

GENERATOR NETWORK

Layer (type)	Output Shape	Param #	Connected to
input_face (InputLayer)	(None, 96, 96, 6)	0	
conv2d_1 (Conv2D)	(None, 96, 96, 32)	9440	input_face[0][0]
batch_normalization_1 (BatchNor	(None, 96, 96, 32)	128	conv2d_1[0][0]
activation_1 (Activation)	(None, 96, 96, 32)	0	batch_normalization_1[0][0]
conv2d_2 (Conv2D)	(None, 48, 48, 64)	51264	activation_1[0][0]
batch_normalization_2 (BatchNor	(None, 48, 48, 64)	256	conv2d_2[0][0]
activation_2 (Activation)	(None, 48, 48, 64)	0	batch_normalization_2[0][0]
conv2d_3 (Conv2D)	(None, 48, 48, 64)	36928	activation_2[0][0]
batch_normalization_3 (BatchNor	(None, 48, 48, 64)	256	conv2d_3[0][0]
activation_3 (Activation)	(None, 48, 48, 64)	0	batch_normalization_3[0][0]
conv2d_4 (Conv2D)	(None, 48, 48, 64)	36928	activation_3[0][0]
batch_normalization_4 (BatchNor	(None, 48, 48, 64)	256	conv2d_4[0][0]
activation_4 (Activation)	(None, 48, 48, 64)	0	batch_normalization_4[0][0]
add_1 (Add)	(None, 48, 48, 64)	0	activation_4[0][0] activation_2[0][0]
activation_5 (Activation)	(None, 48, 48, 64)	0	add_1[0][0]
input_audio (InputLayer)	(None, 80, 27, 1)	0	
conv2d_5 (Conv2D)	(None, 48, 48, 64)	36928	activation_5[0][0]
conv2d_27 (Conv2D)	(None, 80, 27, 32)	320	input_audio[0][0]
batch_normalization_5 (BatchNor	(None, 48, 48, 64)	256	conv2d_5[0][0]
batch_normalization_27 (BatchNo	(None, 80, 27, 32)	128	conv2d_27[0][0]
activation_6 (Activation)	(None, 48, 48, 64)	0	batch_normalization_5[0][0]
activation_36 (Activation)	(None, 80, 27, 32)	0	batch_normalization_27[0][0]
conv2d_6 (Conv2D)	(None, 48, 48, 64)	36928	activation_6[0][0]
conv2d_28 (Conv2D)	(None, 80, 27, 32)	9248	activation_36[0][0]
batch_normalization_6 (BatchNor	(None, 48, 48, 64)	256	conv2d_6[0][0]
batch_normalization_28 (BatchNo	(None, 80, 27, 32)	128	conv2d_28[0][0]
activation_7 (Activation)	(None, 48, 48, 64)	0	batch_normalization_6[0][0]

activation_37 (Activation)	(None, 80, 27, 32)	0	batch_normalization_28[0][0]
add_2 (Add)	(None, 48, 48, 64)	0	activation_7[0][0] activation_5[0][0]
conv2d_29 (Conv2D)	(None, 80, 27, 32)	9248	activation_37[0][0]
activation_8 (Activation)	(None, 48, 48, 64)	0	add_2[0][0]
batch_normalization_29 (BatchNo	(None, 80, 27, 32)	128	conv2d_29[0][0]
conv2d_7 (Conv2D)	(None, 24, 24, 128)	73856	activation_8[0][0]
activation_38 (Activation)	(None, 80, 27, 32)	0	batch_normalization_29[0][0]
batch_normalization_7 (BatchNor	(None, 24, 24, 128)	512	conv2d_7[0][0]
add_10 (Add)	(None, 80, 27, 32)	0	activation_38[0][0] activation_36[0][0]
activation_9 (Activation)	(None, 24, 24, 128)	0	batch_normalization_7[0][0]
activation_39 (Activation)	(None, 80, 27, 32)	0	add_10[0][0]
conv2d_8 (Conv2D)	(None, 24, 24, 128)	147584	activation_9[0][0]
conv2d_30 (Conv2D)	(None, 80, 27, 32)	9248	activation_39[0][0]
batch_normalization_8 (BatchNor	(None, 24, 24, 128)	512	conv2d_8[0][0]
batch_normalization_30 (BatchNo	(None, 80, 27, 32)	128	conv2d_30[0][0]
activation_10 (Activation)	(None, 24, 24, 128)	0	batch_normalization_8[0][0]
activation_40 (Activation)	(None, 80, 27, 32)	0	batch_normalization_30[0][0]
conv2d_9 (Conv2D)	(None, 24, 24, 128)	147584	activation_10[0][0]
conv2d_31 (Conv2D)	(None, 80, 27, 32)	9248	activation_40[0][0]
batch_normalization_9 (BatchNor	(None, 24, 24, 128)	512	conv2d_9[0][0]
batch_normalization_31 (BatchNo	(None, 80, 27, 32)	128	conv2d_31[0][0]
activation_11 (Activation)	(None, 24, 24, 128)	0	batch_normalization_9[0][0]
activation_41 (Activation)	(None, 80, 27, 32)	0	batch_normalization_31[0][0]
add_3 (Add)	(None, 24, 24, 128)	0	activation_11[0][0] activation_9[0][0]
add_11 (Add)	(None, 80, 27, 32)	0	activation_41[0][0] activation_39[0][0]
activation_12 (Activation)	(None, 24, 24, 128)	0	add_3[0][0]
activation_42 (Activation)	(None, 80, 27, 32)	0	add_11[0][0]

