**6 Classes Results**

Vgg19;

Learning rate: 0.001

Optimizer: sgd

Epochs: 20

Batch size: 32

Time: 9347.308967181 s

34/34 [==============================] - 10s 300ms/step - loss: 3.4157 - accuracy: 0.6667

[3.4156723022460938, 0.6666666865348816]

34/34 [==============================] - 6s 176ms/step

precision recall f1-score support

cataract 0.70 0.99 0.82 179

conj 0.84 0.69 0.76 179

healthy 1.00 0.07 0.14 179

mas 0.97 0.78 0.86 179

nuc 0.78 0.46 0.58 179

ulcer 0.44 1.00 0.61 179

accuracy 0.67 1074

macro avg 0.79 0.67 0.63 1074

weighted avg 0.79 0.67 0.63 1074

[[178 1 0 0 0 0]

[ 0 124 0 0 23 32]

[ 76 0 13 0 0 90]

[ 0 0 0 139 0 40]

[ 0 23 0 5 83 68]

[ 0 0 0 0 0 179]]

Vgg19;

Learning rate: 0.001

Optimizer: sgd

Epochs: 10

Batch size: 32

Time: 4456.721311229

[3.81365966796875, 0.6210428476333618]

precision recall f1-score support

cataract 0.84 1.00 0.91 179

conj 0.81 0.56 0.66 179

healthy 0.40 0.01 0.02 179

mas 1.00 0.63 0.77 179

nuc 0.79 0.52 0.63 179

ulcer 0.36 1.00 0.53 179

accuracy 0.62 1074

macro avg 0.70 0.62 0.59 1074

weighted avg 0.70 0.62 0.59 1074

Vgg19;

Learning rate: 0.001

Optimizer: sgd

Epochs: 5

Batch size: 32

Time: 2402.712548356 s

loss: 1.1018 - accuracy: 0.7793

precision recall f1-score support

cataract 0.85 0.99 0.92 179

conj 0.87 0.54 0.66 179

healthy 0.98 0.56 0.71 179

mas 1.00 0.81 0.90 179

nuc 0.68 0.78 0.73 179

ulcer 0.59 0.99 0.74 179

accuracy 0.78 1074

macro avg 0.83 0.78 0.78 1074

weighted avg 0.83 0.78 0.78 1074

[[178 0 1 0 0 0]

[ 4 96 0 0 66 13]

[ 28 0 100 0 0 51]

[ 0 0 0 145 0 34]

[ 0 14 0 0 140 25]

[ 0 0 1 0 0 178]]

Resnet50;

Learning rate: 0.001

Optimizer: Adam

Epochs: 20

Batch size: 32

Time: 2756.517510134s or 45.9 mintues

17/17 [==============================] - 8s 495ms/step - loss: 1.2837 - accuracy: 0.5307

[1.2836768627166748, 0.5307262539863586]

17/17 [==============================] - 5s 268ms/step

precision recall f1-score support

0 0.16 0.20 0.18 179

1 0.19 0.17 0.18 179

2 0.13 0.08 0.10 179

3 0.08 0.02 0.03 179

4 0.12 0.12 0.12 179

5 0.20 0.40 0.27 179

accuracy 0.16 1074

macro avg 0.15 0.16 0.15 1074

weighted avg 0.15 0.16 0.15 1074

[[35 25 17 12 37 53]

[26 30 22 10 30 61]

[41 36 15 8 25 54]

[40 28 22 4 36 49]

[46 22 18 8 21 64]

[29 19 24 9 26 72]]

Resnet50;

Learning rate: 0.001

Optimizer: Adam

Epochs: 18

Batch size: 32

Time: 2351.394280598s

loss: 1.2371 - accuracy: 0.5493

precision recall f1-score support

0 0.14 0.13 0.14 179

1 0.22 0.17 0.19 179

2 0.20 0.13 0.16 179

3 0.27 0.12 0.16 179

4 0.19 0.19 0.19 179

5 0.18 0.40 0.25 179

accuracy 0.19 1074

macro avg 0.20 0.19 0.18 1074

weighted avg 0.20 0.19 0.18 1074

[[24 22 12 9 31 81]

[29 31 23 12 28 56]

[33 25 23 8 32 58]

[26 22 17 21 29 64]

[29 21 23 15 34 57]

[31 20 15 13 29 71]]

Resnet50;

Learning rate: 0.001

Optimizer: Adam

Epochs: 5

Batch size: 32

Time: 823.899540659s

loss: 1.4914 - accuracy: 0.4367

precision recall f1-score support

0 0.18 0.27 0.21 179

1 0.19 0.19 0.19 179

2 0.17 0.08 0.11 179

3 0.16 0.07 0.09 179

4 0.20 0.06 0.09 179

5 0.17 0.39 0.24 179

accuracy 0.18 1074

macro avg 0.18 0.18 0.16 1074

weighted avg 0.18 0.18 0.16 1074

[[49 30 12 8 9 71]

[48 34 11 14 9 63]

[46 33 15 9 14 62]

[40 31 18 12 5 73]

[39 34 17 18 11 60]

[57 20 13 14 6 69]]

