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conv2d (Conv2D) (None, 298, 298, 16) 448

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max\_pooling2d (MaxPooling2D) (None, 149, 149, 16) 0

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conv2d\_1 (Conv2D) (None, 147, 147, 32) 4640

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max\_pooling2d\_1 (MaxPooling2 (None, 73, 73, 32) 0

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conv2d\_2 (Conv2D) (None, 71, 71, 64) 18496

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max\_pooling2d\_2 (MaxPooling2 (None, 35, 35, 64) 0

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conv2d\_3 (Conv2D) (None, 33, 33, 128) 73856

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max\_pooling2d\_3 (MaxPooling2 (None, 16, 16, 128) 0

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conv2d\_4 (Conv2D) (None, 14, 14, 256) 295168

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max\_pooling2d\_4 (MaxPooling2 (None, 7, 7, 256) 0

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global\_average\_pooling2d (Gl (None, 256) 0

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dense (Dense) (None, 128) 32896

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dense\_1 (Dense) (None, 64) 8256

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dense\_2 (Dense) (None, 1) 65

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All filters are (3,3)

Total params: 433,825

Trainable params: 433,825

Non-trainable params: 0

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(None, 300, 300, 3)

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Batch size | epochs | Optimizer | UnderFit | OverFit | Aug |
| 8 | 20 | Adam | No | No | Yes |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Val | Loss | Acc | Recall | precision | specificity |
| 0.2503 | 0.9049 | 0.8784 | 0.9203 | 0.9221 |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Train | Loss | Acc | Recall | precision | specificity |
| 0.2266 | 0.9007 | 0.9069 | 0.8964 | 0. 8824 |

Layer (type) Output Shape Param #

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conv2d (Conv2D) (None, 298, 298, 16) 448

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max\_pooling2d (MaxPooling2D) (None, 149, 149, 16) 0

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conv2d\_1 (Conv2D) (None, 147, 147, 16) 2320

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max\_pooling2d\_1 (MaxPooling2 (None, 73, 73, 16) 0

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conv2d\_2 (Conv2D) (None, 71, 71, 16) 2320

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max\_pooling2d\_2 (MaxPooling2 (None, 35, 35, 16) 0

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conv2d\_3 (Conv2D) (None, 33, 33, 16) 2320

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max\_pooling2d\_3 (MaxPooling2 (None, 16, 16, 16) 0

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

conv2d\_4 (Conv2D) (None, 14, 14, 16) 2320

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

max\_pooling2d\_4 (MaxPooling2 (None, 7, 7, 16) 0

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conv2d\_5 (Conv2D) (None, 5, 5, 16) 2320

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flatten (Flatten) (None, 400) 0

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dense (Dense) (None, 256) 102656

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dense\_1 (Dense) (None, 64) 16448

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dense\_2 (Dense) (None, 1) 65

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All filters are (3,3)

Total params: 131,217

Trainable params: 131,217

Non-trainable params: 0

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|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Batch size | epochs | Optimizer | UnderFit | OverFit | Aug |
| 8 | 20 | Adam | No | No | No |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Val | Loss | Acc | Recall | precision | specificity |
| 0.3009 | 0.8901 | 0.8939 | 0.8858 | 0.8767 |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Train | Loss | Acc | Recall | precision | specificity |
| 0.1610 | 0.9303 | 0.9378 | 0.9284 | 0.9109 |

Layer (type) Output Shape Param #

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conv2d (Conv2D) (None, 298, 298, 16) 448

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

max\_pooling2d (MaxPooling2D) (None, 149, 149, 16) 0

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conv2d\_1 (Conv2D) (None, 147, 147, 16) 2320

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max\_pooling2d\_1 (MaxPooling2 (None, 73, 73, 16) 0

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conv2d\_2 (Conv2D) (None, 71, 71, 16) 2320

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max\_pooling2d\_2 (MaxPooling2 (None, 35, 35, 16) 0

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conv2d\_3 (Conv2D) (None, 33, 33, 16) 2320

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max\_pooling2d\_3 (MaxPooling2 (None, 16, 16, 16) 0

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conv2d\_4 (Conv2D) (None, 14, 14, 16) 2320

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

max\_pooling2d\_4 (MaxPooling2 (None, 7, 7, 16) 0

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conv2d\_5 (Conv2D) (None, 5, 5, 16) 2320

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flatten (Flatten) (None, 400) 0

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dense (Dense) (None, 256) 102656

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dense\_1 (Dense) (None, 64) 16448

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dense\_2 (Dense) (None, 1) 65

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All filters are (3,3)

Total params: 131,217

Trainable params: 131,217

Non-trainable params: 0

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|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Batch size | epochs | Optimizer | UnderFit | OverFit | Aug |
| 16 | 20 | Adam | No | No | Yes |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Val | Loss | Acc | Recall | precision | specificity |
| 0.2214 | 0. 9029 | 0. 9351 | 0. 8954 | 0. 8693 |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Train | Loss | Acc | Recall | precision | specificity |
| 0. 2457 | 0. 8921 | 0. 9088 | 0. 8876 | 0. 9088 |

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Layer (type) Output Shape Param #

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conv2d (Conv2D) (None, 298, 298, 8) 224

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max\_pooling2d (MaxPooling2D) (None, 149, 149, 8) 0

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conv2d\_1 (Conv2D) (None, 147, 147, 8) 584

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max\_pooling2d\_1 (MaxPooling2 (None, 73, 73, 8) 0

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conv2d\_2 (Conv2D) (None, 71, 71, 8) 584

