Model: "sequential\_1"

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Layer (type) Output Shape Param #

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

conv2d (Conv2D) (None, 64, 321, 8) 1280

batch\_normalization (Batch (None, 64, 321, 8) 32

Normalization)

depthwise\_conv2d (Depthwis (None, 1, 321, 16) 1024

eConv2D)

batch\_normalization\_1 (Bat (None, 1, 321, 16) 64

chNormalization)

activation (Activation) (None, 1, 321, 16) 0

average\_pooling2d (Average (None, 1, 80, 16) 0

Pooling2D)

dropout (Dropout) (None, 1, 80, 16) 0

separable\_conv2d (Separabl (None, 1, 80, 16) 512

eConv2D)

batch\_normalization\_2 (Bat (None, 1, 80, 16) 64

chNormalization)

activation\_1 (Activation) (None, 1, 80, 16) 0

average\_pooling2d\_1 (Avera (None, 1, 10, 16) 0

gePooling2D)

dropout\_1 (Dropout) (None, 1, 10, 16) 0

flatten (Flatten) (None, 160) 0

dense (Dense) (None, 4) 644

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

Total params: 3620 (14.14 KB)

Trainable params: 3540 (13.83 KB)

Non-trainable params: 80 (320.00 Byte)

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Epoch 1/10

353/353 - 107s - loss: 1.2241 - accuracy: 0.4510 - val\_loss: 1.1859 - val\_accuracy: 0.4763 - 107s/epoch - 303ms/step

Epoch 2/10

353/353 - 106s - loss: 1.1334 - accuracy: 0.5240 - val\_loss: 1.1036 - val\_accuracy: 0.5379 - 106s/epoch - 299ms/step

Epoch 3/10

353/353 - 105s - loss: 1.1077 - accuracy: 0.5389 - val\_loss: 1.0680 - val\_accuracy: 0.5563 - 105s/epoch - 298ms/step

Epoch 4/10

353/353 - 106s - loss: 1.0929 - accuracy: 0.5465 - val\_loss: 1.0737 - val\_accuracy: 0.5563 - 106s/epoch - 299ms/step

Epoch 5/10

353/353 - 105s - loss: 1.0781 - accuracy: 0.5564 - val\_loss: 1.0690 - val\_accuracy: 0.5641 - 105s/epoch - 298ms/step

Epoch 6/10

353/353 - 106s - loss: 1.0672 - accuracy: 0.5646 - val\_loss: 1.0472 - val\_accuracy: 0.5712 - 106s/epoch - 299ms/step

Epoch 7/10

353/353 - 105s - loss: 1.0494 - accuracy: 0.5727 - val\_loss: 1.0389 - val\_accuracy: 0.5819 - 105s/epoch - 299ms/step

Epoch 8/10

353/353 - 105s - loss: 1.0424 - accuracy: 0.5823 - val\_loss: 1.0666 - val\_accuracy: 0.5436 - 105s/epoch - 298ms/step

Epoch 9/10

353/353 - 105s - loss: 1.0364 - accuracy: 0.5804 - val\_loss: 1.0474 - val\_accuracy: 0.5684 - 105s/epoch - 297ms/step

Epoch 10/10

353/353 - 105s - loss: 1.0286 - accuracy: 0.5890 - val\_loss: 1.0320 - val\_accuracy: 0.5854 - 105s/epoch - 297ms/step

56/56 - 3s - loss: 0.9839 - accuracy: 0.5986 - 3s/epoch - 51ms/step

Test loss: 0.983900785446167

Test accuracy: 0.5986394286155701

56/56 [==============================] - 3s 51ms/step

Model: "sequential\_3"

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Layer (type) Output Shape Param #

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

conv2d\_1 (Conv2D) (None, 64, 321, 8) 1280

batch\_normalization\_3 (Bat (None, 64, 321, 8) 32

chNormalization)

depthwise\_conv2d\_1 (Depthw (None, 1, 321, 16) 1024

iseConv2D)

batch\_normalization\_4 (Bat (None, 1, 321, 16) 64

chNormalization)

activation\_2 (Activation) (None, 1, 321, 16) 0

average\_pooling2d\_2 (Avera (None, 1, 80, 16) 0

gePooling2D)

dropout\_2 (Dropout) (None, 1, 80, 16) 0

separable\_conv2d\_1 (Separa (None, 1, 80, 16) 512

bleConv2D)

batch\_normalization\_5 (Bat (None, 1, 80, 16) 64

chNormalization)

activation\_3 (Activation) (None, 1, 80, 16) 0

average\_pooling2d\_3 (Avera (None, 1, 10, 16) 0

gePooling2D)

dropout\_3 (Dropout) (None, 1, 10, 16) 0

flatten\_1 (Flatten) (None, 160) 0

dense\_1 (Dense) (None, 4) 644

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

Total params: 3620 (14.14 KB)

