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A Blended Approach for Effective Detection of Plants Disorder

Inakollu Praveen[1], Aditya Nageswar Chitirala[2], Ibrahim Baig[3], Dasari Pavan[4]
[1, 2, 3, 4]Department of ECE, Vasireddy Venkatadri Institute of Technology, Guntur, Andhra Pradesh, INDIA

Abstract: "Agriculture is the backbone of our Indian Economy". Disease detection of plants is hard to determine in the field of agriculture. Incorrect identification leads to a huge production loss and loss in economical value of the market. Manual disease detection requires a huge amount of work, skilled labor, plant diseases knowledge and also requires more processing time. So, we use image processing for detection and identification of leaf disease in MATLAB. The process includes steps like loading the image, contrast enhancement, converting RGB to HSI, extracting of features and SVM.

Keywords: GUI, HIS, K-Means Clustering, MATLAB, SVM

I. INTRODUCTION

Agriculture plays a key role in the development of Indian Economy. Effect of agriculture directly shows an impact on the country`s economy. It is important to detect the disease affected plants from others. The major part of it is detecting the diseases. It requires skilled labor, disease knowledge and also requires more processing time. [1] Traditionally, the naked eye observation of farmers was followed by a chemical test which was the main way of detection and classification of agricultural plant diseases. In countries like India, farming land is vast and difficult to monitor and observe each and every plant, every day. Farmers are also unaware of non-native diseases. Consultation of experts for detection and identification will be time-consuming & costly. Also, unnecessary use of pesticides will be dangerous for natural resources such as water, soil, air, food chain etc. it is necessary to avoid contamination of food products with pesticides. [5] Now a day's technology plays a vital role in all the fields but till today we use some old methodologies in agriculture. Plant disease detection can be implemented through machine-learning methods by which we can achieve speed and accuracy. Generally, we can observe the symptoms of the disease on leaves, stems, flowers etc. so here we use leaves for identification of disease affected plants. [3] There is a major need for developing technique such as automatic plant disease detection and classification using leaf image processing techniques. This will improve the yield by alerting them at the right time before spreading of the disease to a large area.

II. PROPOSED APPROACH

For the process of detection and identification of plant leaf diseases we use MATLAB for implementing image processing techniques. The process is comprised of five main phases. Disease classification data is already encoded, the software automatically identifies the disease and percentage region of the area affected. [4]

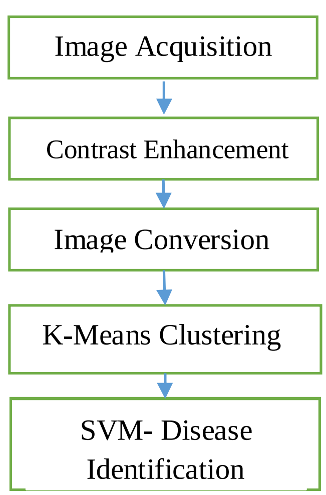

Figure 1: Process Flow Chart

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1) *Image Acquisition:* First, the image is captured in high resolution to get better results which also improves the efficiency of the detection and Identification of Image.
2) *Contrast Enhancement:* In the second phase, the image values are concentrated near a narrow range. The image is given to the system and the output of the system after contrast enhancement is an Enhanced image which is used for further processing.
3) *Converting RGB to HIS:* In the third phase, the pixel range is converted from RGB to HSI. The RGB image is in the size of M-by-N-by-3, where the three dimensions account for three image planes (Red, Green, Blue). Generally, the pixel range of RGB is [0,255] and in this, the pixel range is [0, 1]. Conversion of pixel range can be done by calculating the components; Hue, Saturation, Intensity. [2]

HUE

$numerator = 1/2[(R - G) + (R + B)]$

$denominator = ((R - G)\,2 + ((R - B) * (G - B)))\ \hat{}0.5$

Now, theta value

$h = acosd(numerator/denominator)$

Saturation

$$s = 1 - \left(\frac{3}{R + G + B}\right) * min[R, G, B]$$

Intensity:

$$I = \left(\frac{R + G + B}{3}\right)$$

4) *Using K-means Clustering:* In the fourth phase, K-means Clustering Algorithm is used for dividing the object based on the feature of the leaf into K number of groups. There are two preprocessing steps that are needed in order to implement the K-means clustering algorithm: The process starts first by creating device-independent color space transformation structure which can use coordinates used to specify the color will produce the same color regardless of the device used to draw it. Thus, by creating the color transformation structure that defines the color space conversion. Then, we apply the device-independent color space transformation, which converts the color values in the image to the color space specified in the color transformation structure. The color transformation structure specifies various parameters of the transformation. A device dependent color space is where the resultant color depends on the equipment used to produce it. The classification is done by minimizing the sum of squares of distances between the objects and the corresponding cluster or class centroid [3; 4]. However, K-means clustering is used to partition the leaf image into four clusters in which one or more clusters contain the disease in the case when the leaf is infected by more than one disease. [1]

The algorithm of K means includes the following steps:

a) Initialization: User should select the value of k. k means the number of clusters/groups, i.e. the image is divided into k number of clusters.
b) Every pixel is assigned to its nearest centroid (k).
c) The position of the centroid is changed by means of data values assigned to the group. The centroid moves to the center of its assigned points.

