

A review of various Wheat Quality Assessment Methods

¹Amritpal kaur, ²Navleen kaur
¹Research scholar, ²Assistant professor
 Amritsar College of Engineering and Technology

Abstract - The image processing is the approach which can process data stored in the form of pixels. The plant disease detection and quality assessment is the major issue of image processing. The quality assessment methods have various steps which are pre-processing, segmentation and feature extraction. The various quality assessment techniques with their steps are reviewed and analyzed in this paper.

keywords - Feature Extraction, Segmentation, Quality Assessment

1. INTRODUCTION

The most important culture being followed in India since ancient times is agriculture. The crops were cultivated by the people in ancient times within their own land areas such that they could fulfill their own requirements. Thus, cultivation has been followed ever since and all the living beings have been dependent on this culture. Thus, natural crops grow. Different living things like people, animals and birds consume these produces. The use of greenish yields approaches a fit and wellbeing life. The farming land is destroying gradually due to the discovery of novel pioneering technologies and methodologies. The farmers are focusing on the farming of non-natural goods because of these plentiful innovations. The use of these non-natural commodities results in a harmful life

At the present time, contemporary framers have no knowledge about the suitable timing and place for the farming of crops. These farming methods change seasonal weather situations besides the basic benefits such as soil, water and air. This causes food scarcity. No appropriate solution and technologies are there to conquer the challenges experienced by framers after scrutinizing several issues such as climate, temperature and some other aspects. In agriculture domain, the economic growth can be attained using different means. The production and quality of crops can be improved and increased by different ways. The production of crop can be predicted using data mining approach.

In general, data mining approach analyzes data from different viewpoints and summarizes this data into valuable information. Data mining software is a methodical tool. This tool permits the scrutinizing of data from many different perspectives. This tool classifies and summarizes the discovered associations. Scientifically, data mining process is used to find associations or patterns amongst dozens of fields present in big relational databases. The information can be provided by patterns, associations, or relationships present among this data. Information can be transformed into knowledge regarding past patterns and future tendencies, e.g. summarized information about crop yield can assist cultivators to discover the crop losses. This information can also prevent future losses. The forecasting of crop production is an imperative farming issue. All farmers want to know the amount of crop production. In ancient times, the earlier experience of cultivator was used for estimating the production of some specific crop. The farming produce is mainly based on climate situations, vermin and scheduling of crop process. The precise knowledge about the past history of crop production is very helpful for decision making. This approach is related to farming risk management. Recent researches are mainly focused on the development of a forecasting model. This model can be used to foresee the produce of crop.

2. Proposed Techniques

The quality assessment is the major challenge of image processing due to dynamic nature of the input images. The quality assessment model can be designed on the basis of feature extraction and segmentation. Following are the various phases of quality assessment model:

2.1 Pre-Processing: Pre-processing is an improvement of the image data that suppresses unwanted distortions or enhances some image features important for further processing.

2.2 Segmentation: Segmentation attempts to partition the pixels of an image into set of groups that strongly correlate with the objects in the image. The goal of segmentation is to simplify or change the representation of an image into something that is more meaningful and easier to analyze. The simplest method of image segmentation is called the threshold method.

2.3 Feature Extraction : Feature extraction is the process by which certain features of interest within an image are detected and representation for further processing. It is critical step in most computer vision and image processing solutions because it marks the transition from pictorial to non-pictorial data representation. The resulting representation can be subsequently used as an input to a number of pattern recognition and classification techniques which will then label, classify or recognize the semantic contents of the image or its objects.

2.4 Classification: The classification technique is a systematic approach to build classification models from an input data set. For example, decision tree classifiers, rule-based classifiers, neural networks, support vector machines, and naive Bayes classifiers are different technique to solve a classification problem. Each technique adopts a learning algorithm to identify a

model that best fits the relationship between the attribute set and class label of the input data. Therefore, a key objective of the learning algorithm is to build predictive model that accurately predict the class labels of previously unknown records.

