

Redes Convolucionales

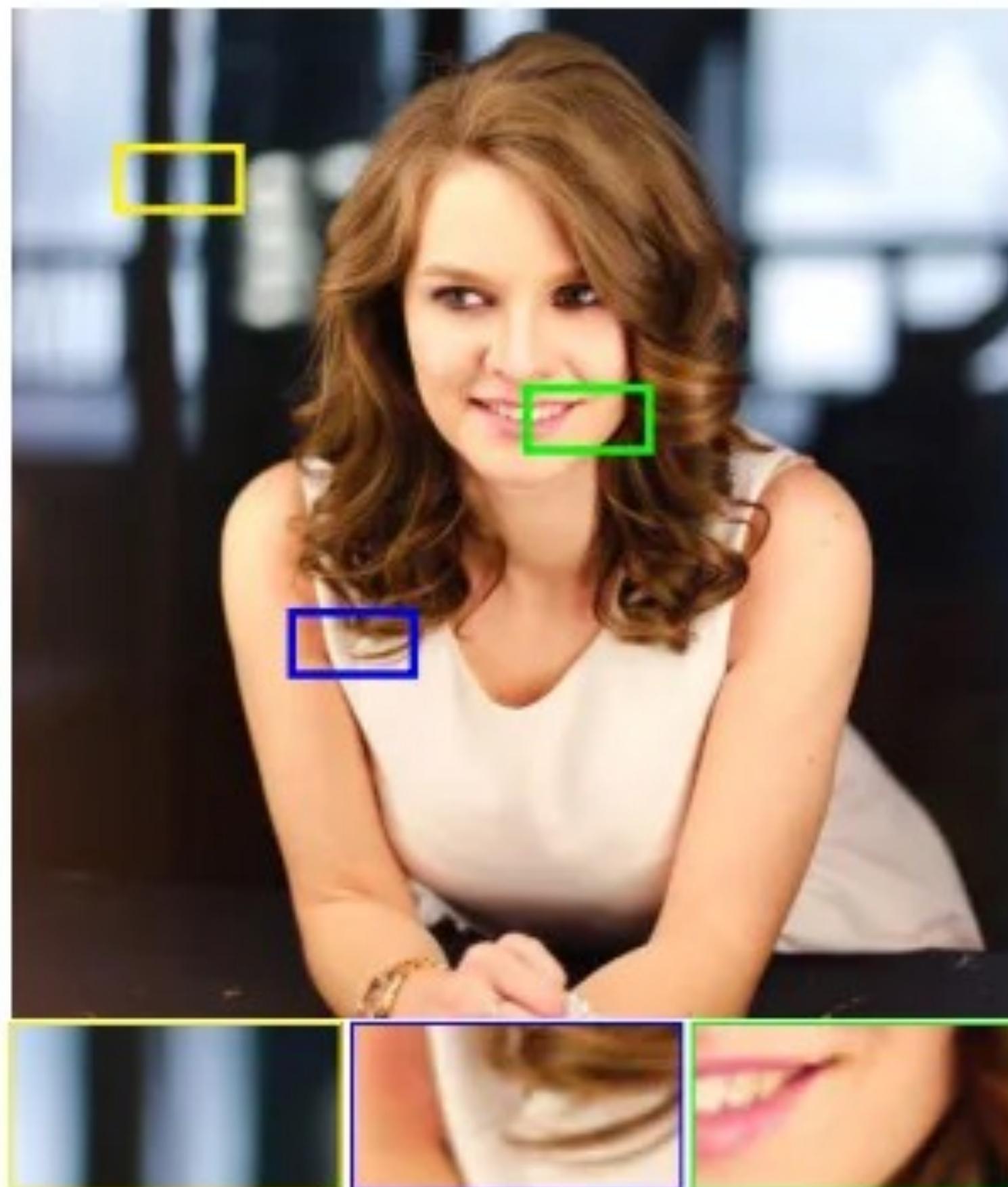
Dr. Alejandro Veloz

Input image

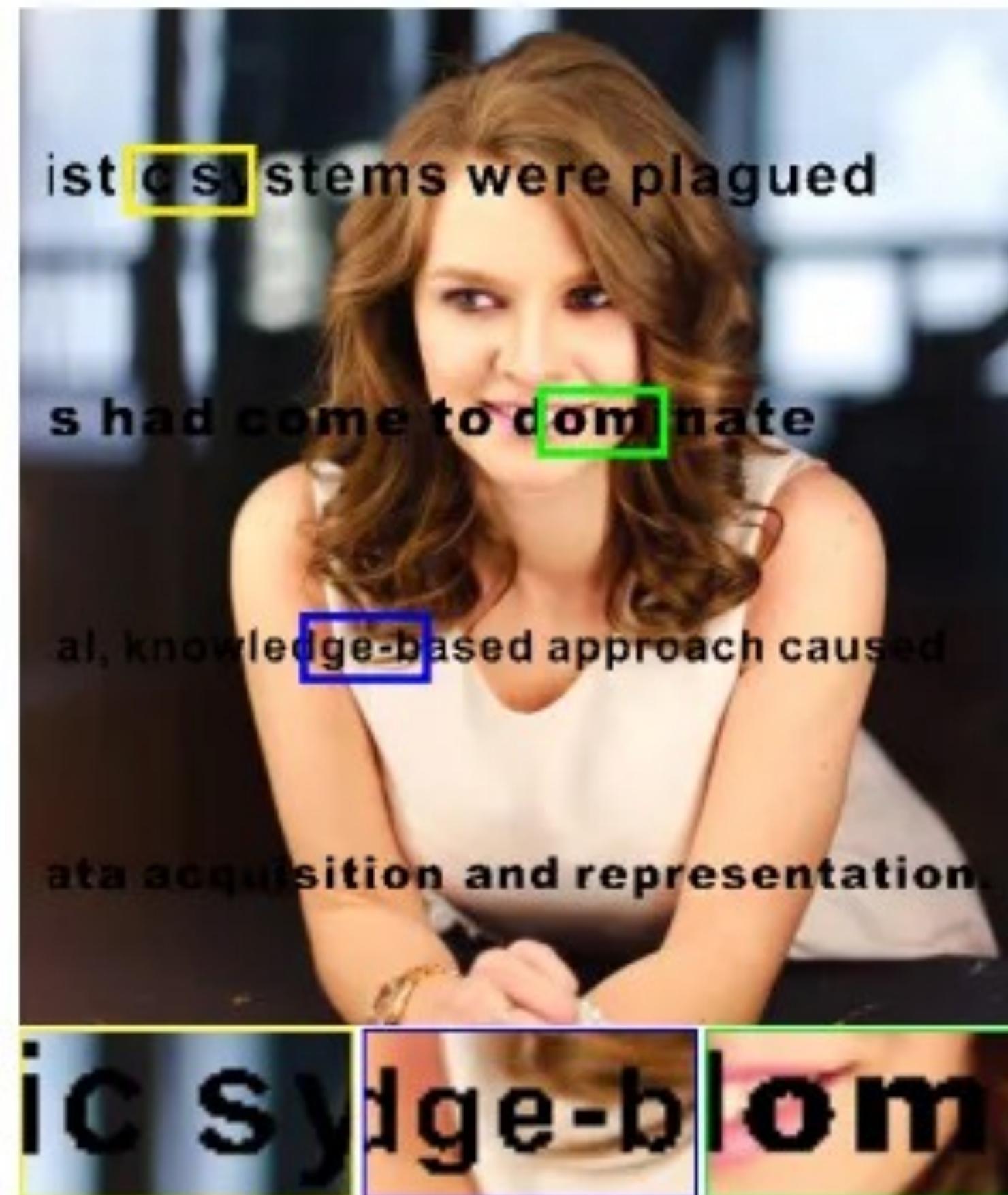


Real-ESRGAN output

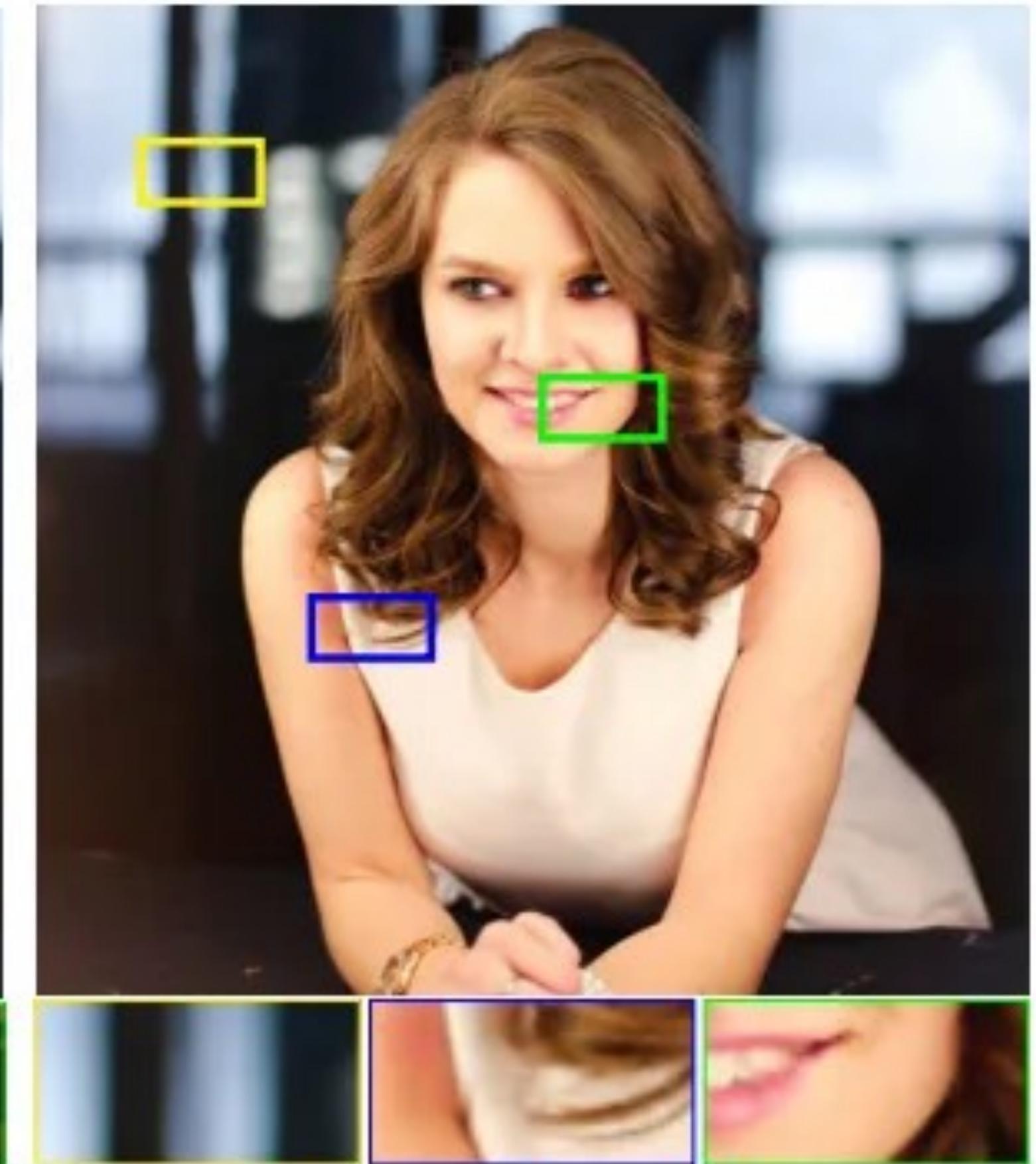




