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]']

conv2d\_3 (Conv2D) (None, 64, 321, 32) 4096 ['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)

batch\_normalization\_9 (Bat (None, 64, 321, 32) 128 ['conv2d\_3[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) ]

depthwise\_conv2d\_3 (Depthw (None, 1, 321, 64) 4096 ['batch\_normalization\_9[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)

batch\_normalization\_10 (Ba (None, 1, 321, 64) 256 ['depthwise\_conv2d\_3[0][0]']

tchNormalization)

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]'

]

activation\_6 (Activation) (None, 1, 321, 64) 0 ['batch\_normalization\_10[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)

average\_pooling2d\_6 (Avera (None, 1, 80, 64) 0 ['activation\_6[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]']

dropout\_4 (Dropout) (None, 1, 80, 64) 0 ['average\_pooling2d\_6[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\_3 (Separa (None, 1, 80, 64) 5120 ['dropout\_4[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\_11 (Ba (None, 1, 80, 64) 256 ['separable\_conv2d\_3[0][0]']

tchNormalization)

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\_7 (Activation) (None, 1, 80, 64) 0 ['batch\_normalization\_11[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\_7 (Avera (None, 1, 10, 64) 0 ['activation\_7[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]']

dropout\_5 (Dropout) (None, 1, 10, 64) 0 ['average\_pooling2d\_7[0][0]']

concatenate (Concatenate) (None, 1, 10, 120) 0 ['average\_pooling2d\_1[0][0]',

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

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

'dropout\_5[0][0]']

flatten (Flatten) (None, 1200) 0 ['concatenate[0][0]']

dense (Dense) (None, 4) 4804 ['flatten[0][0]']

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Total params: 26484 (103.45 KB)

Trainable params: 25884 (101.11 KB)

Non-trainable params: 600 (2.34 KB)

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Epoch 1/10

353/353 - 120s - loss: 1.1708 - accuracy: 0.4868 - val\_loss: 1.1154 - val\_accuracy: 0.5188 - 120s/epoch - 339ms/step

Epoch 2/10

353/353 - 117s - loss: 1.0943 - accuracy: 0.5362 - val\_loss: 1.0881 - val\_accuracy: 0.5521 - 117s/epoch - 330ms/step

Epoch 3/10

353/353 - 116s - loss: 1.0679 - accuracy: 0.5639 - val\_loss: 1.0646 - val\_accuracy: 0.5500 - 116s/epoch - 328ms/step

Epoch 4/10

353/353 - 116s - loss: 1.0474 - accuracy: 0.5726 - val\_loss: 1.0545 - val\_accuracy: 0.5641 - 116s/epoch - 327ms/step

Epoch 5/10

353/353 - 116s - loss: 1.0317 - accuracy: 0.5843 - val\_loss: 1.0216 - val\_accuracy: 0.5719 - 116s/epoch - 329ms/step

Epoch 6/10

353/353 - 115s - loss: 1.0207 - accuracy: 0.5862 - val\_loss: 1.0290 - val\_accuracy: 0.5847 - 115s/epoch - 327ms/step

Epoch 7/10

353/353 - 116s - loss: 1.0111 - accuracy: 0.5929 - val\_loss: 1.1105 - val\_accuracy: 0.5450 - 116s/epoch - 329ms/step

Epoch 8/10

353/353 - 116s - loss: 1.0166 - accuracy: 0.5929 - val\_loss: 1.0210 - val\_accuracy: 0.5946 - 116s/epoch - 330ms/step

Epoch 9/10

353/353 - 115s - loss: 0.9851 - accuracy: 0.6036 - val\_loss: 1.0141 - val\_accuracy: 0.6003 - 115s/epoch - 327ms/step

Epoch 10/10

353/353 - 117s - loss: 0.9874 - accuracy: 0.6061 - val\_loss: 1.0268 - val\_accuracy: 0.5953 - 117s/epoch - 331ms/step

56/56 - 4s - loss: 0.9881 - accuracy: 0.5890 - 4s/epoch - 70ms/step

Test loss: 0.9881433248519897

Test accuracy: 0.589002251625061

56/56 [==============================] - 4s 70ms/step

Model: "model\_1"

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

Layer (type) Output Shape Param # Connected to

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

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

conv2d\_5 (Conv2D) (None, 64, 321, 8) 256 ['input\_2[0][0]']

conv2d\_6 (Conv2D) (None, 64, 321, 16) 1024 ['input\_2[0][0]']

conv2d\_7 (Conv2D) (None, 64, 321, 32) 4096 ['input\_2[0][0]']

batch\_normalization\_15 (Ba (None, 64, 321, 8) 32 ['conv2d\_5[0][0]']

tchNormalization)

