410255: LP-V. DL 3.A 22-23 (2nd Sem)					
Student Name :					
BE Computer Division		Roll No		Batch	
Experiment No: 3A	Convolutional neural network (CNN) - Using Plant disease Dataset				

Aim : Convolutional neural network (CNN) (Any One from the following) :

A. Use any dataset of plant disease and design a plant disease detection system using CNN.
B. Use MNIST Fashion Dataset and create a classifier to classify fashion clothing into categories.

Title of the Assignment (3.A): Use any dataset of plant disease and design a plant disease detection system using CNN.
Objective of the Assignment: Students should be able to detect plant disease

Theory

Today's better technologies have enabled people to provide the adequate nutrition and food needed to meet the needs of the world's growing population. If we talk about India unequivocally, 70% of the Indian people is directly or by suggestion related to the cultivating territory, which remains the greatest region in the country. If we explore the broader Picture According to Research Conducted by 2050 overall yield creation can augment by at any rate half putting more weight on the inside and out pushed and cultivating Sector. The greater part of the Farmers is poor and have no inclination in development which may incite hardships more essential than half because of pets and sicknesses of plant. Vegetables and fruits are common items and the principal agricultural things. Powerful dependence on engineered pesticides achieves the high substance content which creates in the earth, air, water, and shockingly in our bodies antagonistically influence the environment.

At present, the conventional technique of visual inspection in humans by visual inspection makes it impossible to characterize plant diseases. Advances in computer vision models offer fast, normalized, and accurate answers to these problems. Classifiers can also be sent as attachments during preparation [5]. All you need is a web association and a camera-equipped cellphone. The well-known business applications "I Naturalist" and "Plant Snap" show how this is possible. Both apps excel at sharing skills with customers as well as building intuitive online social communities.

