Model: "model"

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

Layer (type) Output Shape Param # Connected to

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

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

conv2d (Conv2D) (None, 64, 321, 16) 496 ['input\_1[0][0]']

tf.math.reduce\_mean (TFOpL (None, 321, 16) 0 ['conv2d[0][0]']

ambda)

tf.math.reduce\_max (TFOpLa (None, 321, 16) 0 ['conv2d[0][0]']

mbda)

tf.expand\_dims (TFOpLambda (None, 1, 321, 16) 0 ['tf.math.reduce\_mean[0][0]']

)

tf.expand\_dims\_1 (TFOpLamb (None, 1, 321, 16) 0 ['tf.math.reduce\_max[0][0]']

da)

concatenate (Concatenate) (None, 1, 321, 32) 0 ['tf.expand\_dims[0][0]',

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

conv2d\_1 (Conv2D) (None, 1, 321, 1) 2049 ['concatenate[0][0]']

multiply (Multiply) (None, 64, 321, 16) 0 ['conv2d[0][0]',

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

depthwise\_conv2d (Depthwis (None, 1, 321, 32) 2080 ['conv2d[0][0]']

eConv2D)

conv2d\_2 (Conv2D) (None, 1, 321, 16) 16400 ['multiply[0][0]']

conv2d\_3 (Conv2D) (None, 1, 321, 16) 16400 ['conv2d[0][0]']

concatenate\_1 (Concatenate (None, 1, 321, 64) 0 ['depthwise\_conv2d[0][0]',

) 'conv2d\_2[0][0]',

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

global\_average\_pooling2d ( (None, 64) 0 ['concatenate\_1[0][0]']

GlobalAveragePooling2D)

global\_max\_pooling2d (Glob (None, 64) 0 ['concatenate\_1[0][0]']

alMaxPooling2D)

dense (Dense) (None, 8) 512 ['global\_average\_pooling2d[0][

0]',

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

dense\_1 (Dense) (None, 64) 512 ['dense[0][0]',

'dense[1][0]']

tf.\_\_operators\_\_.add (TFOp (None, 64) 0 ['dense\_1[0][0]',

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

activation (Activation) (None, 64) 0 ['tf.\_\_operators\_\_.add[0][0]']

multiply\_1 (Multiply) (None, 1, 321, 64) 0 ['concatenate\_1[0][0]',

'activation[0][0]']

reshape (Reshape) (None, 321, 64) 0 ['multiply\_1[0][0]']

lstm (LSTM) (None, 321, 40) 16800 ['reshape[0][0]']

lstm\_1 (LSTM) (None, 321, 20) 4880 ['lstm[0][0]']

lstm\_2 (LSTM) (None, 321, 4) 400 ['lstm\_1[0][0]']

flatten (Flatten) (None, 1284) 0 ['lstm\_2[0][0]']

dense\_2 (Dense) (None, 4) 5140 ['flatten[0][0]']

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Total params: 65669 (256.52 KB)

Trainable params: 65669 (256.52 KB)

Non-trainable params: 0 (0.00 Byte)

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Epoch 1/10

353/353 - 174s - loss: 1.2440 - accuracy: 0.4019 - val\_loss: 1.1987 - val\_accuracy: 0.4529 - 174s/epoch - 494ms/step

Epoch 2/10

353/353 - 167s - loss: 1.1720 - accuracy: 0.4650 - val\_loss: 1.1443 - val\_accuracy: 0.4720 - 167s/epoch - 472ms/step

Epoch 3/10

353/353 - 167s - loss: 1.1379 - accuracy: 0.5031 - val\_loss: 1.1026 - val\_accuracy: 0.5358 - 167s/epoch - 473ms/step

Epoch 4/10

353/353 - 166s - loss: 1.0936 - accuracy: 0.5444 - val\_loss: 1.1032 - val\_accuracy: 0.5216 - 166s/epoch - 471ms/step

Epoch 5/10

353/353 - 167s - loss: 1.0605 - accuracy: 0.5626 - val\_loss: 1.0490 - val\_accuracy: 0.5634 - 167s/epoch - 473ms/step

