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ANDROID BASED PROSOPIS JULIFLORA DETECTION AND ELIMINATION SYSTEM USING INTERNET OF THINGS(IOT)

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Abstract: Plant leaves provide sufficient features to distinguish them among other species. Identification of plants using leaf images is a classic problem in digital image processing. In this paper we describe a prosopisjuliflora (*informallykaruvelam*) identification and elimination system. We developed an Android application that identifies the juliflora plant leaves and activates an injecting machine that contains mera – 71 (glyphosate), 2, 4-D amine and ester which injects the chemical into the plant and clinically kills the plant. The android application is connected with the injecting machine using Internet of Things(IoT).

Keywords: plant identification; image processing; leaf features, internet of things

I.INTRODUCTION

The basic approach in image processing is to identify a leaf or an object based on their physical structure. This can be verified using the various techniques &algorithms. Basically image processing includes three important tasks:

- **Pre Processing:** In this process, the user enrolls in the system by identifying the basic requirements for comparison.
- **Feature Extraction:** Here ,the user determines the type of the leaf and segments it to compare with the leaf that is present in the system.
- **Classification:** The image is classified based on the features extracted from the leaf.

Leaves are the main objects; they appear to maintain their structure with different size. The leaf image can be detected using various algorithms and approaches. The image is segmented; the segmentation process involves partitioning the image into multiple regions that will separate the foreground object from that image. Here, canny edge detection algorithm technique is used which helps us to differentiate between the foreground and the background objects in an image.

II.EXISTING SYSTEM

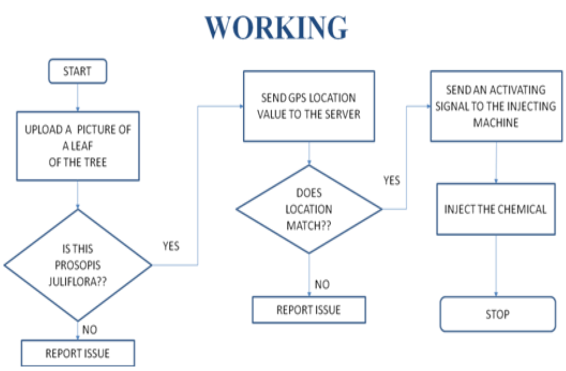
Prosopis is fast growing, salt-tolerant and drought-tolerant trees that can grow in an areas receiving as little as 50 mm of rainfall per year. This is a rhizomatous perennial weed dominating an important part of productive agricultural lands in most of the developing countries including India.

The existing methods of destroying this harmful plant include mechanical methods that involves uprooting the plant which is not an environment friendly method and soil solarisation which is an environment friendly method but proves to be non-effective. Moreover, prosopis tolerates these traditional methods of weed control.

III.PROPOSED SYSTEM

The Proposed system explains the process of leaf identification system and the techniques involved in the detection and processing of a leaf image. An Input leaf image is captured and stored in the database (system folder)using a camera. Then preprocessing is carried out to segment the image into regions which is further separated to find out the edges of image using various edge detection algorithms such as canny. Canny edge detection method gives best results for the segmentation of a leaf image that is exactly captured with proper features.

A. ***Workflow***



The Image of a leaf is captured. This leaf Image is then uploaded and stored separately. In a mobile application ,a default leaf image is stored in the cloud server. The leaf image is then preprocessed by using image processing technique.

Now canny edge detection technique is applied to the segmented image. The leaf image is segmented into equal halves. At each point in the image, the RGB image is converted into a grey scale image using the Equation 1.

$$gray = 0.299.R + 0.587.G + 0.114.B \qquad (1)$$

R, G and B represent the corresponding color of a pixel respectively.

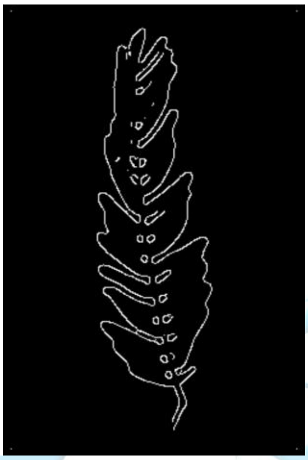


Figure 1:Actual prosopis Juliflora leaf *Figure 2:Canny edge detected prosopis juliflora leaf*

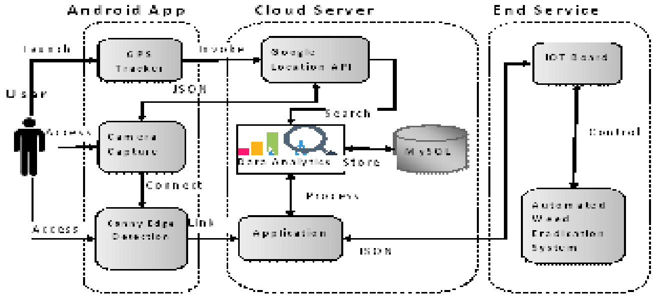
Canny edge detection is a technique to extract useful structural information from different vision objects and dramatically reduce the amount of data to be processed. It has been widely applied in various computer vision systems. Canny has found that the requirements for the application of edge detection on diverse vision systems are relatively similar. Thus, an edge detection solution to address these requirements can be implemented in a wide range of situations. The general criteria for edge detection include:

1. Detection of edge with low error rate, which means that the detection should accurately catch as many edges shown in the image as possible
2. The edge point detected from the operator should accurately localize on the center of the edge.
3. A given edge in the image should only be marked once, and where possible, image noise should not create false edges

Then the key points are extracted and separated from the image to get a clear view of the image. The segmented image is compared with the actual image that is given as an input. If, the images match, the GPS location of the actual image is compared with the location stored in the cloud server.