Trainable params: 3540 (13.83 KB)

Non-trainable params: 80 (320.00 Byte)

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Epoch 1/10

353/353 - 103s - loss: 1.2087 - accuracy: 0.4625 - val\_loss: 1.1233 - val\_accuracy: 0.5301 - 103s/epoch - 292ms/step

Epoch 2/10

353/353 - 104s - loss: 1.1112 - accuracy: 0.5428 - val\_loss: 1.0943 - val\_accuracy: 0.5422 - 104s/epoch - 294ms/step

Epoch 3/10

353/353 - 104s - loss: 1.0829 - accuracy: 0.5572 - val\_loss: 1.0725 - val\_accuracy: 0.5613 - 104s/epoch - 296ms/step

Epoch 4/10

353/353 - 103s - loss: 1.0590 - accuracy: 0.5630 - val\_loss: 1.0658 - val\_accuracy: 0.5677 - 103s/epoch - 292ms/step

Epoch 5/10

353/353 - 104s - loss: 1.0458 - accuracy: 0.5821 - val\_loss: 1.0369 - val\_accuracy: 0.5776 - 104s/epoch - 294ms/step

Epoch 6/10

353/353 - 104s - loss: 1.0358 - accuracy: 0.5892 - val\_loss: 1.0355 - val\_accuracy: 0.5804 - 104s/epoch - 293ms/step

Epoch 7/10

353/353 - 104s - loss: 1.0247 - accuracy: 0.5983 - val\_loss: 1.0204 - val\_accuracy: 0.5776 - 104s/epoch - 294ms/step

Epoch 8/10

353/353 - 104s - loss: 1.0209 - accuracy: 0.5919 - val\_loss: 1.0135 - val\_accuracy: 0.5748 - 104s/epoch - 295ms/step

Epoch 9/10

353/353 - 103s - loss: 1.0175 - accuracy: 0.5947 - val\_loss: 1.0277 - val\_accuracy: 0.5833 - 103s/epoch - 292ms/step

Epoch 10/10

353/353 - 104s - loss: 1.0009 - accuracy: 0.6036 - val\_loss: 1.0154 - val\_accuracy: 0.5741 - 104s/epoch - 295ms/step

56/56 - 3s - loss: 1.0544 - accuracy: 0.5669 - 3s/epoch - 51ms/step

Test loss: 1.054365873336792

Test accuracy: 0.5668933987617493

56/56 [==============================] - 3s 51ms/step

Model: "sequential\_5"

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Layer (type) Output Shape Param #

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

conv2d\_2 (Conv2D) (None, 64, 321, 8) 1280

batch\_normalization\_6 (Bat (None, 64, 321, 8) 32

chNormalization)

depthwise\_conv2d\_2 (Depthw (None, 1, 321, 16) 1024

iseConv2D)

batch\_normalization\_7 (Bat (None, 1, 321, 16) 64

chNormalization)

activation\_4 (Activation) (None, 1, 321, 16) 0

average\_pooling2d\_4 (Avera (None, 1, 80, 16) 0

gePooling2D)

dropout\_4 (Dropout) (None, 1, 80, 16) 0

separable\_conv2d\_2 (Separa (None, 1, 80, 16) 512

bleConv2D)

batch\_normalization\_8 (Bat (None, 1, 80, 16) 64

chNormalization)

activation\_5 (Activation) (None, 1, 80, 16) 0

average\_pooling2d\_5 (Avera (None, 1, 10, 16) 0

gePooling2D)

dropout\_5 (Dropout) (None, 1, 10, 16) 0

flatten\_2 (Flatten) (None, 160) 0

dense\_2 (Dense) (None, 4) 644

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

Total params: 3620 (14.14 KB)

Trainable params: 3540 (13.83 KB)

Non-trainable params: 80 (320.00 Byte)

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Epoch 1/10

353/353 - 104s - loss: 1.2221 - accuracy: 0.4615 - val\_loss: 1.1604 - val\_accuracy: 0.5018 - 104s/epoch - 294ms/step

Epoch 2/10

353/353 - 104s - loss: 1.1363 - accuracy: 0.5226 - val\_loss: 1.1031 - val\_accuracy: 0.5457 - 104s/epoch - 293ms/step

Epoch 3/10

353/353 - 103s - loss: 1.0999 - accuracy: 0.5515 - val\_loss: 1.0940 - val\_accuracy: 0.5415 - 103s/epoch - 293ms/step

