# IDENTIFICATION AND DETECTION OF GROUNDNUT LEAF DISEASE

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## ABSTRACT

*Agricultural productivity is an issue that Indian Economy extremely depends on. This isoften the one in all the explanations that malady detection in plants plays a very important rolein the agriculture field, as having the malady in plants is quite natural. If correct care is not taken during this space, then it causes serious effects on plants and because of that various product quality, amount or productivity is affected.*

*Detection of disease through some automatic technique is helpful because it reduces anoversized work of watching in huge farms of crops, and at a terribly early stage itself it detectsthe symptoms of diseases means that after they seem on plant leaves. Image features are extracted and it's classified by using theMachine learning & Deep learning Classification.*

*These extracted features are fed as input to the Extreme Learning Machine classifier toclassify whether the Groundnut leaf disease is diseased or not. If disease is affected it belongs to which type either Anthracnose, Bud Necrosis, Tikka leaf Spot, Rust and also, we'llfind out the intensity of the disease and recommend the corresponding fertilizer for the type of groundnut leaf diseases.*

**Keywords :** *Deep learning ,KNN(K- Nearest Neighbor), image processing , identification detection of disease.*

## I. INTRODUCTION

The traditional approach for detection and identification of groundnut leaf diseases is based on the naked eye observation by the experts. In some developing countries, consulting professionals are expensive and time consuming due to the distant locations of their availability. Automatic detection of groundnut leaf diseases is essential to automatically detect the symptoms of diseases as early asthey appear on the growing groundnut leaves. Groundnut leaf diseases can cause major losses in yield and quality appeared in harvesting. To know what control factors to takenext year to avoid losses, it is crucial to recognize what is being observed. For example, some common diseases of groundnut leaves are groundnut rot and groundnut blotch. Groundnut rot infections produce slightly sunken, circular brown or black spots that may be covered by a red halo. Groundnut blotch is a fungal disease and appears on the surface of the groundnut leaf as dark, irregular or lobed edges. Visual inspection of groundnuts already automated in the industry by machine vision with respect to size and color.

However, detection of imperfections is still sticky due to natural variability of skin color in changed types of groundnut leaves, high modification of defect types, and presence of diseases. The studies of groundnut leaf can be determined by apparent patterns of specific groundnut leaf and it is critical to monitor health and detect disease within a groundnut leaf. One can encourage the control of diseases, which improves quality, by correct management practices such as the application of pesticides, fungicides, and other chemicals.

Deep learning, also known as neural networks, is abranch of machine learning that makes use of a computing model that is heavily influenced by the way the human brainis organized. You can already use deep learning to image- search for terms like "hug" in Google search and picture search. You can use it to receive Smart Replies in your Email. Speech and vision are affected. I think machinetranslation will soon make use of it," said Geoffrey Hinton, who is known as the father of neural networks.

The multi-level structures of deep learning models,as demonstrated above, are highly useful for extractingintricate information from input photos. Convolutional neural networks can also significantly cut down oncomputation time by utilizing the GPU, which many other networks do not.

Image classification using CNN is maximum effective. First and foremost, we need a set of images. In thisinstance, we use pictures of cosmetic and drugstore items asour early training data established. The four most common picture data input parameters are the number of photos, image dimensions, number of channels, and number of levels per pixel.

The classical method for detection and identification of groundnut leaf sicknesses is based on the naked eye opinion by the experts. In some developing countries, consulting experts are expensive and timeconsuming due to the distant locations of their availability. Automatic detection of groundnut greenery diseases iscritical to automatically notice the indications of

diseases asinitial as they seem on the growing groundnut leaves.Groundnut leaf diseases can cause major losses in yield and quality appeared in harvesting. To know what control factorsto take next year to avoid losses, it is crucial to recognize what is being observed. Some disease also pollutes other areas of the tree causation diseases of twigs, leaves, and branches. For example, roughly common diseases of groundnut groundnuts leaves are groundnut scab, groundnut rot, and groundnut blotch. Groundnut coatings are gray or brunette corky spots.

Groundnut rot contaminations produce slightly recessed, circular brown orblack spots that may be enclosed by a red halo.

Groundnut blotch is a fungal disease and appears on the surface of the groundnut leaf as dark, irregular or lobed edges. Visual inspection of groundnut s is already automated in the industry by machine vision with respect to size and color.

