Plant Disease Detection Using Image Processing Technique

Shoumi Paul [1], Reema Dutta Sharma[2]

Student, Department of Electronics and Telecommunication, Bhilai Institute of Technology, Durg, India [1, 2]

Abstract: In this paper we experimentally evaluate a software solution for fast, accurate and automatic detection of plant diseases through Image Processing. Identification of the plant diseases is the key to preventing losses in the quality and quantity of the agricultural product. Health monitoring and disease detection of plant is critical for sustainable agriculture. The typical method of studying plant disease is to rely on visually observable patterns on the plant leaves. Visually identifying plant diseases is inefficient, difficult, time consuming, requires expertise in plant diseases and continuous monitoring which might be expensive in large farms. Therefore; a fast, automatic and accurate method to detect plant disease is of great importance. Hence, image processing technique is employed for the detection of plant diseases. The implementation of these technologies will lead to improved productivity.

Keywords: Plant disease, Digital photographs, Matlab, Image Processing

I. INTRODUCTION

India has a diverse agricultural sector. Agriculture plays a vital role in India's economy and over 58 per cent of the rural households depend on agriculture as their principal means of livelihood. Research in agriculture is aimed towards increase of productivity and quality of food. The detection of plant leaf disease is a very important factor to prevent serious disruption as plant disease cause heavy crop losses.

Huge numbers of diseases are seen on the plant leaves and stems. Disease management is a challenging task. Image processing is the best way for the detection of diseases. Plant diseases are caused by fungi, bacteria and viruses. In most cases pests or disease are seen on the plant stem or leaves. The monitoring of leaf area is an important tool in studying physiological features related to plant growth. Plant disease is usually an abnormal growth or dysfunction of a plant. One of the common ailments is the yellowing of leaves. They can be either due to environmental conditions or pests. Yellowing of leaves is known as chlorosis. It is due to the lack of chlorophyll in leaves.

Disease fungi take energy from the plant they live on and are responsible for their damage and are characterized by wilting, scabs, moldy coatings, rusts, blotches and rotted tissue. Bacterial Canker is an infection which causes sunken, oozing canker which may cause wilting or death of branches or trees. Early Blight appears on lower, older leaves as small brown spots with concentric rings. Some pests eat out the plant leaves. Caterpillars of a huge number of varieties may be drawn to plants. Their feeding can be recognized as irregular holes in leaves. Sucking insects poke tiny holes in leaves and draw the juices out of them. Common sucking insects include aphids, squash bugs, and spider mites. While in most cases, they will not kill the plants, they can damage the leaves.

II. METHODOLOGY

Flow chart for disease detection using image processing technique:

Image Acquisition
Image Pre-Processing
Image Segmentation
Feature Extraction

Fig 1. Chlorosis

Fig. 2. Fungi infected leaf

Fig. 3. Bacterial Canker

Fig. 4. Early Blight

Fig. 5. Pest infected leaf

A. Image Acquisition

Images of the infected leaves are captured using a webcam via a graphical user interface in matlab. GUIs (also known as graphical user interfaces or UIs) provide point-and-click control of software applications, which automate a task or calculation. The user will capture the picture of the plant leaf by just clicking the button on the GUI.

B. Pre-processing

Pre-processing of plant leaf images is done to remove the noise from the image. The image is enhanced in the pre-processing step.

C. Image Segmentation

Segmentation is one of the critical tasks. The disease affected region of the leaf is segmented into a number of parts to locate objects and boundaries.

D. Feature Extraction

The relevant feature is then extracted. The feature value of the input image is compared with the features of already learned images in order to detect the disease.

III.CONCLUSION

This paper describes the image processing techniques to detect plant disease. Recognizing the disease is the main purpose of the proposed approach. The results indicate that it is an efficient approach, which can support an accurate detection of leaf disease in a little computational effort.

REFERENCES

[1] Mr. Pramod S. landge, Sushil A. Patil, Dhanashree S. Khot, Omkar D. Otari, Utkarsha G. Melaka, "Automatic Detection and Classification of Plant Disease through Image Processing" in International Journal of Advanced Research in Computer Science and Software Engineering. Volume 3, Issue 7, July 2013.

[2] H. Al-Hiary, S. Bani-Ahmad, M. Reyalat, M. Braik and Z. ALRahamneh, "Fast and Accurate Detection and Classification of Plant Diseases" in International Journal of Computer Applications (0975 – 8887) Volume 17– No.1, March 2011.

[3] Dhawale Sariputra , A. A. Shirolkar, "A Review Of Plant Leaf Disease Detection And Classification Based On Digital Image Processing Techniques" in International Journal Of Technology Enhancements And Emerging Engineering Research, Vol. 4, Issue 2.

[4] Y.Sanjana , AshwathSivasamy , SriJayanth, "Plant Disease Detection Using Image Processing Techniques" in International Journal of Innovative Research in Science, Engineering and Technology (An ISO 3297: 2007 Certified Organization) Vol. 4, Special Issue 6, May 2015.

[5] Anand.H.Kulkarni , Ashwin Patil R. K, "Applying image processing technique to detect plant diseases" in International Journal of Modern Engineering Research (IJMER) Vol.2, Issue.5, Sep-Oct. 2012.

[6] Sanjay B. Dhaygude, Mr.Nitin P.Kumbhar, "Agricultural plant Leaf Disease Detection Using Image Processing" in International Journal of Advanced Research in Electrical, Electronics and Instrumentation Engineering Vol. 2, Issue 1, January 2013.