Epoch 4/10

353/353 - 103s - loss: 1.0759 - accuracy: 0.5612 - val\_loss: 1.1211 - val\_accuracy: 0.5145 - 103s/epoch - 291ms/step

Epoch 5/10

353/353 - 103s - loss: 1.0710 - accuracy: 0.5671 - val\_loss: 1.0633 - val\_accuracy: 0.5571 - 103s/epoch - 291ms/step

Epoch 6/10

353/353 - 102s - loss: 1.0489 - accuracy: 0.5710 - val\_loss: 1.0523 - val\_accuracy: 0.5726 - 102s/epoch - 290ms/step

Epoch 7/10

353/353 - 103s - loss: 1.0442 - accuracy: 0.5738 - val\_loss: 1.0643 - val\_accuracy: 0.5507 - 103s/epoch - 291ms/step

Epoch 8/10

353/353 - 103s - loss: 1.0393 - accuracy: 0.5800 - val\_loss: 1.0254 - val\_accuracy: 0.6067 - 103s/epoch - 292ms/step

Epoch 9/10

353/353 - 103s - loss: 1.0285 - accuracy: 0.5836 - val\_loss: 1.0307 - val\_accuracy: 0.5776 - 103s/epoch - 293ms/step

Epoch 10/10

353/353 - 103s - loss: 1.0288 - accuracy: 0.5843 - val\_loss: 1.0312 - val\_accuracy: 0.5854 - 103s/epoch - 291ms/step

56/56 - 3s - loss: 0.9703 - accuracy: 0.6156 - 3s/epoch - 51ms/step

Test loss: 0.9703055620193481

Test accuracy: 0.615646243095398

56/56 [==============================] - 3s 51ms/step

Model: "sequential\_7"

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Layer (type) Output Shape Param #

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

conv2d\_3 (Conv2D) (None, 64, 321, 8) 1280

batch\_normalization\_9 (Bat (None, 64, 321, 8) 32

chNormalization)

depthwise\_conv2d\_3 (Depthw (None, 1, 321, 16) 1024

iseConv2D)

batch\_normalization\_10 (Ba (None, 1, 321, 16) 64

tchNormalization)

activation\_6 (Activation) (None, 1, 321, 16) 0

average\_pooling2d\_6 (Avera (None, 1, 80, 16) 0

gePooling2D)

dropout\_6 (Dropout) (None, 1, 80, 16) 0

separable\_conv2d\_3 (Separa (None, 1, 80, 16) 512

bleConv2D)

batch\_normalization\_11 (Ba (None, 1, 80, 16) 64

tchNormalization)

activation\_7 (Activation) (None, 1, 80, 16) 0

average\_pooling2d\_7 (Avera (None, 1, 10, 16) 0

gePooling2D)

dropout\_7 (Dropout) (None, 1, 10, 16) 0

flatten\_3 (Flatten) (None, 160) 0

dense\_3 (Dense) (None, 4) 644

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

Total params: 3620 (14.14 KB)

Trainable params: 3540 (13.83 KB)

Non-trainable params: 80 (320.00 Byte)

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Epoch 1/10

353/353 - 104s - loss: 1.1889 - accuracy: 0.4707 - val\_loss: 1.1297 - val\_accuracy: 0.5322 - 104s/epoch - 294ms/step

Epoch 2/10

353/353 - 103s - loss: 1.0948 - accuracy: 0.5414 - val\_loss: 1.1187 - val\_accuracy: 0.5145 - 103s/epoch - 293ms/step

Epoch 3/10

353/353 - 103s - loss: 1.0641 - accuracy: 0.5688 - val\_loss: 1.0820 - val\_accuracy: 0.5471 - 103s/epoch - 292ms/step

Epoch 4/10

353/353 - 103s - loss: 1.0479 - accuracy: 0.5738 - val\_loss: 1.0557 - val\_accuracy: 0.5889 - 103s/epoch - 292ms/step

Epoch 5/10

353/353 - 103s - loss: 1.0320 - accuracy: 0.5809 - val\_loss: 1.0426 - val\_accuracy: 0.5769 - 103s/epoch - 291ms/step

Epoch 6/10

353/353 - 103s - loss: 1.0151 - accuracy: 0.5958 - val\_loss: 1.0508 - val\_accuracy: 0.5641 - 103s/epoch - 292ms/step

Epoch 7/10

353/353 - 104s - loss: 1.0115 - accuracy: 0.5961 - val\_loss: 1.0280 - val\_accuracy: 0.5925 - 104s/epoch - 294ms/step

