International Journal of Computer Science & Communication (ISSN: 0973-7391)
Volume 11 • Issue 1 pp. 59-63 Sept 2019 - March 2020 www.csjournals.com

Digital Image processing in Biotechnology for Environment Protection

B.S.Panchbhai[1], Dr. B. H. Barhate[2]
[1]Head, DOCS, R.C.Patel ACS College, Shirpur, KBCNMU, India
[2]Vice-principal, P.O.Nahata ACS College, Bhusawal, KBCNMU, India

Abstract: Constant Monitoring and controlling the environment changes is one of the most important issues for pollution control. India is the nation who gives first choice for agriculture with various crops and plants. Only Human experts are not capable to monitor an access the problems and diseases in agriculture. The technology can be adopted to do these things by experts. Upcoming Computer Science with Biotechnology is helpful for Environment Protection. Digital Image Processing is helpful to detect the disease of plants [10][11][12].The Cabbage DIP system model is able to detect the fungal disease of cabbage leaf in early stage and it is possible to avoid fungal infection. It is possible to treatment only on affected area and prevention from premature distortion of plants and its parts [11][12].

I. INTRODUCTION

To protect an environment due to pollution. It is important to observe various aspects of the environment such as air pollution, noise pollution, water pollution and many more in various fields. One of the most important fields is agriculture. There is a growing need of monitoring in agriculture. However, it is not feasible to monitor and analyze most interesting aspects of the environment by trust only on human experts. Human skills are not able to access some areas and unable to monitor the problems and diseases in farming [4][7][9][10].The human observation by nude eye is insufficient to observe minute variation on infected part of plant [11]. It needs technological support to detect minor infection of plant [6].

From the Natural Environment, Many plants [8] are used for medicine as well as their flowers, leaves for food and worship in all religion. If the leaves are healthy the whole plant and flowers are naturally healthy. The pollution occurred due to different reasons and affects the natural surroundings. The change in atmosphere creates major harms for production of such plants and plants are affected by various diseases and rigid to control. In biotechnology, detection of fungal disease is the mainly interesting research area of researches in early stages which one helps to survive the medicinal, beautiful, heavenly appearance plants and flowers. Digital Image Processing form Computer stream is useful for this purpose. The various processes like grayscale, thresholding and edge detection can be applied on images to observe the fungal infected area of plants [1][2][3][5].

II. NEED OF THE STUDY

For Environment economy, two Technologies Computer Science and Biotechnology can be used together.

- Computer Science (Digital Image Processing): DIP is the technology of manipulating the groups of pixels to increase the quality of the image or to extract information from the digital image.

- Biotechnology: is an interdisciplinary science including not only biology but also subjects like mathematics, chemistry, etc are related together.

Promising Computer Science by Biotechnology is useful for Environment Protection. Digital Image Processing is helpful to discover the disease of plants [10].The various techniques from digital image processing using the cabbage DIP system model can be able to identify the fungal disease of cabbage leaf in early stage and it is possible to keep away from fungal infection. Here only provide treatment on affected area and prevention from early distortion of plants and its parts.

III. RESEARCH METHODOLOGY

Trial methodology is followed for this research using digital image processing. The detection of fungal disease is done with Cabbage DIP system model in digital image processing. Experiment is carried out by using Cabbage DIP system algorithm [12]. The Cabbage DIP system model is shown in Figure-1.

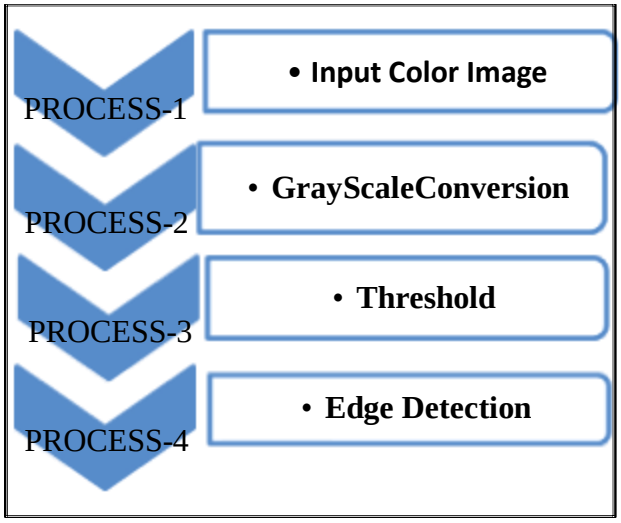
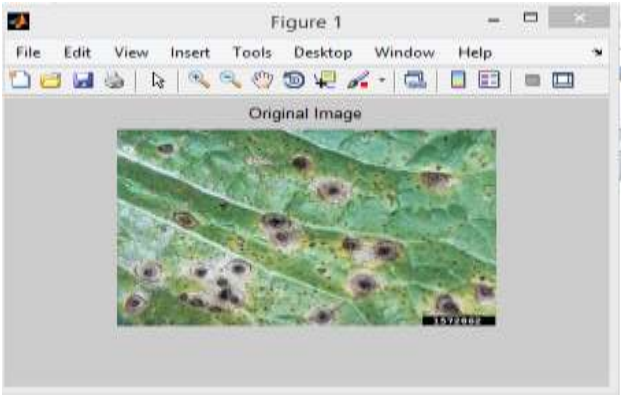


