Model: "model"

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

Layer (type) Output Shape Param # Connected to

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

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

conv2d\_1 (Conv2D) (None, 64, 321, 8) 256 ['input\_1[0][0]']

conv2d\_2 (Conv2D) (None, 64, 321, 16) 1024 ['input\_1[0][0]']

batch\_normalization\_3 (Bat (None, 64, 321, 8) 32 ['conv2d\_1[0][0]']

chNormalization)

batch\_normalization\_6 (Bat (None, 64, 321, 16) 64 ['conv2d\_2[0][0]']

chNormalization)

conv2d (Conv2D) (None, 64, 321, 4) 64 ['input\_1[0][0]']

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

iseConv2D) ]

depthwise\_conv2d\_2 (Depthw (None, 1, 321, 32) 2048 ['batch\_normalization\_6[0][0]'

iseConv2D) ]

batch\_normalization (Batch (None, 64, 321, 4) 16 ['conv2d[0][0]']

Normalization)

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

chNormalization)

batch\_normalization\_7 (Bat (None, 1, 321, 32) 128 ['depthwise\_conv2d\_2[0][0]']

chNormalization)

depthwise\_conv2d (Depthwis (None, 1, 321, 8) 512 ['batch\_normalization[0][0]']

eConv2D)

activation\_2 (Activation) (None, 1, 321, 16) 0 ['batch\_normalization\_4[0][0]'

]

activation\_4 (Activation) (None, 1, 321, 32) 0 ['batch\_normalization\_7[0][0]'

]

batch\_normalization\_1 (Bat (None, 1, 321, 8) 32 ['depthwise\_conv2d[0][0]']

chNormalization)

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

gePooling2D)

average\_pooling2d\_4 (Avera (None, 1, 80, 32) 0 ['activation\_4[0][0]']

gePooling2D)

activation (Activation) (None, 1, 321, 8) 0 ['batch\_normalization\_1[0][0]'

]

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

dropout\_2 (Dropout) (None, 1, 80, 32) 0 ['average\_pooling2d\_4[0][0]']

average\_pooling2d (Average (None, 1, 80, 8) 0 ['activation[0][0]']

Pooling2D)

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

bleConv2D)

separable\_conv2d\_2 (Separa (None, 1, 80, 32) 1536 ['dropout\_2[0][0]']

bleConv2D)

separable\_conv2d (Separabl (None, 1, 80, 8) 192 ['average\_pooling2d[0][0]']

eConv2D)

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

chNormalization)

batch\_normalization\_8 (Bat (None, 1, 80, 32) 128 ['separable\_conv2d\_2[0][0]']

chNormalization)

batch\_normalization\_2 (Bat (None, 1, 80, 8) 32 ['separable\_conv2d[0][0]']

chNormalization)

activation\_3 (Activation) (None, 1, 80, 16) 0 ['batch\_normalization\_5[0][0]'

]

activation\_5 (Activation) (None, 1, 80, 32) 0 ['batch\_normalization\_8[0][0]'

]

activation\_1 (Activation) (None, 1, 80, 8) 0 ['batch\_normalization\_2[0][0]'

]

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

gePooling2D)

average\_pooling2d\_5 (Avera (None, 1, 10, 32) 0 ['activation\_5[0][0]']

gePooling2D)

average\_pooling2d\_1 (Avera (None, 1, 10, 8) 0 ['activation\_1[0][0]']

gePooling2D)

dropout\_1 (Dropout) (None, 1, 10, 16) 0 ['average\_pooling2d\_3[0][0]']

dropout\_3 (Dropout) (None, 1, 10, 32) 0 ['average\_pooling2d\_5[0][0]']

concatenate (Concatenate) (None, 1, 10, 56) 0 ['average\_pooling2d\_1[0][0]',

'dropout\_1[0][0]',

'dropout\_3[0][0]']

flatten (Flatten) (None, 560) 0 ['concatenate[0][0]']

dense (Dense) (None, 4) 2244 ['flatten[0][0]']

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Total params: 9972 (38.95 KB)

Trainable params: 9692 (37.86 KB)

Non-trainable params: 280 (1.09 KB)

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Epoch 1/10

353/353 - 61s - loss: 1.1864 - accuracy: 0.4836 - val\_loss: 1.1455 - val\_accuracy: 0.5386 - 61s/epoch - 173ms/step

Epoch 2/10

353/353 - 58s - loss: 1.0887 - accuracy: 0.5531 - val\_loss: 1.0774 - val\_accuracy: 0.5620 - 58s/epoch - 165ms/step

