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Quick Seed Quality Check Using Artificial Intelligence

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Abstract: *Globally, wheat is the leading source of carbohydrates and fiber in human food. On an average, the wheat contains 12 percent water, 70 percent of carbohydrates, 12 percent protein, 2 percent fat, 1.8 percent minerals, and 2.2 percent crude fibers. As per the research the importance of identifying the quality of wheat cannot be overstated. Manually specifying or establishing the quality of wheat necessitates skilled judgement, which takes time. When wheat varieties appear to be so identical, manually distinguishing them becomes an extremely time-consuming operation.To overcome this problem, Image processing can be used to classify wheat according to its quality. The seed quality identification is very important in agriculture. Before boring the seed in farm, it must be viewed properly and then sowed. In the current scenario the farmersare taking more efforts in their farm and spending more time and money for better productivity. But despite their hard work, they do not get proper profit. So, the technology can come for rescue here make it more efficient. There are certain limitations to human eye to observe the seed. So, the electronic world helps us to separate the faulty and damaged seeds from quality seeds. The image processing algorithm is implemented using Python. The proposed technique is defined with the assistance of image processing mechanism with the help of Python software.*

Keywords: Convolutional Neural Network, Image Processing, etc.

I. INTRODUCTION

Wheat is one of the most nourishing grains, according to study. Wheat quality has a significant impact on heat yield, hence competent professional assessment of wheat quality is critical. During grain handling operations, Before the next course of action can be carried out, information on grain quality is necessary at numerous stages. Visual examination by farmers and employees quickly assesses the handling method, grain variety, and quality. This is a time-consuming and difficult evaluating procedure. Physical factors such as exhaustion and vision, mental state induced by prejudices and job pressure, and working environments such as incorrect lighting, temperature, and so on can all have a significant impact on a grain inspector's decision-making ability. Handpicking grain quality is a traditional way for determining grain quality.

Manually sorting wheat grains is crucial and time-consuming. Image processing and analysis provides a quantitative way for estimating morphological traits that is objective and accurate. The shape recognition and description approach of comparable round objects is examined using wheat grain as an example. Then, based on some wheat grain characteristic points, a grain shape description approach is suggested. Computer vision is a novel technology for acquiring and analysing an image of a real scene by computers and other devices in order to obtain information or to control processes. Wheat is the most important protein source in human food. In terms of total production tonnages utilized for food, India is currently the world's second-largest producer. Wheat quality must be established. Manually determining wheat quality necessitates skilled judgement and takes time. When wheat varieties look so similar, manually distinguishing them can be a difficult chore.

Image processing can be used to classify wheat according to its quality to solve this challenge. In agriculture, seed quality identification is critical. Before sowing the seed in the farm, it must be thoroughly examined. Farmers are putting in more effort and spending more time and money on their farms under the current situation. Despite their efforts, they do not receive adequate compensation.

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As a result, technology may be able to help. The human eye has some limitations when it comes to observing the seed. As a result, the technological world assists us in distinguishing between faulty and quality seeds. Python is used to implement the image processing algorithm.

II. BRIEF LITERATURE SURVEY

The proposed strategy is characterized with the help of electronic picture handling instrument on MATLAB. The picture handling calculation is carried out utilizing MATLAB. The ranchers are taking more Endeavor's in their homestead and furthermore investing more energy and cash. However, despite their persistent effort they don't get legitimate benefit. So, the innovation can come for salvage here. There are sure impediments to natural eye to notice the seed. So, the electronic world assists us with isolating the broken seeds from quality seeds.

Proposed System was created with new calculations and equipment models, and the accessibility of proper picture examination delicate product apparatuses made this approach exceptionally helpful for present and future outline of seed quality exploration. Information acquired through this procedure can additionally be handled measurably and shown graphically, and a data set might be created to incorporate picture examination information with ordered and bio-morphological elements of plant species. Seed inside an enormous seed test helps in the improvement of non-horrendous and more proficient techniques for arranging seed subsamples with various germination capacities.

As per this paper man-made brainpower approach and differentiability of the mistake work are utilized. The specialist centres around examining the multi-facet brain network backward model which has been utilized for tackling the issue of the yield of onion and they prescribed experimental non-straight backward models to choose the connection between the yield of the harvest and the planting thickness or the ranch thickness. The paper likewise gives a model a multi-facet brain perceptron in the design (1-2-1), for example one neuron at the information, two in the secret layer and one at the result, alongside the non-straight initiation work. For the actual learning, they utilized the Back Propagation calculation with the execution of the multi-facet brain network for the forecast of the harvest yield, and the correlation of the precision of this methodology with the exactness of the notable relapse model intended for the expectation of observational information. Choices of its execution.

