PS C:\Users\tgillard\Desktop\internship\0\_Final\_Code> c:; cd 'c:\Users\tgillard\Desktop\internship\0\_Final\_Code'; & 'C:\Users\tgillard\Anaconda3\python.exe' 'c:\Users\tgillard\.vscode\extensions\ms-python.python-2022.18.2\pythonFiles\lib\python\debugpy\adapter/../..\debugpy\launcher' '10574' '--' 'c:\Users\tgillard\Desktop\internship\0\_Final\_Code\data\_augmentation.py'

Traceback (most recent call last):

File "c:\Users\tgillard\Desktop\internship\0\_Final\_Code\data\_augmentation.py", line 8, in <module>

import cv2

ModuleNotFoundError: No module named 'cv2'

PS C:\Users\tgillard\Desktop\internship\0\_Final\_Code> c:; cd 'c:\Users\tgillard\Desktop\internship\0\_Final\_Code'; & 'C:\Users\tgillard\Anaconda3\envs\cnn\python.exe' 'c:\Users\tgillard\.vscode\extensions\ms-python.python-2022.18.2\pythonFiles\lib\python\debugpy\adapter/../..\debugpy\launcher' '27159' '--' 'c:\Users\tgillard\Desktop\internship\0\_Final\_Code\data\_augmentation.py'

train -0 nothing : 100%|████████████████████████████████████████████████| 2226/2226 [00:00<00:00, 224392.44files/s]

train -1stem : 100%|██████████████████████████████████████████████████| 376/376 [00:00<00:00, 379100.55files/s]

train -2calyx : 100%|██████████████████████████████████████████████████| 445/445 [00:00<00:00, 448669.54files/s]

train -3defect : 100%|██████████████████████████████████████████████████| 485/485 [00:00<00:00, 325842.93files/s]

test -0 nothing : 100%|██████████████████████████████████████████████████| 390/390 [00:00<00:00, 393405.14files/s]

test -1stem : 100%|████████████████████████████████████████████████████████████████| 66/66 [00:00<?, ?files/s]

test -2calyx : 100%|████████████████████████████████████████████████████| 76/76 [00:00<00:00, 153253.42files/s]

test -3defect : 100%|████████████████████████████████████████████████████████████████| 83/83 [00:00<?, ?files/s]

number of classes in processed dataset= 4

the maximum files in any class in train\_df is 2114 the minimum files in any class in train\_df is 357

train\_df length: 3355 test\_df length: 615 valid\_df length: 177

average image height= 95 average image width= 95 aspect ratio h/w= 1.0

Initial length of dataframe is 3355

Found 423 validated image filenames. for class 2calyx creating 377 augmented images

Found 357 validated image filenames. for class 1stem creating 443 augmented images

Found 461 validated image filenames. for class 3defect creating 339 augmented images

Total Augmented images created= 1159

Length of augmented dataframe is now 4514

Found 4514 validated image filenames belonging to 4 classes. for train generator

Found 177 validated image filenames belonging to 4 classes. for valid generator

Found 615 validated image filenames belonging to 4 classes. for test generator

test batch size: 41 test steps: 15 number of classes : 4

Created EfficientNet B7 model with initial learning rate set to 0.001

Epoch 1/40

226/226 [==============================] - 759s 3s/step - loss: 7.1637 - accuracy: 0.8126 - val\_loss: 5.2800 - val\_accuracy: 0.9548

Epoch 2/40

226/226 [==============================] - 789s 3s/step - loss: 4.2277 - accuracy: 0.9187 - val\_loss: 3.2751 - val\_accuracy: 0.9661

Epoch 3/40

226/226 [==============================] - 742s 3s/step - loss: 2.7841 - accuracy: 0.9468 - val\_loss: 2.1749 - val\_accuracy: 0.9774

Epoch 4/40

226/226 [==============================] - 786s 3s/step - loss: 1.8907 - accuracy: 0.9619 - val\_loss: 1.4851 - val\_accuracy: 0.9718

Epoch 5/40

226/226 [==============================] - 784s 3s/step - loss: 1.3207 - accuracy: 0.9659 - val\_loss: 1.0402 - val\_accuracy: 0.9661

Epoch 6/40

226/226 [==============================] - 724s 3s/step - loss: 0.9386 - accuracy: 0.9750 - val\_loss: 0.8219 - val\_accuracy: 0.9548

