

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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