III. SYSTEM IMPLEMENTATION

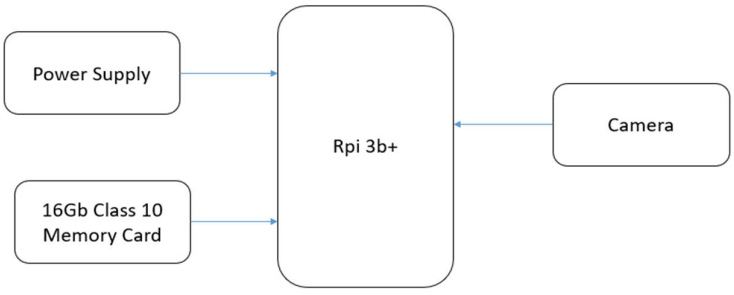

Figure 1: Block Diagram

As shown in Figure1 raspberry camera captures images of grains and store it in memory card which is externally connected to raspberry pi. After capturing images using algorithm it will extract image features on that basis it will generate output.

Figure 2 shows the System Architecture. In the proposed method various varieties of seed grains have been considered. Each of these grains is further categorised and evaluated, with grade 1 being the best and grade 2 being the worst in terms of quality. Grading is done manually in the manual method. Experts rate grains based

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on characteristics such as main axis length, minor axis length, area, eccentricity, and perimeter. Figure 2: - The Architecture of the System The same attributes are employed in the automated grain grading process.

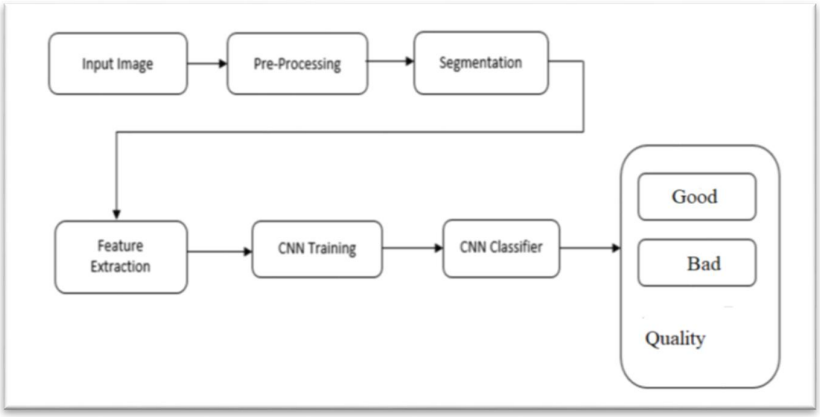

Figure 2: System Architecture

All database elements are categorized in Healthy seed and Defective seeds. Both training and test are performed on these seed dataset using CNN. For image segmentation thresholding method is used. For the classification CNN Classifier is used for checking the condition of seeds.

Pre-processing

Seed datasets are gathered from a variety of sources the first step, and these data pieces are then pre-processed to make an effective input to the prediction algorithm. After cleaning the data, load it into CNN and use the math lab toolbox to run the query. For seed class prediction, we employed CNN, which can be implemented using a learning method. The most essential tasks under data preparation are data collecting and data pre-processing (data cleaning, attribute selection, data formatting and transformation, dimensionality reduction, and the like), which ultimately resulted in the creation of a target data set.

Segmentation

One of the most difficult aspects of image processing is segmentation. The process of segmenting an image into itconstituent sections or objects is known as image segmentation. The level to which this subdivision is carried out depends on the problem being solved, i.e., segmentation should stop when the objects of interest in an applic ation have been isolated. For example, if our interest is in identifying vehicles on a road, the first step is to seg ment the road from the image and then to segment the contents of the road down to potential vehicles.
Picture segmentation is done using image thresholding algorithms.

Feature Extraction

The feature extraction methods are created to extricate highlights in engineered gap radar pictures. This method removes significant level highlights required to perform order of targets. The items that stand out are known as highlights portray an objective, for example, size, shape, piece, area and so forth. Division procedures are utilized to disengage the ideal article from the scene with the goal that estimations can be made on it along these lines. Quantitative estimations of article highlight permit characterization and portrayal of the picture.
Whenever the pre-handling and the ideal degree of division has been accomplished, some element extraction method is applied to the sections to acquire highlights, which is trailed by utilization of characterization and post handling strategies. It is fundamental for centre around the feature extraction stage as it discernibly affects the proficiency of the acknowledgment framework.

