

# Areas of Performance Improvement

# Recap : Performance Comparison

Layer (type)	Output Shape	Param #
conv2d_3 (Conv2D)	(None, 224, 224, 125)	9500
max_pooling2d_1 (MaxPooling2D)	(None, 56, 56, 125)	0
conv2d_4 (Conv2D)	(None, 56, 56, 150)	468900
max_pooling2d_2 (MaxPooling2D)	(None, 14, 14, 150)	0
conv2d_5 (Conv2D)	(None, 14, 14, 200)	750200
max_pooling2d_3 (MaxPooling2D)	(None, 3, 3, 200)	0
flatten_2 (Flatten)	(None, 1800)	0
dense_3 (Dense)	(None, 1024)	1844224
dense_4 (Dense)	(None, 1)	1025
Total params: 3,073,849		
Trainable params: 3,073,849		
Non-trainable params: 0		

Simple CNN Model ~82%

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base_model.summary()
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Layer (type)	Output Shape	Param #
input_2 (InputLayer)	(None, 224, 224, 3)	0
block1_conv1 (Conv2D)	(None, 224, 224, 64)	1792
block1_conv2 (Conv2D)	(None, 224, 224, 64)	36928
block1_pool (MaxPooling2D)	(None, 112, 112, 64)	0
block2_conv1 (Conv2D)	(None, 112, 112, 128)	73856
block2_conv2 (Conv2D)	(None, 112, 112, 128)	147584
block2_pool (MaxPooling2D)	(None, 56, 56, 128)	0
block3_conv1 (Conv2D)	(None, 56, 56, 256)	295168
block3_conv2 (Conv2D)	(None, 56, 56, 256)	590080
block3_conv3 (Conv2D)	(None, 56, 56, 256)	590080
block3_pool (MaxPooling2D)	(None, 28, 28, 256)	0
block4_conv1 (Conv2D)	(None, 28, 28, 512)	1180160
block4_conv2 (Conv2D)	(None, 28, 28, 512)	2359808
block4_conv3 (Conv2D)	(None, 28, 28, 512)	2359808
block4_pool (MaxPooling2D)	(None, 14, 14, 512)	0
block5_conv1 (Conv2D)	(None, 14, 14, 512)	2359808
block5_conv2 (Conv2D)	(None, 14, 14, 512)	2359808
block5_conv3 (Conv2D)	(None, 14, 14, 512)	2359808
block5_pool (MaxPooling2D)	(None, 7, 7, 512)	0

Total params: 14,714,688  
Trainable params: 14,714,688  
Non-trainable params: 0

```
model.summary()
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Layer (type)	Output Shape	Param #
dense_3 (Dense)	(None, 1024)	25691136
dense_4 (Dense)	(None, 2)	2050

Total params: 25,693,186  
Trainable params: 25,693,186  
Non-trainable params: 0

Pre-trained Model ~92%

# Recap : Performance Comparison

Layer (type)	Output Shape	Param #
conv2d_14 (Conv2D)	(None, 224, 224, 64)	1792
conv2d_15 (Conv2D)	(None, 224, 224, 64)	36928
max_pooling2d_6 (MaxPooling2D)	(None, 112, 112, 64)	0
conv2d_16 (Conv2D)	(None, 112, 112, 128)	73856
conv2d_17 (Conv2D)	(None, 112, 112, 128)	147584
max_pooling2d_7 (MaxPooling2D)	(None, 56, 56, 128)	0
conv2d_18 (Conv2D)	(None, 56, 56, 256)	295168
conv2d_19 (Conv2D)	(None, 56, 56, 256)	590080
conv2d_20 (Conv2D)	(None, 56, 56, 256)	590080
max_pooling2d_8 (MaxPooling2D)	(None, 28, 28, 256)	0
conv2d_21 (Conv2D)	(None, 28, 28, 256)	590080
conv2d_22 (Conv2D)	(None, 28, 28, 256)	590080
conv2d_23 (Conv2D)	(None, 28, 28, 256)	590080
max_pooling2d_9 (MaxPooling2D)	(None, 14, 14, 256)	0
conv2d_24 (Conv2D)	(None, 14, 14, 512)	1180160
conv2d_25 (Conv2D)	(None, 14, 14, 512)	2359808
conv2d_26 (Conv2D)	(None, 14, 14, 512)	2359808
max_pooling2d_10 (MaxPooling2D)	(None, 7, 7, 512)	0
flatten_2 (Flatten)	(None, 25088)	0
dense_4 (Dense)	(None, 1024)	25691136
dropout_3 (Dropout)	(None, 1024)	0
dense_5 (Dense)	(None, 2)	2050
Total params: 35,098,690		
Trainable params: 35,098,690		
Non-trainable params: 0		

VGG architecture ~ 85%

base_model.summary()		
Layer (type)	Output Shape	Param #
input_2 (InputLayer)	(None, 224, 224, 3)	0
block1_conv1 (Conv2D)	(None, 224, 224, 64)	1792
block1_conv2 (Conv2D)	(None, 224, 224, 64)	36928
block1_pool (MaxPooling2D)	(None, 112, 112, 64)	0
block2_conv1 (Conv2D)	(None, 112, 112, 128)	73856
block2_conv2 (Conv2D)	(None, 112, 112, 128)	147584
block2_pool (MaxPooling2D)	(None, 56, 56, 128)	0
block3_conv1 (Conv2D)	(None, 56, 56, 256)	295168
block3_conv2 (Conv2D)	(None, 56, 56, 256)	590080
block3_conv3 (Conv2D)	(None, 56, 56, 256)	590080
block3_pool (MaxPooling2D)	(None, 28, 28, 256)	0
block4_conv1 (Conv2D)	(None, 28, 28, 512)	1180160
block4_conv2 (Conv2D)	(None, 28, 28, 512)	2359808
block4_conv3 (Conv2D)	(None, 28, 28, 512)	2359808
block4_pool (MaxPooling2D)	(None, 14, 14, 512)	0
block5_conv1 (Conv2D)	(None, 14, 14, 512)	2359808
block5_conv2 (Conv2D)	(None, 14, 14, 512)	2359808
block5_conv3 (Conv2D)	(None, 14, 14, 512)	2359808
block5_pool (MaxPooling2D)	(None, 7, 7, 512)	0
Total params: 14,714,688		
Trainable params: 14,714,688		
Non-trainable params: 0		

model.summary()		
Layer (type)	Output Shape	Param #
dense_3 (Dense)	(None, 1024)	25691136
dense_4 (Dense)	(None, 2)	2050
Total params: 25,693,186		
Trainable params: 25,693,186		
Non-trainable params: 0		

Pre-trained Model ~92%

# Reasons for low Model Performance

**Less Data to  
train**

**High Variation  
in Data**

**Overfitting**

**Underfitting**

**Training time  
too high**

**No  
appropriate  
Architecture  
for the  
problem**

**Wrong  
Evaluation  
Metric for the  
Problem**

Thank You