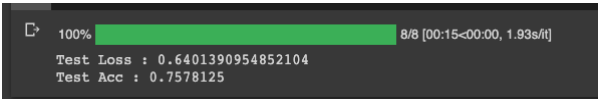
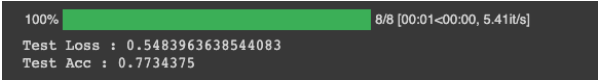
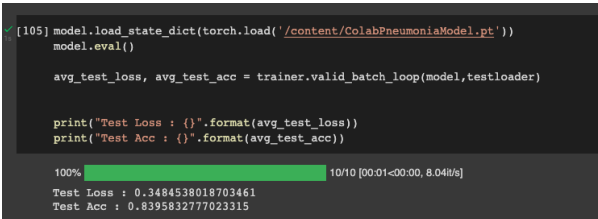
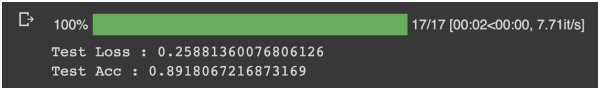
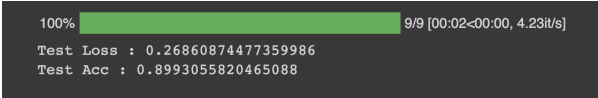
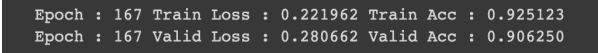
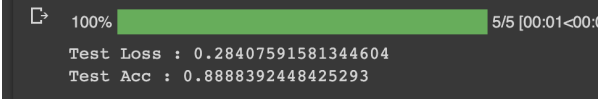
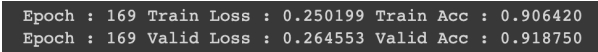
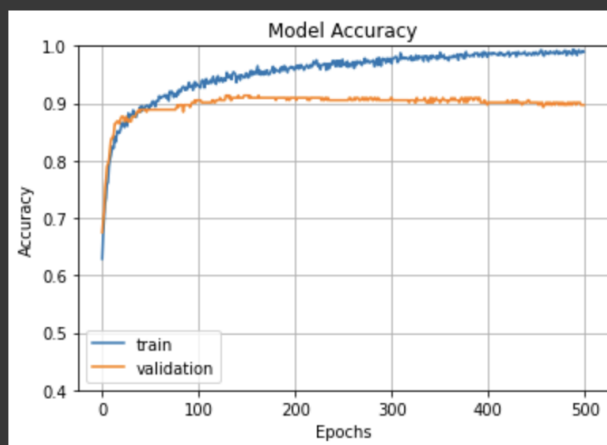
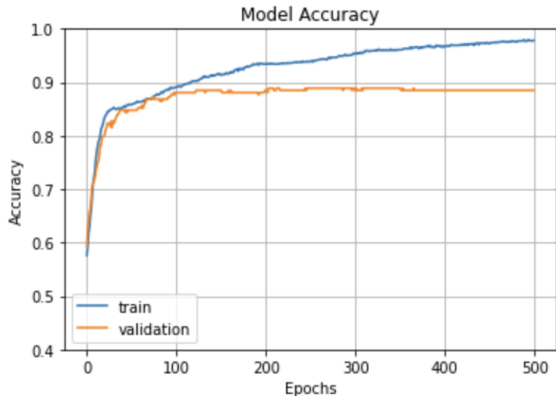
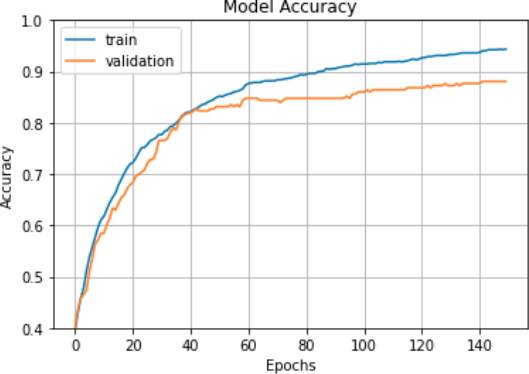
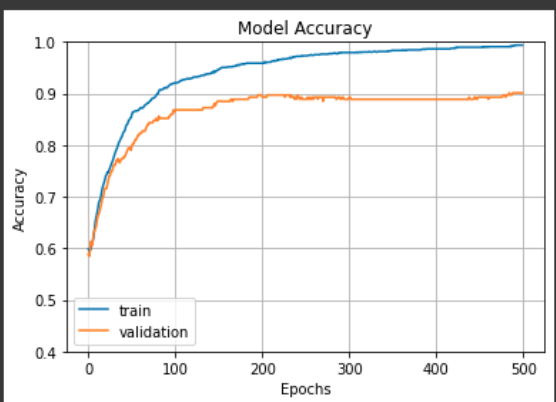
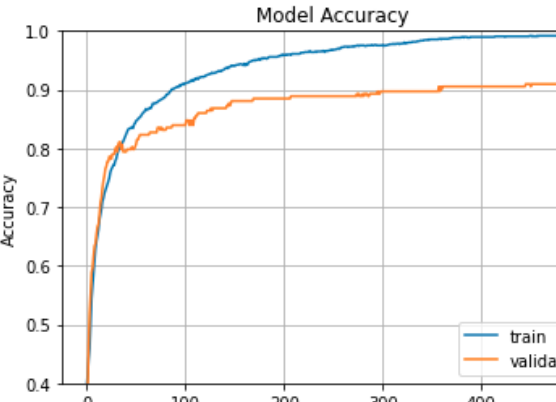


	Model	Accuracy
	Efficientnet_b4 - for 4 classes(normal, rot, bloatch, scab) epochs =20 lr = 0.001	
	Efficientnet_b4 - for 4 classes(normal, rot, bloatch, scab) epochs =200 lr = 0.00001	
	Efficientnet_b4 - for 2 classes(normal, defected) epochs =250 lr = 0.00001	
	Efficientnet_b4 - for 2 classes(normal, defected) - More data - merged data (2 classes + 4 classes) epochs =200 lr = 0.00001	
	Efficientnet_b4 - for 2 classes(normal, defected) - More data - merged data (2 classes + 4 classes) Increased Batch size to 32 epochs =200 lr = 0.000005	<p>Average accuracy:</p>  <p>Best Accuracy at epoch 167:</p> 
	Efficientnet_b4 - for 2 classes(normal, defected) - More data - merged data (2 classes + 4 classes) Increased Batch size to 64 epochs =200 lr = 0.000005	<p>Average Accuracy:</p>  <p>Best Accuracy at epoch 169:</p> 

	<p>Efficientnet_b4 - for 2 classes(normal, defected) - More data - merged data (2 classes + 4 classes)</p> <p>Increased Batch size to 64</p> <p>epochs =400 lr = 0.000005</p>	<p>Average accuracy:</p> <div><div>100%</div><div>5/5 [00:01<00:00, 3.03it/s]</div></div> <p>Test Loss : 0.2485705479979515 Test Acc : 0.909375011920929</p> <p>Best Accuracy at epoch 336:</p> <div><div>100%</div><div>15/15 [00:07<00:00, 2.10it/s]</div></div> <p>Epoch : 136 Train Loss : 0.191113 Train Acc : 0.927891 Epoch : 136 Valid Loss : 0.246882 Valid Acc : 0.912500</p>																														
****	<p>Efficientnet_b4</p> <p>Batch_size = 32 Epochs = 500 Learning_rate = 0.000005</p> <p>Dataset -></p> <p>apple_dataset_normal_and_defected_with_extra_data_for_resnet_only_validation_data</p> <p>Dataset link →</p> <p>https://drive.google.com/drive/folder/s/1NlmW5_Vja29hoDbwE0AxfarM4T2wQG-?usp=sharing</p> <p>Trained Efficientnet_b4 model link →</p> <p>https://drive.google.com/drive/folder/s/1-BEEKPCd8uDyZK_QWg85A0-lePAzbEg?usp=sharing</p> <p>Loading