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Include choice of an element extraction strategy is the absolute most significant feature in accomplishing high acknowledgment execution. Highlight extraction has been given as "removing from the crude information data that is generally appropriate for arrangement purposes, while limiting the inside class design inconstancy and improving the between class design changeability". Along these lines, choice of a reasonable feature extraction procedure as per the contribution to be applied should be finished with extreme attention to detail.

IV. RESULTS

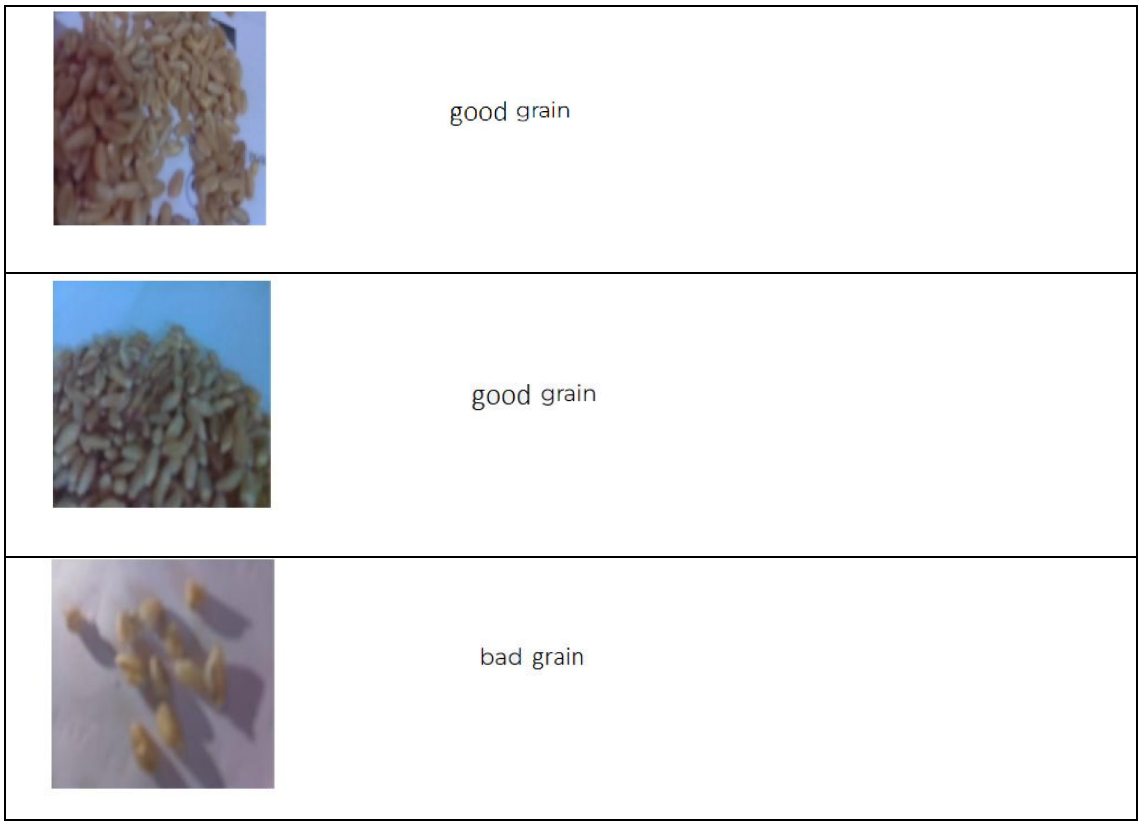

Figure 3: Classification of grain sample

Figure 3 shows the classification of the grain samples which are classified into good grain and bad grains. Good grain shows given grains are healthy grains where Bad grain shows given images are not so healthy.

V. CONCLUSION AND DISCUSSION

Consumers today are increasingly concerned about the quality of the food grains they buy and consume. Using image processing and a convolutional neural network, an attempt is made to grade seeds grains using morphological techniques. The image is first pre-processed, after which the individual seeds are segregated using various image processing algorithms. The outcomes appear to be promising. Seeds are graded using the Neural Network Pattern Recognition Tool. Grade 1, grade 2seeds are available. The created Neural Network May also be put to use grade additional grains and seeds.

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