(a) Original image



(b) Corrupted image



(d) Deep Image Prior

input

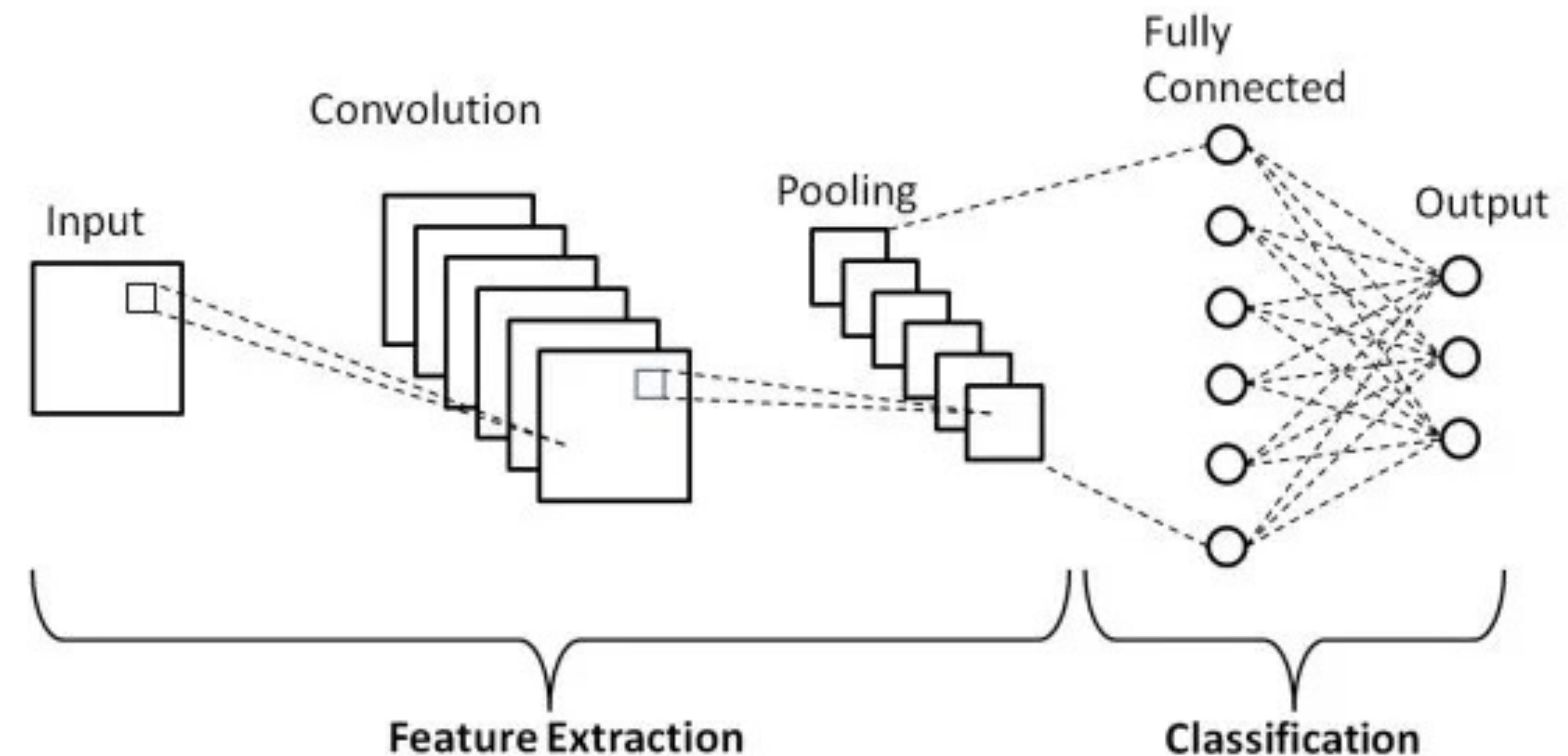


output

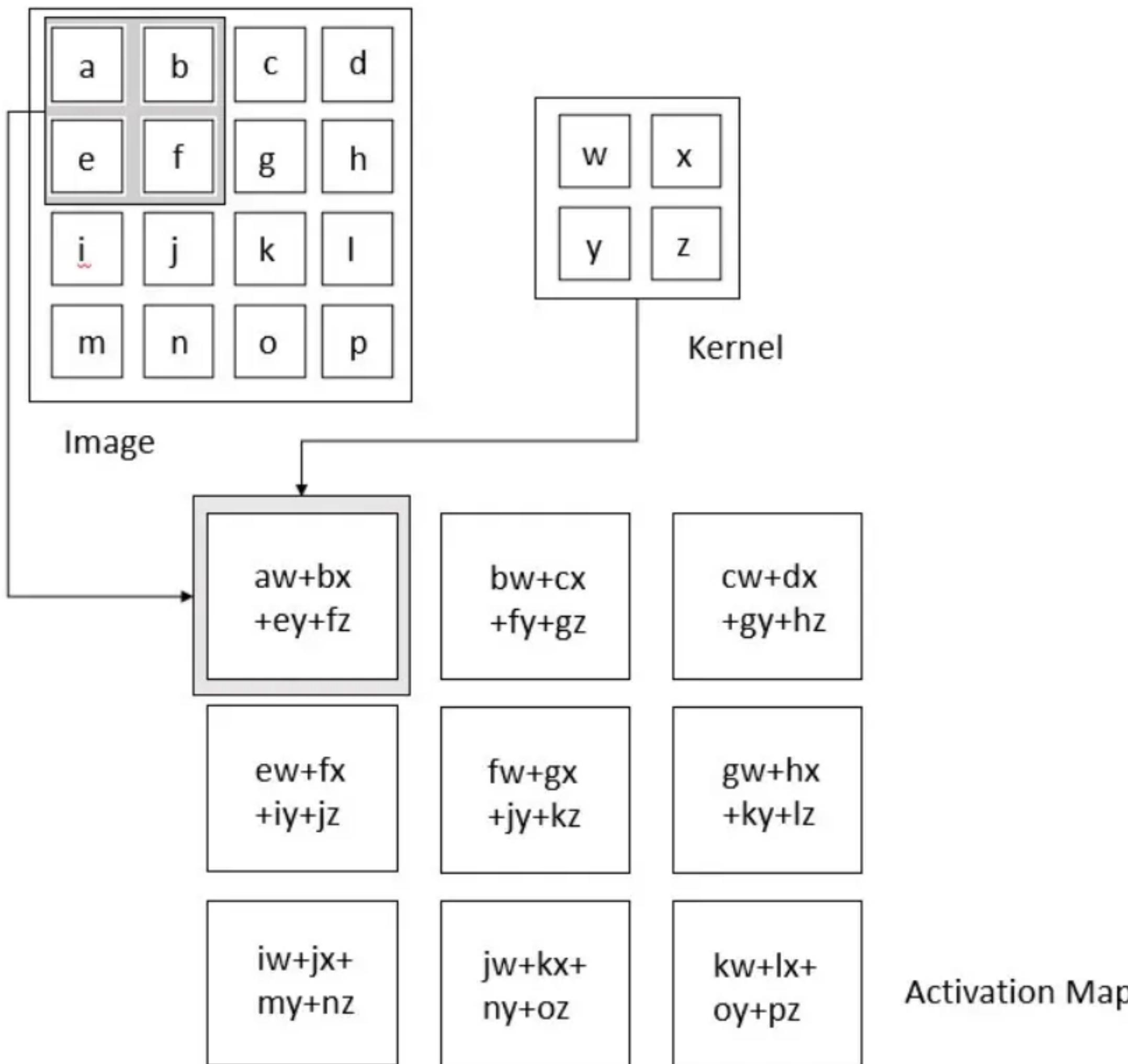


Elementos de una CNN

- Convolutional Layers
