

**International Journal of Advanced Research in  
Education and TechnologY (IJARETY)**

**Volume 11, Issue 2, March 2024**

**Impact Factor: 7.394**



# Plant Disease Detection Using Image Processing (Rice Leaf)

DR.S.Govindaraju<sup>1</sup>, Sakthi Vasanth .A<sup>2</sup>

Associate Professor, PG & Research Department of Computer Science, Sri Ramakrishna College of Arts & Science,  
Coimbatore, Tamil Nadu India<sup>1</sup>

UG Student, PG & Research Department of Computer Science, Sri Ramakrishna College of Arts & Science,  
Coimbatore, Tamil Nadu India<sup>2</sup>

**ABSTRACT:** The project is entitled “RICE LEAF DISEASE IDENTIFICATION”, and was developed by using Python. Rice leaf diseases are a major problem in economic and production losses in the agricultural industry worldwide. In this project, an image processing approach is proposed for identifying passion rice leaf diseases based on a convolutional neural network. According to the CNN algorithm, rice leaf image details are taken by the existing packages from the front end used in this project. However, it can take a few moments. So, this proposed system can be used to identify rice leaf diseases quickly and automatically.

**KEYWORDS** Plant disease detection, image processing, convolutional neural network (CNN)

## I. INTRODUCTION

Toward the start of the 21st century, paddy (*Oryza sativa* species) is as yet the main oat in human food frameworks and the principal wellspring of energy and a critical portion of proteins devoured by very nearly three billion people. More than 90% of the world’s paddy is produced in the Asia-Pacific region In Bangladesh, paddy is the key producing crop food, about 75% of the absolute edited region, and over 80% of the all-out watered zone is planted to rice. As a result, paddy plays an important role in the subsistence of the people of Bangladesh. Most of the time farmers have to face various problems in paddy cultivation such as Damage to arable land, increased population, climate change, pests, diseases, etc. Due to these various problems, farmers are becoming uninterested in paddy cultivation nowadays. This paper has focused only on the pests and diseases to the various problems of rice cultivation. smut.

## II. LITERATURE

According to the research paper, the authors used image processing technology to identify the pomegranate diseases. Image preprocessing was the first step of the methodology. Image resizing was done under the image preprocessing. Because a digital camera had been used to capture the images in this study. The size of those images was very large and took more time to process. So all images were resized to 300 x 300 PX. Morphology, color, and CCV features were used for feature extraction.

The authors used image processing technology to identify the leaf diseases. First authors selected the plants, that were affected by the disease and then took a snapshot of the diseased leaf.

## III. METHODOLOGY

### IMAGE ACQUISITION

In this phase, the sample images are collected, which are required to train the classifier algorithm and build the classifier model. Yellowish or Reddish passion rice leaf variety was selected to take sample images.

### IMAGE PROCESSING

After the image acquisition, image processing was done to improve the image quality. Only horizontal images were rotated by 90 degrees and resized by 200x300 pixels. Vertical images were resized by 200x300 pixels and when the width and height of the image were the same, those images were resized to 250x250 pixels. .

**IMAGE SEGMENTATION**

The third phase of the methodology is image segmentation. As the first step, all preprocessed images were converted into L\*a\*b, HSV, and Grey color models and kept in the original way (RGB). Identifying a suitable color model for preprocessing is one of the outcomes of this research.

**IV. SYSTEM ANALYSIS**

**EXISTING SYSTEM**

In the existing system, normal infections of rice leaves are considered. Few diseases only can be found. The image processing-based existing methodology is made out of the accompanying state-of-the-art color and texture features extracted from the test image, then color and texture features are fused and a random forest classifier is used for disease classification.

**DRAWBACKS OF THE EXISTING SYSTEM**

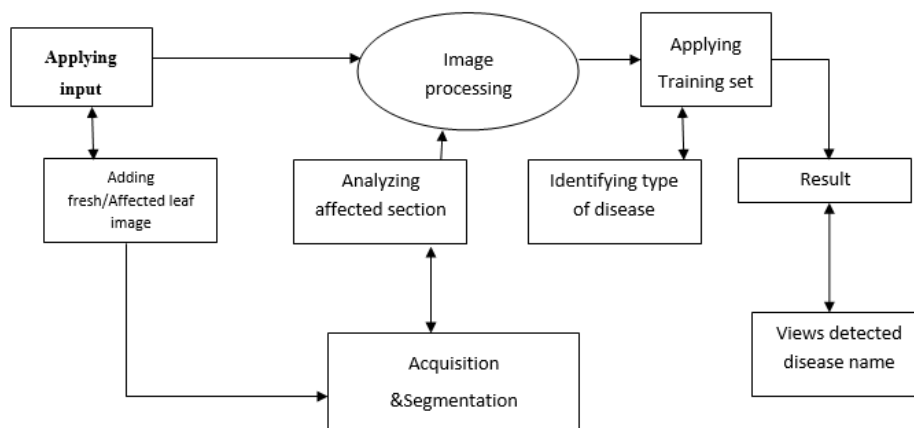
- Accuracy is less.
- The time taken to process the image is high.
- The category of the disease was not found.
- Missed to process high pixel image.

