



## Rotten Fruit Disease Detection and Treatment using Recommended Pesticides

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### ABSTRACT –

Fruit diseases pose a severe threat to agriculture industry production and economic loss. The presence of illnesses in the fruit might cause a fruit's quality and yield to decline too much. Monitoring fruit's health and identifying diseases that are present are essential. In agricultural applications, such as disease detection, categorization, and grading, advanced computational approaches have been applied to assist farmers in routine farm activities with more precision, efficiency, productivity, and cost savings. the classification of disease that improves defect segmentation and fuses color, texture, and shape-based information.

### 1. INTRODUCTION

Fruit diseases possess a severe threat to agriculture industry production and economic loss. The presence of illnesses in the fruit might cause a fruit's quality and yield to decline too much. Monitoring fruit's health and identifying diseases that are present are essential. In agricultural applications, such as disease detection, categorization, and grading, advanced computational approaches have been applied to assist farmers in routine farm activities with more precision, efficiency, productivity, and cost savings. the classification of disease that improves defect segmentation and fuses color, texture, and shape-based information.

#### 1.1 Overview

Fruit diseases seriously jeopardize the agricultural industry's output and financial viability. It is possible for a fruit's quality and yield to drastically fall if it has diseases. It's crucial to keep an eye on fruit's health and spot any infections that might be present. Advanced computational methodologies have been used in agricultural applications, such as disease detection, categorization, and grading, to support farmers in normal farm chores with more precision, efficiency, productivity, and cost savings. the illness categorization that integrates color, texture, and shape-based information and enhances defect segmentation.

#### 1.2 Motivation

India is well known for its agriculture production. Farmers have variety of options to cultivate fruit in the field. Still, the cultivating this fruit for best harvest and top quality of production is done in a technical way. So, the yield can be increased and quality can be improved by the use of technology.

### 2. Literature Survey

#### 1. Paper Name: Fruit Recognition and Grade of Disease Detection using Inception V3 Model

**Author:** M. Nikhitha, S. Roopa Sri, B. Uma Maheshwari **Abstract:** In India, crop yield is declined due to the post-recognition of diseases in fruits/vegetables by the farmers. Farmers face great economic loss worldwide. Diseases in fruits and plants are the main reasons for the agricultural loss. Knowing the health status of fruits/vegetables helps farmers to improve their productivity. This motivates us to design and develop a tool to help farmers detect the diseases in the early stage itself. This work focuses on developing a user-friendly tool which recognizes the level of the disease and grades them accordingly. Inception model uses convolutional neural networks for the classification, which is again retrained using transfer learning technique. The proposed system also grades the fruit based on the percentage of infection. The system is developed in Tensor flow platform. For the proposed work banana, apple and cherry fruits have been considered.

#### 2. Paper Name: Image Segmentation K-Means Clustering Algorithm for Fruit Disease Detection Image Processing

**Author:** P. Kanjana Devi; Rathamani Abstract: Fruit diseases are always considered as a remarkable issue in the cultivating business carried out across the globe. This arises the need for manual checking framework. In this way, agriculturists require the manual analysis of fruits. Nevertheless, the continually manual watching does not provide adequate results and they generally require a heading from an expert. The world economy is primarily depending on the agribusiness as its development is diminishing when it has been appeared differently in relation to the expansion in intrigue and this ratio of intrigue versus creation is foreseen to be high in the upcoming years. Recently, clustering and fruit image segmentation algorithms are implemented for identifying the fruit diseases. To exhibit its importance, an algorithm plot is surveyed by utilizing various estimations. For instance, intensity ratio, specificity ratio, and probability ratio.

### 3. Paper Name: Fruit Disease Identification Based on Improved Densenet Fusion Defogging Algorithm

**Author:** Yan Qi; Chen Zhichao; Luo Lan Abstract: Disease is one of the main factors that threatens the growth of fruits in the field of fruit planting. This paper realized identification and control of fruit disease under complex environment through identification of fruit leaves, which plays a key role in improving yield and quality of the fruit. Basing on the above problems, this paper proposed a new type plant disease identification model basing on deep learning. The model firstly preprocessed and enhanced the image through image normalization processing and MSRCR defogging algorithm, and then used Canny SLIC algorithm based on gradient to perform high-precision segmentation of the data set of disease image, and then get the leave blades with the characteristics of disease spots. Finally, the improved Dense Net algorithm was used to recognize and classify the disease features of the images and complete the identification of fruit disease images. Among fruit diseases, take Grape spot anthracnose, Grapevine white rot and Grapevine anthracnose for testing samples, and the results showed that the average accuracy of the model was 98.98.

### 4. Paper Name: Analysis of diseases in fruits using image processing techniques.

**Author:** Kawaljit Kaur; Chetan Marwaha Abstract: Agriculture plays critical part in harvesting any culture. In fact, human civilization greatly depends upon agriculture. Regular Filed prevalence and water management in soil is key to achieving goal of good production. Plant and fruit diseases are greatly affecting quality and quantity associated with production. Diseases are common now days. The pesticides and other harmful manure are biggest obstacle in this area. This paper analyzes diseases caused due to fruit harvesting. Image processing techniques are used in order to analyze degradation of fruit crop. Analysis of Filtering techniques associated with distortion detection is presented in comprehensive manner.

t classifier

**Author:** Bhavini J. Samajpati; Sheshang D. Degadwala Abstract: Nowadays, abroad trade has expanded definitely in numerous nations. Plenty fruit products are foreign from alternate countries, for example, oranges, apples and so forth. Manual extracted from the test image, then color and texture features are fused together and random forest classifier is used for diseases classification and if the fruit is infected by any of the one disease, then the infected part is segmented using k-means clustering technique. The accuracy of the disease's classification will improve by feature level fusion.

