Dataset link ((<https://www.kaggle.com/sartajbhuvaji/brain-tumor-classification-mri>)

Dataset=3264 // train=2870,test=394

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| **Table 1. Brain tumor systems accuracy for dataset name without data augmentation** | | | | |
|  | **Models** | | **Training accuracy** | **Validation Accuracy** |
|  | [**EfficientNetB0**](https://keras.io/api/applications/efficientnet/#efficientnetb0-function) | | 0.8750 | 0.6701 |
|  | [**EfficientNetB1**](https://keras.io/api/applications/efficientnet/#efficientnetb1-function) | | 0.8860 | 0.7107 |
|  | [**EfficientNetB2**](https://keras.io/api/applications/efficientnet/#efficientnetb2-function) | | 0.8888 | 0.6701 |
|  | [**EfficientNetB6**](https://keras.io/api/applications/efficientnet/#efficientnetb6-function) | | 0.8796 | 0.6777 |
|  | [**EfficientNetB7**](https://keras.io/api/applications/efficientnet/#efficientnetb7-function) | | 0.9063 | 0.7513 |
|  | [**ResNet50V2**](https://keras.io/api/applications/resnet/#resnet50v2-function) | | 0.7608 | 0.5228 |
|  | [**ResNet101V2**](https://keras.io/api/applications/resnet/#resnet101v2-function) | | 0.7059 | 0.4391 |
|  | [**ResNet152V2**](https://keras.io/api/applications/resnet/#resnet152v2-function) | | 0.6395 | 0.3934 |
|  | [**VGG16**](https://keras.io/api/applications/vgg/#vgg16-function) | | 0.8878 | 0.6878 |
|  | [**VGG19**](https://keras.io/api/applications/vgg/#vgg19-function) | | 0.8386 | 0.6904 |
|  | **Google Net** | | 0.8379 | 0.6497 |
|  | [**InceptionV3**](https://keras.io/api/applications/inceptionv3) | | 0.7485 | 0.5888 |
|  | [**InceptionResNetV2**](https://keras.io/api/applications/inceptionresnetv2) | | 0.4381 | 0.2868 |
|  | [**DenseNet121**](https://keras.io/api/applications/densenet/#densenet121-function) | | 0.7805 | 0.5990 |
|  | [**DenseNet169**](https://keras.io/api/applications/densenet/#densenet169-function) | | 0.7828 | 0.5914 |
|  | [**DenseNet201**](https://keras.io/api/applications/densenet/#densenet201-function) | | 0.8063 | 0.5990 |
|  | [**MobileNet**](https://keras.io/api/applications/mobilenet) | | 0.8633 | 0.6244 |
|  | [**MobileNetV2**](https://keras.io/api/applications/mobilenet/#mobilenetv2-function) | | 0.8507 | 0.5914 |
| **19** | **my model** | 0.9686 | | 0.7843 |

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| --- | --- | --- | --- | --- |
|  | **Models** | **precision** | **recall** | **f1-score** |
| 1 | [**EfficientNetB0**](https://keras.io/api/applications/efficientnet/#efficientnetb0-function) | 0. 0.60  1. 0.61  2. 0.70  3. 0.76 | 0. 0.18  1. 0.81  2. 0.86  3. 0.85 | 0. 0.28  1. 0.69  2. 0.77  3. 0.80 |
| 2 | [**EfficientNetB1**](https://keras.io/api/applications/efficientnet/#efficientnetb1-function) | 0. 0.81  1. 0.64  2. 0.71  3. 0.83 | 0. 0.21  1. 0.88  2. 0.90  3. 0.85 | 0. 0.33  1. 0.74  2. 0.80  3. 0.84 |
| 3 | [**EfficientNetB2**](https://keras.io/api/applications/efficientnet/#efficientnetb2-function) | 0. 0.77  1. 0.57  2. 0.66  3. 0.90 | 0. 0.24  1. 0.81  2. 0.87  3. 0.76 | 0. 0.37  1. 0.67  2. 0.75  3. 0.82 |
