REVIEW ON DIGITAL IMAGE PROCESSINGOF FOOD GRAIN

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ABSTRACT: The paper presents the recent development and application of image analysis and computer vision system in quality evaluation of products in the field of agricultural and food. It is very much essential to through light on basic concepts and technologies associated with computer vision system, a tool used in image analysis and automated sorting and grading is highlighted.

Computer vision is a rapid, economic, consistent and objective inspection technique, which has expanded into many diverse industries. Its speed and accuracy satisfy ever increasing production and quality requirements, hence aiding in the development of totally automated processes. This non-destructive method of inspection has found applications in the agricultural and food industry, including the inspection of quality and grading of fruit and vegetable. It has also been used successfully in the analysis of grain characteristics and in the evaluation of foods such as potato chips, meats, cheese and pizza. This paper reviews the progress of computer vision in the agricultural and food field then explores different possible areas of research having a wider scope to enhance the existing algorithms to meet the today's challenges.

KEYWORDS: Quality; Grading and Sorting; Computer vision System; Agricultural and Food Products; Image analysis and Processing;

I.   IMAGE PROCESSING

We can say a signal processing is form of image processing for which the input is an image, such as photographs; an image or some parameters belongs to image can be output of image processing.

There are many techniques have been launched in Image Processing during recent years. Most of the techniques are developed for enhancing images obtained from military reconnaissance flights and spacecraft's. A reason behind the popularity of Image Processing systems is easy availability, large size memory devices, graphics software's etc. Image scanning, storing, enhancing and interpretation, these steps we need to pass in image processing. Figure 1 shown diagram of image scanner.
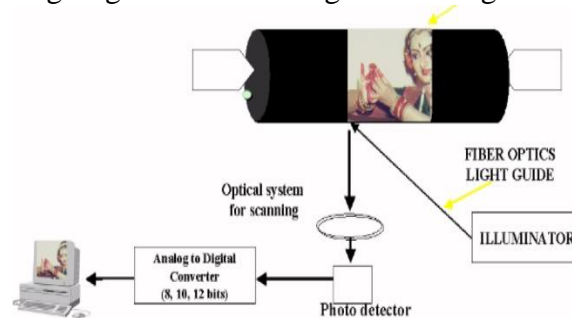

Figure 1: Steps for image scanner

II.   METHODS OF IMAGE PROCESSING

There are two methods available in Image Processing.

Analog Image Processing

Analog Image Processing refers to the alteration of image through electrical means. Television image is main example of image processing. Amplitude of voltage level will represent brightness of the image for television signal. By electrically varying the signal, the displayed image appearance is altered. Adjustment of amplitude control the brightness and contrast for TV set and in reference of the video signal darkening and alteration of the brightness range of the displayed image.

Digital Image Processing

In this case, digital computers are used to process the image. Digitizers are used for conversion of image in digital form [1] (as shown in Figure 1) and then process it. This is numerical representation of objects to a series of operations in order to obtain a desired result. Starting of this with one image and updated version of the same is produced. It is therefore a process that takes an image into another.

Main meaning of digital image processing generally refers to 2-D image processing by a digital computer [2, 3]. It implies digital processing of any two-dimensional data. The principle advantage of Digital Image Processing methods is its versatility, repeatability and the preservation of original data precision. Array of real number represent a digital image by using a finite number of bits.

III.   LITERATURE SURVEY

Digital image has problems of segmentation represent great challenges for computer vision. In Oct, 2011 the problems of computer vision may make good use of image segmentation. In this research they study and evaluate the different methods for segmentation techniques [4].In March, 2012 they discussed all fundamental algorithms of image processing will be discussed and output define the dependency for quality of processed image [5].In August, 2012 hybrid approaches of these techniques have also been evaluated and results for the good combined approach that have been presented and optimized for each class of image query. They propose an idea to enhance the image retrieval using Query modification idea through image cropping. User to refine and personalize the image retrieval results [6].In year 2014 many types of images in data base having various different kinds of images and their own semantics, during extraction contents of image is based on various different kind of feature extraction techniques are available. Main focus of work is on the various feature extraction techniques [7]. Vineet Rani in 2012 presents the study of different edge detection technique. Understanding images and extracting the information from them such that the information can be used for other tasks is an important task. One of the first steps in direction of understanding segmentation of image and then detects different objects in them. Thus image segmentation plays a vital role towards an image that represents the information. Edge detectors along with wavelets or other methods can be used in segmentation of an image using MATLAB [8].

Jyoti Patil in 2012 presents a paper in which process on images of retina with the help of Digital Image Processing tool. In which images are getting detected and then processed. We differentiate the error in of detecting edges in images as a fuzzy logic problem. The edge detection problem can be separated into three classes: filtering, detection, and tracing. Fuzzy separate the images based on characteristics of pixel which can control the degree of Gaussian smoothing [9]. Pushpajit A. Khaire in 2012 proposed a soft computing approach based on Fuzzy. The fuzzy approach converts the color image to a partially segmented image, an edge detector is convolved over the partially segmented image to obtain edged image. [10].Bijuphukanbhagabati in 2012, propose a very simple but novel method for edge detection without determining threshold value. In this a fuzzy inference system in MATLAB is developed to get a simple fuzzy rule based edge detection technique. The results obtained by this method are compared with those of existing standard algorithms and found better results [11].

.T. Shrivakshan in 2012 proposed a paper in which fundamental concept of various filters and apply these filters in identifying a shark fish .It is implemented using MATLAB. The advantages and disadvantages of these filters are also considered in this study [12].

R.Yogamangalam in 2013, presents a brief outline on some of the most common segmentation techniques like model based, edge detection, thresholding, clustering, etc. and also explain about advantages as well as disadvantages. This paper presents that thresholding is the simplest and computationally fast method of segmentation [13].

Nishchal Gyan Upadhyay, Kamlesh Lakhwani in 2013, Automatic Thresholding and generated threshold is done by fuzzy which is used with different methods for edge detection. Proposed methods are found to be comparable to those from many well-known edge detectors. Input parameters providing the appreciable results in the proposed detector [14].

Brajpal Singh Jadon in 2013 presents a fuzzy rule base algorithm which is capable of detecting edges efficiently from the gray scale images. Fuzzy if-then rules are applied to modify the membership to one of low, medium, high classes. Finally, Mamdanidefuzzifier method is applied to produce the final edge image. [15].

R. Swarna lakshmi in 2014, proposed a paper in which three edge detection techniques are implemented on various types of images and they are analyzed based on the parameters PSNR, RMSE, CoC [16].

IV.   CONCLUSION

In India the ever-increasing population, losses in handling and processing and the increased expectation of food products of high quality and safety standards, there is a need for the growth of accurate, fast and objective quality determination of food and agricultural products. The paper reviews the recent developments in computer vision for the agricultural and food industry. Computer vision systems have been used increasingly in industry for inspection and quality evaluation purposes as they can provide rapid, economic, hygienic, consistent and objective assessment. However, difficulties still exist, evident from the relatively slow commercial uptake of computer vision technology in all sectors Even though adequately efficient and accurate algorithms have been produced, processing speeds still fail to meet modern manufacturing requirements. With few exceptions, research in this field has dealt with trials on a laboratory scales thus the area of mechatronics has been neglected, and hence it needs more focused and detailed study.

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