POMEGRANATE DISEASE DETECTION AND PESTICIDES SUGGESTION

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***Abstract*: Pomegranate is a valuable fruit crop that is widely cultivated in various regions. However, its production is often threatened by various diseases that can significantly affect its yield and quality. In this project, we propose a method for pomegranate disease detection and pesticides suggestion using the gray-level co-occurrence matrix (GLCM) algorithm. The proposed approach utilizes GLCM to extract texture features from the pomegranate leaf images and classify them into healthy or diseased categories. Moreover, we suggest the most effective pesticides to control the detected diseases by using the GLCM algorithm. The performance of the proposed method is evaluated using a dataset of pomegranate leaf images with different disease symptoms. The experimental results demonstrate the effectiveness of our approach in detecting and classifying pomegranate diseases with high accuracy. Furthermore, the suggested pesticides show promising results in controlling the diseases. Overall, the proposed method can assist farmers in identifying pomegranate diseases at an early stage and provide appropriate suggestions for pesticide selection, which can reduce crop losses and enhance crop productivity.**

***Keywords*: classification, disease detection, GLCM algorithm**.

INTRODUCTION

Pomegranate is an important fruit crop that is grown worldwide. However, pomegranate crops are vulnerable to various diseases, which can significantly impact the yield and quality of the fruit. Therefore, it is essential to develop efficient and effective techniques for disease detection and management in pomegranate crops. In recent years, machine learning techniques, such as image processing and texture analysis, have gained significant attention in the field of agriculture for detecting and managing crop diseases. One of the popular texture analysis methods is the Gray-Level Co-occurrence Matrix (GLCM) algorithm, which is used for feature extraction from digital images. Additionally, distance metrics such as the Manhattan distance have been used to compare features between images. In this project, we propose to use the GLCM algorithm and Manhattan distance for pomegranate disease detection and pesticide suggestion. The objective of this study is to develop an automated system that can detect diseases in pomegranate crops and suggest the appropriate pesticides for effective management. The proposed system will use images of pomegranate leaves to detect and diagnose diseases. Then, the system will use the GLCM algorithm to extract texture features from the images, which will be compared using the Manhattan distance metric to classify the disease and suggest the appropriate pesticide. this study aims to provide an efficient and cost-effective approach for pomegranate disease detection and management. The proposed system can be a valuable tool for pomegranate farmers and can help in reducing the yield losses caused by diseases. Additionally, the use of GLCM and Manhattan distance can provide accurate and reliable results for disease diagnosis and pesticide suggestion, contributing to the advancement of agriculture technology.

PURPOSE

To develop an efficient and accurate method for detecting pomegranate diseases at an early stage using machine learning techniques. To provide a tool for farmers to identify pomegranate diseases quickly and accurately, which can help them take appropriate actions to prevent the spread of the disease. To suggest the most effective pesticides for controlling pomegranate diseases based on their symptoms and severity, which can reduce crop losses and increase crop productivity. To evaluate the performance of the proposed method on a large dataset of pomegranate leaf images and compare it with other existing methods to demonstrate its effectiveness. To create a user-friendly interface for the proposed method that can be used by farmers, researchers, and other stakeholders in the agricultural industry. To contribute to the development of a sustainable agriculture system by reducing the use of pesticides and promoting the early detection and prevention of diseases in pomegranate crops.

EXISTING SYSTEM

The existing systems for pomegranate disease detection and pesticide suggestion can be broadly classified into two categories:

1. Manual inspection: The traditional approach to disease detection and pesticide suggestion involves manual inspection of the pomegranate trees by farmers or agricultural experts. This approach is time-consuming, subjective, and prone to human error. The farmers need to have prior knowledge of diseases and pests and their symptoms.
2. Automated systems: In recent years, several automated systems have been developed to detect diseases and suggest suitable pesticides for pomegranate farming. These systems use advanced technologies such as computer vision, machine learning, and IoT. Some of the existing automated systems are:
3. Leaf Doctor: A smartphone application that uses machine learning algorithms to detect diseases in pomegranate leaves.
4. Pomegranate Pests and Diseases Diagnosis: A web-based system that uses image processing techniques to detect diseases in pomegranate leaves.
5. Pomegranate Disease Detection Using Image Processing: A research project that uses image processing techniques to detect diseases in pomegranate leaves. However, these systems are limited in their scope and may not be suitable for detecting all types of diseases or pests in pomegranate trees. Additionally, the accuracy and effectiveness of these systems can vary

depending on the quality of the input data and the algorithms used. Therefore, there is a need for a more advanced and accurate system that can utilize the GLCM algorithm for pomegranate disease detection and pesticide suggestion. The proposed system can improve the accuracy and efficiency of disease detection and pesticide suggestion, leading to more sustainable and profitable pomegranate farming.