Epoch 6/10

353/353 - 166s - loss: 1.0337 - accuracy: 0.5772 - val\_loss: 1.0379 - val\_accuracy: 0.5854 - 166s/epoch - 471ms/step

Epoch 7/10

353/353 - 168s - loss: 1.0053 - accuracy: 0.5954 - val\_loss: 1.0296 - val\_accuracy: 0.5826 - 168s/epoch - 476ms/step

Epoch 8/10

353/353 - 167s - loss: 0.9839 - accuracy: 0.6034 - val\_loss: 1.0344 - val\_accuracy: 0.5911 - 167s/epoch - 474ms/step

Epoch 9/10

353/353 - 167s - loss: 0.9597 - accuracy: 0.6142 - val\_loss: 1.0346 - val\_accuracy: 0.5819 - 167s/epoch - 473ms/step

Epoch 10/10

353/353 - 167s - loss: 0.9349 - accuracy: 0.6300 - val\_loss: 1.0413 - val\_accuracy: 0.5698 - 167s/epoch - 472ms/step

56/56 - 8s - loss: 1.0135 - accuracy: 0.5839 - 8s/epoch - 135ms/step

Test loss: 1.0134801864624023

Test accuracy: 0.5839002132415771

56/56 [==============================] - 9s 137ms/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, 16) 496 ['input\_2[0][0]']

tf.math.reduce\_mean\_1 (TFO (None, 321, 16) 0 ['conv2d\_4[0][0]']

pLambda)

tf.math.reduce\_max\_1 (TFOp (None, 321, 16) 0 ['conv2d\_4[0][0]']

Lambda)

tf.expand\_dims\_2 (TFOpLamb (None, 1, 321, 16) 0 ['tf.math.reduce\_mean\_1[0][0]'

da) ]

tf.expand\_dims\_3 (TFOpLamb (None, 1, 321, 16) 0 ['tf.math.reduce\_max\_1[0][0]']

da)

concatenate\_2 (Concatenate (None, 1, 321, 32) 0 ['tf.expand\_dims\_2[0][0]',

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

conv2d\_5 (Conv2D) (None, 1, 321, 1) 2049 ['concatenate\_2[0][0]']

multiply\_2 (Multiply) (None, 64, 321, 16) 0 ['conv2d\_4[0][0]',

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

depthwise\_conv2d\_1 (Depthw (None, 1, 321, 32) 2080 ['conv2d\_4[0][0]']

iseConv2D)

conv2d\_6 (Conv2D) (None, 1, 321, 16) 16400 ['multiply\_2[0][0]']

conv2d\_7 (Conv2D) (None, 1, 321, 16) 16400 ['conv2d\_4[0][0]']

concatenate\_3 (Concatenate (None, 1, 321, 64) 0 ['depthwise\_conv2d\_1[0][0]',

) 'conv2d\_6[0][0]',

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

global\_average\_pooling2d\_1 (None, 64) 0 ['concatenate\_3[0][0]']

(GlobalAveragePooling2D)

global\_max\_pooling2d\_1 (Gl (None, 64) 0 ['concatenate\_3[0][0]']

obalMaxPooling2D)

dense\_3 (Dense) (None, 8) 512 ['global\_average\_pooling2d\_1[0

][0]',

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

']

dense\_4 (Dense) (None, 64) 512 ['dense\_3[0][0]',

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

tf.\_\_operators\_\_.add\_1 (TF (None, 64) 0 ['dense\_4[0][0]',

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

activation\_1 (Activation) (None, 64) 0 ['tf.\_\_operators\_\_.add\_1[0][0]