conv2d_10 (Conv2D)	(None, 24, 24, 128)	147584	activation_12[0][0]
conv2d_32 (Conv2D)	(None, 27, 9, 64)	18496	activation_42[0][0]
batch_normalization_10 (BatchNo)	(None, 24, 24, 128)	512	conv2d_10[0][0]
batch_normalization_32 (BatchNo)	(None, 27, 9, 64)	256	conv2d_32[0][0]
activation_13 (Activation)	(None, 24, 24, 128)	0	batch_normalization_10[0][0]
activation_43 (Activation)	(None, 27, 9, 64)	0	batch_normalization_32[0][0]
conv2d_11 (Conv2D)	(None, 24, 24, 128)	147584	activation_13[0][0]
conv2d_33 (Conv2D)	(None, 27, 9, 64)	36928	activation_43[0][0]
batch_normalization_11 (BatchNo)	(None, 24, 24, 128)	512	conv2d_11[0][0]
batch_normalization_33 (BatchNo)	(None, 27, 9, 64)	256	conv2d_33[0][0]
activation_14 (Activation)	(None, 24, 24, 128)	0	batch_normalization_11[0][0]
activation_44 (Activation)	(None, 27, 9, 64)	0	batch_normalization_33[0][0]
add_4 (Add)	(None, 24, 24, 128)	0	activation_14[0][0] activation_12[0][0]
conv2d_34 (Conv2D)	(None, 27, 9, 64)	36928	activation_44[0][0]
activation_15 (Activation)	(None, 24, 24, 128)	0	add_4[0][0]
batch_normalization_34 (BatchNo)	(None, 27, 9, 64)	256	conv2d_34[0][0]
conv2d_12 (Conv2D)	(None, 24, 24, 128)	147584	activation_15[0][0]
activation_45 (Activation)	(None, 27, 9, 64)	0	batch_normalization_34[0][0]
batch_normalization_12 (BatchNo)	(None, 24, 24, 128)	512	conv2d_12[0][0]
add_12 (Add)	(None, 27, 9, 64)	0	activation_45[0][0] activation_43[0][0]
activation_16 (Activation)	(None, 24, 24, 128)	0	batch_normalization_12[0][0]
activation_46 (Activation)	(None, 27, 9, 64)	0	add_12[0][0]
conv2d_13 (Conv2D)	(None, 24, 24, 128)	147584	activation_16[0][0]
conv2d_35 (Conv2D)	(None, 27, 9, 64)	36928	activation_46[0][0]
batch_normalization_13 (BatchNo)	(None, 24, 24, 128)	512	conv2d_13[0][0]
batch_normalization_35 (BatchNo)	(None, 27, 9, 64)	256	conv2d_35[0][0]
activation_17 (Activation)	(None, 24, 24, 128)	0	batch_normalization_13[0][0]
activation_47 (Activation)	(None, 27, 9, 64)	0	batch_normalization_35[0][0]