Epoch 3/10

353/353 - 58s - loss: 1.0586 - accuracy: 0.5667 - val\_loss: 1.0533 - val\_accuracy: 0.5571 - 58s/epoch - 163ms/step

Epoch 4/10

353/353 - 58s - loss: 1.0367 - accuracy: 0.5818 - val\_loss: 1.0651 - val\_accuracy: 0.5563 - 58s/epoch - 163ms/step

Epoch 5/10

353/353 - 58s - loss: 1.0181 - accuracy: 0.5933 - val\_loss: 1.0687 - val\_accuracy: 0.5521 - 58s/epoch - 164ms/step

Epoch 6/10

353/353 - 58s - loss: 1.0102 - accuracy: 0.5967 - val\_loss: 1.0336 - val\_accuracy: 0.5904 - 58s/epoch - 164ms/step

Epoch 7/10

353/353 - 58s - loss: 0.9993 - accuracy: 0.6009 - val\_loss: 0.9958 - val\_accuracy: 0.5776 - 58s/epoch - 163ms/step

Epoch 8/10

353/353 - 57s - loss: 0.9867 - accuracy: 0.6054 - val\_loss: 1.0136 - val\_accuracy: 0.5840 - 57s/epoch - 161ms/step

Epoch 9/10

353/353 - 57s - loss: 0.9801 - accuracy: 0.6041 - val\_loss: 1.0222 - val\_accuracy: 0.5783 - 57s/epoch - 162ms/step

Epoch 10/10

353/353 - 57s - loss: 0.9734 - accuracy: 0.6160 - val\_loss: 1.0359 - val\_accuracy: 0.5925 - 57s/epoch - 163ms/step

56/56 - 2s - loss: 0.9886 - accuracy: 0.6071 - 2s/epoch - 40ms/step

Test loss: 0.9885638952255249

Test accuracy: 0.6071428656578064

56/56 [==============================] - 2s 40ms/step

Model: "model\_1"

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

Layer (type) Output Shape Param # Connected to

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

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

conv2d\_4 (Conv2D) (None, 64, 321, 8) 256 ['input\_2[0][0]']

conv2d\_5 (Conv2D) (None, 64, 321, 16) 1024 ['input\_2[0][0]']

batch\_normalization\_12 (Ba (None, 64, 321, 8) 32 ['conv2d\_4[0][0]']

tchNormalization)

batch\_normalization\_15 (Ba (None, 64, 321, 16) 64 ['conv2d\_5[0][0]']

tchNormalization)

conv2d\_3 (Conv2D) (None, 64, 321, 4) 64 ['input\_2[0][0]']

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

iseConv2D) ']

depthwise\_conv2d\_5 (Depthw (None, 1, 321, 32) 2048 ['batch\_normalization\_15[0][0]

iseConv2D) ']

batch\_normalization\_9 (Bat (None, 64, 321, 4) 16 ['conv2d\_3[0][0]']

chNormalization)

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

tchNormalization)

batch\_normalization\_16 (Ba (None, 1, 321, 32) 128 ['depthwise\_conv2d\_5[0][0]']

tchNormalization)

depthwise\_conv2d\_3 (Depthw (None, 1, 321, 8) 512 ['batch\_normalization\_9[0][0]'

iseConv2D) ]

activation\_8 (Activation) (None, 1, 321, 16) 0 ['batch\_normalization\_13[0][0]

']

activation\_10 (Activation) (None, 1, 321, 32) 0 ['batch\_normalization\_16[0][0]

']

batch\_normalization\_10 (Ba (None, 1, 321, 8) 32 ['depthwise\_conv2d\_3[0][0]']

tchNormalization)

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

gePooling2D)

average\_pooling2d\_10 (Aver (None, 1, 80, 32) 0 ['activation\_10[0][0]']

agePooling2D)

activation\_6 (Activation) (None, 1, 321, 8) 0 ['batch\_normalization\_10[0][0]

']

dropout\_4 (Dropout) (None, 1, 80, 16) 0 ['average\_pooling2d\_8[0][0]']

dropout\_6 (Dropout) (None, 1, 80, 32) 0 ['average\_pooling2d\_10[0][0]']

average\_pooling2d\_6 (Avera (None, 1, 80, 8) 0 ['activation\_6[0][0]']

gePooling2D)

