

GRADING AND QUALITY TESTING OF FOOD GRAINS USING NEURAL NETWORK

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Abstract

The quality of food grains is referred to the every aspect of the profit of supply and marketing. The varieties purity is one of the factors whose inspection is more difficult and more complicated than that of other factors. In the present grain-handling system, grain type and quality are rapidly assessed by visual inspection. This evaluation process is, however, tedious and time consuming. The decision-making capabilities of a grain inspector can be seriously affected by his/her physical condition such as fatigue and eyesight, mental state caused by biases and work pressure, and working conditions such as improper lighting, climate, etc. The farmers are affected by this manual activity. Hence, these tasks require automation and develop imaging systems that can be helpful to identify quality of grain images. A model of quality grade testing and identification is built which is based on appearance features such as the morphological and colour with technology of computer image processing and neural network. The morphological and colour features are presented to the neural network for training purposes. The trained network is then used to identify the unknown grain types, impurities and its quality.

Keywords: Grain quality, image processing, neural network

1. INTRODUCTION

Grains are the prime crop for our country's peasants to increase their agricultural income. The automation level of testing grain quality is low and most work is done by manpower. The workload is so mass that it will lead to workers' fatigue and need them to have ample testing experience. And it also makes the testing more costly and long to be made. With the development of import and export trade this contradiction is more and more outstanding [1]. During grain handling operations, information on grain type and grain quality is required at several stages before the next course of operation can be determined and performed. The varieties purity is one of the factors whose inspection is more difficult and more complicated than that of other factors. In the present grain handling system, grain type and quality are rapidly assessed by visual inspection. This evaluation process is, however, tedious and time consuming. The decision-making capabilities of a grain inspector can be seriously affected by his/her physical condition such as fatigue and eyesight, mental state caused by biases and work pressure, and working conditions such as improper lighting, climate, etc. [2]. The farmers are affected by this manual activity. Hence, these tasks require automation and develop systems that can be helpful to identify grain images, rectify it & then being analyzed.

1.1 Problem Definition

In the food industry there are various food stuffs in the form of grains. The food grain types and their quality are rapidly assessed through visual inspection by human inspectors. The decision-making capabilities of human-inspectors are subjected to external influences. A model of quality testing and identification is built which is based on appearance features such as the shape and color with technology of image processing and neural network. The system will take an image of grain and identifies the grains and impurities if any and gives the quality of the grain.

2. DESIGN AND IMPLEMENTATION DETAILS

2.1 System Architecture & Design

The work finds application in grain handling operations at Agriculture Produce Market Committee (APMC), which is an important organization that deals with farmers, produce, measures quality and finally values the produce [3]. Different food grains like wheat, horse gram, corn and rice are considered in the study. Considering example of rice, rice is one of the most important cereal grain crops. The quality of rice has distinct effect on the yield of rice, so the proper inspection of rice quality is very important. During grain handling operations, information on grain type and grain quality is required at several stages before the next course of

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Table of Contents Classification And Quality Analysis Of Food Grains

1. Understanding the eBook Classification And Quality Analysis Of Food Grains
 - The Rise of Digital Reading Classification And Quality Analysis Of Food Grains
 - Advantages of eBooks Over Traditional Books
2. Identifying Classification And Quality Analysis Of Food Grains
 - Exploring Different Genres
 - Considering Fiction vs. Non-Fiction
 - Determining Your Reading Goals
3. Choosing the Right eBook Platform
 - Popular eBook Platforms
 - Features to Look for in an Classification And Quality Analysis Of Food Grains
 - User-Friendly Interface
4. Exploring eBook Recommendations from Classification And Quality Analysis Of Food Grains

- Personalized Recommendations
 - Classification And Quality Analysis Of Food Grains User Reviews and Ratings
 - Classification And Quality Analysis Of Food Grains and Bestseller Lists
5. Accessing Classification And Quality Analysis Of Food Grains Free and Paid eBooks
 - Classification And Quality Analysis Of Food Grains Public Domain eBooks
 - Classification And Quality Analysis Of Food Grains eBook Subscription Services
 - Classification And Quality Analysis Of Food Grains Budget-Friendly Options
 6. Navigating Classification And Quality Analysis Of Food Grains eBook Formats
 - ePub, PDF, MOBI, and More
 - Classification And Quality Analysis Of Food Grains Compatibility with Devices
 - Classification And Quality Analysis Of Food Grains Enhanced eBook Features
 7. Enhancing Your Reading Experience
 - Adjustable Fonts and Text Sizes of Classification And Quality Analysis Of Food Grains
 - Highlighting and Note-Taking Classification And Quality Analysis Of Food Grains
 - Interactive Elements Classification And Quality Analysis Of Food Grains
 8. Staying Engaged with Classification And Quality Analysis Of Food Grains
 - Joining Online Reading Communities
 - Participating in Virtual Book Clubs
 - Following Authors and Publishers Classification And Quality Analysis Of Food Grains
 9. Balancing eBooks and Physical Books Classification And Quality Analysis Of Food Grains
 - Benefits of a Digital Library
 - Creating a Diverse Reading Collection Classification And Quality Analysis Of Food Grains
 10. Overcoming Reading Challenges
 - Dealing with Digital Eye Strain
 - Minimizing Distractions
 - Managing Screen Time
 11. Cultivating a Reading Routine Classification And Quality Analysis Of Food Grains
 - Setting Reading Goals Classification And Quality Analysis Of Food Grains
 - Carving Out Dedicated Reading Time
 12. Sourcing Reliable Information of Classification And Quality Analysis Of Food Grains

- Fact-Checking eBook Content of Classification And Quality Analysis Of Food Grains
 - Distinguishing Credible Sources
13. Promoting Lifelong Learning
- Utilizing eBooks for Skill Development
 - Exploring Educational eBooks
14. Embracing eBook Trends
- Integration of Multimedia Elements
 - Interactive and Gamified eBooks

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sep 1 2021 in this paper a novel wideband hexagonal cavity backed slot antenna array waveguide siw is proposed first a single element low profile wideband linearly polarized cavity backed antenna using two slots is designed and analyzed the antenna bandwidth is increased by nrws which makes both hybrid modes of tm input impedance keywords

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jul 24 2023 the feed network of the antenna is composed of an air filled rectangular waveguide rwg to substrate integrated waveguide siw transition and a power division feed network finally the array element and the feed network are combined to form an 8 times 16 slot array the overall simulation design is carried out in hfss