

A MEASURE OF QUALITY AND IDENTIFY THE BREED OF RICE GRAIN

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ABSTRACT: Rice is the most consuming food all over the world and the market for rice is always high. In rice manufacturing industries the market demand is always centred on quality of rice. The analysis of grain type, grading, and quality criteria are still determined by skilled persons manually. Because it depends on a number of variables, including human factors, working conditions, cleaning and salvage recovery rates, this process is complex. Deep learning and image processing methods may be used to overcome this. In the food business, quality testing is becoming more significant for grading and classifying grains. In deep learning-based testing, we take into account both physical (grain form and size) and chemical (amylose content, gel consistency) features. The quality and grading of rice grains were examined using this proposed algorithm's average values for the features that were taken out of the network. Since grain quality directly affects human health, it is very important for people. Thus, it is crucial to evaluate grain quality and spot low-quality components. The mix of physical and chemical properties makes up rice quality. Two physical traits are grain size and shape. Using canny edge detection, the derived physical characteristics are used to classify the rice grains. This essay offers a solution to the issue of quality analysis in the rice sector. Compared to conventional human-based inspection methods, computer vision-based inspection offers an option that is quick, accurate, convenient, and safe. This article offers a technique for determining the rice grain's quality and categorising it according to various breed types.

In this we are going to use three types of rice grains: -

1. Basmati Rice 2. Sonamasoori Rice 3. jhilli Rice

Key words: Image processing, CNN, Rice Grading.

I. INTRODUCTION

Our nation's main crop for raising agricultural income is grains. Farmers notice yield most when the grain is still in the ground, but once the rice has been milled and sold, quality becomes the primary factor in determining its viability for sale. [1]. To measure the degree of genetic purity and to raise the calibre of the

nation's rice exports, the classification of rice varieties into a certain category is the area of expertise of specific professionals [2]. There is no easy way to tell which grains on the market are of lower grade. As a result, the consumer now faces a major problem. [1]. This project offers a solution to the issue of quality analysis in the rice sector. Compared to conventional human-based inspection methods, computer vision-based inspection offers an option that is quick, accurate, convenient, and safe. This article offers a technique for determining the rice grain's quality and categorising it according to various breed types. [4].

Without physical contact or human involvement, digital photography is acknowledged as a useful method for automating the process of removing characteristics from rice grains [3]. Compared to the chemical procedure, visual or digital image processing is a non-destructive process that is also highly quick and affordable [5]. An algorithm that can act as a framework for creating software systems can be created.[6].

The acquisition of picture data, feature extraction (such as form, size, colour, and orientation), feature representation, model/algorithm selection and learning, and model testing are the most crucial processes [7]. Image segmentation in computer vision is the division of a digital image into various segments (sets of pixels also referred to as super-pixels). [5]. A skilled individual and technician visually evaluate quality. However, the findings of each measurement are variable and time-consuming, thus improved techniques, such as image processing, are anticipated to replace the conventional approaches. [4].

The process of image segmentation is widely used to locate boundaries and objects in photographs (such as lines, curves, etc.). Giving each pixel in a picture a label so that pixels with the same label have certain qualities is the process of image segmentation.[5] Identification of the quality of rice is crucial because it has a significant impact on the development of horticultural and agronomic crops. Image processing, a vital and cutting-edge technology area, has significantly advanced traditional farming. [8]

In order to automatically identify the sizes, shapes, and diversity of samples of 442 rice grains, they next used multilayer artificial neural network models. [7]

Disposable objects like paddy, chaff, broken grains, weed seeds, stones, etc. were discovered in rice samples. The quality of the rice is impacted by these impurity levels. It is resolved utilising image processing techniques as a complicated problem. [9]

This labour-intensive Farmers are impacted by activities. Investigating if technology adoption is a realistic alternative is important as a result.[1]

In Asia, where 520 million people are estimated to live below the poverty line, rice can provide up to 50% of the daily caloric needs. Growing rice has changed drastically over time, becoming the main source of income for about 200 million households throughout the developing globe. Its considerable popularity is due to elements like inexpensive cost, simple and quick preparation, and long shelf life.[3]

Ingestion of grain of lower grade can lead to significant illness. Occasionally inferior grain is blended with superior grain to increase pricing. This type of mixture's end product may result in foods of inferior quality. While choosing grains, this form of adulteration must be detected.

II.DESIGN METHODOLOGY

Input image: The digital scanner and the digital still camera are the two main tools for capturing digital images. We give the single rice grain image as a input image.

Pre-processing: The phrase "image pre-processing" refers to simple operations performed on images. Both its input and output are images of intensity. By removing undesirable distortions or increasing particular elements that are essential for later processing, pre-processing seeks to enhance the image data.

Feature Extraction: Deep learning and machine learning for feature extraction. The technique of feature extraction transforms unprocessed data into controllable numerical features while maintaining the details of the initial data set. It produces more effectively. results compared to utilising machine learning on the raw data directly.

