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DEPARTMENTAL ACCEPTANCE

The thesis entitled “AN APPROACH TO IDENTIFY EARLY BLIGHT, LATE BLIGHT AND SEPTORIA DISEASE PRESENT IN LEAF OF TOMATO PLANT BY APPLYING CONVOLUTION NEURAL NETWORK AND RECURRENT NEURAL NETWORK”, submitted by Himel Chand Thapa in partial fulfillment of the requirement for the award of the degree of “Master of Science in Computer System and Knowledge Engineering” has been accepted as a bona fide record of work independently carried out by him in the department.

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ABSTRACT

Tomato plant is one of the most cultivated plants in Nepal. Large losses due to several diseases threaten the cultivation of tomato plant. Most of the diseases of tomato plant detected at initial stages as they affects leaves first. In this thesis work, a deep learning based approach (combination of convolution neural network and recurrent neural network) is used to find disease named early blight, late blight and septoria present in leaf of tomato.

The dataset contains 4000 images of tomato leaves infected by three diseases. Convolution neural network in combination of recurrent neural network are introduced and that leads to the direct use of image which avoids conventional image processing techniques. The obtained results are applicable; they can be used as a practical tool for farmers to protect against disease. Accuracy of these architectures has been calculated by feeding the networks with the test data. Lastly, results are compared and analyzed to find out best architecture. Small filter size of having filter size 3X3 best accuracy. Thus, this study gives a way to design efficient architecture to predict disease present in leaf of tomato plant.

Keywords:

Convolution neural network, recurrent neural network, early blight, late blight, Septoria

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Sincerely,

Himal Chand Thapa

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ABBREVIATIONS

CNN: Convolution Neural Network

GDP Gross Domestic Product

RNN: Recurrent Neural Network

SVM: Support Vector Machine

MLP: Multilayer Perceptron

LSTM: Long Short-Term Memory

CPU: Central Processing Unit

TP: True positive

FP: False positive

TN: True Negative

FN: False Negative