VGG16;

Learning rate: 0.001

Optimizer: Adam

Epochs: 25

Batch size: 32

Time: 8766.197013447

loss: 4.6901 - accuracy: 0.5987

test\_loss, test accuracy [4.690120220184326, 0.5986964702606201]

Classification Report:

precision recall f1-score support

0 0.79 0.99 0.88 179

1 0.75 0.57 0.65 179

2 1.00 0.08 0.15 179

3 1.00 0.38 0.55 179

4 0.65 0.57 0.61 179

5 0.38 1.00 0.55 179

accuracy 0.60 1074

macro avg 0.76 0.60 0.56 1074

weighted avg 0.76 0.60 0.56 1074

Confusion Matrix:

[[28 24 2 12 27 86]

[32 19 3 11 30 84]

[44 24 2 9 22 78]

[34 25 2 15 28 75]

[52 19 2 16 21 69]

[35 25 4 5 28 82]]

Test Accuracy: 0.5986964702606201

VGG16;

Learning rate: 0.001

Optimizer: Adam

Epochs: 20

Batch size: 32

Time: 8166.172612939001s or 136 minutes

loss: 2.4333 - accuracy: 0.6890

test\_loss, test accuracy [2.4333457946777344, 0.6890130639076233]

Classification Report:

precision recall f1-score support

0 0.72 0.99 0.84 179

1 0.77 0.65 0.71 179

2 0.00 0.00 0.00 179

3 0.99 0.84 0.91 179

4 0.72 0.66 0.69 179

5 0.49 0.99 0.65 179

accuracy 0.69 1074

macro avg 0.62 0.69 0.63 1074

weighted avg 0.62 0.69 0.63 1074

Confusion Matrix:

[[43 19 0 29 29 59]

[36 21 0 32 23 67]

[36 29 0 21 29 64]

[38 32 0 18 27 64]

[45 24 0 24 31 55]

[48 26 0 27 25 53]]

Test Accuracy: 0.6890130639076233

VGG16:

Learning rate: 0.001

Optimizer: Adam

Epochs: 5

Batch size: 32

Time: 40 minutes

loss: 3.0727 - accuracy: 0.5177

test\_loss, test accuracy [3.0727460384368896, 0.517690896987915]

precision recall f1-score support

0 0.78 0.99 0.87 179

1 0.93 0.14 0.24 179

2 1.00 0.11 0.20 179

3 1.00 0.34 0.50 179

4 0.45 0.53 0.49 179

5 0.34 0.99 0.50 179

accuracy 0.52 1074

macro avg 0.75 0.52 0.47 1074

weighted avg 0.75 0.52 0.47 1074

[[40 2 3 12 31 91]

[30 2 8 14 43 82]

[48 4 3 10 25 89]

[38 7 1 10 39 84]

[36 6 2 8 39 88]

[37 6 3 6 32 95]]

Inception\_V3;

Learning rate: 0.001

Optimizer: Adam

Epochs: 30

Batch size: 32

Time: 3938.150742287 s

34/34 [==============================] - 8s 245ms/step - loss: 3.2122 - auc: 0.9068

Test accuracy: 0.9067655205726624

Test loss: 3.212202787399292

precision recall f1-score support

cat 0.17 0.24 0.20 179

conj 0.12 0.11 0.11 179

healthy 0.16 0.11 0.13 179

mas 0.16 0.17 0.17 179

nuc 0.17 0.17 0.17 179

ulcer 0.19 0.20 0.20 179

accuracy 0.17 1074

macro avg 0.16 0.17 0.16 1074

weighted avg 0.16 0.17 0.16 1074

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Description automatically generated

Inception\_V3;

Learning rate: 0.001

Optimizer: Adam

Epochs: 20

Batch size: 32

Time: 2557.462010978s

34/34 [==============================] - 5s 129ms/step - loss: 2.5502 - auc: 0.9090

Test accuracy: 0.9090404510498047

Test loss: 2.5501508712768555

34/34 [==============================] - 9s 239ms/step

precision recall f1-score support

cat 0.13 0.17 0.15 179

conj 0.23 0.24 0.24 179

healthy 0.16 0.14 0.15 179

mas 0.17 0.16 0.16 179

nuc 0.14 0.10 0.12 179

ulcer 0.16 0.18 0.17 179

accuracy 0.17 1074

macro avg 0.17 0.17 0.16 1074

weighted avg 0.17 0.17 0.16 1074

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Description automatically generated

Inception\_V3;

Learning rate: 0.001

Optimizer: Adam

Epochs: 24

Batch size: 32

Time: 2945.662810214

**Test accuracy: 0.9195771217346191**

**Test loss: 1.8469288349151611**

precision recall f1-score support

cat 0.17 0.27 0.21 179

conj 0.15 0.11 0.13 179

healthy 0.17 0.12 0.14 179

mas 0.16 0.15 0.15 179

nuc 0.13 0.12 0.12 179

ulcer 0.15 0.17 0.16 179

accuracy 0.16 1074

macro avg 0.16 0.16 0.15 1074

weighted avg 0.16 0.16 0.15 1074

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Description automatically generated