Figure-1. Cabbage DIP system model

The Experiment uses two Cabbage leaf images given in Figure-2(a), Figure-2(b) and tested and on Cabbage DIP system model and comparison is done.



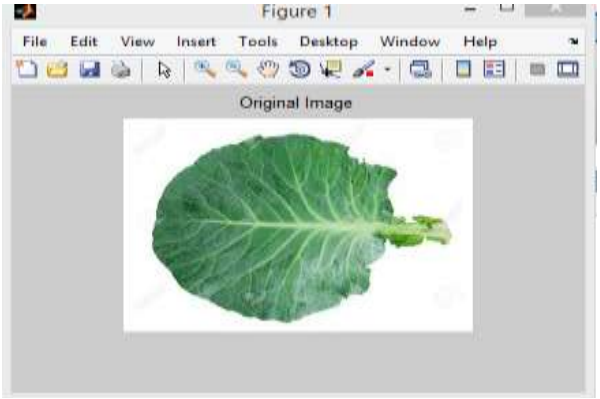


Figure-2(a): Cabbage Leaf1 Figure-2(b): Cabbage Leaf2

International Journal of Computer Science & Communication (ISSN: 0973-7391)
Volume 11 • Issue 1 pp. 59-63 Sept 2019 - March 2020 www.csjournals.com

IV. RESULTS AND ANALYSIS

Cabbage leaf with fungal infection shown in Figure-2(a): CabbageLeaf1and Figure-2(b): CabbageLeaf2 tested on Cabbage DIP system model.

Performing grayscale conversion **process-1** of the model the output image shown in Figure-3(a) and Figure-3(b). The leaf displayed with gray, light gray and dark grayarea denoting the fungus infection. In Figure-3(a) the fungal area is denoted by grayish white shade. While the dark gray shaded area denoted the infected areain Figure-3(b) of CabbageLeaf2.

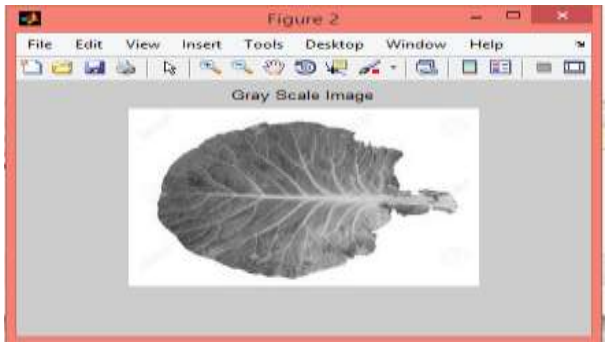


Figure-3(a). GrayScale of Cabbage Leaf1 Figure-3(b). GrayScale of Cabbage Leaf2

In **process-3** of the model thresholding is performed onthe Gray Scale image in Figure -3(a) ,Figure-3(b).After thresholding the resultant image depicted in Figure-4(a) and Figure-4(b). The Cabbage leaf image entirely described with only black and white spots. In Figure-4(a), the white spot on leaf denotes the infection of fungus. And in Figure-4(b),the black spots on leaf denote infection of fungus. The thresholding detects every cell of the leaf either infected by fungus or not.

