IDENTIFICATION OF CROP DISEASE USING IMAGE SEGMENTATION IN MATLAB

[1]S.PRIYADHARSHINI, [2]G.PARAMESWARI, [3]T.PAVITHRA
FINAL YEAR - ECE,
PSNA COLLEGE OF ENGINEERING AND TECHNOLOGY, DINDIGUL.
[1]priyad2231@gmail.com, [2]saipavigovindh@gmail.com, [3]pavipriya1522@gmail.com,

Abstract —

the system is proposed to identify and classify the diseases in vegetable using the image processing techniques starting from image acquisition, pre- processing, testing, and training. Feature extraction is achieved through DISCRETE Wavelet Transform (DWT). The GLCM features are help to categorize the vegetable disease using BACK PROPAGATION NETWORK (NEURAL NETWORK).The project presents the robust object recognition using edge and texture feature extraction. The project presents leaf disease diagnosis using image processing techniques for automated vision system used at agricultural field. In agriculture research of automatic leaf disease detection is essential one in monitoring large fields of crops, and thus automatically detects symptoms of disease as soon as they appear on plant leaves. The proposed decision making system utilizes image content characterization and supervised classifier type back propagation with feed forward neural network. Image processing techniques for this kind of decision analysis involves preprocessing, feature extraction and classification stage. At Processing, an input image will be resized and region of interest selection performed if needed. Here, color and texture features are extracted from an input for network training and classification. Color features like mean, standard deviation of HSV color space and texture features like energy, contrast, homogeneity and correlation. The system will be used to classify the test images automatically to decide leaf either abnormality or good one. For this approach, automatic classifier BPN with FF will be used for classification based on learning with some training samples of that two category. This network uses tangent sigmoid function as kernel function. Finally, the simulated result shows that used network classifier provides minimum error during training and better accuracy in classification.shows much higher contrast between the object and the background than the surface texture.

I. INTRODUCTION

During the cropping cycle, several diseases andabnormal conditions may affect the vegetables plants resulting on considerable losses of production. A precise identificationof these pathologies in early phases is fundamental for the implementation of control strategies. Nevertheless, the rightidentification of symptoms of plants diseases require highlyspecialized knowledge, which is usually not available for small growers. Traditionally, detection of fungi or virus on vegetables cropshas been performed by growers based her/his experience. In some cases, highly experienced growers can rapidly identifyvegetablesphytopathology by visual inspection. Nevertheless,in most of the cases this identification should be confirmedby objective tests. These tests are based on specializedmethods, for instance, transmission electron microscopy andimmunological approaches, such as, ELISA. Theseapproaches are highly precise; however, they require highly trained personal working on very expensive facilities. Two factors that may limit their use for low-income commercial growers. It is important to recall, that an early identification isfundamental to prevent diseases spreading at the greenhouse and it is critical for the implementation of strategies for diseases control [2]. Unfortunately, the use of specializeddiagnostic methods may introduce time delays that may compromise the vegetables crop health. In the recent years, alternative automated approaches fornon-invasive and faster diagnosis of vegetables diseases havebeen explored. Ghaffari et al.used electronic noses andmachine learning to detect signatures of volatile compoundslinked to vegetables diseases. This approach provides highly competitive classification results for discrimination betweenhealthy and Powdery mildew and healthy versus spider mite infected plants. However, the access to this kind of technologymaybe limited for small growers. An alternative approach rely on the automatic recognition of visual symptoms.In this sense, Camargo et al.proposed a visual analysis pipeline to label infected regions on leafs based on colorinformation and an adapted intensity thresholding algorithm. Similarly, Parsons et al. proposed an automated strategy for the quality grading of vegetables crops by using color information and artificial neuronal networks. Rumpf et al.proposed touse hyper-spectral reflectance information and support vectormachines to discriminate between plants infected by diseasesversus healthy plants. This approach achieves high discrimination rates. Nevertheless, it relies on expensive instrumentsmaking this strategy unsuitable for small growers. All theseapproaches provide information about the presence or not ofdiseases. However, it does not provide any information aboutthe kind of infection found.Automated visual assessment of diseases in vegetables plants provides an accessible alternative to support diagnosis forsmall growers. However, in many cases non specialists may even lack of clarity about what they are looking for duringthe assessment. In these cases complementary strategies can be helpful to improve the quality of the search by allowingthe exploration of reference databases with supplementary information about the diseases/abnormalities.In this work,we propose a novel strategy for image retrieval that allowsexploring a reference database of infected vegetables leaves in greenhouse crops. This strategy may serve as acomplementarystrategy to support disease diagnosis.

