ABSTRACT

- Agricultural productivity is something on which indian economy highly depends.
- This is one of the reasons that disease detection in plants plays an important role in agricultural field, as having disease in plants is quite natural.
- proper care is not taken in this area then it causes serious effects on plants and due to which respective product quality, quantity or productivity is deteriorated
- Therefore;fast,automaticand accurate method to detect plant disease is of great importance.
- Hence, image processing technique is employed for the detection of plant diseases

INTRODUCTION

- In this research, the aim is to develop a technology in agriculture field, based on engineering technique. Nowadays, crops face many traits/diseases.
- On the basis of unhealthy or healthy categories, the neural network will classify the sample data of the leaf images.
- Recently, ANN is widely used in agriculture image processing and it is one of the popular methods for classification problems as compared to most traditional classification approaches.
- The aim of this work is threefold:
- 1) Identifying the infected object(s) based upon K-means clustering.
- 2) Extracting the feature set of the infected Leaf images.
- 3) Detecting and classifying the type of disease using ANNs(Artificial Neural Networks.

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EXISTING METHOD

- Agriculture is an important source in the economic development of India. About 70% of Indian economy relies on agriculture.
- The crops need to be monitored against diseases from the very first stage of their life-cycle to the time they are ready to be harvested.
- The overall system disease detection and classification accuracy was found to be around 93%.
- Many existing machine learning classifiers fails for leaf disease detection such as SVM , KNN, Decision Tree , Random Forest, etc