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

bleConv2D)

separable\_conv2d\_5 (Separa (None, 1, 80, 32) 1536 ['dropout\_6[0][0]']

bleConv2D)

separable\_conv2d\_3 (Separa (None, 1, 80, 8) 192 ['average\_pooling2d\_6[0][0]']

bleConv2D)

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

tchNormalization)

batch\_normalization\_17 (Ba (None, 1, 80, 32) 128 ['separable\_conv2d\_5[0][0]']

tchNormalization)

batch\_normalization\_11 (Ba (None, 1, 80, 8) 32 ['separable\_conv2d\_3[0][0]']

tchNormalization)

activation\_9 (Activation) (None, 1, 80, 16) 0 ['batch\_normalization\_14[0][0]

']

activation\_11 (Activation) (None, 1, 80, 32) 0 ['batch\_normalization\_17[0][0]

']

activation\_7 (Activation) (None, 1, 80, 8) 0 ['batch\_normalization\_11[0][0]

']

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

gePooling2D)

average\_pooling2d\_11 (Aver (None, 1, 10, 32) 0 ['activation\_11[0][0]']

agePooling2D)

average\_pooling2d\_7 (Avera (None, 1, 10, 8) 0 ['activation\_7[0][0]']

gePooling2D)

dropout\_5 (Dropout) (None, 1, 10, 16) 0 ['average\_pooling2d\_9[0][0]']

dropout\_7 (Dropout) (None, 1, 10, 32) 0 ['average\_pooling2d\_11[0][0]']

concatenate\_1 (Concatenate (None, 1, 10, 56) 0 ['average\_pooling2d\_7[0][0]',

) 'dropout\_5[0][0]',

'dropout\_7[0][0]']

flatten\_1 (Flatten) (None, 560) 0 ['concatenate\_1[0][0]']

dense\_1 (Dense) (None, 4) 2244 ['flatten\_1[0][0]']

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Total params: 9972 (38.95 KB)

Trainable params: 9692 (37.86 KB)

Non-trainable params: 280 (1.09 KB)

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

Epoch 1/10

353/353 - 60s - loss: 1.1632 - accuracy: 0.5010 - val\_loss: 1.1203 - val\_accuracy: 0.5280 - 60s/epoch - 169ms/step

Epoch 2/10

353/353 - 57s - loss: 1.0787 - accuracy: 0.5621 - val\_loss: 1.0688 - val\_accuracy: 0.5620 - 57s/epoch - 162ms/step

Epoch 3/10

353/353 - 57s - loss: 1.0516 - accuracy: 0.5813 - val\_loss: 1.0395 - val\_accuracy: 0.5790 - 57s/epoch - 161ms/step

Epoch 4/10

353/353 - 57s - loss: 1.0367 - accuracy: 0.5820 - val\_loss: 1.0430 - val\_accuracy: 0.5705 - 57s/epoch - 161ms/step

Epoch 5/10

353/353 - 57s - loss: 1.0180 - accuracy: 0.5867 - val\_loss: 1.0295 - val\_accuracy: 0.5663 - 57s/epoch - 161ms/step

Epoch 6/10

353/353 - 57s - loss: 1.0089 - accuracy: 0.5970 - val\_loss: 1.0316 - val\_accuracy: 0.5684 - 57s/epoch - 162ms/step

Epoch 7/10

353/353 - 57s - loss: 0.9907 - accuracy: 0.6093 - val\_loss: 1.0108 - val\_accuracy: 0.5953 - 57s/epoch - 161ms/step

Epoch 8/10

353/353 - 57s - loss: 0.9799 - accuracy: 0.6093 - val\_loss: 1.0233 - val\_accuracy: 0.5748 - 57s/epoch - 161ms/step

Epoch 9/10

353/353 - 57s - loss: 0.9746 - accuracy: 0.6078 - val\_loss: 1.0147 - val\_accuracy: 0.5826 - 57s/epoch - 162ms/step

Epoch 10/10

353/353 - 57s - loss: 0.9615 - accuracy: 0.6128 - val\_loss: 1.0315 - val\_accuracy: 0.5790 - 57s/epoch - 161ms/step

56/56 - 2s - loss: 1.0332 - accuracy: 0.5686 - 2s/epoch - 39ms/step

Test loss: 1.0332491397857666

Test accuracy: 0.5685940980911255

56/56 [==============================] - 2s 40ms/step

Model: "model\_2"