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

tchNormalization)

batch\_normalization\_21 (Ba (None, 64, 321, 32) 128 ['conv2d\_7[0][0]']

tchNormalization)

conv2d\_4 (Conv2D) (None, 64, 321, 4) 64 ['input\_2[0][0]']

depthwise\_conv2d\_5 (Depthw (None, 1, 321, 16) 1024 ['batch\_normalization\_15[0][0]

iseConv2D) ']

depthwise\_conv2d\_6 (Depthw (None, 1, 321, 32) 2048 ['batch\_normalization\_18[0][0]

iseConv2D) ']

depthwise\_conv2d\_7 (Depthw (None, 1, 321, 64) 4096 ['batch\_normalization\_21[0][0]

iseConv2D) ']

batch\_normalization\_12 (Ba (None, 64, 321, 4) 16 ['conv2d\_4[0][0]']

tchNormalization)

batch\_normalization\_16 (Ba (None, 1, 321, 16) 64 ['depthwise\_conv2d\_5[0][0]']

tchNormalization)

batch\_normalization\_19 (Ba (None, 1, 321, 32) 128 ['depthwise\_conv2d\_6[0][0]']

tchNormalization)

batch\_normalization\_22 (Ba (None, 1, 321, 64) 256 ['depthwise\_conv2d\_7[0][0]']

tchNormalization)

depthwise\_conv2d\_4 (Depthw (None, 1, 321, 8) 512 ['batch\_normalization\_12[0][0]

iseConv2D) ']

activation\_10 (Activation) (None, 1, 321, 16) 0 ['batch\_normalization\_16[0][0]

']

activation\_12 (Activation) (None, 1, 321, 32) 0 ['batch\_normalization\_19[0][0]

']

activation\_14 (Activation) (None, 1, 321, 64) 0 ['batch\_normalization\_22[0][0]

']

batch\_normalization\_13 (Ba (None, 1, 321, 8) 32 ['depthwise\_conv2d\_4[0][0]']

tchNormalization)

average\_pooling2d\_10 (Aver (None, 1, 80, 16) 0 ['activation\_10[0][0]']

agePooling2D)

average\_pooling2d\_12 (Aver (None, 1, 80, 32) 0 ['activation\_12[0][0]']

agePooling2D)

average\_pooling2d\_14 (Aver (None, 1, 80, 64) 0 ['activation\_14[0][0]']

agePooling2D)

activation\_8 (Activation) (None, 1, 321, 8) 0 ['batch\_normalization\_13[0][0]

']

dropout\_6 (Dropout) (None, 1, 80, 16) 0 ['average\_pooling2d\_10[0][0]']

dropout\_8 (Dropout) (None, 1, 80, 32) 0 ['average\_pooling2d\_12[0][0]']

dropout\_10 (Dropout) (None, 1, 80, 64) 0 ['average\_pooling2d\_14[0][0]']

average\_pooling2d\_8 (Avera (None, 1, 80, 8) 0 ['activation\_8[0][0]']

gePooling2D)

separable\_conv2d\_5 (Separa (None, 1, 80, 16) 512 ['dropout\_6[0][0]']

bleConv2D)

separable\_conv2d\_6 (Separa (None, 1, 80, 32) 1536 ['dropout\_8[0][0]']

bleConv2D)

separable\_conv2d\_7 (Separa (None, 1, 80, 64) 5120 ['dropout\_10[0][0]']

bleConv2D)

separable\_conv2d\_4 (Separa (None, 1, 80, 8) 192 ['average\_pooling2d\_8[0][0]']

bleConv2D)

batch\_normalization\_17 (Ba (None, 1, 80, 16) 64 ['separable\_conv2d\_5[0][0]']

tchNormalization)

batch\_normalization\_20 (Ba (None, 1, 80, 32) 128 ['separable\_conv2d\_6[0][0]']

tchNormalization)

batch\_normalization\_23 (Ba (None, 1, 80, 64) 256 ['separable\_conv2d\_7[0][0]']

tchNormalization)

batch\_normalization\_14 (Ba (None, 1, 80, 8) 32 ['separable\_conv2d\_4[0][0]']

tchNormalization)

activation\_11 (Activation) (None, 1, 80, 16) 0 ['batch\_normalization\_17[0][0]

']

activation\_13 (Activation) (None, 1, 80, 32) 0 ['batch\_normalization\_20[0][0]

