

Analysis of Segmentation and Classification Approach Using Image Processing over Rice Samples

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ABSTRACT

Rice is most important and consumable grains for people in Asian countries. In the worldwide market of grains, milling method is estimated utilizing rice's quality. Henceforth nature of rice is imperative to recognize. Identification of quality of rice is accomplished physically by human reviewers or skilled professionals who guarantee exactness at some degree. In any case, it needs a huge labor, time utilization and judgments are abstract. Rice test is a blend of rice of whole grain, rice broken n small pieces and stones. Rice sample required to arrange in to the clusters to recognize rice's quality. Thus we review different approaches to deal with isolate and group objects of rice sample relies upon texture and color highlights with the assistance of Artificial intelligence (AI) and image processing (IP) strategies. This strategy initiate with capturing of image. Steps involved can be preprocessing techniques color to gray conversion, morphological operations, binarization, are applied on image obtained. Shapes of items are determined by using form location. Watershed calculation is utilized to division of contacting and covering rice portions. Local Binary Pattern (LBP) surface component and shading highlights removed from portioned pictures used to gauge the rice test questions by utilizing Linear Kernel based Support Vector Machine (SVM).

Keywords : Machine Learning, Support Vector Machine, Image Processing, Classification.

I. INTRODUCTION

Agricultural product such as rice is considered as very important product. Crop rice is vital nourishment crops that all human expends everywhere throughout the world vastly in Asian nations. It is mainly categorized depending on grain color, shape etc. Assortments of rice grains are distinctive in size, shading, shape and surface. False marking of one assortment as another is a significant worry in the nourishment business. These associations have set up principles and guidelines for rice grain assortments.

The investigation of type of grain and its quality parameters is still carried out manually by food inspector. This task consists many drawbacks like, it is mostly subject driven and also, is affected by human issues and working environments, human recognition can without much of a stretch be impacted by outside components like his physical condition, such as, mental state, visual perception and weariness brought about by predispositions and work weight, and working situations, for example, inappropriate lighting, atmosphere, and so forth. . That outcomes in conflicting outcomes, the pace of cleaning and recuperation is restricted, consequently require

computerization and create imaging frameworks which can be useful to recognize rice grain pictures, correct it and afterward being dissected. Computer vision based methods can be used to analyze images and overcome above mitigation.

Different solutions are presented and reviewed for grouping rice image utilizing image pre-processing and AI methods relies upon their physical properties which includes texture and color. The arrangement has 2 commitments. Those are object division and AI based grouping. Captured image of rice consistently exists contacting and covering bits. Consequently, the arrangement finds that fetch of portioning contacting and covering objects by utilizing watershed calculation.

Digital image processing is process of utilizing different algorithms to implement image processing on digital images. Quality of world's vital grains can be determined depends on the length, shape size and texture of the grain, these features can be extracted by utilizing the available imaging techniques.

Image processing and machine vision are generally used in natural and farming exploration with the upgraded of innovation. Numerous inquiries about applied machine vision to compute rice appearance quality examination. Numerous nourishment assortments are rice, wheat, potato and soya bean. The rice and wheat are indispensable among all the grains. Grain shape is assessed with width, length, and proportion of width and length of rice grains. For estimating nature of grain test, investigator requires to get barely any seeds from test and do the examination. In any case, for estimating width and length of even barely any seeds, by setting them in one grain plate and measure the length and width of each seed individually, is exceptionally feverish assignment and takes heaps of time. Results from various reviewers or unpracticed auditors may differ at an unsuitable range. Hence, it is not a good way in estimating rice appearance quality depends on manual method.

Reminder of paper is arranged as follows. In section II, a brief overview of existing rice grain sample classification s mentioned. Section III defines proposed system, Section IV consist of dataset description. At last, concluded paper in section IV.

