###Model 2

metrics = [sm.metrics.IOUScore(threshold=0.5), sm.metrics.FScore(threshold=0.5)]

#Reused parameters in all models

n\_classes=1

activation='sigmoid'

LR = 0.0001

optim = tf.keras.optimizers.Adam(LR)

BACKBONE2 = 'inceptionv3'

preprocess\_input2 = sm.get\_preprocessing(BACKBONE2)

# preprocess input

X\_train2 = preprocess\_input2(X1)

X\_test2 = preprocess\_input2(X\_test)

# define model

model2 = sm.Unet(BACKBONE2, encoder\_weights='imagenet', classes=n\_classes, activation=activation)

# compile keras model with defined optimozer, loss and metrics

model2.compile(optim, loss='binary\_crossentropy', metrics=metrics)

#model2.compile(optimizer='adam', loss='categorical\_crossentropy', metrics=metrics)

Model Summary

Downloading data from<https://github.com/fchollet/deep-learning-models/releases/download/v0.5/inception_v3_weights_tf_dim_ordering_tf_kernels_notop.h5>

87916544/87910968 [==============================] - 1s 0us/step

87924736/87910968 [==============================] - 1s 0us/step

Model: "model\_2"

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

Layer (type) Output Shape Param # Connected to

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

input\_1 (InputLayer) [(None, None, None, 0 []

3)]

conv2d (Conv2D) (None, None, None, 864 ['input\_1[0][0]']

32)

batch\_normalization (BatchNorm (None, None, None, 96 ['conv2d[0][0]']

alization) 32)

activation (Activation) (None, None, None, 0 ['batch\_normalization[0][0]']

32)

conv2d\_1 (Conv2D) (None, None, None, 9216 ['activation[0][0]']

32)

batch\_normalization\_1 (BatchNo (None, None, None, 96 ['conv2d\_1[0][0]']

rmalization) 32)

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

32)

conv2d\_2 (Conv2D) (None, None, None, 18432 ['activation\_1[0][0]']

64)

batch\_normalization\_2 (BatchNo (None, None, None, 192 ['conv2d\_2[0][0]']

rmalization) 64)

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

64)

max\_pooling2d (MaxPooling2D) (None, None, None, 0 ['activation\_2[0][0]']

64)

conv2d\_3 (Conv2D) (None, None, None, 5120 ['max\_pooling2d[0][0]']

80)

batch\_normalization\_3 (BatchNo (None, None, None, 240 ['conv2d\_3[0][0]']

rmalization) 80)

activation\_3 (Activation) (None, None, None, 0 ['batch\_normalization\_3[0][0]']

80)

conv2d\_4 (Conv2D) (None, None, None, 138240 ['activation\_3[0][0]']

192)

batch\_normalization\_4 (BatchNo (None, None, None, 576 ['conv2d\_4[0][0]']

rmalization) 192)

activation\_4 (Activation) (None, None, None, 0 ['batch\_normalization\_4[0][0]']

192)

max\_pooling2d\_1 (MaxPooling2D) (None, None, None, 0 ['activation\_4[0][0]']

192)

conv2d\_8 (Conv2D) (None, None, None, 12288 ['max\_pooling2d\_1[0][0]']

64)

batch\_normalization\_8 (BatchNo (None, None, None, 192 ['conv2d\_8[0][0]']

rmalization) 64)

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

64)

conv2d\_6 (Conv2D) (None, None, None, 9216 ['max\_pooling2d\_1[0][0]']

48)

conv2d\_9 (Conv2D) (None, None, None, 55296 ['activation\_8[0][0]']

96)

batch\_normalization\_6 (BatchNo (None, None, None, 144 ['conv2d\_6[0][0]']

rmalization) 48)

batch\_normalization\_9 (BatchNo (None, None, None, 288 ['conv2d\_9[0][0]']

rmalization) 96)

activation\_6 (Activation) (None, None, None, 0 ['batch\_normalization\_6[0][0]']

48)

activation\_9 (Activation) (None, None, None, 0 ['batch\_normalization\_9[0][0]']

96)

average\_pooling2d (AveragePool (None, None, None, 0 ['max\_pooling2d\_1[0][0]']

ing2D) 192)

conv2d\_5 (Conv2D) (None, None, None, 12288 ['max\_pooling2d\_1[0][0]']

64)

conv2d\_7 (Conv2D) (None, None, None, 76800 ['activation\_6[0][0]']

64)

conv2d\_10 (Conv2D) (None, None, None, 82944 ['activation\_9[0][0]']

96)

conv2d\_11 (Conv2D) (None, None, None, 6144 ['average\_pooling2d[0][0]']

32)

batch\_normalization\_5 (BatchNo (None, None, None, 192 ['conv2d\_5[0][0]']

rmalization) 64)

batch\_normalization\_7 (BatchNo (None, None, None, 192 ['conv2d\_7[0][0]']

rmalization) 64)

batch\_normalization\_10 (BatchN (None, None, None, 288 ['conv2d\_10[0][0]']

ormalization) 96)

batch\_normalization\_11 (BatchN (None, None, None, 96 ['conv2d\_11[0][0]']

ormalization) 32)

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

64)

activation\_7 (Activation) (None, None, None, 0 ['batch\_normalization\_7[0][0]']

64)

activation\_10 (Activation) (None, None, None, 0 ['batch\_normalization\_10[0][0]']

96)

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

32)

mixed0 (Concatenate) (None, None, None, 0 ['activation\_5[0][0]',

256) 'activation\_7[0][0]',

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

'activation\_11[0][0]']

conv2d\_15 (Conv2D) (None, None, None, 16384 ['mixed0[0][0]']

64)

batch\_normalization\_15 (BatchN (None, None, None, 192 ['conv2d\_15[0][0]']

ormalization) 64)

activation\_15 (Activation) (None, None, None, 0 ['batch\_normalization\_15[0][0]']

64)

conv2d\_13 (Conv2D) (None, None, None, 12288 ['mixed0[0][0]']

48)

conv2d\_16 (Conv2D) (None, None, None, 55296 ['activation\_15[0][0]']

96)

batch\_normalization\_13 (BatchN (None, None, None, 144 ['conv2d\_13[0][0]']

ormalization) 48)

batch\_normalization\_16 (BatchN (None, None, None, 288 ['conv2d\_16[0][0]']

ormalization) 96)

activation\_13 (Activation) (None, None, None, 0 ['batch\_normalization\_13[0][0]']

48)

activation\_16 (Activation) (None, None, None, 0 ['batch\_normalization\_16[0][0]']

96)

average\_pooling2d\_1 (AveragePo (None, None, None, 0 ['mixed0[0][0]']

oling2D) 256)

conv2d\_12 (Conv2D) (None, None, None, 16384 ['mixed0[0][0]']

64)

conv2d\_14 (Conv2D) (None, None, None, 76800 ['activation\_13[0][0]']

64)

conv2d\_17 (Conv2D) (None, None, None, 82944 ['activation\_16[0][0]']

96)

conv2d\_18 (Conv2D) (None, None, None, 16384 ['average\_pooling2d\_1[0][0]']

