Design and Development of Autonomous Weed Plant Detection And Removal System

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Abstract- *Aim of this project is to have weed Identification in the images, initially the images are identified with the pre-preprocessing stages in reshape and filtering of image in a such a way it will be identified the every stages, starting from cluster and it is defined in every region, with identifying to low and high brightness using (K means clustering). Such that associated data to be checked in every aspects of the level. Where in turn this kind of identification is captured though he method called LOCAL BINARY PATTERN, so the clustered region are more highlighted, then as a next steps feature identification are done thorough Gray CO occurrence matrix, where based on that input it is fed to MACHINE LERNING MODEL (SVM) will try to identify the features and it will process back for the accurate results in counter wise, as an overall proposed method will have more accuracy reaching around 96%*

Keywords- Weed, Local binary pattern, SVM,

I. INTRODUCTION

In the Indian economy, agriculture plays an important role. Agriculture is a traditional job in our region. All in our country comes from an agricultural tradition. In those days, all family members relied only on work related to agriculture or agriculture. They will all work on the ground to get the return. From germination until harvesting, everything was done manually in the field and all work was done. In those days the cultivation of products would be sufficient to meet the family requirements and agriculture as a motive for service. The cultivated land was also limited, and the rest of the field was used for grassing cattle land, which provided manure and transport of goods for agriculture. Later with the advancement of technology and the Green Revolution farmers were led to profit-driven agriculture and cultivation. The younger generation, on the other hand, prefers other jobs. Artificial fertilizers were then replaced with natural manure. Then they eventually resulted in the seizure of human energy in the fields and increased cropland induced a certain technological use in agriculture. But no equipment has yet been used to remove the herb. Agriculture offers a wide number of job opportunities. Farmers pick numerous crop varieties. Plant diseases may cause significant losses in agricultural products. Continuous monitoring of plant health should be done to improve crop yield. The detection of diseased plants was historically carried out manually, which took a great deal of time. Therefore, an effective method to identify the disease on plants should be developed in order to increase agricultural development. In certain areas of plants, diseases exist, such as root, leaves or fruit. Using texture features, leaf diseases can also be recognized as common disease forms. Some lethal pesticides called herbicides were used to kill the weeds [5]. The Herbicides were used by spraying them in the Entire Field. They also have detrimental effects on crops and the environment, leading to health issues for people using these crops. The image processing was implemented to minimize the use of herbicides. The process of image processing required the herbicides to spray the chemicals only on the weeds. This method is to spray the herbicides only on the weeds by using the image processing to examine the whole area.

II. REALTED WORKS

[1] Monocropped crops are special to India and a few countries worldwide. Basically, the Plantation method to crop growing in India also provided the cultivation to combat many pest and disease outbreaks. Mono crop plants are constantly under threat of pests and diseases because they promote the growth of pesticides. In order to tackle these issues, the paper proposes an automated pest detection technique using texture features in MATLAB. Photo acquisition tools are used at regular intervals to capture photographs of plantations. These images then are preprocessed, transformed and clustered. [2] The basis of human effort in this world is agriculture. Today, we need to increase the production of agriculture a lot to fulfill the requirements. In former times, they used natural techniques, such as using cow dung as a fertilizer in the field, to improve productivity. This led to an increase in productivity sufficient to meet population demand. But later people started thinking about making more gains by producing more results. So a movement called the "Green Revolution" came in. Using deadly poisons as herbicides has increased to a dramatic level following this time. This has helped us to achieve productivity, but has overlooked the environmental damage which will give rise to a doubt in our livelihood on this