Out of these three clusters classification is done for only one cluster which has affected area.

5) *Support Vector Mechanism (SVM):* In the final phase, the Support Vector Machine (SVM) technique is a machine learning technique used for further processing of plant disease detection and Identification.

We apply the transformation and add one more dimension as we call it z-axis. Let us assume the value of points on z plane, $w = x^2 + y^2$. In this case, we can manipulate it as the distance of point from z-origin. Now if we plot in z-axis, a clear separation is visible and a line can be drawn.

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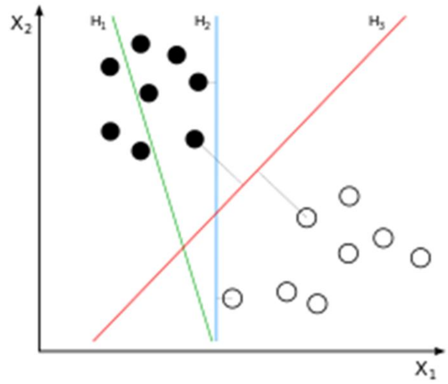

Figure 3: Classification using SVM

III. EXPERIMENTAL RESULTS AND OBSERVATIONS

The captured leaf image is processed by MATLAB to process the detection and identification of the Plant Disease. On running the program, the GUI window appears.

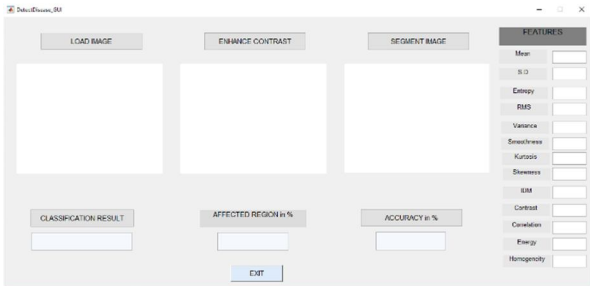

Figure 2: Interface for Image acquisition and Output

The Window can be used to continue with the further process. On Selecting LOAD IMAGE the GUI asks to browse the captured image to give the input image for detection and identification. On selecting ENHANCE CONTRAST, the image is then enhanced and GUI gives the image that is contrast enhanced.

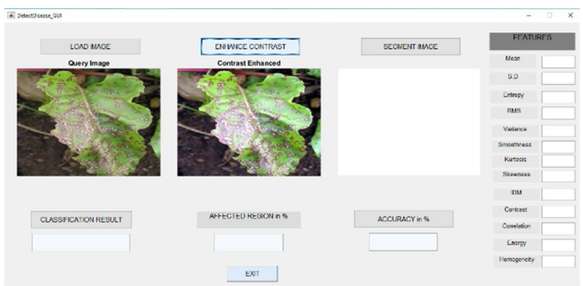

Figure 4: Interface after selecting and Enhancing Contrast

Then the image is segmented using K means clustering. On selecting SEGMENT IMAGE the image is then segmented and gives three output segmented images. The user needs to manually select the cluster where the affected region is clearly visible.

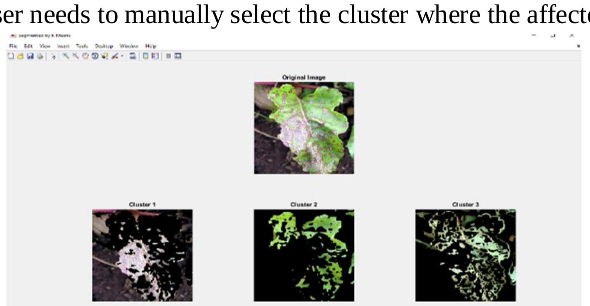

Figure 5: K-Means Cluster Images. Displaying all the three clusters.

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On selecting the affected cluster image. The software identifies the disease on which the plant is affected and gives the percentage region of the affected area of the leaf.

Figure 6: Classification Result

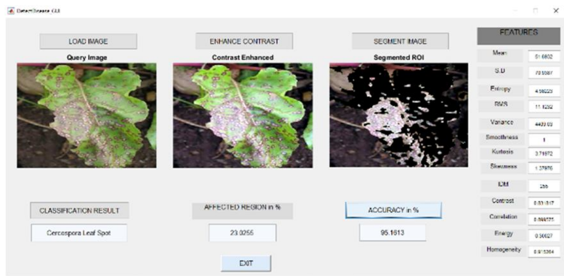

Figure 7: Output Window displaying the disease, accuracy and all other parameters.

The accuracy of the result can also be measured on selecting ACCURACY it calculates the accuracy in percentage (%) which gives the accuracy of the result.

IV. CONCLUSION

In this study, by using this procedure the disease detection and identification can be simpler and can be integrated with the device to easily detect the affected plants in the field. Helps to reduce the effort of labor and also to increase yield by easily detecting the affected plants and avoid widespread of disease to a larger scale.

