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A SURVEY OF COTTON CROP DISEASE DETECTION AND CLASSIFICATION USING ORC-NET SEGMENTATION AND DEEP LEARNING METHODS

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Abstract: Main focused on Detection and classification of Diseases A] This will really help in identifying low intensity/high intensity of image easily during an image processing in background and foreground to identify plant diseases with low intensity detection. B] This will also help in giving color assemblance in good plant and affected plant during an image processing using an deep learning method/ORC net method. C] Also identify noise in infected plant leaves via showing difference in their structure, chromosomes, shape as well as size. As well as need to provide image processing with customer Centre Net Framework with DenseNet-77 to identify the Centre of affected area on leaves. It will categorize different plant diseases with deep key point extraction. After this use segmentation method /feature extraction method ORC net that will be Context Base network to simultaneously segment the ocular region component. This will help in identifying the different types of disease
Keywords: agriculture field, ORC-net, SVM, infection, dense net, disease of plant leave , segmentation, detection

Introduction: Plant disease detection really motivates our farmers OR manufacture for their qualitative and quantities production of agricultural crops like Rice, Tomato, potato, wheat, citrus, watermelon etc. This will helps in increasing the economic condition of the country and farmers, manufactures. Here we are focusing on this plant disease detection to get quality and quantities product even in unavailable of cultivator and water. This is what our main goal to focus. Huge Dataset will be collected for leaves, Cotton, Stem that are almost images from agriculture field/colleges which will helps to increase the actual disease type and stage of diseases with total number of accuracy of detection. Performing work on cotton disease detection from plant leave cotton. Taking Real time dataset-i.e different kind of images of leave/stem/cotton. Taking new DL method for identifying key point of disease area of plant using Dense Net and segmentation process by ORC Net used : Context Base network to be simultaneously segment the ocular region component to improve the accuracy. Using this Segmentation process, identifying the different types of disease like either its bacterial, fungus, milt ,infection of disease in plant leaves. Identifying pesticide for the earliest detected diseases of plant as precautionary stage.

As we already discussed, it is very difficult to identify and detect as well as analyze any plant or crop disease by pathologist detection or via manual identification; this will lead to 30-40% of disease detection. So to avoid this or tackle this situation of analysis/detection we will create software which detect the disease via identifying earliest through image of plant leaves detection. In this we will mostly focused on plant village dataset from kaggle for testing initially and then we will apply the real time dataset (i.e real image of healthy and infected plant leaves to detect diseases.).So huge amount of photo will be capture from agriculture start from small plant leaves to till it middle growth plant leave. In these images we are most focus on leaves color intensity, variance in background and foreground images, also focus on their structure size of images. This will be initially preprocessed via different algorithm like HOG,PCA/LDA etc , which are image preprocessing algorithm in machine learning use to for dimensionality reduction as well as preprocess huge image dataset in to one of good trained set of data.

Then we will apply CustomerCentreNet ,Densed Net-77,78 to centralize location of focused area on given leave which will create key points for feature extraction .

Once we analyze the key point of extraction then we will go to identify the one of best methods to

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extract features of affected leaves. Here identified many more methods like CNN,RNN,RCNN,ANN ,DBN,GAN etc DL technique to extract the best features. These techniques work with image input as single dataset or multi dataset (meta learning).

