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ENHANCING THE LEAF DISEASE DETECTION THROUGH CONVOLUTIONAL NEURAL NETWORK

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PRESENTATION OUTLINE

- INTRODUCTION
- LITERATURE SURVEY
- METHODOLOGY
- EXPERIMENTAL RESULTS(DISCUSSION)
- CONCLUSION
- REFERENCES

Introduction

- In India, where a majority of the population depends on agriculture, combating crop diseases is paramount to ensure food security and economic stability. The prevalence of crop diseases poses a significant threat to global agriculture, leading to substantial yield losses and impacting overall food production.

- Traditional methods of disease detection, reliant on skilled agronomists and optical equipment, prove to be cumbersome, time-consuming, and susceptible to human error. This inefficiency is exacerbated by the fact that crop diseases lead to an average yield loss of 42% for vital food crops.

- As such, there is a critical need for reliable, time-saving automated techniques to detect leaf diseases, offering a more efficient and accurate alternative. This study endeavors to address this imperative by proposing the application of convolutional neural networks (CNNs), a powerful form of deep learning, to revolutionize disease detection in young leaves. By harnessing the capacity of CNNs to discern intricate patterns from images, this research aims to provide farmers with a swift and precise means of diagnosing and managing crop diseases, ultimately leading to increased agricultural productivity and economic growth.

Continue…

- The research focuses on early detection to mitigate the risk of widespread crop destruction. Traditional techniques like manual leaf examination and disease prediction have proven insufficient for accurate identification.

- Instead, the study advocates for the use of reliable disease image processing algorithms, which leverage modern technology to deliver precise results. The application of CNNs in identifying leaf diseases across a wide range of fruit and vegetable crops has demonstrated remarkable success, achieving an impressive accuracy of 97%.

- This optimized approach holds significant potential for advancing the agricultural sector, ultimately leading to increased production. The paper's structure encompasses a literature survey, methodologies, results, and a conclusion, providing a comprehensive overview of its findings and implications for the agricultural industry in India.

LITERATURE SURVEY

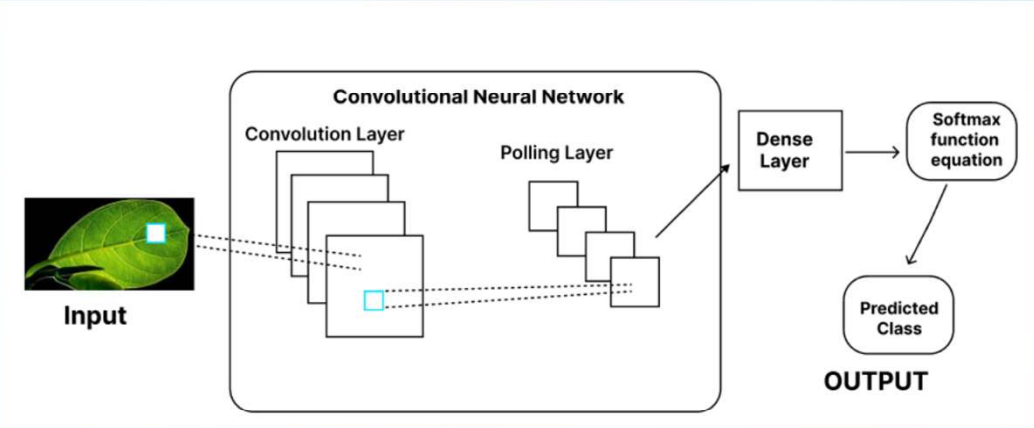
TITLE	AUTHOR	DESCRIPTION
Plant diseases and pests detection based on deep learning: a review	Liu, Jun, and Xuewei Wang.	This is a review paper which discusses on plant pests detection with modern and traditional methods.
Crop leaf disease recognition based on Self-Attention convolutional neural network	Zeng, W., Li, M	This paper enhances use of 'SACNN" on AES-CD9214 and MK-D2 datasets with an accuracy of 95%.
Transfer Learning for Multi-Crop Leaf Disease Image Classification using Convolutional Neural Network VGG	Paymode, A.S., Malode, V.B	This paper enhances use of transfer learning using CNN with VGG for tomatoes and Grapes with an accuracy of 95.71% and 98.40%.
Crop disease detection using image segmentation	Jaware, T.H., Badgujar, R.D., Patil, P.G	This paper enhances the use of K-means clustering an image segmentation technique for disease detection.
Plant Leaf Disease Detection and Classification Based on CNN with LVQ Algorithm	Sardogan, M., Tuncer, A., Ozen, Y	This paper enhances use of CNN with LVQ algorithm for detecting 4 four tomato leaf diseases trained on a dataset of 500 images

