iJRASET
International Journal For Research in Applied Science and Engineering Technology



# INTERNATIONAL JOURNAL FOR RESEARCH

IN APPLIED SCIENCE & ENGINEERING TECHNOLOGY

**Volume:** 14 **Issue:** V **Month of publication:** May 2026

**DOI:** https://doi.org/10.22214/ijraset.2026.81726

www.ijraset.com

Call: 08813907089 | E-mail ID: ijraset@gmail.com

International Journal for Research in Applied Science & Engineering Technology (IJRASET)
*ISSN: 2321-9653; IC Value: 45.98; SJ Impact Factor: 7.538*
*Volume 14 Issue V May 2026- Available at www.ijraset.com*

# AI Based Mango Leaf Disease Detection and Management System

Prerana Patil[1], Shravani Bhatkar[2], Mubashsheera Momin[3], Gauri Tanpure[4], Dr.Minakshee M. Patil[5]
*Computer Engineering Department, KJ College of Engineering and Management Research*

***Abstract:*** ***Leaf diseases pose a serious difficulty challenge in the management of mango growers and may cause significant yield loss if diagnosis is delayed. In this paper, we describe a novel deep learning-based approach for the classification of diseases in mango leaves using images. The method proposed takes advantage of a pretrained MobileNetV2 model to predict whether a leaf image is healthy or belongs to one of its diseased classes, including Anthracnose, Bacterial Canker, Powdery Mildew Cutting Weevil (Die Back), Gall Midge and Sooty Mould. In addition to detecting diseases, it provides treatment suggestions and general tips for leaf care, such as organic solutions. High-risk periods for disease spread are continuously analyzed, and alerts are generated based on prevailing weather conditions. System supports multiple languages (Marathi,English and Hindi) which makes the user interface Farmer Friendly; increase usability in different regions, this will contribute for early diagnosis improved crop management.***

***Keywords: Mango Leaf Disease Detection ,DeepLearning ,MobileNetV2 ,ImageClassification ,Smart Agriculture***.

## I. INTRODUCTION

Cultivation of mango is a major agricultural industry in many parts of the India, producing around 25-30 million tones each year. However mango plants are frequently affected by leaf diseases such as Anthracnose, Bacterial Canker, Powdery Mildew, Cutting Weevil, Die Back, Gall Midge, and Sooty Mould. If these diseases are left untreated,then it will affect both quantity and quality of crop yield. The conventional way of diagnosing diseases is based on visual assessment by farmers or agronomy specialists, which can be slow and expensive as well as inaccurate in some cases. In rural areas, the limited access to expert guidance and lack of technical knowledge leads to difficulty of early leaf disease identification. So there is a higher demand for such systems which helps farmers to detect mango leaf diseases in the early stage and save their crops. With the growing use of artificial intelligence and deep learning techniques, crop diseases can now be identified using leaf images. Deep learning model such as CNN can able to analyze leaf images by learning visual features such as colour, texture patterns and shape differences. In this project MobileNetV2 model is used to classify the mango leaf images such as healthy or diseased. According to this, transfer learning is a method that improves the accuracy of future models while reducing computational cost which would in turn be one of the prerequisites for deploying such system in real-world. Along with the disease identification the system gives treatment recommendations and provides disease risk alerts by analyzing real time weather alerts. Temperature,humidity and rainfall variation are the key factors in spread of plant diseases at large, continuous weather monitoring can help to predict high risk conditions. To cater farmers from various regions to use the system comfortably, one of the application helps has multilingual support( e.g., Marathi, Hindi and English).A simple user interface developed using streamlit allows users to upload mango leaf images, view disease results and access treatment recommendations, organic and chemical alternatives, general leaf care tips easily. This system assists in recognizing mango diseases and tells about how to treat these diseases as well by blending advanced technology with traditional farming methods, integrating deep learning, climate analysis and user interface.