Epoch 7/40

226/226 [==============================] - 764s 3s/step - loss: 0.6655 - accuracy: 0.9823 - val\_loss: 0.6078 - val\_accuracy: 0.9831

Epoch 8/40

226/226 [==============================] - 742s 3s/step - loss: 0.5182 - accuracy: 0.9776 - val\_loss: 0.4336 - val\_accuracy: 0.9718

Epoch 9/40

226/226 [==============================] - 738s 3s/step - loss: 0.4147 - accuracy: 0.9801 - val\_loss: 0.3503 - val\_accuracy: 0.9831

Epoch 10/40

226/226 [==============================] - 796s 4s/step - loss: 0.3543 - accuracy: 0.9814 - val\_loss: 0.2948 - val\_accuracy: 0.9887

Epoch 11/40

226/226 [==============================] - 675s 3s/step - loss: 0.2859 - accuracy: 0.9840 - val\_loss: 0.2777 - val\_accuracy: 0.9774

Epoch 12/40

226/226 [==============================] - 837s 4s/step - loss: 0.2548 - accuracy: 0.9845 - val\_loss: 0.2247 - val\_accuracy: 0.9831

Epoch 13/40

226/226 [==============================] - 772s 3s/step - loss: 0.2204 - accuracy: 0.9887 - val\_loss: 0.2433 - val\_accuracy: 0.9774

Epoch 14/40

226/226 [==============================] - 751s 3s/step - loss: 0.1983 - accuracy: 0.9887 - val\_loss: 0.2612 - val\_accuracy: 0.9661

Epoch 15/40

226/226 [==============================] - 722s 3s/step - loss: 0.1989 - accuracy: 0.9874 - val\_loss: 0.2300 - val\_accuracy: 0.9774

Epoch 16/40

226/226 [==============================] - 734s 3s/step - loss: 0.1686 - accuracy: 0.9914 - val\_loss: 0.1790 - val\_accuracy: 0.9774

Epoch 17/40

226/226 [==============================] - 751s 3s/step - loss: 0.1597 - accuracy: 0.9931 - val\_loss: 0.2443 - val\_accuracy: 0.9661

Epoch 18/40

226/226 [==============================] - 778s 3s/step - loss: 0.1538 - accuracy: 0.9925 - val\_loss: 0.1368 - val\_accuracy: 0.9887

Epoch 19/40

226/226 [==============================] - 775s 3s/step - loss: 0.1531 - accuracy: 0.9931 - val\_loss: 0.1969 - val\_accuracy: 0.9661

Epoch 20/40

226/226 [==============================] - 731s 3s/step - loss: 0.1385 - accuracy: 0.9929 - val\_loss: 0.1785 - val\_accuracy: 0.9718

Epoch 21/40

226/226 [==============================] - 547s 2s/step - loss: 0.1329 - accuracy: 0.9942 - val\_loss: 0.1830 - val\_accuracy: 0.9774

Epoch 22/40

226/226 [==============================] - 721s 3s/step - loss: 0.1300 - accuracy: 0.9951 - val\_loss: 0.2531 - val\_accuracy: 0.9548

Epoch 23/40

226/226 [==============================] - 771s 3s/step - loss: 0.1243 - accuracy: 0.9945 - val\_loss: 0.1725 - val\_accuracy: 0.9774

Epoch 24/40

226/226 [==============================] - 775s 3s/step - loss: 0.1276 - accuracy: 0.9942 - val\_loss: 0.1630 - val\_accuracy: 0.9831

Epoch 25/40

226/226 [==============================] - 739s 3s/step - loss: 0.1208 - accuracy: 0.9953 - val\_loss: 0.1558 - val\_accuracy: 0.9774

Epoch 26/40

226/226 [==============================] - 766s 3s/step - loss: 0.1294 - accuracy: 0.9922 - val\_loss: 0.1682 - val\_accuracy: 0.9831

Epoch 27/40

226/226 [==============================] - 732s 3s/step - loss: 0.1245 - accuracy: 0.9925 - val\_loss: 0.1829 - val\_accuracy: 0.9774

Epoch 28/40

226/226 [==============================] - 737s 3s/step - loss: 0.1087 - accuracy: 0.9965 - val\_loss: 0.1941 - val\_accuracy: 0.9661

Epoch 29/40

226/226 [==============================] - 764s 3s/step - loss: 0.1026 - accuracy: 0.9971 - val\_loss: 0.1997 - val\_accuracy: 0.9718

