

A Survey on Region Identification of Rice Diseases Using Image Processing

Lipsa Barik[#]

[#]*Department of Electronics, Sambalpur University / Sambalpur University Institute of Information Technology (SUIIT), India*

Abstract— In this paper, we presents a rigorous survey on different image processing technique used to identify various rice leaf diseases. India is the second largest country producing of rice. An estimated 70% of indian economy depends on agriculture. Since, growing indian population, which is increasingly depends on the agriculture. Production of crops must be enhanced. A crops disease has financially strike the society. Crops diseases have caused huge economic losses in each countries. Normal human vision cannot detect the disease more accurately. Therefore, an alternative system is required. Where, a low cost but technology dependent system is required. The best alternative is nothing but image processing as it provides results than any other techniques.

Keywords— Plant leaf disease; feature extraction; image processing

I. INTRODUCTION

Rice is considered as the most important food crop all over the world. so, the crop losses in the developing countries like india which run to billions of dollars affect adversely the country economy and nutritional standard because almost 70% of the population of indian depend on it. These are different types of rice plants diseases with different symptoms. Observing the symptoms but due to changes of climate, biological condition and characteristics of the rice disease change with respect to time. Therefore, accurate and timely diagnosis of rice plant diseases is necessary and may play significant role in country's economical growth. Rice covers about 69 percent of the cultivated area and is the major crop covering about 63 percent of total area under the food grains. The grain will be distinguished based on the shape analysis, texture analysis and edge detection of the grain. Rice disease diagnosis by soft computing technique is useful technology now days.

II.CONTRIBUTION BY PREVIOUS RESEARCHER

Here surveyed by the different researchers and modifications are made to provide more reliable in the proposed system. Main objective of this study is to develop a prototype for detection, classification and segmentation of rice and leaf disease. To detect diseased leaf ,To classify the leaf disease To the severity index. So, that appropriate disease control methods can be adapted in order to cut a good harvest in rice plantation.

Jayamala K.Patil, et al," Advances in Image Processing for

Detection of Plant Diseases",Journal of Advanced Bioinformatics Applications and Research (2011).This survey on leaf disease detection using various image processing technique. Digital image processing is reliable and accurate technique for detection of diseases also various algorithms can be used for identification and classification of leaf diseases in plant. This survey presents techniques used by different author to identify disease such as clustering method, colour base image analysis method, classifier and artificial neural network for classification of diseases. The focus of this survey is on the analysis of different leaf disease detection techniques and provides an overview of different image processing techniques [3].

Santanu Phadikar, et al, " Rice diseases classification using feature selection and rule generation techniques" Computers and Electronics in Agriculture (2012).

Development of an automation system for classifying diseases of the infected plants is a growing research area in agriculture. The paper aims at classifying different types of rice diseases by extracting features from the infected regions of the rice plant images. Fermi energy based segmentation method has been proposed in the study to isolate the infected region of the image from its background. Based on the field experts' opinions, symptoms of the diseases are characterized using features like colour, shape and position of the infected region and extracted by developing novel algorithms. To reduce complexity of the classifier, important features are selected using rough set theory to minimize the loss of information. Finally using selected features, a rule base classifier has been built that cover all the diseased rice plant images and provides superior result compare to traditional classifiers. Fermi energy based region extraction method is applied to overcome the limitation of selecting proper threshold value. To identify the shape of the infected region, Genetic algorithm is applied that best approximates the structure of the region. Position of infection is determined by partitioning the spot into different blocks and arranged as a quad tree at different labels. Binary representation of each block reduces computational complexity reasonably. Using rough set concept features are selected by generating all reduce the minimizes loss of information. From the reduced dataset a set of classification, rules are derived using a novel classification data mining technique. Advantages of the study is that it does not require any gain calculation of the rules and so involves lesser computational complexity. Finally, ten-fold

cross validation is performed to measure the efficiency, which shows superiority over other methods [1].

S. Phadikar, et al, "Classification of Rice Leaf Diseases Based on Morphological Changes," International Journal of Information and Electronics Engineering (2012).

Cultivation the earliest and accurate diagnosis of the rice plant diseases able to reduce the damage, resulting environment protection. In this survey, an automated system has been developed to classify the leaf brown spot and the leaf blast diseases of rice plant based on the morphological changes of the plants caused by the diseases. Bayes' and SVM Classifier have used radial distribution from the centre to the boundary of the spot images as features to classify the diseases. The system has been validated using 1000 test spot images of infected rice leaves collected from the field, gives 79.5% and 68.1% accuracies for Bayes' and SVM Classifier based system respectively. In this survey, an automated system has been developed for identifying two different types of rice diseases. In the first stage, uninfected and the diseased leaves are classified based on the number of peaks in the histogram. Miss classification may occur due to shadow effect and colour distortion of aging leaves. In the second level, Bayes' classifier and SVM are applied to classify the leaf diseases [9]. Time complexity of the Bayes' classifier is $O(N \times D^2)$ where as for the support vector machine it is $O(D \times N^2)$ where D is the dimension of the feature vector and N is the number of training samples. Since number of samples normally much larger than the dimension of the feature vector, therefore the system is time efficient compare to SVM [2].

Jayamala Gaecia Arnal Barbedo, et al, "Digital image processing techniques for detecting, quantifying and classifying plant diseases," Springer Plus (2013).

