

Neural Network and Deep Learning output

```
train_df length: 17573  test_df length: 976  valid_df length: 977
CLASS      IMAGE COUNT
Lime_Bad   1085
Guava_Bad  1129
Pomegranate_Good  5940
Lime_Good  1094
Apple_Bad  1141
Orange_Bad 1159
Guava_Good 1152
Apple_Good 1149
Orange_Good 1216
Banana_mixed 285
Banana_Good 1113
Banana_Bad  1087
Pomegranate_Bad 1187
Guava_mixed 148
Lemon_mixed 278
Pomegranate_mixed 125
Apple_mixed 113
Orange_mixed 125
Average Image Height: 721.152  Average Image Width: 702.528  Aspect ratio: 1.0265099754031157
```

```
Original Number of classes in dataframe: 18
[200, 200, 200, 200, 200, 200, 200, 200, 200, 200, 200, 200, 200, 200, 200, 133, 113, 113, 102]
Found 133 validated image filenames.
Found 113 validated image filenames.
Found 102 validated image filenames.
Found 113 validated image filenames.
Total Augmented images created= 339
[200, 200, 200, 200, 200, 200, 200, 200, 200, 200, 200, 200, 200, 200, 200, 200, 200]
```

```
Found 3600 validated image filenames belonging to 18 classes.
Found 977 validated image filenames belonging to 18 classes.
Found 976 validated image filenames belonging to 18 classes.
test batch size: 61  test steps: 16  number of classes : 18
class name      class index
Apple_Bad       0
Apple_Good      1
Apple_mixed     2
Banana_Bad      3
Banana_Good     4
Banana_mixed    5
Guava_Bad       6
Guava_Good      7
Guava_mixed     8
Lemon_mixed     9
Lime_Bad        10
Lime_Good       11
Orange_Bad      12
Orange_Good     13
Orange_mixed    14
Pomegranate_Bad 15
Pomegranate_Good 16
Pomegranate_mixed 17
```

show_image_samples(train_gen)

Pomegranate_Good

Apple_Good

Guava_Bad

Banana_Good

Lime_Bad

Apple_Good

Guava_Good

Guava_Good

Lime_Good

Lemon_mixed

Lime_Bad

Apple_Good

Banana_Bad

Lemon_mixed

Banana_Bad

Models

Notebook options

ACCELERATOR

GPU P100

Quota: 00:06 / 30 hrs

LANGUAGE

Python

PERSISTENCE

No persistence

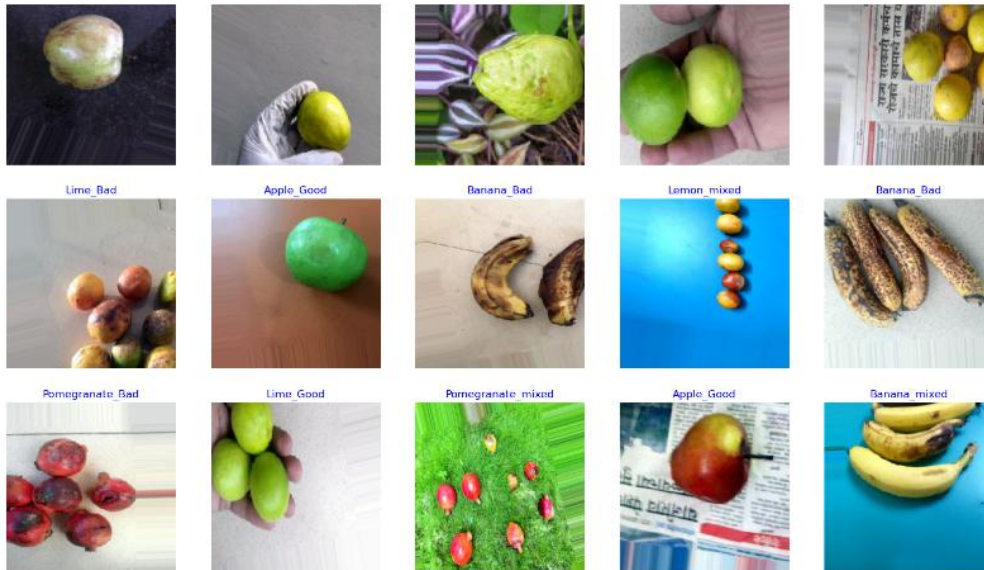
Activate Windows

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ENVIRONMENT

Always use latest environment

Search 22°C Partly sunny 3:01 PM



Training will proceed until epoch 5 then you will be asked to enter H to halt training or enter an integer for how many more epochs to run then be asked again Epoch 1/40

