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RICE QUALITY ANALYSIS USING IMAGE PROCESSING AND MACHINE LEARNING.

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ABSTRACT: All over the world rice is the most consumed food and the requirement and demand of rice in the market is always high. In the market rice demand is always centered at the quality of rice depending upon its factors like length ,thickness of rice grain . Traditional methods to check all aspects of rice can be a very time consuming process and have to be done manually. Quality and purity checking of rice grains are commonly derived from human vision observation. Analyzing the rice grain sample manually is a longer consuming and sophisticated process, and having more chances of errors with the subjectivity of human perception. This paved the way for development of a computerized model for checking rice quality and all its aspects needed for checking the quality of rice. The strategies of digital image processing are used in this paper to provide a solution to the problem. Ninety percent).In proposed system model is built by clubbing both image processing and machine learning techniques to grade the rice .Digital Imaging is recognized as an efficient technique to extract the features from rice grains.We are also attempting to develop a Neural Network model in order to achieve better results.

Index Terms **– Rice quality using Image Processing and Machine Learning, OpenCV.**

I. INTRODUCTION

Rice is a favorable and high consumed food grain in Asian countries. It can be easily found all over the world. In the rice market, the key determinant of milled rice is quality. The quality measurement becomes more important with import and export trade. Rice Quality varies according to impurity content and each type of rice have different quality based on the physical features. The main purpose of the proposed method is to offer alternative ways for quality control and analysis which reduce the required effort, cost and time. Image processing and Machine Learning are significant and advanced technological area where important developments have been made. Quality control and analysis plays a vital role in agricultural and farming. Quality is analyzed visually by a veteran person and technician. But the effect of each measurement is changing in results and prolonged, so to overcome the traditional methods advanced techniques i.e Image processing is projected. Image Processing manipulates images for performing some operations on targeted images to get an improved and desirable image. And extort some valuable information from the input image. All types of data have to go through three general phases: preprocessing, enhancement and display, and information extraction.

II. LITERATURE SURVEY

No.	Author Name	Topic Name	Output
1	1.SiddhantGhule, 2.Amit Thakur 3.Sidhodhan Kamble	Quick Analysis of Quality of Cereals, Oilseeds and Pulses	Powerful grain analysis system is introduced and the method proposed is for industrial systems. Computer Vision is used to detect and analyze grain and it gives more than 90% accuracy.
2	1 Prabir Kumar Sethy, 2 Santi Behera, 3 Soubhagyalina Dash 4 Abhishek Pattnaik	Rice Quality Evaluation Based on Image Processing	An image processing based solution is explored for automatic rice recognition, classification, and recognition of foreign particles from images using color and texture features
3	1. Nikhade Pratibha 2.More Hemlata, 3.Manekar Krunali	Analysis and Identification of Rice Granules Using Image Processing and Neural Network	The grading system is developed for easing the labor intensive work and creates consistency in the quality of product. There are several inferior quality grains arriving at the market day by day. This system is helpful for categorization grades of granules using Neural Network Pattern Recognition Tool
4	1.S.Sangamithra, 2.A.Silpha roselin , 3.S.Sherin farhana, 4.KM.Visalakshi	Analysing Rice Seed Quality Using Machine Learning Algorithms	An image processing algorithm to grade the rice on the basis of length, width, area and area of chalky and also worked on the colour detection of the image.

III. APPROACH

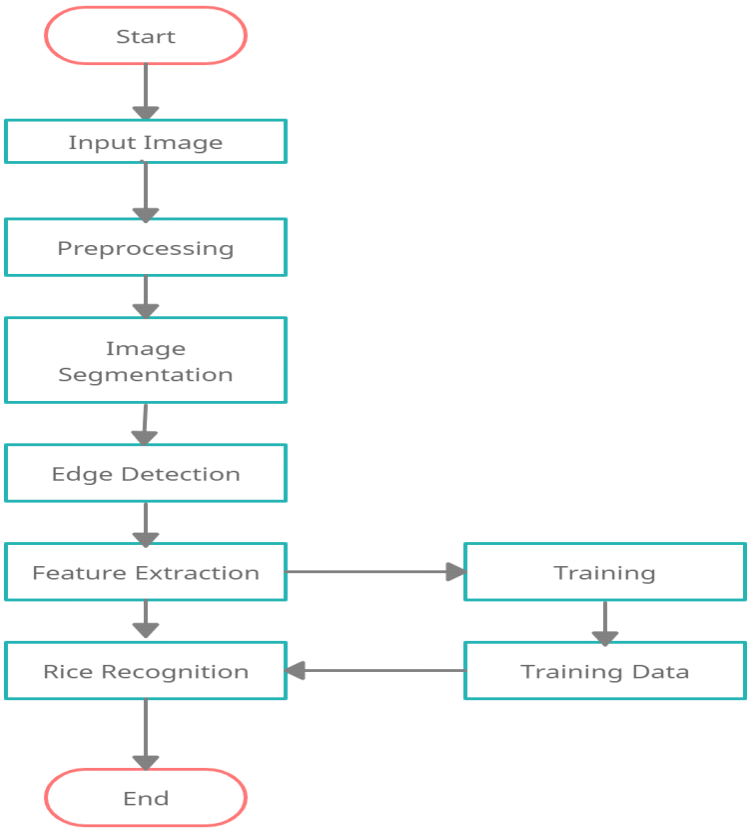

Fig. 3.1 Flow Diagram

IV. PROPOSED SYSTEM

To Create a platform where we can analyze the Quality of rice based on Morphological Qualities Using Machine Learning and Image Processing Algorithms.