add_5 (Add)	(None, 24, 24, 128) 0	activation_17[0][0] activation_15[0][0]
conv2d_36 (Conv2D)	(None, 27, 9, 64) 36928	activation_47[0][0]
activation_18 (Activation)	(None, 24, 24, 128) 0	add_5[0][0]
batch_normalization_36 (BatchNo	(None, 27, 9, 64) 256	conv2d_36[0][0]
conv2d_14 (Conv2D)	(None, 12, 12, 256) 295168	activation_18[0][0]
activation_48 (Activation)	(None, 27, 9, 64) 0	batch_normalization_36[0][0]
batch_normalization_14 (BatchNo	(None, 12, 12, 256) 1024	conv2d_14[0][0]
add_13 (Add)	(None, 27, 9, 64) 0	activation_48[0][0] activation_46[0][0]
activation_19 (Activation)	(None, 12, 12, 256) 0	batch_normalization_14[0][0]
activation_49 (Activation)	(None, 27, 9, 64) 0	add_13[0][0]
conv2d_15 (Conv2D)	(None, 12, 12, 256) 590080	activation_19[0][0]
conv2d_37 (Conv2D)	(None, 9, 9, 128) 73856	activation_49[0][0]
batch_normalization_15 (BatchNo	(None, 12, 12, 256) 1024	conv2d_15[0][0]
batch_normalization_37 (BatchNo	(None, 9, 9, 128) 512	conv2d_37[0][0]
activation_20 (Activation)	(None, 12, 12, 256) 0	batch_normalization_15[0][0]
activation_50 (Activation)	(None, 9, 9, 128) 0	batch_normalization_37[0][0]
conv2d_16 (Conv2D)	(None, 12, 12, 256) 590080	activation_20[0][0]
conv2d_38 (Conv2D)	(None, 9, 9, 128) 147584	activation_50[0][0]
batch_normalization_16 (BatchNo	(None, 12, 12, 256) 1024	conv2d_16[0][0]
batch_normalization_38 (BatchNo	(None, 9, 9, 128) 512	conv2d_38[0][0]
activation_21 (Activation)	(None, 12, 12, 256) 0	batch_normalization_16[0][0]
activation_51 (Activation)	(None, 9, 9, 128) 0	batch_normalization_38[0][0]
add_6 (Add)	(None, 12, 12, 256) 0	activation_21[0][0] activation_19[0][0]
conv2d_39 (Conv2D)	(None, 9, 9, 128) 147584	activation_51[0][0]
activation_22 (Activation)	(None, 12, 12, 256) 0	add_6[0][0]
batch_normalization_39 (BatchNo	(None, 9, 9, 128) 512	conv2d_39[0][0]
conv2d_17 (Conv2D)	(None, 12, 12, 256) 590080	activation_22[0][0]

activation_52 (Activation)	(None, 9, 9, 128)	0	batch_normalization_39[0][0]
batch_normalization_17 (BatchNo)	(None, 12, 12, 256)	1024	conv2d_17[0][0]
add_14 (Add)	(None, 9, 9, 128)	0	activation_52[0][0] activation_50[0][0]
activation_23 (Activation)	(None, 12, 12, 256)	0	batch_normalization_17[0][0]
activation_53 (Activation)	(None, 9, 9, 128)	0	add_14[0][0]
conv2d_18 (Conv2D)	(None, 12, 12, 256)	590080	activation_23[0][0]
conv2d_40 (Conv2D)	(None, 9, 9, 128)	147584	activation_53[0][0]
batch_normalization_18 (BatchNo)	(None, 12, 12, 256)	1024	conv2d_18[0][0]
batch_normalization_40 (BatchNo)	(None, 9, 9, 128)	512	conv2d_40[0][0]
activation_24 (Activation)	(None, 12, 12, 256)	0	batch_normalization_18[0][0]
activation_54 (Activation)	(None, 9, 9, 128)	0	batch_normalization_40[0][0]
add_7 (Add)	(None, 12, 12, 256)	0	activation_24[0][0] activation_22[0][0]
conv2d_41 (Conv2D)	(None, 9, 9, 128)	147584	activation_54[0][0]
activation_25 (Activation)	(None, 12, 12, 256)	0	add_7[0][0]
batch_normalization_41 (BatchNo)	(None, 9, 9, 128)	512	conv2d_41[0][0]
conv2d_19 (Conv2D)	(None, 6, 6, 512)	1180160	activation_25[0][0]
activation_55 (Activation)	(None, 9, 9, 128)	0	batch_normalization_41[0][0]
batch_normalization_19 (BatchNo)	(None, 6, 6, 512)	2048	conv2d_19[0][0]
add_15 (Add)	(None, 9, 9, 128)	0	activation_55[0][0] activation_53[0][0]
activation_26 (Activation)	(None, 6, 6, 512)	0	batch_normalization_19[0][0]
activation_56 (Activation)	(None, 9, 9, 128)	0	add_15[0][0]
conv2d_20 (Conv2D)	(None, 6, 6, 512)	2359808	activation_26[0][0]
conv2d_42 (Conv2D)	(None, 3, 3, 256)	295168	activation_56[0][0]
batch_normalization_20 (BatchNo)	(None, 6, 6, 512)	2048	conv2d_20[0][0]
batch_normalization_42 (BatchNo)	(None, 3, 3, 256)	1024	conv2d_42[0][0]
activation_27 (Activation)	(None, 6, 6, 512)	0	batch_normalization_20[0][0]
activation_57 (Activation)	(None, 3, 3, 256)	0	batch_normalization_42[0][0]
conv2d_21 (Conv2D)	(None, 6, 6, 512)	2359808	activation_27[0][0]