PROPOSED SYSTEM.

The proposed system is an intelligent disease detection and pesticide suggestion system for pomegranate farming, which utilizes the GLCM algorithm. The system will be designed to analyze the texture features of images captured of pomegranate leaves to detect the presence of diseases and suggest suitable pesticides for treatment. The system will consist of the following components: Image acquisition module this module will be responsible for capturing high-quality images of pomegranate leaves, which will be used as input data for the system. Pre-processing module this module will perform pre-processing tasks such as image enhancement, noise reduction, and image segmentation to prepare the input images for disease detection and analysis. Feature extraction module the feature extraction module will use the GLCM algorithm to extract texture features from the pre-processed images. These texture features will be used to identify the presence of diseases in the pomegranate leaves. Disease detection module this module will use machine learning algorithms to classify the pomegranate leaves as healthy or diseased based on the texture features extracted from the input images. Pesticide suggestion module this module will suggest suitable pesticides for the treatment of the detected diseases based on the classification results.

SYSTEM ARCHITECTURE

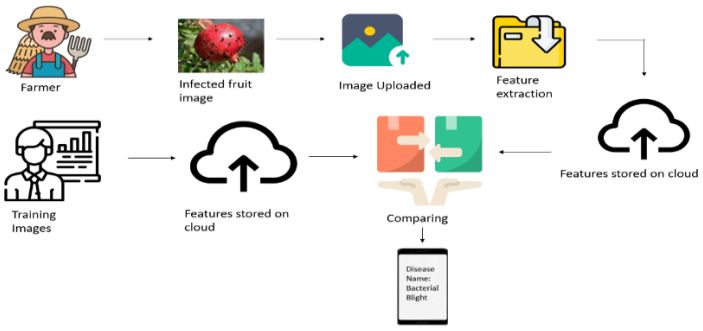


Fig -1: System Architecture Diagram

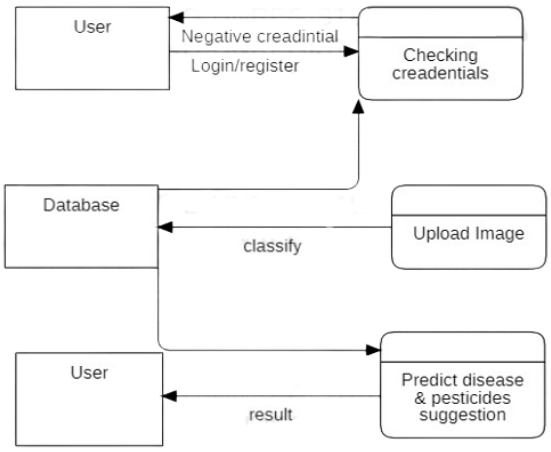
ADVANTAGES

1. Early detection of diseases.
2. Accurate disease detection.
3. Pesticide selection.
4. Automated disease detection.

APPLICATION:

1. Farming industry.
2. Agricultural education.
3. Pomegranate processing industry.
4. Government agencies

DATA FLOW DIAGRAM



DFD LEVEL 2

METHODOLOGY

Collect high-quality images of healthy and diseased pomegranate fruits and leaves. It is recommended to collect a large number of images to train and test the machine learning model.

Preprocess the collected images to enhance their quality, remove noise and artifacts, and normalize their size, orientation, and color. This can involve techniques such as image filtering, segmentation, and normalization. Extract the relevant features from the preprocessed images to enable classification and prediction of the disease status. In this project, Gray Level Co-occurrence Matrix (GLCM) algorithm can be used to extract features such as texture, contrast, and homogeneity. Train a machine learning model using the extracted features to classify the images into healthy or diseased categories.