| 4 | [**EfficientNetB6**](https://keras.io/api/applications/efficientnet/#efficientnetb6-function) | 0. 0.72  1. 0.60  2. 0.70  3. 0.82 | 0. 0.23  1. 0.89  2. 0.82  3. 0.76 | 0. 0.35  1. 0.75  2. 0.75  3. 0.79 |
| 5 | [**EfficientNetB7**](https://keras.io/api/applications/efficientnet/#efficientnetb7-function) | 0. 0.87  1. 0.64  2. 0.80  3. 0.88 | 0. 0.34  1. 0.91  2. 0.94  3. 0.78 | 0. 0.49  1. 0.75  2. 0.86  3. 0.83 |
| 6 | [**ResNet50V2**](https://keras.io/api/applications/resnet/#resnet50v2-function) | 0. 0.79  1. 0.59  2. 0.44  3. 0.70 | 0. 0.11  1. 0.47  2. 0.98  3. 0.51 | 0. 0.19  1. 0.52  2. 0.61  3. 0.59 |
| 7 | [**ResNet101V2**](https://keras.io/api/applications/resnet/#resnet101v2-function) | 0. 0.37  1. 0.68  2. 0.42  3. 0.47 | 0. 0.24  1. 0.11  2. 0. 77  3. 0.74 | 0. 0.29  1. 0.19  2. 0.55  3. 0.57 |
| 8 | [**ResNet152V2**](https://keras.io/api/applications/resnet/#resnet152v2-function) | 0. 0.64  1. 0.38  2. 0.38  3. 0.45 | 0. 0.07  1. 0.30  2. 0.87  3. 0.31 | 0. 0.13  1. 0.33  2. 0.52  3. 0.37 |
| 9 | [**VGG16**](https://keras.io/api/applications/vgg/#vgg16-function) | 0. 0.70  1. 0.61  2. 0.69  3. 0.86 | 0. 0.28  1. 0.82  2. 0.85  3. 0.81 | 0. 0.40  1. 0.70  2. 0.76  3. 0.83 |
| 10 | [**VGG19**](https://keras.io/api/applications/vgg/#vgg19-function) | 0. 0.78  1. 0.70  2. 0.60  3. 0.83 | 0. 0.28  1. 0.81  2. 0.88  3. 0.80 | 0. 0.41  1. 0.75  2. 0.71  3. 0.81 |
| 11 | **Google Net** | 0. 0.71  1. 0.70  2. 0.62  3. 0.58 | 0. 0.20  1. 0.87  2. 0.90  3. 0.55 | 0. 0.31  1. 0.78  2. 0.74  3. 0.57 |
| 12 | [**InceptionV3**](https://keras.io/api/applications/inceptionv3) | 0. 0.77  1. 0.62  2. 0.53  3. 0.64 | 0. 0.10  1. 0.73  2. 0.91  3. 0.57 | 0. 0.18  1. 0.67  2. 0.67  3. 0.60 |
| 13 | [**InceptionResNetV2**](https://keras.io/api/applications/inceptionresnetv2) | 0. 0.41  1. 0.29  2. 0.00  3. 0.29 | 0. 0.01  1. 0.96  2. 0.00  3. 0.03 | 0. 0.02  1. 0.44  2. 0.00  3. 0.05 |
| 14 | [**DenseNet121**](https://keras.io/api/applications/densenet/#densenet121-function) | 0. 0.59  1. 0.60  2. 0.52  3. 0.82 | 0. 0.20  1. 0.66  2. 0.87  3. 0.66 | 0. 0.30  1. 0.63  2. 0.65  3. 0.73 |
| 15 | [**DenseNet169**](https://keras.io/api/applications/densenet/#densenet169-function) | 0. 0.81  1. 0.50  2. 0.57  3. 0.91 | 0. 0.13  1. 0.75  2. 0.89  3. 0.55 | 0. 0.22  1. 0.60  2. 0.70  3. 0.69 |
| 16 | [**DenseNet201**](https://keras.io/api/applications/densenet/#densenet201-function) | 0. 0.66  1. 0.61  2. 0.54  3. 0.70 | 0. 0.25  1. 0.69  2. 0.90  3. 0.51 | 0. 0.36  1. 0.65  2. 0.68  3. 0.59 |
| 17 | [**MobileNet**](https://keras.io/api/applications/mobilenet) | 0. 0.94  1. 0.69  2. 0.50  3. 0.81 | 0. 0.17  1. 0.65  2. 0.99  3. 0.68 | 0. 0.29  1. 0.67  2. 0.67  3. 0.74 |
| 18 | [**MobileNetV2**](https://keras.io/api/applications/mobilenet/#mobilenetv2-function) | 0. 0.94  1. 0.71  2. 0.46  3. 0.80 | 0. 0.16  1. 0.56  2. 1.00  3. 0.65 | 0. 0.27  1. 0.62  2. 0.63  3. 0.72 |