## II. MOTIVATION AND PROBLEM STATEMENT

Mango leaf diseases such as Anthracnose, Bacterial Canker, Cutting Weevil, Die Back, Gall Midge, Powdery Mildew, Sooty Mould impacts mango leaves heavily. It poses a great threat to mango cultivation which subsequently influence the yield quality as well as quantity. Classical methods for identification relying on a specialist visual inspection and are expensive, demanding too many hours in rural area. Recent advances in deep learning and image recognition have made it possible to assist the disease identification process through leaf images.The system used MobileNetV2 model for effectively recognizing mango leaf maladies by checking the visual traits like colour, texture and patterns existing on the leaf to classify it into diseased and healthy leaves. It has one more useful Information as it recommends the treatment, organic and chemical sources to prevent these crops from different kinds of diseases.

©IJRASET: All Rights are Reserved 

It is even combined with weather based notifications which help farmers to keep the distance from disease hazard their crops reflect on temperature and humidity patterns. Farmers can detect any diseases, prevent them and finally increase crop productivity using this intelligent and user friendlyplatform.

## III. LITERATURE REVIEW

Recent studies have shown that deep learning techniques play a significant role in mango leaf disease detection. A lightweight Vision Transformer (ViT)-based model has been proposed for smart agriculture, which uses transfer learning and data augmentation to achieve high accuracy with low computational cost, making it suitable for real-time applications. Several researchers have also developed CNN-based models for image-based disease classification, demonstrating strong performance in identifying different types of mango leaf diseases. Real-time systems using convolutional neural networks further highlight the practical applicability of deep learning in agricultural environments by providing fast and accurate results. In addition, studies on weather-based machine learning models emphasize the importance of environmental factors such as temperature and humidity in disease spread, suggesting the integration of detection systems with weather alerts and treatment recommendations. Comparative analyses between CNN and Vision Transformer models indicate that transformer-based approaches can achieve higher accuracy, while traditional CNN architectures remain effective in capturing visual features. Other approaches, including feed-forward neural networks with hybrid feature selection, have also improved early disease detection accuracy. Moreover, models like LeafNet and MobileNetV2 demonstrate that lightweight deep learning architectures can achieve high performance with reduced computational requirements. Overall, these studies confirm that deep learning-based approaches are highly effective for accurate, efficient, and practical mango leaf disease detection and management systems.

## IV. PROPOSED SYSTEM

### *A. Architecture Overview*

The proposed system helps to find mango leaf diseases automatically using AI. It also provides treatment ideas and weather based alerts to help farmers take care of their crops. This system is able to conduct inspection of diseases in less time and easier than previous methods where leaves had to be checked by observing them.

MobileNetV2 a deep learning model trained to recognize healthy or diseased mango leaf(The diseases are Anthracnose, Bacterial Canker, Cutting Weevil, Die Back, Gall Midge, Powdery Mildew and Sooty Mould) is the core of this complete system.

When the user uploads image of mango leaf, it scans and identify about the disease. After finding the disease it also provides with treatment and prevention.When the user uploads the picture of mango leaf the system analyses the image and detect the disease.

The system takes real-time weather data and provides alerts of disease risk. The weather data helps farmers take precautionary measures before a disease proliferates, because the speed at which diseases spread depends on factors like humidity, rain and temperature.

