

Application of AI Technology and Image Processing to Smart Agriculture: Detection and Classification of Plant Diseases

Ramyashree

Department of Information and
Communication Technology,
Manipal Institute of Technology,
Manipal Academy of Higher Education
Manipal, 576104, India
ramya.shree@manipal.edu

Venugopala Rao A S

Department of computer science and
Engineering,
Alva's Institute of Engineering &
Technology, Moodbidri, India
Mijar Moodbidri, 574225, India
rao.venugopal@gmail.com

Abstract—Every country's fundamental necessity is agricultural products. Infected plants have a detrimental impact on agricultural output and economic assets in the country. According to previous research, 68% of agricultural productivity is lost, and this is attributed only to the rising incidence of plant leaf disease losses. To solve this significant problem, the screening strategy can be used to diagnosis disease from the photos captured. We've used certain sorts of plants in our research, such as and potatoes, peppers and tomatoes. This procedure included preprocessing, image segmentation, and feature extraction. On the basis of the results of these three steps, the K Nearest Neighbor (KNN) classification is implemented. As a consequence, we had outstanding accuracy (98.23%) in predicting plant leaf diseases across all data sets.

Keywords— Plant Leaf Disease Detection, KNN, Image Segmentation, Machine Learning, Classification.

I. INTRODUCTION

Agriculture is vital to each country's economy, and farmers have a wide variety of crops to choose from. The issue or difficulty arises when the crops become infected with a disease and the growers are unaware of the disease until it is too late. And when the illness is discovered, the farmers have no idea what it is. Plant diseases are caused by fungus, viruses, molds, and other microorganisms. Therefore, it is essential to identify the plants disease in an exact and accurate manner [1]. To get the desired result, the proposed technique makes use of digital image processing technology. A human eye cannot precisely determine the illness extent since the results are ambiguous. An automated mechanism designed to assist the detect Learners in the growing process, as well as qualified experts, could benefit greatly from the presence and obvious indicators of diseases as an infection diagnostic verification method. [2]. In this work, we evolve a knowledge engineering approach for detecting and classifying plant disability. Our deep learning work exist stand on KNN [3].

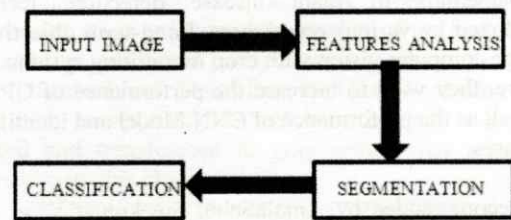


Fig. 1. Block Diagram of Disease detection

Structure, surface, brightness, sharpness, coherence, and intensity among the features that may be analyzed using a two-dimensional photograph of a leaf[4]. The form and roughness information are retrieved at the regional level, and the coloured histogram is flavored for assessing worldwide medical care images to describe the color. Similarly, k-mean cluster is recommended for segmentation and at last classification is done[5] as shown in the Figure 1

II. LITERATURE SURVEY

Amrita S.Tulshan and Nataasha Rau[1]. Proved utilising KNN classifier over SVM classifier, offer improvement in current classification strategies for disease identification using machine learning. After validation with the KNN Classifier, the precise disease label for any amount of disease identification is displayed. Linear SVM, on the other hand, exhibits inaccuracy when more than two disorders are offered. It indicates that SVM is limited to superior for detecting two illnesses, not for more. The test data show that the suggested method is 98.56% accurate, while the present system is only 97.6% accurate.

Marwan Adnan Jasim and Jamal Mustafa AL-Tuwaijari[2], carried out the research in order to acquire results utilizing the CNN algorithm. Achieved excellent results of over 98%, allowing for highly precise and quick identification of the type of infection as well as the type of plant that transmits the disease through its leaves. Distinct plants, worldwide and necessary in our country, which are

H.O.D
Dept. of Computer Science and Design
Alva's Institute of Engg. & Technology
Mijar, Moodbidri - 574 225