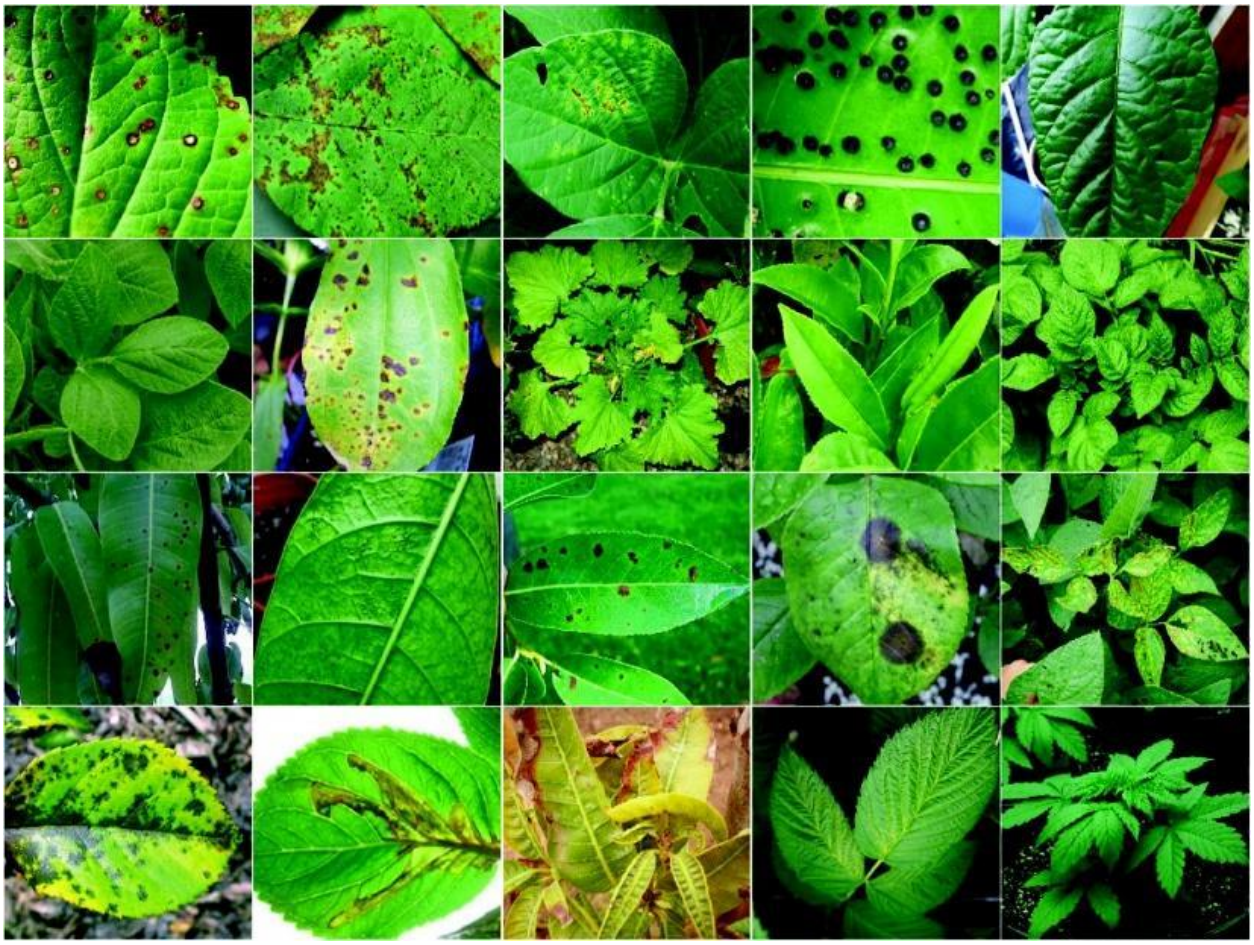


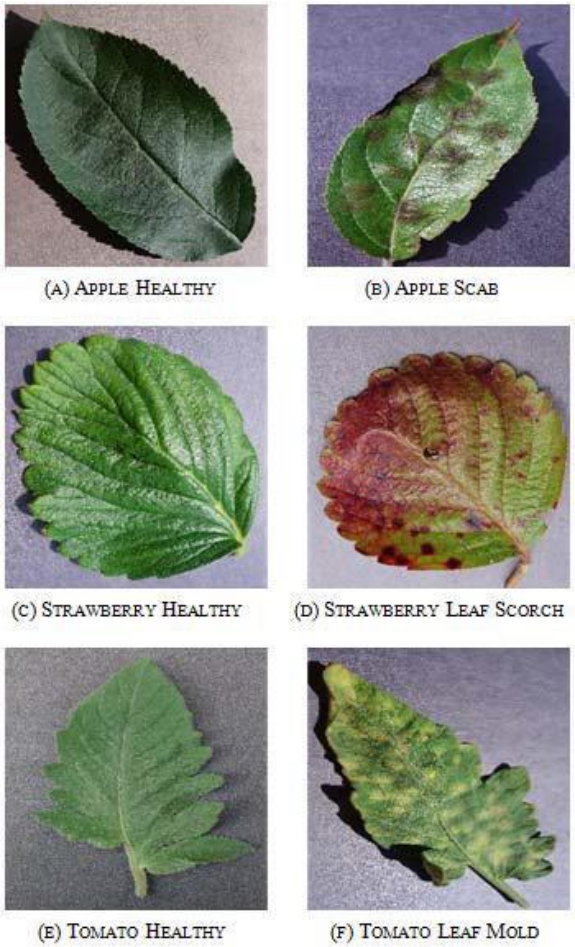
Fig: 1 Disease Plant Leaves

In Recent Years, Deep Learning has led to great performance in various fields like Image Recognition, Speech Recognition, and Natural Language Processing. The use of the Convocational Neural Network in the Problem of Plant Disease Detection has very good results. Convocational Neural Network is recognized as the best method for Object Recognition. We Consider the Neural Architecture namely faster Region-Based Convolutional Neural networks (Faster R-CNN), Region-based Convolution Neural Networks(R-FCN), and single-shot Multi box detector (SSD). Each of the Neural Architecture should be able to be merged with any feature exactor depending on the application. Pre-processing of data is very important to models for accurate performance. Many infections (viral or fungal) can be hard to distinguish often sharing overlap of symptoms.

1. **Dataset : Dataset may be downloaded from https://github.com/spMohanty**
2. **Following is the description of plant disease in which different dataset is used.**

We use Plant Village Dataset. The Plant Village dataset consists of 54303 healthy and unhealthy leaf images divided into 38 categories by species and disease. We analyzed more than 50,000 images of plant leaves with distributed labels from 38 classes and we tried to predict the class of diseases. We resize the image to 256 × 256 pixels and perform optimization and model predictions on this compressed image.

Leaf Category	Images
Apple	3171
Cherry	1906
Grape	4062
Peach	2657
Pepper	2475
Potato	2152
Strawberry	1565
Tomato	18170
Total	36148



