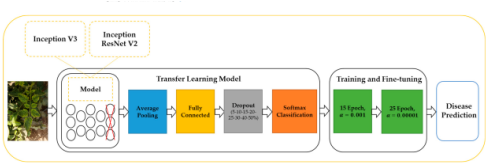
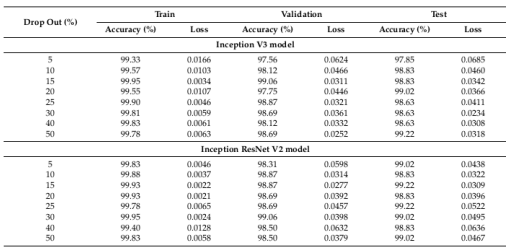
Department of Computer Science and Engineering
Bangladesh University of Business and Technology (BUBT)

CSE 498: Literature Review Records

Student's Id and Name	**Name:** Mustain Murtaza Taib and **ID:** 18193103003
Capstone Project Title	Smart Detection of Tomato Leaf Diseases Using Transfer Learning-Based Convolutional Neural Networks
Supervisor Name & Designation	**Name:** Mr.T.M. Amir - Ul - Haque Bhuiyan & **Designation:** Assistant Professor,Department of CSE, BUBT
Course Teacher's Name & Designation	**Name:** Khan Md. Hasib & **Designation:** Assistant Professor, Department of CSE, BUBT

Aspects	Paper # 1 (Title)
Title / Question (What is problem statement?)	Smart Detection of Tomato Leaf Diseases Using Transfer Learning-Based Convolutional Neural Networks
Objectives / Goal (What is looking for?)	Data augmentation techniques, including horizontal flipping, rotation, and zooming, were applied to tomato disease leaf images. The augmented images were used for further analysis. A convolutional neural network (CNN) architecture was employed, consisting of convolutional, batch normalization, activation, pooling, and fully connected layers. Pre-trained Inception V3 and Inception ResNet V2 models were used, with transfer learning applied to improve model performance. Dropout layers were utilized to address background noise. The CNN models were trained using cross-entropy loss and the Adam optimizer. This approach outperformed traditional feature extraction methods for plant disease identification.
Methodology / Theory (How to find the solution?)	Proposed architecture for tomato leaf disease detection: Input: tomato leaf images. Output: disease labels, predicted values, and prediction percentages. Steps: dataset creation, architecture design, dataset distribution, model training and evaluation. Dataset: 13,500 images of 10 disease categories and healthy leaves. Overfitting prevention: GAN generates synthetic samples. CNN architecture: 4 convolutional layers, MaxPooling layers. Evaluation: k-fold cross-validation. Training: Adam optimizer, categorical crossentropy loss function.
Software Tools (What program/software is used for design, coding and simulation?)	Google colab, keras,Tensorflow,pandas,numpy,matplot ,os.
Test / Experiment How to test and characterize the design/prototype?	 **Figure 4.** CNN architecture to develop a pre-trained model for tomato disease diagnosis.
Simulation/Test Data (What parameters are determined?)	Datasets : Bacterial Spot,Early Blight,Healthy,Late Blight, Leaf Mold,Mosaic virus,Septoria Leaf Spot,Two Spotted Spider Mites,Target Spot,Yellow Leaf Curl Virus.
Result / Conclusion (What was the final result?)	

Drop Out (%)	Train		Validation		Test	
	Accuracy (%)	Loss	Accuracy (%)	Loss	Accuracy (%)	Loss
Inception V3 model						
5	99.33	0.0166	97.56	0.0624	97.85	0.0685
10	99.57	0.0103	98.12	0.0466	98.83	0.0460
15	99.95	0.0034	99.06	0.0311	98.83	0.0342
20	99.55	0.0107	97.75	0.0446	99.02	0.0366
25	99.90	0.0046	98.87	0.0321	98.63	0.0411
30	99.81	0.0059	98.69	0.0361	98.63	0.0234
40	99.83	0.0061	98.12	0.0332	98.63	0.0308
50	99.78	0.0063	98.69	0.0252	99.22	0.0318
Inception ResNet V2 model						
5	99.83	0.0046	98.31	0.0598	99.02	0.0438
10	99.88	0.0037	98.87	0.0314	98.83	0.0322
15	99.93	0.0022	98.87	0.0277	99.22	0.0309
20	99.93	0.0021	98.69	0.0392	98.83	0.0396
25	99.78	0.0065	98.69	0.0457	99.22	0.0522
30	99.95	0.0024	99.06	0.0398	99.02	0.0495
40	99.40	0.0128	98.50	0.0632	98.83	0.0636
50	99.83	0.0058	98.50	0.0379	99.02	0.0467

Obstacles/Challenges (List the methodological obstacles if authors mentioned in the article)	Team didnt find any challenges
Terminology (List the common	deep learning; convolutional neural networks; inception V3;

Review Judgment (Briefly compare the objectives and results of all the articles you reviewed)	Validation accuracy is 98.69% Test Accuaracy is 99.22% Train Accuaracy is 99.78% In Inceptionv3
Review Outcome	This paper didn't use updated model