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LDA BASED TEA LEAF CLASSIFICATION ON THE BASES OF SHAPE COLOUR AND TEXTURE

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Abstract :- **Background/Objectives**: The presented paper shows a model of leaf segmentation for tea leaf, its seem to be a promising and feasible approach to perform the task of detecting arbitrary shapes in a tea leaf image with a minimum prior. The performance for given image samples was satisfying. **Methods/Statistical analysis**: Traditional models were very easy to use in but they did not detect boundaries very accurately. On the other hand proposed algorithm was able to detect boundaries well and will be enhanced with image blending to prove the effectiveness of the technique in real applications. **Findings**: The results have been displayed in the result section with comparison to previous system in terms of area, time and efficiency. **Improvements/Applications**: In the proposed LDA system accuracy has been improved.

Keywords: Segmentation, LDA, PDE, SVM, RGB

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1. Introduction

Natural images consist of an overwhelming number of visual patterns generated by very diverse stochastic processes in nature. The objective of image understanding is to parse an input image into its constituent patterns. This can be done by image segmentation. Image segmentation mainly deals with distinguishing objects from its background. It is one of the most important elements in automated image analysis because objects or other entities of interest are extracted from an image for subsequent processing, such as description and recognition. Basically the segmentation is also a process of pixel classification: the picture is segmented into subsets by assigning the individual pixel values to classes. The result may be going into a classification process which assigns some further properties to the previously defined segments.

Segmentation subdivides [1] an image into its constituent regions or objects. Segmentation is a process of grouping together pixels that have similar attributes. Image Segmentation is the process of partitioning an image into non-intersecting regions such that each region is homogeneous and the union of no two adjacent regions is homogeneous. Segmentation is typically associated with pattern recognition problems. It is considered the first phase of a pattern recognition process and is sometimes also referred to as object isolation. Segmentation of images is a difficult task in image processing and is still under research.

Digitized pictures more often than not experience the ill effects of poor picture quality, especially absence of contrast and vicinity of shading and artifacts, because of the lacks in focusing, lighting, specimen staining and different components. Since a few components are not really perceptible by eye in a picture, we frequently transform pictures before display. Image enhancement is a digital processing system which does its best to enhance picture vision and makes the picture adjust to be prepared by PC. As well, the requirement for contrast enhancement additionally emerges from the way that current softcopy display gadgets, are unequipped for showing the greatest number of distinctive detectable levels of luminance as can be recorded in a computerized picture [2]. It truly enhances some data inside the picture specifically and limits alternate ones. Thusly, it is anything but difficult to identify and perceive helpful data. It generally yields acceptable results if the best possible procedure is chosen for a given application alongside the correct handling parameters.

Image enhancement procedure comprises of a gathering of strategies that look to enhance the visual appearance of a picture or to change over the picture to a structure more qualified for investigation by a human or machine [3]. The central goal of image enhancement is to alter credits of a picture to make it more suitable for a given undertaking and a particular spectator. Amid this procedure, one or more characteristics of the picture are adjusted.

2. Literature Review

Mr. Pramod and S. landgeet [5] proposed an image handling based processing procedure for plant maladies discovery and grouping. They clarified how Indian ranchers confront issue with plant ailments because of absence of horticultural master get to. In this paper, their goal was to build up a picture handling strategy to naturally perceive plant illnesses in view of their shape, surface and shading. After discovery of cause or plant ailments this framework gives quick and moment data to ranchers with SMS. This framework will diminish cost, compound testing method, time and improve profitability.

Jayamala K. Patil et.al [4] has created strategy progresses in picture preparing for recognizing plant leaves ailments for expanding throughput and decreasing subjective ness emerging from human specialists in distinguishing the plant infection its is exceptionally speed and precise. Thus there is a degree for dealing with advancement of imaginative, productive and quick deciphering algorithms.