Figure: Image retrieval analysis scheme. Images patches are obtained from

Greenhouse tomato plant leaves.

Image retrieval techniques are useful in many image-processing applications. Content-based image retrieval systems work with whole images and searching is based on comparison of the query. General techniques for image retrieval are color, texture and shape. These techniques are applied to get an image from the image database. They are not concerned with the various resolutions of the images, size and spatial color distribution. Hence all these methods are not appropriate to the art image retrieval. Moreover shape based retrievals are useful only in the limited domain. The content and metadata based system gives images using an effective image retrieval technique. Many other image retrieval systems use global features like color, shape and texture. But the prior results say there are too many false positives while using those global features to search for similar images. Hence we give the new view of image retrieval system using both content and metadata.

II. PROBLEM STATEMENT

The goals for this thesis have been the following,

- The primary goal our project is to detect the diseases which is affect in the plant leaf by using the back propagation networks
- In our proposed system we compute texture color feature for compute the

similarity between query and database images. This integrated approach will reduce the output results to a certain levels based on the user threshold value.

- The novel clustering(i.e K mean cluster) technique cluster the output images and select one representative image from each clusters.
- A third goal is to evaluate their performance with regard to speed and accuracy. These properties were chosen because they have the greatest impact on the implementation effort.
- A final goal has been to design and implement an algorithm. This should be done in high-level language or Matlab. .
- The disadvantages are that the theory only really covers the determination of the parameters for a given value of the regularisation and kernel parameters and choice of kernel. In a way the SVM moves the problem of over-fitting from optimising the parameters to model selection. Sadly kernel models can be quite sensitive to over-fitting the model selection criterion to overcome above problem we go for the Back propagation networks

III. EXISTING SYSTEM

. SUPPORT VECTOR MACHINES (SVMS)

Support vector machines are the supervised learning and basic algorithm mostly for classification and pattern recognition based on guaranteed risk bounds of statistical learning theory. This support vector machine theory is developed by Vladimir Vapnik & his team in 1995 at AT& Bell Laboratories, and the principle is based on structural risk minimization, so it has very good generalization ability

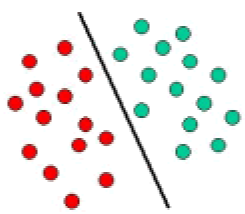
The basic principle of SVM is construct a hyperplane as the decision plane which is binary class with the largest margin to find the optimal hyperplane making expected errors minimized to the unknown test data, while the location of the separating hyperplane is specified via only data that lie close to the decision boundary between the two classes, which are support vectors.

By using support vector machine classify all window patterns and if the class matches a face then make a square around the face in the output image.

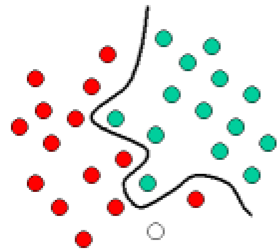
SVM is fast and robust learning machine for binary classification, it has demonstrated good empirical results. It offers to detect faces in various poses and orientations. On the other hand, SVM suffers some demerits i.e.It is usually needed to look for the space and scale and It requires lots of positive and negative examples.

Support Vector Machines (SVM) Introductory Overview

Support Vector Machines are based on the concept of decision planes that define decision boundaries. A decision plane is one that separates between a set of objects having different class memberships. A schematic example is shown in the illustration below. In this example, the objects belong either to class GREEN or RED. The separating line defines a boundary on the right side of which all objects are GREEN and to the left of which all objects are RED. Any new object (white circle) falling to the right is labeled, i.e., classified, as GREEN (or classified as RED should it fall to the left of the separating line).