64)

batch\_normalization\_12 (BatchN (None, None, None, 192 ['conv2d\_12[0][0]']

ormalization) 64)

batch\_normalization\_14 (BatchN (None, None, None, 192 ['conv2d\_14[0][0]']

ormalization) 64)

batch\_normalization\_17 (BatchN (None, None, None, 288 ['conv2d\_17[0][0]']

ormalization) 96)

batch\_normalization\_18 (BatchN (None, None, None, 192 ['conv2d\_18[0][0]']

ormalization) 64)

activation\_12 (Activation) (None, None, None, 0 ['batch\_normalization\_12[0][0]']

64)

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

64)

activation\_17 (Activation) (None, None, None, 0 ['batch\_normalization\_17[0][0]']

96)

activation\_18 (Activation) (None, None, None, 0 ['batch\_normalization\_18[0][0]']

64)

mixed1 (Concatenate) (None, None, None, 0 ['activation\_12[0][0]',

288) 'activation\_14[0][0]',

'activation\_17[0][0]',

'activation\_18[0][0]']

conv2d\_22 (Conv2D) (None, None, None, 18432 ['mixed1[0][0]']

64)

batch\_normalization\_22 (BatchN (None, None, None, 192 ['conv2d\_22[0][0]']

ormalization) 64)

activation\_22 (Activation) (None, None, None, 0 ['batch\_normalization\_22[0][0]']

64)

conv2d\_20 (Conv2D) (None, None, None, 13824 ['mixed1[0][0]']

48)

conv2d\_23 (Conv2D) (None, None, None, 55296 ['activation\_22[0][0]']

96)

batch\_normalization\_20 (BatchN (None, None, None, 144 ['conv2d\_20[0][0]']

ormalization) 48)

batch\_normalization\_23 (BatchN (None, None, None, 288 ['conv2d\_23[0][0]']

ormalization) 96)

activation\_20 (Activation) (None, None, None, 0 ['batch\_normalization\_20[0][0]']

48)

activation\_23 (Activation) (None, None, None, 0 ['batch\_normalization\_23[0][0]']

96)

average\_pooling2d\_2 (AveragePo (None, None, None, 0 ['mixed1[0][0]']

oling2D) 288)

conv2d\_19 (Conv2D) (None, None, None, 18432 ['mixed1[0][0]']

64)

conv2d\_21 (Conv2D) (None, None, None, 76800 ['activation\_20[0][0]']

64)

conv2d\_24 (Conv2D) (None, None, None, 82944 ['activation\_23[0][0]']

96)

conv2d\_25 (Conv2D) (None, None, None, 18432 ['average\_pooling2d\_2[0][0]']

64)

batch\_normalization\_19 (BatchN (None, None, None, 192 ['conv2d\_19[0][0]']

ormalization) 64)

batch\_normalization\_21 (BatchN (None, None, None, 192 ['conv2d\_21[0][0]']

ormalization) 64)

batch\_normalization\_24 (BatchN (None, None, None, 288 ['conv2d\_24[0][0]']

ormalization) 96)

batch\_normalization\_25 (BatchN (None, None, None, 192 ['conv2d\_25[0][0]']

ormalization) 64)

activation\_19 (Activation) (None, None, None, 0 ['batch\_normalization\_19[0][0]']

64)

activation\_21 (Activation) (None, None, None, 0 ['batch\_normalization\_21[0][0]']

64)

activation\_24 (Activation) (None, None, None, 0 ['batch\_normalization\_24[0][0]']

96)

activation\_25 (Activation) (None, None, None, 0 ['batch\_normalization\_25[0][0]']

64)

mixed2 (Concatenate) (None, None, None, 0 ['activation\_19[0][0]',

288) 'activation\_21[0][0]',

'activation\_24[0][0]',

'activation\_25[0][0]']

conv2d\_27 (Conv2D) (None, None, None, 18432 ['mixed2[0][0]']

64)

batch\_normalization\_27 (BatchN (None, None, None, 192 ['conv2d\_27[0][0]']

ormalization) 64)

activation\_27 (Activation) (None, None, None, 0 ['batch\_normalization\_27[0][0]']

64)

conv2d\_28 (Conv2D) (None, None, None, 55296 ['activation\_27[0][0]']

96)

batch\_normalization\_28 (BatchN (None, None, None, 288 ['conv2d\_28[0][0]']

ormalization) 96)

activation\_28 (Activation) (None, None, None, 0 ['batch\_normalization\_28[0][0]']

96)

conv2d\_26 (Conv2D) (None, None, None, 995328 ['mixed2[0][0]']

384)

conv2d\_29 (Conv2D) (None, None, None, 82944 ['activation\_28[0][0]']

96)

batch\_normalization\_26 (BatchN (None, None, None, 1152 ['conv2d\_26[0][0]']

ormalization) 384)

batch\_normalization\_29 (BatchN (None, None, None, 288 ['conv2d\_29[0][0]']

ormalization) 96)

activation\_26 (Activation) (None, None, None, 0 ['batch\_normalization\_26[0][0]']

384)

activation\_29 (Activation) (None, None, None, 0 ['batch\_normalization\_29[0][0]']

96)

max\_pooling2d\_2 (MaxPooling2D) (None, None, None, 0 ['mixed2[0][0]']

288)

mixed3 (Concatenate) (None, None, None, 0 ['activation\_26[0][0]',

768) 'activation\_29[0][0]',

'max\_pooling2d\_2[0][0]']

conv2d\_34 (Conv2D) (None, None, None, 98304 ['mixed3[0][0]']

128)

batch\_normalization\_34 (BatchN (None, None, None, 384 ['conv2d\_34[0][0]']

ormalization) 128)

activation\_34 (Activation) (None, None, None, 0 ['batch\_normalization\_34[0][0]']

128)

conv2d\_35 (Conv2D) (None, None, None, 114688 ['activation\_34[0][0]']

128)

batch\_normalization\_35 (BatchN (None, None, None, 384 ['conv2d\_35[0][0]']

ormalization) 128)

activation\_35 (Activation) (None, None, None, 0 ['batch\_normalization\_35[0][0]']

128)

conv2d\_31 (Conv2D) (None, None, None, 98304 ['mixed3[0][0]']

128)

conv2d\_36 (Conv2D) (None, None, None, 114688 ['activation\_35[0][0]']

128)

batch\_normalization\_31 (BatchN (None, None, None, 384 ['conv2d\_31[0][0]']

ormalization) 128)

batch\_normalization\_36 (BatchN (None, None, None, 384 ['conv2d\_36[0][0]']

ormalization) 128)

activation\_31 (Activation) (None, None, None, 0 ['batch\_normalization\_31[0][0]']

128)

activation\_36 (Activation) (None, None, None, 0 ['batch\_normalization\_36[0][0]']

128)

conv2d\_32 (Conv2D) (None, None, None, 114688 ['activation\_31[0][0]']

128)

conv2d\_37 (Conv2D) (None, None, None, 114688 ['activation\_36[0][0]']

