Model: "model"

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

Layer (type) Output Shape Param # Connected to

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

input\_1 (InputLayer) [(None, 64, 321, 1)] 0 []

conv2d (Conv2D) (None, 64, 321, 8) 1280 ['input\_1[0][0]']

batch\_normalization (Batch (None, 64, 321, 8) 32 ['conv2d[0][0]']

Normalization)

depthwise\_conv2d (Depthwis (None, 1, 321, 16) 1024 ['batch\_normalization[0][0]']

eConv2D)

batch\_normalization\_1 (Bat (None, 1, 321, 16) 64 ['depthwise\_conv2d[0][0]']

chNormalization)

activation (Activation) (None, 1, 321, 16) 0 ['batch\_normalization\_1[0][0]'

]

average\_pooling2d (Average (None, 1, 80, 16) 0 ['activation[0][0]']

Pooling2D)

dropout (Dropout) (None, 1, 80, 16) 0 ['average\_pooling2d[0][0]']

global\_average\_pooling2d ( (None, 16) 0 ['dropout[0][0]']

GlobalAveragePooling2D)

global\_max\_pooling2d (Glob (None, 16) 0 ['dropout[0][0]']

alMaxPooling2D)

dense (Dense) (None, 8) 128 ['global\_average\_pooling2d[0][

0]',

'global\_max\_pooling2d[0][0]']

dense\_1 (Dense) (None, 16) 128 ['dense[0][0]',

'dense[1][0]']

tf.\_\_operators\_\_.add (TFOp (None, 16) 0 ['dense\_1[0][0]',

Lambda) 'dense\_1[1][0]']

activation\_1 (Activation) (None, 16) 0 ['tf.\_\_operators\_\_.add[0][0]']

multiply (Multiply) (None, 1, 80, 16) 0 ['dropout[0][0]',

'activation\_1[0][0]']

tf.math.reduce\_mean (TFOpL (None, 1, 80) 0 ['multiply[0][0]']

ambda)

tf.math.reduce\_max (TFOpLa (None, 1, 80) 0 ['multiply[0][0]']

mbda)

tf.expand\_dims (TFOpLambda (None, 1, 80, 1) 0 ['tf.math.reduce\_mean[0][0]']

)

tf.expand\_dims\_1 (TFOpLamb (None, 1, 80, 1) 0 ['tf.math.reduce\_max[0][0]']

da)

concatenate (Concatenate) (None, 1, 80, 2) 0 ['tf.expand\_dims[0][0]',

'tf.expand\_dims\_1[0][0]']

conv2d\_1 (Conv2D) (None, 1, 80, 1) 9 ['concatenate[0][0]']

multiply\_1 (Multiply) (None, 1, 80, 16) 0 ['multiply[0][0]',

'conv2d\_1[0][0]']

separable\_conv2d (Separabl (None, 1, 80, 16) 512 ['multiply\_1[0][0]']

eConv2D)

batch\_normalization\_2 (Bat (None, 1, 80, 16) 64 ['separable\_conv2d[0][0]']

chNormalization)

activation\_2 (Activation) (None, 1, 80, 16) 0 ['batch\_normalization\_2[0][0]'

]

average\_pooling2d\_1 (Avera (None, 1, 10, 16) 0 ['activation\_2[0][0]']

gePooling2D)

dropout\_1 (Dropout) (None, 1, 10, 16) 0 ['average\_pooling2d\_1[0][0]']

flatten (Flatten) (None, 160) 0 ['dropout\_1[0][0]']

dense\_2 (Dense) (None, 4) 644 ['flatten[0][0]']

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Total params: 3885 (15.18 KB)

Trainable params: 3805 (14.86 KB)

Non-trainable params: 80 (320.00 Byte)

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

Epoch 1/10

353/353 - 104s - loss: 1.2361 - accuracy: 0.4335 - val\_loss: 1.1608 - val\_accuracy: 0.5089 - 104s/epoch - 295ms/step