- Pooling Layers
- Fully-Connected Layers

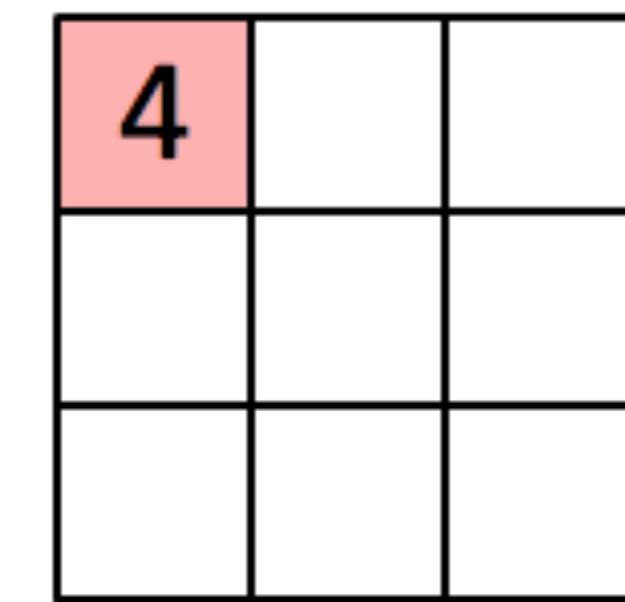


Capas convolucionales



1 _{x1}	1 _{x0}	1 _{x1}	0	0
0 _{x0}	1 _{x1}	1 _{x0}	1	0
0 _{x1}	0 _{x0}	1 _{x1}	1	1
0	0	1	1	0
0	1	1	0	0