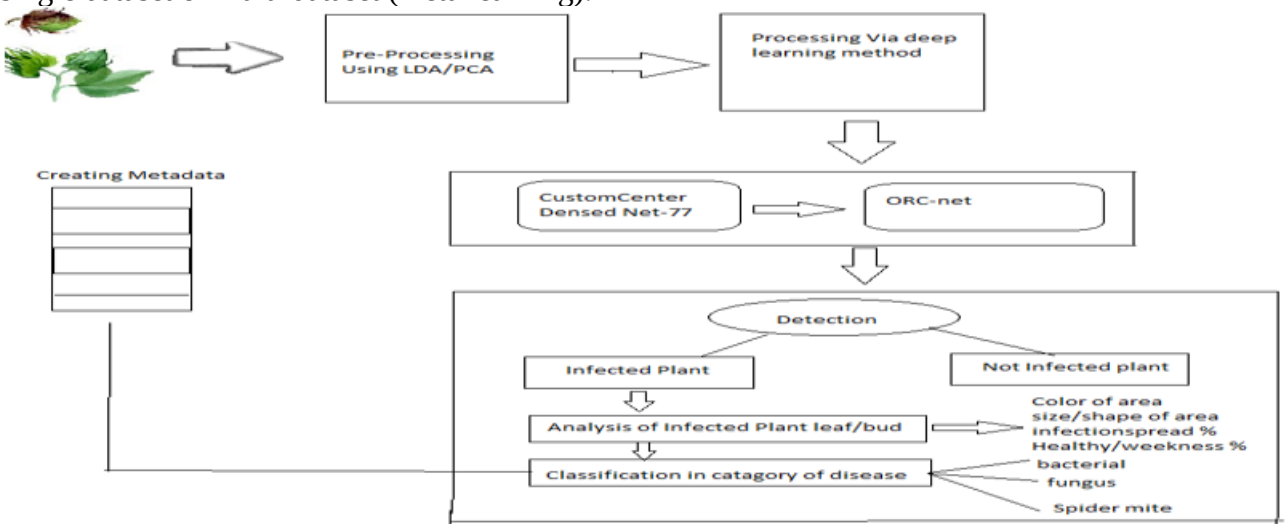

Figure 1: Block diagram of proposed work i.e Cotton plant disease detection and classification using ORC net and Deep learning method

In this proposed framework to locate and classify / detect plant diseases and apply precautionary methods by suggesting names of pesticide. In the first step, Dense Net applied to the input image to compute the key-points feature. Then we will use the . method is ORC-Net ; Context Base network to simultaneously segment the ocular region component which was already identified in the first step. In the third step will apply any good neural network method for feature extraction and matching. Finally training/testing of data will be done by apply Machine learning algorithm to get accurate detection/identification plant diseases.

2. Literature Review

Almost those plant are cover that we are not taking in our research of disease detection plant. I have identified the Cotton plant diseases detection. And Dataset will be collected for leaves, Cotton, Stem. And Some gaps are identified from different paper surveys. In short Paper Survey are below in Table 1:

Paper [1] base paper of Springer-A novel deep learning method for detection and classification of plant Diseases-2022. However, In this paper plant diseases are the most significant impediment to the production and quality of food. The identification of plant diseases at an early stage is crucial for global health and wellbeing. The traditional diagnosis process involves visual assessment of an individual plant by a pathologist through on-site visits is difficult and time consuming. Precise identification and classification of plant diseases is a tedious job due because of the occurrence of low-intensity information in the image background and foreground, the huge color resemblance in the healthy and diseased plant areas, the occurrence of noise in the samples, and changes in the position, chrominance, structure, and size of plant leaves.

Table 1:Literature Survey

Reference Paper	Method and technique Used	Outcome and Accuracy	Limitations	Research Gap
[2]	CNN method and Multi-Layer Perceptron (MLP).	Detection with accuracy 95%	Use of Unimodel and performance degrad with distored sample	integration of 2-model require to overcome limitation
[3]	REHBI's ability to detect FHB infection by calculating R sqr and RMSE	Detection with accuracy 76%	REHBI performed better in disease monitoring	Get best analysis of disease instead of monitoring
[4]	R-CNN was integrated in fine grained-GAN	Performace of 2 classifier is 90%	Limited to 1000 local spot area sub images	Can process any kind of image by finding occular region of infection.
[5]	regression-based object detection applied over UAV images.	Accuracy of detection 98%	Use of UAV labled dataset can process only selected ML model	Use of real plant image not to be labled and process any DL,ML model
[7]	Rectified Meta-learning from Noisy Labels for Robust Image addressed by CNN	Performance is good range in 81%	RML integration restrected for other method	overcome this problem by using method of annotation/metatdata
[8]	EfficientNetV2 model	detection of infected and non infected plant 98%	Unimodel to result with detection of infected plant leaves	need to integrate with other method,and performance analysis /classification must
[9]	Wavelate attention learning	process image with deraining	Its give clearity of image before preprocessing is 99%	Make use of this method in integration with other preprocess method
[10]	DCGANs (Deep Convolutional Generative Adversarial	Acccuracy of 92 %	Use of Village kaggle data set	Create real plant image and hudge dataset

