

Sorting Raisins Using Image Processing Technology

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Abstract: Grading of farming items is done to get the great nature of items, which too intends to partitioned or expel low quality of items, to build the nature of efficiency. Reviewing of the items is either done physically or utilizing a few apparatuses. As of late few robotized frameworks are created utilizing picture handling innovation for review the rural items. The items which can be evaluated naturally incorporate organic products, grains, dry natural products and so forth. There is a need to build up a robotized framework utilizing picture handling to make reviewing simpler. This paper displays an calculation for evaluating raisins utilizing picture handling. The framework initially peruses a picture from the record and after that the picture is passed for handling. The picture is caught utilizing high determination versatile camera of 16 megapixels. Preparing incorporates many strides like picture pre-handling, include extraction, order and reviewing. The framework is created utilizing Matlab. Arrangement and reviewing is done on the premise of shading and size. The classifier utilized is neural system and the evaluations utilized are mechanical evaluations. The outcomes are exact and precise with normal acknowledgment rate of 95%.

Keywords: Raisins, Automatic Grading, Feature Extraction, Neural Network, Industrial Grades, Neural Network,

1. Introduction

Horticulture assumes a noteworthy part being developed of Indian economy. In quickly developing nations like India, creation of raisins is in substantial scale. Reviewing of raisins for the fare and inward use generally utilizes manual strategies or some apparatus in view of size strainers. These machines utilized are expensive and are equivalent to a size of room. These apparatuses are called sorter machines. Sorter machines are distinctive for various products of the soil in light of their sizes. Agriculturists feel it better for hand picking of organic products. Manual reviewing is arduous, dull, tedious and mistaken. The poor grouping and arranging will prompt diminishment in quality confirmation. Because of these downsides of manual evaluating like dullness, work necessities, irregularity and gigantic cost of machines, an robotized evaluating framework should be created which is reasonable by little dealers and agriculturists.

Programmed evaluating framework enhances the nature of item, builds generation and furthermore decreases the reliance on labor. The manual arranging and reviewing has been supplanted by machine vision framework which has numerous favorable circumstances like high precision, consistency and handling speed. Evaluating of agrarian items is done to recognize the nature of the item and to isolate the great quality from poor. Raisins are reviewed to get the best quality as per industry standard. Computerized framework utilizes diverse sorts of calculations to remove elements of the products of the soil for order of the organic products. Programmed evaluating framework is embraced with a specific end goal to defeat the issues of manual reviewing.

Reviewing of raisins includes arranging raisins by measure, principally for trades. To deliver raisins, clusters of grapes are first conveyed from the vineyards to the raisin-producing units, called 'sheds'. There they are prepared by the

assortment of raisins to be fabricated. The green hued raisin Hirwa and yellow shaded raisin Pivla are two of the real evaluations produced in the locale of Maharashtra. Hirwa review is essentially made for fare and Pivla is available to be purchased in the local market.

The manual arranging and evaluating has been supplanted by machine vision framework which has many preferences like high precision, consistency and less tedious.

1.1 Self-regulating grading: Overview

Color and size are the most important attributes for accurate grading of bulk raisins. Accordingly, a machine vision system for grading raisins by color and size features was designed and implemented.

Picture preparing has been ended up being compelling instrument for examination in different fields and applications. Horticulture division where the parameters like overhang, yield, nature of item were the essential measures from the agriculturists' perspective. Ordinarily master guidance may not be moderate, dominant part times the accessibility of master and their administrations may expend time. Picture handling alongside accessibility of correspondence system can change the circumstance of getting the master counsel well inside time and at reasonable cost since picture preparing was the viable apparatus for examination of parameters. This paper means to concentrate on the study of use of picture handling in horticulture field, for example, imaging methods, weed discovery and natural product evaluating.



Figure 1.1: System Architecture of self-regulating grading system

Grading of agricultural products is very important to identify its quality. Raisins are graded by its size and colour. Existing systems sort either by colour and size. There are some systems in which raisins are sorted by colour and size but those systems are grade raisins of same colour into subcategories and these are not industrial standard grades. As the raisins available in the market will be available in different grades, so the raisins must be sorted and graded according to industry standards. So farmers and small dealers need a system which grades the raisins according to industries standard. So the previously developed systems cannot be used by farmers. The System architecture is give below. It shows that the system is subdivided into various modules, like pre-processing, feature extraction, segmentation, Classification/grading. Classification is done using feed forward neural network. Raw image is given as the input to system; this undergoes pre-processing of image like background elimination, noise removal. Background removal is done using thresholding. Then the image is segmented to extract individual objects. Segmentation is done using connected components labelling. Then each raisins are extracted into sub images. Feature extraction is done on segmented individual objects. Color feature and geometric features are extracted.

2. Problem Statement

Evaluating of horticultural items is critical to recognize its quality. On account of these downsides in manual evaluating like irregularity, dreariness, work prerequisites and enormous cost of machines, a mechanized reviewing framework is to be produced which is reasonable by little dealers and ranchers. Raisins are evaluated by its size and shading. Existing frameworks sort either by shading and size. There are a few frameworks in which raisins are arranged by shading and size however those frameworks review raisins of same shading into subcategories and these are not modern standard grades. As the raisins accessible in the market will be accessible in various evaluations, so the raisins must be arranged and reviewed by industry norms. So agriculturists and little merchants require a framework which reviews the raisins as indicated by enterprises standard. So the beforehand created frameworks can't be utilized by ranchers.

