Various Approaches for Flower Detection & Surveillance: A Performance Evaluation

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Abstract—Floriculture is the branch of horticulture. Floriculture consist of traditional and modern flower crops in which modern flowers are grown in poly house or greenhouse while traditional flowers are grown in open fields. Marigold, chrysanthemum, crossandra, jasmine, rose, tuberose, champaka and aster are come under traditional flower. Some examples of modern flower are gerbera, rose, anthurium, bird of paradise and carnation. Floriculture is basically a labour-intensive industry since the flower crop requires 24*7 care and attention-n to manage the production process at different stages of flower life. Precision agriculture solve all the problems by providing full atomization using computer and machine vision based decision support system at every stage of flower from planting to the market sell. By the use of precision agriculture (high tech applications) flower cultivation can be very profitable for farmers.

Keywords—*Flower recognition, Flower detection, Image processing,circular Hough Transform.*

I. INTRODUCTION

The main work is to classify flowers from the images. Flowers and the ability to identify them has been fascinating humans for hundreds of years. In the 18thcentury, Carl Linnaeus proposed a hierarchical classification system for plants which is still widely used.

One of the main applications of precision agriculture is yield estimation. Yield estimation means prediction of flowers in the field which are ready for harvesting. Prior knowledge of yield will help farmer to preplan further task like transporting, packaging, preorder to consumers etc. For the yield estimation lots of the categorization is done manually to this point which isn't handiest laborious however the cumbersome and time consuming as well. With the passage of time detecting and counting of flowers and there yield prediction is done by machine and computer vision. Three methods are generally used for any object detection like color, shape and texture. In case of floriculture product color detection is more favorable for detection process because it is simple to implement. Pictures are converted into HSV photograph in order that we can discover flower area with the decision of precise hue. After detection of flora in the given picture, they're extracted from the background using segmentation procedure. Otsu thresholding process is the most widely used manner for segmentation. The segmented image is called binary image in which flower region is white and background is black and vice versa. It is easy to count objects in binary image using a single Matlab command. In our research work we use circle fitting algorithm in which circle fits into the flower region then center of the circle is equivalent to the flower. For yield estimation we count the center of the circles.

Early estimation of floriculture crop yield is important for preplanning and taking several policy decisions. Decade ago conventional technique of raw data collection for yield prediction was based on visits and report. With the passage of time efforts are being done for yield prediction to improve timeliness and accuracy. Yield estimation can be done under the precision agriculture. Precision agriculture (PA) is defined as information and technology based farm management system that identify, examine and manage variability within farms for maximum benefit, sustainability and aegis of the land resource (Bongiovanni and Lowenberg-deboer, 2004).

In our country Tamil Nadu is a main state in subject and construction of vegetation. In 1999-2000, discipline underneath flower vegetation was once 20,801 ha and the construction of loose flower used to be 1.24 lakh million tones. A massive quantity of style of flowers like jasmine, chrysanthemum, tuberose, rose, marigold, crossandra, lily, barleria, limonium, freesia, IRIS, lisianthus, alsteoemeria, calla, liatris, carnation, gerbera and anthurium are commercially cultivated with many hello-tech items.

The daily traditional trade of Rs. 2 lakh for cut flower and Rs. 5 lakh for unfastened flower. Rose is a major business cut flower and belongs to the family rosaceae and a member of the genus Rosa. For Rose cultivation area below in Tamil Nadu state is estimated at 15 ha with production of twenty-two lakh cut vegetation at an estimated value of Rs. 70 lakhs.

The Gerbera flower was once headquartered by means of the Pre-Lannean botanist, Gronovius and was named in honor of Traugott Gerber (German naturalist) who traveled Russia in 1743. Gerbera is a very gorgeous, appealing, business reduce flower crop and exported within the international florists market in giant quantities. Discipline beneath gerbera cultivation in Tamil Nadu is estimated at 25 ha with creation of fifty three lakhs reduce vegetation at an estimated worth of Rs. 15 lakh. It is the evergreen plant and demands whole yr. In India different states of floriculture are Nasik, Pune, Hauser, Kodaikanal, Kalimpong, Ooty, Darjeeling, Bangalore, Palampur, Shimla, Srinagar, Delhi, Ludhiana and Calcutta as shown in determine 1.1 (Sudhagar, 2013).

Fig. 1 Major floriculture region over India (Sudhagar, 2013).

II. A SURVEY OF PRIOR ARTS

In 2002,Sural *et al* analyzed the properties of HSV color model which was used for two applications such as segmentation and histogram analysis for object retrieval with the help of variation in hue, saturation and value of pixel features. Authors extracted snapshot pixel by both deciding upon the hue or the worth as the dominant property headquartered on the saturation of a pixel. Outcome showed that segmentation was once higher using HSV colour mannequin then compared to RGB color model.

