IJIRCCE

e-ISSN: 2320-9801 | p-ISSN: 2320-9798

INTERNATIONAL JOURNAL OF INNOVATIVE RESEARCH

IN COMPUTER & COMMUNICATION ENGINEERING

Volume 10, Issue 5, May 2022

INTERNATIONAL STANDARD SERIAL NUMBER INDIA

Impact Factor: 8.165

International Journal of Innovative Research in Computer and Communication Engineering

| e-ISSN: 2320-9801, p-ISSN: 2320-9798| www.ijircce.com | |Impact Factor: 8.165 |

|| Volume 10, Issue 5, May 2022 ||

| DOI: 10.15680/IJIRCCE.2022.1005170|

Crop Disease Detection Using Deep Neural Network

Samiksha Jangam, Harshali Johari, Kritika Kadam, Kartiki Patil

Department of Information Technology, Nutan Maharashtra Institute of Engineering and Technology, Pune, India

ABSTRACT: India is global powerhouse of agricultural sectors India is a largest producer of growing varieties of different crops . Agriculture accounts nearly about 70% of the Indian economy, yet leaf infection causes the loss of major crops, resulting in economic losses. Folium infection is the type of disease- causing organisms such as bacteria, viruses, and fungus into leaf tissues, resulting in leaf and plant degeneration. Digital image processing and image analysis technology, which is based on improvements in microelectronics as well as computers, has a larger range of applications in our biology and avoids some drawbacks of traditional photography image processing method.

KEYWORDS*:* Convolutional Neural Network, crop disease Feature extraction, classification, deep neural network..

I. INTRODUCTION

When it comes to increasing productivity and crop production efficiency Analytical Prediction Agricultural systems are particularly easy. On the other hand, population grows slowly, while crop production resources decreases everyday. Traditionally, in farming either planting or harvesting a crop according to a set schedule. In India, the bulk of agricultural crops have been negatively impacted by climate change in terms of performance over the last 20yrs [1]. In an farm-based country, agricultural planning aims to maximize crop yields while utilizing limited land resources[2]. They demonstrated in their research that a method to address the crop selection problem and method. Nowadays, many are not aware of the importance of cultivating crops at the accurate time and location[3]. Machine learning techniques can be used to improve crop yield prediction in various climate conditions. This work gives an overview of the use of such machine learning techniques crop producing areas in India[4]. If pests attack plants and crops, it has an impact on the country's agricultural production[5]. In their study, they proposed identifying plant symptoms at an early stage. Real-time weather data, air quality, soil, crop maturity, machinery, labor costs, and current data availability are all required for precision agriculture. This type of predictive analytics can be useful in the agricultural area, it was used to make better decisions. Farmers predict diseases based on their experience; but, this is not the best technique. Bacteria, fungus, viruses, and other microorganisms can lead to crop diseases. To control this, diseases in the crop are diagnosed using a Neural Networks algorithm based on type of leaf disease, allowing us to take the appropriate procedures in time to minimize production loss. People photograph a leaf of a harvest that he has won on his farm in this concept. After clicking, the image will be submitted to the server, where it will be processed and the features of the image extracted as per.

.

Consultant oculus inspection is the most widely used approach for detecting and identifying plant diseases.

The main cause of for this not accepting in the agriculture sector is due to the fact that farmers are not empowered or well educated and due to lack of application of IT in the farming sector. Farmers have less knowledge about the different crops they grow.

We can be able to overcome this obstacle by applying machine learning techniques to predict the crop yield and name by considering various factors such as temperature, rainfall, Season and area along with this applying deep learning algorithm techniques to detect disease the crop images.

II. PROPOSED METHODOLOGY

In this proposed algorithm, the aim is to detect the diseases in plants by considering leaves. In this proposed method, we are providing the type of disease that the leaf is affected by, from the images, and shows the contaminated region of the leaf by the means of image processing technique. The result will be provided within less time and the percentage of the area affected and also higher accuracy.

International Journal of Innovative Research in Computer and Communication Engineering

| e-ISSN: 2320-9801, p-ISSN: 2320-9798| www.ijircce.com | |Impact Factor: 8.165 |

|| Volume 10, Issue 5, May 2022 ||

| DOI: 10.15680/IJIRCCE.2022.1005170|

CONVOLUTIONAL NEURAL NETWORK

A Convolutional Neural Network (ConvNet/CNN) is a Deep Learning system that can take an input as image, assign the material (learnable weights and biases) to various aspects/objects in the pictures, and difference between them. When compared to other classification methods, the amount of pre-processing required by a ConvNet is significantly less. While basic techniques needed hands-on-engineering of filters, ConvNets can learn these filters/characteristics with enough training.