However, detection of faults is still difficult due to natural variability of skin color in different types of groundnut leaves, high modification of defect types, and attendance of stem/calyx. The studies of groundnut leaf canbe determined by apparent patterns of specific groundnut leaf and it is critical to monitor health and detect disease within a groundnut leaf. Through proper management action such as pesticides, fungicides and chemical applications one can promote control of diseases whichinterns improve quality. One can encourage the control of diseases, which improves quality, by correct management practices such as the application of pesticides, fungicides, and other chemicals. To improve plant disease prevention and management, a variety of techniques, such as spectroscopic and imaging technology, are available. Agriculture is becoming more commercialized, therefore farms are constantly looking for ways to cut labor costs without sacrificing efficiency. Use of automatic harvesters is one special consideration because it would greatly reducecosts throughout the process. The primary use of a groundnut leaf detecting system is in robotic harvesting. However the technique can be tailored to fit additionaloperations like disease diagnosis, adulthood detection, tree harvest monitoring, and additional comparable tasks. Varieties of groundnut leaves are being exported all over the world with the development in cold storage facilities and transportation.

Maintaining the peak level of export quality becomes necessary, and this is primarily done through skilled visual inspection. As a result of the farms' remote location, this is costly and time-consuming. Due to advancements and disclosures in numerous domains, precision agriculture assists farmers in providing adequate and affordable information and technological control. Systematizing agricultural inputs, increasing profits, and minimizing environmental harm are the goals. This work therefore proposes and experimentally validates a method for theidentification and categorization of groundnut leaf diseases.This system accepts a groundnut leaf image as input and determines whether it is diseased or not. The method that this proposed effort uses to assist farmers in accuratelyidentifying disease. Groundnut leaf industry is one of the foremost drivers to grow economy of country. There ispossibility of erroneous sorting and packaging of groundnutleaf's due to manual inspection and lack of knowledge of quality evaluation. The farmers are on pressure for demand of rapid supply due to shortage of skilled workers and rising of the empirical findings, it has been discovered that employing three or four clusters produces good segmentation outcomes. We employed GCH, LBP, CCV, and CLBP to extract features. The CLBP feature extraction method could yield more precise findings. For segmentation, K-means clustering was employed of labor costs. In such a scenario, automation can reduce thecosts by promoting production efficiency.

In Agricultural image processing significant research have done foridentification of groundnut leaves and detection & quantification of diseases. Most of the previous works are based on C-Mean, K-Mean and KNN for identification and quality analysis of groundnut leaves. In this broadside an automatic system is proposed, which is less time consumingand cost effective for farmer to identify the type of groundnut leaf and grade according to appearance of defectsand disease.

This research considers five type of groundnut leaves
i.e. groundnut , mango, orange, pomegranate and tomato with two common appeared disease i.e. groundnut leaf rot & anthracnose. Anthracnose symptoms initially appear as small, irregular, mildly depressed lesions on the surface of deteriorating organic materials. The organic product spoil disease spreads slowly, causing a horrible degradation and splitting of the affected area. Microscopic organisms may overrun the epidermis. Adverse effects range from little flecking to black, dry, depressed sores.

## LITERATURE REVIEW

**Title: Pomegranate Disease Detection Using Image Processing. India, Elsevier B.V, 2019**.

**Author :** Bhange, M. & Hingoliwala, H. A

Recent studies have focused on applying profound and image processing to identify illnesses in vegetables andgroundnut leaves. The research article claims that the illnesses of pomegranates were identified using image processing technologies. The methodology's first stage was image preparation. The preparation of images included image scaling. since the photographs utilized in this investigation were taken with a digital camera. Some photographs were very enormous in size

and required moreprocessing time. Hence, 300 × 300 PX was the new size forall photos. For feature extraction, morphology, color, and CCV characteristics were applied. SVM was rummage-saleto classify the image as diseased or non-diseased following clustering. The user intention was found using an intent search approach. Using morphological feature extraction, the best outcome was obtained. This method's experimentalstudy for pomegranate illness identification was successful and 82% accurate.

**Title:** Adapted Approach for Groundnut leaf Disease Identification using Images. India, International Journal of Computer Vision and Image Processing, 2018

**Author :** Dubey, S. R. & Jalal. A. S.

The image processing-based method for detecting groundnut leaf disease was provided by the authors. Read the input image first, then convert it since RGB to L*a*b. Because the color info in the L*a*b color interplanetary is stored in individual two channels. In this study, input photoswere divided into four sections using a K-means cluster. Due to classify every pixel in the image, individuals segmented images were removed. The groundnut leaf disease SVM technique was utilized forexercise and organization. The categorization model for thethree forms of groundnut diseases groundnut rot, groundnutblotch, and groundnut scab was assessed by the authors using groundnut as a trial case. Up to 93% accuracy was attained using this method.