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

Layer (type) Output Shape Param # Connected to

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

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

conv2d\_7 (Conv2D) (None, 64, 321, 8) 256 ['input\_3[0][0]']

conv2d\_8 (Conv2D) (None, 64, 321, 16) 1024 ['input\_3[0][0]']

batch\_normalization\_21 (Ba (None, 64, 321, 8) 32 ['conv2d\_7[0][0]']

tchNormalization)

batch\_normalization\_24 (Ba (None, 64, 321, 16) 64 ['conv2d\_8[0][0]']

tchNormalization)

conv2d\_6 (Conv2D) (None, 64, 321, 4) 64 ['input\_3[0][0]']

depthwise\_conv2d\_7 (Depthw (None, 1, 321, 16) 1024 ['batch\_normalization\_21[0][0]

iseConv2D) ']

depthwise\_conv2d\_8 (Depthw (None, 1, 321, 32) 2048 ['batch\_normalization\_24[0][0]

iseConv2D) ']

batch\_normalization\_18 (Ba (None, 64, 321, 4) 16 ['conv2d\_6[0][0]']

tchNormalization)

batch\_normalization\_22 (Ba (None, 1, 321, 16) 64 ['depthwise\_conv2d\_7[0][0]']

tchNormalization)

batch\_normalization\_25 (Ba (None, 1, 321, 32) 128 ['depthwise\_conv2d\_8[0][0]']

tchNormalization)

depthwise\_conv2d\_6 (Depthw (None, 1, 321, 8) 512 ['batch\_normalization\_18[0][0]

iseConv2D) ']

activation\_14 (Activation) (None, 1, 321, 16) 0 ['batch\_normalization\_22[0][0]

']

activation\_16 (Activation) (None, 1, 321, 32) 0 ['batch\_normalization\_25[0][0]

']

batch\_normalization\_19 (Ba (None, 1, 321, 8) 32 ['depthwise\_conv2d\_6[0][0]']

tchNormalization)

average\_pooling2d\_14 (Aver (None, 1, 80, 16) 0 ['activation\_14[0][0]']

agePooling2D)

average\_pooling2d\_16 (Aver (None, 1, 80, 32) 0 ['activation\_16[0][0]']

agePooling2D)

activation\_12 (Activation) (None, 1, 321, 8) 0 ['batch\_normalization\_19[0][0]

']

dropout\_8 (Dropout) (None, 1, 80, 16) 0 ['average\_pooling2d\_14[0][0]']

dropout\_10 (Dropout) (None, 1, 80, 32) 0 ['average\_pooling2d\_16[0][0]']

average\_pooling2d\_12 (Aver (None, 1, 80, 8) 0 ['activation\_12[0][0]']

agePooling2D)

separable\_conv2d\_7 (Separa (None, 1, 80, 16) 512 ['dropout\_8[0][0]']

bleConv2D)

separable\_conv2d\_8 (Separa (None, 1, 80, 32) 1536 ['dropout\_10[0][0]']

bleConv2D)

separable\_conv2d\_6 (Separa (None, 1, 80, 8) 192 ['average\_pooling2d\_12[0][0]']

bleConv2D)

batch\_normalization\_23 (Ba (None, 1, 80, 16) 64 ['separable\_conv2d\_7[0][0]']

tchNormalization)

batch\_normalization\_26 (Ba (None, 1, 80, 32) 128 ['separable\_conv2d\_8[0][0]']

tchNormalization)

batch\_normalization\_20 (Ba (None, 1, 80, 8) 32 ['separable\_conv2d\_6[0][0]']

tchNormalization)

activation\_15 (Activation) (None, 1, 80, 16) 0 ['batch\_normalization\_23[0][0]

']

activation\_17 (Activation) (None, 1, 80, 32) 0 ['batch\_normalization\_26[0][0]

']

activation\_13 (Activation) (None, 1, 80, 8) 0 ['batch\_normalization\_20[0][0]

']

average\_pooling2d\_15 (Aver (None, 1, 10, 16) 0 ['activation\_15[0][0]']

agePooling2D)

average\_pooling2d\_17 (Aver (None, 1, 10, 32) 0 ['activation\_17[0][0]']

agePooling2D)

average\_pooling2d\_13 (Aver (None, 1, 10, 8) 0 ['activation\_13[0][0]']

agePooling2D)

dropout\_9 (Dropout) (None, 1, 10, 16) 0 ['average\_pooling2d\_15[0][0]']

dropout\_11 (Dropout) (None, 1, 10, 32) 0 ['average\_pooling2d\_17[0][0]']

concatenate\_2 (Concatenate (None, 1, 10, 56) 0 ['average\_pooling2d\_13[0][0]',

) 'dropout\_9[0][0]',

'dropout\_11[0][0]']

flatten\_2 (Flatten) (None, 560) 0 ['concatenate\_2[0][0]']

dense\_2 (Dense) (None, 4) 2244 ['flatten\_2[0][0]']

