# Computer Vision - EX 1

Lior Soffer 203135058

Idan Daniel 308088624

# A: Chapter 4

## Q18 and Q20 : What is Xception pre-trained on?

pretrained version of the network trained on **more than a million images from the ImageNet database** . The pretrained network can classify images into 1000 object categories, such as keyboard, mouse, pencil, and many animals.

The researches conduct their comparison on two image classification tasks: one is the well-known 1000-class single-label classification task on the ImageNet dataset , and the other is a 17,000-class multi-label classification task on the large-scale JFT dataset.

## Q19: What are the basic building blocks of Xception?

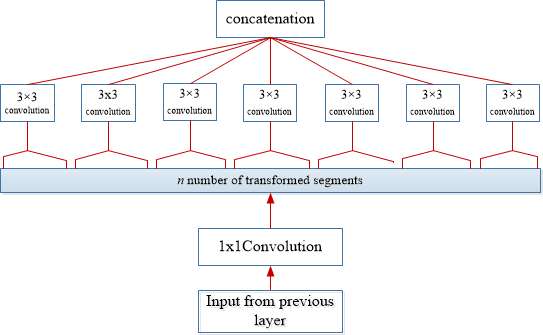
Xception basic building block is **depthwise Separable Convolutions**.

1.     **Depthwise convolution** is the **channel-wise n×n spatial convolution**. Suppose in the figure above, we have 3 channels, then we will have 3 n×n spatial convolution.

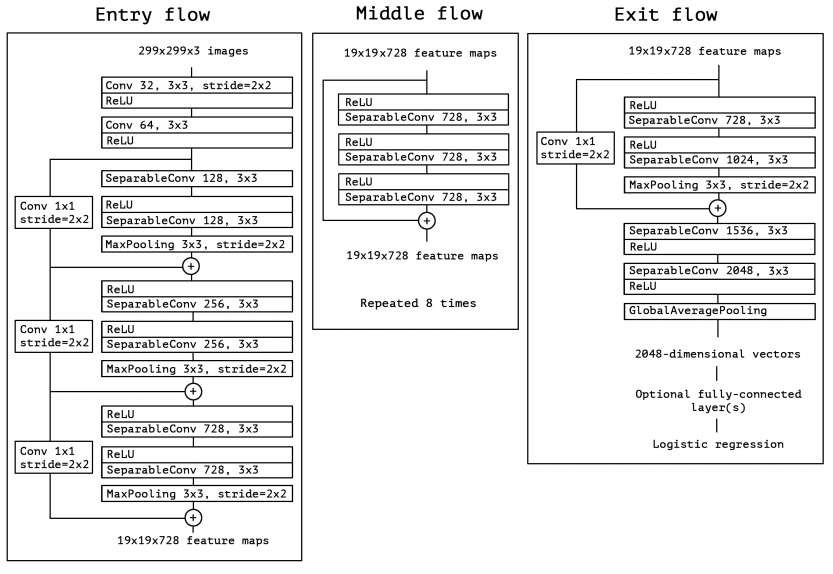
2.    **Pointwise convolution** actually is the **1×1 convolution** to change the dimension.

Compared with conventional convolution, we do not need to perform convolution across all channels. That means **the number of connections are fewer and the model is lighter.**