Methodology

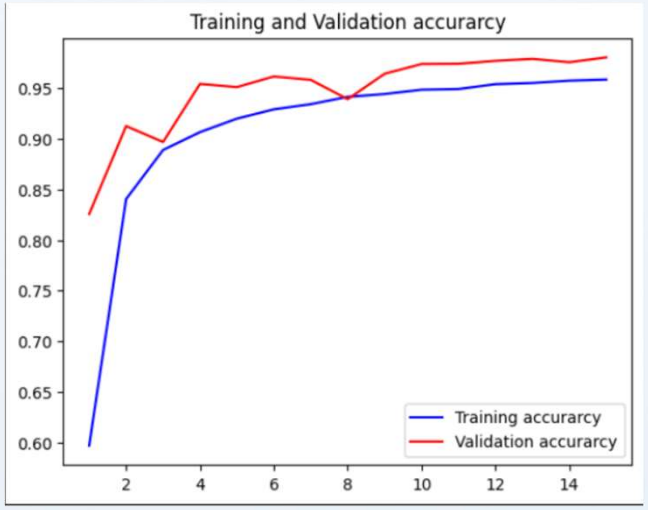
Data Collection

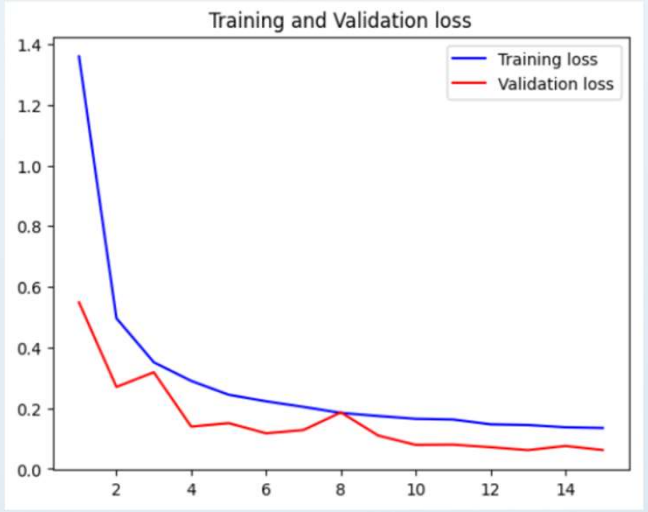
Classes	No of images
Apple	7771
Blueberry	1816
Cherry	13,985
Corn	21,301
Grape	28,523
Orange	2010
Peach	3566
Bell Pepper	3901
Potato	5702
Raspberry	1781
Soybean	2022
Strawberry	3598
Squash	1736
Tomato	18,345

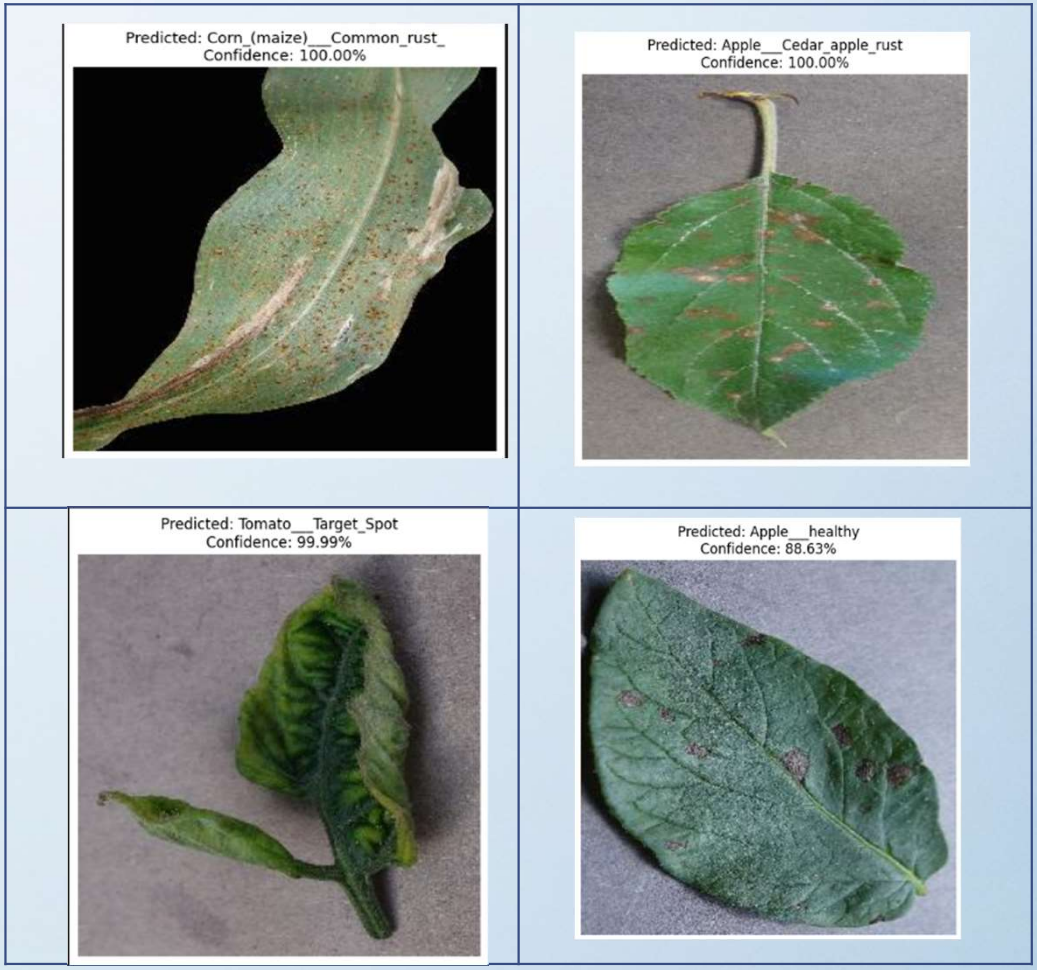
Image Classification



Experimental Results (Discussion)







Conclusion

- In Conclusion, The devised disease classification techniques, coupled with the deep learning model, present a significant advancement in the automated detection and categorization of plant leaf diseases. Extensively tested across 14 diverse species encompassing 38 plant classes, including vital crops like Apple, Blueberry, Corn, and Tomato, the CNN-based system showcases exceptional potential for practical implementation in agriculture. With a commendable model validation rate of 97% globally, this research holds promise for revolutionizing disease classification and enabling early detection, ultimately leading to enhanced crop yields. In essence, this study makes a substantial contribution to the field of plant pathology, providing valuable insights for the improvement of plant health management.

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