



**Department of Electrical and Computer Engineering
North South University**

Senior Design Project
**Leaf Disease Detection Using Image Processing and
Convolutional Neural Networks**

Susmita Roy Happy	1911678043
Sadia Mahjabin Sanchary	1912138042
Md Saleh Ahmed	1821259042

Faculty Advisor:

DR. SHAHNEWAZ SIDDIQUE

Associate Professor

ECE Department

Spring, 2024

LETTER OF TRANSMITTAL

June, 2024

To

Dr. Rajesh Palit
Chairman,
Department of Electrical and Computer Engineering
North South University, Dhaka

Subject: Submission of Capstone Project Report on “Leaf Disease Detection Using Image Processing and Convolutional Neural Networks”

Dear Sir,

With due respect, we would like to submit our **Capstone Project Report** on “**Leaf Disease Detection Using Image Processing and Convolutional Neural Networks**” as a part of our BSc program. The report deals with Multi Level Based Home Security System. This project was very much valuable to us as it helped us gain experience from practical field and apply in real life. We tried to the maximum competence to meet all the dimensions required from this report.

We will be highly obliged if you kindly receive this report and provide your valuable judgment. It would be our immense pleasure if you find this report useful and informative to have an apparent perspective on the issue.

Sincerely Yours,

.....

Susmita Roy
ECE Department
North South University, Bangladesh

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Sadia Mehjabin
ECE Department
North South University, Bangladesh

.....

Saleh Ahmed
ECE Department
North South University, Bangladesh

APPROVAL

Susmita Roy Happy (1911678043), Sadia Mahjabin Sanchary (1912138042) and Md Saleh Ahmed (1821259042) from Electrical and Computer Engineering Department of North South University, have worked on the Senior Design Project titled “**Leaf Disease Detection Using Image Processing and Convolutional Neural Networks**” under the supervision of Dr. Riasat Khan partial fulfillment of the requirement for the degree of Bachelors of Science in Engineering and has been accepted as satisfactory.

Supervisor’s Signature

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Dr. SHAHNEWAZ SIDDIQUE

Associate Professor

Department of Electrical and Computer Engineering

North South University

Dhaka, Bangladesh.

Chairman’s Signature

.....

Dr. Rajesh Palit

Professor

Department of Electrical and Computer Engineering

North South University

Dhaka, Bangladesh.

DECLARATION

This is to declare that this project is our original work. No part of this work has been submitted elsewhere partially or fully for the award of any other degree or diploma. All project related information will remain confidential and shall not be disclosed without the formal consent of the project supervisor. Relevant previous works presented in this report have been properly acknowledged and cited. The plagiarism policy, as stated by the supervisor, has been maintained.

Students' names & Signatures

1. Susmita Roy Happy

2. Sadia Mahjabin Sanchary

3. Md Saleh Ahmed

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ABSTRACT

Plants play a key part in economy and climate change. Since climate change has become a worldwide concern also addressed in UN general assembly 2019, several countries including Pakistan are on mission to plant more and more trees and plants to sustain climate balance. Many research have demonstrated that extinction of plants due to industry use have caused harm to ozone layer and therefore consequent global warming. The rate of climate change anticipated for the future is 10-100 times faster than the rate of DE glacial warming [1]. These plants additionally pay a vital part in food business as well. Balance of world food production is also an important issue [2]. Apart from this in health care also plants play an important role [3]. Overall plants are highly essential for human survival hence it's also a worldwide concern to take care of them. Just like human health plants health can also be affected by several diseases. In economic terms, annual losses in food, fiber and decorative production systems caused by plant pests and diseases are estimated in the hundreds of billions of dollars [4]. These disorders are caused by fungi or fungal like orgasms. However, other major illnesses of food and feed crops are caused by viral and bacterial species [5]. Some of the illnesses may be of spreadable character, means they may spread from one plant to other thus needs to be discovered and taken care timely.[3].

Some of the common symptoms of disease in plants disease are Leaf rust (common leaf rust in corn), Stem rust (wheat stem rust), Sclerotinia (white mold), Powdery mildew, Birds-eye spot on berries (anthracnose), Damping off of seedlings (phytophthora), Leaf spot (septoria brown spot), Chlorosis (yellowing of leaves). These diseases can be identified by physical state of plants leaves. The specialists can identify whether the plant is defective or not by examining at leaves stems or fruit. This strategy demands having plenty human resources for this particular work. In this era of technology and automation it is not very efficient technique, it would be much better if we have an automated system which detects disease in plants automatically. There are several researches already done to fill this goal most of them utilize classic machine learning methodologies [6].

Deep learning a subset of machine learning. The advantage of deep learning over machine learning is that one does not need to worry about domain expertise as no feature engineering is required in this, unlike typical machine learning approaches [7]. Our approach similarly like other earlier

works utilizes photographs of plants leaves to identify sickness in plants. Plant disease detector is computer vision based automated plant disease detection system which utilizes machine learning techniques to correctly identify disease and healthy plants also the type of disease. For attaining so deep learning network for images like Convolution neural network (CNN) can be applied. CNN is used to extract features from images i.e. horizontal edges, vertical edges, RGB values etc. CNN is best deep learning neural network for visual feature extraction [8]. The CNN based network can be trained for detecting disease in plants by supplying vast quantity of photos of healthy and sick plants and trained model in future may be used to forecast the disease in plants by images of plants leaves.