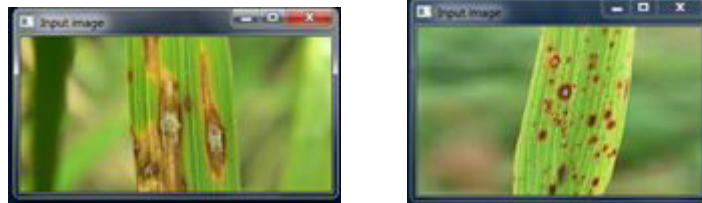
**PROPOSED SYSTEM**

For the rice leaf disease classification problem, precise image segmentation is required; otherwise, the features of the non-infected region will dominate over the features of the infected region. In this approach, CNN-based image processing is preferred to detect the region of interest which is the infected part only. After processing the input image, features are extracted from the processed image of the rice leaf. Finally, training and the results are executed.

**ADVANTAGE OF PROPOSED SYSTEM**

- Accuracy is high.
- Enhancing the value of rice leaf disease detection.
- Less time-consuming.
- Finding the category of the disease is done by highlighting the affected places.
- Applicable for both low and high-pixel images.

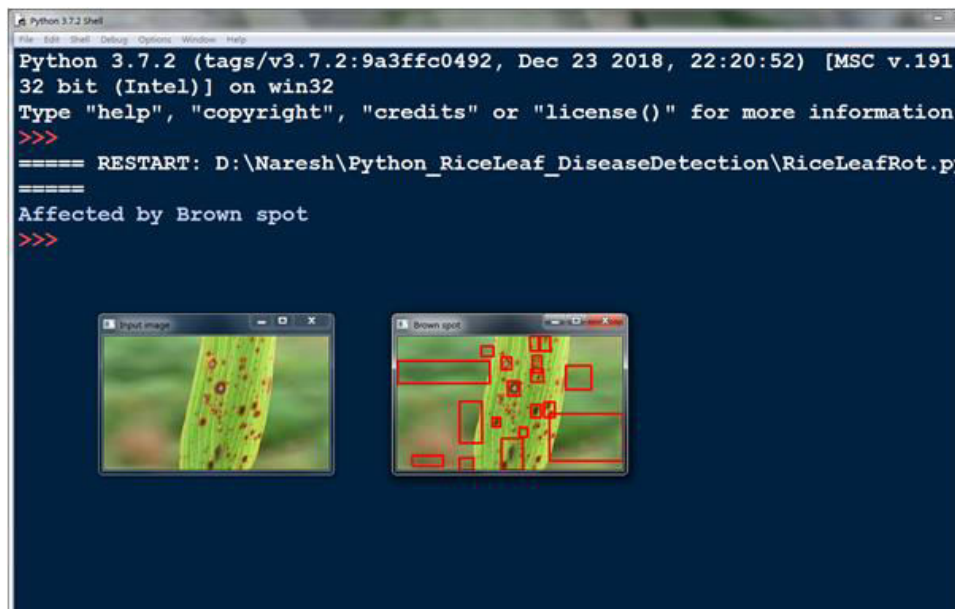




Input image



Shows the brown spot



Shows the result of the image

## V. FUTURE WORK

This research can be carried forward with more varieties of leaf diseases and more fine-tuned CNN models with the expectation of finding better accuracy and ensuring faster detection. A detailed comprehensive study is a must to understand the factors affecting the detection of plant diseases, like the classes' datasets, size of datasets, learning rate, illumination, etc.

## VI. CONCLUSION

An image processing-based solution is proposed and evaluated in this project for the detection and classification of rice leaf diseases. The proposed approach is composed of mainly three steps. In the first step image segmentation is performed using convolutional neural network technique. In the second step affected places are found. In the third step training and classification are performed. This project will support Indian Farmers to do smart farming which helps to make time-to-time decisions which also saves time and reduces the loss of plants due to diseases. The leading objective of our project is to enhance the value of rice leaf disease detection.

