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 via Compact Convolutional Neural Networks with Transfer Learning and Feature Selection
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

<table>
<tr><th>Aspects</th><th>Paper # 1 (Title)</th></tr>
<tr><td>Title / Question
(What is problem statement?)</td><td>Tomato Leaf Disease Classification via Compact Convolutional Neural Networks with Transfer Learning and Feature Selection</td></tr>
<tr><td>Objectives / Goal (What is looking for?)</td><td>Tomatoes are valuable vegetables and a major crop in many countries. his study proposes a pipeline using three compact convolutional neural networks (CNNs) and transfer learning to extract condensed features. The pipeline achieves high accuracy (99.92% and 99.90%). Six classifiers are utilized in the identification process,The experimental results demonstrate the competitive performance of the proposed pipeline compared to previous studies on tomato leaf disease classification.</td></tr>
<tr><td>Methodology / Theory (How to find the solution?)</td><td>Three compact CNNs (ResNet-18, ShuffleNet, and MobileNet) are then retrained using transfer learning, and deep features are extracted from each CNN. Six ML classifiers (Naïve Bayes, K-nearest neighbor, decision tree, linear discriminant analysis, support vector machine, and quadratic discriminant analysis) are used to classify tomato leaves into ten classes.</td></tr>
<tr><td>Software Tools (What program/software is used for design, coding and simulation?)</td><td>Google colab, keras,Tensorflow,pandas,numpy,matplot ,os.</td></tr>
<tr><td>Test / Experiment How to test and characterize the design/prototype?</td><td>For the experimental work, the datasets were divided into the ratio of 80% and 20%. 80% of the datasets were used to train classification algorithms, and the remaining 20% used for testing purposes.classifiers.</td></tr>
<tr><td>Simulation/Test Data (What parameters are determined?)</td><td>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.</td></tr>
<tr><td>Result / Conclusion (What was the final result?)</td><td><table>
<tr><th>Model</th><th>Features</th><th>Accuracy</th></tr>
<tr><td>ResNet-50</td><td>Features of ResNet-50</td><td>97.0%</td></tr>
<tr><td>U-Net</td><td>ResNet-50</td><td>97.11%</td></tr>
<tr><td>Customized CNN</td><td>Customized CNN</td><td>99.3%</td></tr>
<tr><td>Customized CNN</td><td>Customized CNN</td><td>98.70%</td></tr>
<tr><td>Fine-tuned MobileNet</td><td>Features of MobileNet</td><td>90.3%</td></tr>
<tr><td>Spatial attention with CNN</td><td>Fully connected layer</td><td>95.20%</td></tr>
<tr><td>VGG16</td><td>Features of VGG16</td><td>96.19%</td></tr>
<tr><td>Multinomial Logistic regression</td><td>MobileNetV2 or NASNetMobile</td><td>97%</td></tr>
<tr><td>EfficientNet-B0</td><td>EfficientNet-B0</td><td>98.60%</td></tr>
<tr><td>KNN</td><td>Fully connected layer (MobileNet + ShuffleNet + ResNet-18) + hybrid FS</td><td>99.92%</td></tr>
</table></td></tr>
<tr><td>Obstacles/Challenges (List the methodological obstacles if authors mentioned in the article)</td><td>The agricultural sector is facing challenges in detecting leaf diseases for efficient food production. This study proposes a robust deep learning-based pipeline for automatic detection and identification of tomato diseases.</td></tr>
<tr><td>Terminology (List the common basic words frequently used in this research field)</td><td>smart agriculture; precision agriculture; deep learning; tomato leaf disease classification; feature selection; transfer learning</td></tr>
</table>

Review Judgment (Briefly compare the objectives and results of all the articles you reviewed)	• This is best accuary than "Savary, S.; Ficke, A.; Aubertot, J.-N.; Hollier, C. Crop Losses Due to Diseases and Their Implications for Global Food Production" Losses and Food Security. Food Secur. 2012, 4, 519–537. [CrossRef]" Best accuracy is 97.0%
Review Outcome (Make a decision how to use/refer the obtained knowledge to prepare a separate and new methodology for your own research project)	But I can get best from that paper with using resnet50 and other classifiers