**Title:** Classifier Based Grape Leaf Disease Detection. India, Conference on Advances in Signal Processing (CASP), 2017

**ssAuthor :** Padol, P. B.

For the purpose of identifying and categorizing thegrape leaf diseases, the author employed SVM classification. Digital camera photos of grape leaves were taken, and they stayed used for the system's testing and training. Pictures of powdery and downy mildew-infected leaves were among the photographs that were gathered. Under image preprocessing, background noise was eliminated and the image was resized to 300*300 PX. The image's noise had been eliminated using a Gaussian filter. Three groups were created by segmenting an image using K-means clustering.

For the purpose of gathering precise illness information, features were mined based on both color and texture. The classification model was finally employed to identify the leaf disease. In this study, Using LSVM, leaf diseases were categorised. The analyzed diseasecould be properly detected and classified by this approach. This system had an accuracy rate of 88.89%.

**Title:** Leaf disease detection using image processing. Vellore, Journal of Chemical and Pharmaceutical Sciences,2017.

**Author :** Sujatha, R., Kumar, Y. S., Akhil, G, U.

Authors had identified the leaf diseases by means of image processing techniques. Before taking a photo of the sick leaf, the writers first chose the plants that were infectedby the disease. Under the heading of picture preparation, contrast enhancement and RGB to HIS conversion were carried out. The item was divided into k groups using the K-means clustering technique based proceeding the feature of leaf. This system employed the SVM algorithm forcategorization. A statistical learning-grounded solver is known as SVM. Ultimately, a system was successful in detecting a leaf disease when a unhealthy leaf image was entered into it.

**Title:** Pomegranate Disease Detection Using ImageProcessing Techniques. Pune, International Journal of Advanced Research in Electrical, Electronics and Instrumentation Engineering, 2016.

**Author :** Khot, S. T., Supriya, P., Gitanjali, M., & Vidya, L.

In order to diagnose pomegranate groundnut leaf diseases, authors had previously presented an imageprocessing-based approach. Anthracnose, Alternaria, andBacterial Blight are the primary diseases that harm thisgroundnut leaf. Following the capture of the illness photos, the images were preprocessed using image scaling, filtering,segmentation, and morphological characteristics. The technique of segmenting an image involves breaking it up into several pieces. This study uses color-based segmentation techniques as cluster, YCbCr, RGB, L*a*b, and HSV. The HSV and YCbCr, however, demonstrated the best presentation in terms of subdivision error. Forcategorization purposes, geomorphology, consistency, and color features were taken out. Color feature extraction had been done using the his color classical and color histogram methods. Boundary extraction was employed as part of the morphology feature mining to pinpoint the area and shape. To derive a shape from a healthy groundnut leafimage, the eroded images were subtracted from the originalimage. To extract textural features, the Gabor filter was applied. Groundnut leaves with and without illness were distinguished using the Minimal Distance Classifier following training and testing of the pictures

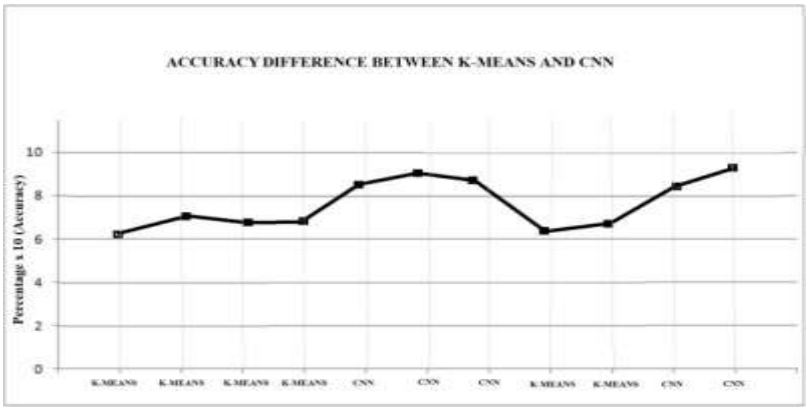



**Figure shows the Difference between K-means andCNN**

## II. PROPOSED METHODOLOGY

Within this methodology, there are six. They include the steps of image acquisition, image preprocessing,image segmentation, using a training dataset, and experimental outcomes. For the ground nut leaf affliction classification question, exact countenance separation is required; alternatively, the countenance of the noncontaminated domain will dominate over the physiognomy of the contaminated domain. In this approachKNN located image transform is chosen to discover the domain of interest which is the contaminated p art only. After deal with the recommendation representation, features are glea ned from the treated exact likeness the nut leaf. Finally, training and categorization are acted and the exact result has existed supported.