Epoch 8/10

353/353 - 102s - loss: 1.0027 - accuracy: 0.6011 - val\_loss: 1.0454 - val\_accuracy: 0.5748 - 102s/epoch - 290ms/step

Epoch 9/10

353/353 - 102s - loss: 0.9913 - accuracy: 0.5991 - val\_loss: 1.0306 - val\_accuracy: 0.5861 - 102s/epoch - 290ms/step

Epoch 10/10

353/353 - 102s - loss: 0.9945 - accuracy: 0.6029 - val\_loss: 1.0185 - val\_accuracy: 0.6017 - 102s/epoch - 290ms/step

56/56 - 3s - loss: 1.1507 - accuracy: 0.5278 - 3s/epoch - 51ms/step

Test loss: 1.1507149934768677

Test accuracy: 0.5277777910232544

56/56 [==============================] - 3s 51ms/step

Model: "sequential\_9"

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Layer (type) Output Shape Param #

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

conv2d\_4 (Conv2D) (None, 64, 321, 8) 1280

batch\_normalization\_12 (Ba (None, 64, 321, 8) 32

tchNormalization)

depthwise\_conv2d\_4 (Depthw (None, 1, 321, 16) 1024

iseConv2D)

batch\_normalization\_13 (Ba (None, 1, 321, 16) 64

tchNormalization)

activation\_8 (Activation) (None, 1, 321, 16) 0

average\_pooling2d\_8 (Avera (None, 1, 80, 16) 0

gePooling2D)

dropout\_8 (Dropout) (None, 1, 80, 16) 0

separable\_conv2d\_4 (Separa (None, 1, 80, 16) 512

bleConv2D)

batch\_normalization\_14 (Ba (None, 1, 80, 16) 64

tchNormalization)

activation\_9 (Activation) (None, 1, 80, 16) 0

average\_pooling2d\_9 (Avera (None, 1, 10, 16) 0

gePooling2D)

dropout\_9 (Dropout) (None, 1, 10, 16) 0

flatten\_4 (Flatten) (None, 160) 0

dense\_4 (Dense) (None, 4) 644

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

Total params: 3620 (14.14 KB)

Trainable params: 3540 (13.83 KB)

Non-trainable params: 80 (320.00 Byte)

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Epoch 1/10

353/353 - 105s - loss: 1.2030 - accuracy: 0.4633 - val\_loss: 1.1398 - val\_accuracy: 0.5390 - 105s/epoch - 296ms/step

Epoch 2/10

353/353 - 101s - loss: 1.1122 - accuracy: 0.5395 - val\_loss: 1.1213 - val\_accuracy: 0.5397 - 101s/epoch - 287ms/step

Epoch 3/10

353/353 - 101s - loss: 1.0923 - accuracy: 0.5443 - val\_loss: 1.0998 - val\_accuracy: 0.5446 - 101s/epoch - 287ms/step

Epoch 4/10

353/353 - 102s - loss: 1.0780 - accuracy: 0.5487 - val\_loss: 1.1001 - val\_accuracy: 0.5425 - 102s/epoch - 289ms/step

Epoch 5/10

353/353 - 102s - loss: 1.0647 - accuracy: 0.5625 - val\_loss: 1.0912 - val\_accuracy: 0.5489 - 102s/epoch - 289ms/step

Epoch 6/10

353/353 - 102s - loss: 1.0540 - accuracy: 0.5751 - val\_loss: 1.0863 - val\_accuracy: 0.5467 - 102s/epoch - 289ms/step

Epoch 7/10

353/353 - 102s - loss: 1.0498 - accuracy: 0.5663 - val\_loss: 1.0752 - val\_accuracy: 0.5496 - 102s/epoch - 289ms/step

Epoch 8/10

353/353 - 102s - loss: 1.0400 - accuracy: 0.5765 - val\_loss: 1.0612 - val\_accuracy: 0.5687 - 102s/epoch - 289ms/step

Epoch 9/10

353/353 - 102s - loss: 1.0341 - accuracy: 0.5753 - val\_loss: 1.0681 - val\_accuracy: 0.5630 - 102s/epoch - 288ms/step

Epoch 10/10

353/353 - 102s - loss: 1.0272 - accuracy: 0.5845 - val\_loss: 1.0751 - val\_accuracy: 0.5411 - 102s/epoch - 288ms/step

56/56 - 3s - loss: 1.0696 - accuracy: 0.5454 - 3s/epoch - 51ms/step

Test loss: 1.0695562362670898

Test accuracy: 0.5454029440879822

56/56 [==============================] - 3s 51ms/step

Mean loss: 1.0457686901092529

Mean accuracy: 0.5708719611167907