Epoch 2/10

353/353 - 102s - loss: 1.1310 - accuracy: 0.5325 - val\_loss: 1.1272 - val\_accuracy: 0.5159 - 102s/epoch - 288ms/step

Epoch 3/10

353/353 - 101s - loss: 1.1090 - accuracy: 0.5447 - val\_loss: 1.0842 - val\_accuracy: 0.5556 - 101s/epoch - 287ms/step

Epoch 4/10

353/353 - 101s - loss: 1.0974 - accuracy: 0.5472 - val\_loss: 1.0855 - val\_accuracy: 0.5620 - 101s/epoch - 287ms/step

Epoch 5/10

353/353 - 102s - loss: 1.0892 - accuracy: 0.5499 - val\_loss: 1.0711 - val\_accuracy: 0.5684 - 102s/epoch - 289ms/step

Epoch 6/10

353/353 - 101s - loss: 1.0716 - accuracy: 0.5515 - val\_loss: 1.0471 - val\_accuracy: 0.5691 - 101s/epoch - 286ms/step

Epoch 7/10

353/353 - 102s - loss: 1.0648 - accuracy: 0.5630 - val\_loss: 1.0431 - val\_accuracy: 0.5875 - 102s/epoch - 289ms/step

Epoch 8/10

353/353 - 102s - loss: 1.0542 - accuracy: 0.5674 - val\_loss: 1.0507 - val\_accuracy: 0.5762 - 102s/epoch - 289ms/step

Epoch 9/10

353/353 - 101s - loss: 1.0487 - accuracy: 0.5692 - val\_loss: 1.0460 - val\_accuracy: 0.5648 - 101s/epoch - 286ms/step

Epoch 10/10

353/353 - 102s - loss: 1.0454 - accuracy: 0.5699 - val\_loss: 1.0363 - val\_accuracy: 0.5684 - 102s/epoch - 289ms/step

56/56 - 3s - loss: 1.0207 - accuracy: 0.5884 - 3s/epoch - 52ms/step

Test loss: 1.0206844806671143

Test accuracy: 0.5884353518486023

56/56 [==============================] - 3s 52ms/step

Model: "model\_1"

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

Layer (type) Output Shape Param # Connected to

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

input\_2 (InputLayer) [(None, 64, 321, 1)] 0 []

conv2d\_2 (Conv2D) (None, 64, 321, 8) 1280 ['input\_2[0][0]']

batch\_normalization\_3 (Bat (None, 64, 321, 8) 32 ['conv2d\_2[0][0]']

chNormalization)

depthwise\_conv2d\_1 (Depthw (None, 1, 321, 16) 1024 ['batch\_normalization\_3[0][0]'

iseConv2D) ]

batch\_normalization\_4 (Bat (None, 1, 321, 16) 64 ['depthwise\_conv2d\_1[0][0]']

chNormalization)

activation\_3 (Activation) (None, 1, 321, 16) 0 ['batch\_normalization\_4[0][0]'

]

average\_pooling2d\_2 (Avera (None, 1, 80, 16) 0 ['activation\_3[0][0]']

gePooling2D)

dropout\_2 (Dropout) (None, 1, 80, 16) 0 ['average\_pooling2d\_2[0][0]']

global\_average\_pooling2d\_1 (None, 16) 0 ['dropout\_2[0][0]']

(GlobalAveragePooling2D)

global\_max\_pooling2d\_1 (Gl (None, 16) 0 ['dropout\_2[0][0]']

obalMaxPooling2D)

dense\_3 (Dense) (None, 8) 128 ['global\_average\_pooling2d\_1[0

][0]',

'global\_max\_pooling2d\_1[0][0]

']

dense\_4 (Dense) (None, 16) 128 ['dense\_3[0][0]',

'dense\_3[1][0]']

tf.\_\_operators\_\_.add\_1 (TF (None, 16) 0 ['dense\_4[0][0]',

OpLambda) 'dense\_4[1][0]']

activation\_4 (Activation) (None, 16) 0 ['tf.\_\_operators\_\_.add\_1[0][0]

