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PEST DETECTION

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Abstract- *The principal idea which empowered us to work on the project pest detection using image processing is to ensure improved and better farming techniques for farmer .The present scenario in the agricultural field is not proficient enough as the farmers have to face a lot of problems like survey the land manually for pest detection. So,to remove such problems we came up with this very idea. The techniques of image analysis are extensively applied to agricultural science, and it provides maximum protection to crops and also much less use of pesticides which can ultimately lead to better crop management and production. Monitoring of pests depends on manpower, however automatic monitoring has been improving in order to minimize human efforts and errors .We are using Image Processing techniques for the early detection of pests ,allowing farmers to take early measures.*

1. INTRODUCTION

India has many traditions and even a large variety of cultures. 61.5 % of the Indian population is connected with agriculture. New modern agricultural technique are established in order to optimise the quantity and quality of the yield. The production nowadays is reduced due to reduction in landscape and also increase in different kinds of pest, there is no possible way to increase the landscape .In most of the cases, pests or diseases are seen on the leaves or stems of the plants like tomato plant, cotton, sugarcane and crop yielding are also reduced due to mealy bug. The identification of plants leaves with pests or diseases, symptoms of the pest or disease attack, plays a key role in successful cultivation of crops. Most of the farmers used the traditional pest management methods which is the regular spray program which sometimes kill useful insects that help in eradicating pests. The old methods trap the insect pests and are brought to the laboratory for counting and identifying manually which are used to estimate the pest density. However this process is tedious and time consuming for a crop technician and also lead to low count accuracy and delays in obtaining accurate counts. Digital images using computer algorithms to provide more accurate and effective analysis of images . Several applications of image processing technique have been developed in the areas of medical visualization, textile industries, military, agriculture sector, remote sensing and robotic vision processing. Due to the rapid development of digital technology, there is an opportunity for image processing technology to be used of agricultural research which could help the researcher to solve a complex problem. Image analysis allows a realistic opportunity for the automation of insect pest detection. Through this system, crop analyist can easily count the pests from the collected specimens, and right pests management can be applied to increase both the quantity and quality of production. Using the automated systems, crop analysis monitoring process can be made easier.

2. RELATED WORK

Boissarda et al. [1] proposed multidisciplinary cognitive vision approach for agro system to detect whiteflies on rose leaves at the earlier stage. [3]An image processing system was used detection of pest in soyabean leaves which used conversion of RGB to CMYK color for better thresholding . After that the image was represented in channel Y of the model ,following which two binary images were obtained which were then combined using logical operation to obtain region of interest .[2] Another system was devised which used clustering technique to detect pests. It used image segmentation and separation through use of k mean clustering. The study conducted by Samantha and Ghosh [4] is concentrated to eight major insect pests based on the records of tea gardens of North Bengal Districts of India. The authors apply correlation based feature selection for the feature extraction and reduction, and incremental back propagation neural network as the neural network algorithm used for classifications. Al-Saqer [5] developed a neural network-based identification system for pecan weevils. They used descriptors as input in the neural network to realise the pecan weevil. The authors collected different images of pecan weevil and other pest found in the paddy fields. After collecting the images they converted them into binary images and resized them to 114×134 pixels. They used different image processing techniques such as Regional Properties and many more. Do, Harp and Norris [6] designed a computerized pattern recognition system for non-specialist in recognizing arachids

and other arthropods to make the specimen identification easier and accurate. The researchers nowdays promote early insect pest detection in greenhouse crops in order to reduce pesticide and fertilisers use. The work of Martin,V.Thonnat ,combines image processing techniques as well as knowledge based technique[7] ,it will detect only whiteflies. The result of this system are more reliable and accurate than that of the manual methods.

3. PROPOSED METHODOLOGY

Step 1 - The first step is acquiring the image .

Step2 - The second step is to remove or reduce the noise in the image which could have been introduced due to random reasons. Image noise is the variance present in luminosity or color information. There are different types of noises in image

Gaussian Noise – It is introduced in digital images due to poor illumination , electronic circuit noise and high temperature.

Salt and Pepper noise – Salt and pepper noise is a form of noise that sometimes can be seen in images. It is also known as impulse noise. This noise can be caused by sudden and sharp disturbances in the image signal.

Shot noise – It generally follows Poisson distributuion . Shot noise occurs in photon counting in optical devices, where shot noise is associated with the particle nature of light.

Quantization noise – It follows an approximate uniform distribution .The cause of this type of noise is the quantizing of pixels into a number of discontinuous levels.

In this system we have used gaussian filter and averaging filter technique for the noise removal from image.