Networks)

[12]	CNN method	Accuracy of detection 96%	Performance calculation for detection of disease	Need to improve performance in classification with precautionary action
[13]	A framework named k-FLBPCM along with SVM	Accuracy of 96% for plant with similar morphological texture	performance degrade with distorted sample	If plant are not with similar morphological structure then will not perform better
[14]	DLQP approach with SVM classifier	Accuracy of 96.63	Its robust to detect classification of plant leaf disease under intense scale and angle	Performance further need to improve classification
[15]	The LBP algorithm together with the SVM classifier	The model has better generalization power,Accuracy is 95%	Classification performance degrades over noisy samples	It should perform better under noisy sample by removing noise at preprocessing
[16]	The key points were computed via employing GLCM and LBP descriptors,Classification with SVM	The framework can locate the diseased plant portion with 98%	Result are reported with small dataset	Create real plant image and hudge dataset
[17]	Employed a lightweight CNN for tomato leaf disease classification	This work is Computationally efficient with 97%	Only with tomato leaf, not robust to real-world scenarios	Should not robust to real world problem of plant disease detection
[20]	Edge as a Service model with DL model	Real time reporting of infection status with 95 %	Detect only fungal biotic stress condition among many stress condition	Expand the detection to many infection/stress condition

3. Problem Statement and Research Gaps

Problem statement : All most will try to resolve the gap by

- Performing work on cotton disease detection from cotton crop plant
- Taking Real time dataset-i.e different kind of images of leave
- Taking a new DL method for identifying the key point of disease area of the plant using Dense Net and segmentation process by ORC Net used : Context Base network to simultaneously segment the ocular region component to improve the accuracy.
- Using this Segmentation process, identifying the different types of disease like either its bacterial, fungus, milt ,infection of disease in plant leaves
- Identifying pesticide for the earliest detected diseases of plant as a precautionary stage.

Research Gap :

Most papers are worked on the Kaggle dataset instead to get some real time dataset (images from nature plants) and more information for implementation like what kind of new disease can occur nowadays in plants with their symptoms. In most survey papers and my base paper, work is not found for cotton disease detection. So I will go for cotton disease detection. In most of the survey disease was detected after some stage crosses. Which should not allow to take precaution action at earliest stage, So its better to detect disease earliest prior to 1st stage .So helpful to take precautions. In most of survey only detection and classification was there, no proper analysis , not identified solution given, no suggestion of pesticides mentioned. Here we will cover all problems. In most of the research almost all DL methods but not Dense net-77/78, ORC net (new one not used in any survey paper) for preprocessing. As they are computationally high processing technique. Use of Process of Annotation for classification i.e Use Rectified Meta-learning from Noisy Labels for Robust Image-based Plant Disease Classification, artificial intelligence to assist plant disease diagnosis. To overcome the problem of leading a model overfitting and performance degradation we use Rectified Meta-learning.

4. Proposed Methodology

The proposed methodologies all are from Deep Learning and Machine leaning model, that explained state by step here. Start from Dataset visualization by using seaborn, mat-plot library and applying dimensionality reduction technique like HOG, PCA, LDA in python . Image of plant leave, stem processed to view its centralize part or infected area of image using Dense Net method of Deep Learning.

Later Image is Processed to have segmentation to identify the infection or disease area like part of infected and healthy area was separated for given plant leave, stem, cotton using ORC Net method under Deep Learning.Training /Testing of image dataset done using one of good validation technique like Cross validation ,K- fold (try both) .Applying an Machine learning model like SVM , Random-forest, Decision tree using Bagging for categorical matching ,Identification ,classification of disease type in plant with confidence score.Give good performance with identifying best pesticide control for classified/identified diseases.