In this survey, methods that use digital image processing technique to detect & classify plant diseases from digital images in the infected region are given. Methods that explore visible symptoms in leaves, stem, panicle branches were considered. It divided into three classes according to their objectives; identify disease region, severity of quantification & classification. This paper is expected to be useful to researchers working both on vegetable and pattern recognition, accessible overview of this important field of research[8]. Thus survey present to comprehensive survey on the subject, aiming at being the issue. Much survey on the subjects could not be included in order to keep the survey length under control.

Marion Neumann, et al, "Cell Phone Image-Based Plant Disease Classification," University of Bonn (2015).

This study provides survey on rice plant leaf disease detection using image-processing techniques. Disease in crops causes significant reduction in quantity and quality of the agricultural product. Identification of symptoms of disease by naked eye is difficult for farmer. Crop protection especially in large farms is done by using soft computing image processing technique

that can identify diseased leaf using colour information of leaves. In this survey, we bring into play some papers to obtain detailed investigation and propose our research work of plant disease detection and classification on mobile devices [4].

M. Malathi, et al, "A Survey on Plant Leaf Disease Detection Using Image Processing Techniques," International Research Journal of Engineering and Technology (2015).

This survey on plant leaf disease identification using image processing technique. Disease crops causes in quantification & quality of agricultural product. Computerized image processing technique detect leaf colour information of leaves. Image processing technique has been introduced to solve the problems by pattern recognition & automatic classification using single method. Many methods in automated or computer vision for detection of leaf disease [7].

Vijai Singh, et al, "Detection of Plant Leaf Diseases Using Image Segmentation and Soft Computing Techniques," Computer Science Department (2016)

Detection of plant disease through some automatic technique is beneficial as it reduces a large work of monitoring of crops, and at very early stage itself it detects the symptoms of diseases i.e. when they appear on plant leaves. In this survey presents an algorithm for image segmentation technique, which is used for detection and classification of plant leaf diseases. It also covers survey on different diseases classification techniques that can be used for plant leaf disease detection. Image segmentation, which is an important aspect for disease detection in plant leaf disease, which is using genetic algorithm [7]. With very less computational efforts the optimum results were obtained, which also shows the efficiency of proposed algorithm in recognition and classification of the leaf diseases. Another advantage of using this method is that the plant diseases can be identify at early stage or the initial stage. To improve recognition rate in classification process Artificial Neural Network, Bayes classifier, Fuzzy Logic and hybrid algorithms can also be use [5].

Shampa Sengupta, Asit K. Das, "Particle Swarm Optimization Based Incremental Classifier Design for Rice Disease Prediction", Computers and Electronics in Agriculture (2017).

Increase of huge amount of data in every application demands an incremental learning technique for data analysis. One of such data analysis task in dynamic environment is to design an incremental classifier for decision making and consequently updating the knowledge base of the overall system. The time complexity of the classification system increases gradually and the system becomes inefficient while new group of data with the existing one in a certain interval of time. PSO and data mining are used to design an incremental rice based classification system. Incremental classifier apply for disease prediction. This method applied on both simulated rice disease. These classification is measures and compared

different state of classification. It deals with small to medium size data & it can run in a regular interval time. It not only reduce the time but also accuracy & other statistical measures. the concepts of Particle Swarm Optimization technique and Association data Mining are used to design an incremental rule based classification system. The incremental classifier is apply on rice disease dataset for disease prediction as the characteristics of rice diseases change in time for change of climate, biological condition and geographical factors. The proposed method has been applied on both simulated rice disease dataset and basis datasets and the classification accuracy is measured and compared with various state of the classification algorithms. The method is also evaluated based on some statistical measures is done to establish its significance and effectiveness. One more advantage of the method is that it can generate classification rules both in static and dynamic environment, where data arrives gradually with respect to the time [11].

Sandesh Raut et al," Review On Leaf Disease Detection Using Image Processing Techniques", International Research Journal of Engineering and Technology (2017).

This survey gives an overview on different classification techniques that can be used for plant leaf disease classification. A classification technique deals with classifying each pattern in one of the distinct classes. A classification is a technique where leaf is classified based on its different morphological features. There are so many classification techniques such as k-Nearest Neighbour Classifier, Probabilistic Neural Network, Genetic Algorithm, Support Vector Machine, and Principal Component Analysis, Artificial neural network, Fuzzy logic. Selecting a classification method is always a difficult task because the quality of result can vary for different input data. Plant leaf disease classifications have wide applications in various fields such as in biological research, in Agriculture etc. This paper provides an overview of different classification techniques used for plant leaf disease classification [10].

U. Gayathri et al," Effective Disease Detection for Plants" International Journal of Advanced Research Methodology in Engineering & Technology (2017).

This survey concentrate on the image processing techniques used to enhance the quality of the image and neural network technique to classify the banana disease. The methodology involves image acquisition, pre-processing and segmentation, analysis and classification of the disease. All the banana sample will be passing through the RGB calculation before it proceed to the binary conversion. If the range of normal Banana RGB, then it is automatically, classify as type 4 which is Normal. Then, all the segmented Banana disease sample will be convert into the binary data for classification training

and testing. Consequently, by employing the neural network technique, the Banana diseases are recognized about 92.5 percent accuracy rates. This prototype has a very great potential to be further improved in the future to detect the plant related issues in the field of agricultural analysis. This survey gradually decrease the effects of disease in plants and the plants can be easily monitored via camera at less expenditure. Hence, more plants were saved by the advent of the project [12].

III.CONCLUSION

The literature survey done it provides a new insight in detection of the diseases of plant. The scope in doing research in this field is to design such system that automatically estimating the severity of the detected disease. Also developed a innovative, efficient and fast interpreting algorithms which will not only detect the disease but also classified it in to various categories.

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