']

activation\_15 (Activation) (None, 1, 80, 64) 0 ['batch\_normalization\_23[0][0]

']

activation\_9 (Activation) (None, 1, 80, 8) 0 ['batch\_normalization\_14[0][0]

']

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

agePooling2D)

average\_pooling2d\_13 (Aver (None, 1, 10, 32) 0 ['activation\_13[0][0]']

agePooling2D)

average\_pooling2d\_15 (Aver (None, 1, 10, 64) 0 ['activation\_15[0][0]']

agePooling2D)

average\_pooling2d\_9 (Avera (None, 1, 10, 8) 0 ['activation\_9[0][0]']

gePooling2D)

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

dropout\_9 (Dropout) (None, 1, 10, 32) 0 ['average\_pooling2d\_13[0][0]']

dropout\_11 (Dropout) (None, 1, 10, 64) 0 ['average\_pooling2d\_15[0][0]']

concatenate\_1 (Concatenate (None, 1, 10, 120) 0 ['average\_pooling2d\_9[0][0]',

) 'dropout\_7[0][0]',

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

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

flatten\_1 (Flatten) (None, 1200) 0 ['concatenate\_1[0][0]']

dense\_1 (Dense) (None, 4) 4804 ['flatten\_1[0][0]']

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Total params: 26484 (103.45 KB)

Trainable params: 25884 (101.11 KB)

Non-trainable params: 600 (2.34 KB)

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Epoch 1/10

353/353 - 119s - loss: 1.1567 - accuracy: 0.5045 - val\_loss: 1.1288 - val\_accuracy: 0.5308 - 119s/epoch - 337ms/step

Epoch 2/10

353/353 - 116s - loss: 1.0786 - accuracy: 0.5494 - val\_loss: 1.0892 - val\_accuracy: 0.5280 - 116s/epoch - 329ms/step

Epoch 3/10

353/353 - 116s - loss: 1.0482 - accuracy: 0.5736 - val\_loss: 1.0477 - val\_accuracy: 0.5606 - 116s/epoch - 330ms/step

Epoch 4/10

353/353 - 115s - loss: 1.0227 - accuracy: 0.5832 - val\_loss: 1.0536 - val\_accuracy: 0.5712 - 115s/epoch - 326ms/step

Epoch 5/10

353/353 - 116s - loss: 1.0148 - accuracy: 0.5933 - val\_loss: 1.0438 - val\_accuracy: 0.5691 - 116s/epoch - 328ms/step

Epoch 6/10

353/353 - 116s - loss: 1.0023 - accuracy: 0.5935 - val\_loss: 1.0842 - val\_accuracy: 0.5485 - 116s/epoch - 330ms/step

Epoch 7/10

353/353 - 116s - loss: 0.9922 - accuracy: 0.6057 - val\_loss: 1.0265 - val\_accuracy: 0.5741 - 116s/epoch - 328ms/step

Epoch 8/10

353/353 - 116s - loss: 0.9848 - accuracy: 0.6071 - val\_loss: 1.0632 - val\_accuracy: 0.5408 - 116s/epoch - 329ms/step

Epoch 9/10

353/353 - 116s - loss: 0.9753 - accuracy: 0.6103 - val\_loss: 1.0252 - val\_accuracy: 0.5925 - 116s/epoch - 329ms/step

Epoch 10/10

353/353 - 116s - loss: 0.9633 - accuracy: 0.6116 - val\_loss: 1.0310 - val\_accuracy: 0.5826 - 116s/epoch - 328ms/step

56/56 - 4s - loss: 1.0773 - accuracy: 0.5437 - 4s/epoch - 70ms/step

Test loss: 1.0773370265960693

Test accuracy: 0.5436508059501648

56/56 [==============================] - 4s 71ms/step

Model: "model\_2"

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Layer (type) Output Shape Param # Connected to

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

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

conv2d\_9 (Conv2D) (None, 64, 321, 8) 256 ['input\_3[0][0]']

conv2d\_10 (Conv2D) (None, 64, 321, 16) 1024 ['input\_3[0][0]']

conv2d\_11 (Conv2D) (None, 64, 321, 32) 4096 ['input\_3[0][0]']

batch\_normalization\_27 (Ba (None, 64, 321, 8) 32 ['conv2d\_9[0][0]']

tchNormalization)

batch\_normalization\_30 (Ba (None, 64, 321, 16) 64 ['conv2d\_10[0][0]']

tchNormalization)

batch\_normalization\_33 (Ba (None, 64, 321, 32) 128 ['conv2d\_11[0][0]']

tchNormalization)