this model:-</p> <p>"/content/drive/MyDrive/CMPE-295-A/my_EfficientNetB4_model_1"</p>	<p>Epoch 500/500 31/31 [=====] - 5s 163ms/step - loss: 0.0580 - accuracy: 0.9897 - val_loss: 0.2811 - val accuracy: 0.8971</p>  <p>Training Accuracy: 98.97</p> <p>Validation Accuracy: 89.71</p> <table><tr><th></th><th>precision</th><th>recall</th><th>f1-score</th><th>support</th></tr><tr><td>DEFECTED</td><td>0.94</td><td>0.90</td><td>0.92</td><td>157</td></tr><tr><td>NORMAL</td><td>0.83</td><td>0.90</td><td>0.86</td><td>86</td></tr><tr><td>accuracy</td><td></td><td></td><td>0.90</td><td>243</td></tr><tr><td>macro avg</td><td>0.88</td><td>0.90</td><td>0.89</td><td>243</td></tr><tr><td>weighted avg</td><td>0.90</td><td>0.90</td><td>0.90</td><td>243</td></tr></table> <p>Using this instead of restnet-50 as this gives prediction results under 30ms.</p>		precision	recall	f1-score	support	DEFECTED	0.94	0.90	0.92	157	NORMAL	0.83	0.90	0.86	86	accuracy			0.90	243	macro avg	0.88	0.90	0.89	243	weighted avg	0.90	0.90	0.90	243
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weighted avg	0.90	0.90	0.90	243																												
	<p>EfficientNetV2L-transfer-learning</p> <p>Dataset:- apple_dataset_normal_and_defected_with_extra_data_for_</p>	<p>Epoch 350/350 31/31 [=====] - 10s 320ms/step - loss: 0.1893 - accuracy: 0.9444 - val_loss: 0.2980 - val_accuracy: 0.8848</p>																														

<p>resnet_only_validation_data</p> <p>Batch size:- 32 epochs = 350 lr = 0.000002</p>	<p>Val accuracy = 88.48%</p>
<p>EfficientNetV2L-transfer-learning</p> <p>Dataset:- apple_dataset_normal_and_defected_with_extra_data_for_resnet_only_validation_data</p> <p>Batch size:- 32 epochs = 500 lr = 0.000003</p>	<p>Epoch 500/500 31/31 [=====] - 10s 322ms/step - loss: 0.1043 - accuracy: 0.9784 - val_loss: 0.2767 - val_accuracy: 0.8848</p> <p>Val accuracy = 88.48%</p> 
<p>Resnet-50</p> <p>Batch_size = 32 Epochs = 150 Learning_rate = 0.000001</p> <p>Dataset -> apple_dataset_normal_and_defected_with_extra_data_for_resnet_only_validation_data</p>	<p>Epoch 150/150 31/31 [=====] - 4s 117ms/step - loss: 0.1948 - accuracy: 0.9434 - val_loss: 0.3101 - val_accuracy: 0.8807</p> <p>Val accuracy = 0.8807</p> 
<p>Resnet-50</p> <p>Batch_size = 32 Epochs = 500 Learning_rate = 0.000001</p> <p>Dataset -></p>	<p>Epoch 500/500 31/31 [=====] - 4s 118ms/step - loss: 0.0598 - accuracy: 0.9938 - val_loss: 0.2697 - val_accuracy: 0.9012</p> <p>Training Accuracy: 99.38</p>