More Detail about an Dense Net and ORC net:

Dense-Net: Process single image is super-resolution (SR) task by utilizing the design of densely connected convolutional networks (Dense-Net). The proposed method is an end-to-end model which is able to learn mapping between low- and high-resolution images shown in Figure-3 and Figure-4. next slide The proposed method takes the low-resolution images as input and generates its high-resolution version Unlike those conventional methods. Unlike those conventional methods which adjust each component of convolutional networks separately, our model jointly optimizes all layers. Besides, the proposed model has a lightweight structure and is extensively evaluated on widely adopted data sets. In our experiments, the proposed method outperforms state-of-the-art methods both qualitatively and quantitatively.

- It is used to centralize the infected area which is a key point for feature extraction integration

with ORC-Net.

• ORC-Net : This method will do segmentation and feature extraction for defined ocular region component

Some related figures shown below:

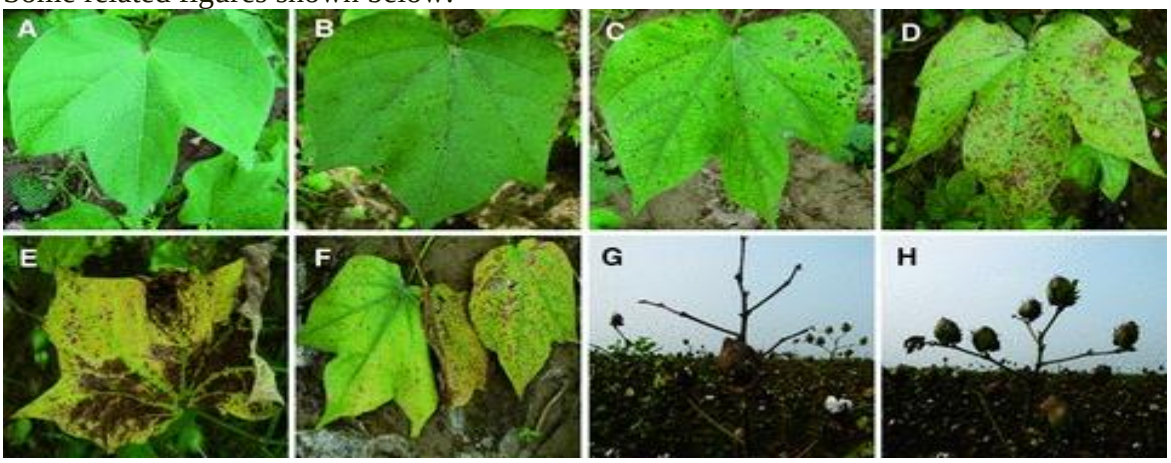

Figure 2 : Data set Images

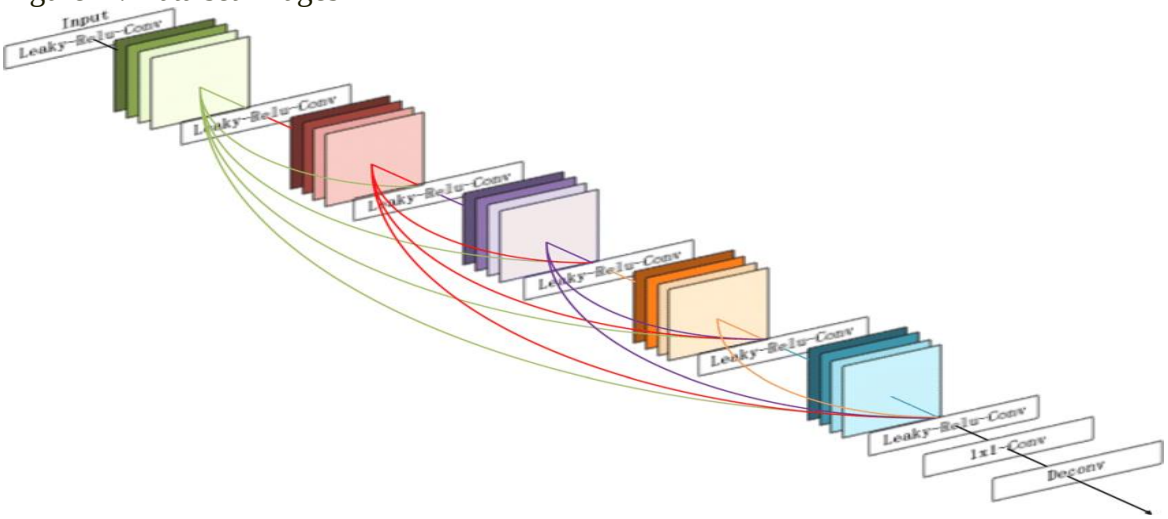

Figure 3 : Network architecture: Our network consists of 6 normal convolution layers followed by a leaky-Relu and 5-layer dense blocks where contains 4 densely connected convolutional layers

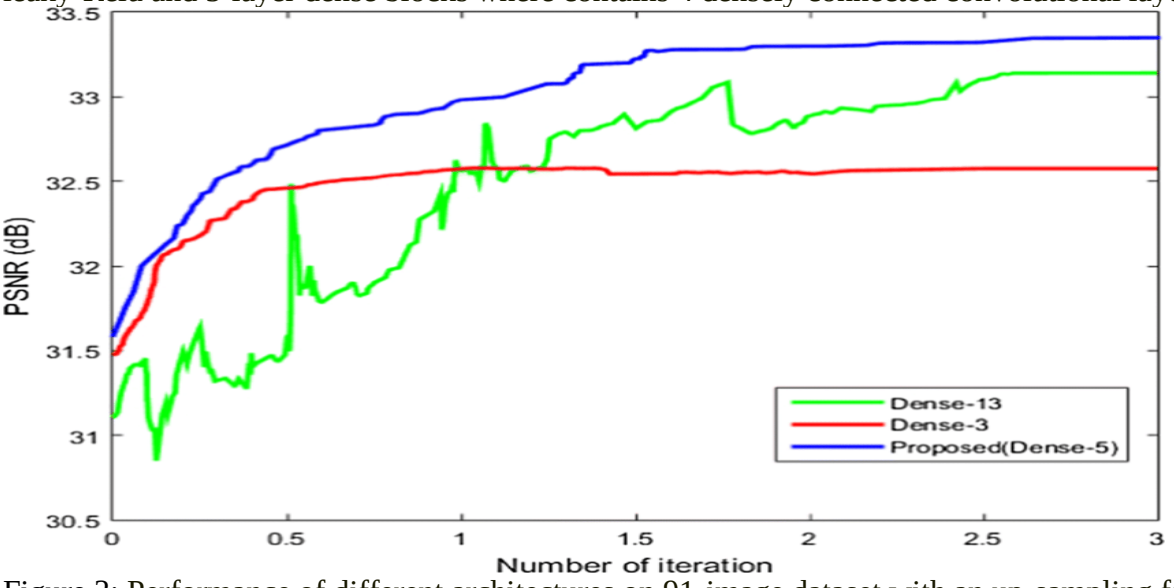

Figure 3: Performance of different architectures on 91-image dataset with an up-sampling factor-3

5. Expected Deliverables and Conclusion

There is no software implemented for such detection/identification for earliest stage diseases detection. Now a days farmers have Identification of plant/crop diseases is base on only the Pathologist and based on manual analysis , in this process farmers can not go to detect things accurately as well as earliest too. So because of this They are not able to provide the good pesticide , and can not take precautions that will affect the economic and manufacturing growth of the country and farmers too.

That's why I have decided to go for plant/crop disease detection for our agricultures which will be very help to grow our country in productivity as well as economically.

In this project our main objective is to identify a good and huge dataset of leaves of plant by creating our own dataset (realistic dataset) from the agriculture field/college

A] This will really help in identifying low intensity/high intensity of image easily during an image processing in background and foreground to identify plant diseases with low intensity detection. B] This will also help in giving color assemblance in good plants and affected plants during an image processing.C] Also identify noise in infected plant leaves via showing difference in their structure, chromosomes, shape as well as size.

So all this information is not easy to identify with less and stored sample data collection. We need to get real images in a huge dataset and apply many proposed methods of DL and ML for leading to the conclusion/goal of Detecting an plant disease at the earliest stage.

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