(A) Apple Healthy (B) Apple Scab

(C) Strawberry Healthy (D) Strawberry Leaf Scorch

(E) Tomato Healthy (F) Tomato Leaf Mold

IMAGES FROM THE DATASET

Data Processing and Argumention

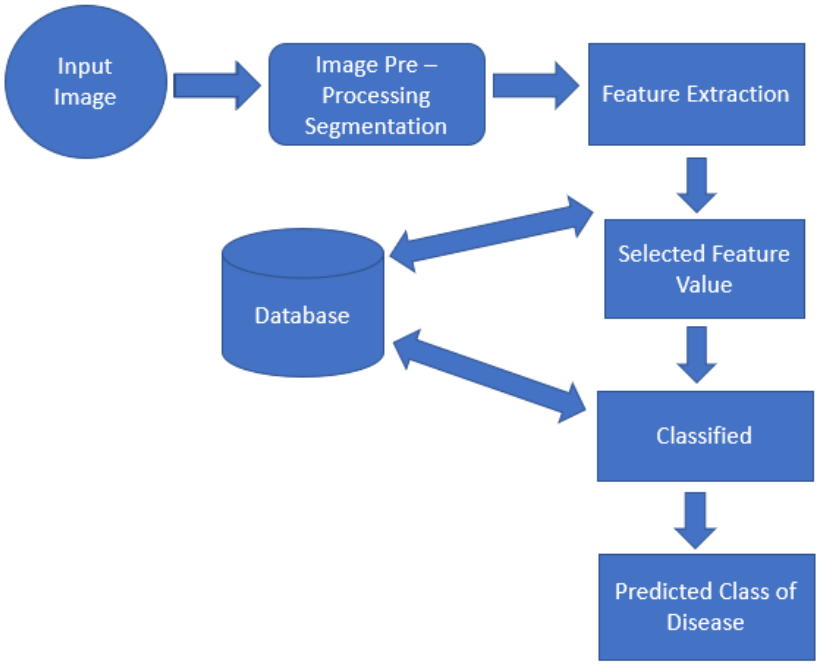
Image augmentation plays a key role in building an effective image classifier. Though datasets may contain anywhere from hundreds to a couple of thousand training examples, the variety might still not be enough to build an accurate model. Some of the many image augmentation options are flipping the image vertically/horizontally, rotating through various angles and scaling the image. These augmentations help increase the relevant data in a dataset. The size of each image in the Plant Village dataset is found to be 256 x 256 pixels. The data processing and image augmentation are done using the Keras deep-learning framework. The augmentation options used for training are as follows:

• Rotation - To rotate a training image randomly over various angle.

• Brightness - Helps the model to adapt to variation in lighting while feeding images of varying brightness
during training

• Shear - Adjust the shearing angle

System Overview



Steps related to image processing to detect plant diseases

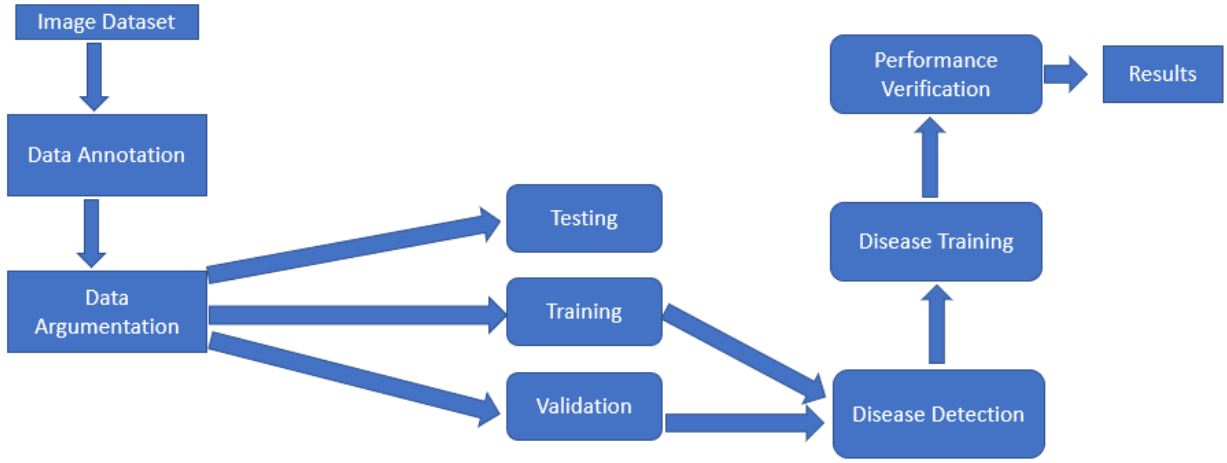
The whole process is divided into three stages:

1. Input images are first created by an Android device or uploaded to our web application by users.

2. Segmentation pre-processing includes the process of image segmentation, image enhancement and color space conversion. First, the digital image of the image is enhanced with a filter. Then convert each image into an array.

Using the scientific name for Binarizes Diseases, each image name is converted to a binary field.

3. CNN classifiers are trained to identify diseases in each plant class. Level 2 results are used to call up a classifier,
which is trained to classify various diseases in that plant. If not present, the leaves are classified as "healthy".



Questions

1. Discuss any other two datasets with their attributes of plant leaves disease
2. State and explain various disease in plants
3. How CNN involves in plant disease detection system.

Attendance (5 Marks)	Conduction (5 Marks)	Oral (5 Marks)	Total (15 Marks)	Sign of Teacher