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A Review on Edge Improvement of Clustered Soybean Seeds

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Abstract - *This paper shows a strategy to consequently tally grouped or clustered soybean seeds utilizing computerized pictures or digital images. The strategy depends on established morphological operations, and was outlined to manage the primary troubles forced by pictures of soybean seeds, to be specific the grouping of the seeds, varieties in the light, and low differentiation in the middle of seeds and background. The proposition demonstrates a decent execution under a wide assortment of condition.*

Key Words: Clustered Objects, Soybean Seeds, Digital Image, Edge Improvement.

1. INTRODUCTION

One of the most used method to improve the quality of clustered soybean seeds using digital image. The quality of images is improved by filter method.

Figure 1: Clustered Soybean Seeds.

The proposed method is mainly based on morphological operations largely used in digital image processing, in order to make its implementation simple and to keep the computational burden low. The image of clustered soybean seeds is shown in the Figure 1.

The method presented here was designed to work with images captured from a distance between 0.5 and 1 meter from the seeds. This is not mandatory, but the results will be more reliable if that condition is observed. Also, the capture must be as vertical as possible to avoid problems of perspective. As input to the program, the user has to provide the name and the type of the image. There are two possible types: either the seeds occupy the entire image, or they occupy only part of the image Figure 1. This information is necessary because, in the former case, it is important to determine the region where the seeds effectively are. If the contrast with the background is high, this is easily done. However, if the contrast is low, defining such a region may be challenging. In this case, it is desirable that the image be captured in such a way that either it shows seeds over all its extent, or it allows cropping without losing objects.

2. LITERATURE REVIEW

To test the quality of grain seeds is to determine their weight per thousand kernels. Normally, those seeds are counted either manually or using expensive commercial photo electronic counters. In this context, a method that depends only on a low-end digital camera and a computer may be very useful. Automatic counting of objects in digital images is a subject that has received significant attention in the last 20 years, dealing with objects as varied as cells [1], bacteria [2], trees [3], fruit [4], pollen [5], insects [6], people [7], etc. However, there have been only a few proposals on the subject of grain seeds. In fact, almost all work on the area has

been carried out in China and, to the authors knowledge, the only paper in English on the subject was written by Zhao and Li [8]. In their work, the authors proposed a vibrating mechanism to separate the seeds, and used a high contrast background to favor the estimates. They reported accuracy close to 100%. The method proposed in [8] works well when the seeds are spread out and there is a high contrast between seeds and the background. If the contrast is low, both seed and background will be bright, in which case the best option is to explore the shadows cast by the seeds as reference for the thresholding used in [8]. Quick tests revealed that using this strategy still results in accuracies above 97%. Without external intervention, the seeds are more likely to be found clustered than spread, in which case the method proposed by Zhao and Li is not effective. Also, it is usually more time effective to have a higher seed density per image. The technique proposed here tackles this clustered seed problem, and it was designed to work even under far-from ideal conditions, including variation in illumination and low contrast between seeds and background. The proposal is mainly based on morphologic operations largely used in digital image processing, in order to make its implementation simple and to keep the computational burden low.

3. EDGE IMPROVEMENT

Edge is an important feature for image segmentation and object detection. Edge detection reduces the amount of data needed to process by. The method for edge detection of color images with removing unnecessary features. Edge detection in color images is more challenging than edge detection in gray-level images automatic threshold detection. The proposed algorithm extracts the edge information of color images in RGB color space with fixed threshold value. The algorithm uses sobel operator for detecting the edge. A new automatic threshold detection method based on histogram data is used for estimating the threshold value. The method is applied for large number of images and the result shows that the algorithm produces effective results when compared to some of the existing edge detection methods.

3.1 EDGE DETECTION USING SOBEL OPERATOR

Sobel is a 3x3 neighborhood based gradient operator. The Sobel operator performs a 2-D spatial gradient measurement on an image and typically it is used to find the approximate absolute gradient magnitude at each point in input image.

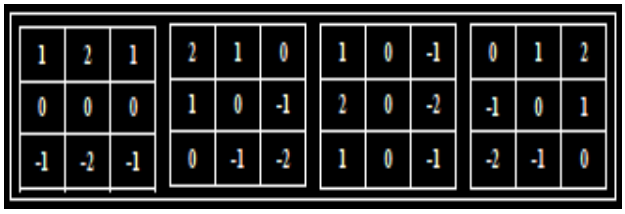

Figure 2: Directional masks$(0^{\circ}, 45^{\circ}, 90^{\circ}, 135^{\circ})$ defined in improved Sobel Operator.

3.2 THRESHOLD DETECTION

Threshold detection technique is very important task in edge detection. It is important in picture processing to select an adequate threshold of gray level for extracting objects from the background. The proposed method uses a fixed or global threshold value from the histogram data which carries image information; the value of the threshold remains constant throughout the image. Fixed threshold is of the form is given by

$$g(x,y) = \begin{cases} 0 & f(x,y) < T \\ 1 & f(x,y) \geq T \end{cases}$$

3.3 MORPHOLOGICAL OPERATION

Morphological operations are affecting the form, structure or shape of an object. Applied on binary images (black & white images – Images with only 2 colors: black and white). They are used in pre or post processing (filtering, thinning, and pruning) or for getting a representation or description of the shape of objects/regions (boundaries, skeletons convex hulls).The two principal morphological operations are dilation and erosion. Dilation allows objects to expand, thus potentially filling in

small holes and connecting disjoint objects. Erosion shrinks objects by etching away (eroding) their boundaries. These operations can be customized for an application by the proper selection of the structuring element, which determines exactly how the objects will be dilated or eroded.

4. CONCLUSION

This paper introduces a strategy to enhance edges of grouped or clustered soybean seeds from advanced pictures captured under non-ideal or non-perfect conditions. The technique is completely taking into account to a great extent utilized morphological operations, which results in a simple execution and low computational weight. The outcomes demonstrate that the technique functions admirably even under testing conditions, similar to seed grouped in one area of the picture and low complexity in the middle of seeds and foundation.

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