conv2d\_8 (Conv2D) (None, 64, 321, 4) 64 ['input\_3[0][0]']

depthwise\_conv2d\_9 (Depthw (None, 1, 321, 16) 1024 ['batch\_normalization\_27[0][0]

iseConv2D) ']

depthwise\_conv2d\_10 (Depth (None, 1, 321, 32) 2048 ['batch\_normalization\_30[0][0]

wiseConv2D) ']

depthwise\_conv2d\_11 (Depth (None, 1, 321, 64) 4096 ['batch\_normalization\_33[0][0]

wiseConv2D) ']

batch\_normalization\_24 (Ba (None, 64, 321, 4) 16 ['conv2d\_8[0][0]']

tchNormalization)

batch\_normalization\_28 (Ba (None, 1, 321, 16) 64 ['depthwise\_conv2d\_9[0][0]']

tchNormalization)

batch\_normalization\_31 (Ba (None, 1, 321, 32) 128 ['depthwise\_conv2d\_10[0][0]']

tchNormalization)

batch\_normalization\_34 (Ba (None, 1, 321, 64) 256 ['depthwise\_conv2d\_11[0][0]']

tchNormalization)

depthwise\_conv2d\_8 (Depthw (None, 1, 321, 8) 512 ['batch\_normalization\_24[0][0]

iseConv2D) ']

activation\_18 (Activation) (None, 1, 321, 16) 0 ['batch\_normalization\_28[0][0]

']

activation\_20 (Activation) (None, 1, 321, 32) 0 ['batch\_normalization\_31[0][0]

']

activation\_22 (Activation) (None, 1, 321, 64) 0 ['batch\_normalization\_34[0][0]

']

batch\_normalization\_25 (Ba (None, 1, 321, 8) 32 ['depthwise\_conv2d\_8[0][0]']

tchNormalization)

average\_pooling2d\_18 (Aver (None, 1, 80, 16) 0 ['activation\_18[0][0]']

agePooling2D)

average\_pooling2d\_20 (Aver (None, 1, 80, 32) 0 ['activation\_20[0][0]']

agePooling2D)

average\_pooling2d\_22 (Aver (None, 1, 80, 64) 0 ['activation\_22[0][0]']

agePooling2D)

activation\_16 (Activation) (None, 1, 321, 8) 0 ['batch\_normalization\_25[0][0]

']

dropout\_12 (Dropout) (None, 1, 80, 16) 0 ['average\_pooling2d\_18[0][0]']

dropout\_14 (Dropout) (None, 1, 80, 32) 0 ['average\_pooling2d\_20[0][0]']

dropout\_16 (Dropout) (None, 1, 80, 64) 0 ['average\_pooling2d\_22[0][0]']

average\_pooling2d\_16 (Aver (None, 1, 80, 8) 0 ['activation\_16[0][0]']

agePooling2D)

separable\_conv2d\_9 (Separa (None, 1, 80, 16) 512 ['dropout\_12[0][0]']

bleConv2D)

separable\_conv2d\_10 (Separ (None, 1, 80, 32) 1536 ['dropout\_14[0][0]']

ableConv2D)

separable\_conv2d\_11 (Separ (None, 1, 80, 64) 5120 ['dropout\_16[0][0]']

ableConv2D)

separable\_conv2d\_8 (Separa (None, 1, 80, 8) 192 ['average\_pooling2d\_16[0][0]']

bleConv2D)

batch\_normalization\_29 (Ba (None, 1, 80, 16) 64 ['separable\_conv2d\_9[0][0]']

tchNormalization)

batch\_normalization\_32 (Ba (None, 1, 80, 32) 128 ['separable\_conv2d\_10[0][0]']

tchNormalization)

batch\_normalization\_35 (Ba (None, 1, 80, 64) 256 ['separable\_conv2d\_11[0][0]']

tchNormalization)

batch\_normalization\_26 (Ba (None, 1, 80, 8) 32 ['separable\_conv2d\_8[0][0]']

tchNormalization)

activation\_19 (Activation) (None, 1, 80, 16) 0 ['batch\_normalization\_29[0][0]

']

activation\_21 (Activation) (None, 1, 80, 32) 0 ['batch\_normalization\_32[0][0]

']

activation\_23 (Activation) (None, 1, 80, 64) 0 ['batch\_normalization\_35[0][0]

']

activation\_17 (Activation) (None, 1, 80, 8) 0 ['batch\_normalization\_26[0][0]