Image

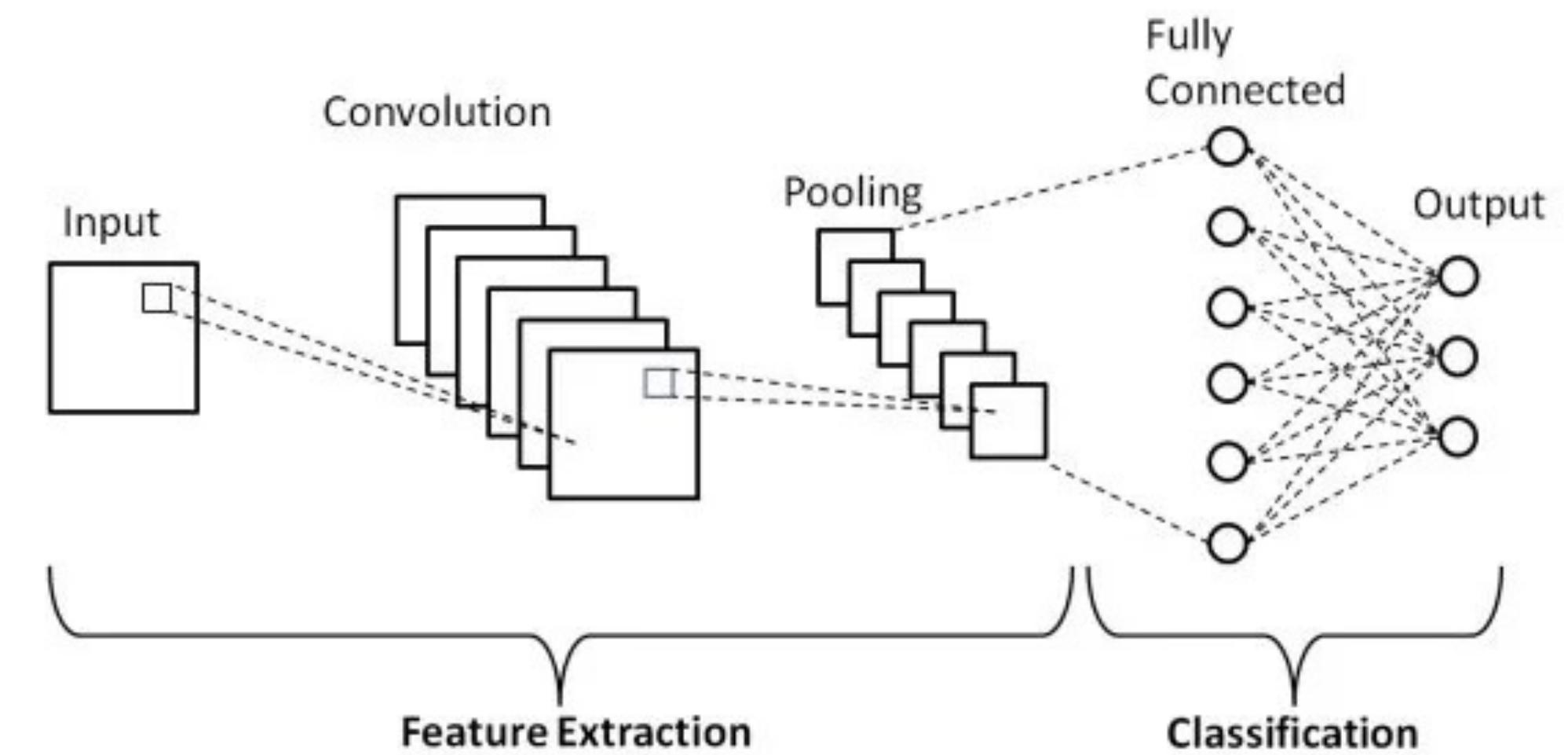


Convolved Feature

Capas convolucionales

Parámetros

- Kernel size: It determines the size of the sliding window. It is generally recommended to use smaller window sizes, preferably odd values such as 1, 3, 5, and occasionally, rarely 7.
- Stride: The number of pixels the kernel window will move during each step of convolution. Typically, it is set to 1 to ensure that no locations are missed in an image. However, it can be increased if the intention is to simultaneously reduce the input size.
- Padding: Padding refers to the technique of adding zeros to the border of an image. By applying padding, the kernel can fully filter every position of an input image, ensuring that even the edges are properly processed.
- Number of filters /Depth: The number of filters in a convolutional layer determines the number of patterns or features that the layer will seek to identify. In other words, it governs the number of distinct characteristics or elements that the convolutional layer will focus on detecting.



Entradas multiespectrales

0	0	0	0	0	0	...
0	156	155	156	158	158	...
0	153	154	157	159	159	...
0	149	151	155	158	159	...
0	146	146	149	153	158	...
0	145	143	143	148	158	...
...

Input Channel #1 (Red)

0	0	0	0	0	0	...
0	167	166	167	169	169	...
0	164	165	168	170	170	...
0	160	162	166	169	170	...
0	156	156	159	163	168	...
0	155	153	153	158	168	...
...

Input Channel #2 (Green)

0	0	0	0	0	0	...
0	163	162	163	165	165	...
0	160	161	164	166	166	...
0	156	158	162	165	166	...
0	155	155	158	162	167	...
0	154	152	152	157	167	...
...

Input Channel #3 (Blue)