128)

batch\_normalization\_32 (BatchN (None, None, None, 384 ['conv2d\_32[0][0]']

ormalization) 128)

batch\_normalization\_37 (BatchN (None, None, None, 384 ['conv2d\_37[0][0]']

ormalization) 128)

activation\_32 (Activation) (None, None, None, 0 ['batch\_normalization\_32[0][0]']

128)

activation\_37 (Activation) (None, None, None, 0 ['batch\_normalization\_37[0][0]']

128)

average\_pooling2d\_3 (AveragePo (None, None, None, 0 ['mixed3[0][0]']

oling2D) 768)

conv2d\_30 (Conv2D) (None, None, None, 147456 ['mixed3[0][0]']

192)

conv2d\_33 (Conv2D) (None, None, None, 172032 ['activation\_32[0][0]']

192)

conv2d\_38 (Conv2D) (None, None, None, 172032 ['activation\_37[0][0]']

192)

conv2d\_39 (Conv2D) (None, None, None, 147456 ['average\_pooling2d\_3[0][0]']

192)

batch\_normalization\_30 (BatchN (None, None, None, 576 ['conv2d\_30[0][0]']

ormalization) 192)

batch\_normalization\_33 (BatchN (None, None, None, 576 ['conv2d\_33[0][0]']

ormalization) 192)

batch\_normalization\_38 (BatchN (None, None, None, 576 ['conv2d\_38[0][0]']

ormalization) 192)

batch\_normalization\_39 (BatchN (None, None, None, 576 ['conv2d\_39[0][0]']

ormalization) 192)

activation\_30 (Activation) (None, None, None, 0 ['batch\_normalization\_30[0][0]']

192)

activation\_33 (Activation) (None, None, None, 0 ['batch\_normalization\_33[0][0]']

192)

activation\_38 (Activation) (None, None, None, 0 ['batch\_normalization\_38[0][0]']

192)

activation\_39 (Activation) (None, None, None, 0 ['batch\_normalization\_39[0][0]']

192)

mixed4 (Concatenate) (None, None, None, 0 ['activation\_30[0][0]',

768) 'activation\_33[0][0]',

'activation\_38[0][0]',

'activation\_39[0][0]']

conv2d\_44 (Conv2D) (None, None, None, 122880 ['mixed4[0][0]']

160)

batch\_normalization\_44 (BatchN (None, None, None, 480 ['conv2d\_44[0][0]']

ormalization) 160)

activation\_44 (Activation) (None, None, None, 0 ['batch\_normalization\_44[0][0]']

160)

conv2d\_45 (Conv2D) (None, None, None, 179200 ['activation\_44[0][0]']

160)

batch\_normalization\_45 (BatchN (None, None, None, 480 ['conv2d\_45[0][0]']

ormalization) 160)

activation\_45 (Activation) (None, None, None, 0 ['batch\_normalization\_45[0][0]']

160)

conv2d\_41 (Conv2D) (None, None, None, 122880 ['mixed4[0][0]']

160)

conv2d\_46 (Conv2D) (None, None, None, 179200 ['activation\_45[0][0]']

160)

batch\_normalization\_41 (BatchN (None, None, None, 480 ['conv2d\_41[0][0]']

ormalization) 160)

batch\_normalization\_46 (BatchN (None, None, None, 480 ['conv2d\_46[0][0]']

ormalization) 160)

activation\_41 (Activation) (None, None, None, 0 ['batch\_normalization\_41[0][0]']

160)

activation\_46 (Activation) (None, None, None, 0 ['batch\_normalization\_46[0][0]']

160)

conv2d\_42 (Conv2D) (None, None, None, 179200 ['activation\_41[0][0]']

160)

conv2d\_47 (Conv2D) (None, None, None, 179200 ['activation\_46[0][0]']

160)

batch\_normalization\_42 (BatchN (None, None, None, 480 ['conv2d\_42[0][0]']

ormalization) 160)

batch\_normalization\_47 (BatchN (None, None, None, 480 ['conv2d\_47[0][0]']

ormalization) 160)

activation\_42 (Activation) (None, None, None, 0 ['batch\_normalization\_42[0][0]']

160)

activation\_47 (Activation) (None, None, None, 0 ['batch\_normalization\_47[0][0]']

160)

average\_pooling2d\_4 (AveragePo (None, None, None, 0 ['mixed4[0][0]']

oling2D) 768)

conv2d\_40 (Conv2D) (None, None, None, 147456 ['mixed4[0][0]']

192)

conv2d\_43 (Conv2D) (None, None, None, 215040 ['activation\_42[0][0]']

192)

conv2d\_48 (Conv2D) (None, None, None, 215040 ['activation\_47[0][0]']

192)

conv2d\_49 (Conv2D) (None, None, None, 147456 ['average\_pooling2d\_4[0][0]']

192)

batch\_normalization\_40 (BatchN (None, None, None, 576 ['conv2d\_40[0][0]']

ormalization) 192)

batch\_normalization\_43 (BatchN (None, None, None, 576 ['conv2d\_43[0][0]']

ormalization) 192)

batch\_normalization\_48 (BatchN (None, None, None, 576 ['conv2d\_48[0][0]']

ormalization) 192)

batch\_normalization\_49 (BatchN (None, None, None, 576 ['conv2d\_49[0][0]']

ormalization) 192)

activation\_40 (Activation) (None, None, None, 0 ['batch\_normalization\_40[0][0]']

192)

activation\_43 (Activation) (None, None, None, 0 ['batch\_normalization\_43[0][0]']

192)

activation\_48 (Activation) (None, None, None, 0 ['batch\_normalization\_48[0][0]']

192)

activation\_49 (Activation) (None, None, None, 0 ['batch\_normalization\_49[0][0]']

192)

mixed5 (Concatenate) (None, None, None, 0 ['activation\_40[0][0]',

768) 'activation\_43[0][0]',

'activation\_48[0][0]',

'activation\_49[0][0]']

conv2d\_54 (Conv2D) (None, None, None, 122880 ['mixed5[0][0]']

160)

batch\_normalization\_54 (BatchN (None, None, None, 480 ['conv2d\_54[0][0]']

ormalization) 160)

activation\_54 (Activation) (None, None, None, 0 ['batch\_normalization\_54[0][0]']

160)

conv2d\_55 (Conv2D) (None, None, None, 179200 ['activation\_54[0][0]']

160)

batch\_normalization\_55 (BatchN (None, None, None, 480 ['conv2d\_55[0][0]']

ormalization) 160)

activation\_55 (Activation) (None, None, None, 0 ['batch\_normalization\_55[0][0]']

160)

conv2d\_51 (Conv2D) (None, None, None, 122880 ['mixed5[0][0]']

160)

conv2d\_56 (Conv2D) (None, None, None, 179200 ['activation\_55[0][0]']

160)

batch\_normalization\_51 (BatchN (None, None, None, 480 ['conv2d\_51[0][0]']

ormalization) 160)

batch\_normalization\_56 (BatchN (None, None, None, 480 ['conv2d\_56[0][0]']

ormalization) 160)

activation\_51 (Activation) (None, None, None, 0 ['batch\_normalization\_51[0][0]']