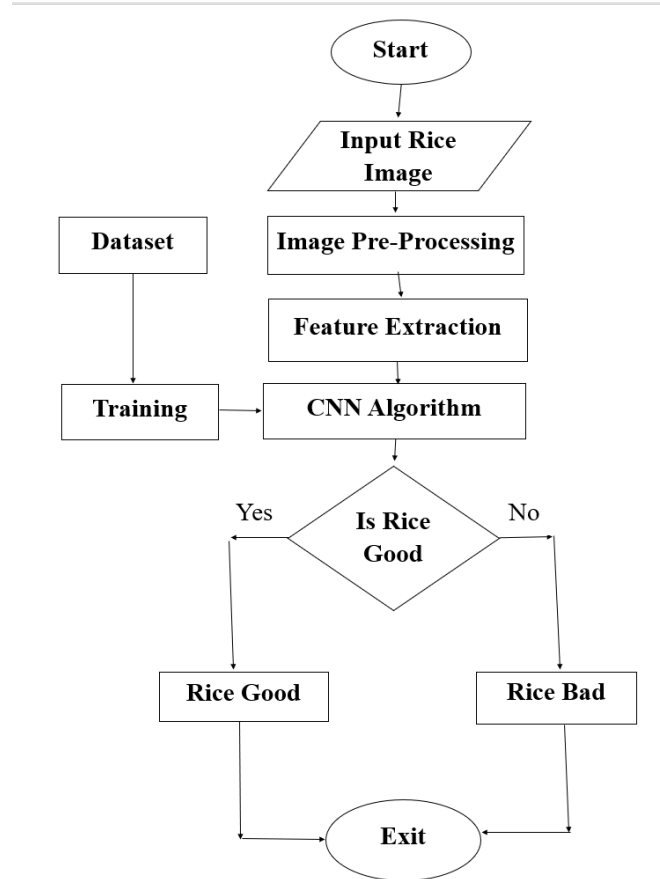


Figure 1. Flowchart

With a computer, digital image processing entails editing digital photos. It is a division of signals and systems that places a significant emphasis on images. The creation of an image-processing computer system is the main objective of DIP. The system takes a digital image as input and processes it using an effective algorithm. It can prevent issues like processing-related noise and distortion accumulation and allows for the employment of a much wider variety of algorithms on the input data. importing the image using tools for photo acquisition.

Examining and modifying the image:

Creating output that may produce altered images.

Image Pre-processing is a term used to describe actions taken on photographs at their most basic level.

CNN: For tasks like image identification and pixel data processing, deep learning algorithms use a specific kind of network design called a CNN. Convolutional neural networks are a deep learning

network design that learns directly from data (CNN or ConvNet). By looking for patterns in the photos, CNNs are immensely useful for identifying items, classes, and categories in photographs. For categorising audio, time-series, and signal data, they may be highly useful. The main advantage CNN has over its forerunners is that it can identify crucial components without human interaction, which makes it the most well-liked. We have outlined CNN's essential components so that you can comprehend it completely.

Despite the usage of other neural network types in deep learning, CNNs are the favoured network design for object recognition and classification. As a result, they are ideal for computer vision (CV) activities and for applications like face and self-driving auto systems where accurate object detection is crucial.

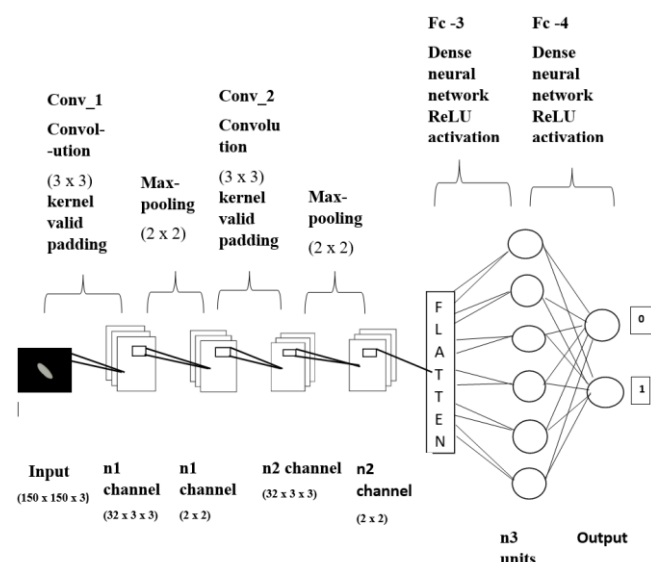


Fig.2 CNN Block Diagram

NN: Deep learning is a type of machine learning that imitates the human brain by using linked neurons or nodes in a layered framework. Synthetic neurons are a network of interconnected, communicative nodes that make up the object. These signals are sent from the input to form an output. Tasks that a neural network can perform cannot be done by a linear programme. The neural network can continue operating even if one of its components fails because of its parallel features. A neural network can make judgements without having to be reprogrammed.

Result:

Image #289 : jhili good



Image #437 : basmati (good)



Conclusion:

In this project, a straightforward, transportable, and effective approach is created to evaluate rice grain quality and categorize various rice kinds. The goal of this study is to assist industrialists in determining the quality of rice grains for both import and export reasons. The neural network methodology along with the segmentation method is used to implement the whole system. In this study, image processing techniques are

used to segment and identify rice grains. Grain size-based quality can be assessed well by using an image processing technique. The main benefit of the suggested method is that it operates more rapidly, is less expensive, and yields superior results to manual or traditional methods. We successfully implemented every suggestion that was made.

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