

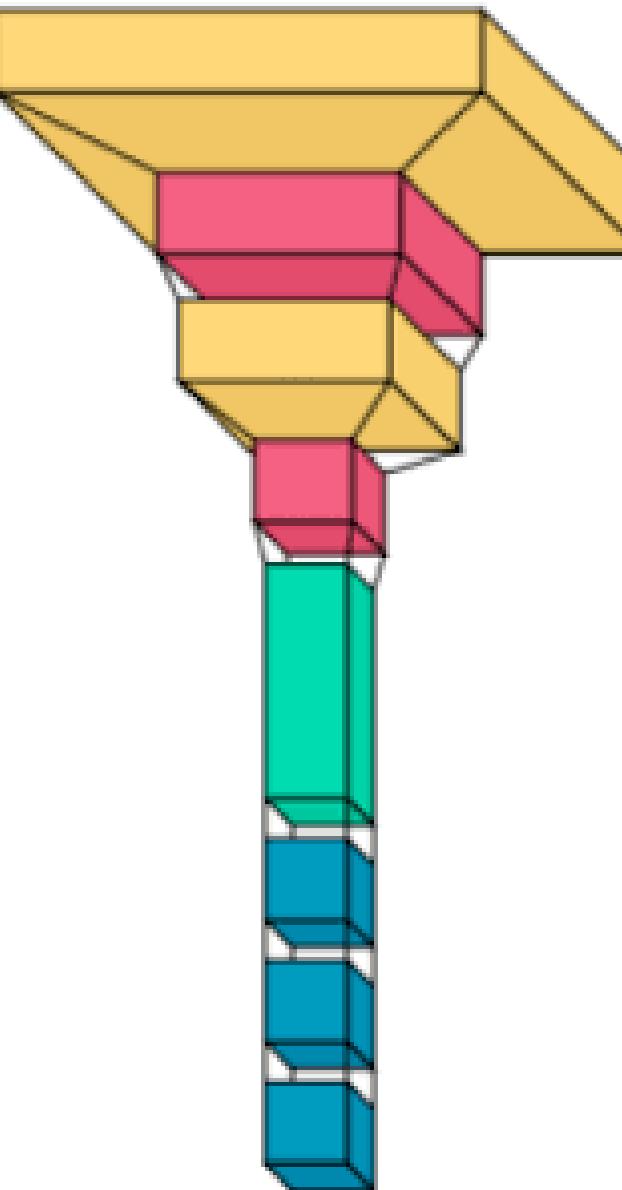
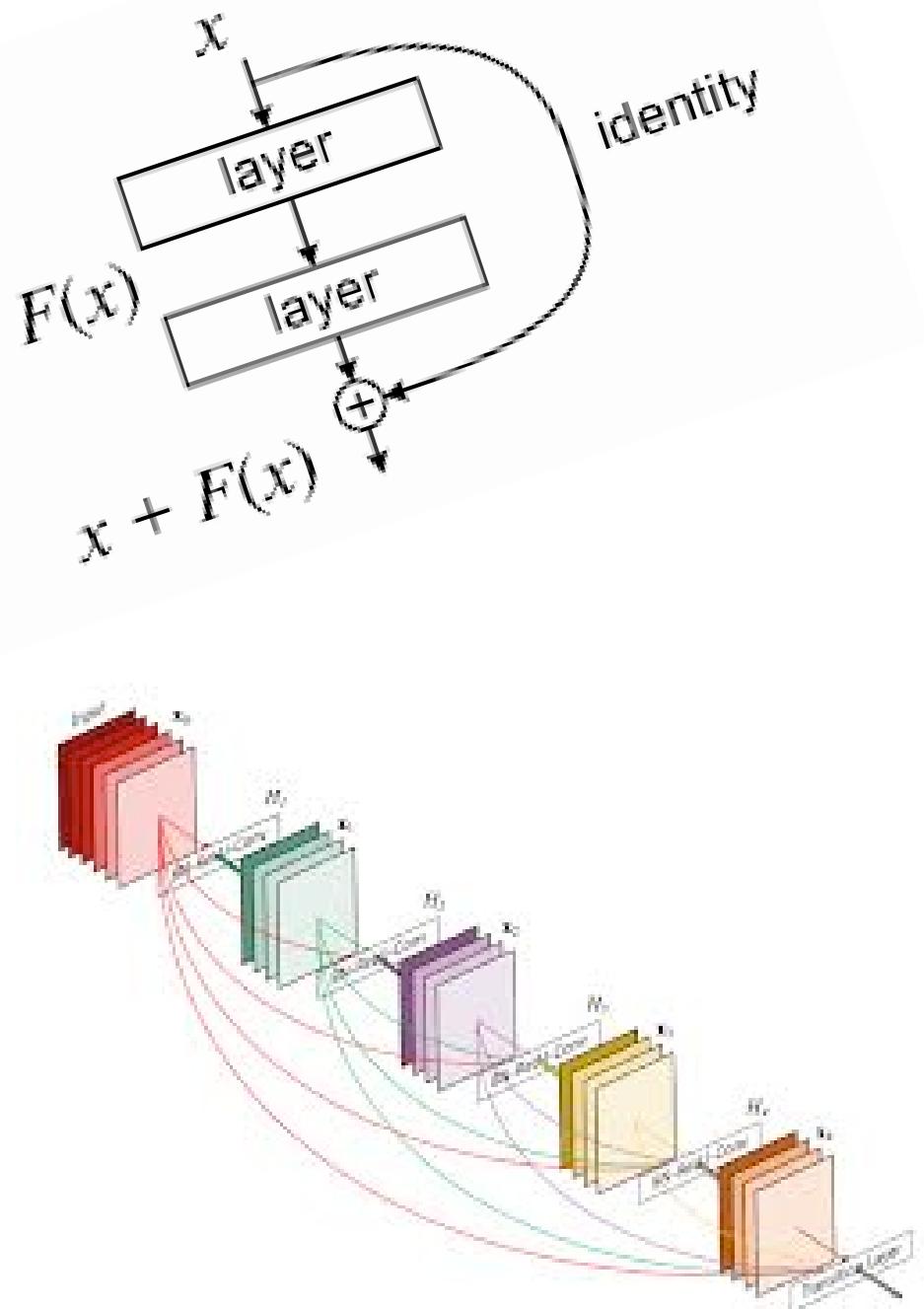
Amity Institute of Information Technology (AIIT)

