

Supervisor's Recommendation

I hereby recommend that this project under my supervision by Kushal Raj Sharma and Ashish Gyawali entitled **Plant Disease Detection** in partial fulfillment of requirements for the degree of B.Sc. Computer Science and Information Technology are processed for evaluation.

.....

Er. Prakash Poudel
Project Supervisor
Nepathya College
Tilottama-5, Rupandehi

Acknowledgement

The success and final outcome of this project requires a lot of guidance and assistance from many people, and we are extremely privileged to have got this along the starting of the project.

It gives us immense pleasure to express our deepest sense of gratitude and sincere thanks to our highly respected teachers, guardians, specially thanks to our principal **Mr. Sanjeev Bhandari**, Head of Department **Mr. Ananta Pandey** and esteemed guide **Er. Prakash Poudel ‘Jigyashu’** for their valuable guidance, and encouragement in making this project possible. Their constructive suggestions regarding this project work and consistent support are sincerely acknowledged.

We would also like to express our sincere thanks to all our friends and all those who supported us directly or indirectly during this project work and make this project a successful one.

Abstract

Crop diseases are a noteworthy risk to sustenance security; however, their quick distinguishing proof stays troublesome in numerous parts of the world because of the non-attendance of the important foundation. The emergence of accurate techniques in the field of leaf-based image classification has shown impressive results. This paper makes use of Sequential in identifying between healthy and diseased leaves from the data sets created. Our proposed paper includes various phases of implementation namely dataset creation, feature extraction, training the classifier, and classification. The created datasets of diseased and healthy leaves are collectively trained under Sequential Model to classify the diseased and healthy images. For extracting features of an image, we use Histogram of an Oriented Gradient (HOG). Overall, using Machine learning to train the large data sets available publicly gives us a clear way to detect the disease present in plants on a colossal scale.

Letter of Approval

After a thorough analysis of the project, we are pleased to inform that the project “PLANT DISEASE DETECTION USING CNN WITH PYTORCH” prepared by Kushal Raj Sharma and Ashish Gyawali in partial fulfillment of the requirements for the degree of B.Sc. in Computer Science and Information Technology has been well studied. In our opinion it is satisfactory in the scope and quality as a project for the required degree.

.....

External Examiner
Tribhuvan University
Nepathya College

.....

Er. Prakash Poudel
Project Supervisor

.....

Mr. Ananta Pandey
Head of Department (HOD)
Nepathya College

.....

Mr. Sanjeev Bhandari
Principal
Nepathya College

Table of Contents

Title page.....	I
Supervisor's Recommendation.....	II
Letter Of Approval.....	III
Acknowledgement.....	IV
Abstract Page.....	V
List Of Figures.....	VII
List Of Abbreviation.....	VIII
Chapter 1. Introduction	1-4
1.1 Problem Statement.....	2
1.2 Objectives.....	2
1.4 Scope and Limitation.....	2
1.5 Development Methodology.....	2
1.5.1 Image Acquisition.....	3
1.5.2 Image Pre-Processing.....	3
1.5.3 Image Segmentation.....	4
1.5.4 Feature Extraction.....	4
1.5.5. Classification.....	4
Chapter 2. Background Study and Literature Review.....	5-6
2.1 Background study.....	5
2.2 Literature Review.....	6
Chapter 3. System Analysis.....	8-12
3.1 Requirement Analysis.....	8
3.1.1 Software Requirements.....	8
3.1.2 Hardware Requirements.....	8
3.1.3 Functional Requirement.....	9
3.1.4 Non-Functional Requirement.....	9
3.2 Feasibility Analysis.....	11
3.2.1 Technical Feasibility.....	11

3.2.2 Operational Feasibility.....	11
3.2.3 Economical Feasibility.....	11
3.2.4 Schedule Feasibility.....	12
3.3 Analysis.....	12
Chapter 4.System Design.....	15-20
4.1 Use Case diagram.....	15
4.2 System Architecture.....	16
4.5 Algorithm.....	18
4.5.1 CNN.....	16
Chapter 5. Implementation and Testing.....	18-21
5.1 Implementation.....	18
5.1.1 Tools Used.....	19
5.1.2 Implementation Details of Modules.....	20
5.2 Testing.....	20
5.2.1 Unit testing.....	20
5.2.2 System testing.....	20
5.3 Result Analysis.....	21
Chapter 6. Conclusion and Future Recommendations.....	22
6.1 Conclusion.....	22
6.2 Future Recommendations.....	22
REFERENCES	23
APPENDIX	

List of Figures

Figure 1: Development Methodology	Error! Bookmark not defined.
Figure 2: Non-Functional Requirements	Error! Bookmark not defined.
Figure 3: Activity Diagram	Error! Bookmark not defined.
Figure 4: Level 0 DFD	Error! Bookmark not defined.
Figure 5: Level 1 DFD	Error! Bookmark not defined.
Figure 6: Sequence Diagram	Error! Bookmark not defined.
Figure 7: Use Case Diagram	Error! Bookmark not defined.
Figure 8: System Architecture	Error! Bookmark not defined.
Figure 9: CNN Architecture	Error! Bookmark not defined.
Figure 10: Implementation	Error! Bookmark not defined.
Figure 11: Training and Validation Loss	Error! Bookmark not defined.
Figure 12: Training and Validation accuracy	Error! Bookmark not defined.

List of Abbreviations

CNN: Convolutional Neural Network

CV: Computer Vision

GLCM: Gray Level Co-occurrence Matrix

GPU: Graphics Processing Unit

HOG: Histogram of Oriented Gradients

KNN: K-Nearest Neighbour

ML: Machine Learning

ReLU: Rectified Linear Unit

SVM: Support Vector Machine