']

multiply\_3 (Multiply) (None, 1, 321, 64) 0 ['concatenate\_3[0][0]',

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

reshape\_1 (Reshape) (None, 321, 64) 0 ['multiply\_3[0][0]']

lstm\_3 (LSTM) (None, 321, 40) 16800 ['reshape\_1[0][0]']

lstm\_4 (LSTM) (None, 321, 20) 4880 ['lstm\_3[0][0]']

lstm\_5 (LSTM) (None, 321, 4) 400 ['lstm\_4[0][0]']

flatten\_1 (Flatten) (None, 1284) 0 ['lstm\_5[0][0]']

dense\_5 (Dense) (None, 4) 5140 ['flatten\_1[0][0]']

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Total params: 65669 (256.52 KB)

Trainable params: 65669 (256.52 KB)

Non-trainable params: 0 (0.00 Byte)

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Epoch 1/10

353/353 - 171s - loss: 1.3621 - accuracy: 0.2842 - val\_loss: 1.2308 - val\_accuracy: 0.4196 - 171s/epoch - 485ms/step

Epoch 2/10

353/353 - 165s - loss: 1.1695 - accuracy: 0.4724 - val\_loss: 1.1134 - val\_accuracy: 0.5337 - 165s/epoch - 468ms/step

Epoch 3/10

353/353 - 165s - loss: 1.0874 - accuracy: 0.5508 - val\_loss: 1.0932 - val\_accuracy: 0.5563 - 165s/epoch - 467ms/step

Epoch 4/10

353/353 - 165s - loss: 1.0475 - accuracy: 0.5763 - val\_loss: 1.0655 - val\_accuracy: 0.5670 - 165s/epoch - 467ms/step

Epoch 5/10

353/353 - 165s - loss: 1.0107 - accuracy: 0.5919 - val\_loss: 1.0513 - val\_accuracy: 0.5748 - 165s/epoch - 468ms/step

Epoch 6/10

353/353 - 165s - loss: 0.9882 - accuracy: 0.6009 - val\_loss: 1.0475 - val\_accuracy: 0.5804 - 165s/epoch - 468ms/step

Epoch 7/10

353/353 - 165s - loss: 0.9508 - accuracy: 0.6197 - val\_loss: 1.1186 - val\_accuracy: 0.5330 - 165s/epoch - 468ms/step

Epoch 8/10

353/353 - 165s - loss: 0.9280 - accuracy: 0.6282 - val\_loss: 1.0418 - val\_accuracy: 0.5783 - 165s/epoch - 468ms/step

Epoch 9/10

353/353 - 166s - loss: 0.9109 - accuracy: 0.6362 - val\_loss: 1.0403 - val\_accuracy: 0.5875 - 166s/epoch - 469ms/step

Epoch 10/10

353/353 - 165s - loss: 0.8746 - accuracy: 0.6505 - val\_loss: 1.0382 - val\_accuracy: 0.5854 - 165s/epoch - 469ms/step

56/56 - 7s - loss: 1.0816 - accuracy: 0.5556 - 7s/epoch - 131ms/step

Test loss: 1.0816400051116943

Test accuracy: 0.5555555820465088

56/56 [==============================] - 8s 134ms/step

Model: "model\_2"

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

Layer (type) Output Shape Param # Connected to

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

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

conv2d\_8 (Conv2D) (None, 64, 321, 16) 496 ['input\_3[0][0]']

tf.math.reduce\_mean\_2 (TFO (None, 321, 16) 0 ['conv2d\_8[0][0]']

pLambda)

tf.math.reduce\_max\_2 (TFOp (None, 321, 16) 0 ['conv2d\_8[0][0]']

Lambda)

tf.expand\_dims\_4 (TFOpLamb (None, 1, 321, 16) 0 ['tf.math.reduce\_mean\_2[0][0]'

da) ]

tf.expand\_dims\_5 (TFOpLamb (None, 1, 321, 16) 0 ['tf.math.reduce\_max\_2[0][0]']

da)

concatenate\_4 (Concatenate (None, 1, 321, 32) 0 ['tf.expand\_dims\_4[0][0]',

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

conv2d\_9 (Conv2D) (None, 1, 321, 1) 2049 ['concatenate\_4[0][0]']

multiply\_4 (Multiply) (None, 64, 321, 16) 0 ['conv2d\_8[0][0]',

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

depthwise\_conv2d\_2 (Depthw (None, 1, 321, 32) 2080 ['conv2d\_8[0][0]']

