disease on cotton leaf. The diseases that may found on cotton can be classified as.

1.1Rust
1.2 Fusarium
1.3 Reddening.

II. LITERATURE SURVEY

There are various existing methods in some research that can be used to detect diseases on different leaf. These existing methods are illustrated and discussed here. [1] During this paper consists of two phases to identify the affected a neighborhood of the disease. Initially Edge detection based Image segmentation is completed, and eventually image analysis and classification of diseases. This work the input images using the RGB pixel counting values features used and identify disease wise and next using homogenization techniques Sobel and Canny using edge detection to spot the affected parts of the leaf spot to acknowledge the diseases boundary is white lighting then result's recognition of the diseases as output.[2] during this paper detection of leaf diseases has been used method is threefold: 1) identifying the infected object based upon k-means clustering; 2) extracting the features set of the infected objects using color co-occurrence methodology for texture analysis; 3) detecting and classifying the type of disease using NNs, moreover, the presented scheme classifies the plant leaves into infected and not-infected classes. [3] during this

paper a comparison of the effect of CIELAB, HSI and YCbCr color space within the tactic of disease spot detection is completed . of these color models are compared and eventually a component of CIELAB color model is used . [4] during this paper Support vector machines are a bunch of related supervised learning method used for classification and regression. The detection accuracy is improved by SVM classifier. [5] the strategy of image segmentation was analyzed and leaf region was segmented by using Otsu method. within the HSI colour system, H component was chosen to segment disease spot to chop back the disturbance of illumination changes therefore the vein. Then disease spot regions were segmented by using sobel operator to seem at disease spot edges. Finally plant diseases are graded by calculating the quotient of disease spot and leaf areas.

III. METHODOLOGY

The modular structure of proposed methodology has been shown in figure 1.1

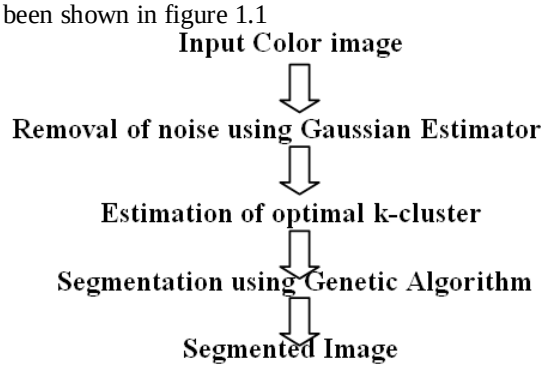

Fig 3.1 *Proposed Image Segmentation System*

Proposed Algorithm

The flow chart of the proposed algorithm is as shown in Figure 1.2 and the steps of the proposed improved Genetic Algorithm are as follows:

Step 1: In the proposed scheme, a color image of size m x n, each pixel of which has Red, Green and Blue components, has been considered as the input.

Step 2: Removal of noise

Gaussian estimators are used for removing the noise from the input image. If X is considered as a random variable that takes these values then Gaussian distribution is given by:= 1 (| , 2)

Step 3: Estimation of k

The ISODATA algorithm has been used to find the optimal no. of clusters. After estimating the number of clusters, the clusters are split if a predefined value is exceeded by the cluster standard deviation and Clusters are merged if for threshold, either the number of members (pixel) in a cluster is less than that threshold or if the centers of two clusters are closer than that threshold.

Step 4: Clustering using GA

In this step the searching capabilities of GA have been utilized for the purpose of appropriately clustering a set into K clusters in N-dimension [83]. Sequence of K cluster centers is a solution which is represented by each chromosome. Initialization of population is done randomly in so many rounds and best chromosome survives in each round for processing in the next round.