BCA VI Semester

AIML 203 : Deep Neural Networks

Popular CNN Architectures

Presented By- Chitraksh Mahur, Aditya Pratap Singh



GoogLeNet

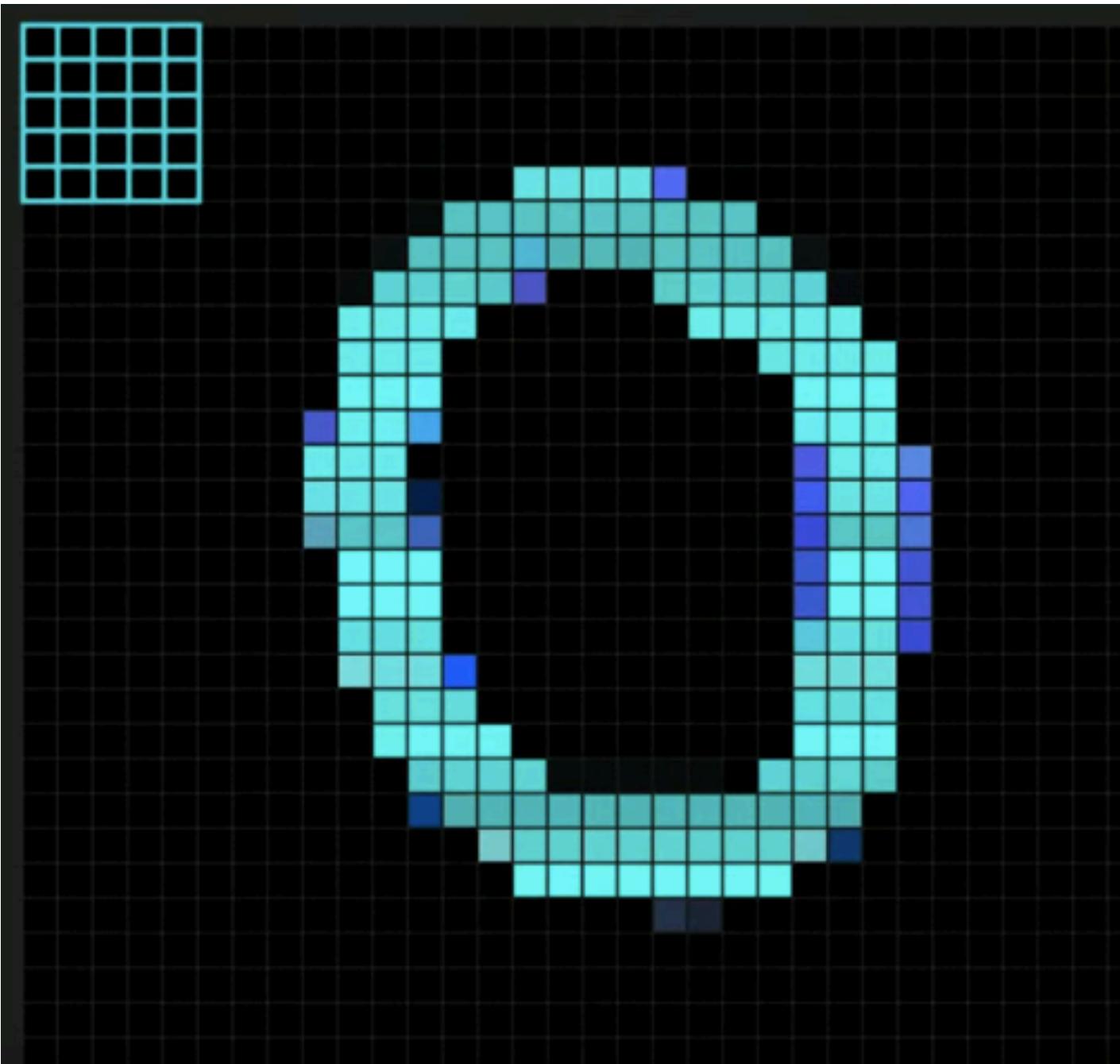


Presented By:
Chitraksh Mahur
Aditya Pratap Singh

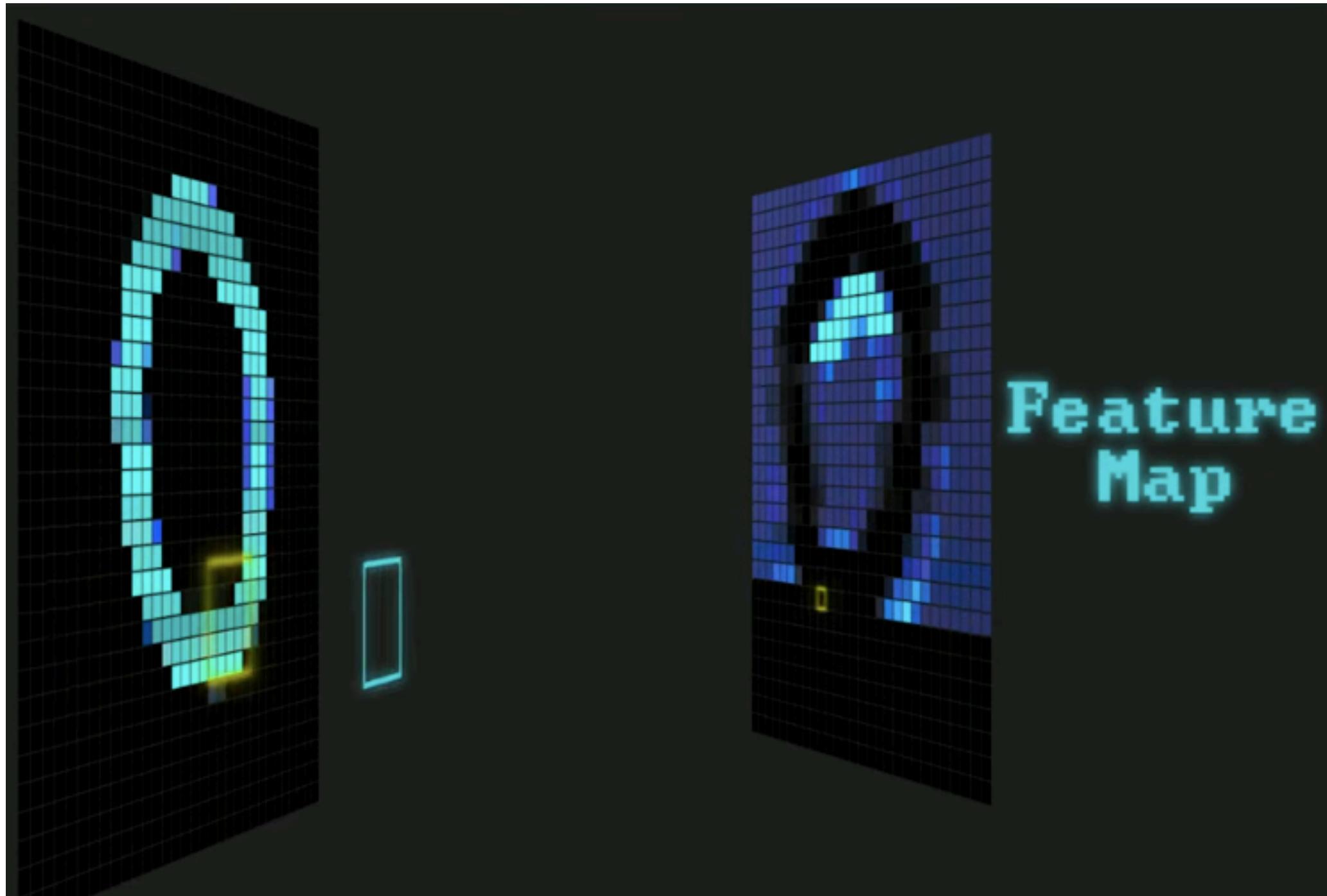
Layers:

- Convolutional Layer
- Pooling Layer
- Fully Connected Layer

Convolutional Layer



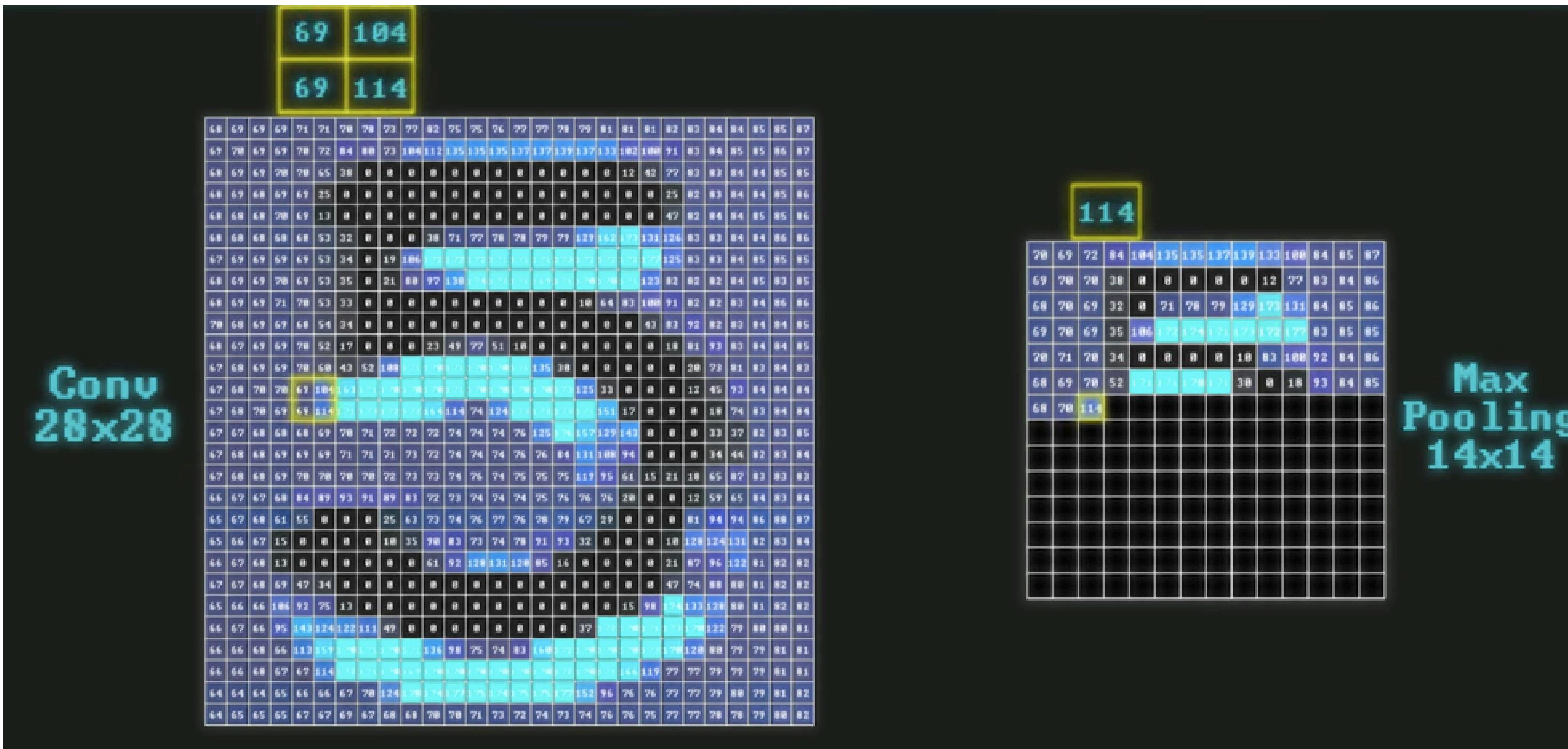
Edge Detection Kernels						
Horizontal				Vertical		
$\begin{matrix} 2 & 2 & 4 & 2 & 2 \\ 1 & 1 & 2 & 1 & 1 \\ 0 & 0 & 0 & 0 & 0 \\ -1 & -1 & -2 & -1 & -1 \\ -2 & -2 & -4 & -2 & -2 \end{matrix}$				$\begin{matrix} 2 & 1 & 0 & -1 & -2 \\ 2 & 1 & 0 & -1 & -2 \\ 4 & 2 & 0 & -2 & -4 \\ 2 & 1 & 0 & -1 & -2 \\ 2 & 1 & 0 & -1 & -2 \end{matrix}$		

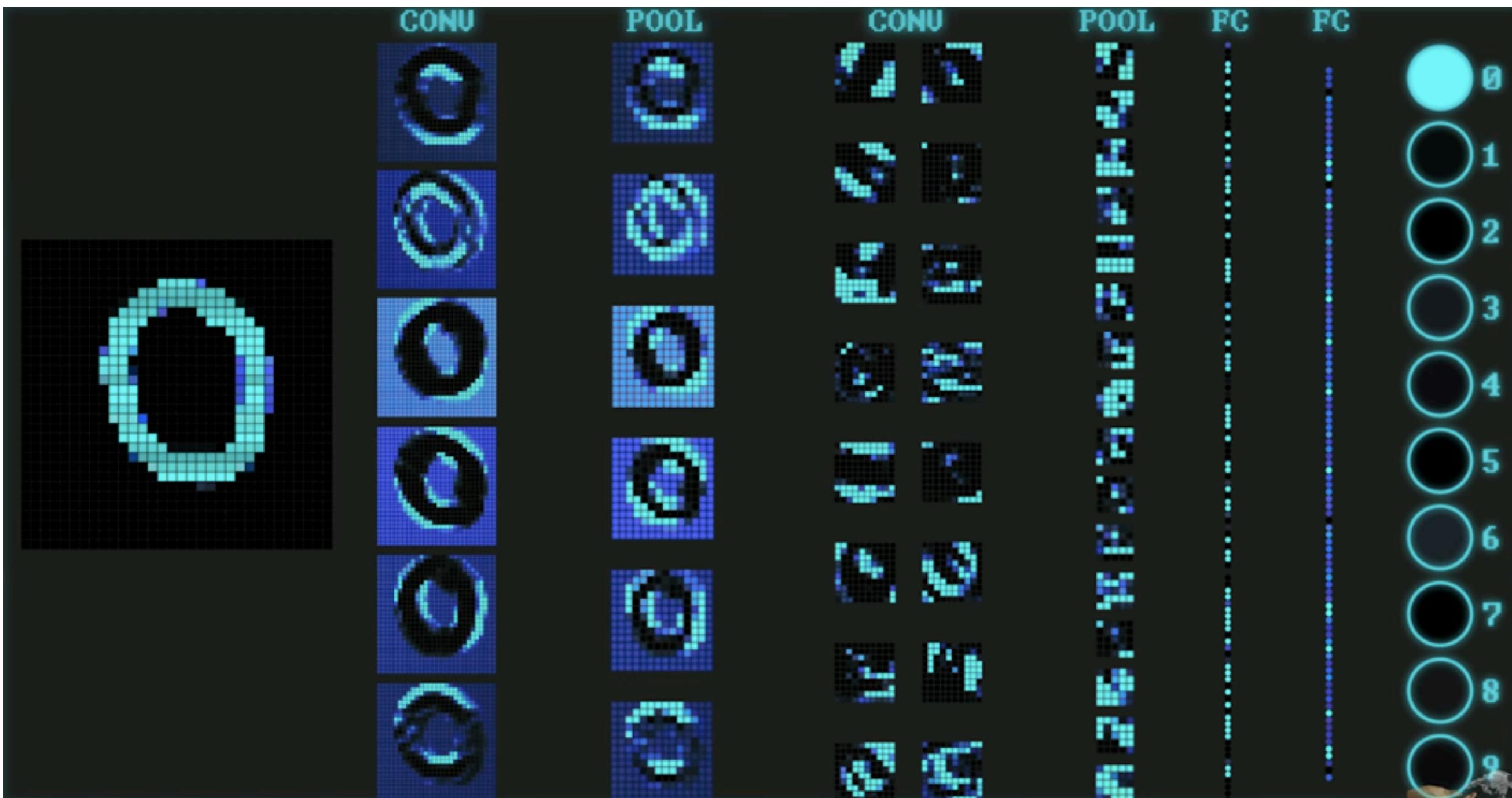


Convolutional Layer in a formula:

$$a_i = \text{ReLU}(z_i), z_i = \sum_{i=1}^k w_i \times a_i + b$$

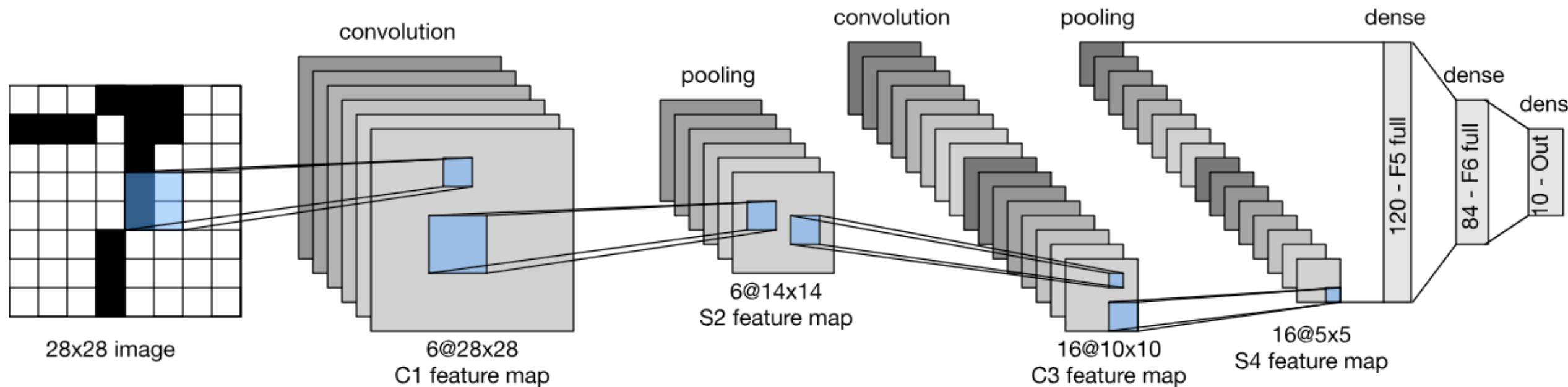
Pooling Layer

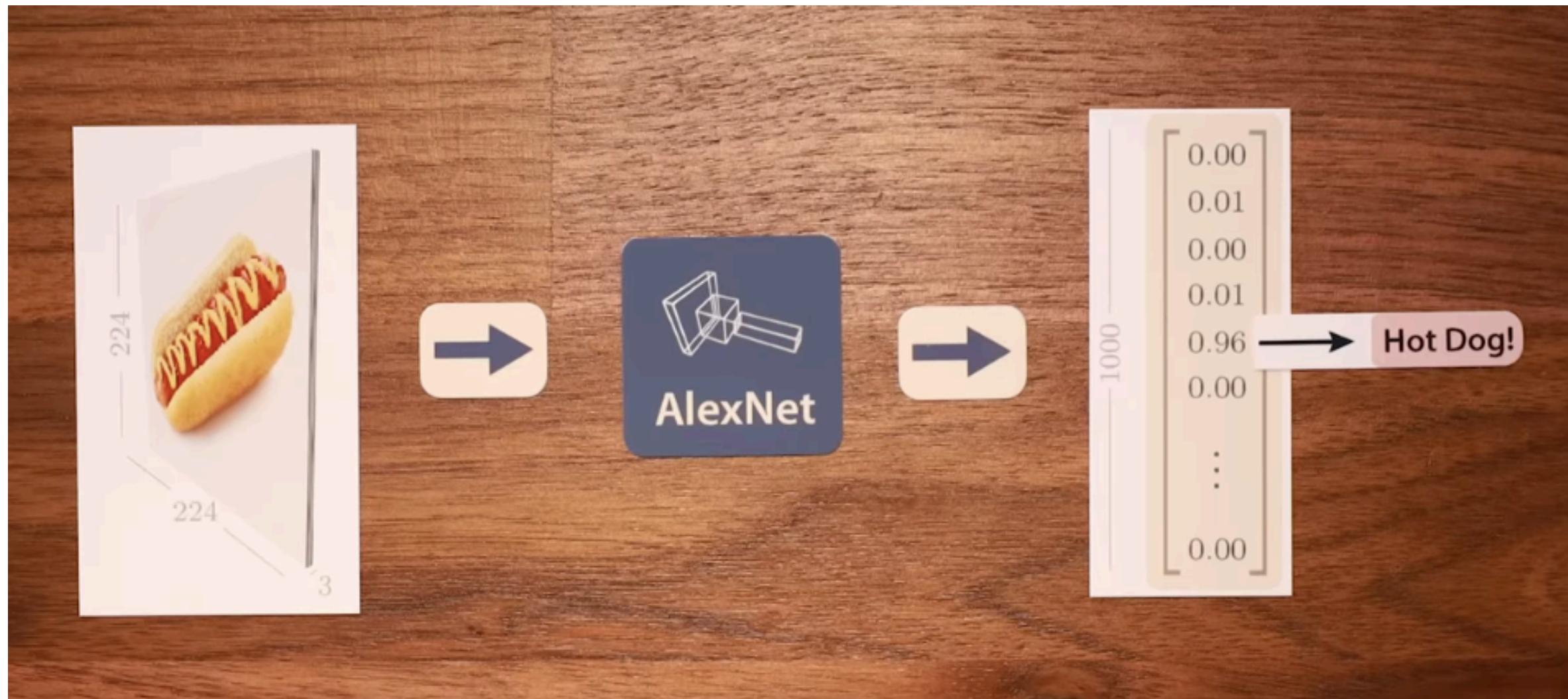




Architecture:

- 2 Convolutional Layers
- 2 AvgPooling Layers
- 3 Fully Connected Layers



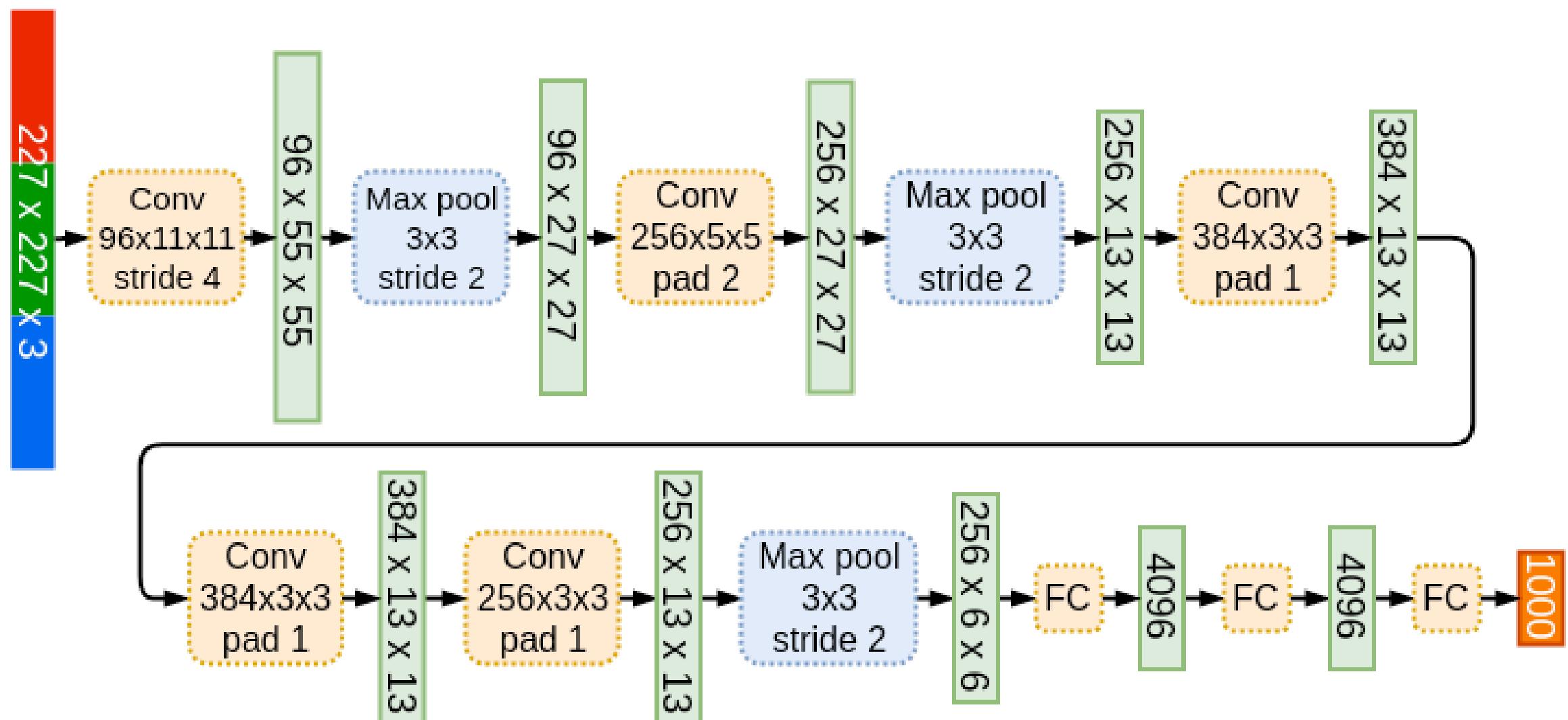


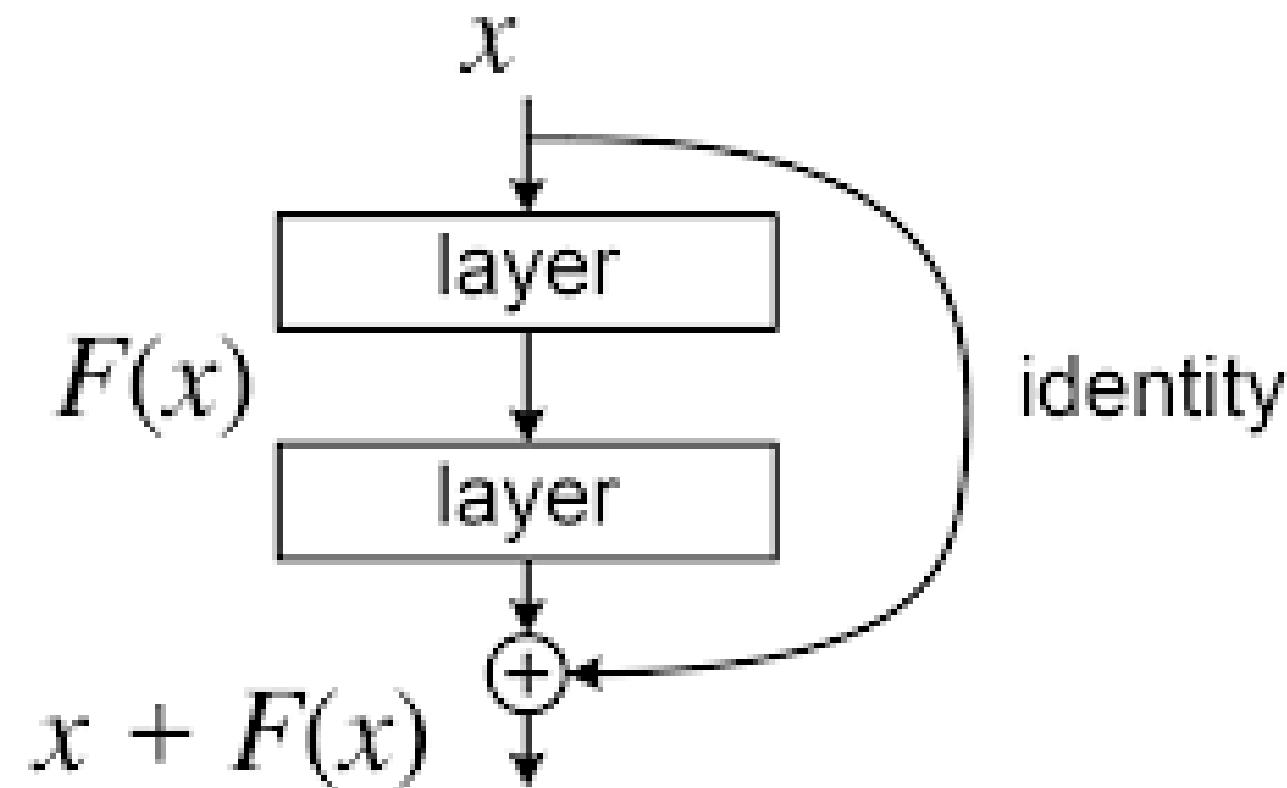
Predicts label for the input image

AlexNet [2012]

Architecture:

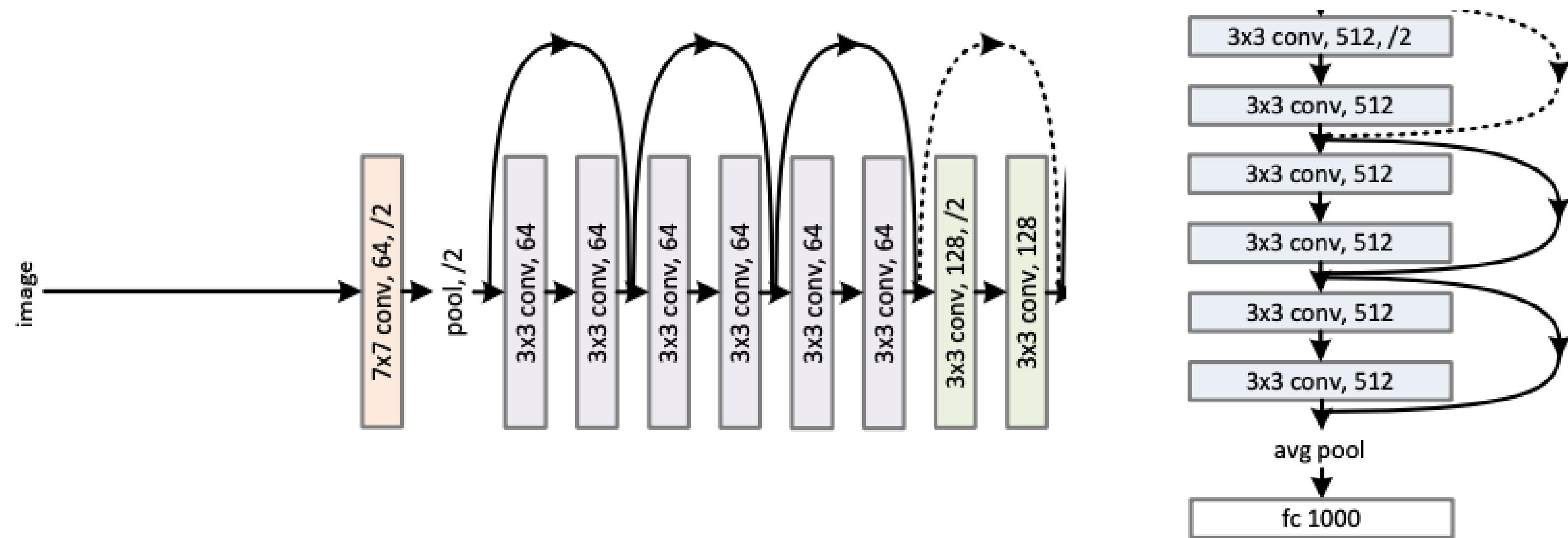
- > 5 Convolutional Layers
- > 3 MaxPooling Layers
- > 2 Normalized Layers
- > 2 Fully Connected Layers
- > 1 Softmax Layer





Building Block of ResNet

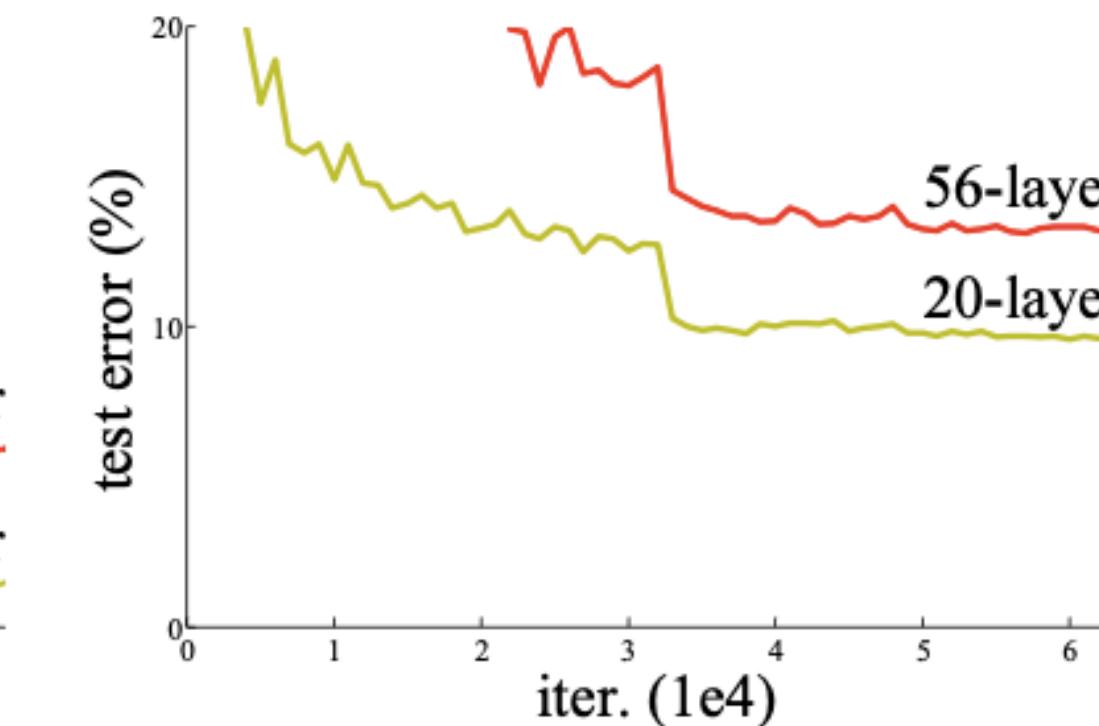
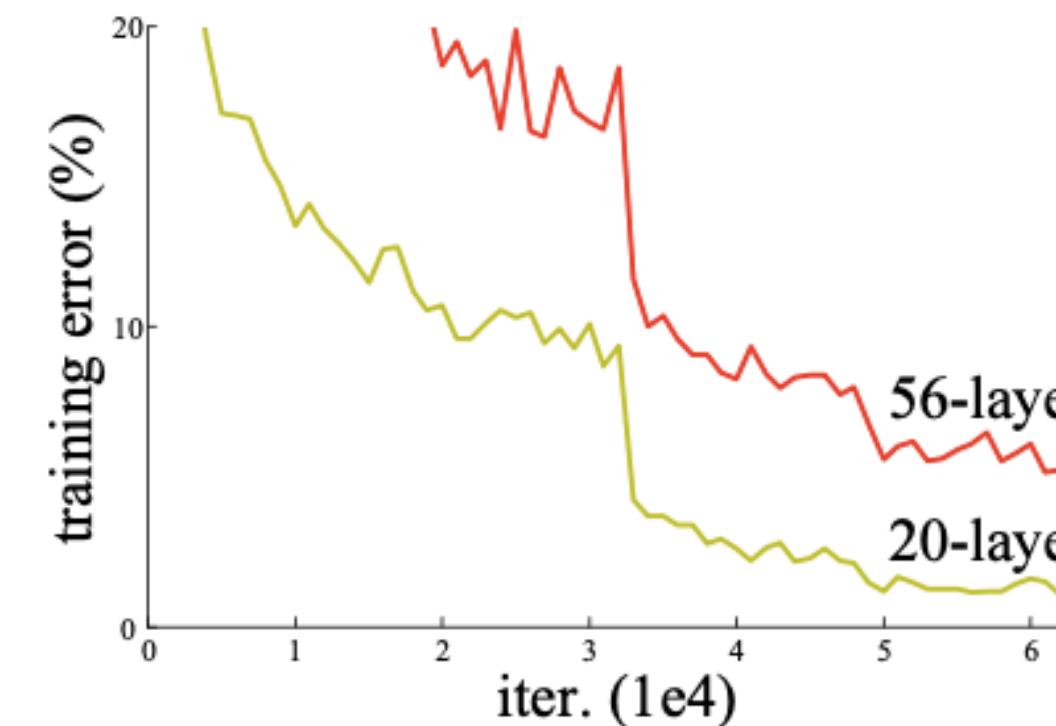
34-layer residual