iseConv2D)

conv2d\_10 (Conv2D) (None, 1, 321, 16) 16400 ['multiply\_4[0][0]']

conv2d\_11 (Conv2D) (None, 1, 321, 16) 16400 ['conv2d\_8[0][0]']

concatenate\_5 (Concatenate (None, 1, 321, 64) 0 ['depthwise\_conv2d\_2[0][0]',

) 'conv2d\_10[0][0]',

'conv2d\_11[0][0]']

global\_average\_pooling2d\_2 (None, 64) 0 ['concatenate\_5[0][0]']

(GlobalAveragePooling2D)

global\_max\_pooling2d\_2 (Gl (None, 64) 0 ['concatenate\_5[0][0]']

obalMaxPooling2D)

dense\_6 (Dense) (None, 8) 512 ['global\_average\_pooling2d\_2[0

][0]',

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

']

dense\_7 (Dense) (None, 64) 512 ['dense\_6[0][0]',

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

tf.\_\_operators\_\_.add\_2 (TF (None, 64) 0 ['dense\_7[0][0]',

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

activation\_2 (Activation) (None, 64) 0 ['tf.\_\_operators\_\_.add\_2[0][0]

']

multiply\_5 (Multiply) (None, 1, 321, 64) 0 ['concatenate\_5[0][0]',

'activation\_2[0][0]']

reshape\_2 (Reshape) (None, 321, 64) 0 ['multiply\_5[0][0]']

lstm\_6 (LSTM) (None, 321, 40) 16800 ['reshape\_2[0][0]']

lstm\_7 (LSTM) (None, 321, 20) 4880 ['lstm\_6[0][0]']

lstm\_8 (LSTM) (None, 321, 4) 400 ['lstm\_7[0][0]']

flatten\_2 (Flatten) (None, 1284) 0 ['lstm\_8[0][0]']

dense\_8 (Dense) (None, 4) 5140 ['flatten\_2[0][0]']

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Total params: 65669 (256.52 KB)

Trainable params: 65669 (256.52 KB)

Non-trainable params: 0 (0.00 Byte)

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Epoch 1/10

353/353 - 171s - loss: 1.3876 - accuracy: 0.2522 - val\_loss: 1.3871 - val\_accuracy: 0.2303 - 171s/epoch - 485ms/step

Epoch 2/10

353/353 - 165s - loss: 1.3036 - accuracy: 0.3679 - val\_loss: 1.2097 - val\_accuracy: 0.4231 - 165s/epoch - 466ms/step

Epoch 3/10

353/353 - 164s - loss: 1.1739 - accuracy: 0.4620 - val\_loss: 1.1525 - val\_accuracy: 0.4819 - 164s/epoch - 465ms/step

Epoch 4/10

353/353 - 165s - loss: 1.1230 - accuracy: 0.5120 - val\_loss: 1.1487 - val\_accuracy: 0.5089 - 165s/epoch - 466ms/step

Epoch 5/10

353/353 - 165s - loss: 1.0697 - accuracy: 0.5515 - val\_loss: 1.0589 - val\_accuracy: 0.5762 - 165s/epoch - 467ms/step

Epoch 6/10

353/353 - 164s - loss: 1.0370 - accuracy: 0.5774 - val\_loss: 1.0566 - val\_accuracy: 0.5705 - 164s/epoch - 466ms/step

Epoch 7/10

353/353 - 165s - loss: 1.0055 - accuracy: 0.5960 - val\_loss: 1.0513 - val\_accuracy: 0.5776 - 165s/epoch - 468ms/step

Epoch 8/10

353/353 - 165s - loss: 0.9874 - accuracy: 0.6046 - val\_loss: 1.0468 - val\_accuracy: 0.5670 - 165s/epoch - 468ms/step

Epoch 9/10

353/353 - 165s - loss: 0.9580 - accuracy: 0.6117 - val\_loss: 1.0839 - val\_accuracy: 0.5528 - 165s/epoch - 466ms/step