In 2009,Liu *et al* presented an algorithm based on edge detection and HSV color information. At first authors detected edge at the Region-of-Interest (ROI) so they got the axis of symmetry and the edge of the vehicle. After detection of vehicles, shadow was discriminated with the help of HSV color information. The experiment showed that the algorithm can perfectly resolve the problem of mistaking dark moving object for shadow. The proposed algorithm promoted the accuracy of detecting shadow but its shortness for simple background. Complex background like zebra crossing, human etc caused error in shadow identification[2].

In 2010,Ke*et al* proposed an algorithm for flower image retrieval including many steps like filtering for noise removal, 2RGB mixed color model for image segmentation, support vector machine (SVM) based algorithm for flower image retrieval using shape and texture feature[6]. Three experiment were carried out for segmentation, in first one pyramid segmentation based on HSV color model was applied which had good adaptability but poor segmentation for some flowers. The second segmentation technique was based on saliency map, their results were poor for flowers which have same background. Third one was 2RGB color mixed model provided very good results for all kind of flowers and extracted flowers from the background precisely.

In 2009,Maini*et al.*studied the most commonly used edge detection techniques for extracting boundaries of objects using gradient-based and Laplacian based edge detection. Experiment showed that the canny edge detection algorithm performed better than Robert, Prewitt and Sobel operators under almost all scenarios. The result also showed that the performance of canny algorithm depends heavily on the standard deviation of the Gaussian filter.

In 2010,Al-amri and Agrawal applied five thresholding methods on three different satellite images for segmentation. The five methods were mean method, histogram dependent technique (HDT), P-tile method, visual technique and edge maximization technique (EMT). Comparative study showed that EMT and HDT gave optimum results for image thresholding[5].

,In2011, Zhou *et al.*discussed the basic theory of edge detection which was based on the traditional Canny operator. They proposed an improved edge detection algorithm based on the eight neighborhood gradient magnitude. Proposed algorithm was much better than traditional one and it was less sensitive to the noise. Canny operator required manual setting for threshold value. In the proposed algorithm adaptive threshold was computed by OTSU method. The results proved that algorithm was effectively detecting the edge due to strong continuity[2].

In 1990,Yuen *et al*investigated a number of circle detection algorithms like standard Hough Transform, Gerig and Klein Hough transform (GKHT) and fast Hough Transform which were based on variations of the Hough Transform. They compared different performance properties such as accuracy, computational efficiency, reliability and storage requirements. The results of study indicated that the GKHT experienced a severe difficulty if applied to complex images. The main problem of the GKHT was the unreliability and low efficiency due to the fact that edge direction information was not incorporated in this method[3].

In 1999,Atherton and Kerbyson presented a specific combination of modifications to the Circular Hough Transform (CHT) with scale invariant kernel operator. Authors analyzed that the peak width in the output circle detection array in the presence or absence of noise, and analysis of peak position in terms of increasing noise levels. Results showed that CHT had improved noise tolerance[1].

In 2012,Jiangpresented efficient randomized circle detection algorithm using Hough transform. It was optimized method for determining improved sample points validity and finding candidate circles. Experimental results demonstrated that the proposed algorithm had high resolution and strong robustness, prevents false circle detection and also applicable for ellipse detection.

In 2007 [4],Cointault*et al* proposed a feasible system for counting of wheat ears using color and texture analysis. For leaves extraction k means algorithm was used since it used to be easy to put into effect and provide higher texture stratification. For counting effect growth, each and every grayscale of the snapshot used to be multiply by the distinction, which makes it possible for to broaden the high-

quality intensities of ears and to scale back the susceptible intensities like soil, branches and leaves. Counting was done by three image processing methods in which first method was 1st order statistics, second was co-occurrence matrix and last was run length method. Run length gave optimum results among three and it was close to manual count.

In 2008,Wijethunga*et al[1]* discussed robust and consistent technique for yield estimation of green and gold kiwi. Kiwi images in orchard were captured prior to harvesting so that maximum number of kiwi can be counted. Color extraction of kiwi fruit was done by L*a*b color space. The Proposed algorithm gave 90% accuracy for gold kiwi fruit image data and above 60% accuracy on green kiwi image data. Accuracy for green kiwi was mainly affected because wooden bar was also considered as fruit.

In 2009,Harmsen*et al.* presented A multi target monitoring algorithm for flower counting in pot plant. Number of plant life in a pot plant determines the rate at the time of selling. Plant life were recorded using limited quantity of 2nd graphics captured via digital camera. RGB threshold was once used for segmentation. To seek out shape and function of flower in the image[5].

In recent years the area under floriculture increases rapidly because of high profits. As far as the productivity is concerned there is a lot of scope for increasing the productivity and profit through adoption of the latest improved production and marketing technologies. There is a need to generate information regarding production and marketing aspects, the profile of cut flower growers and the constraints in production and marketing of cut flowers (Sudhagar *et al.*, 2013)[6].

III. CONCLUSION

In this paper we discuss various state of arts carried in direction of flower detection and counting. Various approaches in this direction includes Lab, YUV, HSV color models, segmentation techniques includes kmeans, Otsu, region-growing etc. And the overlapping is targeted in literature using edge based approaches. The discussion of various arts presented here prove to be a milestone study for various scholars researching in this direction.

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