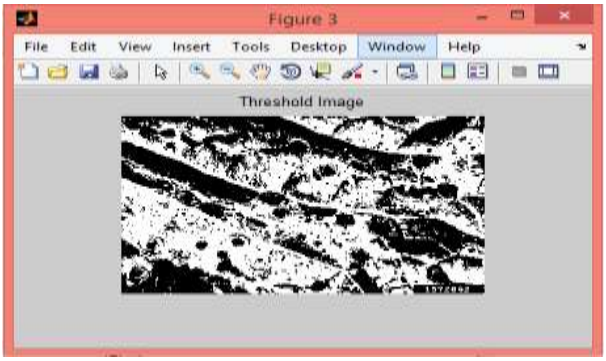


Figure-4(a).Threshold of Cabbage Leaf1

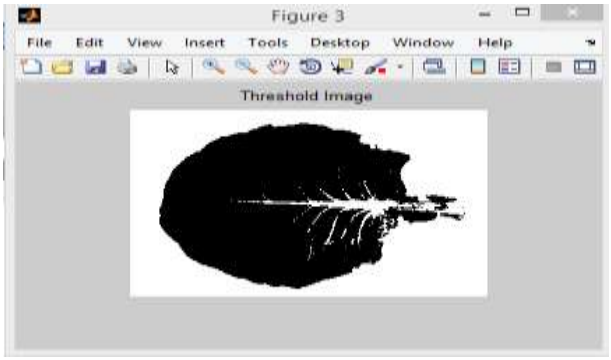


Figure-4(b).Threshold of Cabbage Leaf2

The output image of the process-3 as in Figure-4(a) and Figure-4(b) are then passed over to CabbageDIP system model for edge detecting process-4. The resultant images are as in Figure-5(a) Figure-5(b) describes white color doted edges detected. The area surrounded by edges denotes the fungal infection on a cabbage leaf. As compared to Cabbage Leaf1, Cabbage Leaf2 has a very fewer area which is infected by the fungal infection.

Figure-5(a). Edge Detection of CabbageLeaf1

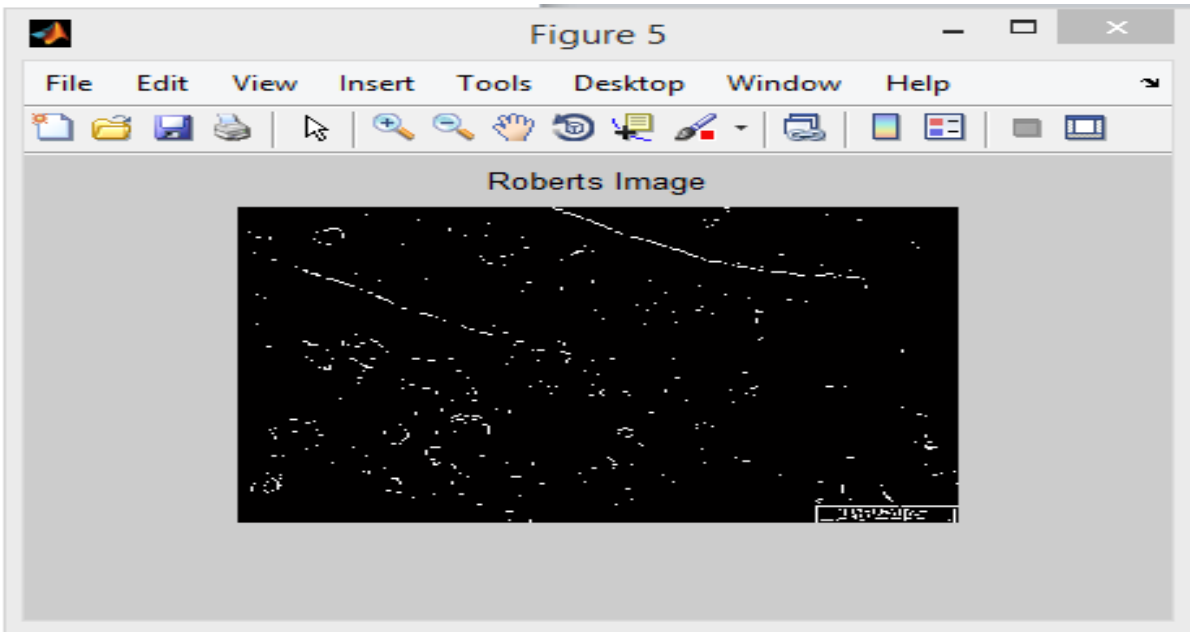
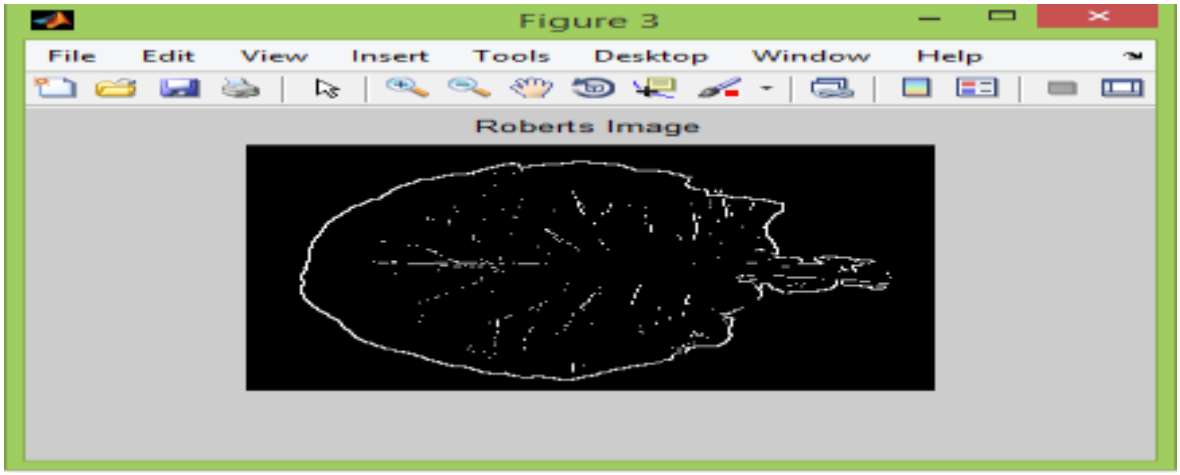