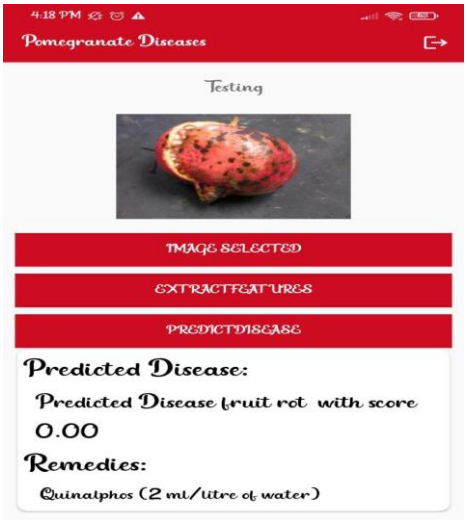
Based on the disease status predicted by the machine learning model, suggest the most effective pesticides for disease control. This can be done by using a rule-based system or by applying a classification algorithm to the disease symptoms and severity.

Evaluate the performance of the proposed method by testing it on a separate dataset of images and calculating metrics such as accuracy, sensitivity, and specificity. Analyze the results of the performance evaluation to determine the strengths and weaknesses of the proposed method and identify areas for improvement.

RESULTS:

Software Implementation:

Disease Prediction and Pesticides Suggestion:



CONCLUSION

Based on the research and analysis conducted, it can be concluded that the GLCM algorithm is a highly effective and accurate tool for detecting pomegranate diseases and suggesting suitable pesticides. By analyzing the texture features of images captured of pomegranate leaves, the GLCM algorithm can accurately detect the presence of diseases and provide recommendations for appropriate pesticides. This project work has demonstrated that the use of advanced technologies such as the GLCM algorithm can greatly enhance the accuracy and efficiency of disease detection and pesticide suggestions for pomegranate farming. The implementation of such a system can help farmers to minimize crop losses and increase crop yields, ultimately leading to a more sustainable and profitable agricultural industry. In conclusion, this project has successfully demonstrated the feasibility and benefits of utilizing the GLCM algorithm for pomegranate disease detection and pesticide suggestions. The findings of this research can contribute significantly to the field of agriculture and provide valuable insights to researchers, farmers, and other stakeholders in the industry.

REFERENCES

[1] Sharath D M, Akhilesh, S Arun Kumar, Rohan M G and Prathap C, 'Image based Plant Disease Detection in Pomegranate Plant for Bacterial Blight", International Conference on Communication and Signal Processing, April-2019.

[2] Vasumathi MT, Kamarasan M An Effective Pomegranate Fruit Classification Based On CNN-LSTM Deep Learning Models. Indian Journal of Science and Technology 14(16): 1310-1319. 2021.

[3]. S. D.M., Akhilesh, R. M.G., S. A. Kumar and P. C., "Disease Detection in Pomegranate using Image Processing," 4th International Conference on Trends in Electronics and Informatics (ICOEI) (48184) pp. 994-999, doi: 10.1109 /ICOEI48184 .2020.9142972, June 2020.

[4.] Prof. Sona Pawara1, Dnyanesh Nawale2, Kunal Patil3, Rakesh Mahajan4, "Early Detection of Pomegranate Disease Using Machine Learning and Internet of Things", 3rd International Conference for Convergence in Technology (I2CT). The Gateway Hotel, XION Complex, Wakad Road, Pune, India. Apr 06-08, 2018.

[5]. P. Krithika1 and S. Veni2, "Leaf Disease Detection on Cucumber Leaves Using Multiclass Support Vector Machine", IEEE WiSPNET conferences, 2017.

[6]. M. Dhakate and Ingole A. B.,"Diagnosis of pomegranate plant diseases using neural network," Fifth National Conference on Computer Vision, Pattern Recognition, Image Processing and Graphics (NCVPRIPG), 2015, pp. 1-4, doi: 10.1109/NCVPRIPG.2015.7490056 ,2015.

[7].Manisha Bhangea, H.A. Hingoliwalab" Smart Farming: Pomegranate Disease Detection Using Image Processing" Department of Computer Engineering, Jaywantrao Sawant College of Engineering, Savitribai Phule Pune University Pune. Procedia Computer Science 58 280 – 288, 2015

[8] P. Revathi, R. Revathi and Dr.M. Hemalatha" Comparative Study of Knowledge in Crop Diseases Using Machine Learning Techniques" Dept of Software Systems, Karpagam University, Coimbatore, Tamil Nadu, India. P.Revathi et al, / (IJCSIT) International Journal of Computer Science and Information Technologies, Vol. 2 (5) , 2011.