LITERATURE SURVEY

Adnan Zahid, et.al (2018) presented preliminary results on employing Terahertz (THz) technology for measuring the water contents of leaves. The main purpose of this work is to highlight transmission constraints of terahertz radiation through the plants in the THz frequency region [7]. Multiple leaves of plants are examined using the THz Swissto12 system and the effect of thickness and water contents on transmission loss and attenuation are observed at different frequency regions, which can lead to meaningful information to study and analyze the existence of any pesticides in leaves with terahertz frequencies. The results of this paper pave the way for applicability of terahertz frequencies for sensing the quality of life in plants.

GuanjunGuo, et.al (2018) proposed a novel cascaded cropping regression (CCR) method to perform image cropping by learning the knowledge from professional photographers [8]. The proposed CCR method improves the convergence speed of the cascaded method, which directly uses random-ferns regressors. In addition, a two-step learning strategy is proposed and used in the CCR method to address the problem of lacking labeled cropping data. Specifically, a deep convolutional neural network (CNN) classifier is first trained on large-scale visual aesthetic datasets. The deep CNN model is then designed to extract features from several images cropping datasets, upon which the cropping bounding boxes are predicted by the proposed CCR method. Experimental results on public image cropping datasets demonstrate that the proposed method significantly outperforms several state-of-the-art image cropping methods.

Wenguan Wang, et.al (2018) studied the problem of photo cropping, which aims to find a cropping window of an input image to preserve as much as possible its important parts while being aesthetically pleasant [9]. Seeking a deep learning-based solution, a neural network is designed that has two branches for attention box prediction (ABP) and aesthetics assessment (AA), respectively. Given the input image, the ABP network predicts an attention bounding box as an initial minimum cropping window, around which a set of cropping candidates are generated with little loss of important information. Then, the AA network is employed to select the final cropping window with the best aesthetic quality among the candidates. The two sub-networks are designed to share the same full-image convolutional feature map, and thus are computationally efficient. By leveraging attention prediction and aesthetics assessment, the cropping model produces high-quality cropping results, even with the limited availability of training data for photo cropping. The experimental results on benchmark datasets clearly validate the effectiveness of the proposed approach. In addition, our approach runs at 5 fps, outperforming most previous solutions.

Engr. ZahidaParveen, et.al (2017) developed an image processing algorithm to grade the rice on the basis of length, width, area and area of chalky and also worked on the color detection on the rice grain [10]. From the results obtained, it is concluded that some rice are better on the basis of their length, some are better on the basis of their width while some can be termed good in quality on the basis of their area and area of the chalky. However it is not essential that all features can be present in the rice grain. More data can be acquired for further validation of our techniques .For further research, the moisture content in the rice grain can also be added to grade the overall quality of the rice grain.

Deepika Sharma, et.al (2017) proposed a system that determines the quality of food. Initially, the grain samples run on the conveyor belt and then random images of grains are captured by the camera [11]. The image processing algorithm is applied on the grain samples through MATLAB. The classification has been done according to color, shape and size. It results good, bad and medium quality by using Neural Network (NN) classifier. The final output is displayed on the LCD also the message will be sent to higher authority through GSM module. This system can be implemented in food industries at later stage for grading purpose which will ma the task of classification of grains simpler for the public.

Table 1: Comparison Analysis

Technique Used	Description	Results
Terahertz technology	The main purpose of this work is to highlight transmission constraints of terahertz radiation through the plants in the THz frequency region. Multiple leaves of plants are examined using the THz Swissto12 system and the effect of thickness and water contents on transmission loss	The results of this paper pave the way for applicability of terahertz frequencies for sensing the quality of life in plants
Deep Convolutional Neural Network (CNN)	A novel cascaded cropping regression (CCR) method to perform image cropping by learning the knowledge from professional photographers. The proposed CCR method improves the convergence speed of the cascaded method, which directly uses random-ferns regressors.	Experimental results on public image cropping datasets demonstrate that the proposed method significantly outperforms several state-of-the-art image cropping methods
Deep Learning	A cropping window of an input image to preserve as much as possible its important parts while being aesthetically pleasant. Seeking a deep learning-based solution, a neural network is designed that has two branches for attention box prediction (ABP) and aesthetics assessment (AA), respectively	The experimental results on benchmark datasets clearly validate the effectiveness of the proposed approach. In addition, our approach runs at 5 fps, outperforming most previous solutions
Histogram Approach	An image processing algorithm to grade the rice on the basis of length, width, area and area of chalky and also worked on the color detection on the rice grain. From the results obtained, it is concluded that some rice are better on the basis of their length, some are better on the basis of their width while some	The rice grain. More data can be acquired for further validation of our techniques .For further research, the moisture content in the rice grain can

