

Objective:

Manual detection of plant disease is very difficult, costly and time consuming. Inaccuracy in identification of plant disease may cause the great loss in the production and economical value of market. Detection of plant disease may require huge amount of knowledge and work on plant disease. Therefore, we use the image processing technique for detection of plant's leaf detection. . Then the result consisting of the disease name with the **accuracy** is retrieved using **CNN algorithm**.

The main objectives of the project are:

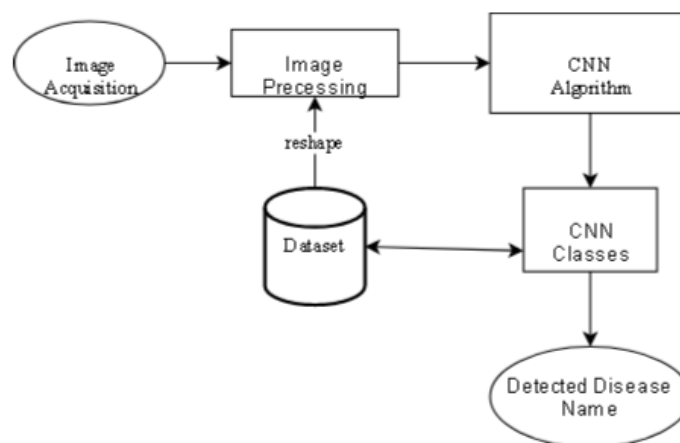
To detect the disease of the crop-Bacterial spot,Yellow leaf curl,late blight or healthy.

To display accurate result about the leaf disease to the user.

Introduction(Techniques used):

Image Processing Techniques:

For our project, we have chosen digital image processing. The phase in Image Processing are organized in such a way that current step provides the deliverables for the next phase.Initially, input image is given through user interface. The input image is then preprocessed by using library called OpenCv. The color image format is read by using Cv2.IMREAD_COLOR method and the image is resized by using the Cv2.resize() function.



Classification:

We have used Convolutional Neural Network Algorithm as a image classifier. A CNN consist of number of convolutional and sampling layers optionally followed by fully connected layers. The network will consist of several convolutional neural networks mixed with non-linear and pooling layers.

Dataset used:

The data used in this project are the images of the various crops among which some of them were fed into the model for the training model and some were used for testing purpose and we downloaded it from Kaggle.

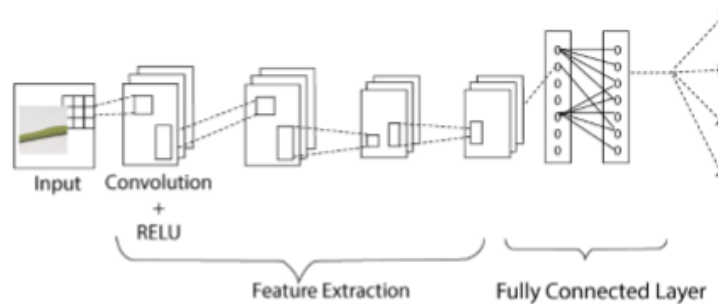
Dataset Link:

<https://www.kaggle.com/emmarex/plantdisease>

Algorithm used:

Convolutional Neural Network(CNN):

The system use CNN to extract features and classify the image by the user in the user interface . Convolutional Neural Networks are made up of neurons that have learnable weights and biases. A convolutional Neural Network is comprised of convolutional layer and then followed by fully connected layer as in standard multilayer neural network.