Figure-5(b). Edge Detection of CabbageLeaf2



V. CONCLUSION

The appearance of modern technology such as Computer Science with Environment avail a range of ideas in research fields. India is one of the most agricultural countries, and quality and quantity of agricultural production can be improved using precision agriculture. It is possible with one of the branches of computer technology that is Digital Image Processing (DIP) with Biotechnology. It is possible to treatment only an affected area and prevention from early distortion of plants and its parts for environment protection.

REFERENCES:

1. Manisha Kaushal, Arjan Singh, Baljit Singh, "Adaptive Thresholding for Edge Detection in Gray Scale Images", International Journal of Engineering Science and Technology Vol. 2(6), 2010, 2077-2082, ISSN: 0975-5462, pp. 2077- 2082.
2. "Plant and Pest Diagnostic" Clinic University of Nebraska-Lincoln 448 Plant Sciences Hall Lincoln, NE 68583-0722 (402) 472-2559. This publication was developed and distributed with the assistance of the U.S. Department of Agriculture (USDA). March 2011
3. R. C. Gonzalez and R.E. Woods, "Digital Image Processing", Addison-Wesley, New York (2005).
4. R. Maheswaran, S Muruganand, C Hemalatha, "Hybrid Embeded System Design for Real time monitoring the growth and detection of diseases in oryza sativa L and triticum aestivum." International conference on interdisciplinary research in engineering and technology (2015), pp. 23-32.
5. Sanjay B. Dhaygude, Mr.Nitin P.Kumbhar,"Agricultural plant Leaf Disease Detection Using Image Processing", International Journal ofAdvanced Research in Electrical, Electronics and Instrumentation EngineeringVol. 2, Issue 1, January 2013
6. Sarika Datir, "Monitoring and Detection of Agricultural Disease using Wireless Sensor Network", International Journal of Computer Applications, February 2014, ISSN:0975 – 8887, Volume-87, Issue-4
7. Shitala Prasad1, Piyush Kumar2, "Plant Leaf Disease Detection Using Gabor Wavelet Transform", SEMCCO 2012, LNCS 7677, pp. 372–379, 2012, Springer-Verlag Berlin Heidelberg 2012
8. Supriya S. Patki, Dr. G. S. Sable, "Cotton Leaf Disease Detection", IOSR Journal of VLSI and Signal Processing (IOSR-JVSP) Volume 6, Issue-3, Ver-I -May-Jun 2016.
9. S. Manimegalai, "Apple Leaf Disease Identification using Support Vector Machine", International Conference on Emerging Trends in Applications of Computing (ICETAC-2K17), pp. 1-4, ISSN: 2394-2231
10. Tirath P. Sahu and Yogendra K. Jain, "Improved Simplified Novel Method for Edge Detection in Grayscale Images Using Adaptive Thresholding", Journal of Advances in Computer Networks, Vol. 3, No. 2, June 2015, DOI: 10.7763/JACN.2015.V3.159, pp. 157-16
11. Gouri M. Patil, "Digital Image Processing-An Elegant Technology to Perceive Diseases in Plants", International Journal of Scientific Research in Computer Science and Engineering,Vol.6, Special Issue.1, pp.43-47, January (2018) E-ISSN: 2320-7639.
12. Vidya S. Barhate, Gouri M. Patil, Sweta G. Sonawane, "Fungal Disease Detection of Cabbage Leaf Using Digital Image Processing", International Journal of Scientific Research in Computer Science and Engineering", Vol.6, Special Issue.1, pp.81-83, January (2018) E-ISSN: 2320-7639