### IMAGE ACQUISITION

This stage involves gathering the sample photos needed to sleeper the classifier algorithm and create the classifier model. To capture example photos, the yellowish or reddish passion groundnut leaf variety was used. since ourplace has a large population of the yellowish kind. Images of healthy and sick passion groundnut leaf were captured using a mobile phone's digital camera, and both the classifieralgorithm's training and testing phases used them. Several angles, environments, and lighting settings were used to getthe images. These photographs were saved in the common JPG format. For this study, pictures from farms in various regions were gathered. Images of affected passion groundnut leaves from the scab and woodiness viruses werepresented.

### IMAGE PREPROCESSING

The acquisition of the image, image processing was carried out to enhance the image quality. All of the original photos of passion groundnut leaves were kept in one folder. The photos were given names based on our preferences, which might be any amount of digits. Only horizontal photos were scaled down to 200x300 pixels and rotated 90 degrees. Images that are vertical were reduced to200x300 pixels when the image's width and height are equal,and to 250x250 pixels otherwise. The processing operation requires additional time once the image size is too huge. Theclatter from the photos was then removed, sharpening themup using one of the noise reduction techniques. All preprocessed pictures were afterwards placed in a folder.

### IMAGE SEGMENTATION

Image segmentation is the methodology's thirdstep. All previously processed photos were initiallyconverted into L*a*b, HSV, and Grey color models, withone remaining in its original form (RGB). Since one of theresults of this investigate is the identification of anappropriate color model for preprocessing. The image wasthen changed to binary format. The CNN method was rummage-sale to cluster these format values. With the algorithm employed, image segmentation was complete.

### APPLYING TRAINING SET

Applying exercise established images is the methodology's fifth step. The segmented output, which wasproduced via feature extraction, was completed. To conductexperiments, three image groups were developed. This article discusses how certain image sets are prepared. For the categorization of photos, field proficiency support was enlisted, and respectively i mage was chosen at random fromthe categorised groups of an image.

Experimentation Findings Three base folders were utilized to identify passion groundnut leaf disease in accordance with its

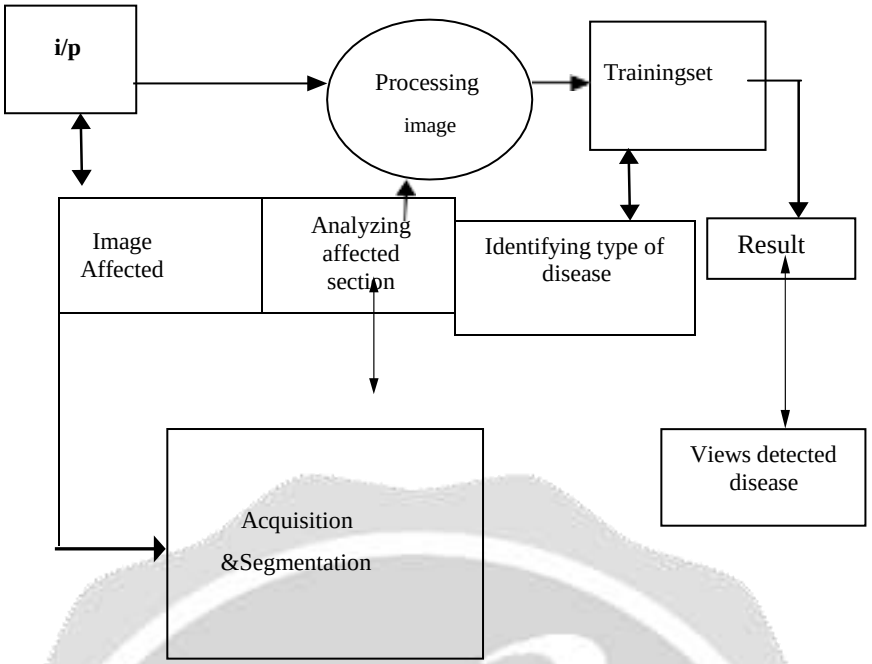



**Fig : Block of disease detection**

name after applying the training set photographs. The "3 classes dataset" is the name given to these files. Another method for classifying passion groundnut leaf diseases according to their stages is by count the number ofaffected areas. This technique is called as alternative method.