### *B. Workflow Diagram*

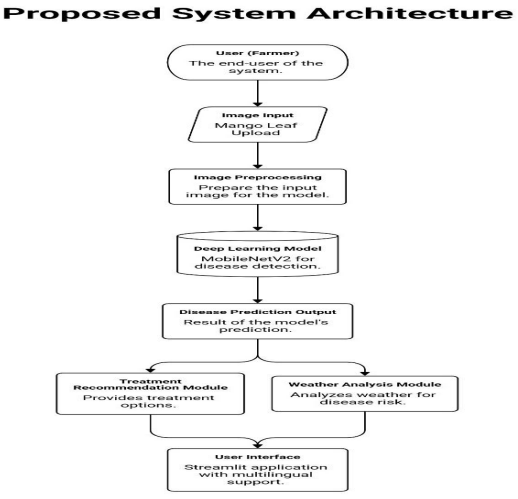



Fig. 1. Workflow diagram of the proposed system

## V. METHODOLGY

The proposed methodology is used for disease detection in mango leaves using deep learning with weather data and user-friendly interface. In the first proceed, images of mango leaves are collected for performing the detection process. These consist of healthy leaves as well a diseased ones such as anthracnose, bacterial spot and powdery mildew. Images are cleaned and resized such that the model can understand it easily. It helps the model to more accurately learn and generate results from data. The detection is done by using a deep learning model, MobileNetV2, with the image data collected previously to train and learn to differentiate healthy leaves from infected ones. After training, the model is able to determine whether a new leaf image is healthy or affected by a disease. The images are cleaned and resized prior to modeling so that the model will function correctly. Moreover,this helps to increase accuracy. MobileNetV2 being used for classifying. So, the collected pictures are used to train it in order to teach how healthy and ill leaves appear. The system is easy to use and has a simple screen made using Strealit. This system also uses live weather data (temperature, rain and humidity) to caution about the possibility of spread of disease.Farmers are notified by sensors the way high humidity and rainfall creates conditions suitable for an infection outbreak. This approach assists farmers in early-detection of leaf diseases and offering them guidance to safeguard their crops, thus enhancing the production yield of mangoes.

System Overview

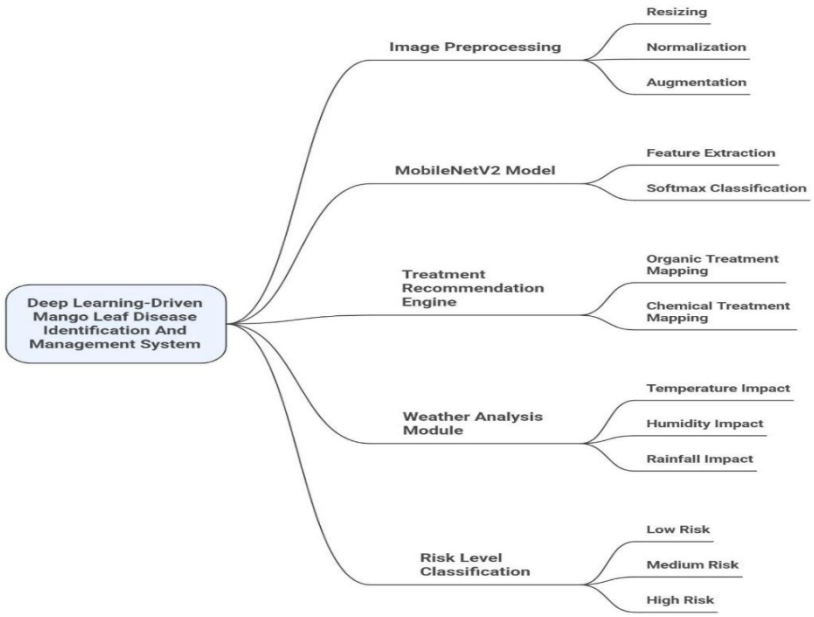



Fig. 1. Workflow diagram of system overview

## VI. EXPECTED OUTCOME

The proposed deep learning–based mango leaf disease identification and management system aims to improve the early detection and diagnosis of common mango leaf diseases such as like Anthracnose, Bacterial Canker, Powdery Mildew, Cutting Weevil, Die Back, Gall Midge and Sooty Mould.The system classifies healthy and diseased mango leaves using a trained MobileNet V2 CNN model consequently it decreases the involvement of labour work and expert supervision for deep analysis. Already, computers can predict diseases based on the consistent appearance of leaves as their texture and color change in response to diseases.

Disease prediction not only identifies what is ailing the crop but also in what way best to react, from that which is the best course of treatment to what prevention measures may be put in place. These in depth analyses will allow farmers to do timely interventions which in turn will see to it that there is large scale reduction in crop damage and yield loss within our agricultural systems.

The module will be augmented with real-time weather data, which will provide alerts for the probability of a disease depending on its relationship with climate.Throughanalyzing temperature, humidity, and rainfall parameters the system can tell in which year it is conducive to disease spread which helps in crop management.The multilingual support feature helps to improve system accessibility and usability across various diverse regions which enables the farmers to interact with the application in their preferred language.

This design helps practical usage among farmers and makes the system user friendly.The goal is to create an understandable system for farmers that draws on weather analysis; deep learning, a form of artificial intelligence; and a library of available treatments. This system we have developed is in many languages and we have designed it to support farmers in the implementation of very precise disease management strategies for mango crops.The system is used to improve crop health which in turn increases productivity, reduces economic losses and also promotes smart and sustainable agricultural practices.