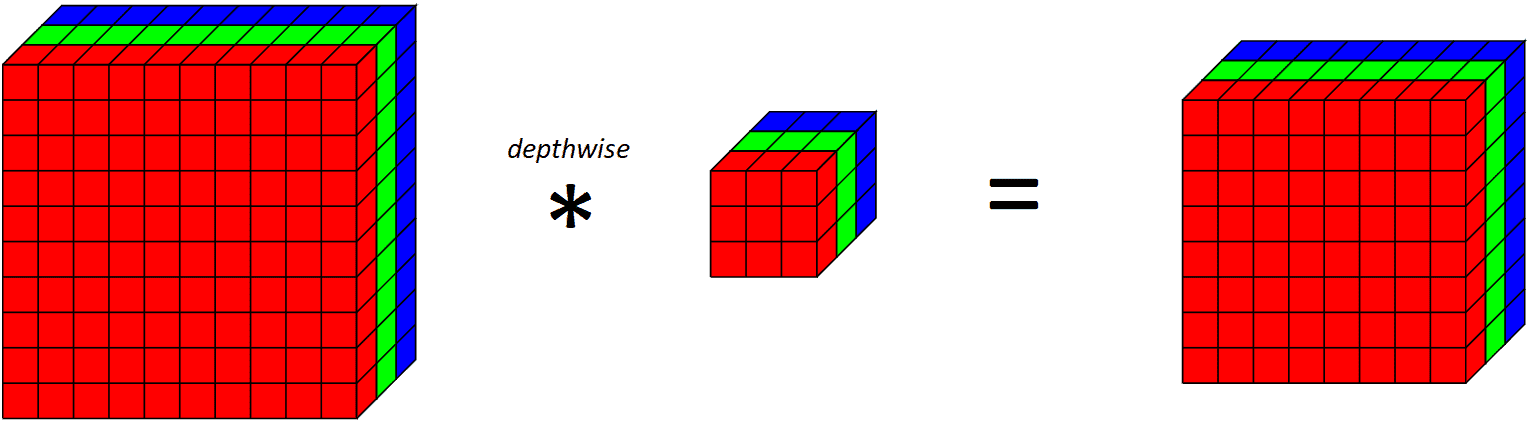
The modified depthwise separable convolution is the **pointwise convolution followed by a depthwise convolution**. **In Xception**.



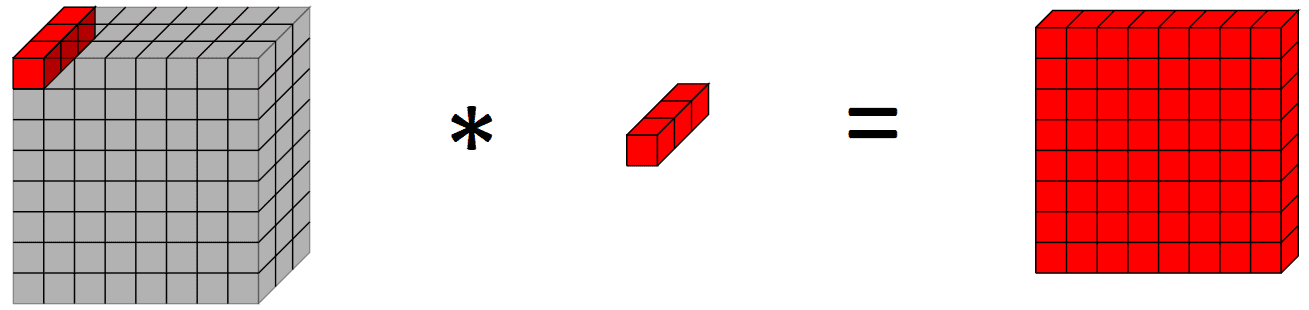
depthwise Separable Convolutions diagram



Xception model diagram



Applying a depthwise convolutional filter on 10x10x3 input volume outputs 8x8x3 volume



Applying a pointwise convolution on a 10x10x3 input volume outputs a 10x10x1 output volume

## Q21: What is the input feature dimension to the final classification block “fc”?

2048.

## Q22: What is the number of parameters the Xception network holds by de-fault? That is, without architectural change and default parameters.

In paper: Xception has 22.8 million parameters.