## 3. Analysis Model

The SDLC life cycle chosen for the project "Distributed Web Application for Vulnerability Scanning" is Waterfall model. The Waterfall Model was the first Process Model to be introduced. It is also referred to as a linear-sequential life cycle model. It is very simple to understand and use. In a waterfall model, each phase must be completed before the next phase can begin and there is no overlapping in the phases. The Waterfall model is chosen for the project because all the requirements of the project is under consideration at the requirement phase and no additional function is to be added at the middle of the project. The waterfall model was closely matching our project details and implementation. The water model consists of six phases mainly requirement analysis, System Design, Implementation, Testing, Deployment, Maintenance.

## 4. System Architecture

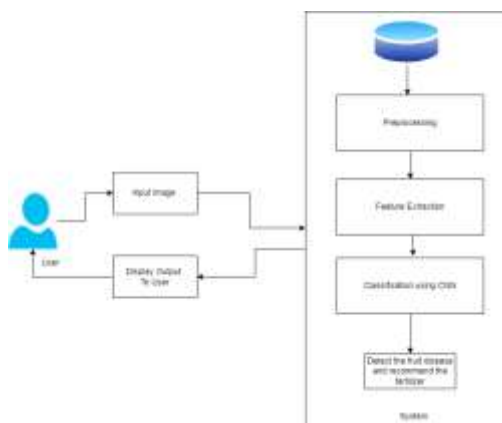


Fig. 1 System Design

**Modules:**

**Admin:** - In this module, the admin has to log in by using valid user name and password. After login successful he can do some operations, such as View All Users and Authorize, View All E-Commerce Website and Authorize, View All Products and Reviews, View All Products Early Reviews, View All Keyword Search Details, View All Products Search Ratio, View All Keyword Search Results, View All Product Review Rank Results.

- **View and Authorize Users:** - In this module, the admin can view the list of users who all registered. In this, the admin can view the user's details such as, user name, email, address and admin authorize the users.
- **View Charts Results:** - View All Products Search Ratio, View All Keyword Search Results, View All Product Review Rank Results.
- **Ecommerce User:** - In this module, there are n numbers of users are present. User should register before doing any operations. Once user registers, their details will be stored to the database. After registration successful, he has to login by using authorized user name and password. Once Login is successful user will do some operations like Add Products, View All Products with reviews, View All Early Product's reviews, View All Purchased Transactions.
- **End User:** - In this module, there are n numbers of users are present. User should register before doing any operations. Once user registers, their details will be stored to the database. After registration successful, he has to login by using authorized user name and password. Once Login is successful user will do some operations like Manage Account, Search Products by keyword and Purchase, View Your Search Transactions, View.

**5. Algorithms Used****a) CNN**

A convolutional neural network (CNN or convnet) is a subset of machine learning. It is one of the various types of artificial neural networks which are used for different applications and data types. A CNN is a kind of network architecture for deep learning algorithms and is specifically used for image recognition and tasks that involve the processing of pixel data. There are other types of neural networks in deep learning, but for identifying and recognizing objects, CNNs are the network architecture of choice. This makes them highly suitable for computer vision (CV) tasks and for applications where object recognition is vital, such as self-driving cars and facial recognition.

**b) Elephant Herding Optimization**

Elephant herding optimization (EHO) is a nature- inspired metaheuristic optimization algorithm based on the herding behavior of elephants. EHO uses a clan operator to update the distance of the elephants in each clan with respect to the position of a matriarch elephant.

**6. Applications**

- Gives an effective savvy cultivating method which will help for better yield and development with less human endeavors.
- With brilliant cultivating the present agriculturist can utilize choice instruments and mechanization strategies which flawlessly coordinate item, learning and administrations for better efficiency, evaluating and surplus yield.
- It would likewise elevate Indian Farmers to do smart cultivating which sets aside opportunity to time choices which additionally spare time and lessen loss of fruit because of diseases.

**7. Experimental Results/Screenshots**

Fig. 2 Screenshot (a)

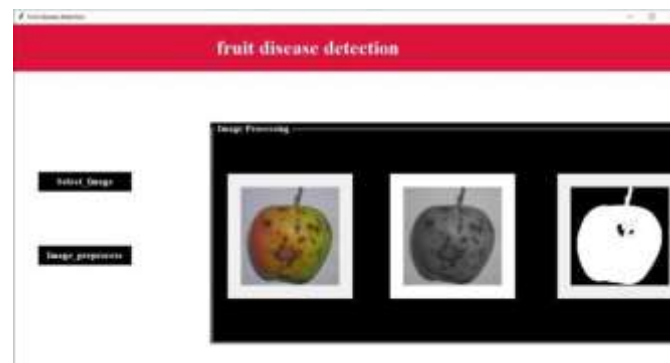


Fig. 3 Screenshot (b)

## 8. Future Scope

- i. Feature work or scope is one of the important steps in the system of fruit disease classification and treatment.
- ii. In the future we detect the how many percent disease covered by fruit and recommend its reinvoice for fruit protection.
- iii. We can implement this system while the process of growing fruits along with AI and IOT.
- iv. In the future we detect the how many percent disease covered by fruit and recommend its predivorce for fruit protection.

## 9. Conclusions

Image processing-based method for the identification and categorization of fruit illnesses. The proposed method consists mostly of three steps. Using the K-Means clustering technique, image segmentation is carried out in the first stage. Features are extracted in the subsequent stage. The third step involves training and classification on a CNN. Additionally, it would encourage Indian farmers to use smart farming, which enables them to make timely decisions that also save time and lessen fruit loss from diseases. Our paper's main goal is to increase the utility of fruit disease diagnosis.

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