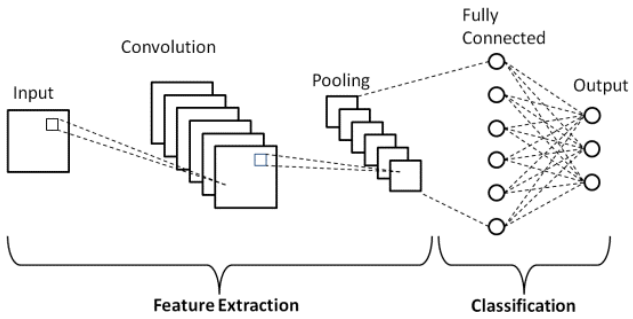

fig1. Feature Extraction and Classification

PROJECT STUDY AREA

The Project Study Area is the area from which all identified environmental resources are gathered to classify field data. This area is set up early in the planning process and needs to be sufficiently wide to include possible conceptual project sub alternatives.

User Classes and Characteristics

Our system is divided into two class/modules:

1) user
2) system

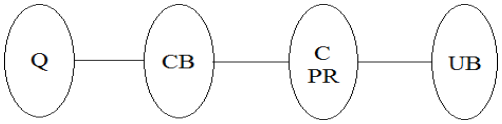

fig2. Mathematical Modeling

Where,
Q = User entered input CB = preprocess
C= feature selection
PR= Preprocess request evaluation UB = predict outcome

Set Theory

1) Let S be as system which input image S = {In, P, Op, }
2) Identify Input In as

In = {Q}
Where,
Q = User entered input image(dataset)

3) Identify Process P as

P = {CB, C, PR}
Where,
CB = System check entered list is present in ct image or not
C =predict crop disease PR = Preprocess request

| e-ISSN: 2320-9801, p-ISSN: 2320-9798| www.ijircce.com | |Impact Factor: 8.165 |

|| Volume 10, Issue 5, May 2022 ||

| DOI: 10.15680/IJIRCCE.2022.1005170|

4) Identify Output Op as
Failures and Success conditions.

Failures:
Large database can lead to more time consumption to get the information.
Hardware failure. Software failure.

Achievement:
Search the required information from available in Datasets. User will get any result fast according to their need.

Space Complexity:
The space complexity depends on visualization or presentation of discovered patterns. Space complexity is more as the storage of data more.

Time Complexity:

Here, Check No. of patterns available in the datasets= n
If (n>1) then retrieving of information can be time taking. So the time complexity of this algorithm is O

A.System Architecture:

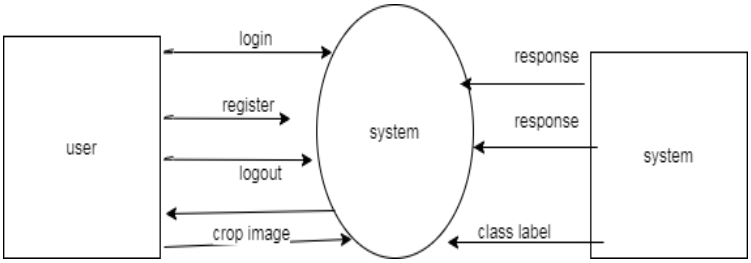

Fig3. System Architecture

B.Data Flow Diagram:

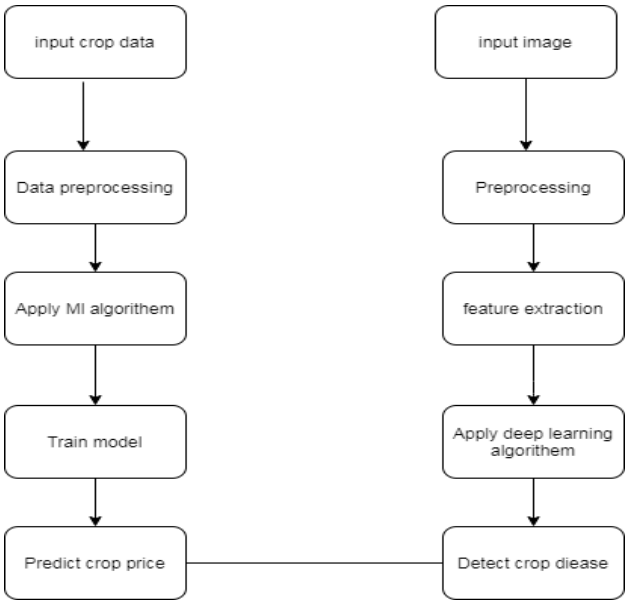

Fig4. Data Flow Diagram

International Journal of Innovative Research in Computer and Communication Engineering

| e-ISSN: 2320-9801, p-ISSN: 2320-9798| www.ijircce.com | |Impact Factor: 8.165 |

|| Volume 10, Issue 5, May 2022 ||

| DOI: 10.15680/IJIRCCE.2022.1005170|

III. TESTING METHODS

A. *Unit Testing*

Some of the gadgets or components of software are examined in unit testing, which is a like software testing. Unit testing has the profit of isolating each portion of the program and demonstrating whether or not the individual pieces are proper. All of these units or modules are individually evaluated and produce results as desired.

