

Tainted Seed Test Using Digital Image Processing

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Abstract- Today's farmers face a major problem in detecting tainted seeds with the naked eye. The proposed project detects the percentage of both pure and impure seeds by using digital image processing technique. As India is an agriculture based country, a thought came up as to what a Computer Science undergraduate could do for the farmers. Due to the increased amount of counterfeit seeds, there are huge losses faced by the farmers who eventually are committing suicides. In order to eradicate this, a project has been developed that helps detect different seed varieties apart from the required ones in a sample of seeds. This requires a web camera to capture the images of the seeds and the results are generated immediately stating what percentage of the seeds from the seed lot belong to which variety and also if there are any unwanted ODVs. This project can be extended in future to develop a mobile application where a user can capture an image of a seed sample from a mobile device and the application generates the report regarding the purity and impure percentages.

Keywords: Tainted, Digital Image Processing, ODVs.

I. INTRODUCTION

In our work, we study the purity of a sample of seeds. Till date purity detection of seeds has been restricted to be in the hands of technicians. They perform testing at various levels at their laboratories. This process is performed manually and hence takes a minimum time of two weeks to generate results. These are undertaken by government run organization by the name A.P.Seeds within the state of Andhra Pradesh. Such organizations are all over India. The primary focus of them is to test the purity of the seed, whether it is useful for cultivation and procurement by the farmers. They receive processed seeds, which means that the seeds are separated from the nodal roots. These are taken as samples and observed under few circumstances. The testing process is a four step process that takes two weeks of time to generate results. It is a complete manual process done taking in the physical properties of the seed into consideration. There is no technical involvement in the training and testing of the seeds. So this process is time taking and strenuous. In this paper, testing the purity of a seed sample is achieved using digital image processing technique through which an image captured of a seed sample detects what varieties of the seeds are mixed. The seed samples are first trained by taking into consideration the length to breadth ratios. By using edge detection the edges of the seed are detected and the type of the seed is detected. As India is an agriculture based country and the farmers have been facing many troubles due to fake and impure seeds, this project helps them a lot in easily detecting the fake seeds.

II. LITERATURE SURVEY

Antonio Dell'Aquila"[2009][1] .New Perspectives for Seed Germination Testing Through Digital Imaging Technology", Computer image analysis technology enables a plant seed to

be viewed as a digital image that can be regarded as a two-dimensional object which can be measured in size, shape and color density. Seed changes its biological structure passing from a quiescent stage to a proliferating one, and any morphological variation can be associated with the corresponding variation of seed geometry and color space components. Future perspectives are addressed to design comprehensive biological models that may contribute to studying seed quality patterns possibly integrated with those proposed for other biological systems. This process is not effective in detecting the purity of the seeds. Hence this is not suitable for identifying the pure seeds. FranciscoGuilhien Gomes Junior, Helena Maria Carmignani Pescarin Chamma and Silvio Moure Cicero,[2014][2] "Automated image analysis of seedlings for vigor evaluation of common bean seeds", 2014 [2]. The objective of this experiment was to determine the number of days necessary to calculate the vigor index of common bean seeds using an automated system of seedling images, and compare its results with the traditional tests of seed vigor. Samples of five seed lots of the IAC Carioca cultivar were submitted to germination, accelerated aging, seedling emergence in sand and electrical conductivity tests. The parameters measured by the Seed Vigor Imaging System were mean seedling length, growth (ratio of the actual seedling growth to the maximum possible growth), uniformity of growth and the vigor indexes based on different growth/uniformity ratios are computed from scanned images of three- and four-day-old seedlings. Results of SVIS® analyses were consistent with the physiological potential evaluations provided by the traditional tests of seed vigor. This process is not effective in detecting the purity of the seeds. Hence this is not suitable for identifying the pure seeds. S.Khunkhett,T.Remsungnen[2014][3] "Non-destructive identification of pure breeding Rice seed using digital image analysis". In this paper, digital image analysis is applied for

non-destructive identification of pure breeding Rice seed. The shape and color of rice are the important features in agricultural breeding and quality testing. The similar surface color of the seeds makes it difficult for farmer to identify rice seeds. Based on segment images and RGB color features, an automatic classification method is presented in this paper. Scanner is used to capture images. The ratio between segment images and varieties of different shades RGB histogram are then calculated. The rule of classification “Khao Dawk Mali 105” between pure breeding Rice seed and impure breeding Rice seed are created. The correct classification rates for two steps are: good rice seeds 98% and pure breeding rice seeds 82%. This information could be used as a signal to farmer decided to switch to a new generation seeds. This process is not effective in detecting the purity of the seeds. Hence this is not suitable for identifying the pure seeds.

José Luís de Marchi¹, Silvio Moure Cicero¹, [2016][4]. “Use of the software Seed Vigor Imaging System (SVIS®) for assessing vigor of carrot seeds”. Seed vigor has traditionally been evaluated by physiological, biochemical and stress tolerance tests. The aim of this study was to verify the efficiency of computerized seedling image analysis by Seed Vigor Imaging System (SVIS®) to detect differences in vigor between carrot seed lots as compared to those provided by traditional vigor tests. Seeds from seven lots from the Brasilia cultivar were subjected to a germination test, first count of germination, speed of germination, accelerated aging with saline solution and seedling emergence; furthermore, a vigor index, growth index and uniformity index were determined by the Seed Vigor Imaging System (SVIS®) during four evaluation periods. The results obtained by the computerized seedling analysis (vigor index and growth index) show that SVIS® is efficient in assessing carrot seed vigor. This process is not effective in detecting the purity of the seeds. Hence this is not suitable for identifying the pure seeds.