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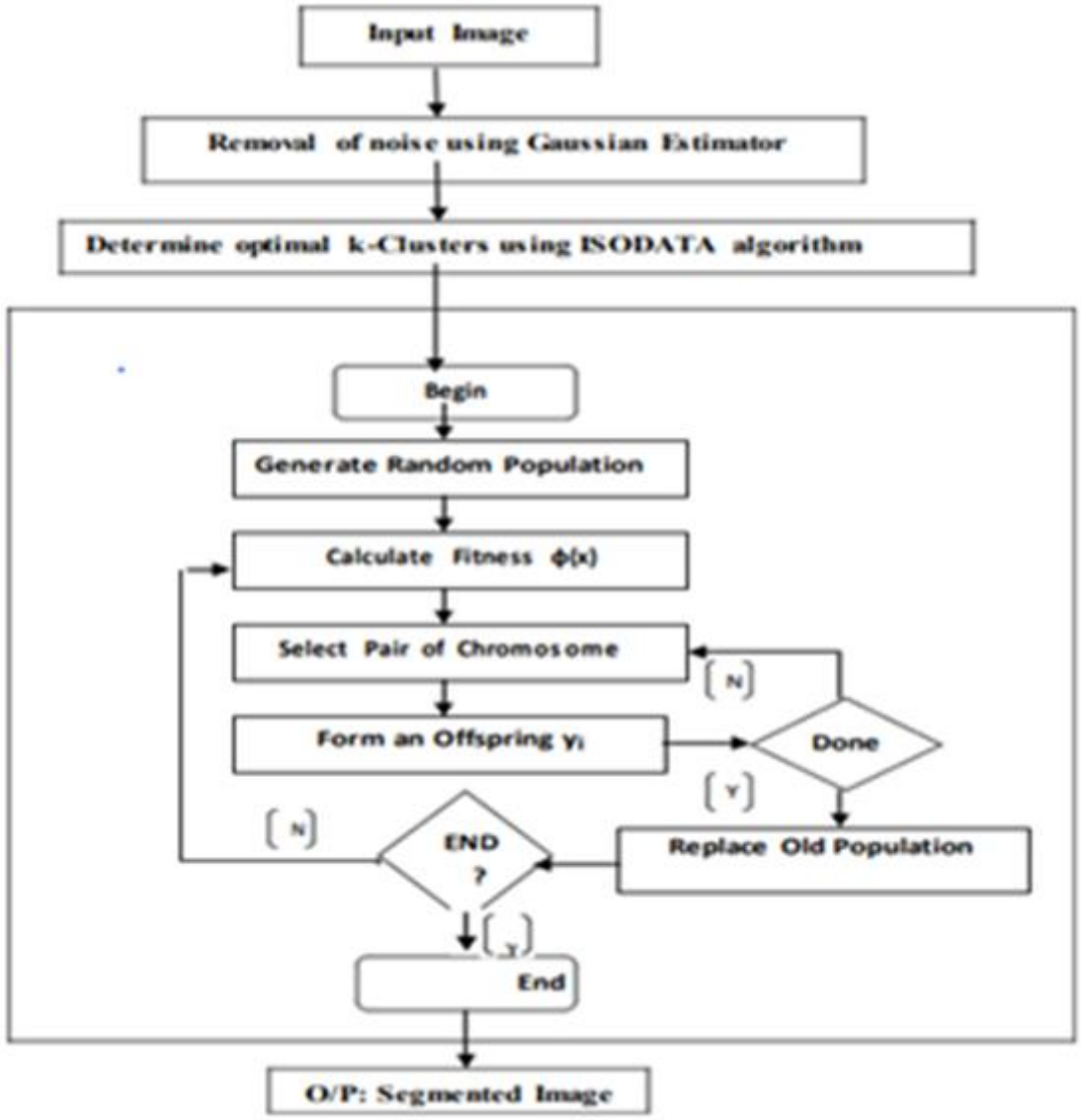

During this project disease caused is shows within the sort of percentage, so it's helpful for us to know what proportion amount of fertilizer required to beat the disease. during this way we successfully identify the disease on leaf by using image processing. After detection of disease data within the binary form is shipped to controller, which takes place by using UART1.
Controller receives data then actuator gets ON at output port of controller.

IV. RESULTS

We can successfully detect disease on given leaf, which help to increase productivity.

Trained neural network

We successfully trained Neural Network, using 5 iterations. In our research we are taking the features values of small pixels values images which may have some disease like bacterial disease, Rending, fungus and rust disease etc.

Rust leaf

Here we load the image of leaf, which shows us that it is defected 8.22% by Rust,which also shows percentage of normal leaf? From this data we can spray suitable fertilizers to remove rust from leaf.

V. CONCLUSION AND FUTURE SCOPE

We discussed that, correct identification of disease is a difficult by naked eye, called the experts system. This system is time consuming and there is no guarantee that identified disease will be correct or not. So with reference to this project by using image processing we can successfully identify and classify the disease by using Neural Network. Because of this we can help farmers to increase their productivity, quality and quantity of the products.

In future, we trained lots of diseases and showing their causes, effcts and about fertilizers used. We also use the wired robot which can reach to that site and actuators starts working which will act as spraying device in defected areas.

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