']

multiply\_2 (Multiply) (None, 1, 80, 16) 0 ['dropout\_2[0][0]',

'activation\_4[0][0]']

tf.math.reduce\_mean\_1 (TFO (None, 1, 80) 0 ['multiply\_2[0][0]']

pLambda)

tf.math.reduce\_max\_1 (TFOp (None, 1, 80) 0 ['multiply\_2[0][0]']

Lambda)

tf.expand\_dims\_2 (TFOpLamb (None, 1, 80, 1) 0 ['tf.math.reduce\_mean\_1[0][0]'

da) ]

tf.expand\_dims\_3 (TFOpLamb (None, 1, 80, 1) 0 ['tf.math.reduce\_max\_1[0][0]']

da)

concatenate\_1 (Concatenate (None, 1, 80, 2) 0 ['tf.expand\_dims\_2[0][0]',

) 'tf.expand\_dims\_3[0][0]']

conv2d\_3 (Conv2D) (None, 1, 80, 1) 9 ['concatenate\_1[0][0]']

multiply\_3 (Multiply) (None, 1, 80, 16) 0 ['multiply\_2[0][0]',

'conv2d\_3[0][0]']

separable\_conv2d\_1 (Separa (None, 1, 80, 16) 512 ['multiply\_3[0][0]']

bleConv2D)

batch\_normalization\_5 (Bat (None, 1, 80, 16) 64 ['separable\_conv2d\_1[0][0]']

chNormalization)

activation\_5 (Activation) (None, 1, 80, 16) 0 ['batch\_normalization\_5[0][0]'

]

average\_pooling2d\_3 (Avera (None, 1, 10, 16) 0 ['activation\_5[0][0]']

gePooling2D)

dropout\_3 (Dropout) (None, 1, 10, 16) 0 ['average\_pooling2d\_3[0][0]']

flatten\_1 (Flatten) (None, 160) 0 ['dropout\_3[0][0]']

dense\_5 (Dense) (None, 4) 644 ['flatten\_1[0][0]']

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Total params: 3885 (15.18 KB)

Trainable params: 3805 (14.86 KB)

Non-trainable params: 80 (320.00 Byte)

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Epoch 1/10

353/353 - 103s - loss: 1.2263 - accuracy: 0.4570 - val\_loss: 1.1836 - val\_accuracy: 0.4954 - 103s/epoch - 292ms/step

Epoch 2/10

353/353 - 102s - loss: 1.1073 - accuracy: 0.5361 - val\_loss: 1.0947 - val\_accuracy: 0.5422 - 102s/epoch - 289ms/step

Epoch 3/10

353/353 - 101s - loss: 1.0778 - accuracy: 0.5563 - val\_loss: 1.0550 - val\_accuracy: 0.5578 - 101s/epoch - 286ms/step

Epoch 4/10

353/353 - 101s - loss: 1.0580 - accuracy: 0.5637 - val\_loss: 1.0529 - val\_accuracy: 0.5620 - 101s/epoch - 287ms/step

Epoch 5/10

353/353 - 101s - loss: 1.0448 - accuracy: 0.5683 - val\_loss: 1.0561 - val\_accuracy: 0.5592 - 101s/epoch - 287ms/step

Epoch 6/10

353/353 - 102s - loss: 1.0326 - accuracy: 0.5821 - val\_loss: 1.0449 - val\_accuracy: 0.5656 - 102s/epoch - 288ms/step

Epoch 7/10

353/353 - 101s - loss: 1.0161 - accuracy: 0.5848 - val\_loss: 1.0398 - val\_accuracy: 0.5769 - 101s/epoch - 287ms/step

Epoch 8/10

353/353 - 102s - loss: 1.0122 - accuracy: 0.5889 - val\_loss: 1.0034 - val\_accuracy: 0.5918 - 102s/epoch - 288ms/step