Epoch 10/10

353/353 - 165s - loss: 0.9353 - accuracy: 0.6250 - val\_loss: 1.0575 - val\_accuracy: 0.5627 - 165s/epoch - 467ms/step

56/56 - 7s - loss: 0.9789 - accuracy: 0.6049 - 7s/epoch - 131ms/step

Test loss: 0.9788646697998047

Test accuracy: 0.6048752665519714

56/56 [==============================] - 8s 130ms/step

Model: "model\_3"

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

Layer (type) Output Shape Param # Connected to

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

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

conv2d\_12 (Conv2D) (None, 64, 321, 16) 496 ['input\_4[0][0]']

tf.math.reduce\_mean\_3 (TFO (None, 321, 16) 0 ['conv2d\_12[0][0]']

pLambda)

tf.math.reduce\_max\_3 (TFOp (None, 321, 16) 0 ['conv2d\_12[0][0]']

Lambda)

tf.expand\_dims\_6 (TFOpLamb (None, 1, 321, 16) 0 ['tf.math.reduce\_mean\_3[0][0]'

da) ]

tf.expand\_dims\_7 (TFOpLamb (None, 1, 321, 16) 0 ['tf.math.reduce\_max\_3[0][0]']

da)

concatenate\_6 (Concatenate (None, 1, 321, 32) 0 ['tf.expand\_dims\_6[0][0]',

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

conv2d\_13 (Conv2D) (None, 1, 321, 1) 2049 ['concatenate\_6[0][0]']

multiply\_6 (Multiply) (None, 64, 321, 16) 0 ['conv2d\_12[0][0]',

'conv2d\_13[0][0]']

depthwise\_conv2d\_3 (Depthw (None, 1, 321, 32) 2080 ['conv2d\_12[0][0]']

iseConv2D)

conv2d\_14 (Conv2D) (None, 1, 321, 16) 16400 ['multiply\_6[0][0]']

conv2d\_15 (Conv2D) (None, 1, 321, 16) 16400 ['conv2d\_12[0][0]']

concatenate\_7 (Concatenate (None, 1, 321, 64) 0 ['depthwise\_conv2d\_3[0][0]',

) 'conv2d\_14[0][0]',

'conv2d\_15[0][0]']

global\_average\_pooling2d\_3 (None, 64) 0 ['concatenate\_7[0][0]']

(GlobalAveragePooling2D)

global\_max\_pooling2d\_3 (Gl (None, 64) 0 ['concatenate\_7[0][0]']

obalMaxPooling2D)

dense\_9 (Dense) (None, 8) 512 ['global\_average\_pooling2d\_3[0

][0]',

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

']

dense\_10 (Dense) (None, 64) 512 ['dense\_9[0][0]',

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

tf.\_\_operators\_\_.add\_3 (TF (None, 64) 0 ['dense\_10[0][0]',

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

activation\_3 (Activation) (None, 64) 0 ['tf.\_\_operators\_\_.add\_3[0][0]

']

multiply\_7 (Multiply) (None, 1, 321, 64) 0 ['concatenate\_7[0][0]',

'activation\_3[0][0]']

reshape\_3 (Reshape) (None, 321, 64) 0 ['multiply\_7[0][0]']

lstm\_9 (LSTM) (None, 321, 40) 16800 ['reshape\_3[0][0]']

lstm\_10 (LSTM) (None, 321, 20) 4880 ['lstm\_9[0][0]']

lstm\_11 (LSTM) (None, 321, 4) 400 ['lstm\_10[0][0]']

flatten\_3 (Flatten) (None, 1284) 0 ['lstm\_11[0][0]']

dense\_11 (Dense) (None, 4) 5140 ['flatten\_3[0][0]']

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Total params: 65669 (256.52 KB)

Trainable params: 65669 (256.52 KB)

Non-trainable params: 0 (0.00 Byte)

