**Custom CNN model Architecture**

* 1 Image Input layer
* 13 Convolution layers (conv\_1 to conv\_13)
* 5 ReLU activation layers (relu\_1 to relu\_5)
* 5 Max Pooling layers (maxpool\_1 to maxpool\_5)
* 1 Flatten layer
* 2 Fully Connected layers (fc\_1, fc\_2)
* 1 Dropout layer
* 1 Softmax layer
* 1 Classification Output layer

**VGG16 model Architecture**

* 1 Input layer
* 13 Conv2D layers (conv\_block1\_conv1 to conv\_block5\_conv3, each with ReLU activation included)
* 5 MaxPooling2D layers (maxpool\_block1 to maxpool\_block5)
* 1 GlobalAveragePooling2D layer
* 2 Dense layers (dense\_1, dense\_2, with ReLU activation)
* 1 Dropout layer
* 1 Dense (Softmax) output layer

Each Conv2D layer includes its ReLU activation as part of the layer's operation,

**RestNet50 model architecture**

* 1 Input layer
* 1 Conv2D layer (initial\_conv, with ReLU activation)
* 1 MaxPooling2D layer (initial\_maxpool)
* 9 Conv2D layers in residual\_stage1\_block1 (3 Conv2D per block × 3 blocks)
* 12 Conv2D layers in residual\_stage2\_block2 (3 Conv2D per block × 4 blocks)
* 18 Conv2D layers in residual\_stage3\_block3 (3 Conv2D per block × 6 blocks)
* 9 Conv2D layers in residual\_stage4\_block4 (3 Conv2D per block × 3 blocks)
* 1 GlobalAveragePooling2D layer
* 1 Dense layer (dense\_1, with ReLU activation)
* 1 Dropout layer
* 1 Dense layer (dense\_2, with ReLU activation)
* 1 Dense (Softmax) output layer

Each Conv2D layer includes its ReLU activation as part of the layer's operation

**MobileNetV2**

* 1 Input layer
* 1 Conv2D layer (initial\_conv, with BatchNorm and ReLU6)
* 51 Conv2D layers from bottleneck blocks (17 blocks × 3 layers each: 1x1 Conv2D, 3x3 DepthwiseConv2D, 1x1 Conv2D)
* 1 GlobalAveragePooling2D layer
* 1 Dense layer (dense\_1, with ReLU activation)
* 1 Dropout layer
* 1 Dense (Softmax) output layer

Each bottleneck block contains three layers (expansion, depthwise, projection), and BatchNorm/ReLU6 are considered part of the Conv2D operations, not separate layers

**EfficientNetb0**

* 1 Input layer
* 1 Conv2D layer (initial\_conv, with BatchNorm and Swish activation)
* 3 Conv2D layers in mbconv\_stage\_1 (1 MBConv1 block × 3 layers: expansion, depthwise, projection)
* 6 Conv2D layers in mbconv\_stage\_2 (2 MBConv6 blocks × 3 layers each)
* 6 Conv2D layers in mbconv\_stage\_3 (2 MBConv6 blocks × 3 layers each)
* 9 Conv2D layers in mbconv\_stage\_4 (3 MBConv6 blocks × 3 layers each)
* 9 Conv2D layers in mbconv\_stage\_5 (3 MBConv6 blocks × 3 layers each)
* 12 Conv2D layers in mbconv\_stage\_6 (4 MBConv6 blocks × 3 layers each)
* 3 Conv2D layers in mbconv\_stage\_7 (1 MBConv6 block × 3 layers)
* 1 Conv2D layer (final\_conv)
* 1 GlobalAveragePooling2D layer
* 1 Dense layer (dense\_1, with ReLU activation)
* 1 Dropout layer
* 1 Dense (Softmax) output layer

Each MBConv block includes three Conv2D layers (expansion, depthwise, projection), and BatchNorm/Swish activations are part of the Conv2D operations, not counted separately

**Xception**

* 1 Input layer
* 2 Conv2D layers (entry\_conv1, entry\_conv2, each with BatchNorm and ReLU)
* 9 layers in entry\_block\_1\_to\_3 (3 blocks × (2 SeparableConv2D + 1 Conv2D))
* 24 SeparableConv2D layers in middle\_flow\_blocks (8 blocks × 3 SeparableConv2D)
* 3 layers in exit\_block (2 SeparableConv2D + 1 Conv2D)
* 1 GlobalAveragePooling2D layer
* 1 Dense layer (dense\_1, with ReLU activation)
* 1 Dense (Softmax) output layer

Each SeparableConv2D is counted as a single layer (combining depthwise and pointwise convolutions), and BatchNorm/ReLU are considered part of the Conv2D or SeparableConv2D operations, not separate layers.

**InceptionV3**

* 1 Input layer
* 5 Conv2D layers (conv1 to conv5)
* 1 MaxPooling2D layer (maxpool1)
* 27 Conv2D layers in inception\_A\_blocks (3 blocks × 9 Conv2D each)
* 35 Conv2D layers in inception\_B\_blocks (5 blocks × 7 Conv2D each)
* 24 Conv2D layers in inception\_C\_blocks (3 blocks × 8 Conv2D each)
* 2 MaxPooling2D layers (aux\_maxpool\_1, aux\_maxpool\_2)
* 1 GlobalAveragePooling2D layer
* 1 Dense layer (dense\_1, with ReLU activation)
* 1 Dropout layer
* 1 Dense (Softmax) output layer

Each Inception module's Conv2D layers are counted based on the specified number of convolutions per block. BatchNorm and activation functions (e.g., ReLU) are considered part of the Conv2D operations and not counted separately**.**

**Swin Transformer**

* 1 Input layer
* 1 Conv2D layer (patch\_embedding)
* 2 Swin Transformer Blocks in stage1 (stage1\_block1, stage1\_block2)
* 1 Patch Merging layer (patch\_merging1)
* 2 Swin Transformer Blocks in stage2 (stage2\_block1, stage2\_block2)
* 1 Patch Merging layer (patch\_merging2)
* 6 Swin Transformer Blocks in stage3 (stage3\_block1-6)
* 1 Patch Merging layer (patch\_merging3)
* 2 Swin Transformer Blocks in stage4 (stage4\_block1, stage4\_block2)
* 1 GlobalAveragePooling2D layer
* 1 Dense layer (dense\_1, with ReLU activation)
* 1 Dropout layer
* 1 Dense (Softmax) output layer

Each Swin Transformer Block and Patch Merging layer is counted as a single layer, as they represent distinct functional units in the architecture. Internal components like self-attention or normalization within blocks are not counted separately.