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Detection of Diseases in Pomegranate using Image Processing

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***Abstract*: Food quality depends mostly upon external appearance and in particular upon color. Sorting is an important step in processing and packing lines of fruits. Manual sorting poses problems such as tediousness, low accuracy, subjectivity etc. A fresh fruit color scale is builtup by machine vision system. Each fruit batch to be evaluated is first photographed. The color which appears at the surface of the fruit is not uniform and half of the surface is hidden to the camera, so a few pictures of the fruit samples are taken out, changing the container after each shot. One of the most important abnormalities in the appearance of the fruit is the effect of direct sun light. Main purpose of this paper is to detect quality of the fruit using machine vision.**

***Keywords*: Image processing**

1. Introduction

Evaluation of the fruit quality is a difficult task. Consumers rely on the external inspection of the fruits: color, shape, bruise, firmness. So the quality inspection is mainly done by human labor in food industry.

Nevertheless, judging a fruit on its external parameters is a subjective task, and human decision is inconsistent and may change for each individual. There is a need for an objective system, which will be able to grade automatically fruit product, with a sensitivity closer to the human's one. Nowadays, with the lower price of the digital camera and computer, a computer vision system may be used for inspection tasks. A computer vision system is made of an optical setup to capture image, then this image is sent to a computer, first to be segmented, and then to be analyzed.

Because of its non-contact and nondestructive properties, the computer vision system is highly suitable for the food industry.

2. Literature survey

Tejas Deshpande (2014) proposed an automatic grading of disease on the pomegranate plant leaves. Bacterial blight disease is chosen for the research work. Manual grading is time consuming so automatic grading system becomes beneficial. K-means clustering method is used for conducting image segmentation and disease detection. Total leaf area (At) and total disease area (Ad) is calculated. After calculating At and Ad, disease grading has been done [1]. This system is useful for plant pathologists and not for the farmers directly. In [2] Monika Jhuria, Ashwini Kumar (2013) suggested an image processing approach for detection of disease and fruit grading. The major goal of research work is to analyze disease on fruit/leaf of fruits and provide alternative solutions. The work has done on fruits namely Apple and grapes. Image processing techniques are used for fruit disease detection and for calculation of weight of fruit. Color, Texture and morphology features are considered for feature extraction. Artificial Neural network is used for image classification. Back propagation technique is used for weight adjustment of images stored in training database. The fruit grade is decided on the basis of disease spreading and weight of fruit.

Ilaria Pertot (2012) provided multilingual web-based tool for visual plant disease identification. The system has 2 users. User who can use disease identification process for diagnostic and super user who can update system (add/delete/ modify images, disease). This system is developed for identification various diseases on strawberry. The grower in the field analyze the symptotic plant and compare symptoms on plant with images provided by web based system. The system responds with identification of most probable disease [3].

Z. May and M. H. Amaran has proposed Automated Oil Palm Fruit Grading System using Artificial Intelligence, This project deals with the ripeness of oil palm fruit. The current procedure in the palm oil mills is grading the oil palm fruit manually using human graders. This method is subjective and inconsistence because each graders has its own techniques and may vary from each other's. Hence, it affects the quality and quantity of the oil that can be extracted. In this project, a new model of automated grading system for oil palm fruit is developed using the RGB color model and artificial fuzzy logic. The vegetation indices from hyper spectral data have been shown for indirect monitoring of plant diseases. But they cannot distinguish different diseases on crop [4].

3. Block diagram description

Pre-processing: In pre-processing system use various techniques like image resize, filtering, segmentation, morphological operation etc. Size of the given image is very large, since they are captured by digital camera. Therefore, resize the given captured image using image pre-processing.

Segmentation: Image segmentation is the processes of

dividing on image into multiple parts. This is typically used to identify objects or other relevant information in digital images. In our project we use color based segmentation such as clustering, RGB, HSV, La*b, YCbCr etc. The best performance in terms of segmentation error is achieved by the HSV and YCbCr.

Feature Extraction: The fruit are identified by the human being mainly by color, shape, and texture of the fruit. In the purposed system, for the extraction of feature we have used color, morphology, texture feature.

Color: A color is mostly used to compare images and is one of the most widely used visual features. For the representation of color of an image, we are used HSI (hue, saturation and intensity) color model. And for representation of the distribution of a color image, we are used color histogram. Here, we compute the color histogram for all image in dataset and save in database which will be used for comparison of query image with dataset image.