Training :

When the CNN starts, the weights or filter values are randomly initialized. The filter doesn't know to look for edge and curves. The idea of being given image and labels is training process that CNN go through. The way the computer is able to adjust its filter value(or weights) is through a training process called back propagation can be separated into 4 distinct sections. The forward pass, the loss function. The backward pass and weight update

Performance metrics:

```
import cnn
```

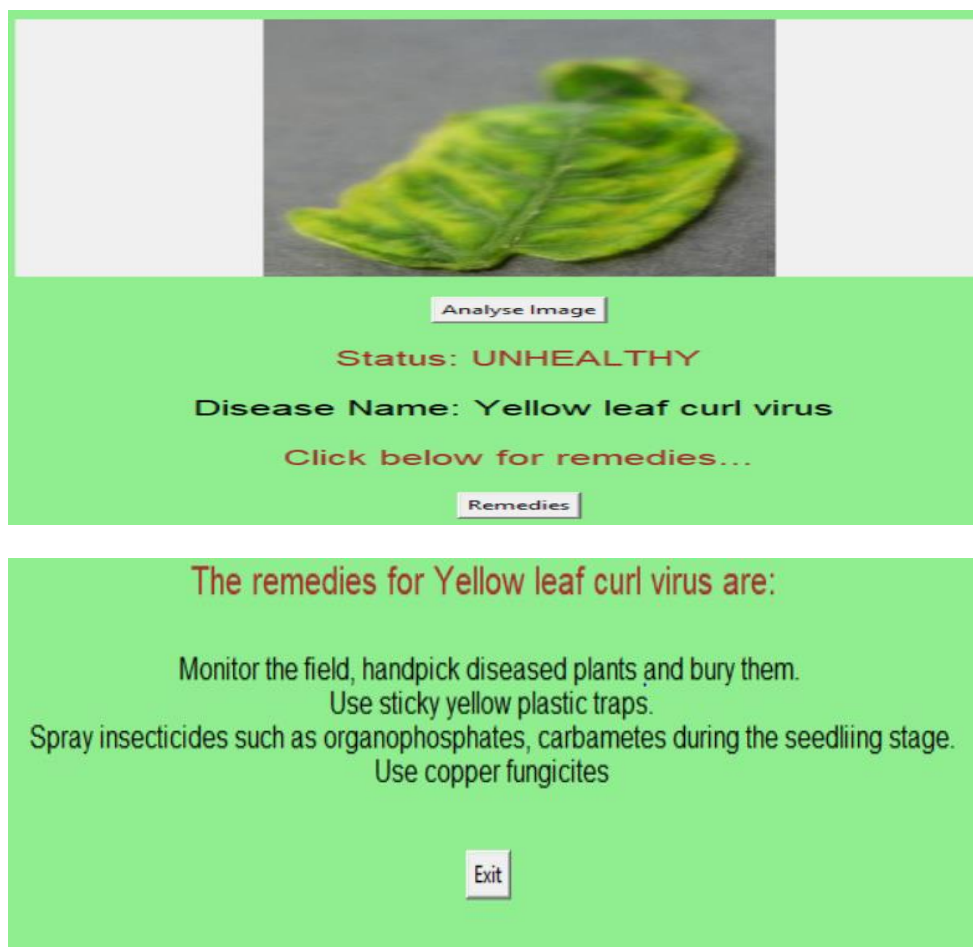
```
Training Step: 5719 | total loss: 0.07178 | time: 9.409s  
| Adam | epoch: 008 | loss: 0.07178 - acc: 0.9919 -- iter: 3456/3500  
Training Step: 5720 | total loss: 0.06474 | time: 10.566s  
| Adam | epoch: 008 | loss: 0.06474 - acc: 0.9927 | val_loss: 0.00120 - val_acc: 1.0000 -- iter: 3500/3500  
--  
INFO:tensorflow:C:\Users\Ashvathe\Desktop\Plantdisease\PlantDisease\healthyvsunhealthy-0.001-2conv-basic.model is not in all_model_checkpoint_paths. Manually adding it.
```

```
import ui
```

```
100%|██████████████████████████████████████████████████████████████████████████████| 1/1 [00:00<00:00, 95.27it/s]
```

```
INFO:tensorflow:Restoring parameters from C:\Users\Ashvathe\Desktop\Plantdisease\PlantDisease\healthyvsunhealthy-0.001-2conv-basic.model  
model loaded!
```

Output screen:



Conclusion:

Thus the output consists of the name of the disease with a good accuracy and its corresponding remedy if required.