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

Total params: 9972 (38.95 KB)

Trainable params: 9692 (37.86 KB)

Non-trainable params: 280 (1.09 KB)

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Epoch 1/10

353/353 - 60s - loss: 1.1740 - accuracy: 0.5012 - val\_loss: 1.1448 - val\_accuracy: 0.5223 - 60s/epoch - 169ms/step

Epoch 2/10

353/353 - 57s - loss: 1.0959 - accuracy: 0.5439 - val\_loss: 1.0667 - val\_accuracy: 0.5776 - 57s/epoch - 163ms/step

Epoch 3/10

353/353 - 57s - loss: 1.0613 - accuracy: 0.5676 - val\_loss: 1.0587 - val\_accuracy: 0.5698 - 57s/epoch - 161ms/step

Epoch 4/10

353/353 - 57s - loss: 1.0375 - accuracy: 0.5775 - val\_loss: 1.0544 - val\_accuracy: 0.5656 - 57s/epoch - 162ms/step

Epoch 5/10

353/353 - 57s - loss: 1.0256 - accuracy: 0.5823 - val\_loss: 1.0681 - val\_accuracy: 0.5507 - 57s/epoch - 161ms/step

Epoch 6/10

353/353 - 57s - loss: 1.0205 - accuracy: 0.5919 - val\_loss: 1.0569 - val\_accuracy: 0.5748 - 57s/epoch - 161ms/step

Epoch 7/10

353/353 - 57s - loss: 1.0060 - accuracy: 0.5968 - val\_loss: 1.0549 - val\_accuracy: 0.5670 - 57s/epoch - 162ms/step

Epoch 8/10

353/353 - 57s - loss: 1.0010 - accuracy: 0.5970 - val\_loss: 1.0308 - val\_accuracy: 0.5811 - 57s/epoch - 161ms/step

Epoch 9/10

353/353 - 57s - loss: 0.9849 - accuracy: 0.6025 - val\_loss: 1.0474 - val\_accuracy: 0.5663 - 57s/epoch - 161ms/step

Epoch 10/10

353/353 - 57s - loss: 0.9762 - accuracy: 0.6117 - val\_loss: 1.0728 - val\_accuracy: 0.5613 - 57s/epoch - 162ms/step

56/56 - 2s - loss: 0.9920 - accuracy: 0.5975 - 2s/epoch - 40ms/step

Test loss: 0.9920459985733032

Test accuracy: 0.5975056886672974

56/56 [==============================] - 2s 41ms/step

Model: "model\_3"

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

Layer (type) Output Shape Param # Connected to

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

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

conv2d\_10 (Conv2D) (None, 64, 321, 8) 256 ['input\_4[0][0]']

conv2d\_11 (Conv2D) (None, 64, 321, 16) 1024 ['input\_4[0][0]']

batch\_normalization\_30 (Ba (None, 64, 321, 8) 32 ['conv2d\_10[0][0]']

tchNormalization)

batch\_normalization\_33 (Ba (None, 64, 321, 16) 64 ['conv2d\_11[0][0]']

tchNormalization)

conv2d\_9 (Conv2D) (None, 64, 321, 4) 64 ['input\_4[0][0]']

depthwise\_conv2d\_10 (Depth (None, 1, 321, 16) 1024 ['batch\_normalization\_30[0][0]

wiseConv2D) ']

depthwise\_conv2d\_11 (Depth (None, 1, 321, 32) 2048 ['batch\_normalization\_33[0][0]

wiseConv2D) ']

batch\_normalization\_27 (Ba (None, 64, 321, 4) 16 ['conv2d\_9[0][0]']

tchNormalization)

batch\_normalization\_31 (Ba (None, 1, 321, 16) 64 ['depthwise\_conv2d\_10[0][0]']

tchNormalization)

batch\_normalization\_34 (Ba (None, 1, 321, 32) 128 ['depthwise\_conv2d\_11[0][0]']

tchNormalization)

depthwise\_conv2d\_9 (Depthw (None, 1, 321, 8) 512 ['batch\_normalization\_27[0][0]

iseConv2D) ']

activation\_20 (Activation) (None, 1, 321, 16) 0 ['batch\_normalization\_31[0][0]