Epoch 9/10

353/353 - 101s - loss: 1.0061 - accuracy: 0.5949 - val\_loss: 0.9984 - val\_accuracy: 0.5946 - 101s/epoch - 286ms/step

Epoch 10/10

353/353 - 101s - loss: 0.9811 - accuracy: 0.6043 - val\_loss: 1.0122 - val\_accuracy: 0.5748 - 101s/epoch - 287ms/step

56/56 - 3s - loss: 1.0874 - accuracy: 0.5391 - 3s/epoch - 51ms/step

Test loss: 1.0873790979385376

Test accuracy: 0.5391156673431396

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

Model: "model\_2"

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

Layer (type) Output Shape Param # Connected to

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

input\_3 (InputLayer) [(None, 64, 321, 1)] 0 []

conv2d\_4 (Conv2D) (None, 64, 321, 8) 1280 ['input\_3[0][0]']

batch\_normalization\_6 (Bat (None, 64, 321, 8) 32 ['conv2d\_4[0][0]']

chNormalization)

depthwise\_conv2d\_2 (Depthw (None, 1, 321, 16) 1024 ['batch\_normalization\_6[0][0]'

iseConv2D) ]

batch\_normalization\_7 (Bat (None, 1, 321, 16) 64 ['depthwise\_conv2d\_2[0][0]']

chNormalization)

activation\_6 (Activation) (None, 1, 321, 16) 0 ['batch\_normalization\_7[0][0]'

]

average\_pooling2d\_4 (Avera (None, 1, 80, 16) 0 ['activation\_6[0][0]']

gePooling2D)

dropout\_4 (Dropout) (None, 1, 80, 16) 0 ['average\_pooling2d\_4[0][0]']

global\_average\_pooling2d\_2 (None, 16) 0 ['dropout\_4[0][0]']

(GlobalAveragePooling2D)

global\_max\_pooling2d\_2 (Gl (None, 16) 0 ['dropout\_4[0][0]']

obalMaxPooling2D)

dense\_6 (Dense) (None, 8) 128 ['global\_average\_pooling2d\_2[0

][0]',

'global\_max\_pooling2d\_2[0][0]

']

dense\_7 (Dense) (None, 16) 128 ['dense\_6[0][0]',

'dense\_6[1][0]']

tf.\_\_operators\_\_.add\_2 (TF (None, 16) 0 ['dense\_7[0][0]',

OpLambda) 'dense\_7[1][0]']

activation\_7 (Activation) (None, 16) 0 ['tf.\_\_operators\_\_.add\_2[0][0]

']

multiply\_4 (Multiply) (None, 1, 80, 16) 0 ['dropout\_4[0][0]',

'activation\_7[0][0]']

tf.math.reduce\_mean\_2 (TFO (None, 1, 80) 0 ['multiply\_4[0][0]']

pLambda)

tf.math.reduce\_max\_2 (TFOp (None, 1, 80) 0 ['multiply\_4[0][0]']

Lambda)

tf.expand\_dims\_4 (TFOpLamb (None, 1, 80, 1) 0 ['tf.math.reduce\_mean\_2[0][0]'

da) ]

tf.expand\_dims\_5 (TFOpLamb (None, 1, 80, 1) 0 ['tf.math.reduce\_max\_2[0][0]']

da)

concatenate\_2 (Concatenate (None, 1, 80, 2) 0 ['tf.expand\_dims\_4[0][0]',

) 'tf.expand\_dims\_5[0][0]']

conv2d\_5 (Conv2D) (None, 1, 80, 1) 9 ['concatenate\_2[0][0]']

multiply\_5 (Multiply) (None, 1, 80, 16) 0 ['multiply\_4[0][0]',

'conv2d\_5[0][0]']

separable\_conv2d\_2 (Separa (None, 1, 80, 16) 512 ['multiply\_5[0][0]']

bleConv2D)

batch\_normalization\_8 (Bat (None, 1, 80, 16) 64 ['separable\_conv2d\_2[0][0]']

chNormalization)

activation\_8 (Activation) (None, 1, 80, 16) 0 ['batch\_normalization\_8[0][0]'

