SURVEY ON RICE DISEASES CLASSIFICATION BASED ON FERMI ENERGY AND DISTANCE REGULARIZED LEVEL SET EVOLUTION

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Abstract — Precision agriculture is a growing research area based on inter and intra-field variability in crops threshold segmentation. Previous yearly identify the rice leaves detect the spot and assume the diseases name and shape extraction can be used.In this paper identify the exact diseases name where the infected region in a leaves spot area using two methods they are Fermi energy and DRLSE method. Local thresholding, Edge thresholding, Threshold using averaging, Gradient detectors, Region Growing, Split & Merge, Shape Matching, Shape . A two-step circle detection algorithm using pairs of chord to detect irregular shapes of infected regions and identify the color of shapes. The naive Bayes classifier greatly simplify learning by assuming that features are independent given class We also demonstrate that naive Bayes works well for certain nearly functional feature dependencies consists of two cases: completely independent features and functionally dependent features. Feature extraction is the process of deriving new features from the original features in order to reduce the cost of feature measurement we present a new approach to feature extraction in which feature extraction are performed simultaneously using a genetic algorithm. . DRLSE also allows the use of more general and efficient initialization of the level set function. An automation system based on Fermi Energy based image segmentation is developed to classify the disease of infected regions. Fermi Energy based segmentation isolates the infected region from the background and the color and shape features are extracted to characterize the disease.

KEY WORDS— RICE DISEASES, FERMI ENERGY, FEATURE EXTRACTION, ROUGH SET THEORY , GENETIC ALGORITHM DRLSE METHOD.

I. INTRODUCTION

Precision agriculture is defined as an information technology based farm management method aims at inferring more accurate decision in detecting diseases automatically. Feature selection process refers to selecting subset of features from the set of original features. The purpose of the feature selection is to identify the significant features, eliminate the irrelevant features and build a good learning model. RST approach to feature selection is used to determine a subset of features (or attributes) called *"reduct*" which can predict the decision concepts. **Otsu's method** is used to automatically perform clustering-based image thresholding, and reduction of a gray level image to a binary image. This method assumes that the image contains two classes of pixels following bi-modal histogram (foreground pixels and background pixels), it then calculates exact threshold separating the two classes so that their combined spread (intra-class variance) is minimal, this method used for proposed system in calculates the optimum threshold separating the two classes combing the image. The success of naive Bayes in the presence of feature dependencies can be explained as follows: optimality in terms of zero-one loss (classification error) is not necessarily related to the quality of the fit to a probability distribution. the distribution entropy on the classification error, showing that certain almost deterministic or low-entropy, dependencies yield good performance of naive Bayes. feature selection of

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an appropriate representation is of considerable importance. For classical pattern recognition techniques, Feature extraction is a more general method in which the original set of features is transformed to provide a new set of features role of feature extraction in a pattern recognition system. The genetic algorithm (GA) feature extractor presented here utilizes feedback from the classifier to the feature extractor values. many researchers have developed the modified HT methods using the parameter decomposition and/or some geometric properties of circles to reduce the complexities. The basic idea of the level set method is to represent a contour as the zero level set of a higher dimensional function, called a level set function (LSF), and formulate the motion of the contour as the evolution of the level set function. The level set methods have been used to solve a wide range of scientific and engineering problems. The distance regularization effect eliminates the need for reinitialization and thereby avoids its induced numerical errors and identify find exact image segmentation. A novel region identification method based on Fermi energy has been proposed to detect the infected portion of the diseased rice images .

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II. LITERATURE SURVEY

In this section, we are focus on the different methods to describe the infected region, According to the experts' opinions, different types of rice diseases create distinct visual symptoms in the infected and its surrounding regions. Change of colour of the infected region in comparison with the background is considered as one of the important features for disease classification. If the infected region spot can be change color features are measured by calculating mean and standard deviation of the infected and background pixels as well as change of colour of the infected region in comparison with the background in three different colour planes, Red (R), Green (G) and Blue (B). Shape of the infected region is a major symptom to identify the diseases. Oval, elliptical, circular, rectangular and irregular spot are created by the pathogens when the plant is infected.[1] Kim, H.S and Kim, H.J Genetic algorithm (GA) is a population based search algorithm applied earlier for shape matching, GA is applied in two steps to detect the shape of the infected region more accurately. First, the center of the infected region is approximated and in the next step, several primitive shapes are positioned at the centre and the one that closely matches with the infected region is selected as the desired shape. Rule learning techniques have largely focused on finding possible set of rules that satisfy a set of constraints). [2] Liu and Li et al describe Classification Based on Associations (CBA) and Classification based on Multiple Association Rules (CMAR) typically discover all the association rules in the first phase and then post-process the resulting rule sets in order to retain only a small number of suitable rules. The classification rules, a conditional attribute and its each value in the dataset is considered as an antecedent of the rule. Change of colour of the infected region from the original color of the leaf is a crucial feature for disease recognition. Change of colour in the infected region may also vary even for the same disease depending on the original colour of the affected leaf. Mean (M) and standard deviation (SD) of the background pixels and the pixel of infected regions, as well as the change of colour of the infected region with respect to the background colour in three classical R, G and B planes are considered as colour features obtained by considering mean and standard deviation of spot and background pixel as well as change of spot colour with respect to back ground considering each of three colour planes RGB individually represent to identify the infected spot To identify shape feature inspecting large number of infected leaves spot may be circular, elliptical, oval, diamond, rectangular or irregular. Genetic algorithm (GA) based two step method used to determine the shape of the spot. First the center of the spot is detected and then the shape of the spot is determined by positioning a set of primitive shapes at the centre of the spot. [3] Rich and Knight describe The primitive shape having minimum area difference with the spot is detected as the shape of the spot. the minimal feature subset or reduct is considered for rule generation where a rule is represented as IF-THEN form consisting of pre-condition or antecedent and action or consequent). Antecedent part consists of literal or con-

