**LEAF DISEASE DETECTION USING DEEP LEARNING & ML TECHNIQUES**

**ABSTRACT:** Economy contributes the most for the productivity of the agriculture. In agricultural field, the disease in plants is more common and the detection of disease in plants has become more feasible due to the above reason. This dais’s plant disease detection has acquired enlarging scrutiny in shrivelling crops of large and various fields. Farmers undergo significant hassles in chop and changing from one disease administer principle to a different one. We can identify or spotting the tomato leaf diseases for detection for surveillance and monitoring experts is the standard approach for detection. The plants get seriously affected if the proper control hasn't been taken and this represents the quality of the pants the production of the plants will be affected. Detection of disease through some mechanised technique and methodology is efficient and constructive because it decreases an outsized toil of surveilling in the large cultivation. In the premature phase we can detect the symptoms of the plant diseases since their first appearance on their leaves of the plants. By using this paper we can identify the algorithm which is used for image segmentation and for automated classification used for the detection of diseases of leaves in the plants. It also covers distinct disease classification methods of working which is used for the detection of diseases in plants.

The application of deep learning in plant disease recognition can avoid the disadvantages caused by artificial selection of disease spot features, make plant disease feature extraction more objective, and improve the research efficiency and technology transformation speed. This review provides the research progress of deep learning technology in the field of crop leaf disease identification in recent years. In this paper, we present the current trends and challenges for the detection of plant leaf disease using deep learning and advanced imaging techniques. We hope that this work will be a valuable resource for researchers who study the detection of plant diseases and insect pests. At the same time, we also discussed some of the current challenges and problems that need to be resolved.

**Keyword:** Plant leaf disease images, deep learning, Machine Learning, SVC, ANN, CNN, Resnet50.

**SYSTEM ANALYSIS & FEASIBILITY STUDY**

**Existing Method:**

This model emphasizes an existing method that which is designed using the some of the algorithms of deep learning. Here the process is performed using the machine learning, which is one of the transfer learning methods, but this could not get the high accuracy.

**Disadvantages:**

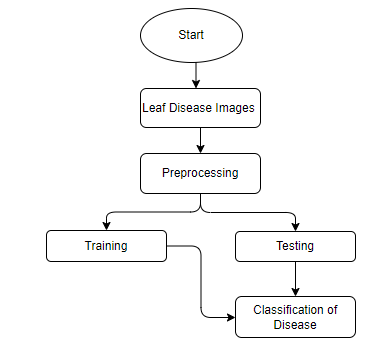
• Less feature compatibility

• Low accuracy

**Proposed System:**

In purposed method we are performing the classification of either the Plant Leaf Disease identification using Convolution Neural Network (CNN) of deep learning along with the machine learning methods. As image analysis based approaches for Leaf Disease detection. Hence, proper classification is important for the Leaf disease that which will be possible by using our proposed method. Block diagram of proposed method is shown below.

**Block Diagram:**



**Fig 1. Block diagram of proposed method**

**Advantages**:

* Accurate classification
* Less complexity
* High performance
* Easy Identification

**MODULES:**

**System User**

**1. System:**

1.1 Create Dataset:

The dataset containing images of the plant disease classification images with the Plant health or not i.e., normal are to be classified is split into training and testing dataset with the test size of 30-20%.

1.2 Pre-processing:

Resizing and reshaping the images into appropriate format to train our model.

1.3 Training:

Use the pre-processed training dataset is used to train our model using CNN Deep learning and machine learning algorithms along with Resnet50 transfer learning methods.

1.4 Classification:

The results of our model are display of plant disease classification images are either with different labels

**2. User:**

2.1 Upload Image

The user has to upload an image which needs to be classified.

2.2 View Results

The classified image results are viewed by user.

**SYSTEM SPECIFICATIONS:**

# **H/W Specifications:**

# Processor : I5/Intel Processor

# RAM : 8GB (min)

* Hard Disk : 128 GB

**S/W Specifications:**

* Operating System : Windows 10
* Server-side Script : Python 3.6
* IDE : PyCharm,Jupyter notebook
* Libraries Used : Numpy, IO, OS, Flask, keras, pandas, tensorflow

**LEARNING OUTCOMES:**

* Practical exposure to
  + - * Hardware and software tools
      * Solution providing for real time problems
      * Working with team/individual
      * Work on creative ideas
* Testing techniques
* Error correction mechanisms
* What type of technology versions is used?
* Working of Tensor Flow
* Implementation of Deep Learning techniques
* Working of CNN algorithm
* Working of Transfer Learning methods
* Building of model creations
* Scope of project
* Applications of the project
* About Python language
* About Deep Learning Frameworks
* Use of Data Science