160)

activation\_56 (Activation) (None, None, None, 0 ['batch\_normalization\_56[0][0]']

160)

conv2d\_52 (Conv2D) (None, None, None, 179200 ['activation\_51[0][0]']

160)

conv2d\_57 (Conv2D) (None, None, None, 179200 ['activation\_56[0][0]']

160)

batch\_normalization\_52 (BatchN (None, None, None, 480 ['conv2d\_52[0][0]']

ormalization) 160)

batch\_normalization\_57 (BatchN (None, None, None, 480 ['conv2d\_57[0][0]']

ormalization) 160)

activation\_52 (Activation) (None, None, None, 0 ['batch\_normalization\_52[0][0]']

160)

activation\_57 (Activation) (None, None, None, 0 ['batch\_normalization\_57[0][0]']

160)

average\_pooling2d\_5 (AveragePo (None, None, None, 0 ['mixed5[0][0]']

oling2D) 768)

conv2d\_50 (Conv2D) (None, None, None, 147456 ['mixed5[0][0]']

192)

conv2d\_53 (Conv2D) (None, None, None, 215040 ['activation\_52[0][0]']

192)

conv2d\_58 (Conv2D) (None, None, None, 215040 ['activation\_57[0][0]']

192)

conv2d\_59 (Conv2D) (None, None, None, 147456 ['average\_pooling2d\_5[0][0]']

192)

batch\_normalization\_50 (BatchN (None, None, None, 576 ['conv2d\_50[0][0]']

ormalization) 192)

batch\_normalization\_53 (BatchN (None, None, None, 576 ['conv2d\_53[0][0]']

ormalization) 192)

batch\_normalization\_58 (BatchN (None, None, None, 576 ['conv2d\_58[0][0]']

ormalization) 192)

batch\_normalization\_59 (BatchN (None, None, None, 576 ['conv2d\_59[0][0]']

ormalization) 192)

activation\_50 (Activation) (None, None, None, 0 ['batch\_normalization\_50[0][0]']

192)

activation\_53 (Activation) (None, None, None, 0 ['batch\_normalization\_53[0][0]']

192)

activation\_58 (Activation) (None, None, None, 0 ['batch\_normalization\_58[0][0]']

192)

activation\_59 (Activation) (None, None, None, 0 ['batch\_normalization\_59[0][0]']

192)

mixed6 (Concatenate) (None, None, None, 0 ['activation\_50[0][0]',

768) 'activation\_53[0][0]',

'activation\_58[0][0]',

'activation\_59[0][0]']

conv2d\_64 (Conv2D) (None, None, None, 147456 ['mixed6[0][0]']

192)

batch\_normalization\_64 (BatchN (None, None, None, 576 ['conv2d\_64[0][0]']

ormalization) 192)

activation\_64 (Activation) (None, None, None, 0 ['batch\_normalization\_64[0][0]']

192)

conv2d\_65 (Conv2D) (None, None, None, 258048 ['activation\_64[0][0]']

192)

batch\_normalization\_65 (BatchN (None, None, None, 576 ['conv2d\_65[0][0]']

ormalization) 192)

activation\_65 (Activation) (None, None, None, 0 ['batch\_normalization\_65[0][0]']

192)

conv2d\_61 (Conv2D) (None, None, None, 147456 ['mixed6[0][0]']

192)

conv2d\_66 (Conv2D) (None, None, None, 258048 ['activation\_65[0][0]']

192)

batch\_normalization\_61 (BatchN (None, None, None, 576 ['conv2d\_61[0][0]']

ormalization) 192)

batch\_normalization\_66 (BatchN (None, None, None, 576 ['conv2d\_66[0][0]']

ormalization) 192)

activation\_61 (Activation) (None, None, None, 0 ['batch\_normalization\_61[0][0]']

192)

activation\_66 (Activation) (None, None, None, 0 ['batch\_normalization\_66[0][0]']

192)

conv2d\_62 (Conv2D) (None, None, None, 258048 ['activation\_61[0][0]']

192)

conv2d\_67 (Conv2D) (None, None, None, 258048 ['activation\_66[0][0]']

192)

batch\_normalization\_62 (BatchN (None, None, None, 576 ['conv2d\_62[0][0]']

ormalization) 192)

batch\_normalization\_67 (BatchN (None, None, None, 576 ['conv2d\_67[0][0]']

ormalization) 192)

activation\_62 (Activation) (None, None, None, 0 ['batch\_normalization\_62[0][0]']

192)

activation\_67 (Activation) (None, None, None, 0 ['batch\_normalization\_67[0][0]']

192)

average\_pooling2d\_6 (AveragePo (None, None, None, 0 ['mixed6[0][0]']

oling2D) 768)

conv2d\_60 (Conv2D) (None, None, None, 147456 ['mixed6[0][0]']

192)

conv2d\_63 (Conv2D) (None, None, None, 258048 ['activation\_62[0][0]']

192)

conv2d\_68 (Conv2D) (None, None, None, 258048 ['activation\_67[0][0]']

192)

conv2d\_69 (Conv2D) (None, None, None, 147456 ['average\_pooling2d\_6[0][0]']

192)

batch\_normalization\_60 (BatchN (None, None, None, 576 ['conv2d\_60[0][0]']

ormalization) 192)

batch\_normalization\_63 (BatchN (None, None, None, 576 ['conv2d\_63[0][0]']

ormalization) 192)

batch\_normalization\_68 (BatchN (None, None, None, 576 ['conv2d\_68[0][0]']

ormalization) 192)

batch\_normalization\_69 (BatchN (None, None, None, 576 ['conv2d\_69[0][0]']

ormalization) 192)

activation\_60 (Activation) (None, None, None, 0 ['batch\_normalization\_60[0][0]']

192)

activation\_63 (Activation) (None, None, None, 0 ['batch\_normalization\_63[0][0]']

192)

activation\_68 (Activation) (None, None, None, 0 ['batch\_normalization\_68[0][0]']

192)

activation\_69 (Activation) (None, None, None, 0 ['batch\_normalization\_69[0][0]']

192)

mixed7 (Concatenate) (None, None, None, 0 ['activation\_60[0][0]',

768) 'activation\_63[0][0]',

'activation\_68[0][0]',

'activation\_69[0][0]']

conv2d\_72 (Conv2D) (None, None, None, 147456 ['mixed7[0][0]']

192)

batch\_normalization\_72 (BatchN (None, None, None, 576 ['conv2d\_72[0][0]']

ormalization) 192)

activation\_72 (Activation) (None, None, None, 0 ['batch\_normalization\_72[0][0]']

192)

conv2d\_73 (Conv2D) (None, None, None, 258048 ['activation\_72[0][0]']

192)

batch\_normalization\_73 (BatchN (None, None, None, 576 ['conv2d\_73[0][0]']

ormalization) 192)

activation\_73 (Activation) (None, None, None, 0 ['batch\_normalization\_73[0][0]']

192)

conv2d\_70 (Conv2D) (None, None, None, 147456 ['mixed7[0][0]']