']

average\_pooling2d\_19 (Aver (None, 1, 10, 16) 0 ['activation\_19[0][0]']

agePooling2D)

average\_pooling2d\_21 (Aver (None, 1, 10, 32) 0 ['activation\_21[0][0]']

agePooling2D)

average\_pooling2d\_23 (Aver (None, 1, 10, 64) 0 ['activation\_23[0][0]']

agePooling2D)

average\_pooling2d\_17 (Aver (None, 1, 10, 8) 0 ['activation\_17[0][0]']

agePooling2D)

dropout\_13 (Dropout) (None, 1, 10, 16) 0 ['average\_pooling2d\_19[0][0]']

dropout\_15 (Dropout) (None, 1, 10, 32) 0 ['average\_pooling2d\_21[0][0]']

dropout\_17 (Dropout) (None, 1, 10, 64) 0 ['average\_pooling2d\_23[0][0]']

concatenate\_2 (Concatenate (None, 1, 10, 120) 0 ['average\_pooling2d\_17[0][0]',

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

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

'dropout\_17[0][0]']

flatten\_2 (Flatten) (None, 1200) 0 ['concatenate\_2[0][0]']

dense\_2 (Dense) (None, 4) 4804 ['flatten\_2[0][0]']

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Total params: 26484 (103.45 KB)

Trainable params: 25884 (101.11 KB)

Non-trainable params: 600 (2.34 KB)

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Epoch 1/10

353/353 - 119s - loss: 1.1841 - accuracy: 0.4866 - val\_loss: 1.1232 - val\_accuracy: 0.5528 - 119s/epoch - 338ms/step

Epoch 2/10

353/353 - 115s - loss: 1.0992 - accuracy: 0.5346 - val\_loss: 1.0941 - val\_accuracy: 0.5422 - 115s/epoch - 327ms/step

Epoch 3/10

353/353 - 116s - loss: 1.0634 - accuracy: 0.5623 - val\_loss: 1.1109 - val\_accuracy: 0.5174 - 116s/epoch - 327ms/step

Epoch 4/10

353/353 - 116s - loss: 1.0453 - accuracy: 0.5685 - val\_loss: 1.0994 - val\_accuracy: 0.5436 - 116s/epoch - 328ms/step

Epoch 5/10

353/353 - 116s - loss: 1.0388 - accuracy: 0.5766 - val\_loss: 1.0482 - val\_accuracy: 0.5641 - 116s/epoch - 328ms/step

Epoch 6/10

353/353 - 115s - loss: 1.0205 - accuracy: 0.5928 - val\_loss: 1.0499 - val\_accuracy: 0.5563 - 115s/epoch - 327ms/step

Epoch 7/10

353/353 - 115s - loss: 1.0158 - accuracy: 0.5921 - val\_loss: 1.0361 - val\_accuracy: 0.5811 - 115s/epoch - 326ms/step

Epoch 8/10

353/353 - 116s - loss: 1.0024 - accuracy: 0.5961 - val\_loss: 1.0553 - val\_accuracy: 0.5578 - 116s/epoch - 328ms/step

Epoch 9/10

353/353 - 114s - loss: 1.0032 - accuracy: 0.5965 - val\_loss: 1.0329 - val\_accuracy: 0.5755 - 114s/epoch - 323ms/step

Epoch 10/10

353/353 - 115s - loss: 0.9838 - accuracy: 0.6062 - val\_loss: 1.0337 - val\_accuracy: 0.5790 - 115s/epoch - 326ms/step

56/56 - 4s - loss: 0.9676 - accuracy: 0.6049 - 4s/epoch - 71ms/step

Test loss: 0.9676259756088257

Test accuracy: 0.6048752665519714

56/56 [==============================] - 4s 71ms/step

Model: "model\_3"

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

Layer (type) Output Shape Param # Connected to

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

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

conv2d\_13 (Conv2D) (None, 64, 321, 8) 256 ['input\_4[0][0]']

conv2d\_14 (Conv2D) (None, 64, 321, 16) 1024 ['input\_4[0][0]']

conv2d\_15 (Conv2D) (None, 64, 321, 32) 4096 ['input\_4[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)

batch\_normalization\_45 (Ba (None, 64, 321, 32) 128 ['conv2d\_15[0][0]']

tchNormalization)

conv2d\_12 (Conv2D) (None, 64, 321, 4) 64 ['input\_4[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) ']

depthwise\_conv2d\_15 (Depth (None, 1, 321, 64) 4096 ['batch\_normalization\_45[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)

batch\_normalization\_46 (Ba (None, 1, 321, 64) 256 ['depthwise\_conv2d\_15[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]