S. Arivazhagan et al. [6] has created four principle steps are initial a shading change structure for the info RGB picture is made, and after that the green pixels are conceal and expelled utilizing particular limit esteem took after by division process, figuring the surface elements utilizing shading co-event technique for the valuable portions, at last the removed element are gone through the classifier. Bolster vector machines are an arrangement of related administered learning technique utilized for characterization and relapse. The recognition exactness is enhanced by SVM classifier. The two class issue is then stretched out to multi class issue where the identified leaf infections are then ordered into different classifications. By this technique, the plant sicknesses can be distinguished at introductory stage itself and the irritation control devices can be utilized to tackle bother issues while limiting dangers to individuals and nature.Savita N. et al. Examined different order strategies for plant leaf sicknesses. Each example of unmistakable classes is grouped in order method in light of their morphological elements. Different strategies, for example, Artificial neural system, Probabilistic Neural Network, Genetic Algorithm, k-Nearest Neighbor, Principal Component Analysis and Fuzzy rationale

3. Proposed Work

The basic mechanism of the proposed algorithm consists of the user or a higher-level image descriptor based on LDA process initializing any arbitrary shaped closed area to the object boundary features of the image to be detected. The algorithm proceeds and starts deforming trying to minimize its error function at every step. One can interpret the selective area framework that the proposed algorithm represents a top-down, rather than a bottom-up, approach to image segmentation problem. The prior can be interpreted in terms of the initialization of the contour close to the desired boundary, which is used as an input to start the algorithm. (Figure 1)

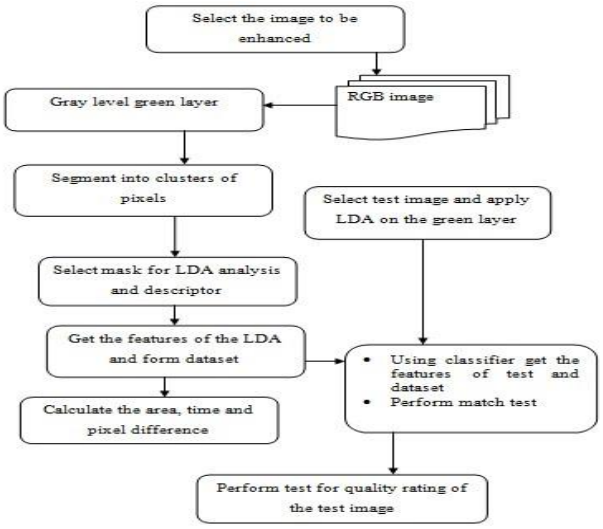

Figure 1. Shows the proposed system work flow

[1] Select the target image and import to MATLAB
[2] Separate the image layers to form three different images after de noising.
[3] Create gray level copy of the RGB image by separating the green layer
[4] For all the layers extract the effective segmented pixels with the gray converted image and map the LDA on the mask of image
[5] Merge the segmented image with contour mapping.
[6] Derive the obtained image into a secondary filtering, based on block processing and find the area of leaf.
[7] Deduce the Independent LDA features details of the image using descriptor Frequencies.
[8] Do this for each image of modified RGB image and store coefficients of the image blocks in dataset
[9] Select the image for test and match the features with stored features
[10] Match the image with previous and find the grade of the tea leaf image
[11] Evaluation with efficiency, area and time calculation

4.Results and Implementation

For **the proposed system of segmentation were applied** total 11 images and were taken from the internet database and were stored as the back end dataset in laptop. The entire testing is done on the Matlab R2013b platform and the laptop of 2.40 Ghz Processor and 4 GB RAM is used to run the prototype model.