Ms. Mrinal Sawarkar¹, Dr. S.V.Rode² [2017][5]. “Digital Image Processing Applied to Seed Purity Test”. The paper used digital image processing techniques for purity test of various seeds. Physical purity analysis tells us the proportion of pure seed component in the seed lot. The computer software to predict seed image from seed is developed. People can take pictures from mobile phone and easily transform and process by using a computer system. Thus, this project employs a digital camera to capture the image. This paper studies various digital image processing techniques which reduces the labor input required to evaluate seedling growth rate and increases the accuracy of these measurements. This process is not effective in detecting the purity of the seeds. Hence this is not suitable for identifying the pure seeds.

III. RELATED WORK

Till date, the process for testing the purity of seeds is by performing few steps manually by the laboratory technicians who are erudite about the seed structure and its properties. They get processed seeds which means that the seeds are separated from their nodal roots and stored in dry places. The testing takes place on these seeds in the following procedure.

a) Germination: Germination is a process where few seeds of one variety are picked randomly and spread over a sheet that acts like soil and then kept in a germinator which is a device that lets the seed grow into a sapling in two weeks time. It can be checked after one week and after two weeks the percentage of success can be derived.

b) Moisture: Moisture in a sample of seeds can be detected using a device that measures the moisture which should be less than 13.

c) Purity: Purity of a seed sample is tested manually by separating seeds of different varieties according to their length to breadth ratio and color, shape and size.

d) ODVs: ODVs is an abbreviated form for Other Distinctive Varieties which means the seeds are tested if they are mixed with other varieties of seeds or sand, stone and other unwanted properties.

IV. PROPOSED SYSTEM

The proposed application detects the percentage of pure seeds by using digital image processing technique. The picture taken is passed through Gaussian filter that reduces noise which means that the image is passed through few filters to sharpen the details. Then the image is converted into gray scale and feature extraction is done which detects the length to breadth ratio. Using edge detection technique, the borders of the seeds are detected and compared with those samples stored in the database. Based on the purity percentage, a report is generated that tells what percentage of the seeds in the sample belong to which variety.

Advantages in Proposed System

- Fast retrieval of the report which is time saving.
- Money saving as no technician or labour is required.
- Energy saving as no physical work is required.
- Accurate or precise diagnosis.
- This is not only restricted to India but also has a large scope to extend its hands to other agriculture based countries as well.

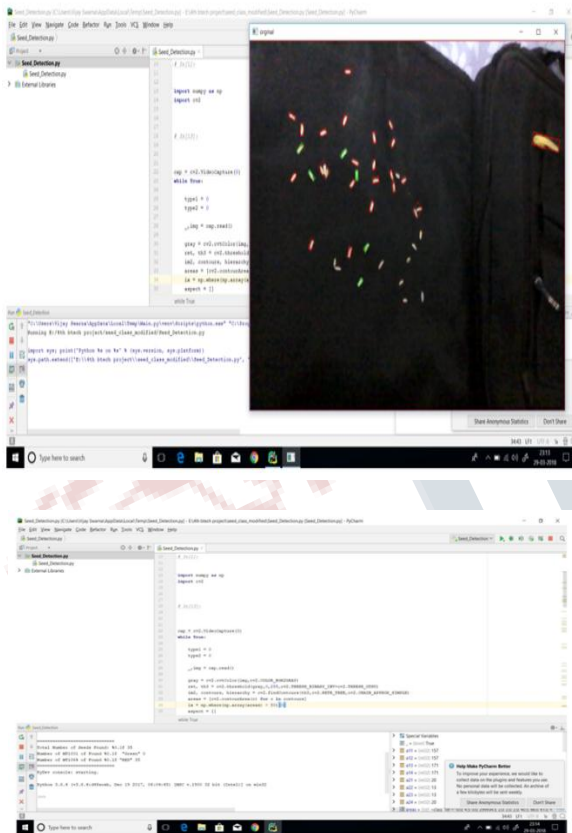
V. ALGORITHM

1. capture(image)//using a web camera
2. convertGreyScale(capturedImage)//convert the captured image to greyscale
3. extractFeature(capturedImg)//Extract the features of seeds such as Length and Breadth
4. calculateLBRatio(seeds)//calculate length and breadth ratio
5. Generate Report

REFERENCES

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VI. EXPERIMENTAL RESULTS



VII. CONCLUSION

The new Digital Image Processing platform constructed for detecting the tainted seeds lets easy detection of any ODVs mixed in the seed sample. The report generated gives accurate results by which the percentage of the different seed varieties in the sample are detected easily and within no time. Hence the required seeds can be identified accurately. Thus this saves a lot time in identifying the purity percentage of a sample of seeds. All we need is a webcam and python running on our desktop and the results are in front of us in no time.