beautiful land. In this initiative, therefore, we have put in place some methods to minimize the use of herbicides by spraying them exclusively in areas of weed. In this paper we have implemented MATLAB image processing to detect weed areas in an image that we have taken from the fields. [3]India is an agro-based economy and farmers are very expert on the issue of fauna detection and prevention. There is also a need to detect diseases in fauna that is accurate and appropriate for researchers. It may be very imprecise and inefficient to rely on pure naked-eye observations to diagnose and identify diseases. Color and texture characteristics are used to distinguish and identify various agricultural/horticultural products in natural and affected areas. The combinations of features are very effective in the identification of diseases. The experimental results show that the method proposed dramatically improves accuracy in the automatic identification of normal and impaired products. This paper provides an efficient method of disease detection in Malus Domestica using methods such as K-mean clusters, colour and texture analysis. [4] These robots should be equipped with a digital camera that utilizes a method of classifying weeds and crops based on images captured and then eradicate the weed by precisely spraying herbicides on the weed, by blading, or by destroying electric shock devices. [4] Any of these approaches minimize the use of herbicides that also protect the environment against the side effects of these chemical substances. In this paper, a method is proposed using quick transformation from Fourier to leaf edge density to classify in real time between crop and weed leaves in cornfields. This approach is focused on complex forms of these structures of the leaves and veins. Tests on a sample collection of maize field photos showed over 92% precision in weed plants detection. The resulting programmer is eventually compiled into a dynamically connected library (dll) and used in a GUI for real field use of a cultivator robot. [5] The objective of this paper is to examine the application of image processing in agriculture, including imaging techniques, weed detection and fruit grading. The parameter analysis has proven to be exact and time-consuming in contrast with conventional approaches. Implementation of image processing can enhance landscape, irrigation, fruit sorting, etc. Decision making. [6]This paper shows the achievement of chlorophyll determination using image processing. The rice leaf is used to examine chlorophyll directly into the rice product in the experiment. The Linear Regression technique [1] is used to calculate chlorophyll and then to equate it with chlorophyll meter. There are 45 rice leaves picked in this experiment to be tested. The results show that the average precision of this technique is approximately 95% in comparison with the SPAD measurement [7]. The system consists of four main phases. Next, segmentation is carried out using rgbcolour space. Secondly, several different characteristics are detected and extracted from the segmented image. The third choice is to pick the most discriminatory collection of features. In conjunction avec leaves of the newly proposed Post-Probability Model Selection (PPMS) algorithm, the neural network architecture of Generalized Softmax Perceptron (GSP) will be used to pick the leaves in an image and then label them either as sunflower or as non-sunflower. The experimental results show that the device is of high precision with only five selected discriminatory characteristics, the average correct grading rate is 85% and the region under the receiver operating curve more than 90% for the test range. [8]This paper addresses the technique for weed removal, which decreases herbicide use in the whole area. The herbicides are sprayed on the weed through this method. In this method the weed removal can be achieved using image processing from the image taken from the field. [9] Our approach is to treat packet loss signatures as time series information and to use symbolic dynamic techniques to gain insight into the dynamic structure of the time series. We measure the structure according to its complexity in the sequence. We also discovered that packetloss signatures' complexity measurements have different statistical properties when they are within the network rather than outside the domain of the network. Indeed, the statistical properties are distinct enough for us to build robust hypothesis tests on the cause of data loss using Bayesian statistics [10] The proposed approach is more robust than the method based on contour characteristics since these important curvature points are difficult to locate. Finally, experiments show the efficiency and effectiveness of the proposed method for the recognition of different plants.

III. EXISTING SYSTEM

Quality and personalized is the way the crop is separated from the context (which often includes weed). The approach helps to separate all visually distinctive colors. The desired image after colour segmentation comprises of green colour (the crop and the weed) and the rest of the image is black, which enables the image to be detected on the border. In a picture, an outline is a curve following a path in which image intensity changes rapidly. Corners are often linked to object boundaries in a scene. Feature extraction is used to track image edges. In order to properly detect edges we have to transform a color-segmented image into a grey image. The picture is left with both the edges and veins of the crop and weed in white after region detection and edge detection Black Color segmentation and edge detection operations make the image ready for the next operation called filtering. This filter is used to determine areas in which borders appear in a specific range with a frequency (weed frequency range). Here is the image as the input after the edge detection. In order to filter the image, a certain size must be divided into blocks.

There is a compromise between the block size and the accuracy obtained. If the block size is too big, the estimate of the frequency may be inaccurate since both crop and weed occur in the same block. If the frequency is too small, it cannot be correctly determined due to an insufficient number of edges in a block. The inner part of the weed leaf can be detected by a small block, due to a lesser number of edges. We take the example of maize crop, where weed edge frequency is greater than crop frequency. We first took a picture that contains pure weeds and calculated the number of borders therein using "for" loops for the edge value, then we recorded the mean of edges per frame for pure weed. It turned out to be around 350. Then we did the same exact thing by taking a pure plant picture and its edge is around 210. Throughout this proposed paper, we therefore took 343 as the threshold to detect all weeds. In this project, we took a picture of roughly 320x240 pixels of this dimension. And we broke it into 25 blocks of 64x48 pixels each. We used the software we wrote to calculate the number of pixels for loops and to maintain the value of the threshold. If the edge intensity is higher than the recommended, this block can be detected as a weed block, and again with loops, all pixels in this block are transformed into white pixels. As a result, the picture containing the weed blocks will remain unchanged as complete white blocks and other blocks.