conv2d_43 (Conv2D)	(None, 3, 3, 256)	590080	activation_57[0][0]
batch_normalization_21 (BatchNo	(None, 6, 6, 512)	2048	conv2d_21[0][0]
batch_normalization_43 (BatchNo	(None, 3, 3, 256)	1024	conv2d_43[0][0]
activation_28 (Activation)	(None, 6, 6, 512)	0	batch_normalization_21[0][0]
activation_58 (Activation)	(None, 3, 3, 256)	0	batch_normalization_43[0][0]
add_8 (Add)	(None, 6, 6, 512)	0	activation_28[0][0] activation_26[0][0]
conv2d_44 (Conv2D)	(None, 3, 3, 256)	590080	activation_58[0][0]
activation_29 (Activation)	(None, 6, 6, 512)	0	add_8[0][0]
batch_normalization_44 (BatchNo	(None, 3, 3, 256)	1024	conv2d_44[0][0]
conv2d_22 (Conv2D)	(None, 6, 6, 512)	2359808	activation_29[0][0]
activation_59 (Activation)	(None, 3, 3, 256)	0	batch_normalization_44[0][0]
batch_normalization_22 (BatchNo	(None, 6, 6, 512)	2048	conv2d_22[0][0]
add_16 (Add)	(None, 3, 3, 256)	0	activation_59[0][0] activation_57[0][0]
activation_30 (Activation)	(None, 6, 6, 512)	0	batch_normalization_22[0][0]
activation_60 (Activation)	(None, 3, 3, 256)	0	add_16[0][0]
conv2d_23 (Conv2D)	(None, 6, 6, 512)	2359808	activation_30[0][0]
conv2d_45 (Conv2D)	(None, 3, 3, 256)	590080	activation_60[0][0]
batch_normalization_23 (BatchNo	(None, 6, 6, 512)	2048	conv2d_23[0][0]
batch_normalization_45 (BatchNo	(None, 3, 3, 256)	1024	conv2d_45[0][0]
activation_31 (Activation)	(None, 6, 6, 512)	0	batch_normalization_23[0][0]
activation_61 (Activation)	(None, 3, 3, 256)	0	batch_normalization_45[0][0]
add_9 (Add)	(None, 6, 6, 512)	0	activation_31[0][0] activation_29[0][0]
conv2d_46 (Conv2D)	(None, 3, 3, 256)	590080	activation_61[0][0]
activation_32 (Activation)	(None, 6, 6, 512)	0	add_9[0][0]
batch_normalization_46 (BatchNo	(None, 3, 3, 256)	1024	conv2d_46[0][0]
conv2d_24 (Conv2D)	(None, 3, 3, 512)	2359808	activation_32[0][0]
activation_62 (Activation)	(None, 3, 3, 256)	0	batch_normalization_46[0][0]