The length, breadth, and length – breadth ratio of the rice grains are measured by counting and classifying the rice grains on the same basis, which is accomplished through the use of image processing techniques.

In comparison to manual inspection, using image processing and machine learning algorithms to determine the quality of rice grain is a more accurate and time-saving method.

Working of the proposed system is shown in the below steps:

1.Image Acquisition takes place(Image of Rice grain is provided to the system).

2.This Image is pre processed and converted to gray scale and noise removal is done.

3.Image Segmentation is done to find the ROI(Region of Interest). This is done to find the required objects and region of boundaries in an image.

4.Using Canny Edge Detection we perform edge detection to find out the region of rice grains.

5.Rice grain measurement is done and features(length, width etc.) are extracted from the image.

6.CNN is used to classify the rice grains based on the features like length, breadth etc.

7.Final Result is displayed.

V. ALGORITHM

This Deep Training algorithm, known as a Convolutional Neural (ConvNet/CNN), can take in an image, assign importance (learnable weights and biases) to diverse elements there in picture, and make a distinction fact from opinion. When especially in comparison to other classification algorithms, the amount of pre-processing required by a ConvNet is significantly lower. Convolutional neural networks (ConvNets) have the ability to learn these filters/characteristics if they are given enough training.

Architecture of ConvNet is similar to that of human brain connectivity patterns and was inspired by visual cortex organisation. The Receptive Field is the area of the visual field in which individual neurons respond to stimuli. All of the visible space is filled by a smattering of these fields.

Enter a colour image from the source Quality of Grain for Food. The first step is to get the image of rice grains. Using preprocessing, improve the image quality (RGB to Gray, Noise Removal etc). Image Segmentation can then be used to identify ROIs.Take features and feed them into the model as input. Using ML Algorithms, identify and classify rice grain samples based on these features.

Convolutional Neural Networks: As in any other neural network, the input of a CNN, in this case an image, is passed through a series of filters in order to obtain a labelled output that can then be classified. The specificity of a CNN lies in its filtering layers, which include at least one convolution layer. These allow it to process more complex pictures than a regular neural network. Whereas the latter is well adapted for simple, well-centred images such as hand-written digits, the use of CNNs in image analysis ranges from Facebook's automatic tagging algorithms, to object classification and detection, in particular in the field of radiology. There are Four types of layers in Convolutional Neural Networks: 1) Convolutional Layer: In a typical neural network each input neuron is connected to the next hidden layer. In CNN, only a small region of the input layer neurons connect to the neuron hidden layer. 2) Pooling Layer: The pooling layer is used to reduce the dimensionality of the feature map. There will be multiple activation pooling layers inside the hidden layer of the CNN. 3) Flatten: Flattening is converting the data into a 1-dimensional array for inputting it to the next layer. We flatten the output of the convolutional layers to create a single long feature vector. 4) Fully-Connected layer:Fully Connected Layers form the last few layers in the network. The input to the fully connected layer is the output from the final Pooling or Convolutional Layer, which is flattened and then fed into the fully connected layer.

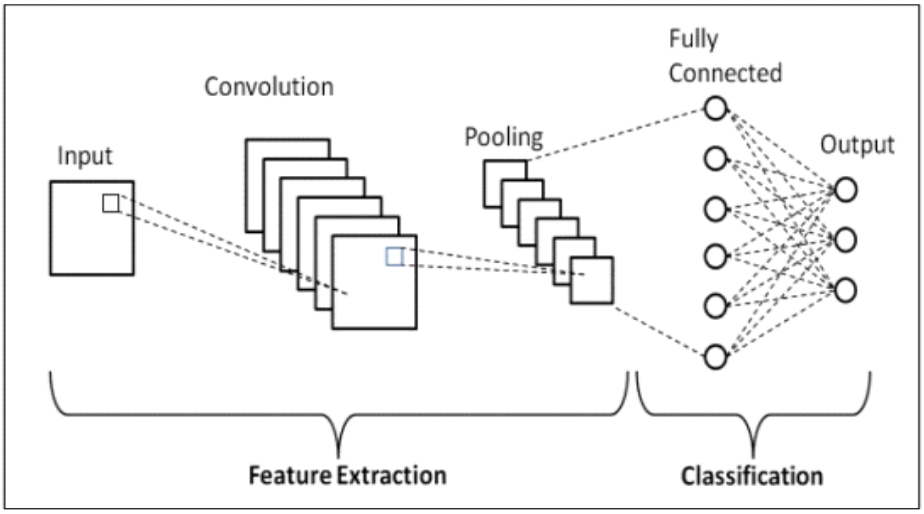

Fig 5.1 CNN Algorithm

VI. CONCLUSION

All over the world rice is most consuming food and the requirement and demand of rice in market is always high. In market rice demand is always centered at quality of rice depending upon its factors like length , thickness .Traditional methods to check this all aspects of rice can be very time consuming process and have to done manually . Quality and purity checking of grains are commonly derived from human vision observation. Analyzing the grain sample manually is a long and time consuming as well as sophisticated process, and having more chances of errors with the subjectivity of human perception. An attempt is made to grade the rice grains when subjected to pre-processing. Based on the rice grains, filtered image is performed from the original image to eradicate the noise. Later on we classify the different types of rice grains based on Edge detection and based on length-breadth ratio. We also conclude the quality of rice grains using length, breadth ,etc.

In this article, the image processing CNN algorithm is graded to rice on the basis of length, width, area and also worked on color identification. From the results, it was concluded that some are results better while comparing one with other in quality that is based on area.

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