Patent Search

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Inventor

Name	Address	Country
Dr. M Nagaraju	Assistant Professor, Department of CSE(AI&ML), Institute of Aeronautical Engineering, Dundigal, Hyderabad. Email: m.nagaraju@iare.ac.in	India
Dr. Priyanka Chawla	Associate Professor, Department of CSE, National Institute of Technology, Warangal.Email: priyankac@nitw.ac.in	India
Dr. P. Ashok Babu	Professor, Department of CSE(AI&ML), Institute of Aeronautical Engineering, Dundigal, Hyderabad. Email: p.ashokbabu@iare.ac.in	India

Applicant

Name	Address	Country
Dr. M Nagaraju	Assistant Professor, Department of CSE(AI&ML), Institute of Aeronautical Engineering, Dundigal, Hyderabad. Email: m.nagaraju@iare.ac.in	India
Dr. Priyanka Chawla	Associate Professor, Department of CSE, National Institute of Technology, Warangal.Email: priyankac@nitw.ac.in	India
Dr. P. Ashok Babu	Professor, Department of CSE(AI&ML), Institute of Aeronautical Engineering, Dundigal, Hyderabad. Email: p.ashokbabu@iare.ac.in	India

Abstract:

This invention proposes a novel CNN-based neural network model named NPNet-19 that accurately classifies seven different kinds of maize crop diseases, including t crop, with a higher level of classification accuracy when compared with other existing models. The proposed model was trained and tested using diverse datasets coll public repositories and a real agriculture field, with various image augmentation techniques used to generate new images from the original ones, overcoming the cha limited image availability. A comparison of the proposed model with ten other existing models using several performance metrics, such as accuracy, loss, number of v predictions, precision, recall, and f1-score, demonstrated its superior classification performance. Accurately diagnosing crop diseases can lead to better yields and hig produce, ultimately improving the economic outcome of farming practices. The proposed model can reduce reliance on manual diagnosis, which can be time-consum expensive, and often subjective, by using a machine learning-based approach. It can also increase access to diagnosis, particularly in regions where expert diagnosis i available or affordable, ultimately improving the management of crop diseases and reducing the impact of diseases on crop yields and food security. The invention h potential to foster innovation in precision agriculture by expanding the use of machine learning techniques in the field of crop disease diagnosis, leading to new adva precision agriculture and improving the sustainability and efficiency of food production.

Complete Specification

Description:The primary thing in agriculture is the timely recognition of crop diseases. As the verification process is conducting manually it is becoming very difficult recognize the disease categories. With an increase in cultivation, the early detection of disease symptoms can increase the productivity, address environmental and economic concerns. The disease identification has become very critical due to lack of infrastructure. Automatic recognition of crop diseases is a complex and a chall task for sustainable cultivation. Recent developments in deep learning have shown a remarkable improvement in the early recognition of crop diseases.

In this research a convolutional neural networks-based approach has been followed to address seven different types of disease identification in maize crop. A syste method has been followed to address the classification problem. First, a review of existing deep learning techniques, data acquisition, image processing techniques, augmentation techniques, neural network models and their performance have been conducted. Second, image acquisition and enrichment process to prepare trair testing image sets has been carried out. Third, a new CNN architecture named NPNet-19 is proposed, designed and developed from the scratch. The model is traine 80% of images gathered from internet repositories. The model is tested with 20% of image acquired from real agricultural field. After the experimental process, the have shown that the classification performance of the proposed model is more accurate than the other ten existing models. During experiments, a total of 15,960 ir have been considered where 13,300 images for training and 2660 images were used for classification.
From the literature review, the study has observed some significant challenges (research gaps) for detecting and classifying the diseases in maize crop. Some of ther

- Acquiring the appropriate images is difficult especially in the field of agriculture

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