batch_normalization_24 (BatchNo (None, 3, 3, 512)	2048	conv2d_24[0][0]
add_17 (Add) (None, 3, 3, 256)	0	activation_62[0][0] activation_60[0][0]
activation_33 (Activation) (None, 3, 3, 512)	0	batch_normalization_24[0][0]
activation_63 (Activation) (None, 3, 3, 256)	0	add_17[0][0]
conv2d_25 (Conv2D) (None, 1, 1, 512)	2359808	activation_33[0][0]
conv2d_47 (Conv2D) (None, 1, 1, 512)	1180160	activation_63[0][0]
batch_normalization_25 (BatchNo (None, 1, 1, 512)	2048	conv2d_25[0][0]
batch_normalization_47 (BatchNo (None, 1, 1, 512)	2048	conv2d_47[0][0]
activation_34 (Activation) (None, 1, 1, 512)	0	batch_normalization_25[0][0]
activation_64 (Activation) (None, 1, 1, 512)	0	batch_normalization_47[0][0]
conv2d_26 (Conv2D) (None, 1, 1, 512)	262656	activation_34[0][0]
conv2d_48 (Conv2D) (None, 1, 1, 512)	262656	activation_64[0][0]
batch_normalization_26 (BatchNo (None, 1, 1, 512)	2048	conv2d_26[0][0]
batch_normalization_48 (BatchNo (None, 1, 1, 512)	2048	conv2d_48[0][0]
activation_35 (Activation) (None, 1, 1, 512)	0	batch_normalization_26[0][0]
activation_65 (Activation) (None, 1, 1, 512)	0	batch_normalization_48[0][0]
concatenate_1 (Concatenate) (None, 1, 1, 1024)	0	activation_35[0][0] activation_65[0][0]
conv2d_transpose_1 (Conv2DTrans (None, 3, 3, 512)	4719104	concatenate_1[0][0]
batch_normalization_49 (BatchNo (None, 3, 3, 512)	2048	conv2d_transpose_1[0][0]
activation_66 (Activation) (None, 3, 3, 512)	0	batch_normalization_49[0][0]
concatenate_2 (Concatenate) (None, 3, 3, 1024)	0	activation_33[0][0] activation_66[0][0]
conv2d_transpose_2 (Conv2DTrans (None, 6, 6, 512)	4719104	concatenate_2[0][0]
batch_normalization_50 (BatchNo (None, 6, 6, 512)	2048	conv2d_transpose_2[0][0]
activation_67 (Activation) (None, 6, 6, 512)	0	batch_normalization_50[0][0]
conv2d_49 (Conv2D) (None, 6, 6, 512)	2359808	activation_67[0][0]
batch_normalization_51 (BatchNo (None, 6, 6, 512)	2048	conv2d_49[0][0]
activation_68 (Activation) (None, 6, 6, 512)	0	batch_normalization_51[0][0]
conv2d_50 (Conv2D) (None, 6, 6, 512)	2359808	activation_68[0][0]

batch_normalization_52 (BatchNo (None, 6, 6, 512) 2048	conv2d_50[0][0]
activation_69 (Activation) (None, 6, 6, 512) 0	batch_normalization_52[0][0]
add_18 (Add) (None, 6, 6, 512) 0	activation_69[0][0] activation_67[0][0]
activation_70 (Activation) (None, 6, 6, 512) 0	add_18[0][0]
conv2d_51 (Conv2D) (None, 6, 6, 512) 2359808	activation_70[0][0]
batch_normalization_53 (BatchNo (None, 6, 6, 512) 2048	conv2d_51[0][0]
activation_71 (Activation) (None, 6, 6, 512) 0	batch_normalization_53[0][0]
conv2d_52 (Conv2D) (None, 6, 6, 512) 2359808	activation_71[0][0]
batch_normalization_54 (BatchNo (None, 6, 6, 512) 2048	conv2d_52[0][0]
activation_72 (Activation) (None, 6, 6, 512) 0	batch_normalization_54[0][0]
add_19 (Add) (None, 6, 6, 512) 0	activation_72[0][0] activation_70[0][0]
activation_73 (Activation) (None, 6, 6, 512) 0	add_19[0][0]
concatenate_3 (Concatenate) (None, 6, 6, 1024) 0	activation_32[0][0] activation_73[0][0]
conv2d_transpose_3 (Conv2DTrans (None, 12, 12, 256) 2359552	concatenate_3[0][0]
batch_normalization_55 (BatchNo (None, 12, 12, 256) 1024	conv2d_transpose_3[0][0]
activation_74 (Activation) (None, 12, 12, 256) 0	batch_normalization_55[0][0]
conv2d_53 (Conv2D) (None, 12, 12, 256) 590080	activation_74[0][0]
batch_normalization_56 (BatchNo (None, 12, 12, 256) 1024	conv2d_53[0][0]
activation_75 (Activation) (None, 12, 12, 256) 0	batch_normalization_56[0][0]
conv2d_54 (Conv2D) (None, 12, 12, 256) 590080	activation_75[0][0]
batch_normalization_57 (BatchNo (None, 12, 12, 256) 1024	conv2d_54[0][0]
activation_76 (Activation) (None, 12, 12, 256) 0	batch_normalization_57[0][0]
add_20 (Add) (None, 12, 12, 256) 0	activation_76[0][0] activation_74[0][0]
activation_77 (Activation) (None, 12, 12, 256) 0	add_20[0][0]
conv2d_55 (Conv2D) (None, 12, 12, 256) 590080	activation_77[0][0]
batch_normalization_58 (BatchNo (None, 12, 12, 256) 1024	conv2d_55[0][0]
activation_78 (Activation) (None, 12, 12, 256) 0	batch_normalization_58[0][0]