| 19 | **My model** | 0. 0.88  1. 0.76  2. 0.76  3. 0.83 | 0. 0.28  1. 0.95  2. 0.99  3. 0.92 | 0. 42  1. 0.84  2. 0.86  3. 0.87 |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Table 1. Brain tumor systems accuracy dataset name with data augmentation** | | | | |
|  | **Models** | | **Training accuracy** | **Validation Accuracy** |
|  | [**EfficientNetB0**](https://keras.io/api/applications/efficientnet/#efficientnetb0-function) | | 0.8330 | 0.6142 |
|  | [**EfficientNetB1**](https://keras.io/api/applications/efficientnet/#efficientnetb1-function) | | 0.8286 | 0.6371 |
|  | [**EfficientNetB2**](https://keras.io/api/applications/efficientnet/#efficientnetb2-function) | | 0.8514 | 0.6447 |
|  | [**EfficientNetB6**](https://keras.io/api/applications/efficientnet/#efficientnetb6-function) | | 0.8383 | 0.6827 |
|  | [**EfficientNetB7**](https://keras.io/api/applications/efficientnet/#efficientnetb7-function) | | 0.8402 | 0.6523 |
|  | [**ResNet50V2**](https://keras.io/api/applications/resnet/#resnet50v2-function) | | 0.5613 | 0.4061 |
|  | [**ResNet101V2**](https://keras.io/api/applications/resnet/#resnet101v2-function) | | 0.4735 | 0.3832 |
|  | [**ResNet152V2**](https://keras.io/api/applications/resnet/#resnet152v2-function) | | 0.4427 | 0.3223 |
|  | [**VGG16**](https://keras.io/api/applications/vgg/#vgg16-function) | | 0.7903 | 0.6041 |
|  | [**VGG19**](https://keras.io/api/applications/vgg/#vgg19-function) | | 0.7786 | 0.6041 |
|  | [**Xception**](https://keras.io/api/applications/xception) | | 0.6335 | 0.4949 |
|  | [**InceptionV3**](https://keras.io/api/applications/inceptionv3) | | 0.4624 | 0.4315 |
|  | [**InceptionResNetV2**](https://keras.io/api/applications/inceptionresnetv2) | | 0.3559 | 0.2843 |
|  | [**DenseNet121**](https://keras.io/api/applications/densenet/#densenet121-function) | | 0.7190 | 0.4645 |
|  | [**DenseNet169**](https://keras.io/api/applications/densenet/#densenet169-function) | | 0.6825 | 0.4695 |
|  | [**DenseNet201**](https://keras.io/api/applications/densenet/#densenet201-function) | | 0.7180 | 0.5279 |
|  | [**MobileNet**](https://keras.io/api/applications/mobilenet) | | 0.7499 | 0.5025 |
|  | [**MobileNetV2**](https://keras.io/api/applications/mobilenet/#mobilenetv2-function) | | 0.7516 | 0.4797 |
| **19** | **my model** | 0.5072 | | 0.3883 |

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| --- | --- | --- | --- | --- |
|  | Models | precision | recall | f1-score |
| 1 | [EfficientNetB0](https://keras.io/api/applications/efficientnet/#efficientnetb0-function) | 0. 0.58  1. 0.64  2. 0.62  3. 0.67 | 0. 0.22  1. 0.68  2. 0.83  3. 0.85 | 0. 0.32  1. 0.66  2. 0.71  3. 0.75 |
| 2 | [EfficientNetB1](https://keras.io/api/applications/efficientnet/#efficientnetb1-function) | 0. 0.62  1. 0.59  2. 0.72  3. 0.68 | 0. 0.15  1. 0.75  2. 0.89  3. 0.88 | 0. 0.24  1. 0.66  2. 0.79  3. 0.76 |
| 3 | [EfficientNetB2](https://keras.io/api/applications/efficientnet/#efficientnetb2-function) | 0. 0.67  1. 0.59  2. 0.69  3. 0.67 | 0. 0.26  1. 0.69  2. 0.81  3. 0.89 | 0. 0.37  1. 0.64  2. 0.74  3. 0.77 |