II. LITERATURE

Rice is most consuming grains in Asian countries. Milling method is calculated by utilizing rice quality in rice market. Hence recognition of rice quality is very vital. Rice quality identify by manually using human reviewers or skilled professionals who guarantee exactness at some degree. Since it needs large number of man power and is time consumptive. Besides size and shape, numerous things, like chalkiness or whiteness add towards taste and quality. Hence according to Teresa Mary Philip et al. [1] automated characterization of rice grains can support in lessening mistakes of physical reviewing and in allowing for many highlights which demonstrate quality. This considers hardly any accessible rice grains in South part of India for distinguishing new traits for grain order. For that rice samples are brought together and captured its images and processed for getting different properties with some other morphological features. AI algorithms utilized for creating classification rule. Here fourier highlights are additionally removed from grain pictures notwithstanding the spatial highlights to land at an upgraded exactness for order. The dataset gathered from wholesale shops in Karnataka, it comprise of nine assortments of rice which are most ordinarily devoured by the individuals of the Karnataka district. These are sona boiled, basmati rice, red raw, broken rice, idli rice, SG sona, supreme sona, titanic sona, bullet sona.

Rice quality is defined from its physical and chemical features. Rice grains sample quality is needed for guarding consumers from standard goods. Previously classification, quality and category of grain are analyzed by visual inspection. The method needs lot of time. Here Mansi Kulkarni et al. [2] utilized

image processing and Neural Network to categorize rice grain sample accurately.

Rice grain is one of the vital and most utilized grains in whole world. Examination of quality of rice vital for resident and export purpose. Requires automatic system to check quality identification and to distinguish among various varieties of rice. Hence Muhammad Junaid Asif et al. [3] presented an image pre-preparing based answer for characterize the various classes of rice and its quality examination. This methodology fundamentally relies upon the mix of head segment investigation and shrewd edge identification is utilized for arrangement. Quality examination of rice is additionally perceived by morphological highlights of rice grains (flightiness, significant pivot length, minor hub length, edge, region and size of grains). Here creator uses six unique assortments of rice to do grouping and investigation. Order and quality investigation is finished by contrasting the example picture and database picture. Vigilant edge identifier is applied to discover boundaries of rice grains. Eigen values and Eigen vectors are assessed based on morphological highlights. At that point by applying the Principal Component Analysis, various assortments of rice are ordered by contrasting the example picture and a database.

Ping Lin et al. [4] presented convolutional neural network (CNN) model for automatic extraction from a gray image of numerous properties of the rice kernels. Previously, the recognition of rice kernel variations is depends on physicochemical methods. These approaches can yield relatively accurate outcomes but also have few limits so for mitigate that limitations author presented machine vision and deep learning (DL) techniques.

Seeds are building block for agriculture. Hence quality of seeds plays a important role in high yield production of crops. Seed examination and classification helps to get better quality of seeds.

These are performed by food inspector visually by inspecting every sample, that is a tedious and need lot of time. Nowadays, the computerized technology is hugely utilized to reduce time and work load on human, by considering more samples at a time. Hence Ranjith Bose M. et al. [5] uses convolutional neural network (CNN) with increased parameters to achieve better results and also they utilize more feature extraction techniques, to enhance the accuracy of classification. Here author implemented the Grey level co-occurrence matrix, RGB Color Space and Threshold technology as feature extraction techniques.

Evaluating of rice grains to perceive broken and entire grain from sample. Standard methods that are based on rice image reviewing utilizing progressed measurable strategies once in a while considered. In setting of a high item esteem basmati rice with a picture based reviewing method, an important to think about physical features of grain and related information. Model of value grade testing and recognizable proof is presented by Dipankar Mandal et al. [6] using a novel computerized picture handling and information based versatile neuro-fluffy surmising framework (ANFIS). Reason behind receiving an evaluating framework dependent on fluffy principles depends on capacities of ANFIS to recreate conduct of a specialist in classification of rice grain utilizing physical features of rice grains. Rice portions are described with assistance of morphological descriptors and geometric highlights that are gotten from test pictures of processed basmati rice. Order precision for broken and entire grains contrasted with standard AI method viz. SVM and K-closest neighbor (KNN). Here author takes 40 images of basmati rice samples as dataset to collect features.