]

average\_pooling2d\_5 (Avera (None, 1, 10, 16) 0 ['activation\_8[0][0]']

gePooling2D)

dropout\_5 (Dropout) (None, 1, 10, 16) 0 ['average\_pooling2d\_5[0][0]']

flatten\_2 (Flatten) (None, 160) 0 ['dropout\_5[0][0]']

dense\_8 (Dense) (None, 4) 644 ['flatten\_2[0][0]']

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

Total params: 3885 (15.18 KB)

Trainable params: 3805 (14.86 KB)

Non-trainable params: 80 (320.00 Byte)

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

Epoch 1/10

353/353 - 103s - loss: 1.2080 - accuracy: 0.4707 - val\_loss: 1.1516 - val\_accuracy: 0.5230 - 103s/epoch - 293ms/step

Epoch 2/10

353/353 - 101s - loss: 1.1226 - accuracy: 0.5274 - val\_loss: 1.1190 - val\_accuracy: 0.5181 - 101s/epoch - 286ms/step

Epoch 3/10

353/353 - 100s - loss: 1.1085 - accuracy: 0.5391 - val\_loss: 1.0892 - val\_accuracy: 0.5556 - 100s/epoch - 284ms/step

Epoch 4/10

353/353 - 101s - loss: 1.0914 - accuracy: 0.5474 - val\_loss: 1.0924 - val\_accuracy: 0.5471 - 101s/epoch - 286ms/step

Epoch 5/10

353/353 - 101s - loss: 1.0756 - accuracy: 0.5533 - val\_loss: 1.0629 - val\_accuracy: 0.5684 - 101s/epoch - 285ms/step

Epoch 6/10

353/353 - 100s - loss: 1.0727 - accuracy: 0.5619 - val\_loss: 1.0730 - val\_accuracy: 0.5549 - 100s/epoch - 285ms/step

Epoch 7/10

353/353 - 100s - loss: 1.0597 - accuracy: 0.5595 - val\_loss: 1.0986 - val\_accuracy: 0.5535 - 100s/epoch - 284ms/step

Epoch 8/10

353/353 - 101s - loss: 1.0546 - accuracy: 0.5671 - val\_loss: 1.0622 - val\_accuracy: 0.5634 - 101s/epoch - 285ms/step

Epoch 9/10

353/353 - 100s - loss: 1.0465 - accuracy: 0.5712 - val\_loss: 1.0565 - val\_accuracy: 0.5585 - 100s/epoch - 285ms/step

Epoch 10/10

353/353 - 101s - loss: 1.0335 - accuracy: 0.5750 - val\_loss: 1.0675 - val\_accuracy: 0.5585 - 101s/epoch - 287ms/step

56/56 - 3s - loss: 0.9798 - accuracy: 0.6037 - 3s/epoch - 51ms/step

Test loss: 0.9797876477241516

Test accuracy: 0.603741466999054

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

Model: "model\_3"

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

Layer (type) Output Shape Param # Connected to

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

input\_4 (InputLayer) [(None, 64, 321, 1)] 0 []

conv2d\_6 (Conv2D) (None, 64, 321, 8) 1280 ['input\_4[0][0]']

batch\_normalization\_9 (Bat (None, 64, 321, 8) 32 ['conv2d\_6[0][0]']

chNormalization)

depthwise\_conv2d\_3 (Depthw (None, 1, 321, 16) 1024 ['batch\_normalization\_9[0][0]'

iseConv2D) ]

batch\_normalization\_10 (Ba (None, 1, 321, 16) 64 ['depthwise\_conv2d\_3[0][0]']

tchNormalization)

activation\_9 (Activation) (None, 1, 321, 16) 0 ['batch\_normalization\_10[0][0]