REFERENCES

[1] Smita Naikwadi, Niket Amoda, “Advances in image processing for detection of plant diseases”, International Journal of application or innovation in engineering and management (IJAIEM) Volume 2, Issue 11, November 2013

[2] Barbedo, Jayme Garcia Arnal, A new automatic method for disease symptom segmentation in digital photographs of plant leaves, European Journal of Plant Pathology, 2016, 1-16.

[3] Zhang S. W, Shang Y.J, and Wang L, Plant Disease Recognition Based on Plant Leaf Image, Journal of Animal and Plant Sciences, 25 (1), 2015, 42-45.

[4] Sasirekha N, Swetha N, An Identification of Variety of Leaf Diseases Using Various Data Mining Techniques, International Journal of Advanced Research in Computer and Communication Engineering, 4 (10), 2015.

[5] Sachin D, A B Patil, Plant Disease Detection Using Image Processing, International Conference on Computing Communication Control and Automation, 2015.

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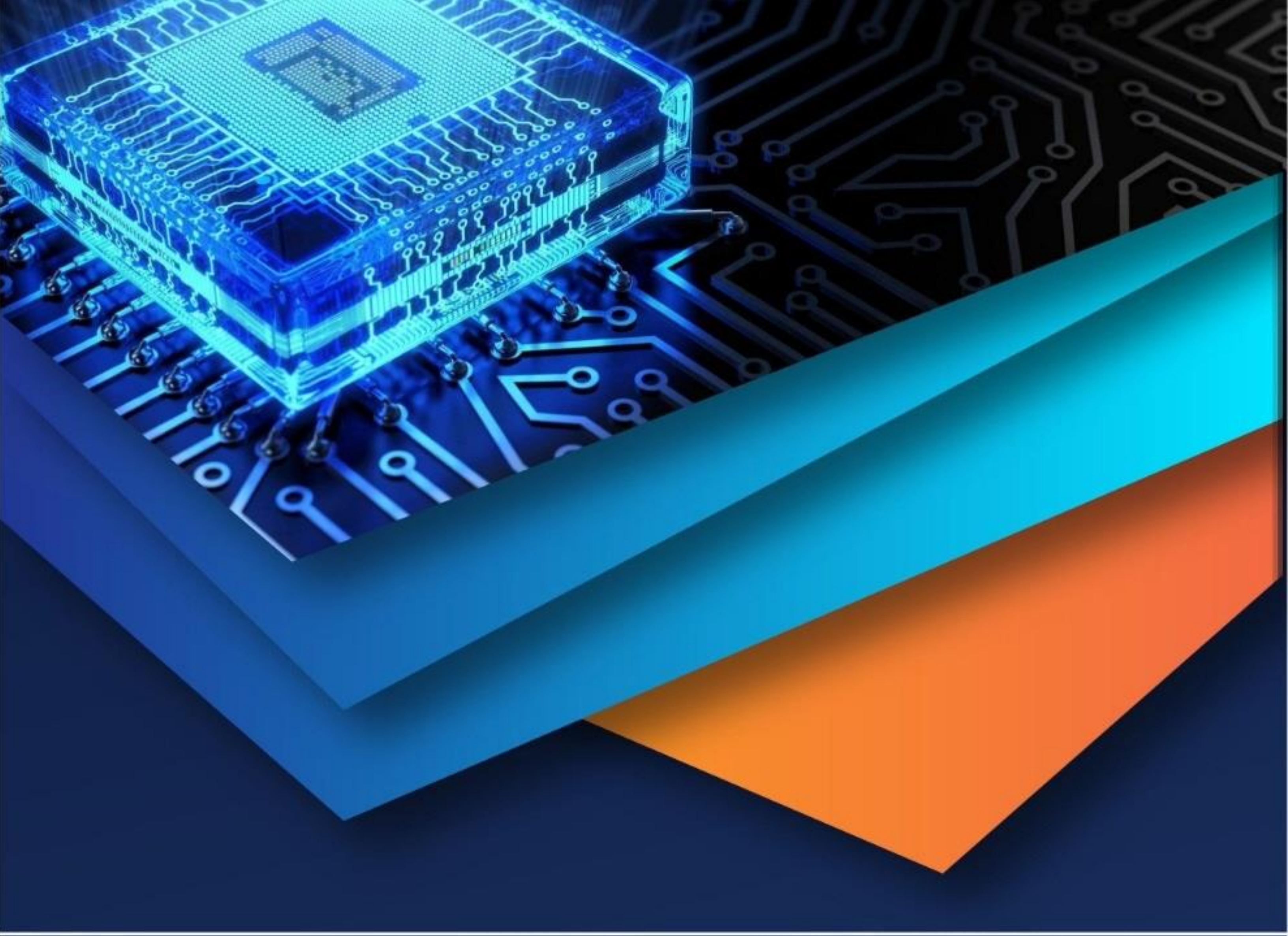

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