Then the location of the input image and the stored image is compared. If, the location matches, a signal is transmitted from the application to the injecting machine.

B.Architecture



C. Proposed Algorithm()

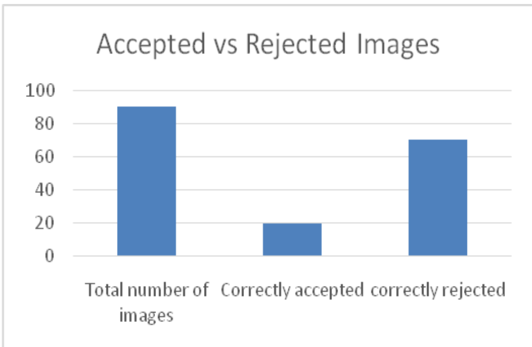
1. *Apply Gaussian Filter to the image in order to remove the noise.*
2. *Find the intensity gradients of the image.*
3. *Apply non-maximum suppression to detect the edges from the image.*
4. *Apply double thresholds to identify potential edges.*
5. *Track the edges of the image by constructing a line around the separated pixel shapes of the image.*
6. *Compute image transformation and perform dilation to make the boundaries visible.*
7. *Apply canny edge detection edge for the segmented image to find the edge of the objects in images.*
8. *It returns edges at the point where intensity is maximum.*
9. *Compute RGB and gray scale pixel points for both actual input sample and database image.*
10. *Compare the points in both the images.*

IV. EXPERIMENT AND RESULTS

In order to train and test the proposed system we used 90 leaf images coming from 11 plant species. We used 7 images from each species. A set of 20 images includes the juliflora plant leaves .All these images were captured against a simple white background .

To evaluate the performance of the proposed approach using evaluation metrics such as Accuracy are computed using the formula below:

$$Accuracy = \frac{Number\ of\ correctly\ recogni}{Total\ number\ of\ ima} * 100$$



We obtained an accuracy of 96.48% for our data set.The matching percentage of the input leaf image greatly depends on image intensity and ligthing.After adjusting the illuminating conditions and intensity variations in the image the input sets were tested, there is an improvement in the threshold values of the images obtained after processing.

V .CONCLUSION

We have implemented a simple leaf identification system for identification of prosopis juliflora plants and based on the results the injecting machine is activated and prosopis juliflora plant is clinically killed. The image accuracy can be enhanced by applying segmentation and edge detection approach. For best results, the leaf images should be properly captured and must have proper lighting. This method gives poor results for the leaf images which are not captured properly or if it has a varying background.

VI.REFERENCES

[1]. N. Kumar, P. N. Belhumeur, A. Biswas, D. W. Jacobs, W. J. Kress,I. C. Lopez, and J. V.Soares, “Leafsnap: A computer vision system for automatic plant species identification,” in Computer Vision–ECCV,
2012, pp. 502–516.

[2]. W. Petry and W. Kuhbauch, “Automated discrimination of weed species with quantitative image analysis,” Journal of Agronomy & Crop Science, vol. 163, pp. 345–351, 1989.

[3]. Bin Wang, Douglas Brown, Yongsheng Gao, John La Salle, ”MARCH: Multiscale-arch-height description for mobile retrieval of leaf images”,Elsevier – 2014.

[4]. Abdul Kadir, Lukito Edi Nugroho, Adhi Susanto and Paulus Insap Santosa ,“Leaf Classification Using Shape, Color and T exture Features”, International Journal of Computer Trends and Technology, pp. 225-230, 2011.

[5]. Jyotismita Chaki, Ranjan Parekh, “Plant Leaf Recognition using Shape based Features and Network classifiers”,(IJACSA) International Journal of Advanced Computer Science and Applications, Vol. 2, No. 10, 2011.

[6]. Zhang, X. and F. Zhang, “Images features extraction of tobacco leaves”, Proceeding of the Congress on Image and Signal Processing, May 27-30, IEEE Xplor Press, Sanya, China, pp: 773-776. DOI: 10.1109/CISP.2008.88.

[7]. Kue-Bum Lee and Kwang-Seok Hong, "Advanced Leaf Recognition based on Leaf Contour and Centroid for Plant Classification.

[8]. YuMeng and Dr. Bernard Tiddeman, "Implementing the Scale Invariant Feature Transform (SIFT) Method".

[9]. https://en.wikipedia.org/wiki/Canny_edge_detector [9] H. Go¨eau, P. Bonnet, A. Joly, N. Boujemaa, D. Barthelemy, J. Molino, P. Birnbaum, E. Mouysset, and M. Picard, “The CLEF 2011 plant image classification
task,” in CLEF 2011 notes, The Netherlands, 2011.

[10]. J. Villena-Rom´an, S. Lana-Serrano, and J. C. Gonz´ales-Crist´obal, “Daedalus at ImageCLEF 2011 plant identification task: Using sift keypoints for object detection,” in CLEF (Notebook Papers/Labs/Workshop), 2011.

[11]. Z. Wang, Z. Chi, and D. Feng, “Shape based leaf image retrieval,” IEEE Proceedings- Vision, Image and Signal Processing, vol. 150,no. 1, February 2003.

[12]. H. Fu, Z. Chi, D. Feng, and J. Song, “Machine learning techniques for ontology-based leaf classification,” IEEE 2004 8th International Conference on Control, Automation, Robotics and Vision, Kunming, China, 2004.