## VII. CONCLUSION

The system delivers an intelligent method for the identification of the mango leaf diseases using a deep learning model. In this work we look at the identification of healthy and sick leaves via use of MobileNetV2.The system not only identifies the leaf diseases but it also gives treatment recommendations, organic solutions and general leaf care tips. The integration of real time weather analysis along with the multilingual support in languages such as Marathi, Hindi and English makes the user interface
farmer- friendly.

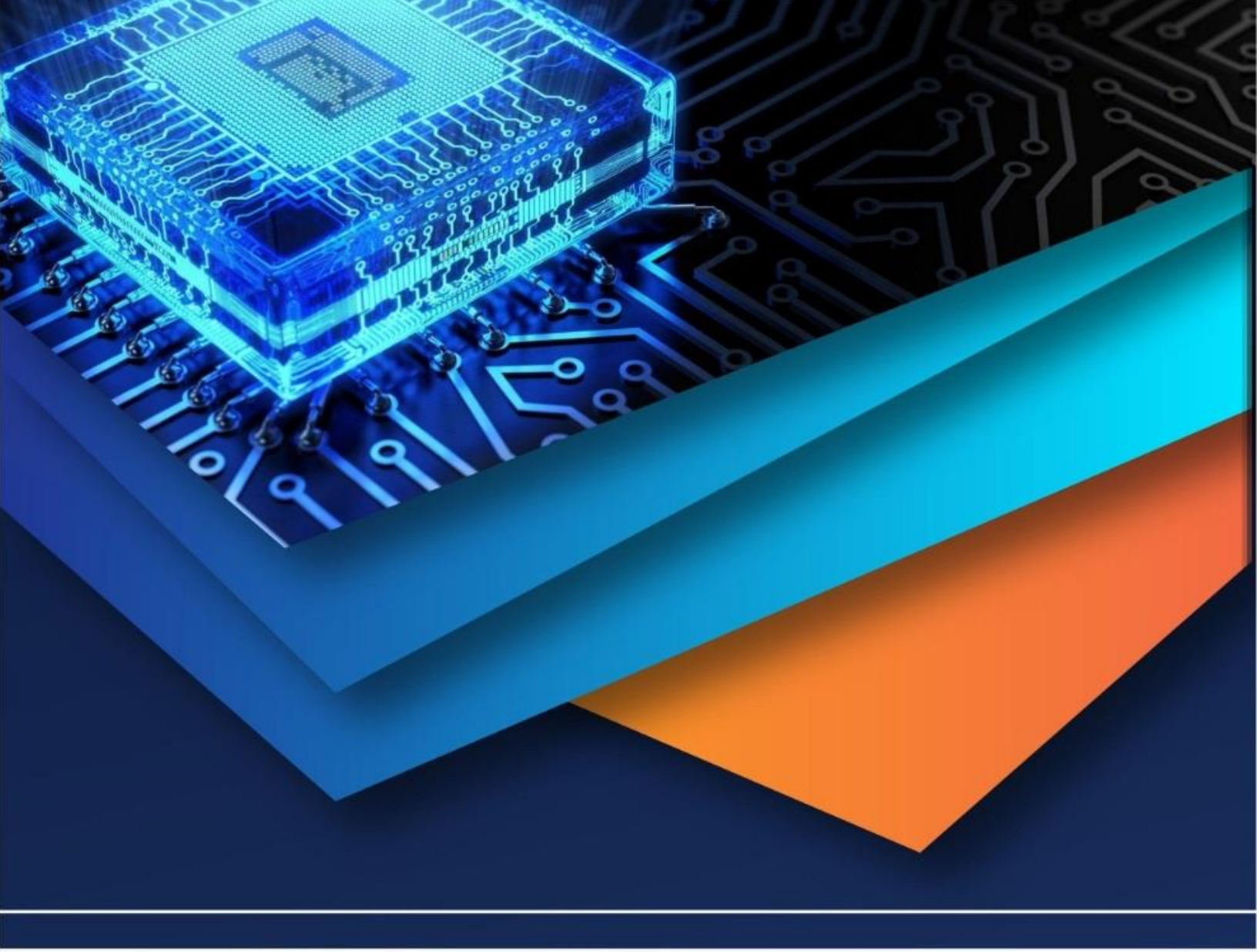
## VIII. ACKNOWLEDGEMENT

The authors gratefully acknowledge the guidance of Dr. MinaksheeM.Patiland the Department of Computer Engineering, K. J. College of Engineering and Management Research, Pune, for their invaluable support.