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Epoch 1/10

353/353 - 172s - loss: 1.2092 - accuracy: 0.4322 - val\_loss: 1.1854 - val\_accuracy: 0.4855 - 172s/epoch - 486ms/step

Epoch 2/10

353/353 - 164s - loss: 1.0944 - accuracy: 0.5416 - val\_loss: 1.0981 - val\_accuracy: 0.5549 - 164s/epoch - 466ms/step

Epoch 3/10

353/353 - 165s - loss: 1.0558 - accuracy: 0.5653 - val\_loss: 1.0828 - val\_accuracy: 0.5542 - 165s/epoch - 467ms/step

Epoch 4/10

353/353 - 164s - loss: 1.0273 - accuracy: 0.5813 - val\_loss: 1.0660 - val\_accuracy: 0.5549 - 164s/epoch - 466ms/step

Epoch 5/10

353/353 - 165s - loss: 1.0043 - accuracy: 0.5857 - val\_loss: 1.0743 - val\_accuracy: 0.5656 - 165s/epoch - 466ms/step

Epoch 6/10

353/353 - 164s - loss: 0.9770 - accuracy: 0.6046 - val\_loss: 1.0446 - val\_accuracy: 0.5719 - 164s/epoch - 466ms/step

Epoch 7/10

353/353 - 164s - loss: 0.9594 - accuracy: 0.6178 - val\_loss: 1.0819 - val\_accuracy: 0.5585 - 164s/epoch - 466ms/step

Epoch 8/10

353/353 - 164s - loss: 0.9389 - accuracy: 0.6220 - val\_loss: 1.0615 - val\_accuracy: 0.5755 - 164s/epoch - 465ms/step

Epoch 9/10

353/353 - 165s - loss: 0.9179 - accuracy: 0.6371 - val\_loss: 1.0843 - val\_accuracy: 0.5599 - 165s/epoch - 467ms/step

Epoch 10/10

353/353 - 165s - loss: 0.8890 - accuracy: 0.6415 - val\_loss: 1.0418 - val\_accuracy: 0.5776 - 165s/epoch - 469ms/step

56/56 - 7s - loss: 1.2066 - accuracy: 0.5170 - 7s/epoch - 130ms/step

Test loss: 1.206575632095337

Test accuracy: 0.5170068144798279

56/56 [==============================] - 8s 130ms/step

Model: "model\_4"

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Layer (type) Output Shape Param # Connected to

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

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

conv2d\_16 (Conv2D) (None, 64, 321, 16) 496 ['input\_5[0][0]']

tf.math.reduce\_mean\_4 (TFO (None, 321, 16) 0 ['conv2d\_16[0][0]']

pLambda)

tf.math.reduce\_max\_4 (TFOp (None, 321, 16) 0 ['conv2d\_16[0][0]']

Lambda)

tf.expand\_dims\_8 (TFOpLamb (None, 1, 321, 16) 0 ['tf.math.reduce\_mean\_4[0][0]'

da) ]

tf.expand\_dims\_9 (TFOpLamb (None, 1, 321, 16) 0 ['tf.math.reduce\_max\_4[0][0]']

da)

concatenate\_8 (Concatenate (None, 1, 321, 32) 0 ['tf.expand\_dims\_8[0][0]',

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

conv2d\_17 (Conv2D) (None, 1, 321, 1) 2049 ['concatenate\_8[0][0]']

multiply\_8 (Multiply) (None, 64, 321, 16) 0 ['conv2d\_16[0][0]',

'conv2d\_17[0][0]']

depthwise\_conv2d\_4 (Depthw (None, 1, 321, 32) 2080 ['conv2d\_16[0][0]']

iseConv2D)

conv2d\_18 (Conv2D) (None, 1, 321, 16) 16400 ['multiply\_8[0][0]']

conv2d\_19 (Conv2D) (None, 1, 321, 16) 16400 ['conv2d\_16[0][0]']

concatenate\_9 (Concatenate (None, 1, 321, 64) 0 ['depthwise\_conv2d\_4[0][0]',

) 'conv2d\_18[0][0]',

'conv2d\_19[0][0]']

global\_average\_pooling2d\_4 (None, 64) 0 ['concatenate\_9[0][0]']

