|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | VGG16 | | | | |
| Stages | one | One | One | Two(fine tune) | |
| Sample rate | 3000 | Same data | Same data | Same data | |
| Balanced | True | False | False | False | |
| Rendom state | 128 | 128 | 128 | 128 | |
| train/Test/val | 70/30/10of training | 80/20/10of testing | 80/20/10of testing | 80/20/10of training | |
| Activation function | Relu,softmax | Relu,softmax | Relu, softmax | Relu , softmax | |
| Epoch | 20 | 15 | 15 | 25 | |
| Hidden layers | 512,128  256,256,64 | 512,128 | 512,128 | [512, 128]  [256, 256, 64] | |
| Data augmentation  For training data | True | True | False | True | |
| Batch size | 1000 | 100 | 100 | 200 | |
| Accuracy | 0.7938 | 0.7786 | 0.7831 | 0.7770 | 0.9472 |
| Validation accuracy | 0.8119 | 0.8273 | 0.8224 | 0.8224 | 0.9441 |
| Loss | 0.5899 | 0.6383 | 0.6221 | 0.6532 | 0.2165 |
| Validation loss | 0.5004 | 0.5286 | 0.5400 | 0.5336 | 0.2126 |

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| --- | --- | --- | --- | --- | --- | --- |
|  | MobileNetV2 | | | | MobileNet | |
| stages | 1 | 1 | 1 | 1 | Two | |
| Sample rate | same | Same | 2000 | Same | 2000 | |
| balanced | false | False | True | False | True | |
| Rendom state | 128 | 128 | 128 | 128 | 128 | |
| train/Test/val | 80/20/10of training | 80/20/10of training | 70/30/10of testing | 70/30/10of testing | 80/20/10of training | |
| Activation function | Relu, sigmoid | Relu, sigmoid | Relu, softmax | Relu, softmax, sigmoid | Relu, softmax | |
| Epoch | 25 | 30 | 15 | 30 | 10 | |
| Hidden layers | [512, 128]  [256, 256, 64] | [512, 128] | [512, 128]  [256, 256, 64] | [512, 128]  [256, 256, 64] | [256, 256, 64] | |
| Data augmentation  For training data | False | False | True | true | True | |
| Batch size | 100 | 1000 | 100 | 100 | 200 | |
| Accuracy | 0.8342 | 0.8692 | 0.9394 | 0.7375 | 0.9397 | 0.8411 |
| Validation accuracy | 0.7695 | 0.7914 | 0.9350 | 0.7246 | 0.9443 | 0.8750 |
| Loss | 0.4641 | 0.3895 | 0.1666 | 0.8041 | 0.1843 | 0.4997 |
| Validation loss | 0.7804 | 0.7240 | 0.2253 | 0.8304 | 0.1992 | 0.4192 |

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|  | DenseNet201 | | | |
| stages | 1 | 1 | 2 | |
| Sample rate | 2000 | Same | Same | |
| balanced | True | False | False | |
| Random state | 128 | 128 | 128 | |
| train/Test/Val | 80/20/10of training | 70/30/10of testing | 80/20/5of training | |
| Epoch | 25 | 25 | 10 | |
| Hidden layers | [512, 128]  [256, 256, 64] | 512,128 | 512,128 | |
| Data augmentation  For training data | True | True | True | |
| Batch size | 100 | 100 | 128 | |
| Accuracy | 0.9516 | 0.9140 | 0.8394 | 0.9457 |
| Validation accuracy | 0.9421 | 0.8872 | 0.7665 | 0.7824 |
| Loss | 0.1448 | 0.2421 | 0.4573 | 0.1906 |
| Validation loss | 0.2231 | 0.3896 | 0.6638 | 0.7419 |