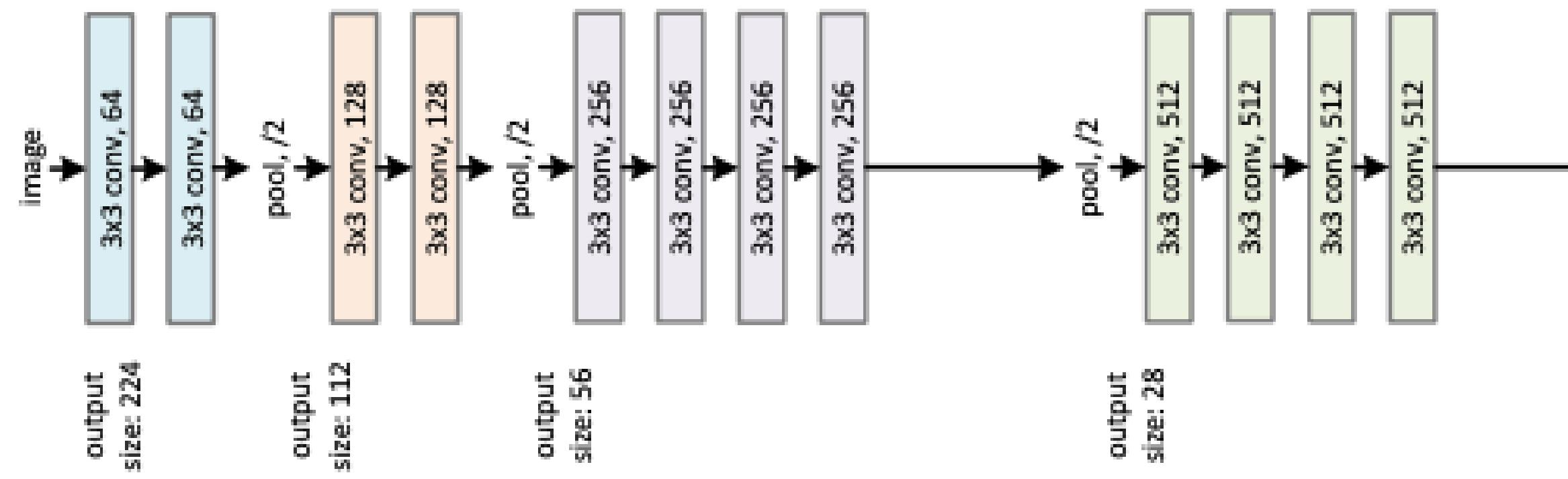
“Skip Connections”

Why the Skip Connections?

- Combats the issue of vanishing gradients
- Very deep networks can be trained

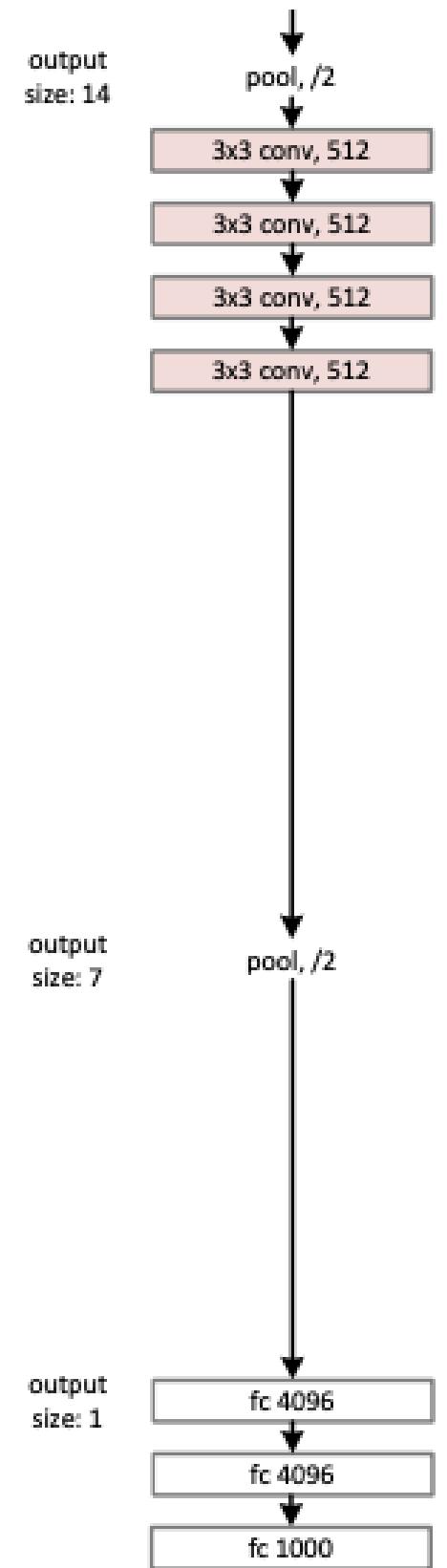


VGG-19



Architecture:

- 16 Convolutional Layers
- 5 MaxPooling Layers
- 3 Fully Connected Layers

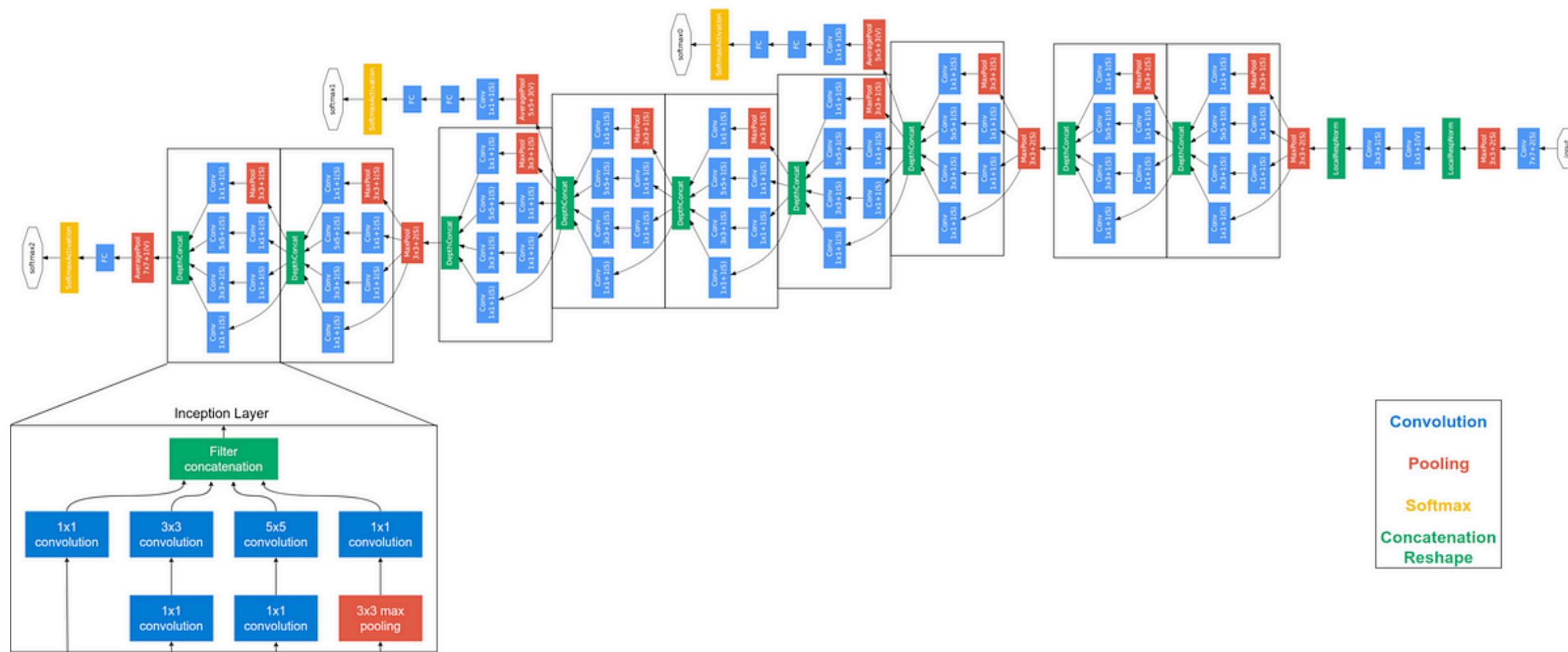


Features:

- Built upon AlexNet
- Uses small 3×3 convolutional filters stacked deeper.
- Uses 2×2 max pooling to reduce spatial dimensions.

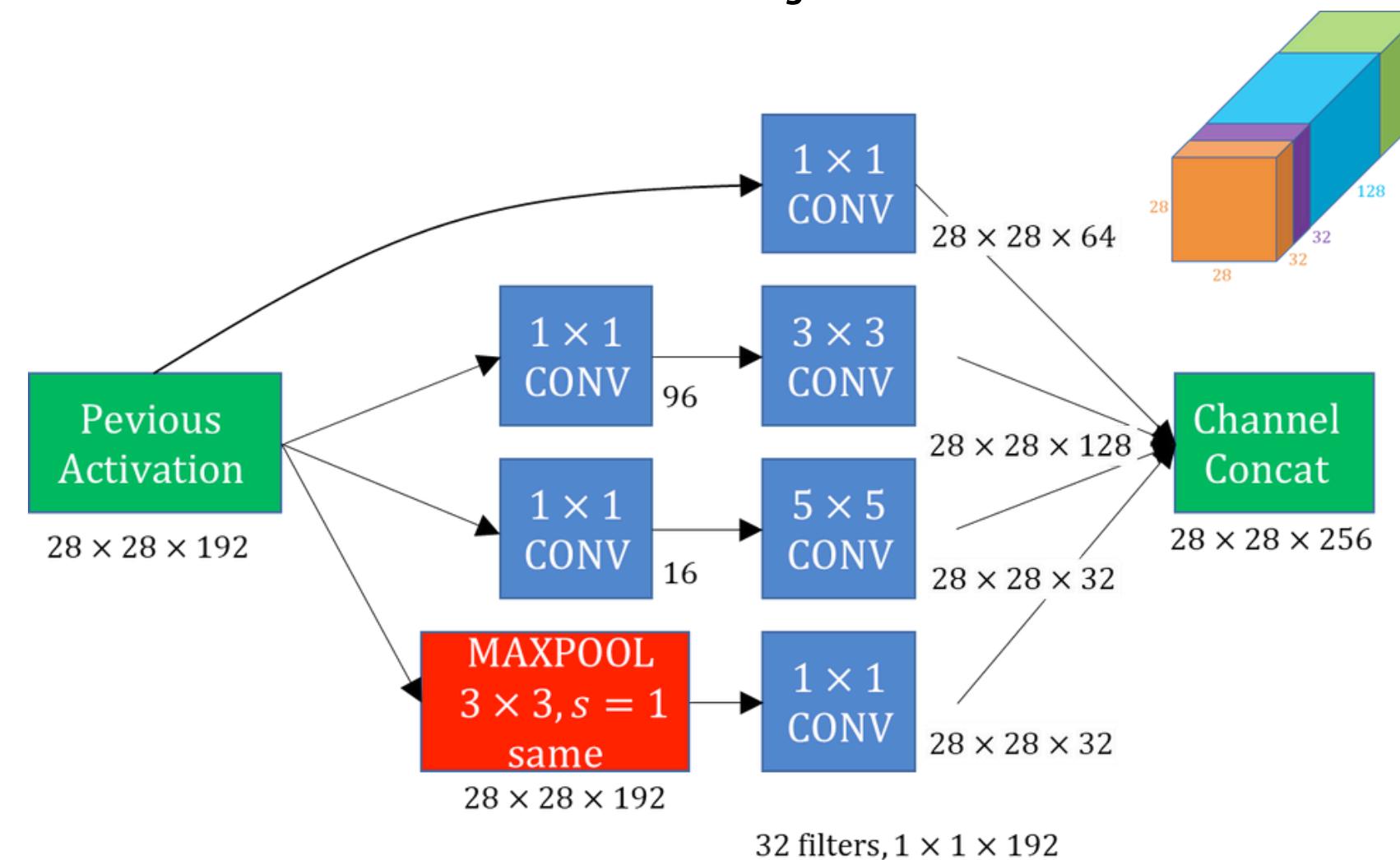
Architecture:

- > 20 Convolutional Layers: Includes 1×1 , 3×3 , and 5×5 convolutions.
- > 9 Inception Modules
- > 5 MaxPooling Layers
- > 1 Fully Connected Softmax Layer