']

activation\_22 (Activation) (None, 1, 321, 32) 0 ['batch\_normalization\_34[0][0]

']

batch\_normalization\_28 (Ba (None, 1, 321, 8) 32 ['depthwise\_conv2d\_9[0][0]']

tchNormalization)

average\_pooling2d\_20 (Aver (None, 1, 80, 16) 0 ['activation\_20[0][0]']

agePooling2D)

average\_pooling2d\_22 (Aver (None, 1, 80, 32) 0 ['activation\_22[0][0]']

agePooling2D)

activation\_18 (Activation) (None, 1, 321, 8) 0 ['batch\_normalization\_28[0][0]

']

dropout\_12 (Dropout) (None, 1, 80, 16) 0 ['average\_pooling2d\_20[0][0]']

dropout\_14 (Dropout) (None, 1, 80, 32) 0 ['average\_pooling2d\_22[0][0]']

average\_pooling2d\_18 (Aver (None, 1, 80, 8) 0 ['activation\_18[0][0]']

agePooling2D)

separable\_conv2d\_10 (Separ (None, 1, 80, 16) 512 ['dropout\_12[0][0]']

ableConv2D)

separable\_conv2d\_11 (Separ (None, 1, 80, 32) 1536 ['dropout\_14[0][0]']

ableConv2D)

separable\_conv2d\_9 (Separa (None, 1, 80, 8) 192 ['average\_pooling2d\_18[0][0]']

bleConv2D)

batch\_normalization\_32 (Ba (None, 1, 80, 16) 64 ['separable\_conv2d\_10[0][0]']

tchNormalization)

batch\_normalization\_35 (Ba (None, 1, 80, 32) 128 ['separable\_conv2d\_11[0][0]']

tchNormalization)

batch\_normalization\_29 (Ba (None, 1, 80, 8) 32 ['separable\_conv2d\_9[0][0]']

tchNormalization)

activation\_21 (Activation) (None, 1, 80, 16) 0 ['batch\_normalization\_32[0][0]

']

activation\_23 (Activation) (None, 1, 80, 32) 0 ['batch\_normalization\_35[0][0]

']

activation\_19 (Activation) (None, 1, 80, 8) 0 ['batch\_normalization\_29[0][0]

']

average\_pooling2d\_21 (Aver (None, 1, 10, 16) 0 ['activation\_21[0][0]']

agePooling2D)

average\_pooling2d\_23 (Aver (None, 1, 10, 32) 0 ['activation\_23[0][0]']

agePooling2D)

average\_pooling2d\_19 (Aver (None, 1, 10, 8) 0 ['activation\_19[0][0]']

agePooling2D)

dropout\_13 (Dropout) (None, 1, 10, 16) 0 ['average\_pooling2d\_21[0][0]']

dropout\_15 (Dropout) (None, 1, 10, 32) 0 ['average\_pooling2d\_23[0][0]']

concatenate\_3 (Concatenate (None, 1, 10, 56) 0 ['average\_pooling2d\_19[0][0]',

) 'dropout\_13[0][0]',

'dropout\_15[0][0]']

flatten\_3 (Flatten) (None, 560) 0 ['concatenate\_3[0][0]']

dense\_3 (Dense) (None, 4) 2244 ['flatten\_3[0][0]']

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Total params: 9972 (38.95 KB)

Trainable params: 9692 (37.86 KB)

Non-trainable params: 280 (1.09 KB)

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Epoch 1/10

353/353 - 59s - loss: 1.1514 - accuracy: 0.5031 - val\_loss: 1.1392 - val\_accuracy: 0.5351 - 59s/epoch - 168ms/step

Epoch 2/10

353/353 - 57s - loss: 1.0489 - accuracy: 0.5758 - val\_loss: 1.0615 - val\_accuracy: 0.5705 - 57s/epoch - 162ms/step

Epoch 3/10

353/353 - 57s - loss: 1.0162 - accuracy: 0.5896 - val\_loss: 1.0274 - val\_accuracy: 0.5762 - 57s/epoch - 162ms/step

Epoch 4/10

353/353 - 57s - loss: 0.9963 - accuracy: 0.6004 - val\_loss: 1.0270 - val\_accuracy: 0.5918 - 57s/epoch - 161ms/step