	can be termed good in quality on the basis of their area and area of the chalky	also be added to grade the overall quality of the rice grain.
Neural Network (NN) classifier	A system that determines the quality of food. Initially, the grain samples run on the conveyor belt and then random images of grains are captured by the camera	The final output is displayed on the LCD also the message will be sent to higher authority through GSM module

Conclusion

In this paper, it is concluded that quality assessment is the major challenge of image processing due to complex nature of the input data. The quality assessment has various steps like pre-processing, segmentation and feature extraction. In this review paper various techniques of quality assessment of wheat plant is analyzed. In future, novel method will be proposed for the quality assessment.

References

- [1] C. Gee, J. Bossu, G. Jones, F. Truchetet, "Electronic Imaging & Signal Processing - Detecting crops and weeds in precision agriculture," SPIE Newsroom, 2008.
- [2] W. S. Lee, D. C. Slaughter, D. K. Giles, "Development of a machine vision system for weed control using precision chemical application," Proceedings of Int. Conf. on agricultural machinery engineering, 1996, Korea, pp. 802-811.
- [3] L. F. Tian, D. C. Slaughter, "Environmentally adaptive segmentation algorithm for outdoor image segmentation," Computers and Electronics in Agriculture, vol. 21, pp. 153-168, 1998
- [4] F. D. Smedt, I. Billauws, T. Goedeme, "Neural networks and Low-Cost optical filters for plant segmentation," International Journal of Computer Systems and Industrial Management Applications, vol. 3, pp. 804-811, 2011.
- [5] R. Brivot, J. A. Marchant, "Segmentation of plants and weeds for a precision crop protection robot using infrared images," IEEE Process Vis. Image Signal Process, vol. 143, no. 2, pp. 118-124, 1996
- [6] A. Tellaeché, X. P. Burgos-Srtizzu, G. Pajares, A. Ribeiro, "On Combining Support Vector Machines and Fuzzy K-Means in Visionbased Precision Agriculture," World Academy of Science, Engineering and Technology, vol. 28, pp. 33-38, 2007.
- [7] Adnan Zahid, Ke Yang, HadiHeidari, Chong Li, Muhammad Ali Imran, AkramAlomainy, Qammer H. Abbasi, "Terahertz Characterization of Living Plant Leaves for Quality of Life Assessment Applications", 2018 Baltic URSI Symposium (URSI)
- [8] GuanJunGuo, Hanzi Wang, ChunhuaShen, Yan Yan, Hong-Yuan Mark Liao, "Automatic Image Cropping for Visual Aesthetic Enhancement Using Deep Neural Networks and Cascaded Regression", 2018, Volume: 20, Issue: 8, Pages: 2073 – 2085
- [9] Wenguan Wang, JianbingShen, and Haibin Ling, "A Deep Network Solution for Attention and Aesthetics Aware Photo Cropping", 2018, Pages: 1 – 1
- [10] Engr. ZahidaParveen, Dr. Muhammad AnzarAlam, Engr. HinaShakir, "Assessment of Quality of Rice Grain using Optical and Image Processing Technique", 2017 International Conference on Communication, Computing and Digital Systems (C-CODE)
- [11] Deepika Sharma, Sharad D. Sawant, "Grain Quality Detection by using Image Processing for public distribution", International Conference on Intelligent Computing and Control Systems, ICICCS 2017