']

activation\_30 (Activation) (None, 1, 321, 64) 0 ['batch\_normalization\_46[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)

average\_pooling2d\_30 (Aver (None, 1, 80, 64) 0 ['activation\_30[0][0]']

agePooling2D)

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

']

dropout\_18 (Dropout) (None, 1, 80, 16) 0 ['average\_pooling2d\_26[0][0]']

dropout\_20 (Dropout) (None, 1, 80, 32) 0 ['average\_pooling2d\_28[0][0]']

dropout\_22 (Dropout) (None, 1, 80, 64) 0 ['average\_pooling2d\_30[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\_18[0][0]']

ableConv2D)

separable\_conv2d\_14 (Separ (None, 1, 80, 32) 1536 ['dropout\_20[0][0]']

ableConv2D)

separable\_conv2d\_15 (Separ (None, 1, 80, 64) 5120 ['dropout\_22[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\_47 (Ba (None, 1, 80, 64) 256 ['separable\_conv2d\_15[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\_31 (Activation) (None, 1, 80, 64) 0 ['batch\_normalization\_47[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\_31 (Aver (None, 1, 10, 64) 0 ['activation\_31[0][0]']

agePooling2D)

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

agePooling2D)

dropout\_19 (Dropout) (None, 1, 10, 16) 0 ['average\_pooling2d\_27[0][0]']

dropout\_21 (Dropout) (None, 1, 10, 32) 0 ['average\_pooling2d\_29[0][0]']

dropout\_23 (Dropout) (None, 1, 10, 64) 0 ['average\_pooling2d\_31[0][0]']

concatenate\_3 (Concatenate (None, 1, 10, 120) 0 ['average\_pooling2d\_25[0][0]',

) 'dropout\_19[0][0]',

'dropout\_21[0][0]',

'dropout\_23[0][0]']

flatten\_3 (Flatten) (None, 1200) 0 ['concatenate\_3[0][0]']

dense\_3 (Dense) (None, 4) 4804 ['flatten\_3[0][0]']

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Total params: 26484 (103.45 KB)

Trainable params: 25884 (101.11 KB)

Non-trainable params: 600 (2.34 KB)

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Epoch 1/10

353/353 - 119s - loss: 1.1383 - accuracy: 0.5104 - val\_loss: 1.1336 - val\_accuracy: 0.5337 - 119s/epoch - 338ms/step

Epoch 2/10

353/353 - 115s - loss: 1.0420 - accuracy: 0.5687 - val\_loss: 1.0727 - val\_accuracy: 0.5634 - 115s/epoch - 327ms/step

Epoch 3/10

353/353 - 115s - loss: 1.0137 - accuracy: 0.5837 - val\_loss: 1.0682 - val\_accuracy: 0.5656 - 115s/epoch - 325ms/step

Epoch 4/10

353/353 - 116s - loss: 0.9945 - accuracy: 0.5974 - val\_loss: 1.0150 - val\_accuracy: 0.5833 - 116s/epoch - 327ms/step

Epoch 5/10

353/353 - 116s - loss: 0.9846 - accuracy: 0.5997 - val\_loss: 1.0116 - val\_accuracy: 0.5889 - 116s/epoch - 329ms/step

Epoch 6/10

353/353 - 116s - loss: 0.9663 - accuracy: 0.6147 - val\_loss: 0.9900 - val\_accuracy: 0.5932 - 116s/epoch - 328ms/step

Epoch 7/10

353/353 - 115s - loss: 0.9487 - accuracy: 0.6225 - val\_loss: 1.0235 - val\_accuracy: 0.5925 - 115s/epoch - 326ms/step

Epoch 8/10

353/353 - 115s - loss: 0.9505 - accuracy: 0.6241 - val\_loss: 1.0081 - val\_accuracy: 0.5790 - 115s/epoch - 326ms/step

Epoch 9/10

353/353 - 115s - loss: 0.9371 - accuracy: 0.6275 - val\_loss: 1.0251 - val\_accuracy: 0.5882 - 115s/epoch - 326ms/step

Epoch 10/10

353/353 - 116s - loss: 0.9334 - accuracy: 0.6302 - val\_loss: 0.9899 - val\_accuracy: 0.6102 - 116s/epoch - 327ms/step

56/56 - 4s - loss: 1.1706 - accuracy: 0.5385 - 4s/epoch - 71ms/step

Test loss: 1.1705639362335205

Test accuracy: 0.5385487675666809

56/56 [==============================] - 4s 71ms/step

Model: "model\_4"

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Layer (type) Output Shape Param # Connected to