Gaussian filtering is in images for blurring and remove noise and detail. In one dimension, the Gaussian function is: Where σ is the standard deviation of the distribution .The distribution is assumed to have a mean of 0. The shape of kernel in Gaussian filters is bell shaped curve. The Gaussian distribution will require an large convolution kernel, but practically it is effectively zero more than about three standard deviations from the mean, and hence we can truncate the kernel .

$$G(x,y) = \frac{1}{2\pi\sigma^2} e^{-\frac{x^2+y^2}{2\sigma^2}}$$

Gaussian blur is effective for removing gaussian noise . In the system we have used kernel of size 5x5 .

Averaging filter is a spatial filter that replaces the center value in the window with the average of all the pixel values in the window. The kernel is generally square but can be any shape. However the algorithm takes large computation since the kernel is applied to each pixel across the image.

Step 3 – The image thresholding is done using adaptive threshold .Thresholding is done to classify the pixel values in an image. Thresholding is performed on grayscale images, which are image which have pixel values ranging from 0–255. The function of thresholding is to classify these pixels into groups setting a upper and lower bound to each group. Adaptive thresholding takes a grayscale image as input and, in the simplest implementation, gives a binary image representing the segmentation of image. Otsu's method is an adaptive thresholding way for binarization in image processing. By going through all possible threshold values (from 0 to 255), it can find the optimal threshold value of input image.

Step 4 – The calculation of number of object detected after step 3 is done

Sample results of the output of image has been displayed for illustrating the working of the algorithm.

4. FLOWCHART

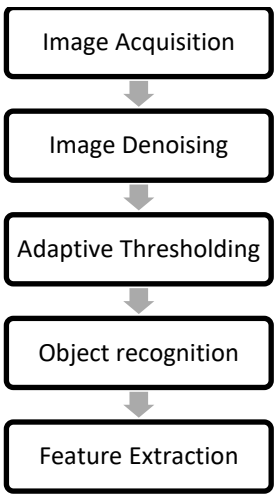

Fig 1. Flowchart for proposed Algorithm

5. RESULT

Fig 2. Input Image

Fig 3. After Gaussian Filtering

Fig 4. After applying averaging filter

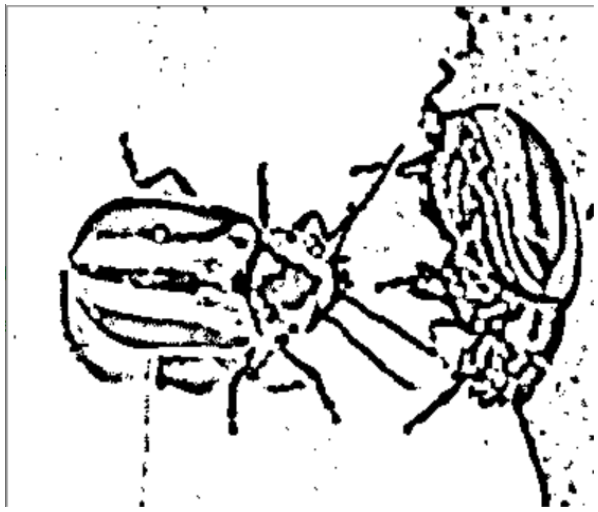

Fig 5. After thresholding

Fig 6. Object detection

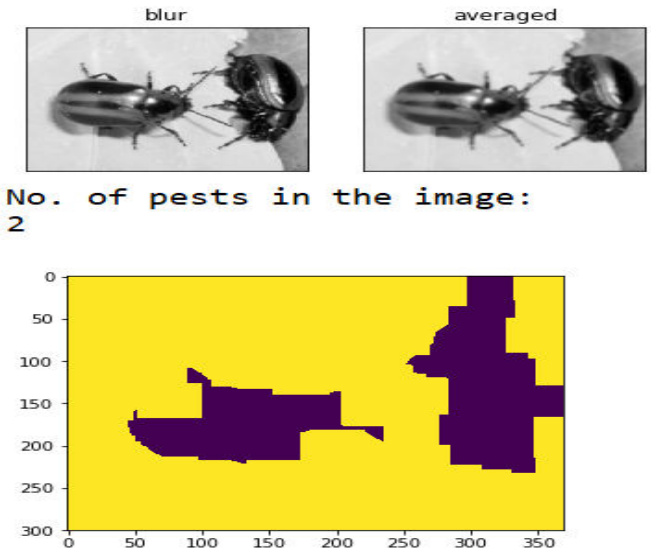

Fig 7. Output image Showing No of Pest

6. CONCLUSION

Pest detection can be done using the stated method and provides reliable results. The output received can be further used for feature extraction. This method can be used for detecting targeted pests in specific crops . The algorithm gives slight differed output if the number of pest is higher.

7. FUTURE WORK

The proposed method can be further developed for gaining accurate results for large number of pests .The accuracy of the algorithm can also be optimized .The information received can be further used for feature extraction. The system can be further developed to form cheap reliable commercial product.

8. REFERENCES

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