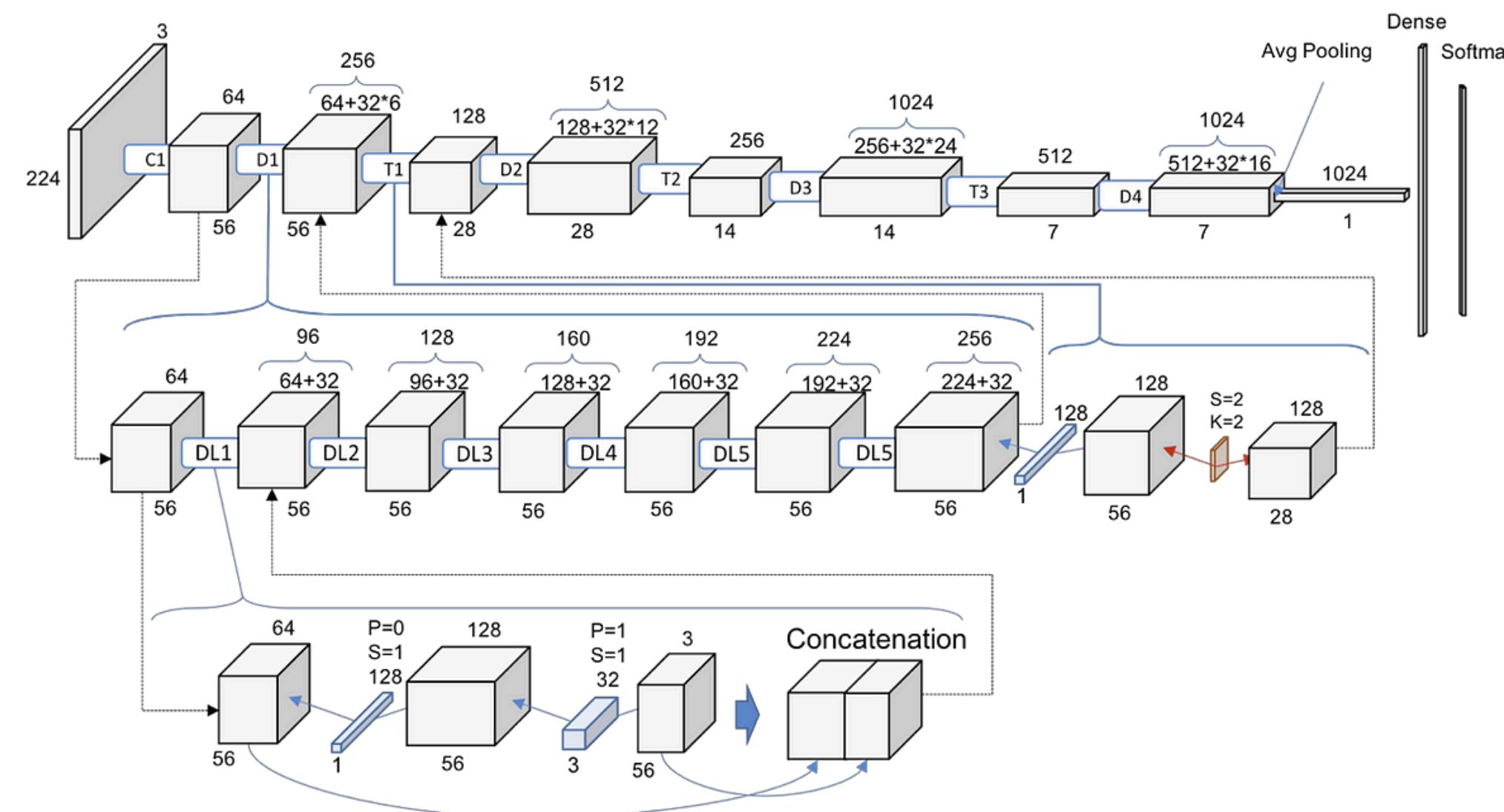
Inception Modules?

Each inception module branches off to four parallel Conv Layers



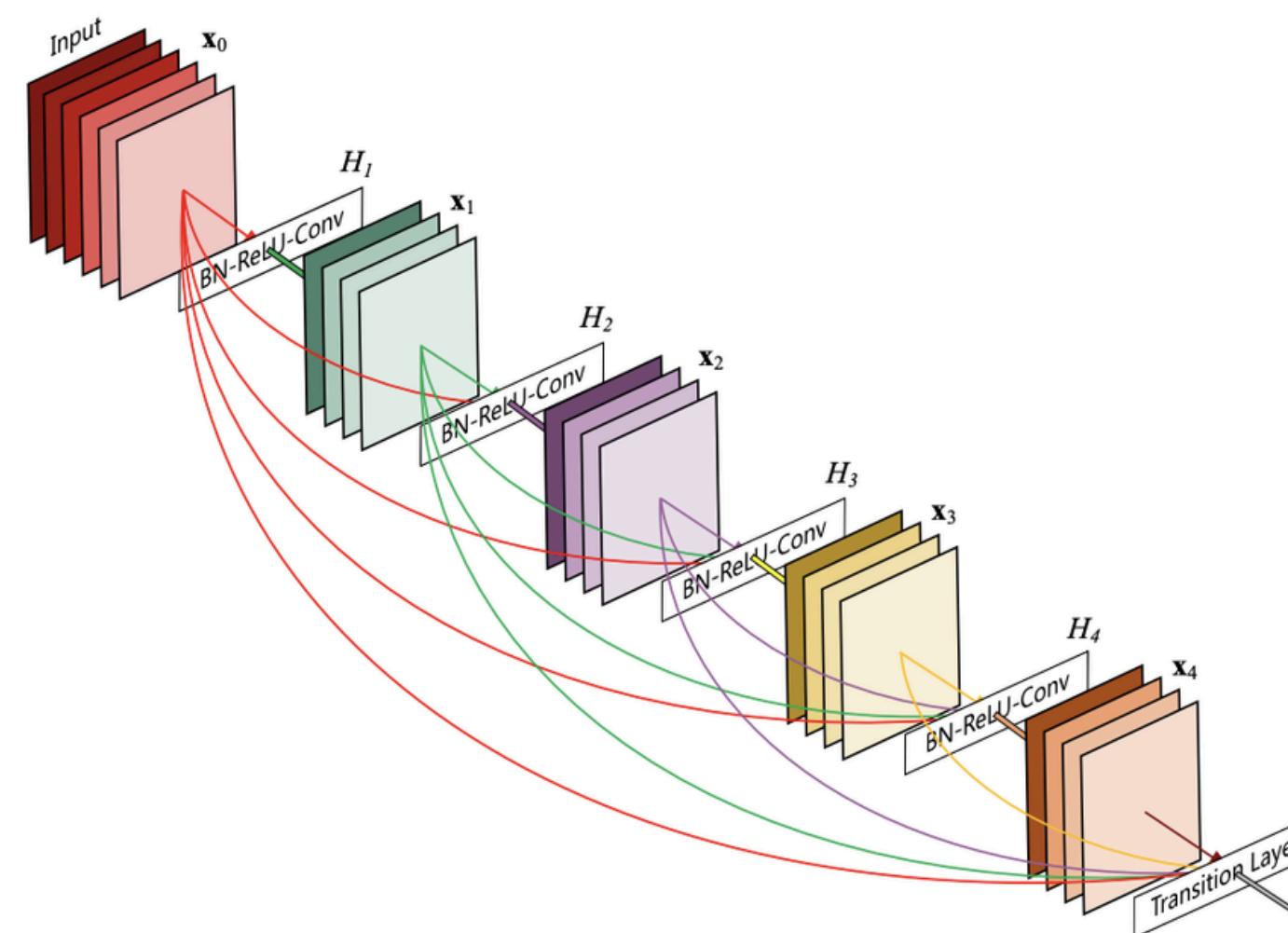
Architecture:

- > 1 Initial Convolutional Layer
- > 4 Dense Blocks
- > 3 Transition Layers
- > 1 Global AvgPool + Softmax Layer



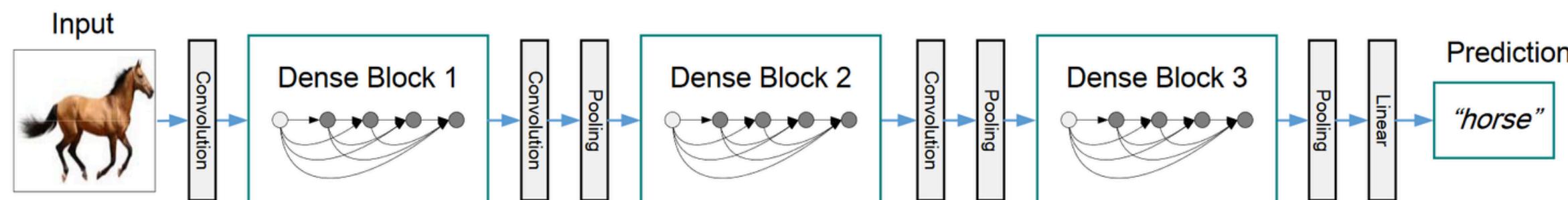
Dense Blocks?

A Dense Block is a module used in convolutional neural networks that connects all layers (with matching feature-map sizes) directly with each other.



Transition Layer

Transition layer is the structure between adjacent dense blocks, which consists of 1×1 convolution and 2×2 average pooling layer



THANK YOU

- If any questions, ask ChatGPT