conv2d_56 (Conv2D)	(None, 12, 12, 256)	590080	activation_78[0][0]
batch_normalization_59 (BatchNo	(None, 12, 12, 256)	1024	conv2d_56[0][0]
activation_79 (Activation)	(None, 12, 12, 256)	0	batch_normalization_59[0][0]
add_21 (Add)	(None, 12, 12, 256)	0	activation_79[0][0] activation_77[0][0]
activation_80 (Activation)	(None, 12, 12, 256)	0	add_21[0][0]
concatenate_4 (Concatenate)	(None, 12, 12, 512)	0	activation_25[0][0] activation_80[0][0]
conv2d_transpose_4 (Conv2DTrans	(None, 24, 24, 128)	589952	concatenate_4[0][0]
batch_normalization_60 (BatchNo	(None, 24, 24, 128)	512	conv2d_transpose_4[0][0]
activation_81 (Activation)	(None, 24, 24, 128)	0	batch_normalization_60[0][0]
conv2d_57 (Conv2D)	(None, 24, 24, 128)	147584	activation_81[0][0]
batch_normalization_61 (BatchNo	(None, 24, 24, 128)	512	conv2d_57[0][0]
activation_82 (Activation)	(None, 24, 24, 128)	0	batch_normalization_61[0][0]
conv2d_58 (Conv2D)	(None, 24, 24, 128)	147584	activation_82[0][0]
batch_normalization_62 (BatchNo	(None, 24, 24, 128)	512	conv2d_58[0][0]
activation_83 (Activation)	(None, 24, 24, 128)	0	batch_normalization_62[0][0]
add_22 (Add)	(None, 24, 24, 128)	0	activation_83[0][0] activation_81[0][0]
activation_84 (Activation)	(None, 24, 24, 128)	0	add_22[0][0]
conv2d_59 (Conv2D)	(None, 24, 24, 128)	147584	activation_84[0][0]
batch_normalization_63 (BatchNo	(None, 24, 24, 128)	512	conv2d_59[0][0]
activation_85 (Activation)	(None, 24, 24, 128)	0	batch_normalization_63[0][0]
conv2d_60 (Conv2D)	(None, 24, 24, 128)	147584	activation_85[0][0]
batch_normalization_64 (BatchNo	(None, 24, 24, 128)	512	conv2d_60[0][0]
activation_86 (Activation)	(None, 24, 24, 128)	0	batch_normalization_64[0][0]
add_23 (Add)	(None, 24, 24, 128)	0	activation_86[0][0] activation_84[0][0]
activation_87 (Activation)	(None, 24, 24, 128)	0	add_23[0][0]
concatenate_5 (Concatenate)	(None, 24, 24, 256)	0	activation_18[0][0] activation_87[0][0]