The above is a classic example of a linear classifier, i.e., a classifier that separates a set of objects into their respective groups (GREEN and RED in this case) with a line. Most classification tasks, however, are not that simple, and often more complex structures are needed in order to make an optimal separation, i.e., correctly classify new objects (test cases) on the basis of the examples that are available (train cases). This situation is depicted in the illustration below. Compared to the previous schematic, it is clear that a full separation of the GREEN and RED objects would require a curve (which is more complex than a line). Classification tasks based on drawing separating lines to distinguish between objects of different class memberships are known as hyperplane classifiers. Support Vector Machines are particularly suited to handle such tasks.

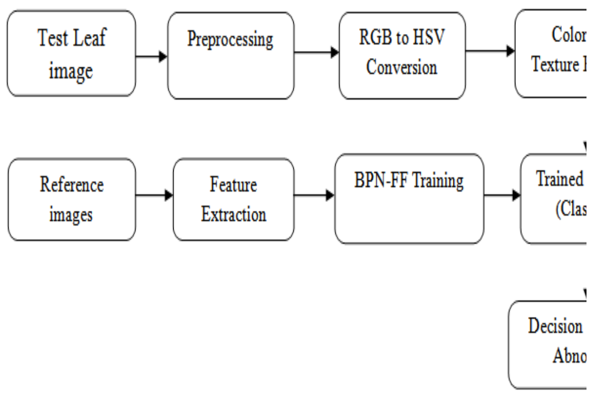


The illustration below shows the basic idea behind Support Vector Machines. Here we see the original objects (left side of the schematic) mapped, i.e., rearranged, using a set of mathematical functions, known as kernels. The process of rearranging the objects is known as mapping (transformation). Note that in this new setting, the mapped objects (right side of the schematic) is linearly separable and, thus, instead of constructing the complex curve (left schematic), all we have to do is to find an optimal line that can separate the GREEN and the RED objects.

IV.PROPOSED SYSTEM

Classify the disease in the plants for disease from the leaves Images based on, DISCRETE wavelet Transform, neural network BPN, Features extraction . The proposed decision making system utilizes image content characterization and supervised classifier type back propagation with feed forward neural network. Image processing techniques for this kind of decision analysis involves preprocessing, feature extraction and classification stage.

BLOCK DIAGRAM:



At Processing, an input image will be resized and region of interest selection used network classifier provides minimum error during training and better accuracy in classification

V.CONCLUSION

In an existing we used the Back propagation networks however BPN have several advantage its have some limitation also which is given below

- Gradient descent with backpropagation is not guaranteed to find the global minimum of the error function, but only a local minimum; also, it has trouble crossing plateaux in the error function landscape. This issue, caused by the non-convexity of error functions in neural networks, was long thought to be a major drawback, but Yann LeCun *et al.* argue that in many practical problems, it is not.[8]

- Backpropagation learning does not require normalization of input vectors; however, normalization could improve performance

performed if needed. Here, color and texture features are extracted from an input for network training and classification. Color features like mean, standard deviation of HSV color space and texture features like energy, contrast, homogeneity and correlation. The system will be used to classify the test images automatically to decide leaf either abnormality or good one. For this approach, automatic classifier BPN with FF will be used for classification based on learning with some training samples of that two category. This network uses tangent sigmoid function as kernel function. Finally, the simulated result shows that

We implement the PNN classifier A probabilistic neural network (PNN) is a feed forward neural network, which is widely used in classification and pattern recognition problems. In the PNN algorithm, the parent probability distribution function (PDF) of each class is approximated by a Parzen window and a non-parametric function

- PNNs are much faster than multilayer perceptron networks.

- PNNs can be more accurate than multilayer perceptron networks.

- PNN networks are relatively insensitive to outliers.PNN networks generate accurate predicted target probability scores.

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