']

average\_pooling2d\_6 (Avera (None, 1, 80, 16) 0 ['activation\_9[0][0]']

gePooling2D)

dropout\_6 (Dropout) (None, 1, 80, 16) 0 ['average\_pooling2d\_6[0][0]']

global\_average\_pooling2d\_3 (None, 16) 0 ['dropout\_6[0][0]']

(GlobalAveragePooling2D)

global\_max\_pooling2d\_3 (Gl (None, 16) 0 ['dropout\_6[0][0]']

obalMaxPooling2D)

dense\_9 (Dense) (None, 8) 128 ['global\_average\_pooling2d\_3[0

][0]',

'global\_max\_pooling2d\_3[0][0]

']

dense\_10 (Dense) (None, 16) 128 ['dense\_9[0][0]',

'dense\_9[1][0]']

tf.\_\_operators\_\_.add\_3 (TF (None, 16) 0 ['dense\_10[0][0]',

OpLambda) 'dense\_10[1][0]']

activation\_10 (Activation) (None, 16) 0 ['tf.\_\_operators\_\_.add\_3[0][0]

']

multiply\_6 (Multiply) (None, 1, 80, 16) 0 ['dropout\_6[0][0]',

'activation\_10[0][0]']

tf.math.reduce\_mean\_3 (TFO (None, 1, 80) 0 ['multiply\_6[0][0]']

pLambda)

tf.math.reduce\_max\_3 (TFOp (None, 1, 80) 0 ['multiply\_6[0][0]']

Lambda)

tf.expand\_dims\_6 (TFOpLamb (None, 1, 80, 1) 0 ['tf.math.reduce\_mean\_3[0][0]'

da) ]

tf.expand\_dims\_7 (TFOpLamb (None, 1, 80, 1) 0 ['tf.math.reduce\_max\_3[0][0]']

da)

concatenate\_3 (Concatenate (None, 1, 80, 2) 0 ['tf.expand\_dims\_6[0][0]',

) 'tf.expand\_dims\_7[0][0]']

conv2d\_7 (Conv2D) (None, 1, 80, 1) 9 ['concatenate\_3[0][0]']

multiply\_7 (Multiply) (None, 1, 80, 16) 0 ['multiply\_6[0][0]',

'conv2d\_7[0][0]']

separable\_conv2d\_3 (Separa (None, 1, 80, 16) 512 ['multiply\_7[0][0]']

bleConv2D)

batch\_normalization\_11 (Ba (None, 1, 80, 16) 64 ['separable\_conv2d\_3[0][0]']

tchNormalization)

activation\_11 (Activation) (None, 1, 80, 16) 0 ['batch\_normalization\_11[0][0]

']

average\_pooling2d\_7 (Avera (None, 1, 10, 16) 0 ['activation\_11[0][0]']

gePooling2D)

dropout\_7 (Dropout) (None, 1, 10, 16) 0 ['average\_pooling2d\_7[0][0]']

flatten\_3 (Flatten) (None, 160) 0 ['dropout\_7[0][0]']

dense\_11 (Dense) (None, 4) 644 ['flatten\_3[0][0]']

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

Total params: 3885 (15.18 KB)

Trainable params: 3805 (14.86 KB)

Non-trainable params: 80 (320.00 Byte)

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

Epoch 1/10

353/353 - 103s - loss: 1.2027 - accuracy: 0.4645 - val\_loss: 1.1707 - val\_accuracy: 0.5358 - 103s/epoch - 291ms/step

Epoch 2/10

353/353 - 102s - loss: 1.0935 - accuracy: 0.5424 - val\_loss: 1.1194 - val\_accuracy: 0.5365 - 102s/epoch - 288ms/step

Epoch 3/10

353/353 - 101s - loss: 1.0732 - accuracy: 0.5543 - val\_loss: 1.0843 - val\_accuracy: 0.5606 - 101s/epoch - 287ms/step

Epoch 4/10

353/353 - 101s - loss: 1.0500 - accuracy: 0.5616 - val\_loss: 1.0779 - val\_accuracy: 0.5500 - 101s/epoch - 286ms/step

