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	Tomato leaf disease classification by exploiting transfer learning and feature concatenation
Supervisor Name & Designation	**Name:** Mr.T.M. Amir - Ul - Haque Bhuiyan & **Designation:** Assistant Professor,Department of CSE, BUBT
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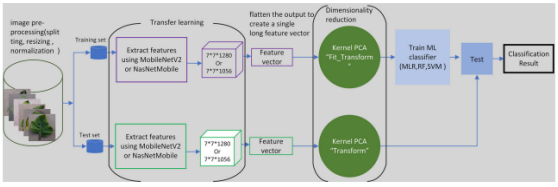
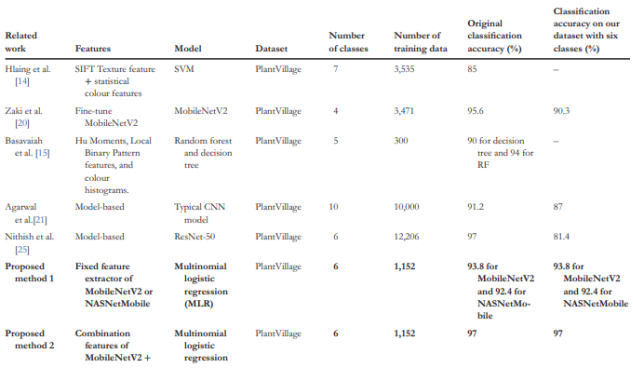
Aspects	Paper # 1 (Title)
Title / Question (What is problem statement?)	Tomato leaf disease classification by exploiting transfer learning and feature concatenation
Objectives / Goal (What is looking for?)	The authors propose a method for automating tomato leaf disease classification using transfer learning and feature concatenation. Pre-trained kernels from MobileNetV2 and NASNetMobile are used to extract features, which are then reduced in dimensionality using kernel principal component analysis. The concatenated features are fed into a conventional learning algorithm, with multinomial logistic regression achieving an average accuracy of 97%.
Methodology / Theory (How to find the solution?)	They selected 1152 tomato leaf images, divided into one healthy class and five unhealthy classes, to extract features. The images were resized to 224x224 pixels and normalized between 0 and 1. Transfer learning is used to adapt pre-trained models for image classification, specifically MobileNetV2 and NASNetMobile, as feature extractors without their final classification layer.
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?	
Simulation/Test Data (What parameters are determined?)	Datasets : Healthy, Bacterial spot, Late blight, Septoria spot, Yellow curved
Result / Conclusion (What was the final result?)	
Obstacles/Challenges (List the methodological obstacles if authors mentioned in the article)	Team didnt find any challenges
Terminology (List the common basic words frequently used in this research field)	Leaf Disease Detection, Leaf Disease Classification, Convolutional Neural Network (CNN), NASNetMobile , MobileNetV2

Related work	Features	Model	Dataset	Number of classes	Number of training data	Original classification accuracy (%)	Classification accuracy on our dataset with six classes (%)
Hlaing et al. [14]	SIFT Texture feature + statistical colour features	SVM	PlantVillage	7	3,535	85	–
Zaki et al. [20]	Fine-tune MobileNetV2	MobileNetV2	PlantVillage	4	3,471	95.6	90.3
Basavaiah et al. [15]	Hu Moments, Local Binary Pattern features, and colour histograms.	Random forest and decision tree	PlantVillage	5	300	90 for decision tree and 94 for RF	–
Agarwal et al.[21]	Model-based	Typical CNN model	PlantVillage	10	10,000	91.2	87
Nithish et al. [25]	Model-based	ResNet-50	PlantVillage	6	12,206	97	81.4
Proposed method 1	**Fixed feature extractor of MobileNetV2 or NASNetMobile**	**Multinomial logistic regression (MLR)**	PlantVillage	**6**	**1,152**	**93.8 for MobileNetV2 and 92.4 for NASNetMobile**	**93.8 for MobileNetV2 and 92.4 for NASNetMobile**
Proposed method 2	**Combination features of MobileNetV2 +**	**Multinomial logistic regression**	PlantVillage	**6**	**1,152**	**97**	**97**

Review Judgment (Briefly compare the objectives and results of all the articles you reviewed)	ResNet-50 was trained on a dataset containing 12206 images; however, when we trained and tested it on our dataset (which contained only 1152 images), the accuracy declined dramatically from 97% to 81.4%.
Review Outcome	This paper didn't use updated model