junction of literals and consequent represents the class label, assigned based on the antecedent in the decision system. A literal p is a (feature, value) pair in the form (Ai,v), where Ai is a conditional feature and v is the value of feature Ai in the

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decision system DS.A disease image im satisfies a literal **p = (Ai,v)** if and only if **Ai(im) = v**, where Ai(im) denotes the ith feature value of image im.Thus an image im enables a rule r, if and only if it satisfies every literal in the rule. In the proposed rule generation method, conditional features are arranged in descending order according to their rank and the initial rule set is generated starting with the highest ranked feature. Let**, V = {vi1,vi2,...,vip}** is the set of distinct values of feature Ai (Ai e C) in the decision system DS. So, possible literals generated using feature Aiis the set **Li = {(Ai, vi1), (Ai, vi2) (Ai, vip)}.** Let the disease image with literal **(Ai, vik**) is identified with class label say, Cl then a rule r in rule set *FR*.[4] Irina describe The naive Bayes classifier greatly simplify learning by assuming that features are independent given class. Although independence is generally a poor assumption, in practice naive Bayes often competes well with more sophisticated classifiers. Our broad goal is to understand the data characteristics which affect the performance of naive Bayes. This method using for measure the effectiveness of features selection and compare the study with existing feature selection find the accuries of error and reduced dataset. [5] Michael L. Raymer, William F. Punch, Erik D. Goodman, Leslie A. Kuhn, and Anil K. Jain describe Pattern recognition generally requires that objects be described in terms of a set of measurable features.. Feature extraction is the process of deriving new features from the original features in order to reduce the cost of feature measurement, increase classifier efficiency, and allow higher classification accuracy. Many current feature extraction techniques involve linear transformations of the original pattern vectors to new vectors of lower dimensionality. Here, we present a new approach to feature extraction in which feature selection, feature extraction, and classifier training are performed simultaneously using a genetic algorithm. The genetic algorithm optimizes a vector of feature weights, which are used to scale the individual features in the original pattern vectors in either a linear or a nonlinear fashion. A masking vector is also employed to perform simultaneous selection of a subset of the features. Feature extraction is a more general method in which the original set of features is transformed to provide a new set of features Feature extraction can be used in conjunction with numerous methods for pattern classification. The well-known statistical methods can be divided into two general classes. GA's comprise a subset of these evolution-based optimization problems techniques focusing on the application of selection, mutation, and recombination to a population of competing problem solutions.[6] Santanu phadikar,Jaya Sil and Asit kumar Das describe we proposed to find Infected regions are identified by applying different threshold based segmentation techniques. However, due to various factors like non-uniform illumination or noises, these techniques fail to provide sufficient information for classifying diseases accurately. In the paper, a novel region identification method based on Fermi energy has been proposed to detect the infected portion of the diseased rice images. From the infected region, neighboring gray level dependence matrix (NGLDM) based texture features are extracted to classify different diseases of rice plants.[7] Chunming Li, Chenyang Xu, Changfeng Gui, and Martin D. Fox describes Level set methods have been widely used in image processing and computer vision. In conventional level set formulations, the level set function typically develops irregularities during its evolution, which may cause numerical errors and eventually destroy the stability of the evolution. DRLSE also allows the use of more general and efficient initialization of the level set function. In its numerical implementation, relatively large time steps can be used in the finite difference scheme to reduce the number of iterations, while ensuring sufficient numerical accuracy. Edge-based contour model used to find the infected spot in the region and find exact infected diseases name using this DRLSE method.

III. CONCLUSION

In this paper finally analysis two method to identify the exact disease spot region using Fermi energy and DRLSE method. First method Fermi Energy based segmentation identify the infected region from the background and the color and shape features are extracted to characterize the disease Shape detection Using Genetic algorithm uses primitive shapes So it has poor performance on highly irregular spots. So in order to classify highly irregular spot of infected area level set method

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called Distance Regularized Level Set Evolution is proposed this method are secondly used for identify exact disease name and also identifies the exact shape of the infected spot from Fermi based segmented image. Feature selection and feature extraction method used to detect the infected spot in a leave area finally identify exact diseases name so we proposed in this paper to detect exact diseases name and exact shape very useful for the precision agriculture farmers for future protect the crop and agriculture cultivation to implement this method to protect the rice crop and yield more cultivation to improve the financial set level in our India.

IV. FUTURE WORK

In future we use two method DRLSE and Fermi energy to detect the diseases name accurately and spot the infected region exactly and also future to detect many more type of new diseases With help of this method to safe our environment &agriculture to reduce the many type of diseases affected in agriculture field.

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