Every training and testing time, rows of training files were shuffled casually for increasing the accurateness of the model. Each training file was checked, tested, and measured for correctness five times.The accurateness of each model was calculated as the average of theseaccuracies. Several different illness kinds were discovered by means of this image dataset.

**EXAMPLE TRAINING SET IMAGE**

**Figure 1 – Anthracose**

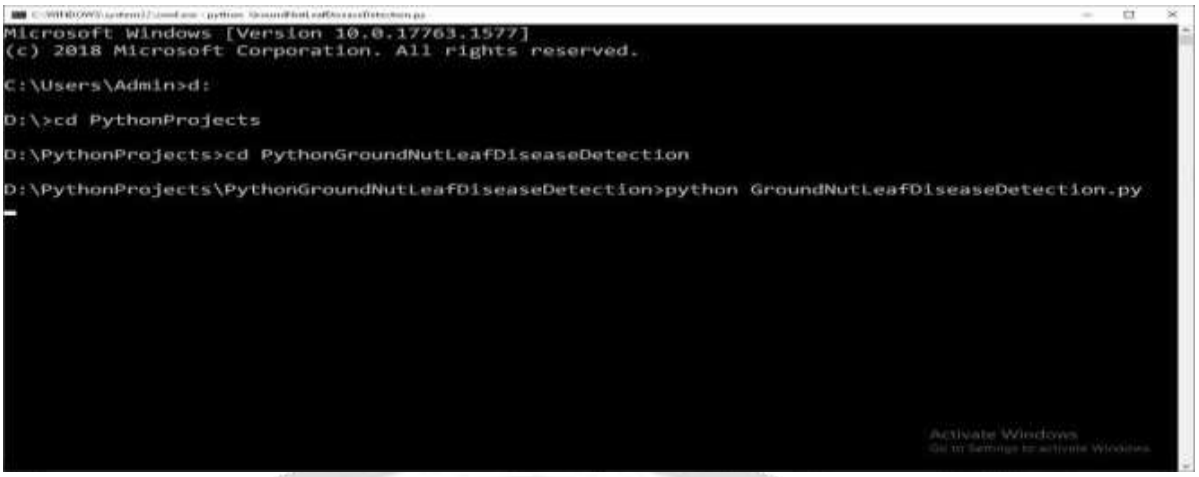
**Figure 2 – Bud Necrosis**

**Figure 3 – Rust**

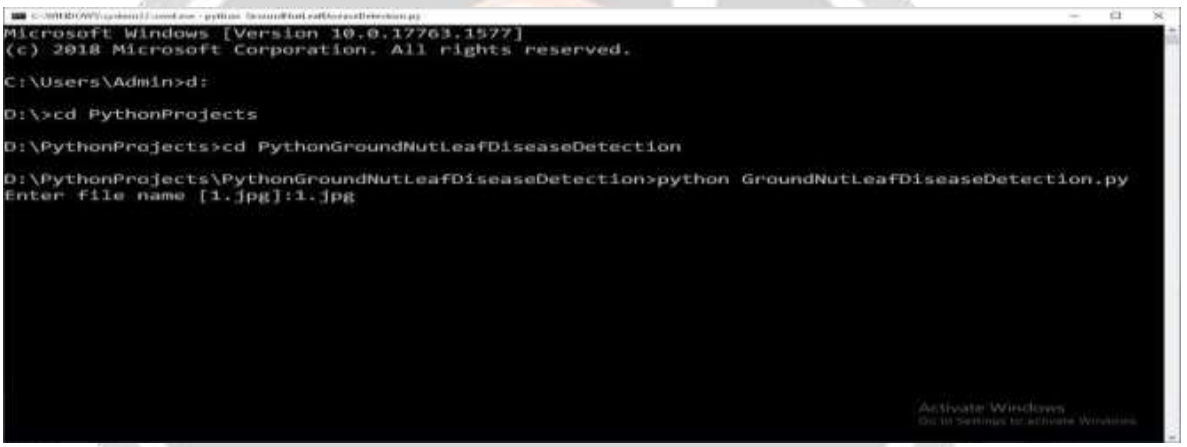
**Figure 4 – Tikka Leaf Spot**

**SCREEN SHOT**

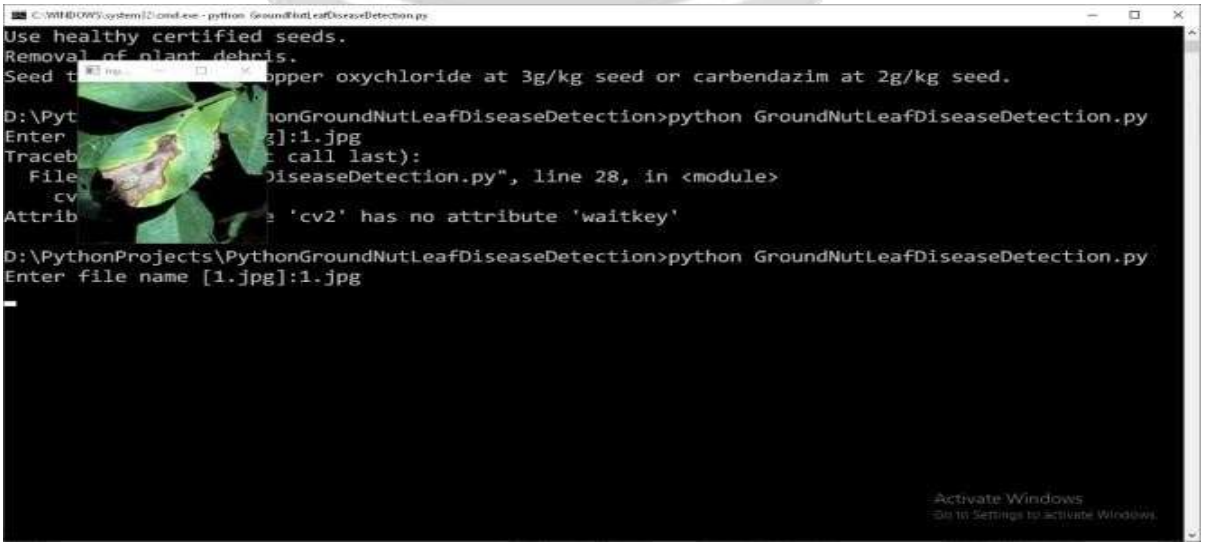
**RUNNING DISEASE DETECTION PROGRAM**




**INPUT IMAGE NAME**



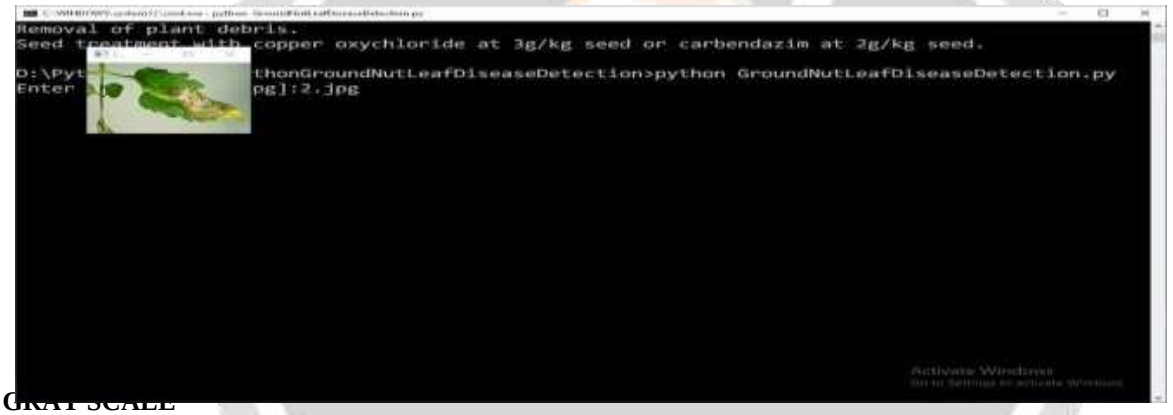

**DISPLAY IMAGE**



**GRAY SCALE CONVERSION**

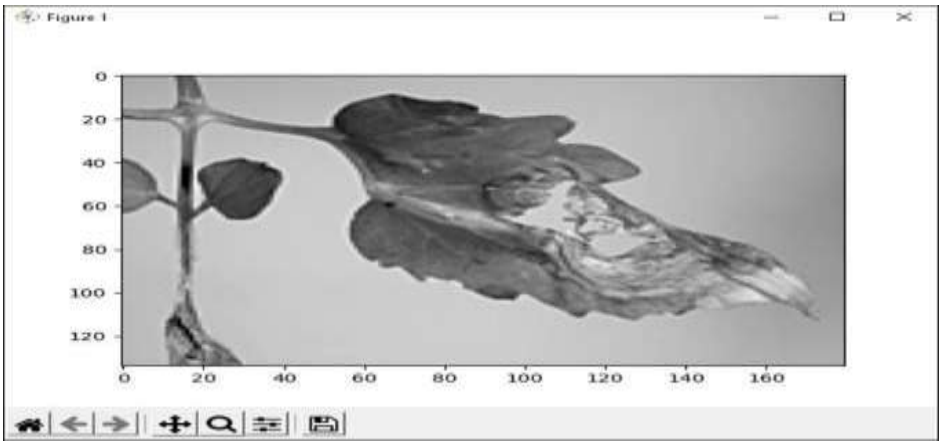

**TUTORIAL FOR FERTILIZER DETAILS**

**DISPLAY IMAGE**

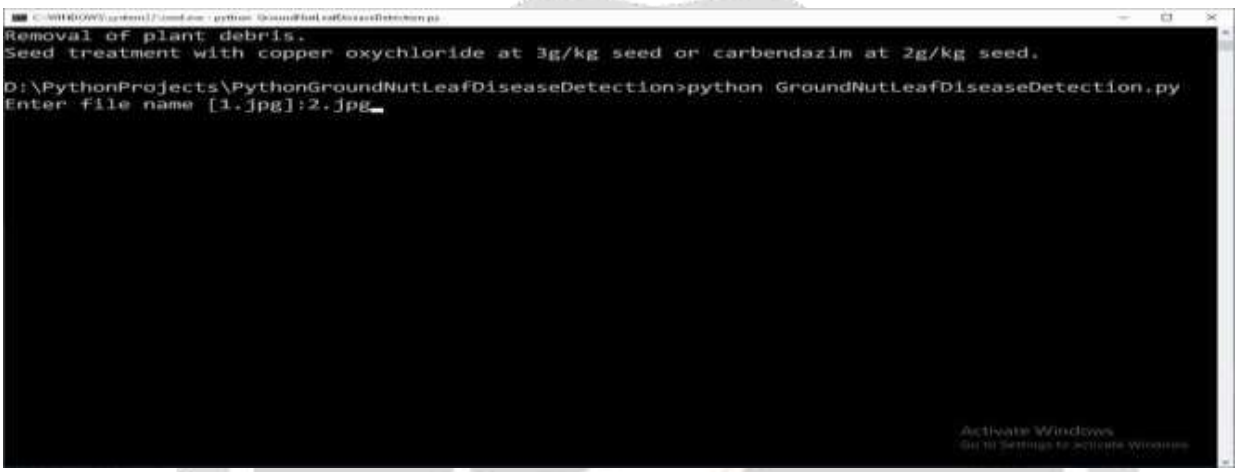



**GRAY SCALE**

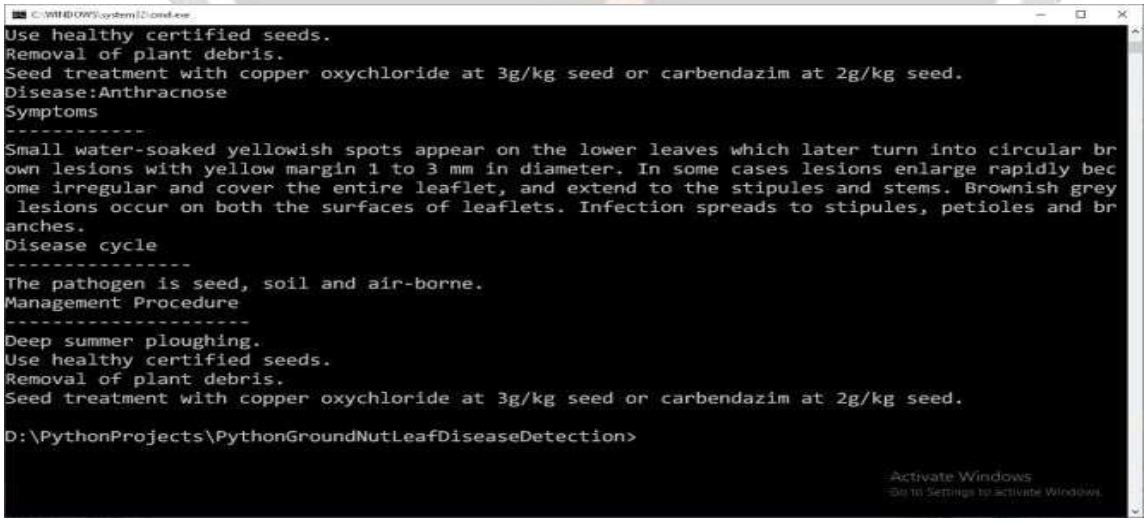