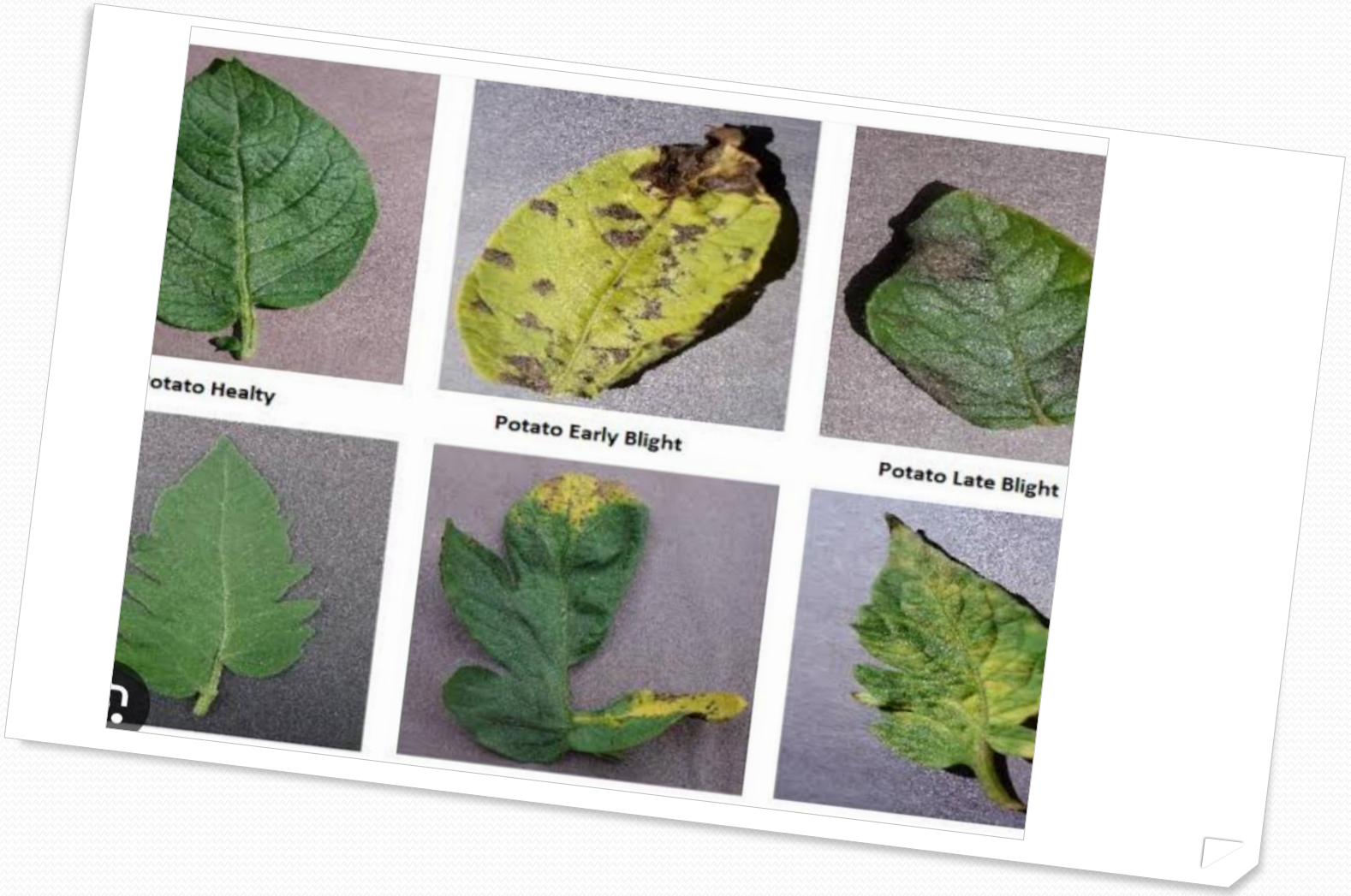
PROPOSED METHOD

- This process describe about process to get the result of the classification of leaf disease.
- Figure shows the flow chart of the proposed approach.
- The fifty samples image for healthy leaf image and fifty sample unhealthy leaf images are taken and the image processing method is used.
- The process for image processing has three components which are contrast enhancement, segmentation and features extraction.
- Lastly, the collected data will be classified to health or unhealthy of leaves using Artificial Neural Network.

FLOW DIAGRAM

INPUT IMAGE SAMPLE

It is a type of signal processing in which input is an image and output may be image or features associated with an image



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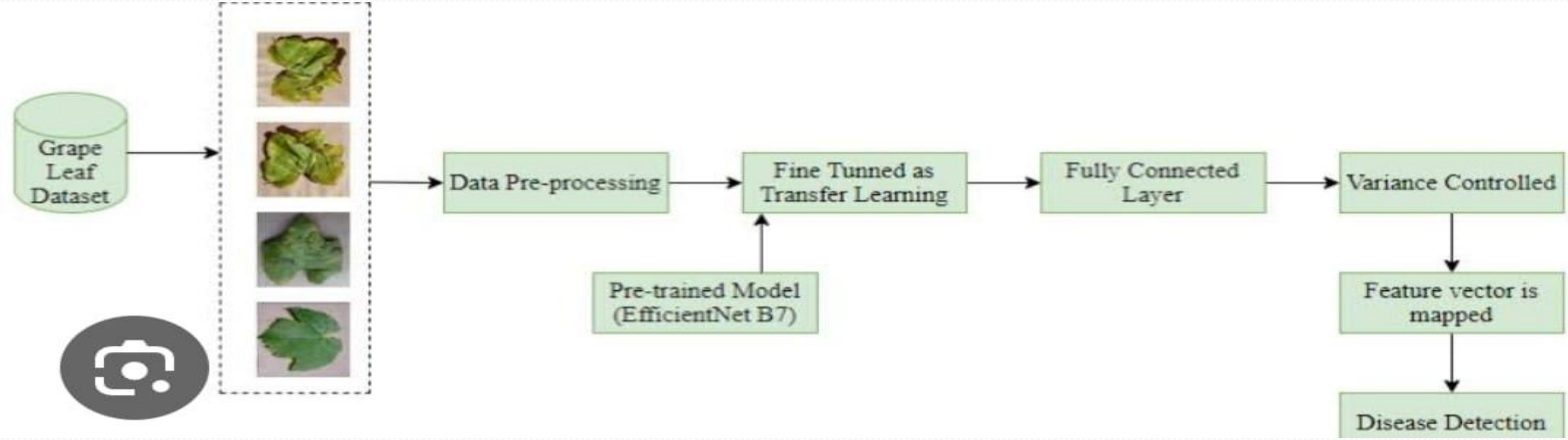
- The input images captured from devices at various instants may consist of the faces that are to be rotated in clockwise direction from horizontal axis to vertical axis such that face rotates clockwise and the face resembles the same as the database.