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max\_pooling2d\_2 (MaxPooling2 (None, 35, 35, 8) 0

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conv2d\_3 (Conv2D) (None, 33, 33, 16) 1168

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max\_pooling2d\_3 (MaxPooling2 (None, 16, 16, 16) 0

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conv2d\_4 (Conv2D) (None, 14, 14, 32) 4640

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max\_pooling2d\_4 (MaxPooling2 (None, 7, 7, 32) 0

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conv2d\_5 (Conv2D) (None, 5, 5, 64) 18496

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flatten (Flatten) (None, 1600) 0

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dense (Dense) (None, 256) 409856

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dense\_1 (Dense) (None, 1) 257

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Total params: 435,809

Trainable params: 435,809

Non-trainable params: 0

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Batch size | epochs | Optimizer | UnderFit | OverFit | Aug |
| 16 | 30 | Adam | No | No | Yes |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Val | Loss | Acc | Recall | precision | specificity |
| 0. 2855 | 0. 8778 | 0. 8866 | 0. 8805 | 0. 8676 |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Train | Loss | Acc | Recall | precision | specificity |
| 0. 2762 | 0. 8725 | 0. 8990 | 0. 8725 | 0. 8488 |

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Layer (type) Output Shape Param #

=================================================================

conv2d (Conv2D) (None, 298, 298, 16) 448

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batch\_normalization (BatchNo (None, 298, 298, 16) 64

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leaky\_re\_lu (LeakyReLU) (None, 298, 298, 16) 0

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max\_pooling2d (MaxPooling2D) (None, 149, 149, 16) 0

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input\_2 (InputLayer) multiple 0

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conv2d\_1 (Conv2D) (None, 147, 147, 32) 4640

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batch\_normalization\_1 (Batch (None, 147, 147, 32) 128

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leaky\_re\_lu\_1 (LeakyReLU) (None, 147, 147, 32) 0

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max\_pooling2d\_1 (MaxPooling2 (None, 73, 73, 32) 0

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input\_3 (InputLayer) multiple 0

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

conv2d\_2 (Conv2D) (None, 71, 71, 64) 18496

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batch\_normalization\_2 (Batch (None, 71, 71, 64) 256

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leaky\_re\_lu\_2 (LeakyReLU) (None, 71, 71, 64) 0

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max\_pooling2d\_2 (MaxPooling2 (None, 35, 35, 64) 0

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input\_4 (InputLayer) multiple 0

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conv2d\_3 (Conv2D) (None, 33, 33, 256) 147712

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batch\_normalization\_3 (Batch (None, 33, 33, 256) 1024

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leaky\_re\_lu\_3 (LeakyReLU) (None, 33, 33, 256) 0

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

max\_pooling2d\_3 (MaxPooling2 (None, 16, 16, 256) 0

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input\_5 (InputLayer) multiple 0

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conv2d\_4 (Conv2D) (None, 14, 14, 512) 1180160

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batch\_normalization\_4 (Batch (None, 14, 14, 512) 2048

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leaky\_re\_lu\_4 (LeakyReLU) (None, 14, 14, 512) 0

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max\_pooling2d\_4 (MaxPooling2 (None, 7, 7, 512) 0

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global\_average\_pooling2d (Gl (None, 512) 0

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dense (Dense) (None, 256) 131328

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dense\_1 (Dense) (None, 64) 16448

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dense\_2 (Dense) (None, 1) 65

=================================================================

Total params: 1,502,817

Trainable params: 1,501,057

Non-trainable params: 1,760

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Batch size | epochs | Optimizer | UnderFit | OverFit | Aug |
| 32 | 45 | RMS-Prop | - | - | Yes |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Val | Loss | Acc | Recall | precision | specificity |
| 0. 1778 | 0. 9335 | 0. 9458 | 0. 9272 | 0. 9191 |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Train | Loss | Acc | Recall | precision | specificity |
| 0. 2149 | 0. 9108 | 0. 9218 | 0. 9132 | 0. 9013 |

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Layer (type) Output Shape Param #

=================================================================

conv2d (Conv2D) (None, 298, 298, 64) 1792

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batch\_normalization (BatchNo (None, 298, 298, 64) 256

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re\_lu (ReLU) (None, 298, 298, 64) 0

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average\_pooling2d (AveragePo (None, 149, 149, 64) 0

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conv2d\_1 (Conv2D) (None, 21, 21, 64) 200768 filter(7,7) strid(7,7)

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batch\_normalization\_1 (Batch (None, 21, 21, 64) 256

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re\_lu\_1 (ReLU) (None, 21, 21, 64) 0

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conv2d\_2 (Conv2D) (None, 19, 19, 512) 295424

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batch\_normalization\_2 (Batch (None, 19, 19, 512) 2048

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re\_lu\_2 (ReLU) (None, 19, 19, 512) 0

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max\_pooling2d (MaxPooling2D) (None, 9, 9, 512) 0

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global\_average\_pooling2d (Gl (None, 512) 0

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dense (Dense) (None, 128) 65664

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dense\_1 (Dense) (None, 64) 8256

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dense\_2 (Dense) (None, 1) 65

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Batch size | epochs | Optimizer | UnderFit | OverFit | Aug |
| 32 | 49 | Adam | - | - | Yes |

119s 380ms/step - loss: 0.1998 - acc: 0.9129 - precision: 0.9108 - recall: 0.9247 - specificity: 0.9025 - val\_loss: 0.2254 - val\_acc: 0.9051 - val\_precision: 0.9154 - val\_recall: 0.9154 - val\_specificity: 0.8927