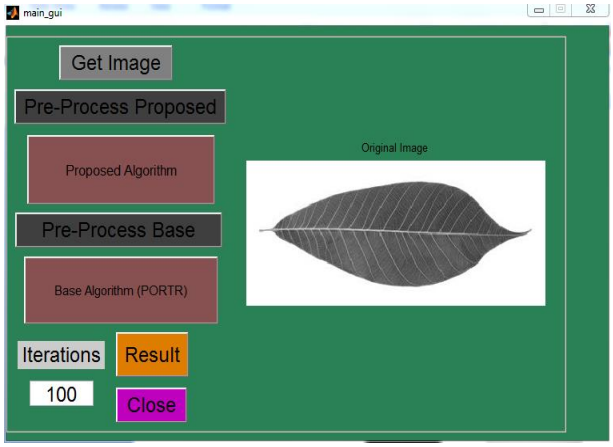

Figure 2. Shows the main GUI of the software

The above figure shows the main GUI window of the matlab view, it displays the button interface and output window with variable options to tune the filter and display the results. (Figure2)

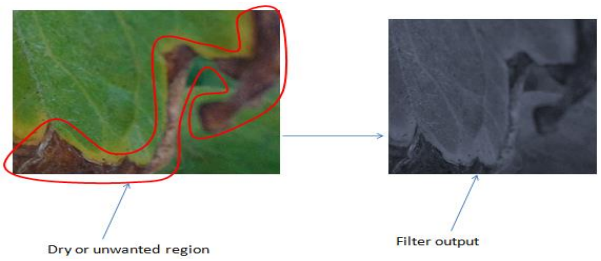

Figure 3. Shows the main region bounding of the selected leaf part

The above figure displays the output of the region bounding and segmentation filter, it also shows the actual gray level mask of the green layer. (Figure 3)

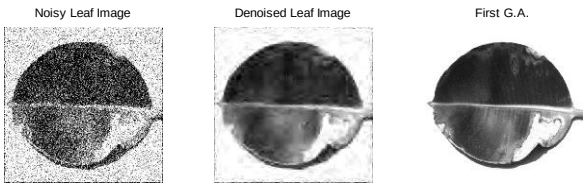

Figure 4 .shows the output of the pre-processing and initial segmentation of green layer

The above figure displays the output of the pre-processing and initial segmentation of green layer. (Figure 4)

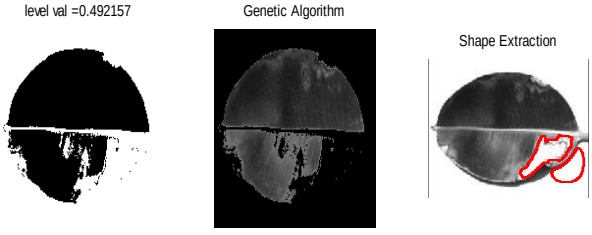

Figure 5.shows the output of the clustered region and final segmented region of the leaf green layer.

The above figure displays the output of the clustered region and final segmented region of the leaf green layer. (Figure5)

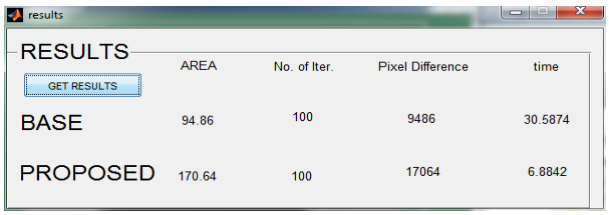

Figure 6. Shows the output comparison of the base and proposed system in terms of area, iterations, pixel difference and the total time consumption

The above figure displays the comparison of the base system and the proposed system. (Figure6)

5. Conclusion

The proposed model seems to be a promising and feasible approach to perform the task of detecting arbitrary shapes in an image with a minimum prior. The performance for given image samples was satisfying. Traditional models were very easy to use in but they did not detect boundaries very accurately. On the other hand proposed algorithm was able to detect boundaries well and will be enhanced with image blending to prove the effectiveness of the technique in real applications.

The LDA based shape, color and texture detection in image gave results as expected; indicates its high quality after the segmentation and classification process was performed. In the formal way, the final step which classified the image with the area, pixel difference and classified the detected image benefits the accuracy of the system

In conclusion, the prototype segmentation and classification procedure and the novel segmentation and classification procedure indicates that proceeding with other frequency filters like the Haar or DFT in future may provide high segmentation and classification resolution and will improve the effective boundary of segmentation

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