192)

conv2d\_74 (Conv2D) (None, None, None, 258048 ['activation\_73[0][0]']

192)

batch\_normalization\_70 (BatchN (None, None, None, 576 ['conv2d\_70[0][0]']

ormalization) 192)

batch\_normalization\_74 (BatchN (None, None, None, 576 ['conv2d\_74[0][0]']

ormalization) 192)

activation\_70 (Activation) (None, None, None, 0 ['batch\_normalization\_70[0][0]']

192)

activation\_74 (Activation) (None, None, None, 0 ['batch\_normalization\_74[0][0]']

192)

conv2d\_71 (Conv2D) (None, None, None, 552960 ['activation\_70[0][0]']

320)

conv2d\_75 (Conv2D) (None, None, None, 331776 ['activation\_74[0][0]']

192)

batch\_normalization\_71 (BatchN (None, None, None, 960 ['conv2d\_71[0][0]']

ormalization) 320)

batch\_normalization\_75 (BatchN (None, None, None, 576 ['conv2d\_75[0][0]']

ormalization) 192)

activation\_71 (Activation) (None, None, None, 0 ['batch\_normalization\_71[0][0]']

320)

activation\_75 (Activation) (None, None, None, 0 ['batch\_normalization\_75[0][0]']

192)

max\_pooling2d\_3 (MaxPooling2D) (None, None, None, 0 ['mixed7[0][0]']

768)

mixed8 (Concatenate) (None, None, None, 0 ['activation\_71[0][0]',

1280) 'activation\_75[0][0]',

'max\_pooling2d\_3[0][0]']

conv2d\_80 (Conv2D) (None, None, None, 573440 ['mixed8[0][0]']

448)

batch\_normalization\_80 (BatchN (None, None, None, 1344 ['conv2d\_80[0][0]']

ormalization) 448)

activation\_80 (Activation) (None, None, None, 0 ['batch\_normalization\_80[0][0]']

448)

conv2d\_77 (Conv2D) (None, None, None, 491520 ['mixed8[0][0]']

384)

conv2d\_81 (Conv2D) (None, None, None, 1548288 ['activation\_80[0][0]']

384)

batch\_normalization\_77 (BatchN (None, None, None, 1152 ['conv2d\_77[0][0]']

ormalization) 384)

batch\_normalization\_81 (BatchN (None, None, None, 1152 ['conv2d\_81[0][0]']

ormalization) 384)

activation\_77 (Activation) (None, None, None, 0 ['batch\_normalization\_77[0][0]']

384)

activation\_81 (Activation) (None, None, None, 0 ['batch\_normalization\_81[0][0]']

384)

conv2d\_78 (Conv2D) (None, None, None, 442368 ['activation\_77[0][0]']

384)

conv2d\_79 (Conv2D) (None, None, None, 442368 ['activation\_77[0][0]']

384)

conv2d\_82 (Conv2D) (None, None, None, 442368 ['activation\_81[0][0]']

384)

conv2d\_83 (Conv2D) (None, None, None, 442368 ['activation\_81[0][0]']

384)

average\_pooling2d\_7 (AveragePo (None, None, None, 0 ['mixed8[0][0]']

oling2D) 1280)

conv2d\_76 (Conv2D) (None, None, None, 409600 ['mixed8[0][0]']

320)

batch\_normalization\_78 (BatchN (None, None, None, 1152 ['conv2d\_78[0][0]']

ormalization) 384)

batch\_normalization\_79 (BatchN (None, None, None, 1152 ['conv2d\_79[0][0]']

ormalization) 384)

batch\_normalization\_82 (BatchN (None, None, None, 1152 ['conv2d\_82[0][0]']

ormalization) 384)

batch\_normalization\_83 (BatchN (None, None, None, 1152 ['conv2d\_83[0][0]']

ormalization) 384)

conv2d\_84 (Conv2D) (None, None, None, 245760 ['average\_pooling2d\_7[0][0]']

192)

batch\_normalization\_76 (BatchN (None, None, None, 960 ['conv2d\_76[0][0]']

ormalization) 320)

activation\_78 (Activation) (None, None, None, 0 ['batch\_normalization\_78[0][0]']

384)

activation\_79 (Activation) (None, None, None, 0 ['batch\_normalization\_79[0][0]']

384)

activation\_82 (Activation) (None, None, None, 0 ['batch\_normalization\_82[0][0]']

384)

activation\_83 (Activation) (None, None, None, 0 ['batch\_normalization\_83[0][0]']

384)

batch\_normalization\_84 (BatchN (None, None, None, 576 ['conv2d\_84[0][0]']

ormalization) 192)

activation\_76 (Activation) (None, None, None, 0 ['batch\_normalization\_76[0][0]']

320)

mixed9\_0 (Concatenate) (None, None, None, 0 ['activation\_78[0][0]',

768) 'activation\_79[0][0]']

concatenate (Concatenate) (None, None, None, 0 ['activation\_82[0][0]',

768) 'activation\_83[0][0]']

activation\_84 (Activation) (None, None, None, 0 ['batch\_normalization\_84[0][0]']

192)

mixed9 (Concatenate) (None, None, None, 0 ['activation\_76[0][0]',

2048) 'mixed9\_0[0][0]',

'concatenate[0][0]',

'activation\_84[0][0]']

conv2d\_89 (Conv2D) (None, None, None, 917504 ['mixed9[0][0]']

448)

batch\_normalization\_89 (BatchN (None, None, None, 1344 ['conv2d\_89[0][0]']

ormalization) 448)

activation\_89 (Activation) (None, None, None, 0 ['batch\_normalization\_89[0][0]']

448)

conv2d\_86 (Conv2D) (None, None, None, 786432 ['mixed9[0][0]']

384)

conv2d\_90 (Conv2D) (None, None, None, 1548288 ['activation\_89[0][0]']

384)

batch\_normalization\_86 (BatchN (None, None, None, 1152 ['conv2d\_86[0][0]']

ormalization) 384)

batch\_normalization\_90 (BatchN (None, None, None, 1152 ['conv2d\_90[0][0]']

ormalization) 384)

activation\_86 (Activation) (None, None, None, 0 ['batch\_normalization\_86[0][0]']

384)

activation\_90 (Activation) (None, None, None, 0 ['batch\_normalization\_90[0][0]']

384)

conv2d\_87 (Conv2D) (None, None, None, 442368 ['activation\_86[0][0]']

384)

conv2d\_88 (Conv2D) (None, None, None, 442368 ['activation\_86[0][0]']

384)

conv2d\_91 (Conv2D) (None, None, None, 442368 ['activation\_90[0][0]']

384)

conv2d\_92 (Conv2D) (None, None, None, 442368 ['activation\_90[0][0]']

384)

average\_pooling2d\_8 (AveragePo (None, None, None, 0 ['mixed9[0][0]']

oling2D) 2048)

conv2d\_85 (Conv2D) (None, None, None, 655360 ['mixed9[0][0]']