| 4 | [EfficientNetB6](https://keras.io/api/applications/efficientnet/#efficientnetb6-function) | 0. 0.65  1. 0.68  2. 0.64  3. 0.61 | 0. 0.24  1. 0.65  2. 0.84  3. 0.89 | 0. 0.35  1. 0.66  2. 0.72  3. 0.73 |
| 5 | [EfficientNetB7](https://keras.io/api/applications/efficientnet/#efficientnetb7-function) | 0. 0.60  1. 0.69  2. 0.71  3. 0.60 | 0. 0.38  1. 0.65  2. 0.85  3. 0.78 | 0. 0.47  1. 0.67  2. 0.77  3. 0.68 |
| 6 | [ResNet50V2](https://keras.io/api/applications/resnet/#resnet50v2-function) | 0. 1.00  1. 0.51  2. 0.50  3. 0.46 | 0. 0.06  1. 0.66  2. 0.55  3. 0.77 | 0. 0.11  1. 0.58  2. 0.52  3. 0.58 |
| 7 | [ResNet101V2](https://keras.io/api/applications/resnet/#resnet101v2-function) | 0. 0.67  1. 0.44  2. 0.51  3. 0.30 | 0. 0.02  1. 0.37  2. 0.37  3. 0.89 | 0. 0.04  1. 0.40  2. 0.43  3. 0.45 |
| 8 | [ResNet152V2](https://keras.io/api/applications/resnet/#resnet152v2-function) | 0. 0.00  1. 0.34  2. 0.30  3. 0.34 | 0. 0.00  1. 0.16  2. 0.70  3. 0.43 | 0. 0.00  1. 0.21  2. 0.42  3. 0.38 |
| 9 | [VGG16](https://keras.io/api/applications/vgg/#vgg16-function) | 0. 0.59  1. 0.55  2. 0.80  3. 0.72 | 0. 0.30  1. 0.73  2. 0.77  3. 0.86 | 0. 0.40  1. 0.63  2. 0.79  3. 0.79 |
| 10 | [VGG19](https://keras.io/api/applications/vgg/#vgg19-function) | 0. 0.45  1. 0.63  2. 0.61  3. 0.70 | 0. 0.38  1. 0.51  2. 0.75  3. 0.81 | 0. 0.41  1. 0.57  2. 0.67  3. 0.75 |
| 11 | [Xception](https://keras.io/api/applications/xception) | 0. 0.62  1. 0.64  2. 0.49  3. 0.51 | 0. 0.16  1. 0.64  2. 0.81  3. 0.55 | 0. 0.25  1. 0.64  2. 0.61  3. 0.53 |
| 12 | [InceptionV3](https://keras.io/api/applications/inceptionv3) | 0. 0.47  1. 0.49  2. 0.43  3. 0.35 | 0. 0.14  1. 0.34  2. 0.58  3. 0.69 | 0. 0.22  1. 0.40  2. 0.50  3. 0.47 |
| 13 | [InceptionResNetV2](https://keras.io/api/applications/inceptionresnetv2) | 0. 0.00  1. 0.29  2. 0.44  3. 0.04 | 0. 0.00  1. 0.90  2. 0.04  3. 0.01 | 0. 0.00  1. 0.44  2. 0.07  3. 0.02 |
| 14 | [DenseNet121](https://keras.io/api/applications/densenet/#densenet121-function) | 0. 0.62  1. 0.66  2. 0.39  3. 0.65 | 0. 0.15  1. 0.32  2. 0.96  3. 0.46 | 0. 0.24  1. 0.43  2. 0.55  3. 0.54 |
| 15 | [DenseNet169](https://keras.io/api/applications/densenet/#densenet169-function) | 0. 0.38  1. 0.55  2. 0.38  3. 0.84 | 0. 0.14  1. 0.39  2. 0.84  3. 0.50 | 0. 0.20  1. 0.46  2. 0.52  3. 0.63 |
| 16 | [DenseNet201](https://keras.io/api/applications/densenet/#densenet201-function) | 0. 0.53  1. 0.67  2. 0.51  3. 0.48 | 0. 0.19  1. 0.45  2. 0.79  3. 0.76 | 0. 0.28  1. 0.54  2. 0.62  3. 0.59 |
| 17 | [MobileNet](https://keras.io/api/applications/mobilenet) | 0. 0.45  1. 0.63  2. 0.47  3. 0.66 | 0. 0.20  1. 0.39  2. 0.89  3. 0.72 | 0. 0.28  1. 0.48  2. 0.61  3. 0.69 |
| 18 | [MobileNetV2](https://keras.io/api/applications/mobilenet/#mobilenetv2-function) | 0. 0.47  1. 0.62  2. 0.44  3. 0.73 | 0. 0.16  1. 0.36  2. 0.93  3. 0.70 | 0. 0.24  1. 0.45  2. 0.60  3. 0.72 |
| 19 | My model | 0. 0.55  1. 0.43  2. 0.43  3. 0.58 | 0. 0.06  1. 0.53  2. 0.67  3. 0.61 | 0. 0.11  1. 0.47  2. 0.52  3. 0.60 |