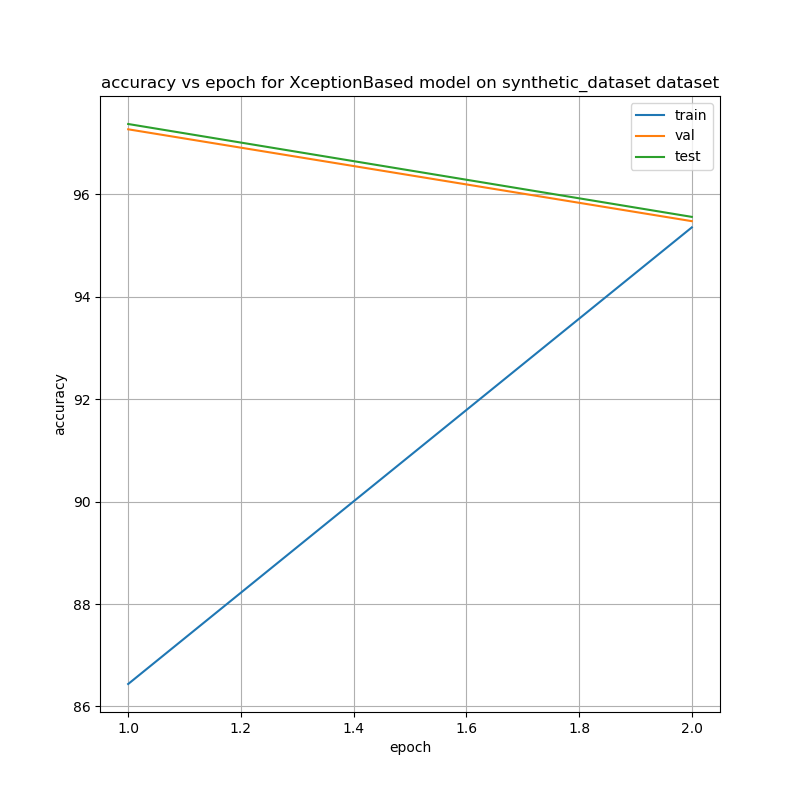
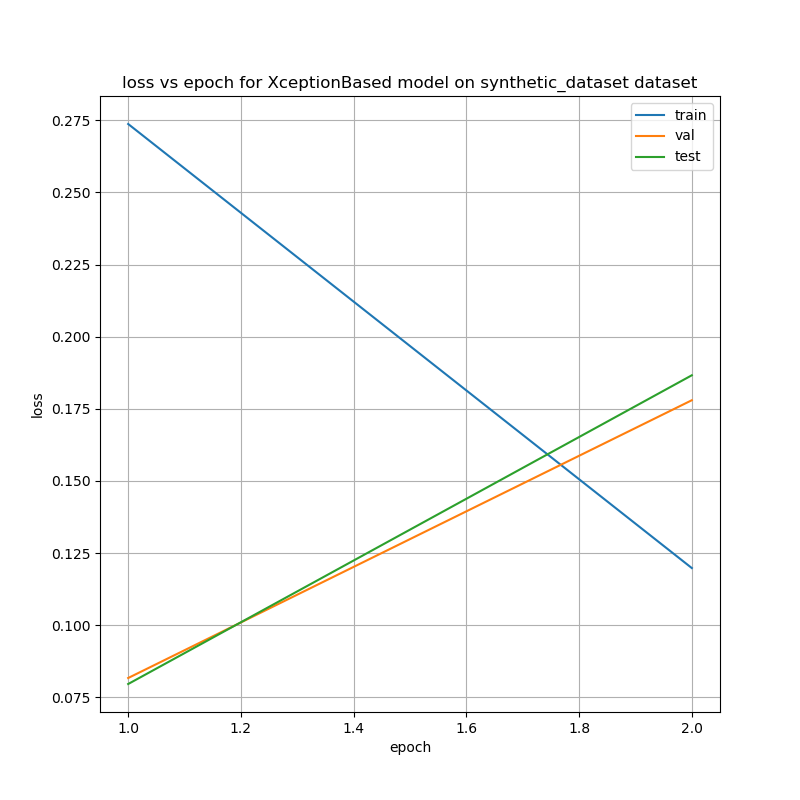
By method: 22,855,952 parameters.

## Q24: How many parameters did we add with the MLP on top of the original Xception’s parameters count?

We added 272,834 parameters.

## Q26: Run the plot accuracy and loss.py script

visualize the data held in the json. figures created:



## Q27: What is the test accuracy corresponding to the highest validation accuaracy you received?

97.2

## Q28: Run the numerical analysis.py script for the Xception-Based network trained on the Synthetic Faces dataset.