-1	-1	1
0	1	-1
0	1	1

Kernel Channel #1



308

+

1	0	0
1	-1	-1
1	0	-1

Kernel Channel #2



-498

0	1	1
0	1	0
1	-1	1

Kernel Channel #3



164

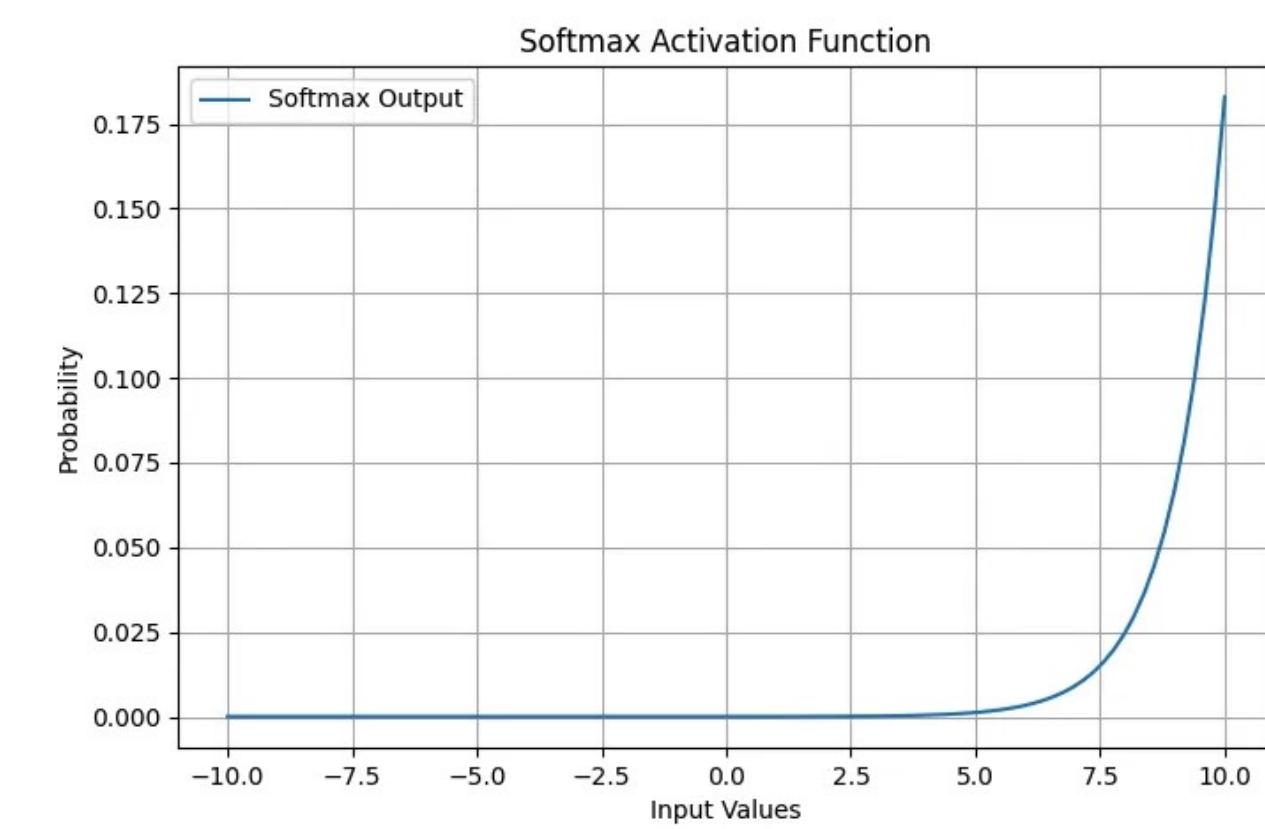
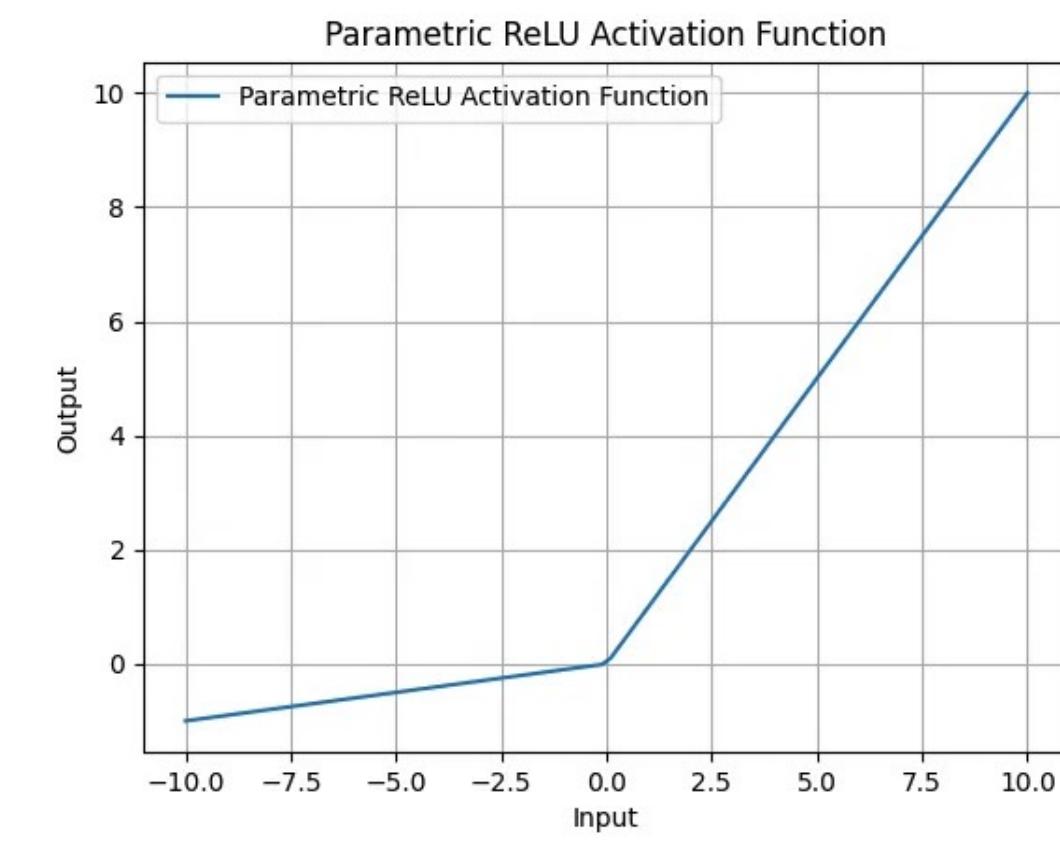
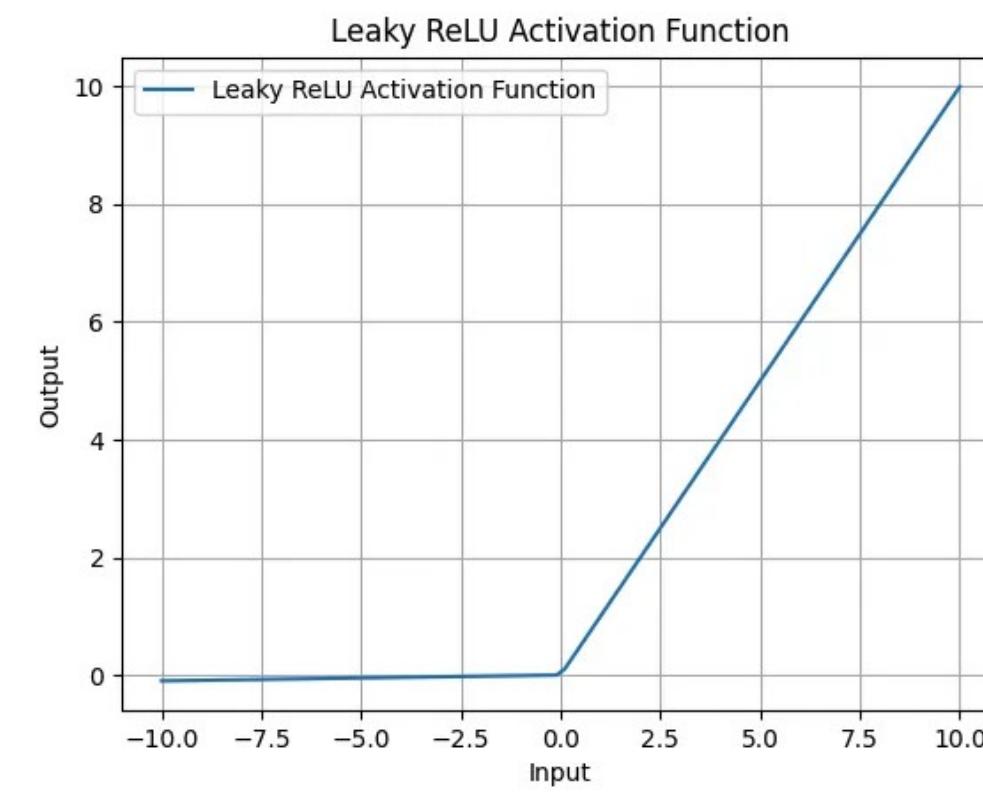
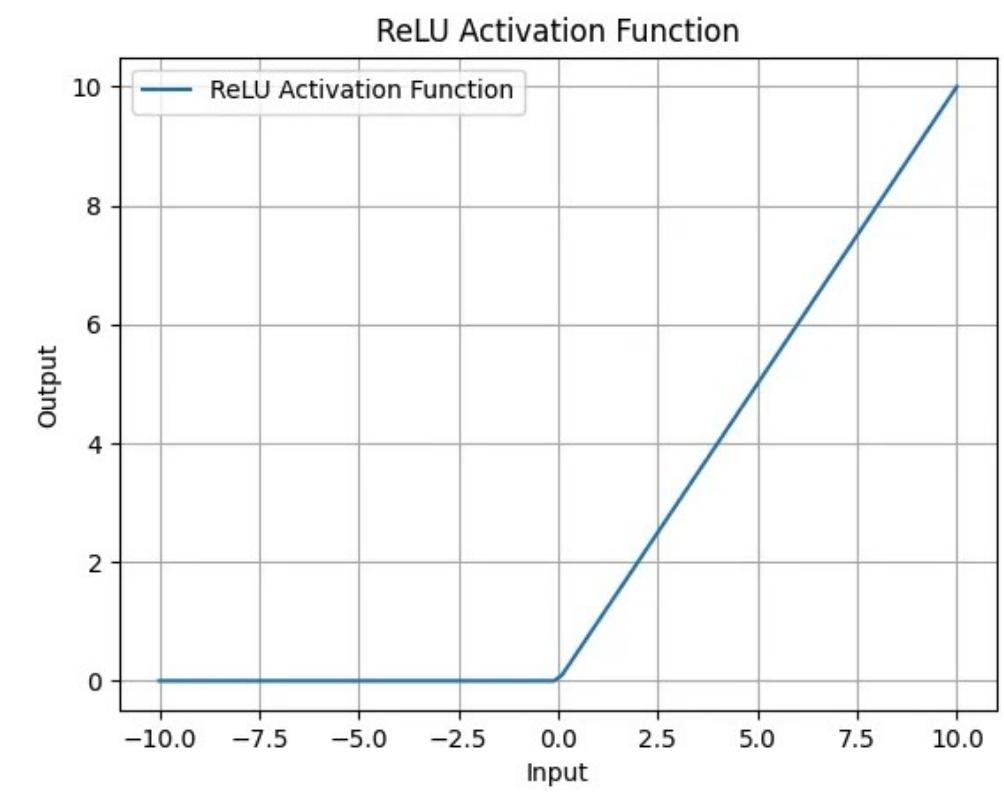