320)

batch\_normalization\_87 (BatchN (None, None, None, 1152 ['conv2d\_87[0][0]']

ormalization) 384)

batch\_normalization\_88 (BatchN (None, None, None, 1152 ['conv2d\_88[0][0]']

ormalization) 384)

batch\_normalization\_91 (BatchN (None, None, None, 1152 ['conv2d\_91[0][0]']

ormalization) 384)

batch\_normalization\_92 (BatchN (None, None, None, 1152 ['conv2d\_92[0][0]']

ormalization) 384)

conv2d\_93 (Conv2D) (None, None, None, 393216 ['average\_pooling2d\_8[0][0]']

192)

batch\_normalization\_85 (BatchN (None, None, None, 960 ['conv2d\_85[0][0]']

ormalization) 320)

activation\_87 (Activation) (None, None, None, 0 ['batch\_normalization\_87[0][0]']

384)

activation\_88 (Activation) (None, None, None, 0 ['batch\_normalization\_88[0][0]']

384)

activation\_91 (Activation) (None, None, None, 0 ['batch\_normalization\_91[0][0]']

384)

activation\_92 (Activation) (None, None, None, 0 ['batch\_normalization\_92[0][0]']

384)

batch\_normalization\_93 (BatchN (None, None, None, 576 ['conv2d\_93[0][0]']

ormalization) 192)

activation\_85 (Activation) (None, None, None, 0 ['batch\_normalization\_85[0][0]']

320)

mixed9\_1 (Concatenate) (None, None, None, 0 ['activation\_87[0][0]',

768) 'activation\_88[0][0]']

concatenate\_1 (Concatenate) (None, None, None, 0 ['activation\_91[0][0]',

768) 'activation\_92[0][0]']

activation\_93 (Activation) (None, None, None, 0 ['batch\_normalization\_93[0][0]']

192)

mixed10 (Concatenate) (None, None, None, 0 ['activation\_85[0][0]',

2048) 'mixed9\_1[0][0]',

'concatenate\_1[0][0]',

'activation\_93[0][0]']

decoder\_stage0\_upsampling (UpS (None, None, None, 0 ['mixed10[0][0]']

ampling2D) 2048)

decoder\_stage0\_concat (Concate (None, None, None, 0 ['decoder\_stage0\_upsampling[0][0]

nate) 2816) ',

'mixed7[0][0]']

decoder\_stage0a\_conv (Conv2D) (None, None, None, 6488064 ['decoder\_stage0\_concat[0][0]']

256)

decoder\_stage0a\_bn (BatchNorma (None, None, None, 1024 ['decoder\_stage0a\_conv[0][0]']

lization) 256)

decoder\_stage0a\_relu (Activati (None, None, None, 0 ['decoder\_stage0a\_bn[0][0]']

on) 256)

decoder\_stage0b\_conv (Conv2D) (None, None, None, 589824 ['decoder\_stage0a\_relu[0][0]']

256)

decoder\_stage0b\_bn (BatchNorma (None, None, None, 1024 ['decoder\_stage0b\_conv[0][0]']

lization) 256)

decoder\_stage0b\_relu (Activati (None, None, None, 0 ['decoder\_stage0b\_bn[0][0]']

on) 256)

decoder\_stage1\_upsampling (UpS (None, None, None, 0 ['decoder\_stage0b\_relu[0][0]']

ampling2D) 256)

decoder\_stage1\_concat (Concate (None, None, None, 0 ['decoder\_stage1\_upsampling[0][0]

nate) 544) ',

'mixed2[0][0]']

decoder\_stage1a\_conv (Conv2D) (None, None, None, 626688 ['decoder\_stage1\_concat[0][0]']

128)

decoder\_stage1a\_bn (BatchNorma (None, None, None, 512 ['decoder\_stage1a\_conv[0][0]']

lization) 128)

decoder\_stage1a\_relu (Activati (None, None, None, 0 ['decoder\_stage1a\_bn[0][0]']

on) 128)

decoder\_stage1b\_conv (Conv2D) (None, None, None, 147456 ['decoder\_stage1a\_relu[0][0]']

128)

decoder\_stage1b\_bn (BatchNorma (None, None, None, 512 ['decoder\_stage1b\_conv[0][0]']

lization) 128)

decoder\_stage1b\_relu (Activati (None, None, None, 0 ['decoder\_stage1b\_bn[0][0]']

on) 128)

decoder\_stage2\_upsampling (UpS (None, None, None, 0 ['decoder\_stage1b\_relu[0][0]']

ampling2D) 128)

decoder\_stage2\_concat (Concate (None, None, None, 0 ['decoder\_stage2\_upsampling[0][0]

nate) 320) ',

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

decoder\_stage2a\_conv (Conv2D) (None, None, None, 184320 ['decoder\_stage2\_concat[0][0]']

64)

decoder\_stage2a\_bn (BatchNorma (None, None, None, 256 ['decoder\_stage2a\_conv[0][0]']

lization) 64)

decoder\_stage2a\_relu (Activati (None, None, None, 0 ['decoder\_stage2a\_bn[0][0]']

on) 64)

decoder\_stage2b\_conv (Conv2D) (None, None, None, 36864 ['decoder\_stage2a\_relu[0][0]']

64)

decoder\_stage2b\_bn (BatchNorma (None, None, None, 256 ['decoder\_stage2b\_conv[0][0]']

lization) 64)

decoder\_stage2b\_relu (Activati (None, None, None, 0 ['decoder\_stage2b\_bn[0][0]']

on) 64)

decoder\_stage3\_upsampling (UpS (None, None, None, 0 ['decoder\_stage2b\_relu[0][0]']

ampling2D) 64)

decoder\_stage3\_concat (Concate (None, None, None, 0 ['decoder\_stage3\_upsampling[0][0]

nate) 128) ',

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

decoder\_stage3a\_conv (Conv2D) (None, None, None, 36864 ['decoder\_stage3\_concat[0][0]']

32)

decoder\_stage3a\_bn (BatchNorma (None, None, None, 128 ['decoder\_stage3a\_conv[0][0]']

lization) 32)

decoder\_stage3a\_relu (Activati (None, None, None, 0 ['decoder\_stage3a\_bn[0][0]']

on) 32)

decoder\_stage3b\_conv (Conv2D) (None, None, None, 9216 ['decoder\_stage3a\_relu[0][0]']

32)

decoder\_stage3b\_bn (BatchNorma (None, None, None, 128 ['decoder\_stage3b\_conv[0][0]']

lization) 32)

decoder\_stage3b\_relu (Activati (None, None, None, 0 ['decoder\_stage3b\_bn[0][0]']

on) 32)

decoder\_stage4\_upsampling (UpS (None, None, None, 0 ['decoder\_stage3b\_relu[0][0]']

ampling2D) 32)

decoder\_stage4a\_conv (Conv2D) (None, None, None, 4608 ['decoder\_stage4\_upsampling[0][0]

16) ']

decoder\_stage4a\_bn (BatchNorma (None, None, None, 64 ['decoder\_stage4a\_conv[0][0]']

lization) 16)

decoder\_stage4a\_relu (Activati (None, None, None, 0 ['decoder\_stage4a\_bn[0][0]']

on) 16)

decoder\_stage4b\_conv (Conv2D) (None, None, None, 2304 ['decoder\_stage4a\_relu[0][0]']