OBJECT DETECTION

- Image or object Detection is a computer technology that processes the image and detects objects in it
- People often confuse Classification.
- The difference is rather clear.
- If you need to classify image items you use classification

PREPROCESSING



- Preprocessing for plant leaf disease detection and classification using an Artificial Neural Network (ANN) typically involves steps such as image normalization, resizing, noise reduction, and feature extraction. These steps help prepare the data before feeding it into the ANN model for training and classification.

SOFTWARE REQUIREMET

- Tensor flow
- Numpy
- Pandas
- Open cv
- Keras
- Python matlab

ADVANTAGES

- Low complexity in algorithm
- It can predict many types of diseases
- Training time is less
- Accuracy is high

APPLICATIONS

- Smart farming
- In government or private agriculture department
- Fertilizers shops
- Every farmer can use this to check what type of diseases and what fertilizer need to purchase

RESULT

RESULTS OF K-MEANS CLUSTERING:1

- The figure shows the original image, the gray scale representation of same. Also the median filtered image can be seen. The K-means clustered image is present which clearly separates the infected part of leaf from the healthy part.The clustering is performed on the basis of the pixel intensity values

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RESULTS OF INITIAL SIX CENTRES FROM K MEANS CLUSTERING:2

- The initial centers obtained from the program are shown as seen in the command window. These centers form the basis of the Kmeans algorithm which is used to segment image into different regions i.e healthy an infected. The following image is a tomato leaf diseased image and below are its initial centers calculated:

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RESULT OF FEATURE EXTRACTION:2

A set of features is extracted from the segmented image which are given as a input while training of the neural network. These features include covariance, standard deviation, entropy and energy. The following is the image of Yellow Sigatoka plant disease and the values of the features are listed below.

- Average = 171.12
- Energy = 147
- Entropy = 0
- Standard Deviation = 36.2912
- Covariance = 1317.43

Continued…

- The results of Feed Forward Neural Network for Black Spot Disease are as shown below
- Average = 185.32
- Energy = 128
- Entropy = 0
- Standard Deviation = 29.4282
- Covariance = 277.5350
- Data of Feature Set =
- 1.8528
- 1.2800

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RESULT OF CASCADED FEED NEURAL NETWORK :4

- The results of Feed Forward Neural Network for Tobacco Ring Spot Disease are as shown below:
- Average = 326.20
- Energy = 147
- Entropy = 0
- Standard Deviation = 29.0432
- Covariance = 119.6732

RESULTS: GRADING

- Keep in mind that the success of the model heavily relies.
- On the quality and size of the dataset as well as the proper tuning of parameters
- Additionally newer techniques and architectures may have emerged beyond my knowledge cutoff in September 2021,so you may want to most up-to-date approaches

OUTPUT

- Test the ANN on unseen data to see how well it generalizes to new samples.
- The output of the ANN will be the predicted disease class for a given plant leaf image.

In above screen all 1281 images from dataset are normalized and now click on 'Segmentation & Features Extraction' to segment images and then extract features and then will get below output

In above screen I am displaying sample segmented image where green part removed out and taking only infected part and now close above image to get below output

CONCLUSION

- The applications of K-means clustering and Neural Networks (NNs) have been formulated for clustering and classification of diseases that affect plant leaves.
- Recognizing the disease is mainly the purpose of the introduced approach. Thus, Feed Forward and Cascaded Feed Neural Networks Algorithm was tested on seven diseases which influence the plants; they are: Black Spot, Powdery Mildew, Yellow Sigatoka, Tobacco Ringspot, Tomato Leaf Disease, Frog Eye and Valedinsia Leaf Spot.

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- The experimental results indicate that both the approaches can significantly support an accurate detection of Leaf Diseases with little computational effort.
- Cascaded Feed approach is better as compared to Feed Forward approach as it requires lesser number of iterations because a smaller value of gradient facilitates quick adaption and also reduces the Mean Square error

	Number of iterations	Performance	Gradient
Blackspot Disease	59	0.00912	0.370
Frog Eye Disease	51	0.0941	0.492

FUTURE SCOPE

- The Feed Forward and Cascaded Feed Neural Network algorithms can be used to design an expert system for the farmers for early detection of Plant Diseases.
- Presently seven Diseases as mentioned earlier can be detected by this process.
- The Feed Forward and Cascaded Feed algorithms can be expanded for detection of multiple diseases on a significantly large scale.
- The use of other algorithms can be explored to enhance the efficiency of the system in future.

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THANK YOU