Epoch 5/10

353/353 - 101s - loss: 1.0308 - accuracy: 0.5763 - val\_loss: 1.0901 - val\_accuracy: 0.5415 - 101s/epoch - 286ms/step

Epoch 6/10

353/353 - 101s - loss: 1.0209 - accuracy: 0.5841 - val\_loss: 1.0689 - val\_accuracy: 0.5535 - 101s/epoch - 285ms/step

Epoch 7/10

353/353 - 100s - loss: 1.0035 - accuracy: 0.5922 - val\_loss: 1.0454 - val\_accuracy: 0.5648 - 100s/epoch - 285ms/step

Epoch 8/10

353/353 - 102s - loss: 1.0008 - accuracy: 0.5960 - val\_loss: 1.0413 - val\_accuracy: 0.5698 - 102s/epoch - 288ms/step

Epoch 9/10

353/353 - 101s - loss: 0.9972 - accuracy: 0.5954 - val\_loss: 1.0252 - val\_accuracy: 0.5790 - 101s/epoch - 286ms/step

Epoch 10/10

353/353 - 101s - loss: 0.9911 - accuracy: 0.5947 - val\_loss: 1.0302 - val\_accuracy: 0.5734 - 101s/epoch - 287ms/step

56/56 - 3s - loss: 1.1868 - accuracy: 0.5278 - 3s/epoch - 51ms/step

Test loss: 1.1867945194244385

Test accuracy: 0.5277777910232544

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

Model: "model\_4"

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Layer (type) Output Shape Param # Connected to

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

input\_5 (InputLayer) [(None, 64, 321, 1)] 0 []

conv2d\_8 (Conv2D) (None, 64, 321, 8) 1280 ['input\_5[0][0]']

batch\_normalization\_12 (Ba (None, 64, 321, 8) 32 ['conv2d\_8[0][0]']

tchNormalization)

depthwise\_conv2d\_4 (Depthw (None, 1, 321, 16) 1024 ['batch\_normalization\_12[0][0]

iseConv2D) ']

batch\_normalization\_13 (Ba (None, 1, 321, 16) 64 ['depthwise\_conv2d\_4[0][0]']

tchNormalization)

activation\_12 (Activation) (None, 1, 321, 16) 0 ['batch\_normalization\_13[0][0]

']

average\_pooling2d\_8 (Avera (None, 1, 80, 16) 0 ['activation\_12[0][0]']

gePooling2D)

dropout\_8 (Dropout) (None, 1, 80, 16) 0 ['average\_pooling2d\_8[0][0]']

global\_average\_pooling2d\_4 (None, 16) 0 ['dropout\_8[0][0]']

(GlobalAveragePooling2D)

global\_max\_pooling2d\_4 (Gl (None, 16) 0 ['dropout\_8[0][0]']

obalMaxPooling2D)

dense\_12 (Dense) (None, 8) 128 ['global\_average\_pooling2d\_4[0

][0]',

'global\_max\_pooling2d\_4[0][0]

']

dense\_13 (Dense) (None, 16) 128 ['dense\_12[0][0]',

'dense\_12[1][0]']

tf.\_\_operators\_\_.add\_4 (TF (None, 16) 0 ['dense\_13[0][0]',

OpLambda) 'dense\_13[1][0]']

activation\_13 (Activation) (None, 16) 0 ['tf.\_\_operators\_\_.add\_4[0][0]

']

multiply\_8 (Multiply) (None, 1, 80, 16) 0 ['dropout\_8[0][0]',

'activation\_13[0][0]']

tf.math.reduce\_mean\_4 (TFO (None, 1, 80) 0 ['multiply\_8[0][0]']

pLambda)

tf.math.reduce\_max\_4 (TFOp (None, 1, 80) 0 ['multiply\_8[0][0]']