16)

decoder\_stage4b\_bn (BatchNorma (None, None, None, 64 ['decoder\_stage4b\_conv[0][0]']

lization) 16)

decoder\_stage4b\_relu (Activati (None, None, None, 0 ['decoder\_stage4b\_bn[0][0]']

on) 16)

final\_conv (Conv2D) (None, None, None, 145 ['decoder\_stage4b\_relu[0][0]']

1)

sigmoid (Activation) (None, None, None, 0 ['final\_conv[0][0]']

1)

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

Total params: 29,933,105

Trainable params: 29,896,689

Non-trainable params: 36,416

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

None

history2=model2.fit(X1,

y1,

batch\_size=8,

epochs=50,

verbose=1,

validation\_data=(X\_test, y\_test))

Epoch 1/50

11/11 [==============================] - 295s 25s/step - loss: 0.5478 - iou\_score: 0.0620 - f1-score: 0.1164 - val\_loss: 3.3512 - val\_iou\_score: 0.0611 - val\_f1-score: 0.1146

Epoch 2/50

11/11 [==============================] - 248s 23s/step - loss: 0.4828 - iou\_score: 0.1138 - f1-score: 0.2028 - val\_loss: 4.1613 - val\_iou\_score: 0.0613 - val\_f1-score: 0.1150

Epoch 3/50

11/11 [==============================] - 248s 23s/step - loss: 0.4318 - iou\_score: 0.2152 - f1-score: 0.3510 - val\_loss: 4.0169 - val\_iou\_score: 0.0619 - val\_f1-score: 0.1161

Epoch 4/50

11/11 [==============================] - 249s 23s/step - loss: 0.3936 - iou\_score: 0.2938 - f1-score: 0.4506 - val\_loss: 3.1623 - val\_iou\_score: 0.0656 - val\_f1-score: 0.1226

Epoch 5/50

11/11 [==============================] - 248s 23s/step - loss: 0.3601 - iou\_score: 0.3663 - f1-score: 0.5334 - val\_loss: 2.1958 - val\_iou\_score: 0.0686 - val\_f1-score: 0.1278

Epoch 6/50

11/11 [==============================] - 249s 23s/step - loss: 0.3313 - iou\_score: 0.4422 - f1-score: 0.6111 - val\_loss: 1.3993 - val\_iou\_score: 0.0744 - val\_f1-score: 0.1377

Epoch 7/50

11/11 [==============================] - 250s 23s/step - loss: 0.3117 - iou\_score: 0.4462 - f1-score: 0.6125 - val\_loss: 0.9999 - val\_iou\_score: 0.0876 - val\_f1-score: 0.1603

Epoch 8/50

11/11 [==============================] - 248s 23s/step - loss: 0.2910 - iou\_score: 0.4485 - f1-score: 0.6176 - val\_loss: 0.6933 - val\_iou\_score: 0.1053 - val\_f1-score: 0.1898

Epoch 9/50

11/11 [==============================] - 248s 23s/step - loss: 0.2700 - iou\_score: 0.5079 - f1-score: 0.6706 - val\_loss: 0.5836 - val\_iou\_score: 0.1052 - val\_f1-score: 0.1896

Epoch 10/50

11/11 [==============================] - 252s 23s/step - loss: 0.2499 - iou\_score: 0.5202 - f1-score: 0.6820 - val\_loss: 0.5004 - val\_iou\_score: 0.1325 - val\_f1-score: 0.2336

Epoch 11/50

11/11 [==============================] - 249s 23s/step - loss: 0.2352 - iou\_score: 0.5284 - f1-score: 0.6883 - val\_loss: 0.3716 - val\_iou\_score: 0.0527 - val\_f1-score: 0.0996

Epoch 12/50

11/11 [==============================] - 248s 23s/step - loss: 0.2171 - iou\_score: 0.5698 - f1-score: 0.7246 - val\_loss: 0.4077 - val\_iou\_score: 0.1498 - val\_f1-score: 0.2593

Epoch 13/50

11/11 [==============================] - 250s 23s/step - loss: 0.2078 - iou\_score: 0.5769 - f1-score: 0.7294 - val\_loss: 0.3311 - val\_iou\_score: 0.0839 - val\_f1-score: 0.1540

Epoch 14/50

11/11 [==============================] - 249s 23s/step - loss: 0.1958 - iou\_score: 0.5751 - f1-score: 0.7275 - val\_loss: 0.3820 - val\_iou\_score: 0.1802 - val\_f1-score: 0.3037

Epoch 15/50

11/11 [==============================] - 250s 23s/step - loss: 0.1861 - iou\_score: 0.5955 - f1-score: 0.7423 - val\_loss: 0.2842 - val\_iou\_score: 0.0501 - val\_f1-score: 0.0954

Epoch 16/50

11/11 [==============================] - 252s 23s/step - loss: 0.1743 - iou\_score: 0.6198 - f1-score: 0.7641 - val\_loss: 0.3139 - val\_iou\_score: 0.1648 - val\_f1-score: 0.2818

Epoch 17/50

11/11 [==============================] - 248s 23s/step - loss: 0.1651 - iou\_score: 0.6398 - f1-score: 0.7793 - val\_loss: 0.2771 - val\_iou\_score: 0.1162 - val\_f1-score: 0.2069

Epoch 18/50

11/11 [==============================] - 248s 23s/step - loss: 0.1525 - iou\_score: 0.6895 - f1-score: 0.8144 - val\_loss: 0.2633 - val\_iou\_score: 0.1163 - val\_f1-score: 0.2079

Epoch 19/50

11/11 [==============================] - 249s 23s/step - loss: 0.1452 - iou\_score: 0.7047 - f1-score: 0.8262 - val\_loss: 0.2674 - val\_iou\_score: 0.1366 - val\_f1-score: 0.2398

Epoch 20/50

11/11 [==============================] - 250s 23s/step - loss: 0.1397 - iou\_score: 0.7093 - f1-score: 0.8274 - val\_loss: 0.2493 - val\_iou\_score: 0.0192 - val\_f1-score: 0.0375

Epoch 21/50

11/11 [==============================] - 248s 23s/step - loss: 0.1361 - iou\_score: 0.6940 - f1-score: 0.8175 - val\_loss: 0.2485 - val\_iou\_score: 0.0788 - val\_f1-score: 0.1458

Epoch 22/50

11/11 [==============================] - 249s 23s/step - loss: 0.1301 - iou\_score: 0.7116 - f1-score: 0.8306 - val\_loss: 0.2439 - val\_iou\_score: 0.1272 - val\_f1-score: 0.2251

Epoch 23/50

11/11 [==============================] - 251s 23s/step - loss: 0.1250 - iou\_score: 0.7128 - f1-score: 0.8306 - val\_loss: 0.2378 - val\_iou\_score: 0.0497 - val\_f1-score: 0.0948