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

conv2d\_17 (Conv2D) (None, 64, 321, 8) 256 ['input\_5[0][0]']

conv2d\_18 (Conv2D) (None, 64, 321, 16) 1024 ['input\_5[0][0]']

conv2d\_19 (Conv2D) (None, 64, 321, 32) 4096 ['input\_5[0][0]']

batch\_normalization\_51 (Ba (None, 64, 321, 8) 32 ['conv2d\_17[0][0]']

tchNormalization)

batch\_normalization\_54 (Ba (None, 64, 321, 16) 64 ['conv2d\_18[0][0]']

tchNormalization)

batch\_normalization\_57 (Ba (None, 64, 321, 32) 128 ['conv2d\_19[0][0]']

tchNormalization)

conv2d\_16 (Conv2D) (None, 64, 321, 4) 64 ['input\_5[0][0]']

depthwise\_conv2d\_17 (Depth (None, 1, 321, 16) 1024 ['batch\_normalization\_51[0][0]

wiseConv2D) ']

depthwise\_conv2d\_18 (Depth (None, 1, 321, 32) 2048 ['batch\_normalization\_54[0][0]

wiseConv2D) ']

depthwise\_conv2d\_19 (Depth (None, 1, 321, 64) 4096 ['batch\_normalization\_57[0][0]

wiseConv2D) ']

batch\_normalization\_48 (Ba (None, 64, 321, 4) 16 ['conv2d\_16[0][0]']

tchNormalization)

batch\_normalization\_52 (Ba (None, 1, 321, 16) 64 ['depthwise\_conv2d\_17[0][0]']

tchNormalization)

batch\_normalization\_55 (Ba (None, 1, 321, 32) 128 ['depthwise\_conv2d\_18[0][0]']

tchNormalization)

batch\_normalization\_58 (Ba (None, 1, 321, 64) 256 ['depthwise\_conv2d\_19[0][0]']

tchNormalization)

depthwise\_conv2d\_16 (Depth (None, 1, 321, 8) 512 ['batch\_normalization\_48[0][0]

wiseConv2D) ']

activation\_34 (Activation) (None, 1, 321, 16) 0 ['batch\_normalization\_52[0][0]

']

activation\_36 (Activation) (None, 1, 321, 32) 0 ['batch\_normalization\_55[0][0]

']

activation\_38 (Activation) (None, 1, 321, 64) 0 ['batch\_normalization\_58[0][0]

']

batch\_normalization\_49 (Ba (None, 1, 321, 8) 32 ['depthwise\_conv2d\_16[0][0]']

tchNormalization)

average\_pooling2d\_34 (Aver (None, 1, 80, 16) 0 ['activation\_34[0][0]']

agePooling2D)

average\_pooling2d\_36 (Aver (None, 1, 80, 32) 0 ['activation\_36[0][0]']

agePooling2D)

average\_pooling2d\_38 (Aver (None, 1, 80, 64) 0 ['activation\_38[0][0]']

agePooling2D)

activation\_32 (Activation) (None, 1, 321, 8) 0 ['batch\_normalization\_49[0][0]

']

dropout\_24 (Dropout) (None, 1, 80, 16) 0 ['average\_pooling2d\_34[0][0]']

dropout\_26 (Dropout) (None, 1, 80, 32) 0 ['average\_pooling2d\_36[0][0]']

dropout\_28 (Dropout) (None, 1, 80, 64) 0 ['average\_pooling2d\_38[0][0]']

average\_pooling2d\_32 (Aver (None, 1, 80, 8) 0 ['activation\_32[0][0]']

agePooling2D)

separable\_conv2d\_17 (Separ (None, 1, 80, 16) 512 ['dropout\_24[0][0]']

ableConv2D)

separable\_conv2d\_18 (Separ (None, 1, 80, 32) 1536 ['dropout\_26[0][0]']

ableConv2D)

separable\_conv2d\_19 (Separ (None, 1, 80, 64) 5120 ['dropout\_28[0][0]']

ableConv2D)

separable\_conv2d\_16 (Separ (None, 1, 80, 8) 192 ['average\_pooling2d\_32[0][0]']

ableConv2D)

batch\_normalization\_53 (Ba (None, 1, 80, 16) 64 ['separable\_conv2d\_17[0][0]']

tchNormalization)

batch\_normalization\_56 (Ba (None, 1, 80, 32) 128 ['separable\_conv2d\_18[0][0]']

tchNormalization)

batch\_normalization\_59 (Ba (None, 1, 80, 64) 256 ['separable\_conv2d\_19[0][0]']

tchNormalization)

batch\_normalization\_50 (Ba (None, 1, 80, 8) 32 ['separable\_conv2d\_16[0][0]']

tchNormalization)

activation\_35 (Activation) (None, 1, 80, 16) 0 ['batch\_normalization\_53[0][0]