Epoch 5/10

353/353 - 57s - loss: 0.9783 - accuracy: 0.6071 - val\_loss: 1.0087 - val\_accuracy: 0.5953 - 57s/epoch - 161ms/step

Epoch 6/10

353/353 - 57s - loss: 0.9652 - accuracy: 0.6131 - val\_loss: 1.0118 - val\_accuracy: 0.5932 - 57s/epoch - 161ms/step

Epoch 7/10

353/353 - 57s - loss: 0.9503 - accuracy: 0.6234 - val\_loss: 1.0132 - val\_accuracy: 0.5911 - 57s/epoch - 161ms/step

Epoch 8/10

353/353 - 57s - loss: 0.9415 - accuracy: 0.6275 - val\_loss: 1.0015 - val\_accuracy: 0.6116 - 57s/epoch - 162ms/step

Epoch 9/10

353/353 - 57s - loss: 0.9329 - accuracy: 0.6291 - val\_loss: 1.0010 - val\_accuracy: 0.6123 - 57s/epoch - 161ms/step

Epoch 10/10

353/353 - 57s - loss: 0.9277 - accuracy: 0.6326 - val\_loss: 0.9869 - val\_accuracy: 0.6095 - 57s/epoch - 162ms/step

56/56 - 2s - loss: 1.1439 - accuracy: 0.5471 - 2s/epoch - 40ms/step

Test loss: 1.143850564956665

Test accuracy: 0.5470521450042725

56/56 [==============================] - 2s 40ms/step

Model: "model\_4"

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Layer (type) Output Shape Param # Connected to

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

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

conv2d\_13 (Conv2D) (None, 64, 321, 8) 256 ['input\_5[0][0]']

conv2d\_14 (Conv2D) (None, 64, 321, 16) 1024 ['input\_5[0][0]']

batch\_normalization\_39 (Ba (None, 64, 321, 8) 32 ['conv2d\_13[0][0]']

tchNormalization)

batch\_normalization\_42 (Ba (None, 64, 321, 16) 64 ['conv2d\_14[0][0]']

tchNormalization)

conv2d\_12 (Conv2D) (None, 64, 321, 4) 64 ['input\_5[0][0]']

depthwise\_conv2d\_13 (Depth (None, 1, 321, 16) 1024 ['batch\_normalization\_39[0][0]

wiseConv2D) ']

depthwise\_conv2d\_14 (Depth (None, 1, 321, 32) 2048 ['batch\_normalization\_42[0][0]

wiseConv2D) ']

batch\_normalization\_36 (Ba (None, 64, 321, 4) 16 ['conv2d\_12[0][0]']

tchNormalization)

batch\_normalization\_40 (Ba (None, 1, 321, 16) 64 ['depthwise\_conv2d\_13[0][0]']

tchNormalization)

batch\_normalization\_43 (Ba (None, 1, 321, 32) 128 ['depthwise\_conv2d\_14[0][0]']

tchNormalization)

depthwise\_conv2d\_12 (Depth (None, 1, 321, 8) 512 ['batch\_normalization\_36[0][0]

wiseConv2D) ']

activation\_26 (Activation) (None, 1, 321, 16) 0 ['batch\_normalization\_40[0][0]

']

activation\_28 (Activation) (None, 1, 321, 32) 0 ['batch\_normalization\_43[0][0]

']

batch\_normalization\_37 (Ba (None, 1, 321, 8) 32 ['depthwise\_conv2d\_12[0][0]']

tchNormalization)

average\_pooling2d\_26 (Aver (None, 1, 80, 16) 0 ['activation\_26[0][0]']

agePooling2D)

average\_pooling2d\_28 (Aver (None, 1, 80, 32) 0 ['activation\_28[0][0]']

agePooling2D)

activation\_24 (Activation) (None, 1, 321, 8) 0 ['batch\_normalization\_37[0][0]

']

dropout\_16 (Dropout) (None, 1, 80, 16) 0 ['average\_pooling2d\_26[0][0]']

dropout\_18 (Dropout) (None, 1, 80, 32) 0 ['average\_pooling2d\_28[0][0]']

average\_pooling2d\_24 (Aver (None, 1, 80, 8) 0 ['activation\_24[0][0]']

agePooling2D)

separable\_conv2d\_13 (Separ (None, 1, 80, 16) 512 ['dropout\_16[0][0]']

ableConv2D)

separable\_conv2d\_14 (Separ (None, 1, 80, 32) 1536 ['dropout\_18[0][0]']

ableConv2D)