IV. PROPOSED SYSTEM

this project is to have weed Identification in the images, initially the images are identified with the pre-preprocessing stages in reshape and filtering of image in a such a way it will be identified the every stages, starting from cluster and it is defined in every region, with identifying to low and high brightness using (K means clustering). Such that associated data to be checked in every aspects of the level. Where in turn this kind of identification is captured though he method called LOCAL BINARY PATTERN, so the clustered region are more highlighted, then as a next steps feature identification are done thorough Gray CO occurrence matrix, where based on that input it is fed to MACHINE LERNING MODEL (SVM) will try to identify the features and it will process back for the accurate results in counter wise , as an overall proposed method will have more accuracy reaching around 96%.

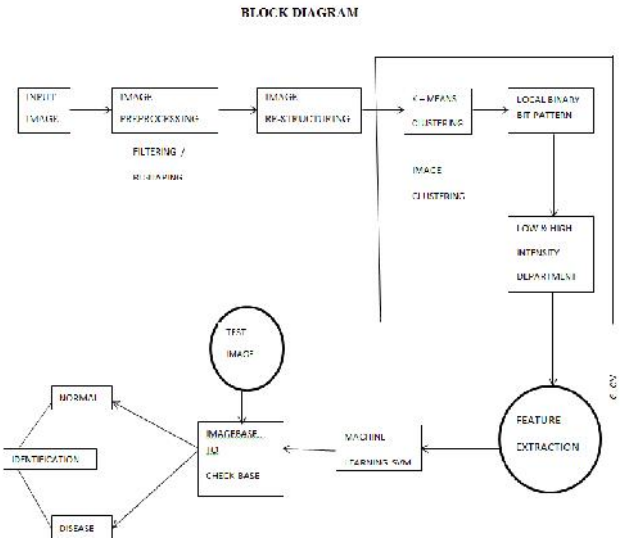

Fig 1 block diagram of proposed

MODULES

ACQUISITION OF IMAGES

The pictures are taken by the camera. The plant leaves images considered are essentially colour images in RGB, red, green and blue.

PRE-PROCESSING

As the primary step we carry out is to get the data we are interested and we have to make use of the form and regression techniques. Records pre-processing is the process of reworking unmingledagitated records into a respectable order. Real international data is commonly incomplete, contradictory, and sometimes contradicts a lot. Statistics pre-processing is a proven method to mitigate mistakes. It prepares the facts before operation. Until processing, the dataset has been standardized for pre-processing. Being thorough in this phase will determine how effective your analytic is. We are accumulating benign and malignant breast cancer samples. This is our learning environment knowledge. The noise is that in this particular phase the picture can be extracted. The image clipping can be used to obtain the area of the image concerned. The image is also enhanced and shown to clarify the image. This contrasting image is now clearer compared to the original image in comparison to the affected area. RGB pictures can be transformed to grey with f(x) = 0.2989*R + 0.5870*G + 0.144.*B. (1)

SEGMENTATION OF IMAGE

The picture is divided into many sections with the same characteristics.

To achieve this, the converting of RGB image into HIS model, such as k-means clustering, can be used. This transforms RGB image into an HIS model.

BOUNDARY AND SPOT DETECTION SEGMENTATION:

The RGB image can be moved to the HIS model to segment an image. The boundary detection method is used to detect contaminated areas on the leaf. This includes 8 pixel connectivity and a boundary detection algorithm.