(GlobalAveragePooling2D)

global\_max\_pooling2d\_4 (Gl (None, 64) 0 ['concatenate\_9[0][0]']

obalMaxPooling2D)

dense\_12 (Dense) (None, 8) 512 ['global\_average\_pooling2d\_4[0

][0]',

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

']

dense\_13 (Dense) (None, 64) 512 ['dense\_12[0][0]',

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

tf.\_\_operators\_\_.add\_4 (TF (None, 64) 0 ['dense\_13[0][0]',

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

activation\_4 (Activation) (None, 64) 0 ['tf.\_\_operators\_\_.add\_4[0][0]

']

multiply\_9 (Multiply) (None, 1, 321, 64) 0 ['concatenate\_9[0][0]',

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

reshape\_4 (Reshape) (None, 321, 64) 0 ['multiply\_9[0][0]']

lstm\_12 (LSTM) (None, 321, 40) 16800 ['reshape\_4[0][0]']

lstm\_13 (LSTM) (None, 321, 20) 4880 ['lstm\_12[0][0]']

lstm\_14 (LSTM) (None, 321, 4) 400 ['lstm\_13[0][0]']

flatten\_4 (Flatten) (None, 1284) 0 ['lstm\_14[0][0]']

dense\_14 (Dense) (None, 4) 5140 ['flatten\_4[0][0]']

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

Total params: 65669 (256.52 KB)

Trainable params: 65669 (256.52 KB)

Non-trainable params: 0 (0.00 Byte)

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Epoch 1/10

353/353 - 170s - loss: 1.3509 - accuracy: 0.3180 - val\_loss: 1.2577 - val\_accuracy: 0.4016 - 170s/epoch - 482ms/step

Epoch 2/10

353/353 - 165s - loss: 1.1556 - accuracy: 0.4961 - val\_loss: 1.1252 - val\_accuracy: 0.5382 - 165s/epoch - 467ms/step

Epoch 3/10

353/353 - 164s - loss: 1.0919 - accuracy: 0.5507 - val\_loss: 1.1150 - val\_accuracy: 0.5305 - 164s/epoch - 465ms/step

Epoch 4/10

353/353 - 165s - loss: 1.0640 - accuracy: 0.5604 - val\_loss: 1.0706 - val\_accuracy: 0.5616 - 165s/epoch - 468ms/step

Epoch 5/10

353/353 - 165s - loss: 1.0435 - accuracy: 0.5719 - val\_loss: 1.0862 - val\_accuracy: 0.5602 - 165s/epoch - 466ms/step

Epoch 6/10

353/353 - 165s - loss: 1.0307 - accuracy: 0.5764 - val\_loss: 1.0841 - val\_accuracy: 0.5524 - 165s/epoch - 467ms/step

Epoch 7/10

353/353 - 165s - loss: 1.0100 - accuracy: 0.5895 - val\_loss: 1.0496 - val\_accuracy: 0.5786 - 165s/epoch - 468ms/step

Epoch 8/10

353/353 - 165s - loss: 0.9879 - accuracy: 0.5960 - val\_loss: 1.0570 - val\_accuracy: 0.5630 - 165s/epoch - 467ms/step

Epoch 9/10

353/353 - 165s - loss: 0.9681 - accuracy: 0.6068 - val\_loss: 1.0621 - val\_accuracy: 0.5722 - 165s/epoch - 466ms/step

Epoch 10/10

353/353 - 165s - loss: 0.9566 - accuracy: 0.6114 - val\_loss: 1.0542 - val\_accuracy: 0.5715 - 165s/epoch - 467ms/step

56/56 - 7s - loss: 1.0504 - accuracy: 0.5806 - 7s/epoch - 129ms/step

Test loss: 1.050394892692566

Test accuracy: 0.5805902481079102

56/56 [==============================] - 8s 129ms/step

Mean loss: 1.0661910772323608

Mean accuracy: 0.5683856248855591