2023-04-26 12:05:04.578355: E tensorflow/core/grappler/optimizers/meta_optimizer.cc:954] layout failed: INVALID_ARGUMENT: Size of values 0 does not match size of permutation 4 @ fanin shape inmodel_1/block1b_drop/dropout/SelectV2-2-TransposeNHWCtoNCHW-LayoutOptimizer

180/180 [=====] - 192s 567ms/step - loss: 23.5400 - accuracy: 0.6214 - val_loss: 17.2103 - val_accuracy: 0.8833 - lr: 0.0010

Epoch 2/40

180/180 [=====] - 93s 518ms/step - loss: 13.5853 - accuracy: 0.8767 - val_loss: 10.1722 - val_accuracy: 0.9478 - lr: 0.0010

Epoch 3/40

180/180 [=====] - 92s 512ms/step - loss: 8.4364 - accuracy: 0.9339 - val_loss: 6.4063 - val_accuracy: 0.9724 - lr: 0.0010

Epoch 4/40

180/180 [=====] - 93s 516ms/step - loss: 5.3688 - accuracy: 0.9636 - val_loss: 4.1221 - val_accuracy: 0.9775 - lr: 0.0010

Epoch 5/40

180/180 [=====] - 93s 515ms/step - loss: 3.4893 - accuracy: 0.9772 - val_loss: 2.6952 - val_accuracy: 0.9826 - lr: 0.0010

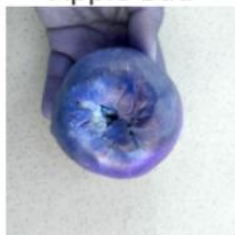
Epoch 6/40

180/180 [=====] - 92s 513ms/step - loss: 2.3691 - accuracy: 0.9789 - val_loss: 1.8700 - val_accuracy: 0.9785 - lr: 0.0010

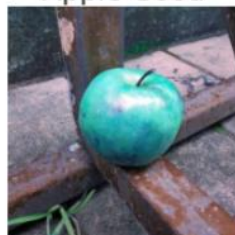
Epoch 7/40

52/180 [=====>.....] - ETA: 1:02 - loss: 1.8404 - accuracy: 0.9904

Apple Bad



Apple Good



Apple mixed



Banana Bad



Banana Good



Banana mixed



Guava Bad



Guava Good



Guava mixed



Activate Window
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Lemon mixed



Lime Bad



Lime Good



Orange Bad



Orange Good



Orange mixed



Acti
Go to

		Confusion Matrix																	
Actual	Apple_Bad	0	3	1	4	6	3	1	3	0	3	1	3	4	2	0	4	18	1
	Apple_Good	5	2	0	4	1	0	4	1	1	1	4	2	2	6	1	3	20	0
	Apple_mixed	0	0	0	0	0	0	0	0	1	0	0	1	1	1	0	0	2	0
	Banana_Bad	1	3	1	1	2	0	2	4	1	0	7	4	4	4	1	4	16	0
	Banana_Good	5	2	0	5	4	3	1	7	1	0	2	4	4	1	0	1	15	0
	Banana_mixed	1	1	0	1	0	0	1	1	0	1	2	0	1	3	0	0	3	0
	Guava_Bad	7	2	0	5	1	2	6	4	1	0	2	4	4	4	0	2	12	0
	Guava_Good	2	4	0	1	5	0	5	4	1	0	1	5	0	3	0	5	21	0
	Guava_mixed	0	2	0	0	0	0	0	0	0	0	0	1	2	1	0	0	2	0
	Lemon_mixed	0	0	0	0	0	0	0	3	0	1	0	2	0	1	1	2	4	0
	Lime_Bad	3	0	0	4	4	2	2	5	1	1	1	3	5	4	1	3	15	0
	Lime_Good	4	4	0	1	4	1	2	4	0	0	4	6	4	2	0	3	15	1
	Orange_Bad	4	3	1	4	3	0	1	1	0	1	4	2	3	8	0	2	21	0
	Orange_Good	1	7	0	3	3	0	7	3	0	2	3	4	3	2	0	8	15	0
	Orange_mixed	0	1	0	0	0	0	0	0	0	0	1	1	0	0	0	0	3	0
	Pomegranate_Bad	2	2	1	5	2	0	4	2	0	0	2	3	4	5	1	5	21	0
	Pomegranate_Good	19	20	2	16	20	6	19	15	1	2	20	11	16	14	1	17	94	4
	Pomegranate_mixed	1	1	0	0	0	0	1	0	0	1	0	0	1	0	0	0	1	0
		Apple_Bad	Apple_Good	Apple_mixed	Banana_Bad	Banana_Good	Banana_mixed	Guava_Bad	Guava_Good	Guava_mixed	Lemon_mixed	Lime_Bad	Lime_Good	Orange_Bad	Orange_Good	Orange_mixed	Pomegranate_Bad	Pomegranate_Good	Pomegranate_mixed

Found 3261 validated image filenames belonging to 18 classes.