Lambda)

tf.expand\_dims\_8 (TFOpLamb (None, 1, 80, 1) 0 ['tf.math.reduce\_mean\_4[0][0]'

da) ]

tf.expand\_dims\_9 (TFOpLamb (None, 1, 80, 1) 0 ['tf.math.reduce\_max\_4[0][0]']

da)

concatenate\_4 (Concatenate (None, 1, 80, 2) 0 ['tf.expand\_dims\_8[0][0]',

) 'tf.expand\_dims\_9[0][0]']

conv2d\_9 (Conv2D) (None, 1, 80, 1) 9 ['concatenate\_4[0][0]']

multiply\_9 (Multiply) (None, 1, 80, 16) 0 ['multiply\_8[0][0]',

'conv2d\_9[0][0]']

separable\_conv2d\_4 (Separa (None, 1, 80, 16) 512 ['multiply\_9[0][0]']

bleConv2D)

batch\_normalization\_14 (Ba (None, 1, 80, 16) 64 ['separable\_conv2d\_4[0][0]']

tchNormalization)

activation\_14 (Activation) (None, 1, 80, 16) 0 ['batch\_normalization\_14[0][0]

']

average\_pooling2d\_9 (Avera (None, 1, 10, 16) 0 ['activation\_14[0][0]']

gePooling2D)

dropout\_9 (Dropout) (None, 1, 10, 16) 0 ['average\_pooling2d\_9[0][0]']

flatten\_4 (Flatten) (None, 160) 0 ['dropout\_9[0][0]']

dense\_14 (Dense) (None, 4) 644 ['flatten\_4[0][0]']

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Total params: 3885 (15.18 KB)

Trainable params: 3805 (14.86 KB)

Non-trainable params: 80 (320.00 Byte)

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Epoch 1/10

353/353 - 103s - loss: 1.2203 - accuracy: 0.4557 - val\_loss: 1.1780 - val\_accuracy: 0.5120 - 103s/epoch - 293ms/step

Epoch 2/10

353/353 - 100s - loss: 1.1154 - accuracy: 0.5291 - val\_loss: 1.1025 - val\_accuracy: 0.5340 - 100s/epoch - 284ms/step

Epoch 3/10

353/353 - 101s - loss: 1.0845 - accuracy: 0.5556 - val\_loss: 1.0888 - val\_accuracy: 0.5482 - 101s/epoch - 285ms/step

Epoch 4/10

353/353 - 101s - loss: 1.0675 - accuracy: 0.5625 - val\_loss: 1.0832 - val\_accuracy: 0.5637 - 101s/epoch - 287ms/step

Epoch 5/10

353/353 - 101s - loss: 1.0503 - accuracy: 0.5670 - val\_loss: 1.0796 - val\_accuracy: 0.5609 - 101s/epoch - 287ms/step

Epoch 6/10

353/353 - 102s - loss: 1.0417 - accuracy: 0.5732 - val\_loss: 1.0666 - val\_accuracy: 0.5524 - 102s/epoch - 288ms/step

Epoch 7/10

353/353 - 101s - loss: 1.0227 - accuracy: 0.5843 - val\_loss: 1.0826 - val\_accuracy: 0.5432 - 101s/epoch - 286ms/step

Epoch 8/10

353/353 - 101s - loss: 1.0144 - accuracy: 0.5831 - val\_loss: 1.0581 - val\_accuracy: 0.5666 - 101s/epoch - 285ms/step

Epoch 9/10

353/353 - 101s - loss: 1.0109 - accuracy: 0.5905 - val\_loss: 1.0667 - val\_accuracy: 0.5666 - 101s/epoch - 286ms/step

Epoch 10/10

353/353 - 101s - loss: 1.0056 - accuracy: 0.5904 - val\_loss: 1.0756 - val\_accuracy: 0.5538 - 101s/epoch - 285ms/step

56/56 - 3s - loss: 1.0736 - accuracy: 0.5709 - 3s/epoch - 52ms/step

Test loss: 1.0736407041549683

Test accuracy: 0.5709421038627625

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

Mean loss: 1.069657289981842

Mean accuracy: 0.5660024762153626