## REFERENCES

1. Sannakki, K. R., & Kurakar, V. G. (2018). "Review on Plant Disease Detection Techniques Using Image Processing." *International Journal of Advanced Research in Computer Science*, 9(3), 1-4.
2. Arsenovic, M., Arsenovic, D., Stefanovic, D., & Arsenovic, N. (2018). "Overview of modern methods for plant disease detection." In *Proceedings of the 4th International Conference on Modern Research in Engineering Technology & Science*, Dubai, UAE.
3. Sladojevic, S., Arsenovic, M., Anderla, A., Culibrk, D., & Stefanovic, D. (2016). "Deep neural networks based recognition of plant diseases by leaf image classification." *Computational Intelligence and Neuroscience*, 2016, 1-11.
4. Chugh, T., Sahoo, P. K., & Kumar, P. (2019). "A Review on Plant Disease Detection Techniques using Image Processing and Deep Learning." *International Journal of Advanced Research in Computer and Communication Engineering*, 8(7), 63-71.
5. Singh, A., Misra, A. K., & Sharma, S. (2020). "Disease Detection in Plants using Image Processing and Machine Learning Techniques: A Review." *Materials Today: Proceedings*, 31, 1203-1206.
6. Barbedo, J. G. A. (2019). "Plant disease identification from individual lesions and spots using deep learning." *Biosystems Engineering*, 180, 96-107.
7. Zeng, Z., Luo, J., Zhang, Y., Wang, L., & Tian, X. (2020). "Deep Learning for Plant Diseases: Detection, Diagnostics, and Identification." *Sensors*, 20(11), 3135.
8. Jiang, S., & Li, C. (2020). "Plant Disease Detection Based on Deep Learning: A Review." *Plant Phenomics*, 2020, 1-13.
9. Chaudhary, S., & Singh, S. (2021). "Detection of Plant Leaf Diseases Using Image Processing Techniques: A Review." *Recent Advances in Computational Intelligence*, 21, 209-227.
10. Dutta, S., Joshi, K., Ghosh, S., & Chaudhuri, S. (2021). "A Comprehensive Review on Plant Leaf Disease Detection Using Deep Learning and Image Processing Techniques." *Archives of Computational Methods in Engineering*, 28(6), 6633-6660.
11. Goswami, P., Kumar, V., & Jat, R. S. (2019). "Review on Detection and Identification Techniques of Plant Diseases." *Journal of Pharmacognosy and Phytochemistry*, 8(6), 3345-3350.
12. Gogoi, S., & Bharali, R. (2020). "A Review on Image Processing Techniques for Detection of Plant Diseases." *International Journal of Innovative Technology and Exploring Engineering*, 9(3S), 103-106.
13. Mittal, S., Kaur, P., & Singh, A. (2021). "Detection of Plant Leaf Diseases Using Image Processing Techniques: A Review." *Journal of Computer Science*, 17(2), 225-235.
14. Mehta, R., & Jain, S. K. (2021). "Plant Leaf Disease Detection Using Deep Learning Techniques: A Review." *International Journal of Computing*, 20(3), 270-277.
15. Lin, S., & Li, Y. (2021). "Plant Disease Recognition Based on Image Processing and Deep Learning: A Review." *International Journal of Advanced Research in Computer Engineering & Technology*, 10(4), 198-204.
16. Sarode, P. R., & Kharate, G. K. (2019). "Plant Disease Detection Techniques: A Review." *International Journal of Advance Research, Ideas and Innovations in Technology*, 4(2), 24-30.
17. Adak, A. K., Kundu, S., & Kundu, S. (2021). "Deep Learning Based Detection of Plant Diseases using Image Processing: A Review." *Advances in Computer Science and Engineering*, 21(2), 175-185.

## BIOGRAPHY



**Dr S Govindaraju MCA MPhil PhD** he pursued Master of Computer Applications @ Gobi Arts and Science College from Bharathiar University, Coimbatore in the year 2005 and completed MPhil in Computer Science from Bharathiar University in the year 2011 and he completed PhD in Bharathiar University, Coimbatore in the year 2019 and currently working as an Associate Professor PG and Research Department of Computer Science Sri Ramakrishna College of Arts and Science (Formerly SNR Sons College), Bharathiar University, Coimbatore. He has published more than fourteen research papers in reputed international journals including Thomson Reuters (SCOPUS) and conferences and it's also available in online. His main research work focuses on Image Retrieval using Medical Images. He has seventeen years of Teaching experience and twelve years of Research experience.



A.SAKTHI VASANTH Pursing B.Sc Computer Science @Sri Ramakrishna College Of Arts And Science, Coimbatore Research areas in image processing

## International Journal of Advanced Research in Education and Technology

ISSN: 2394-2975

Impact Factor: 7.394