B. *Integration Testing*

It is a form of testing in which both software and hardware modules are integrated and tested as a unit. The goal of integration testing is to ensure that any module's input and output requirements are met by the previous module. In our suggested work, the video stream is passed to the next module for object detection, which is then passed to the next module for time determination using the timer's technique. Here,the integration testing was completed successfully, with no system crashes.

C. *White Box Testing*

White box testing is a software testing technique that involves testing the product's internal structure, design, and coding in order to verify flow which is in input-output format and improve design and usability as well as safety. It is one of two components of the software testing approach which is known as Box Testing. Black box testing, on the other hand, entails testing from an external or end-user perspective. White box testing, on the other hand, is centered on internal testing and is focused on the inner workings of an application.

D. *Testing In A Black Box*

The another type of software testing is Black-box is type of testing which looks at an application's functioning without seeing inside its internal structures or functioning. This test approach can be used at all levels of software testing, including unit, integration, system, and acceptance. Specification-based testing is another name for it.

E. *Test Cases And Outcomes*

Test cases are the scenarios that are used to see if the system is performing as planned or not. Any application mistake can be rectified in the code. Test examples with technique, expected output, and actual output are included in this section.

Case Summary	Predicting Crop Disease accurately
Prerequisites	Crop uploaded and model working correctly
Test Procedure	Entering image input processing it. Feeding it the model for prediction
Expected Result	Crop Disease prediction
Actual Result	Crop Disease prediction
Status	Pass

IV. CONCLUSION

The report tells us, the scope continues to be open for the outcome enhancement and improvement. During the studies that we carried out, it is noted that a particular theme is not used by writers where all the variables are involved. It is possible to use the effect on crop yield at a time to estimate crop yield. The dataset used here is considered to be limited

| e-ISSN: 2320-9801, p-ISSN: 2320-9798| www.ijircce.com | |Impact Factor: 8.165 |

|| Volume 10, Issue 5, May 2022 ||

| DOI: 10.15680/IJIRCCE.2022.1005170|

sometimes, there is also more space for development also. The outcome can also be strengthened by using a large dataset.

REFERENCES

1. Ramkrishna Vadali, Swati Sakhare , Jayshri Patil, and Sonali Nale "Technical Advances in Precision Farming" International Journal of Computer Applications(0975–8887)Volume 180 – No.6, December 2017.
2. Machine learning approach for forecasting crop yield based on climatic parameters.
3. Crop selection method to maximize crop yield rate using machine learning techniques.
4. An IoT Environmental Data collection system for Fungal Detection in Crop Fields.
5. "Linear Regression-Intro to Machine Learning #6- simple AI-Medium", available at https://medium.com/simple-ai/linear-regression-intro- tomachine-learning-6-6e320dbdaf06, visited in February 2018
6. Predictive Analysis in Agriculture to Improve the Crop Productivity using Zero R algorithm.
7. "Agriculture in India: Industry Overview, Market Size, Role in Development...|IBEF", available athttps://www.ibef.org/industry/agriculture-india.aspx, visited in February 2018
8. Rossi, V., Onesti, G., Legler, S.E., "Use of systems analysis to develop plant disease models based on literature data: grape black-rot as a case study", European Journal of Plant Pathology, 141, Issue 3, March 2015,pp 427–444.
9. M. R. Sosnowski, R. W. Emmett, W. F. Wilcox, T. J. Wicks, "Eradication of black rot (Guignardia bidwellii) from grapevines by drastic pruning", Plant Pathology,Volume 61, Issue 6, December 2012,pp 1093-1102.
10. Juncheng Ma, Keming Du, Lingxian Zhang, Feixiang Zheng, JinxiangChu, Zhongfu Sun, "A segmentation method for greenhouse vegetable foliar disease spots images using color information and region growing", Computers and Electronics in Agriculture, Computers and Electronics in Agriculture 142, 2017, pp 110–117
11. "Onion, tomato price spike: season not the only reason", available at https://www.thehindubusinessline.com/econo my/agri-business/oniontomato- price-spike- season-not-the-only- reason/article9957255.ece, visited in February 2018.

INNO SPACE
SJIF Scientific Journal Impact Factor

Impact Factor: 8.165

doi cross ref

ISSN INTERNATIONAL STANDARD SERIAL NUMBER INDIA

निस्केयर NISCAIR

INTERNATIONAL JOURNAL OF INNOVATIVE RESEARCH

IN COMPUTER & COMMUNICATION ENGINEERING

9940 572 462 6381 907 438 ijircce@gmail.com

www.ijircce.com

Scan to save the contact details