

Project Proposal for XYZ Semester
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Abstract

Being a major agricultural country, a considerable amount of development depends on the agriculture of Bangladesh. As agriculture stays one of the main areas of the Bangladeshi economy, Bangladesh is attempting to become independent in producing food by creating successful developing agronomy. At the same time, plant leaf disease is quite natural and sometimes uncontrollable, it causes damage of crops as well as causing significant damage in the agronomy of Bangladesh. To prevent the problem, this work aims to classify several plant leaf diseases, specifically corn, grape, mango, and pepper, to diagnose the leaf diseases for proper early action to cure. By this work, we will also been able to classify by means of disease detection as a multi-class classification of those four plant leaves. Therefore, Convolutional Neural Network (CNN) based on Deep Learning models is used to analyze the results, and scores is compared of three CNN models: VGG-16, VGG-19, GoogLeNet. Finally, a new model is proposed for better computation and higher accuracy. And it is found that deep learning could be an appropriate approach to classify ill leaves of the plants from the healthy.

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Chapter 1:

Introduction

1.1 Introduction:

Farmers try to support the rapidly growing global population through good cultivation of crops but plant leaf disease is a barrier for the development of agronomy. Plant leaf disease not only hampers the leaves but also destructs the outer look of crops. The external appearance of crops attracts customers' eyes very effectively. So, sale value and customer's buying probability greatly depend on the crops outer appearance. Hence, the quality reviewing and evaluating process is fundamental in the farming field to develop great solid plants. So to get a healthy and good yield for developing agronomy, plant leaf disease classification is a mandatory action. For the reduction of agricultural losses classification of various leaves, diseases stay a key factor to take necessary steps.

On plant leaves, as maximum diseases are microscopic, the manual process of classification is not a proper way to identify diseases accurately and classify them in the right class. So we want to develop a system that automatically classifies diseases and depending on the disease classification farmers can apply necessary insecticides to prevent losses.

1.2 Motivation:

- Plant leaf disease reduces the production and quality of food, fiber, and crops. So it is the crying need for them to classify leaf disease to reduce the loss of crops.
- This work provides a computerized system through which we can classify plant leaf diseases and take necessary steps to prevent losses.
- The system can automatically classify leaf diseases with higher accuracy than the other existing systems.

Chapter 2:

Related Work

In a paper [1], the authors have made a leaf disease detection and classification based on CNN with LVQ algorithm. Their average accuracy was around 88%. In the proposed methodology, the Convolutional Neural Network model was used to perform leaf disease detection and classification. For color image data, 3 channels (R, G, B) were used as input to the CNN model, and the output was produced using a neural network which is Learning Vector Quantization (LVQ).

Limitations: Although their accuracy is good, they used only tomato-related diseases and their dataset includes only 500 images with five classes for classification.

In another paper [2] the work gives a solution for the plant leaf disease. The authors have done the work with image classification. For image segmentation, image clustering and Otsu's method were used. After that feature extraction was also done from the image. They used image preprocessing techniques to abolish any type of noise problem. In their dataset, there were five classes that were 4 disease classes and 1 healthy class.

Limitations: Only 75 images of various plant leaves were gathered by them which is very less in amount. Moreover, their gained accuracy was not mentioned.

A paper [3] named "Plant Disease Classification Using Image Segmentation and SVM Techniques" also describes a classification technique Support Vector Machine (SVM). Firstly the authors converted images into another color space and then cropped the images and abolished the noise problem by applying some image pre-processing techniques. For more smoothen, they converted the images into the grayscale level. They also performed image segmentation and feature extraction was also done from the image. Applying all those activities they made the image classification.

Limitations: Even though they made a lot of actions for image classification, their proposed model accuracy was not discussed.

Chapter 3:

Objective

- In this work, some Benchmark architectures like VGG-16, VGG-19, GoogLeNet is used and proposed a new model for better accuracy.
- To classify leaves properly in the right class so that farmers can apply insecticides accordingly to the disease class.
- To achieve better and higher accuracy than the existing systems with accurate classification.
- To prevent loss of crops.
- To develop the agronomy of Bangladesh by providing a computerized system to classify leaves.

Chapter 4:

Methodology

4.1 Software Specification:

- Operating System : WINDOWS XP, 7, 8, or 10
- Language : JavaScript, Bootstrap, HTML, CSS
- Database : MySQL 2014

4.1.1 JavaScript:

JavaScript is a dynamic computer programming language. It is lightweight and most commonly used as a part of web pages, whose implementations allow client-side script to interact with the user and make dynamic pages. It is an interpreted programming language with object-oriented capabilities. 11 JavaScript was first known as LiveScript, but Netscape changed its name to JavaScript, possibly because of the excitement being generated by Java. JavaScript made its first appearance in Netscape 2.0 in 1995 with the name LiveScript. The general-purpose core of the language has been embedded in Netscape, Internet Explorer, and other web browsers.

Chapter 5:

Conclusion

In this work, a very accurate Deep Learning solution for classifying corn, grape, mango & pepper plant leaf disease is presented which makes use of a convolutional neural network for classification purposes. The presented models used the dataset that consists of 18,851 images with 12 total classes. The following models can be extended by using an even larger dataset with more categories of diseases and the accuracy can also be improved by tuning the hyper parameters. The remedies for the classified disease can also be included in the model. The model then can be deployed on android and as well as iOS platforms to reach out the farmers who can make actual use of the proposed system.

References

- [1] “Plant Leaf Disease Detection and Classification Based on CNN with LVQ Algorithm” by Melike Sardogan, Adem Tuncer, Yunus Ozen in 3rd International Conference on Computer Science and Engineering, 2018
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