Found 977 validated image filenames belonging to 18 classes.

Found 976 validated image filenames belonging to 18 classes.

test batch size: 61 test steps: 16 number of classes : 18

class name	class index
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Apple_Bad 0

Apple_Good 1

Apple_mixed 2

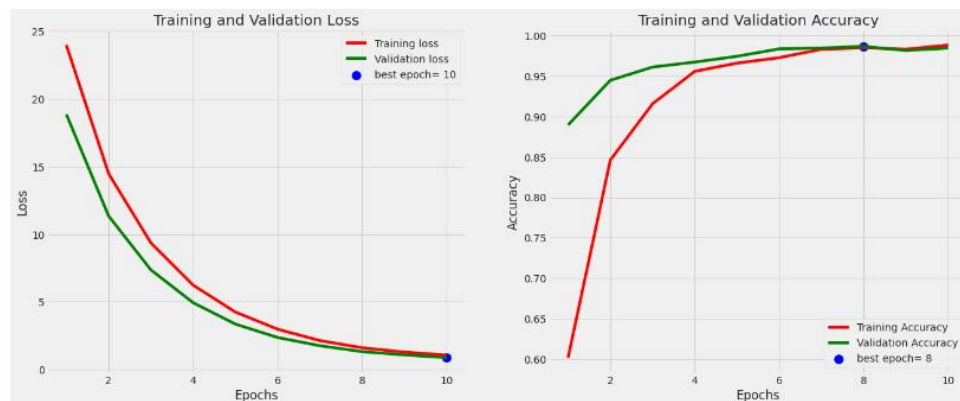
Banana_Bad 3

Banana_Good 4

Banana_mixed 5

Guava_Bad 6

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there were 6 in 976 tests for an accuracy of 99.39

Actual	Apple_Bad	55	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0
	Apple_Good	0	56	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0
	Apple_mixed	0	0	6	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Banana_Bad	0	0	0	54	0	1	0	0	0	0	0	0	0	0	0	0	0
	Banana_Good	0	0	0	0	55	0	0	0	0	0	0	0	0	0	0	0	0
	Banana_mixed	0	0	0	0	1	14	0	0	0	0	0	0	0	0	0	0	0
	Guava_Bad	0	0	0	0	0	0	56	0	0	0	0	0	0	0	0	0	0
	Guava_Good	0	0	0	0	0	0	0	57	0	0	0	0	0	0	0	0	0
	Guava_mixed	0	0	0	0	0	0	0	0	8	0	0	0	0	0	0	0	0
	Lemon_mixed	0	0	0	0	0	0	0	0	14	0	0	0	0	0	0	0	0
	Lime_Bad	0	0	0	0	0	0	0	0	0	54	0	0	0	0	0	0	0
	Lime_Good	0	0	0	0	0	0	0	0	0	1	54	0	0	0	0	0	0
	Orange_Bad	0	0	0	0	0	0	0	0	0	0	0	58	0	0	0	0	0
	Orange_Good	0	0	0	0	0	0	0	0	0	0	0	0	61	0	0	0	0
	Orange_mixed	0	0	0	0	0	0	0	0	0	0	0	0	0	6	0	0	0
	Pomegranate_Bad	0	0	0	0	0	0	0	0	0	0	0	0	0	0	59	0	0
	Pomegranate_Good	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	297	0
	Pomegranate_mixed	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6

Banana_Good	0.9821	1.0000	0.9910	55
Banana_mixed	0.8750	0.9333	0.9032	15
Guava_Bad	1.0000	1.0000	1.0000	56
Guava_Good	1.0000	1.0000	1.0000	57
Guava_mixed	1.0000	1.0000	1.0000	8
Lemon_mixed	1.0000	1.0000	1.0000	14
Lime_Bad	0.9818	1.0000	0.9908	54
Lime_Good	1.0000	0.9818	0.9908	55
Orange_Bad	1.0000	1.0000	1.0000	58
Orange_Good	1.0000	1.0000	1.0000	61
Orange_mixed	1.0000	1.0000	1.0000	6
Pomegranate_Bad	1.0000	1.0000	1.0000	59
Pomegranate_Good	0.9966	1.0000	0.9983	297
Pomegranate_mixed	1.0000	1.0000	1.0000	6
accuracy			0.9939	976
macro avg	0.9899	0.9914	0.9905	976
weighted avg	0.9940	0.9939	0.9939	976