Epoch 24/50

11/11 [==============================] - 249s 23s/step - loss: 0.1192 - iou\_score: 0.7255 - f1-score: 0.8400 - val\_loss: 0.2278 - val\_iou\_score: 0.0646 - val\_f1-score: 0.1214

Epoch 25/50

11/11 [==============================] - 249s 23s/step - loss: 0.1141 - iou\_score: 0.7442 - f1-score: 0.8528 - val\_loss: 0.2304 - val\_iou\_score: 0.0363 - val\_f1-score: 0.0699

Epoch 26/50

11/11 [==============================] - 249s 23s/step - loss: 0.1096 - iou\_score: 0.7390 - f1-score: 0.8490 - val\_loss: 0.2259 - val\_iou\_score: 0.0904 - val\_f1-score: 0.1658

Epoch 27/50

11/11 [==============================] - 252s 23s/step - loss: 0.1036 - iou\_score: 0.7667 - f1-score: 0.8676 - val\_loss: 0.2243 - val\_iou\_score: 0.0672 - val\_f1-score: 0.1260

Epoch 28/50

11/11 [==============================] - 248s 23s/step - loss: 0.1011 - iou\_score: 0.7586 - f1-score: 0.8614 - val\_loss: 0.2213 - val\_iou\_score: 0.0240 - val\_f1-score: 0.0466

Epoch 29/50

11/11 [==============================] - 249s 23s/step - loss: 0.0979 - iou\_score: 0.7544 - f1-score: 0.8566 - val\_loss: 0.2227 - val\_iou\_score: 0.0522 - val\_f1-score: 0.0991

Epoch 30/50

11/11 [==============================] - 249s 23s/step - loss: 0.0922 - iou\_score: 0.7886 - f1-score: 0.8815 - val\_loss: 0.2206 - val\_iou\_score: 0.0458 - val\_f1-score: 0.0874

Epoch 31/50

11/11 [==============================] - 251s 23s/step - loss: 0.0895 - iou\_score: 0.7890 - f1-score: 0.8816 - val\_loss: 0.2184 - val\_iou\_score: 0.0531 - val\_f1-score: 0.1008

Epoch 32/50

11/11 [==============================] - 249s 23s/step - loss: 0.0856 - iou\_score: 0.8033 - f1-score: 0.8896 - val\_loss: 0.2187 - val\_iou\_score: 0.0633 - val\_f1-score: 0.1190

Epoch 33/50

11/11 [==============================] - 248s 23s/step - loss: 0.0845 - iou\_score: 0.7804 - f1-score: 0.8746 - val\_loss: 0.2169 - val\_iou\_score: 0.0392 - val\_f1-score: 0.0752

Epoch 34/50

11/11 [==============================] - 248s 23s/step - loss: 0.0824 - iou\_score: 0.7826 - f1-score: 0.8768 - val\_loss: 0.2152 - val\_iou\_score: 0.0378 - val\_f1-score: 0.0728

Epoch 35/50

11/11 [==============================] - 248s 23s/step - loss: 0.0791 - iou\_score: 0.7925 - f1-score: 0.8830 - val\_loss: 0.2147 - val\_iou\_score: 0.0248 - val\_f1-score: 0.0484

Epoch 36/50

11/11 [==============================] - 250s 23s/step - loss: 0.0764 - iou\_score: 0.7981 - f1-score: 0.8865 - val\_loss: 0.2136 - val\_iou\_score: 0.0412 - val\_f1-score: 0.0790

Epoch 37/50

11/11 [==============================] - 249s 23s/step - loss: 0.0760 - iou\_score: 0.7855 - f1-score: 0.8785 - val\_loss: 0.2121 - val\_iou\_score: 0.0486 - val\_f1-score: 0.0925

Epoch 38/50

11/11 [==============================] - 248s 23s/step - loss: 0.0730 - iou\_score: 0.7929 - f1-score: 0.8833 - val\_loss: 0.2121 - val\_iou\_score: 0.0442 - val\_f1-score: 0.0844

Epoch 39/50

11/11 [==============================] - 248s 23s/step - loss: 0.0705 - iou\_score: 0.8048 - f1-score: 0.8910 - val\_loss: 0.2112 - val\_iou\_score: 0.0328 - val\_f1-score: 0.0633

Epoch 40/50

11/11 [==============================] - 248s 23s/step - loss: 0.0702 - iou\_score: 0.7997 - f1-score: 0.8876 - val\_loss: 0.2139 - val\_iou\_score: 0.0685 - val\_f1-score: 0.1281

Epoch 41/50

11/11 [==============================] - 250s 23s/step - loss: 0.0685 - iou\_score: 0.7957 - f1-score: 0.8838 - val\_loss: 0.2151 - val\_iou\_score: 0.0326 - val\_f1-score: 0.0630

Epoch 42/50

11/11 [==============================] - 247s 23s/step - loss: 0.0654 - iou\_score: 0.8096 - f1-score: 0.8935 - val\_loss: 0.2149 - val\_iou\_score: 0.0693 - val\_f1-score: 0.1296

Epoch 43/50

11/11 [==============================] - 248s 23s/step - loss: 0.0640 - iou\_score: 0.8075 - f1-score: 0.8927 - val\_loss: 0.2148 - val\_iou\_score: 0.0449 - val\_f1-score: 0.0859

Epoch 44/50

11/11 [==============================] - 251s 23s/step - loss: 0.0625 - iou\_score: 0.8016 - f1-score: 0.8873 - val\_loss: 0.2163 - val\_iou\_score: 0.0270 - val\_f1-score: 0.0525

Epoch 45/50

11/11 [==============================] - 249s 23s/step - loss: 0.0608 - iou\_score: 0.8130 - f1-score: 0.8955 - val\_loss: 0.2152 - val\_iou\_score: 0.0453 - val\_f1-score: 0.0864

Epoch 46/50

11/11 [==============================] - 250s 23s/step - loss: 0.0587 - iou\_score: 0.8231 - f1-score: 0.9022 - val\_loss: 0.2125 - val\_iou\_score: 0.0543 - val\_f1-score: 0.1029

Epoch 47/50

11/11 [==============================] - 252s 23s/step - loss: 0.0570 - iou\_score: 0.8298 - f1-score: 0.9053 - val\_loss: 0.2140 - val\_iou\_score: 0.0454 - val\_f1-score: 0.0868

Epoch 48/50

11/11 [==============================] - 249s 23s/step - loss: 0.0552 - iou\_score: 0.8348 - f1-score: 0.9094 - val\_loss: 0.2165 - val\_iou\_score: 0.0379 - val\_f1-score: 0.0728

Epoch 49/50

11/11 [==============================] - 248s 23s/step - loss: 0.0541 - iou\_score: 0.8353 - f1-score: 0.9092 - val\_loss: 0.2135 - val\_iou\_score: 0.0581 - val\_f1-score: 0.1096

Epoch 50/50

11/11 [==============================] - 248s 23s/step - loss: 0.0527 - iou\_score: 0.8369 - f1-score: 0.9108 - val\_loss: 0.2147 - val\_iou\_score: 0.0520 - val\_f1-score: 0.0985