Worldwide there are various varieties of rice have been developed, imported, and sent out. Various rice assortments could be blended at the hour of rice creation and exchanging. Polluted rice could influence trust among rice shippers and exporters so

its required to build up rice assortment assessment framework. Itthi Chatnuntawech et al. [7] build up a non-damaging rice assortment order framework that points of interest from the collaboration between hyper phantom imaging and profound convolutional neural network (CNN). Strategy utilizes a hyper-spectral imaging framework to at the same time get integral spatial and ghostly data of rice seeds. Rice assortments are fined from the gained spatio-phantom information utilizing CNN. Instead of a few existing rice assortment order strategies that need hand-designed highlights, the proposed technique naturally removes spatio-phantom highlights from the crude sensor information. Creator utilized two rice datasets, incorporates handled rice and paddy rice datasets, were gotten from the hyperspectral imaging framework and used to survey the exhibitions of the arrangement techniques.

Bhavesh B. Prajapati et al. [23] presented algorithm for analyzing Basmati Rice quality utilizing IP methods. According to them with support of this algorithm, an automated machine can be made to neglect human assessment and related disadvantages. Image processing techniques can divide rice grain accurately and comparatively faster. Photographic enlarger is utilized to measure the dimensions and to acquire average length and width ratio of basmati grain.

The estimation of rice quality is additionally essential since it is expended as nourishment just as it is utilized for processing method in all market. Numerous analysts have just taken a shot at the nature of grain and presented various strategies to portray rice quality. Chalkish in rice grain is known as Chalky and it is most crucial constraint which is utilized to appraise nature of rice grain. Z. Parveen, et al. [8] proposed a picture preparing procedure by using stretched out maxima administrator to perceive the powdery zone in the rice. They likewise evaluated the measurements and shading to arrange rice grains. They utilized 22 example pictures of rice grain for

performing test and to test the proposed strategy and was approved by utilizing visual investigation.

To enhance the agricultural income Grains are the main crop for our country. When milled rice is taken in grain market, quality of grains turns out to be key point of its sales. These grains include numerous impurities such as stones, weed seeds, chaff, and damaged seeds etc. profit of food market depends on quality of grains. Hence quality is measured by human by doing inspection but it is more hectic and difficult and measurement requires more time and man force. Hence N. Pratibha et al. [9] developed system for grade testing based on major axis, minor axis, parameters and area with IP and neural network. Author used basmati rice for evaluation by IP and Neural Network which is implemented depends on the features extracted from rice granule.

III. PROPOSED SYSTEM

Here we are collecting the sample images of rice grain for classification and segment the object in that image. We are going to use watershed algorithm for segmentation. Initially sample images of rice are given as input then gray scale conversation is performed on that and noise reduction, binarization, morphological operations and contours are applied on that and then watershed algorithm used for segmenting.

IV. CONCLUSION

Here machine vision algorithm to segment touching and overlapping rice seeds with improved outcome combination are utilized. In this paper, different techniques are reviewed to classify rce sample. By using AI with support of linear kernel based SVM the classification technique is implemented. Hence proposed system provides good result than traditional method. Proposed method utilizes computerized vision while traditional method is manual hence it reduces man power and time consumption.