conv2d_transpose_5 (Conv2DTrans (None, 48, 48, 64)	147520	concatenate_5[0][0]
batch_normalization_65 (BatchNo (None, 48, 48, 64)	256	conv2d_transpose_5[0][0]
activation_88 (Activation) (None, 48, 48, 64)	0	batch_normalization_65[0][0]
conv2d_61 (Conv2D) (None, 48, 48, 64)	36928	activation_88[0][0]
batch_normalization_66 (BatchNo (None, 48, 48, 64)	256	conv2d_61[0][0]
activation_89 (Activation) (None, 48, 48, 64)	0	batch_normalization_66[0][0]
conv2d_62 (Conv2D) (None, 48, 48, 64)	36928	activation_89[0][0]
batch_normalization_67 (BatchNo (None, 48, 48, 64)	256	conv2d_62[0][0]
activation_90 (Activation) (None, 48, 48, 64)	0	batch_normalization_67[0][0]
add_24 (Add) (None, 48, 48, 64)	0	activation_90[0][0] activation_88[0][0]
activation_91 (Activation) (None, 48, 48, 64)	0	add_24[0][0]
conv2d_63 (Conv2D) (None, 48, 48, 64)	36928	activation_91[0][0]
batch_normalization_68 (BatchNo (None, 48, 48, 64)	256	conv2d_63[0][0]
activation_92 (Activation) (None, 48, 48, 64)	0	batch_normalization_68[0][0]
conv2d_64 (Conv2D) (None, 48, 48, 64)	36928	activation_92[0][0]
batch_normalization_69 (BatchNo (None, 48, 48, 64)	256	conv2d_64[0][0]
activation_93 (Activation) (None, 48, 48, 64)	0	batch_normalization_69[0][0]
add_25 (Add) (None, 48, 48, 64)	0	activation_93[0][0] activation_91[0][0]
activation_94 (Activation) (None, 48, 48, 64)	0	add_25[0][0]
concatenate_6 (Concatenate) (None, 48, 48, 128)	0	activation_8[0][0] activation_94[0][0]
conv2d_transpose_6 (Conv2DTrans (None, 96, 96, 32)	36896	concatenate_6[0][0]
batch_normalization_70 (BatchNo (None, 96, 96, 32)	128	conv2d_transpose_6[0][0]
activation_95 (Activation) (None, 96, 96, 32)	0	batch_normalization_70[0][0]
concatenate_7 (Concatenate) (None, 96, 96, 64)	0	activation_1[0][0] activation_95[0][0]
conv2d_65 (Conv2D) (None, 96, 96, 16)	9232	concatenate_7[0][0]
batch_normalization_71 (BatchNo (None, 96, 96, 16)	64	conv2d_65[0][0]
activation_96 (Activation) (None, 96, 96, 16)	0	batch_normalization_71[0][0]

```

conv2d_66 (Conv2D)      (None, 96, 96, 16) 2320  activation_96[0][0]
-----
batch_normalization_72 (BatchNo (None, 96, 96, 16) 64  conv2d_66[0][0]
-----
activation_97 (Activation) (None, 96, 96, 16) 0  batch_normalization_72[0][0]
-----
conv2d_67 (Conv2D)      (None, 96, 96, 3) 51  activation_97[0][0]
-----
prediction (Activation) (None, 96, 96, 3) 0  conv2d_67[0][0]
=====
Total params: 49,573,971
Trainable params: 49,543,123
Non-trainable params: 30,848

