

Identification of Plant Leave Disease Using Hybrid Segmentation Technique Sobel Edge Detection and Region Growing Method

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Abstract - Agriculture plays important role in environmental and it gives food to all the livelihoods. Increasing the population creates the demands of food but the environmental changes cause diseases on plant. The plant disease reduces the quality of the food as well as it reduces the quantity of production. Plant disease identification is necessary aspects and without correct identification of the disease, disease control measures will be a waste of time and money which may lead to further plant losses. Identification of disease at earlier plays a vital role. This paper introduces the method to diagnosis the leaf disease and survey about segmentation techniques used on various crops. Segmentation decides the result of the disease identification technique. Edge detection method used to find the discontinuities in intensity values or it can also used to detect the brightness changes. Region growing method is based on the region identified in image segmentation which depends on the selection of preliminary seed point selected.

Keywords - Plant leave disease, segmentation, Image processing, Sobel, Region Growing

I. INTRODUCTION

Agriculture plays an important role in economic growth of the country. Global population is increasing day by day which increase the demand of the food requirement. In Agriculture the crop yield depends on the environmental condition as well as the health of the plant. [1] Plants may get affected by the disease which affects the leaf, stem, flower, fruit and roots. The diseases can damage the quality of the crop. Food production also play important role in farmer's income. Wrong identification may leads to excess or surplus usage of the fertilizers which may cause environmental pollution. Pathogen may also affect the consumer health. These are the facts that it is important to diagnosis the plant disease as earlier as possible. Most of the villages depends on the agriculture but it fare away from the populated area such as towns and cities. Transportation of agricultural products is also a major challenge for farmers. Farmers spent amount the labour, disease management and also transportation too. Crop yield lose may lead to economic lose to the agriculturalist. [2] By improving the technical gab between the scientific development and agriculture it is possible to reduce the crop lose and increase the crop yield rate.

II. REVIEW

Authors [3] proposed automatic method to diagnosis disease symptoms on Wheat. Threshold value consider for the identification of disease which is used on pestilence management system. Mobile device used to identify the symptoms of the disease at earlier which helps to reduce the crop production loss and helps to increase the corrective actions. The proposed image processing method used to find the symptoms in wild state. The research work help to find the diseases such as septoria, rust as well as spot disease on wheat crop. Author got good accuracy rate which is higher than .80 for other surveyed disease. [4] discussed about the automatic detection of plant disease which helps to reduce the large work of supervise the farms. The author taken pine tree for his study. Genetic algorithm used to segment the disease affected area of the leaf. Diseases on the plant affect the productivity of the crop as well as quality and quantity of the yield. Euclidean distance used to find distance between the pixels which help to find the fitness.

Distance = $\sum |img_i(r,g,b) - img_j(r,g,b)|$ for $img_i \in img_j$

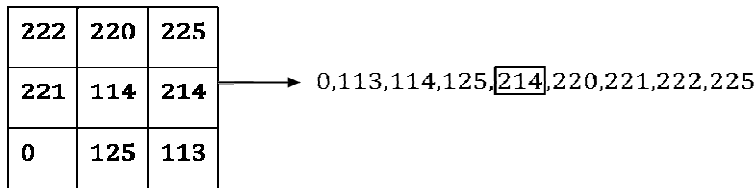
[5] proposed method to find the leaf disease using the indices based method. Region of interest identified and segmented result were used to identify whether blight disease affected or not. Finally Validation metrics such Dice metrics used to validate the result.

III. PROPOSED METHOD

The proposed method combines the advantages of edge detection method with region growing method. Edge detection method used to find the boundaries of the disease affected leaf from this the seed value selected as input to the Region growing method [6][7]. Region growing method grows according to the homogeneous characteristics of the pixel. Before segmentation the input image has to preprocessed for filtering the noise information form the input. This processes done by MATLAB image processing.

A. Image Preprocessing

Noise can occur by external or can occur during the transformation of image. Noise can be defined as unrelated data which affects the result of segmentation of disease affected area. Here Median filter is used for filtering the noise from the input leaf image. Window of size 3x3 taken for the filtering operation. Increasing window size may lead to blur the image and loss the edge information.

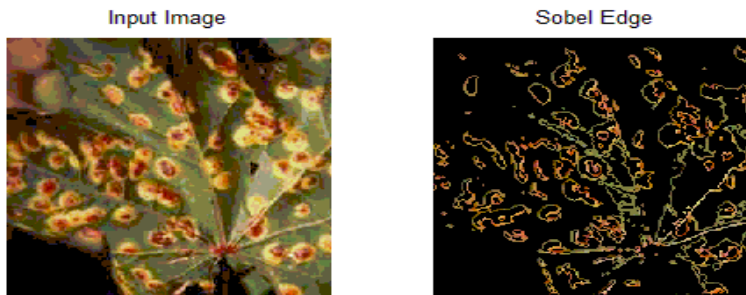


The input image and filtered images are given below. After applying the median filter the noise has reduced.

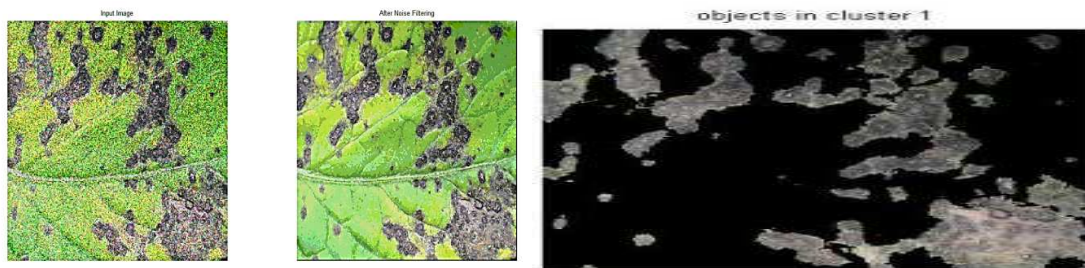


B. Image Segmentation

Diseases affected area can be fragmented from the leaf by region growing method. After segmenting the lesion part of the leaf the disease has identified by using the SURF pattern matching algorithm. Sobel mask applied to each and every 3x3 window, the boundary information identified.



From the edge information it can possible to select the seed point. Region growing method group the homogeneous pixels based on the seed point. Seed value plays vital role of segmenting the lesion part the leaf.



IV.CONCLUSION

Agriculture is an essential and it gives food to all livelihoods. Technical advancement increases Global Smart usage. The proposed algorithm Sobel edge detection with region growing method gives better result of segmenting the disease affected part. By implementing the advanced techniques in agriculture it is possible to reduce the crop loss and increase the production rate which helps to gain reasonable economic income to the farmers. The major challenge is appropriate usage of the fertilizer. Excess usage of fertilizer not only affects the environment which also affects the health condition of the human. In future it is possible to use some advance algorithms like deep learning can be used to diagnosis the leaf disease.

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