**Figure 11**




**INPUT IMAGE**




**TUTORIAL DISPLAY FOR FERTILIZER USAGE**



## III. CONCLUSION

An representation dispose of-based answer is projected and judged in this project for the discovery and categorization of nut leaf diseases. The projected approach is calm of principally three steps. In the beginning image separation is acted utilizing convolutional neural network method. In the second step injured places are raise. In the third step preparation and categorization are acted. It wouldalso advance Indian Farmers commotion smart cultivation which helps to delay to occasion determinations that also preserve occasion and lower loss of nut leaf on account of ailments. The important objective of our project search out reinforce the profit of groundnut leaf affliction discovery.

## SCOPE FOR FUTURE DEVELOPMENT

Future concerning this project maybe easily renewed. To gain the benefits that wonted from the user necessity accept the complete structure and they must withinfinancial means carry out their distinguishing tasks efficiently. The favorable exercise be contingent upon the right people at the official time of region. The requestenhance useful if the beneath augmentations are fashioned in future.5.4.1 If the use is created as netting service, it maybe joined in many netting sites.5.4.2 Several machine learning algorithms can recognize more velocity. The use is grown such that above pronounced augmentations maybe integrated accompanying current modules.

## IV. REFERENCES

[1] Bhange, M. & Hingoliwala, H. A. , “Disease DetectionUsing Image Processing” India, Elsevier B.V, 2019.

[2] Dubey, S. R. & Jalal. A. S. “Adapted Approach for FruitDisease Identification using Images”, India, International Journal of Computer Vision and Image Processing, 2018.

[3]f. Fina, P. Birch, R. Young, J. Obu, B. Faithpraise, and C. Chatwin, "Automatic plant pest Detection and recognition using kmeans clusteralgorithm and correspondence lters," international journal of advanced biotechnology research, vol. 4, no. 2, july 2013, pp. 189–199.

[4] "visual based pest Detection based on SVM classication technique," computer electron agriculture, vol. 137, no. 5258, may 2017. m. A. Ebrahimi, M. H. Khoshtaghaza, S. Min aei, and B. Jamshidi.