```

DISCRIMINATOR NETWORK

```

Layer (type)      Output Shape  Param #  Connected to
-----
input_audio (InputLayer) (None, 80, 27, 1) 0
-----
conv2d_74 (Conv2D)      (None, 80, 27, 32) 320  input_audio[0][0]
-----
input_face_disc (InputLayer) (None, 96, 96, 3) 0
-----
instance_normalization_6 (Insta (None, 80, 27, 32) 2  conv2d_74[0][0]
-----
conv2d_68 (Conv2D)      (None, 48, 48, 64) 9472  input_face_disc[0][0]
-----
leaky_re_lu_6 (LeakyReLU) (None, 80, 27, 32) 0  instance_normalization_6[0][0]
-----
instance_normalization_1 (Insta (None, 48, 48, 64) 2  conv2d_68[0][0]
-----
conv2d_75 (Conv2D)      (None, 27, 9, 64) 18496  leaky_re_lu_6[0][0]
-----
leaky_re_lu_1 (LeakyReLU) (None, 48, 48, 64) 0  instance_normalization_1[0][0]
-----
instance_normalization_7 (Insta (None, 27, 9, 64) 2  conv2d_75[0][0]
-----
conv2d_69 (Conv2D)      (None, 24, 24, 128) 204928  leaky_re_lu_1[0][0]
-----
leaky_re_lu_7 (LeakyReLU) (None, 27, 9, 64) 0  instance_normalization_7[0][0]
-----
instance_normalization_2 (Insta (None, 24, 24, 128) 2  conv2d_69[0][0]
-----
conv2d_76 (Conv2D)      (None, 9, 9, 128) 73856  leaky_re_lu_7[0][0]
-----
leaky_re_lu_2 (LeakyReLU) (None, 24, 24, 128) 0  instance_normalization_2[0][0]
-----
instance_normalization_8 (Insta (None, 9, 9, 128) 2  conv2d_76[0][0]
-----
conv2d_70 (Conv2D)      (None, 12, 12, 256) 295168  leaky_re_lu_2[0][0]
-----
leaky_re_lu_8 (LeakyReLU) (None, 9, 9, 128) 0  instance_normalization_8[0][0]

```

instance_normalization_3 (Insta	(None, 12, 12, 256)	2	conv2d_70[0][0]
conv2d_77 (Conv2D)	(None, 3, 3, 256)	295168	leaky_re_lu_8[0][0]
leaky_re_lu_3 (LeakyReLU)	(None, 12, 12, 256)	0	instance_normalization_3[0][0]
instance_normalization_9 (Insta	(None, 3, 3, 256)	2	conv2d_77[0][0]
conv2d_71 (Conv2D)	(None, 6, 6, 512)	1180160	leaky_re_lu_3[0][0]
leaky_re_lu_9 (LeakyReLU)	(None, 3, 3, 256)	0	instance_normalization_9[0][0]
instance_normalization_4 (Insta	(None, 6, 6, 512)	2	conv2d_71[0][0]
conv2d_78 (Conv2D)	(None, 1, 1, 512)	1180160	leaky_re_lu_9[0][0]
leaky_re_lu_4 (LeakyReLU)	(None, 6, 6, 512)	0	instance_normalization_4[0][0]
instance_normalization_10 (Inst	(None, 1, 1, 512)	2	conv2d_78[0][0]
conv2d_72 (Conv2D)	(None, 3, 3, 512)	2359808	leaky_re_lu_4[0][0]
leaky_re_lu_10 (LeakyReLU)	(None, 1, 1, 512)	0	instance_normalization_10[0][0]
instance_normalization_5 (Insta	(None, 3, 3, 512)	2	conv2d_72[0][0]
conv2d_79 (Conv2D)	(None, 1, 1, 512)	262656	leaky_re_lu_10[0][0]
leaky_re_lu_5 (LeakyReLU)	(None, 3, 3, 512)	0	instance_normalization_5[0][0]
instance_normalization_11 (Inst	(None, 1, 1, 512)	2	conv2d_79[0][0]
conv2d_73 (Conv2D)	(None, 1, 1, 512)	2359808	leaky_re_lu_5[0][0]
leaky_re_lu_11 (LeakyReLU)	(None, 1, 1, 512)	0	instance_normalization_11[0][0]
flatten_1 (Flatten)	(None, 512)	0	conv2d_73[0][0]
flatten_2 (Flatten)	(None, 512)	0	leaky_re_lu_11[0][0]
lambda_1 (Lambda)	(None, 512)	0	flatten_1[0][0] flatten_2[0][0]
lambda_2 (Lambda)	(None, 1)	0	lambda_1[0][0] lambda_1[1][0]

=====
Total params: 8,240,022
Trainable params: 8,240,022
Non-trainable params: 0

Lip-GAN model

Layer (type)	Output Shape	Param #	Connected to
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=====

input_face_comb (InputLayer) (None, 96, 96, 6) 0

input_audio_comb (InputLayer) (None, 80, 27, 1) 0

model_1 (Model) (None, 96, 96, 3) 49573971 input_face_comb[0][0]
input_audio_comb[0][0]

model_2 (Model) (None, 1) 8240022 model_1[1][0]
input_audio_comb[0][0]

=====
Total params: 57,813,993
Trainable params: 49,543,123
Non-trainable params: 8,270,870