3. Proposed Methodology

The proposed methodology provides a method to allocate the raisins to industrial standard i.e. the first class is Brown Grade1; second class is Brown Grade2; third class is Super Sonaka Gold Grade1; fourth class is Super Sonaka Green; fifth class is Thomson Seedless Gold Grade1; sixth class is Thomson Seedless Gold Grade2 and seventh class is Thomson Seedless Green. The system captures the RGB color image. The image is pre-refined and segmented into sub parts i.e. each raisin from the image are taken. Then each raisin is handled for extracting features. The features extracted were color moments and geometric features. These features are gathered in vectors. Then for training and regulation probabilistic neural network is used. Once training is done, the image is passed to test the network. The image undergoes into pre-processing and features are extracted and stored in vector.

4. System design of Raisins Grade Detection System

The above figure describes the flow of the raisin grading system. In training part once image pre-processing is completed then segmentation and feature extraction is done. Above flowchart is utilized as a part of analyzing, planning, documenting with a procedure or program in different fields. Using the features obtained during training we will create knowledge base. The steps for training and testing are same until feature extraction. In testing the previous knowledge base created during training process is used for classification of raisins. Then the results are checked for accuracy by manually testing.

Procedure

- 1) First, image is captured for training process.
- 2) Image is pre-processed by removing back ground image.
- 3) The pre-processed image is converted to binary image and using connected component
- 4) labeling algorithm segmentation is done.
- 5) Then 19 features are extracted from the segmented image.
- 6) Then from all obtained features a classifier is trained and a knowledge base is created.
- 7) Now the system has to be tested for the accuracy of correct output. So a
- 8) Image is captured and selected randomly for testing.
- 9) Then it undergoes pre-processing, segmentation and feature extraction.
- 10) The extracted features are given as input for the classifier.
- 11) The classifier gives the output as the class to which the image belongs.
- 12) Then the accuracy of the system is tested by manually examining the output of the system.

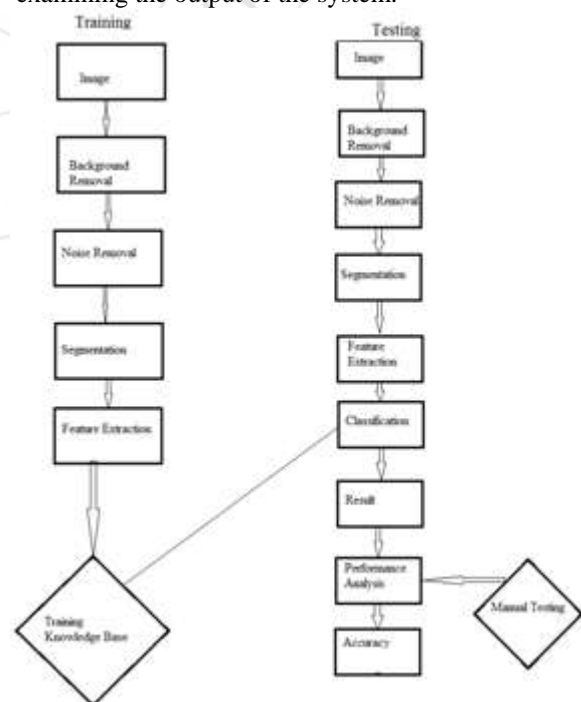


Figure: Raisins Grading System Flow chart

5. Classifier (Probabilistic Neural Network)

The classifier is utilized to decide the shading and the span of the raisin to effectively order it to one of seven right classes. The classifier utilized is the Probabilistic neural system (PNN). To maintain a strategic distance from clamor a foundation with controlled light is picked and the separation between the protest and camera are settled amid catching of pictures. Figure 3, 4 and 5 demonstrates three sorts of raisin pictures captured. The data is divided into two sets, training set and validation set. Training set is used for training and validation set is used for testing. The classifier is first trained using the features extracted. After training is done, testing of the neural network for correct classification is done. First the features of the image being tested are extracted and then passed to the neural network. The network gives the output of the class to which it belongs. And the performance is checked by manually testing the system generated output.



Figure 5.1: Super Sonaka Gold Grade 1



Figure 5.2: Brown Grade 1



Figure 5.3: Thomson Seedless Gold Grade 2

6. Conclusion

The modified exploring system is executed for assessing raisins into mechanical rules. The system made is thoroughly depending upon the shading features and geometric components isolated. These segments are used for the recognizing confirmation of raisin sorts.

As the structure surveys the raisins into mechanical measures it can be used by little scale makes and vendors. Farmers can in like manner use the structure for assessing raisins. The system is executed for the desktop structures. The structure can be used to sort different sorts of cultivating things in perspective of shading and size. In future the system can be made as an application for the mobile phones so the customers can bring it close by them wherever they go.

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