# SYNOPSIS

**Title of Project** - **Cotton Diseases Detection**


**Submitted By-**

1. Name: Hem Prakash Saikia

   Roll No: ADTU/2020-23/BCA/004

   Email: hemprakashsaikia66@gmail.com

   Telephone: 9365448482

2. Name: Bigratom  Saikia

   Roll No: ADTU/2020-23/BCA/040

   Email: saikiabigratom1234@gmail.com

   Telephone: 8638791638

3. Name: Aryan Singh

   Roll No: ADTU/2020-23/BCA/047

   Email: 2017aryansingh@gmail.com

   Telephone: 9706657080


**Course:** BCA (CTIS) **Semester:** 6th **Department:** Engineering and Technology

**Batch:** 2020-2023

**Guide's Name**: Dr. Mostaque Hassan

**Designation:** Asst. Professor

# 1.Introduction-

Cotton, a significant cash crop, plays a vital role in the global textile industry. But, due to various diseases the yield and quality of cotton is decreasing leading to agricultural as well as economical losses. By early detection and proper management, we can reduce the risks associated with cotton. Our model aims to develop a deep learning-based model for the detection of cotton diseases using image data of cotton leaves. Our model will be able to automatically detect cotton diseases based on their symptoms. The model will use various deep learning techniques such as convolutional neural networks (CNNs), to achieve this goal.

# 2. Feasibility Study

**Economical Feasibility** -

(i) Determine the acquiring and maintaining cost of the necessary equipment and infrastructure, including high-performance computing resources and image processing software.

(ii) A cost-benefit analysis is conducted to determine the overall economics feasibility of the model.

**Technical Feasibility** -

(i) Appraises the current state of the art in deep learning algorithm and computer vision technical for image classification and object detection.

(ii) Ascertain the hardware software requirements for accomplishing the deep learning model, including the vital arithmetic of power and storage capacity.

**Operational Feasibility** -

(i) Estimate the practicality and virtue of using a deep learning modal for cotton disease detection in real-world farming conditions.

(ii) Appraises the user friendliness and ease of integration with present framing practices and equipment's.

# 3.Problem Statement-

Cotton is a crucial cash crop in many parts of the world, and cotton leaf disease can significantly reduce crop yield and quality. Early detection of cotton leaf disease is essential to prevent its spread and minimize its impact. However, visual inspection by human experts can be time-consuming, labor-intensive, and prone to errors. Therefore, there is a need for an accurate, automated system for cotton leaf disease detection that can quickly and reliably detect disease symptoms in cotton leaves. This project aims to develop such a system using deep learning algorithms to analyze images of cotton leaves and accurately identify disease in real-time. Develop a deep learning model capable of detecting cotton diseases equipping image data, helping farmers detect cotton disease.

## 4.Objectives-

1. To develop a deep learning-based system for precisely detecting cotton leaf diseases which will employ image data to identify diseases.

2. To provide cotton cultivators with a reliable tool for early detection of diseases associated with cotton plants.

## 5.Dataset -

1.We have collected freely available dataset from the storage uploaded by Krish Naik.

2.Dataset contains 2767 total images.

3.Dataset has been classified into three categories

(i)Training

(ii) Testing

(iii) Validation.

4.Each category has 4 classes-

(a) Disease cotton leaf

(b) Disease cotton plant

(c) Fresh cotton leaf and

(d) Fresh cotton plant

# 5.Methodology-

1. Collection and preprocessing of image dataset containing cotton leaves with various diseases.

2.Design and augmentation of a CNN-based model for cotton disease detection. 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.

3. Evaluation of the model's performance using appropriate metrics (e.g., accuracy, precision, resNet152V2, recall, F1-score).

4.Deployment of the developed model in a user-friendly model for real-world use.

# 6.Expected outcome-

The expected outcome of this model is a deep learning model with high accuracy in detecting cotton diseases. The model will be easy to use and accessible for farmers to improve their crop yield and health.

# 7.Facilities required for proposed work-

1. High-performance computer or cloud-based resources with GPU support for deep learning model development and training.

2.Access to relevant image datasets of cotton diseases and healthy leaves.

3.Deep learning frameworks and libraries (e.g., TensorFlow & Keras) for model development and training.

4.Software tools for preprocessing and data augmentation (e.g., OpenCV, Python libraries).

# 8.Bibliography-

(i) J. Wan, Z. Wang, S. Zhou, and D. Zhang, "A Hybrid Method for Cotton Disease Identification Based on Image Processing and BP Neural Network," IEEE Access, vol. 6, pp. 44363-44372, 2018.

(ii)"A Comparative Analysis of Machine Learning Algorithms for Detection of Organic and Nonorganic Cotton Diseases" Sandeep Kumar , 1 Arpit Jain , 2 Anand Prakash Shukla , 3 Satyendr Singh , 4 Rohit Raja , 5 Shilpa Rani , 6 G. Harshitha , 1 Mohammed A. AlZain , 7 and Mehedi Masud 8 Received 2 May 2021; Revised 31 May 2021; Accepted 7 June 2021; Published 17 June 2021.

(iii) D. S. R. G. Pawan and P. Warne, "Detection of diseases on cotton leaves using K-mean clustering method," International Research Journal of Engineering and Technology, vol. 2, no. 4, pp. 426–428, 2015.

(iv) Collected dataset from the storage uploaded by Krish Naik.

Link provided below: - data - Google Drive

(v) " A Review on Machine Learning Classification Techniques for Plant Disease Detection"U. Shruthi ; V. Nagaveni; B.K. Raghavendra . 2019 5th International Conference on Advanced Computing & Communication Systems (ICACCS).