Epoch 30/40

226/226 [==============================] - 839s 4s/step - loss: 0.1061 - accuracy: 0.9949 - val\_loss: 0.1928 - val\_accuracy: 0.9718

Epoch 31/40

226/226 [==============================] - 831s 4s/step - loss: 0.1065 - accuracy: 0.9965 - val\_loss: 0.1723 - val\_accuracy: 0.9718

Epoch 32/40

226/226 [==============================] - 791s 4s/step - loss: 0.1042 - accuracy: 0.9958 - val\_loss: 0.1553 - val\_accuracy: 0.9774

Epoch 33/40

226/226 [==============================] - 733s 3s/step - loss: 0.1013 - accuracy: 0.9965 - val\_loss: 0.1743 - val\_accuracy: 0.9718

Epoch 34/40

226/226 [==============================] - 821s 4s/step - loss: 0.1009 - accuracy: 0.9947 - val\_loss: 0.1789 - val\_accuracy: 0.9831

Epoch 35/40

226/226 [==============================] - 798s 4s/step - loss: 0.0984 - accuracy: 0.9962 - val\_loss: 0.1508 - val\_accuracy: 0.9718

Epoch 36/40

226/226 [==============================] - 763s 3s/step - loss: 0.0901 - accuracy: 0.9976 - val\_loss: 0.1416 - val\_accuracy: 0.9774

Epoch 37/40

226/226 [==============================] - 775s 3s/step - loss: 0.0935 - accuracy: 0.9973 - val\_loss: 0.1848 - val\_accuracy: 0.9661

Epoch 38/40

226/226 [==============================] - 811s 4s/step - loss: 0.1017 - accuracy: 0.9951 - val\_loss: 0.1210 - val\_accuracy: 0.9774

Epoch 39/40

226/226 [==============================] - 730s 3s/step - loss: 0.0934 - accuracy: 0.9967 - val\_loss: 0.1468 - val\_accuracy: 0.9718

Epoch 40/40

226/226 [==============================] - 804s 4s/step - loss: 0.0935 - accuracy: 0.9967 - val\_loss: 0.1206 - val\_accuracy: 0.9774

15/15 [==============================] - 21s 1s/step

there were 12 errors in 615 tests for an accuracy of 98.05

Classification Report:

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precision recall f1-score support

0 nothing 0.9797 0.9923 0.9860 390

1stem 0.9851 1.0000 0.9925 66

2calyx 1.0000 0.9737 0.9867 76

3defect 0.9620 0.9157 0.9383 83

accuracy 0.9805 615

macro avg 0.9817 0.9704 0.9759 615

weighted avg 0.9804 0.9805 0.9803 615

Below is a list of test files that were miss classified

Test File Predicted as

C:\Users\tgillard\Desktop\internship\DATA\_SET\T2Eve\_trie\Team\test\0 nothing\5730000.BMP

C:\Users\tgillard\Desktop\internship\DATA\_SET\T2Eve\_trie\Team\test\0 nothing\8411000.BMP

C:\Users\tgillard\Desktop\internship\DATA\_SET\T2Eve\_trie\Team\test\0 nothing\9509000.BMP

C:\Users\tgillard\Desktop\internship\DATA\_SET\T2Eve\_trie\Team\test\2calyx\15116220.BMP

C:\Users\tgillard\Desktop\internship\DATA\_SET\T2Eve\_trie\Team\test\2calyx\6107210.BMP

C:\Users\tgillard\Desktop\internship\DATA\_SET\T2Eve\_trie\Team\test\3defect\10018300.BMP

C:\Users\tgillard\Desktop\internship\DATA\_SET\T2Eve\_trie\Team\test\3defect\13018320.BMP

C:\Users\tgillard\Desktop\internship\DATA\_SET\T2Eve\_trie\Team\test\3defect\13920300.BMP

C:\Users\tgillard\Desktop\internship\DATA\_SET\T2Eve\_trie\Team\test\3defect\2726310.BMP

C:\Users\tgillard\Desktop\internship\DATA\_SET\T2Eve\_trie\Team\test\3defect\4806300.BMP

C:\Users\tgillard\Desktop\internship\DATA\_SET\T2Eve\_trie\Team\test\3defect\4829300.BMP

C:\Users\tgillard\Desktop\internship\DATA\_SET\T2Eve\_trie\Team\test\3defect\823300.BMP

model was saved as ./Granny Smith-98.03.h5