REDUCTION DIMENSIONALITY

The larger the amount of features, much harder they can view and work on the training package. Most of these features are linked often and redundant. This is where algorithms are used to minimize dimensionality. The reduction of dimension is a method of collecting major variables to minimize the number of random variables. It can be divided into feature selection and extraction. There are two-dimensional components for reduction:

Feature selection: here we try to find a subset of the original set of variables or functions in order to obtain a smaller subset that can be used for the problem.
It consists typically in three ways:
Embedded Wrapper Filter

Extraction feature: This reduces the picture to a smaller space in a wide area, i.e. a no less dimensional space.
The following actions are included:

• Build the covariance matrix of the image.
• Calculate the own vectors of the matrix.
• Eigenvectors that represent their own largest values are used to reproduce a significant proportion of the variance in original performance.

Reduced dimensionality advantages

• It helps to compact image as well as minimizing storage space.
• It decreases the calculation time.
• It also helps, if possible, minimize redundant features.

Segmentation by clustering of K-means:

Assembly machines that acquire knowledge of algorithms are normally more effective than a single model. The machine learning market, where the dominant approach has become a model for hand x-rays, is considered. The K–implies hand authentication. The parameter estimation technology is used to measure the grey dimensions around an axis in order to correct the effects of background lighting, skin colors and noise. C-Means is just like k-approach, a typical simple C-approach combined is exactly the same as K-approach, which is a common simple clustering approach. The only difference is that it should have some fluidity or overlap between clusters instead of giving an entirely good point for one cluster. K-manner describes the relevant aspects below. This algorithm is used to distinguish the artefacts based on the N cluster collection. The grouping takes into account the mean distance in the clusters. On the basis of such heuristic or random conditions, take a cluster and initialize it. Attribute all pixels to the cluster to minimize the pixel gap between the Infected Leaf Plant 469 Cluster Clustering and the Clustering. Calculate the average number of pixels in the cluster in order to return to the cluster center phases 2 and 3 before the convergence is achieved. The signs of the disease are shown in the picture by colour changes in the leaf. Wherever the colour is green, it is known as good where it is regarded as disease other than green.

EXTRACTION FEATURE:

Feature extraction plays a very important role in identifying an item. Features are extracted based on those characteristics. The characteristic dimension is determined by the Euclidean distance. Differences can be seen when the distance between two points is very large. Using the Euclidean distance it is measured, which indicates whether or not there is a resemblance between the points.

$$d(Xi, Xj) = |Xi - Xj| \text{ all the way to } M(i)\ (j)$$

Where d(Xi, Xj) is the Euclidean distance, M(i) is the medium Xi and Xj distance. Once the features are extracted, neural network training is provided. Features including texture, morphology, colour, etc. are used in the identification of plant disease. The disordered sections of the leaf image are very difficult to distinguish because the area of the affected area varies from one diseased leaf image to another. Texture shows us how the colour extends through the picture of the leaf, its stiffness and ruggedness. This can be used to detect the region of the plant leaf disease.

CLASSIFICATION OF DISEASE:

Use of Artificial Networks: features are extracted from the image and categorised using the neural network as the steps shown. For classification, multiclass vector support machine is used. Features including texture, colour, morphology, edges and so on are used to detect the disease of

the plant leaf. Using Back Propagation the qualified neural weight network is used to compute images that are not present in the learning images for outputs.

V. CONCLUSIONS

Fig 2. Input image

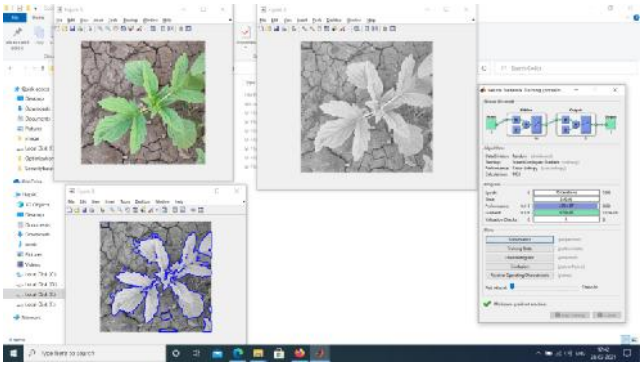

Fig 3 Output images of the proposed system

For the favorable crop production, accurately detecting and categorizing of the leaf disease is necessary and it can be achieved through leaf image processing technique. Various methods are considered for image segmentation. Also feature extractions and Classifying methods for infected plant leaf images are employed. Back propagation method, SVMs is effectively used for classification of diseased leaves. Using image Processing techniques, the diseased plant leaves can be effectively identified and classified various plant diseases.

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