	<p>apple_dataset_normal_and_defected_with_extra_data_for_resnet_only_validation_data</p>	<p>Validation Accuracy: 90.12</p> 																														
**	<p>Resnet-50</p> <p>Batch_size = 32 Epochs = 500 Learning_rate = 0.000001</p> <p>Dataset -></p> <p>apple_dataset_normal_and_defected_with_extra_data_for_resnet_only_validation_data</p> <p>Dataset link →</p> <p>https://drive.google.com/drive/folders/1NImW5_Vja29hoDbwE0AxfarM4T2wQG-?usp=sharing</p> <p>Trained RestNet-50 model link →</p> <p>https://drive.google.com/drive/folders/193IKkplTwwEWv_5RanUPVnuzYvR83qCL?usp=sharing</p> <p>Loading this model:-</p> <p>"/content/drive/MyDrive/CMPE-295-A/my_resnet_model"</p>	<p>Epoch 500/500 31/31 [=====] - 4s 122ms/step - loss: 0.0587 - accuracy: 0.9938 - val_loss: 0.2695 - val_accuracy: 0.9095</p>  <p>Training Accuracy: 99.38</p> <p>Validation Accuracy: 90.95</p> <pre>[116] print(classification_report(labels, predictions, target_names=classnames))</pre> <table><thead><tr><th></th><th>precision</th><th>recall</th><th>f1-score</th><th>support</th></tr></thead><tbody><tr><td>DEFECTED</td><td>0.95</td><td>0.91</td><td>0.93</td><td>157</td></tr><tr><td>NORMAL</td><td>0.85</td><td>0.91</td><td>0.88</td><td>86</td></tr><tr><td>accuracy</td><td></td><td></td><td>0.91</td><td>243</td></tr><tr><td>macro avg</td><td>0.90</td><td>0.91</td><td>0.90</td><td>243</td></tr><tr><td>weighted avg</td><td>0.91</td><td>0.91</td><td>0.91</td><td>243</td></tr></tbody></table>		precision	recall	f1-score	support	DEFECTED	0.95	0.91	0.93	157	NORMAL	0.85	0.91	0.88	86	accuracy			0.91	243	macro avg	0.90	0.91	0.90	243	weighted avg	0.91	0.91	0.91	243
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	<p>Resnet-50</p> <p>Batch_size = 32 Epochs = 500 Learning_rate = 0.000001</p> <p>Dataset -></p> <p>/content/drive/MyDrive/CMPE -295-A/apple_dataset_normal _and_defected_with_extra_da ta_for_resnet_only_validati on_data_more_data_added</p>	<p>Training Accuracy: 100%</p> <p>Validation Accuracy: 97%</p> <p>The model was trained wrong because dataset has repeated images and hence images were repeating training set and validation set.</p> <p>Can be improved but will look into it after 14th.</p> <p>** Work on dataset</p>
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