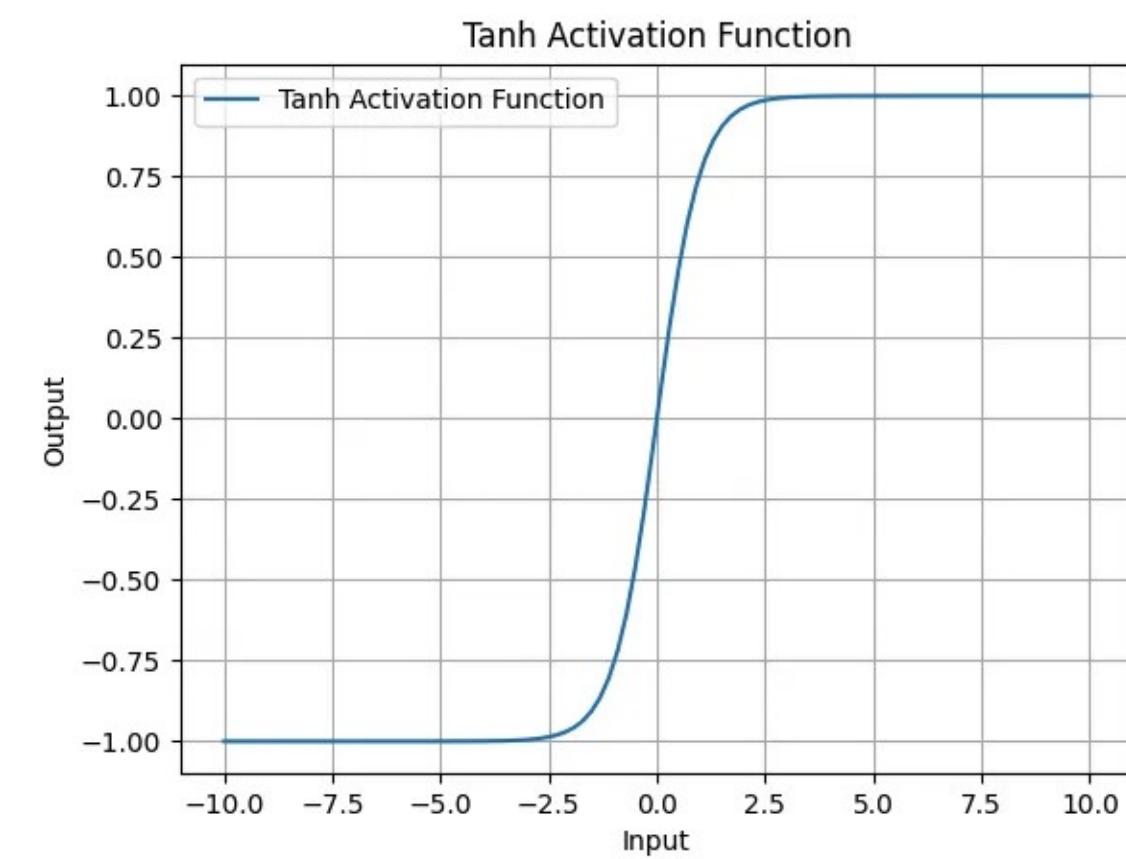
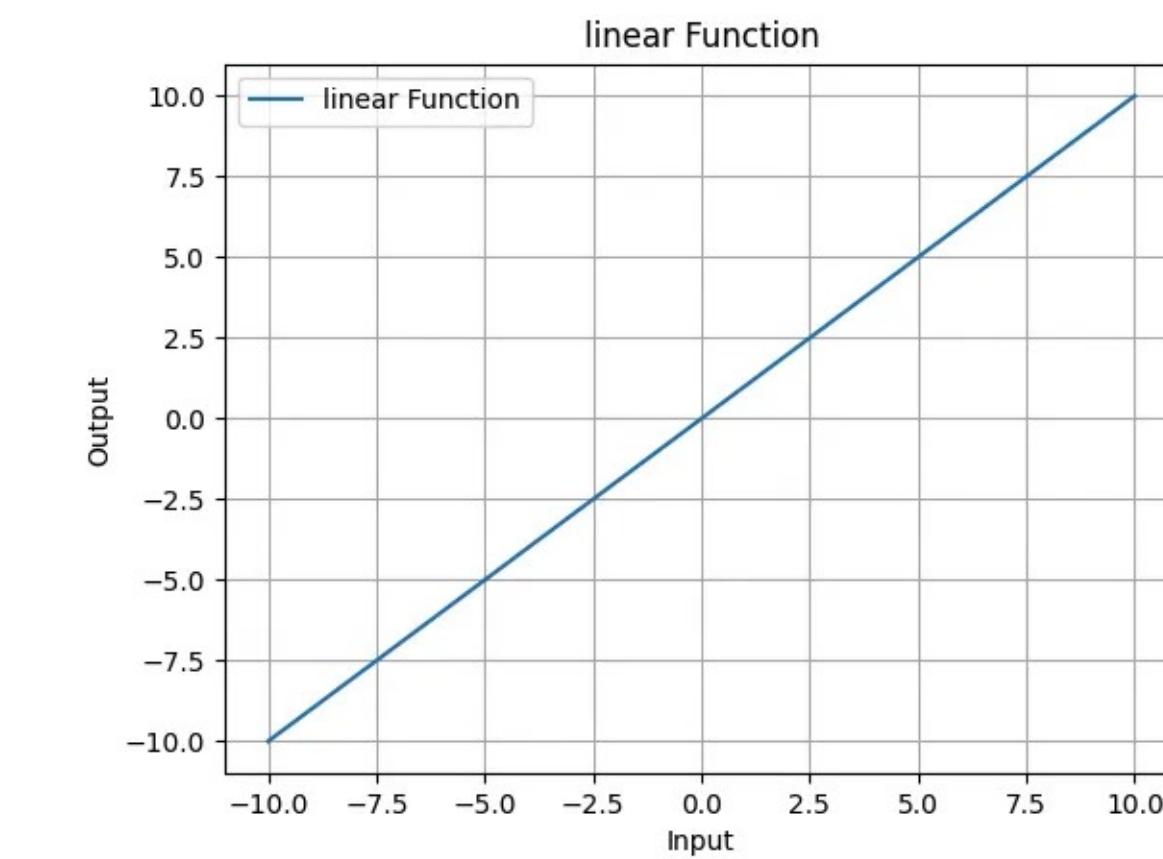
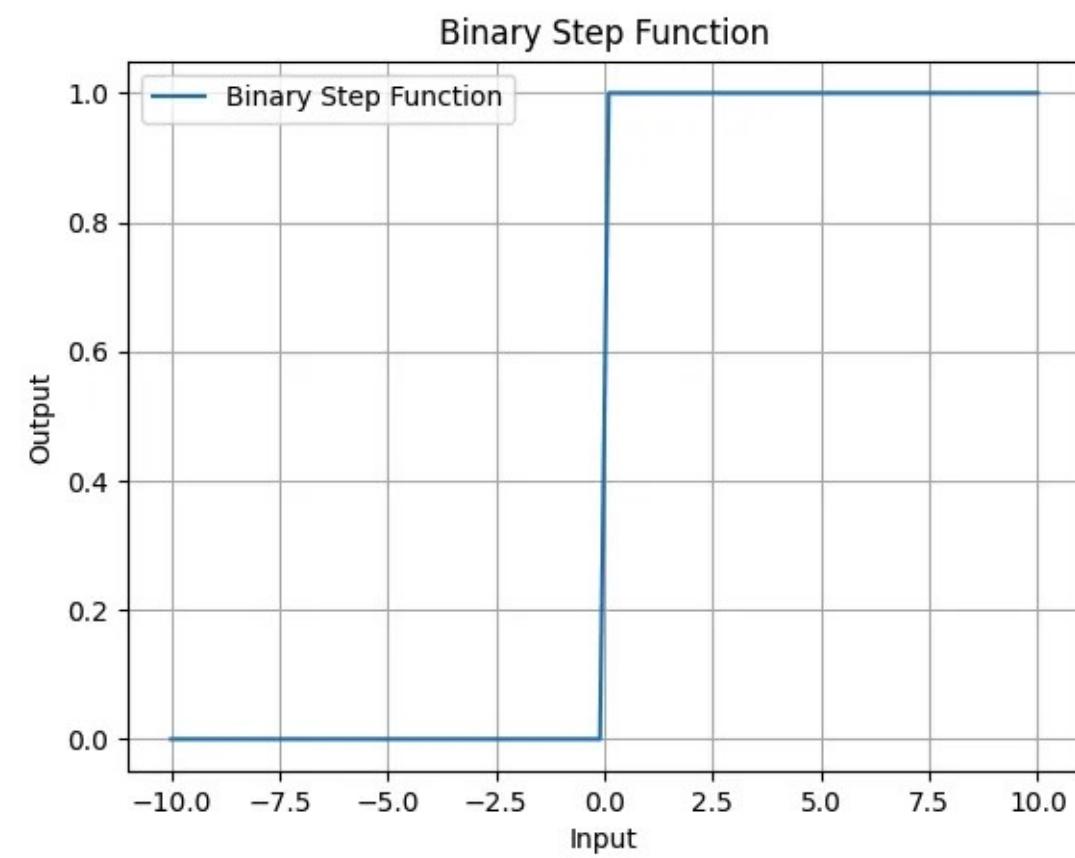
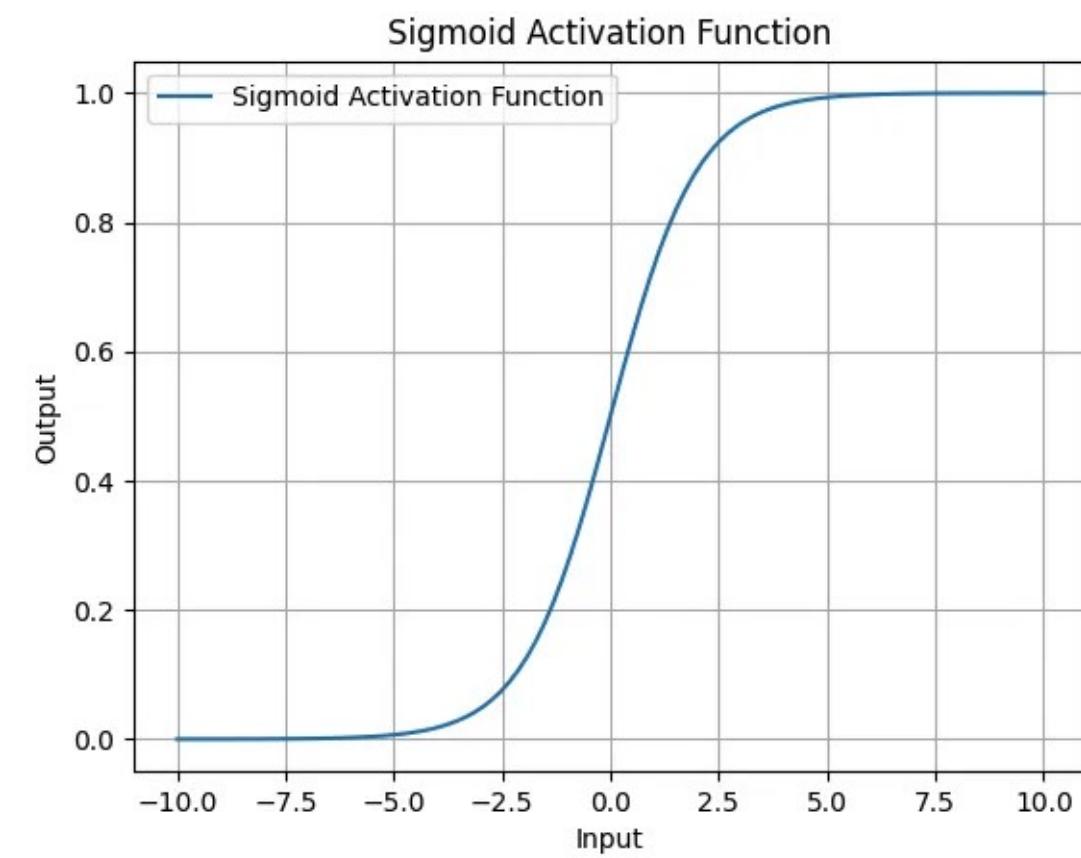
+