separable\_conv2d\_12 (Separ (None, 1, 80, 8) 192 ['average\_pooling2d\_24[0][0]']

ableConv2D)

batch\_normalization\_41 (Ba (None, 1, 80, 16) 64 ['separable\_conv2d\_13[0][0]']

tchNormalization)

batch\_normalization\_44 (Ba (None, 1, 80, 32) 128 ['separable\_conv2d\_14[0][0]']

tchNormalization)

batch\_normalization\_38 (Ba (None, 1, 80, 8) 32 ['separable\_conv2d\_12[0][0]']

tchNormalization)

activation\_27 (Activation) (None, 1, 80, 16) 0 ['batch\_normalization\_41[0][0]

']

activation\_29 (Activation) (None, 1, 80, 32) 0 ['batch\_normalization\_44[0][0]

']

activation\_25 (Activation) (None, 1, 80, 8) 0 ['batch\_normalization\_38[0][0]

']

average\_pooling2d\_27 (Aver (None, 1, 10, 16) 0 ['activation\_27[0][0]']

agePooling2D)

average\_pooling2d\_29 (Aver (None, 1, 10, 32) 0 ['activation\_29[0][0]']

agePooling2D)

average\_pooling2d\_25 (Aver (None, 1, 10, 8) 0 ['activation\_25[0][0]']

agePooling2D)

dropout\_17 (Dropout) (None, 1, 10, 16) 0 ['average\_pooling2d\_27[0][0]']

dropout\_19 (Dropout) (None, 1, 10, 32) 0 ['average\_pooling2d\_29[0][0]']

concatenate\_4 (Concatenate (None, 1, 10, 56) 0 ['average\_pooling2d\_25[0][0]',

) 'dropout\_17[0][0]',

'dropout\_19[0][0]']

flatten\_4 (Flatten) (None, 560) 0 ['concatenate\_4[0][0]']

dense\_4 (Dense) (None, 4) 2244 ['flatten\_4[0][0]']

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Total params: 9972 (38.95 KB)

Trainable params: 9692 (37.86 KB)

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

Epoch 1/10

353/353 - 60s - loss: 1.1697 - accuracy: 0.4950 - val\_loss: 1.1338 - val\_accuracy: 0.5333 - 60s/epoch - 171ms/step

Epoch 2/10

353/353 - 57s - loss: 1.0785 - accuracy: 0.5590 - val\_loss: 1.0964 - val\_accuracy: 0.5559 - 57s/epoch - 162ms/step

Epoch 3/10

353/353 - 57s - loss: 1.0427 - accuracy: 0.5762 - val\_loss: 1.0728 - val\_accuracy: 0.5729 - 57s/epoch - 162ms/step

Epoch 4/10

353/353 - 57s - loss: 1.0249 - accuracy: 0.5872 - val\_loss: 1.0788 - val\_accuracy: 0.5602 - 57s/epoch - 162ms/step

Epoch 5/10

353/353 - 57s - loss: 1.0143 - accuracy: 0.5974 - val\_loss: 1.0418 - val\_accuracy: 0.5871 - 57s/epoch - 162ms/step

Epoch 6/10

353/353 - 57s - loss: 0.9961 - accuracy: 0.6045 - val\_loss: 1.0631 - val\_accuracy: 0.5680 - 57s/epoch - 162ms/step

Epoch 7/10

353/353 - 57s - loss: 0.9845 - accuracy: 0.6083 - val\_loss: 1.0375 - val\_accuracy: 0.5928 - 57s/epoch - 161ms/step

Epoch 8/10

353/353 - 56s - loss: 0.9692 - accuracy: 0.6152 - val\_loss: 1.0395 - val\_accuracy: 0.5786 - 56s/epoch - 160ms/step

Epoch 9/10

353/353 - 57s - loss: 0.9668 - accuracy: 0.6116 - val\_loss: 1.0269 - val\_accuracy: 0.5907 - 57s/epoch - 162ms/step

Epoch 10/10

353/353 - 57s - loss: 0.9561 - accuracy: 0.6175 - val\_loss: 1.0140 - val\_accuracy: 0.5977 - 57s/epoch - 162ms/step

56/56 - 2s - loss: 1.0177 - accuracy: 0.5902 - 2s/epoch - 40ms/step

Test loss: 1.0177127122879028

Test accuracy: 0.5902383923530579

56/56 [==============================] - 2s 39ms/step

Mean loss: 1.0350844621658326

Mean accuracy: 0.582106637954712