V. REFERENCES

- [1]. Philip, Teresa & Anita, H.. (2017). Rice Grain Classification using Fourier Transform and Morphological Features. *Indian Journal of Science and Technology*. 10. 1-6. 10.17485/ijst/2017/v10i14/110468.
- [2]. Prof. P. M. Soni. (2017). A review on identification of rice grain quality using matlab and neural network. *Ijiert - International Journal of Innovations in Engineering Research and Technology*, 4(2), 11-14. <http://doi.org/10.5281/zenodo.1462295>
- [3]. Asif, Muhammad & Shahbaz, Tayyab & Tahir, Syed & Rizvi, Hussain & Iqbal, Sajid. (2018). Rice Grain Identification and Quality Analysis using Image Processing based on Principal Component Analysis. 10.1109/RAEE.2018.8706891.
- [4]. Lin, Ping & Chen, Yongming & He, Jianqiang & Fu, Xiaorong. (2017). Determination of the Varieties of Rice Kernels Based on Machine Vision and Deep Learning Technology. 169-172. 10.1109/ISCID.2017.208.
- [5]. Ranjith Bose M1, Ranjith K2, Suraj Prakash3, Subham Kumar Singh4, Dr Vishwanath Y5, "Intelligent Approach for Classification of Grain Crop Seeds Using Machine Learning", *International Research Journal of Engineering and Technology (IRJET)* Volume: 05 Issue: 05 | May-2018
- [6]. Mandal, Dipankar. (2018). Adaptive Neuro-Fuzzy Inference System Based Grading of Basmati Rice Grains Using Image Processing Technique. *Applied System Innovation*. 1. 19. 10.3390/asi1020019.
- [7]. Itthi Chatnuntawech and Kittipong Tantisantisom and Paisan Khanchaitit and Thitikorn Boonkoom and Berkin Bilgic and Ekapol Chuangsuwanich. (2018)," Rice Classification Using Spatio-Spectral Deep Convolutional Neural Network", *CoRR*, abs/1805.11491
- [8]. Engr. Z. Parveen, Dr. M. A. Alam, Engr. H. Shakir, "Assessment of Quality of Rice Grain using Optical and Image Processing Technique," *International Conference on Communication, Computing and Digital Systems (C-CODE)*, 2017.
- [9]. N. Pratibha, M. Hemlata, M. Krunali, Prof.S.T.Khot, "Analysis and Identification of Rice Granules Using Image Processing and Neural Network," *International Journal of Electronics and Communication Engineering*, 2017.
- [10]. S. Mahajan, S. Kaur, "Quality Analysis of Indian Basmati Rice Grains using Top-Hat Transformation," *International Journal of Computer Applications*, 2014.
- [11]. J. M. Korath, A. Abbas, J. A. Romagnoli, "Separating touching and overlapping objects in particle images - A combined approach".
- [12]. O. AKI, A. Güllü, E. Uçar, "Classification Of Rice Grains Using Image Processing And Machine Learning Techniques," *International Scientific Conference*, 2015.
- [13]. P. Neelamegam, S. Abirami, K Vishnu Priya, S. R. Valantina, "Analysis of rice granules using Image Processing and Neural Network," *IEEE Conference on Information and Communication Technologies (ICT 2013)*, 2013.
- [14]. B. Verma, "Image Processing Techniques for Grading & Classification of Rice," *Int'l Conf. on Computer & Communication Technology*, 2010.
- [15]. Q. Yao, J. Chen, Z. Guan, C. Sun, Z. Zhu, "Inspection of rice appearance quality using machine vision," *Global Congress on Intelligent Systems*, 2009.
- [16]. S. Zafari, T. Eerola, J. Sampo, H. Kalviainen, H. Haario, "Segmentation of Overlapping Elliptical Objects in Silhouette Images," *IEEE Transactions On Image Processing*, 2015.
- [17]. D. Savakar, "Identification and Classification of Bulk Fruits Images using Artificial Neural Networks," *International Journal of Engineering and Innovative Technology (IJEIT)*, 2012.
- [18]. L. Guang-rong, "Rice Color Inspection Based on Image Processing Technique," *International Conference on Advances in Energy Engineering*, 2010.
- [19]. N. OTSU, "A Threshold Selection Method for Gray-Level Histograms," *IEEE TRANSACTIONS ON SYSTEMS, MAN, AND CYBERNETICS*, 1979.
- [20]. opencv dev team, "Smoothing Images: Open Source Computer Vision," 2015. [Online]. Available:

https://docs.opencv.org/3.1.0/d4/d13/tutorial_py_filtering.html.

- [21]. opencv dev team, "Morphological Transformations: OpenCV," 23 June 2018. [Online]. Available: https://docs.opencv.org/3.4/d9/d61/tutorial_py_morphological_ops.html.
- [22]. OpenCV, "Contours: Getting Started," Open Source Computer Vision, 24 Oct 2017. [Online]. Available: https://docs.opencv.org/3.3.1/d4/d73/tutorial_py_contours_begin.html
- [23]. Bhavesh B. Prajapati, Sachin Patel., "Algorithmic approach to quality analysis of Indian basmati rice using digital image processing", International Journal of Emerging Technology and Advanced Engineering International Volume 3, Issue 3, March 2013.
- [24]. Kataria Bhavesh, " Analysis of Rice Grains Through Digital Image Processing", International Journal of Scientific Research in Science and Technology(IJSRST), Print ISSN : 2395-6011, Online ISSN : 2395-602X, Volume 1, Issue 1, pp.01-03, March-April-2015. Journal URL : <http://ijsrst.com/IJSRST15113>

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