## REFERENCES

[1] T. M. Saravanan, M. Jagadeesan, P. A. Selvaraj, M. Aravind, G. D. Raj,P. Lokesh, " Prediction of diseases in mango leaves using aconvolutional neural network approach," in Proc. 2023 Int. Conf. on Computer Communication and Informatics (ICCCI), Coimbatore, India, 2023.
[2] A S. Kini, P. K. V. Reddy, and S. N. Pai, "A review of deep learning and image processing methods for plant leaf disease detection," Int. J. Electr. Comput. Eng. (IJECE), vol. 13, no. 3, pp. 3029–3040, 2023.
[3] T. R. Mahesh, V. Vinoth Kumar, R. Sivakami, I. Manimozhi, N.Krishnamoorthy, and B. Swapna, "Early-stage plant leaf disease detection using a MobileNetV2-based predictive model," Int. J. Intell. Syst. Appl. Eng.(IJISAE), vol. 11, no. 2, pp. 46–54, 2023.
[4] D. David, "A review of machine learning–based weather-driven prediction models for crop diseases and pests," Asian J. Agric. Extens.,Econ. Sociol., vol. 41, no. 11, pp. 334–345, 2023.
[5] B. U. Mahmud, A. Al Mamun, M. J. Hossen, G. Y. Hong, and B.Jahan,"A lightweight deep learning model for fast and efficient mango leaf disease classification," Emerg. Sci. J., vol. 8, no. 1, pp. 28–42, Feb. 2024.
[6] T.M. Saravanan, M.Jagadeesan, P. A. Selvaraj,M. Aravind, G. D.Raj, and P. Lokesh, " Prediction of diseases in mango leaves using a convolutional neural network approach," in Proc. 2023 Int. Conf. on Computer Communication and Informatics (ICCCI), Coimbatore, India, 2023.
[7] A S. Kini, P. K. V. Reddy, and S. N. Pai, "A review of deep learning and image processing methods for plant leaf disease detection," Int. J. Electr.Comput. Eng. (IJECE), vol. 13, no. 3, pp. 3029–3040, 2023.
[8] T. R. Mahesh, V. Vinoth Kumar, R. Sivakami, I. Manimozhi, N.Krishnamoorthy, and B. Swapna, "Early-stage plant leaf disease detection using a MobileNetV2-based predictive model," Int. J. Intell. Syst. Appl.Eng.(IJISAE), vol. 11, no. 2, pp. 46–54, 2023.
[9] D. David, "A review of machine learning–based weather-driven prediction models for crop diseases and pests," Asian J. Agric. Extens., Econ. Sociol.,vol. 41, no. 11, pp. 334–345, 2023.
[10] V. Krishna Pratap and N. Suresh Kumar, "Deep learning approaches for classifying and evaluating mango leaf diseases," ResearchGate Preprint,2024.
[11] B. Uddin Mahmud, A. Rahman, and S. Islam, "A lightweight Dense Net-based deep learning model for mango leaf disease identification," Emerg.Sci. J., vol. 8, no. 1, pp. 112–124, 2024.
[12] P. Mohanty, D. Hughes, and M. Salathé, "Image-based plant disease identification using deep learning," Front. Plant Sci., vol. 7, pp. 1–10, 2016.

©IJRASET: All Rights are Reserved | SJ Impact Factor 7.538 | ISRA Journal Impact Factor 7.894 |



10.22214/IJRASET

45.98

IMPACT FACTOR: 7.129

IMPACT FACTOR: 7.429

# INTERNATIONAL JOURNAL FOR RESEARCH

IN APPLIED SCIENCE & ENGINEERING TECHNOLOGY

Call : 08813907089 (24*7 Support on Whatsapp)