Detection Of Rice Blast Disease Using Pattern Recognition Model

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Abstract - The techniques of machine vision are extensively applied to agricultural science, and it has great perspective especially in the plant protection field, which ultimately leads to crops management. The paper describes a software prototype system for rice disease detection based on the infected images of various rice plants. Images of the infected rice plants are captured by digital camera and processed using image growing, image segmentation techniques to detect infected parts of the plants. Then the infected part of the leaf has been used for the classification purpose using neural network. The methods evolved in this system are both image processing and soft computing technique applied on number of diseased rice plants. We proposed in this project to detect the blast disease in rice through image segmentation, HOG (Histogram of Gradient) feature extraction and classify the disease in high evaluated pattern recognition model called SVM (support vector machine). The experimental result shows in MATLAB in accurate manner.

Keywords - MATLAB,Support Vector Machine,Histogram of Gradient,Detection.

INTRODUCTION

Many diseases affect the plant and its leaf all over the world, including India which reduces the production of food. It causes a significant impact on rice quality and yield. India is an agricultural country wherein most of the population depends on agriculture and is one of the major domains which decides economy of the nation. The quality and quantity of the agricultural production is affected by environmental parameters like rain, temperature and other weather parameters which are beyond control of human beings. In addition to environmental parameters like rain and temperature, diseases on crop are a major factor which affects production quality and quantity of crop yield. Hence disease management is key issue in agriculture. For management of disease, it needs to be detected at earlier stage so as to treat it properly and control its spread. Because of advances in the technologies, nowadays it is possible to use the images of diseased leaf to detect the particular type of disease. This can be achieved by extracting features from the images which can be further used with classification algorithms. Nowadays almost all of these tasks are processed manually or with distinct software packages. It is not only tremendous amount of work but also suffers from two majors, firstly extreme computation times and secondly, subjectiveness expanding from different individuals. Hence to conduct high throughput experiments, plant biologists need an efficient computer software to automatically extract and analyze significant features stated, proposed an image processing based work which consists of the following main steps: In the first step the acquired images are segmented using the K-means techniques and secondly the segmented images are passed through a pretrai ned neural network. In this paper, diagnosis system for grape leaf diseases is proposed and it is composed of three main parts: Firstly grape leaf color extraction from complex background, secondly grape leaf disease color extraction and finally the classification of grape leaf disease. Even-though there are some limitations like extracting ambiguous color pixels from the background of the image, the system demonstrates very promising performance for any agricultural product analysis.

EXISTING SYSTEM

The RGB is transformed into other color space and most green color pixels are identified by applying K-means clustering technique. For masking these green color pixels, Otsu's method of thresholding is used. Next, diseased segmented RGB image is converted to HIS format and texture features are calculated using Color Co-occurrence Matrix (CCM) technique. Finally, the recognition process is performed for the extracted features through a pre-trained neural network. The methodology is proposed for early and accurate disease detection on plant using diverse image processing techniques and Artificial Neural Network (ANN). The work starts with capturing sample images. These RGB images are converted into the CIELAB color scale for segmentation purpose. The images are filtered by Gabor filter to extract the texture and color features. Finally ANN is used for recognition and classification of image.

DISADVANTAGES

- Color prediction in few criteria based only , not giving expecting pair of result.
- Low level shades effects accuracy.

PROPOSED SYSTEM

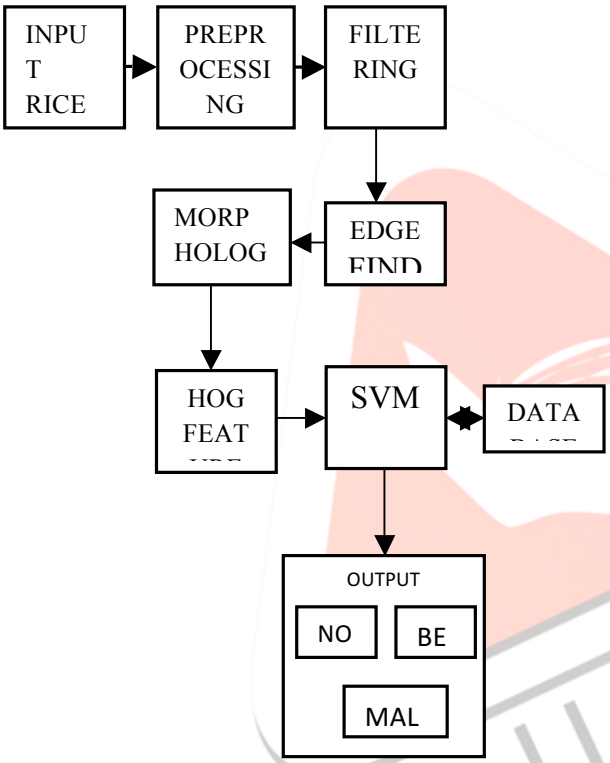
Treatment the rice plant leaf based on diseases saves the products from quantitative and qualitative loss and plays significant role in country's economic growth. The proposed system aims at developing a predicting system to predict the diseases of rice

plant leaf by performing the steps: Identification of the Infected Region, Extraction of Features, Selection of Features, Feature matching and Identification of Diseases. The proposed methodology is an approach to identify the mostly occurring disease in rice plant namely Leaf blast using Support Vector Machine classifier (SVM). The images were taken from International Rice Research Institute (IRRI) database. Segmentation is carried out using K-mean clustering algorithm to acquire the infected portion of leaf. The texture feature vectors which were extracted from the segmented images were given as an input to the classifier. The Support Vector Machine is able to classify the disease more accurately (82%) compared to the other classifiers and neural network.

ADVANTAGES

1. Threshold based segmentation supports to point blasé area.
2. Performance is good in feature selection.
3. Classifier – classify the disease in accurate.
4. Effective in high dimensional spaces.
5. Still effective in cases where number of dimensions is greater than the number of samples.
6. Uses a subset of training points in the decision function (called support vectors), so it is also memory efficient.

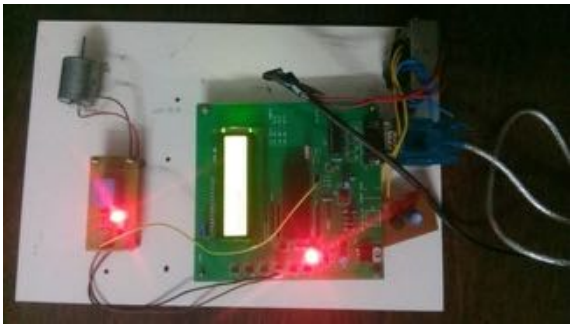
BLOCK DIAGRAM



FORMULA

$$MSE = \frac{\sum_{M,N} [I_1(m,n) - I_2(m,n)]^2}{M * N}$$

$$PSNR = 10 \log_{10}\left(\frac{R^2}{MSE}\right)$$



CONCLUSION AND FUTURE SCOPE

CONCLUSION

The proposed system is the image based tool that helps farmers for identifying disease in the leaf by uploading image to the system. The system has an already trained dataset of images for the good and bad plants. Input image given by the user undergoes several processing steps to detect the severity of disease by comparing with the trained dataset images. According to the image classification the fertilizer motor is on and off.

FUTURE SCOPE

In the future scope image processing is used as a tool to monitor the diseases on fruits during farming, right from plantation to harvesting. For this purpose artificial neural network concept is used. Three diseases of grapes and two of apple have been selected. The system uses two image databases, one for training of already stored disease images and the other for implementation of query images. Back propagation concept is used for weight adjustment of training database. The images are classified and mapped to their respective disease categories on basis of three feature vectors, namely, color, texture and morphology.

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