']

activation\_37 (Activation) (None, 1, 80, 32) 0 ['batch\_normalization\_56[0][0]

']

activation\_39 (Activation) (None, 1, 80, 64) 0 ['batch\_normalization\_59[0][0]

']

activation\_33 (Activation) (None, 1, 80, 8) 0 ['batch\_normalization\_50[0][0]

']

average\_pooling2d\_35 (Aver (None, 1, 10, 16) 0 ['activation\_35[0][0]']

agePooling2D)

average\_pooling2d\_37 (Aver (None, 1, 10, 32) 0 ['activation\_37[0][0]']

agePooling2D)

average\_pooling2d\_39 (Aver (None, 1, 10, 64) 0 ['activation\_39[0][0]']

agePooling2D)

average\_pooling2d\_33 (Aver (None, 1, 10, 8) 0 ['activation\_33[0][0]']

agePooling2D)

dropout\_25 (Dropout) (None, 1, 10, 16) 0 ['average\_pooling2d\_35[0][0]']

dropout\_27 (Dropout) (None, 1, 10, 32) 0 ['average\_pooling2d\_37[0][0]']

dropout\_29 (Dropout) (None, 1, 10, 64) 0 ['average\_pooling2d\_39[0][0]']

concatenate\_4 (Concatenate (None, 1, 10, 120) 0 ['average\_pooling2d\_33[0][0]',

) 'dropout\_25[0][0]',

'dropout\_27[0][0]',

'dropout\_29[0][0]']

flatten\_4 (Flatten) (None, 1200) 0 ['concatenate\_4[0][0]']

dense\_4 (Dense) (None, 4) 4804 ['flatten\_4[0][0]']

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

Total params: 26484 (103.45 KB)

Trainable params: 25884 (101.11 KB)

Non-trainable params: 600 (2.34 KB)

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Epoch 1/10

353/353 - 119s - loss: 1.1632 - accuracy: 0.4924 - val\_loss: 1.1700 - val\_accuracy: 0.4950 - 119s/epoch - 336ms/step

Epoch 2/10

353/353 - 115s - loss: 1.0769 - accuracy: 0.5549 - val\_loss: 1.0936 - val\_accuracy: 0.5531 - 115s/epoch - 326ms/step

Epoch 3/10

353/353 - 115s - loss: 1.0430 - accuracy: 0.5726 - val\_loss: 1.1121 - val\_accuracy: 0.5326 - 115s/epoch - 326ms/step

Epoch 4/10

353/353 - 116s - loss: 1.0275 - accuracy: 0.5808 - val\_loss: 1.0663 - val\_accuracy: 0.5616 - 116s/epoch - 327ms/step

Epoch 5/10

353/353 - 115s - loss: 1.0074 - accuracy: 0.5893 - val\_loss: 1.0896 - val\_accuracy: 0.5510 - 115s/epoch - 327ms/step

Epoch 6/10

353/353 - 115s - loss: 1.0041 - accuracy: 0.5921 - val\_loss: 1.0478 - val\_accuracy: 0.5758 - 115s/epoch - 326ms/step

Epoch 7/10

353/353 - 115s - loss: 0.9878 - accuracy: 0.5971 - val\_loss: 1.0458 - val\_accuracy: 0.5737 - 115s/epoch - 326ms/step

Epoch 8/10

353/353 - 116s - loss: 0.9763 - accuracy: 0.6075 - val\_loss: 1.0485 - val\_accuracy: 0.5786 - 116s/epoch - 329ms/step

Epoch 9/10

353/353 - 116s - loss: 0.9681 - accuracy: 0.6118 - val\_loss: 1.0274 - val\_accuracy: 0.5907 - 116s/epoch - 328ms/step

Epoch 10/10

353/353 - 116s - loss: 0.9600 - accuracy: 0.6161 - val\_loss: 1.0418 - val\_accuracy: 0.5758 - 116s/epoch - 328ms/step

56/56 - 4s - loss: 1.0202 - accuracy: 0.5851 - 4s/epoch - 71ms/step

Test loss: 1.0201784372329712

Test accuracy: 0.585130512714386

56/56 [==============================] - 4s 71ms/step

Mean loss: 1.0447697401046754

Mean accuracy: 0.5722415208816528