Morphology: For extracting image components, morphology tool is used. Description and representation of region shape such as boundary extraction can be done using extracted image component. Here, we used erosion dilation operation of morphology for obtaining the boundaries of images. After applying these operations, we subtract the eroded image from original image. Finally, we will extract shape vector from healthy fruit, by using morphology.

Training and classification: Once the features are extracted, next step is to classify the trained image and testing image using minimum distance classifier (MDC). After applying MDC, clusters will classify into two classes that is diseased and non-diseased.

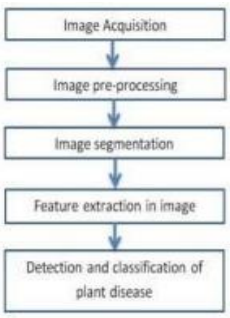

Fig. 1. Basic steps for plant disease detection and classification

4. Proposed methodology

The proposed plant disease detection and classification system makes use of various image processing techniques. The proposed work is mainly divided into four steps namely image acquisition, image pre-processing, feature extraction and disease classification. The pictorial representation of the proposed approach.

Monica Jhuria et. al. considers color, texture and morphology as a feature for disease detection. They have found that morphological result gives better result than the other features. Texture means how the color is distributed in the image, the roughness, hardness of the image. It can also be used for the detection of infected plant areas.

Detection and Classification K-propagation is a training method used for a multi-layer neural network. It is also called the generalized delta rule. It is a gradient descent method which minimizes the total squared error of the output computed by the net. Any neural network is expected to respond correctly to the input patterns that are used for training which is termed as memorization and it should respond reasonably to input that is similar to but not the same as the samples used for training which is called generalization. The training of a neural network by back propagation takes place in three stages as given below: a. Feed forward of the input pattern b. Calculation and Back propagation of the associated error c. Adjustments of the weights.

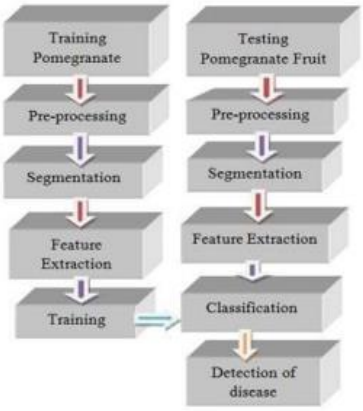

Fig. 2. Process to detect disease

Feature extraction: Feature extraction plays an important role for identification of an object. In many application of an object. In many application of image processing feature extraction is used. Color, texture, morphology, edges etc. are the features which can be used in plant disease detection.

5. Conclusion

An image processing based solution is proposed for detection of pomegranate fruit disease. Bacterial blight disease is identified on pomegranate fruit and leaf. Once the disease is detected proper treatment can be suggested. The proposed system consists of preprocessing, segmentation, feature extraction, training and classification. The existing system providing the solution that are not directly to farmers. This system will provide immediate solution to farmers which is time saving and reduce loss of fruits due to disease. The main purpose of this paper is to improve the efficiency of automatic fruit disease detection system by adding Intent Search technique.

References

[1] H. Al-Hiary et.al., "Fast and Accurate Detection and Classification of Plant Diseases", International Journal of Computer Applications, Volume 17, No. 1, March 2011.

[2] M. Jhuria, A. Kumar and R. Borse, "Image processing for smart farming: Detection of disease and fruit grading," *2013 IEEE Second International Conference on Image Information Processing (ICIIP-2013)*, Shimla, 2013, pp. 521-526.
[3] X. Tang, K. Liu, J. Cui, F. Wen and X. Wang, "IntentSearch: Capturing User Intention for One-Click Internet Image Search," in *IEEE Transactions on Pattern Analysis and Machine Intelligence*, vol. 34, no. 7, pp. 1342-1353, July 2012.
[4] Z. B. Husin, A. Y. B. M. Shakaff, A. H. B. A. Aziz and R. B. S. M. Farook, "Feasibility Study on Plant Chili Disease Detection Using Image Processing Techniques," *2012 Third International Conference on Intelligent Systems Modelling and Simulation*, Kota Kinabalu, 2012, pp. 291-296.