[5] a.-L. Chai, B.-J. Li, Y.-X. Shi, Z.-X. Cen, H.-Y. Huang, and J. Liu, "recognition of Tomato foliage disea se based on computer vision technology," acta horticulturaesinica, vol.37, no. 9, pp. 14231430, Sep. 2010.

[6] According to Z. R. Li and D. J. He's study, "Study on id entify technologies of apple's disease based on mobile phot ograph image analysis," 30513053 and 3095 in Computer Engineering Design, July 2010.

[7] Z.-X. Guan, J. Tang, B.-J. Yang, Y.-F. Zhou, D.- Y.Fan and Q. Yao, "Research on recognition technique ofrice illness based on image," Chinese Journal of Rice Science, May 2010, 497502 (Vol. 24, No. 5).

[8]J. G. A. Barbedo, "Factors inuncing the use of deep learning for plant disease recognition," Biosyst. Eng., vol. 172,pp. 8491, August 2018.

[9]A. Kamilaris and F. X. PrenafetaBold, "Deep learning in agriculture: A survey," 147, p. 7090, April2018, Comput.Electron. Agricult.

[10]G. L. Grinblat, L. C. Uzal, M. G. Larese, and P. M. Granitto, "Deep learning for plant identication using vein morp hological patterns," 2016 September; Computer Electronicsin Agriculture, Volume 127, Pages 418424.