.25						...
						...
						...
						...
...

Bias = 1

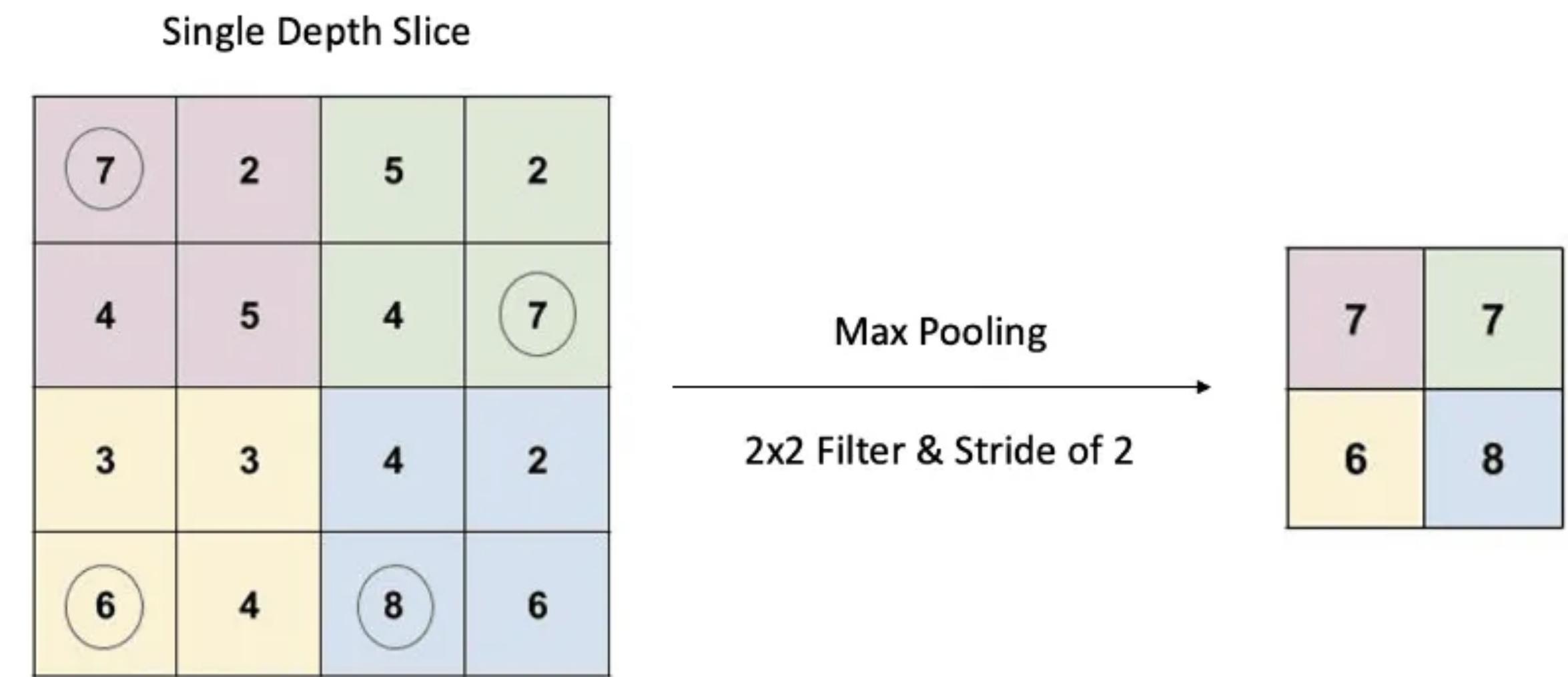
Output

Funciones de activación

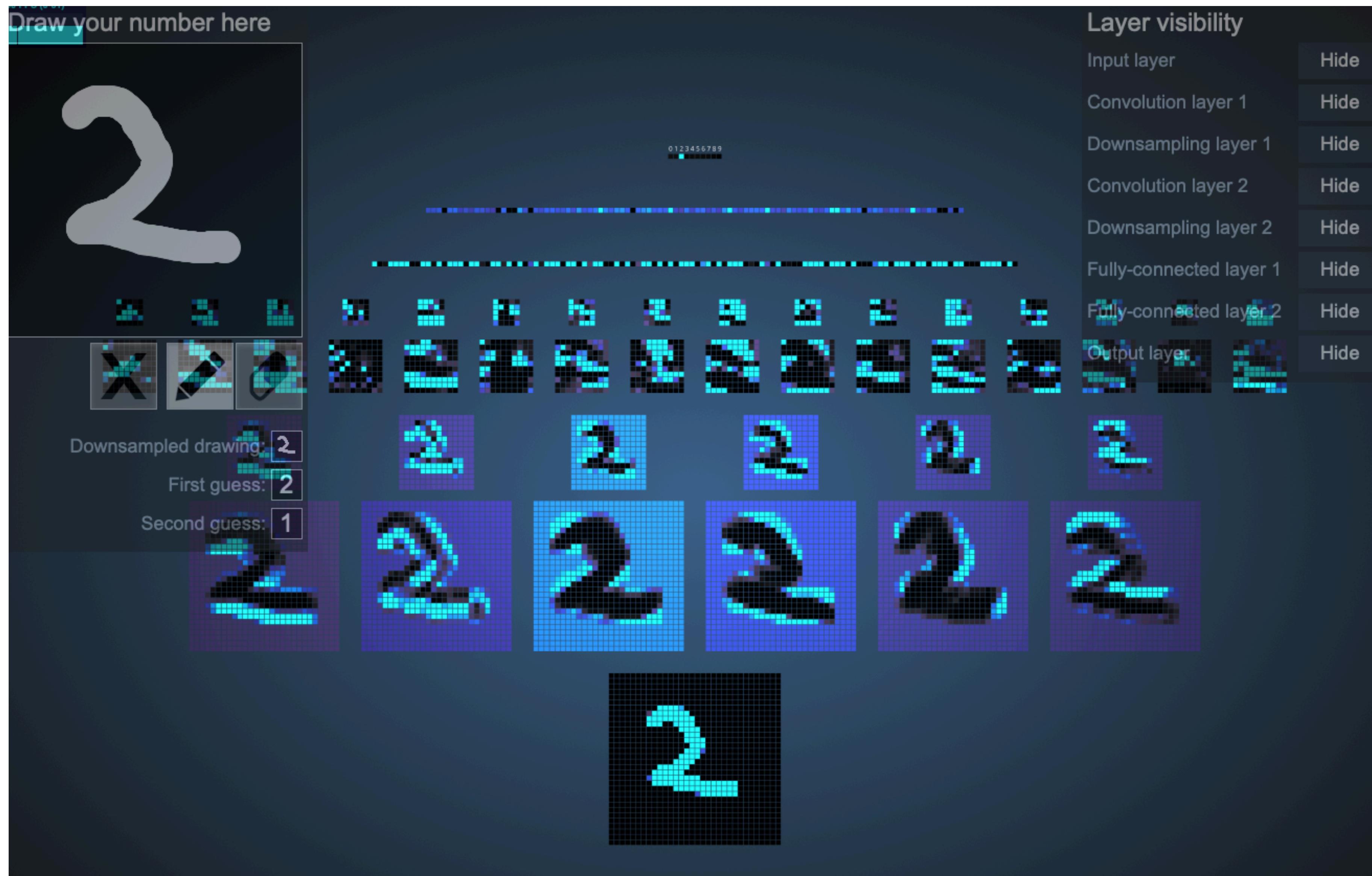


Capas de pooling

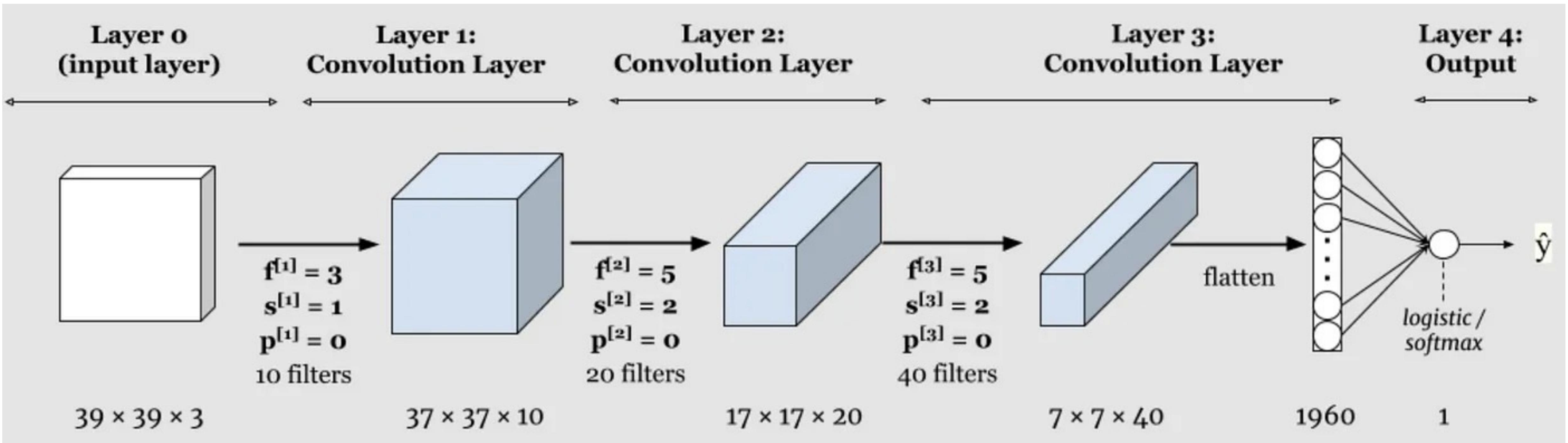
- **Max Pooling:** It selects the pixel with the maximum value to send to the output array.
- **Average pooling:** It calculates the average value within the receptive field to send to the output array.



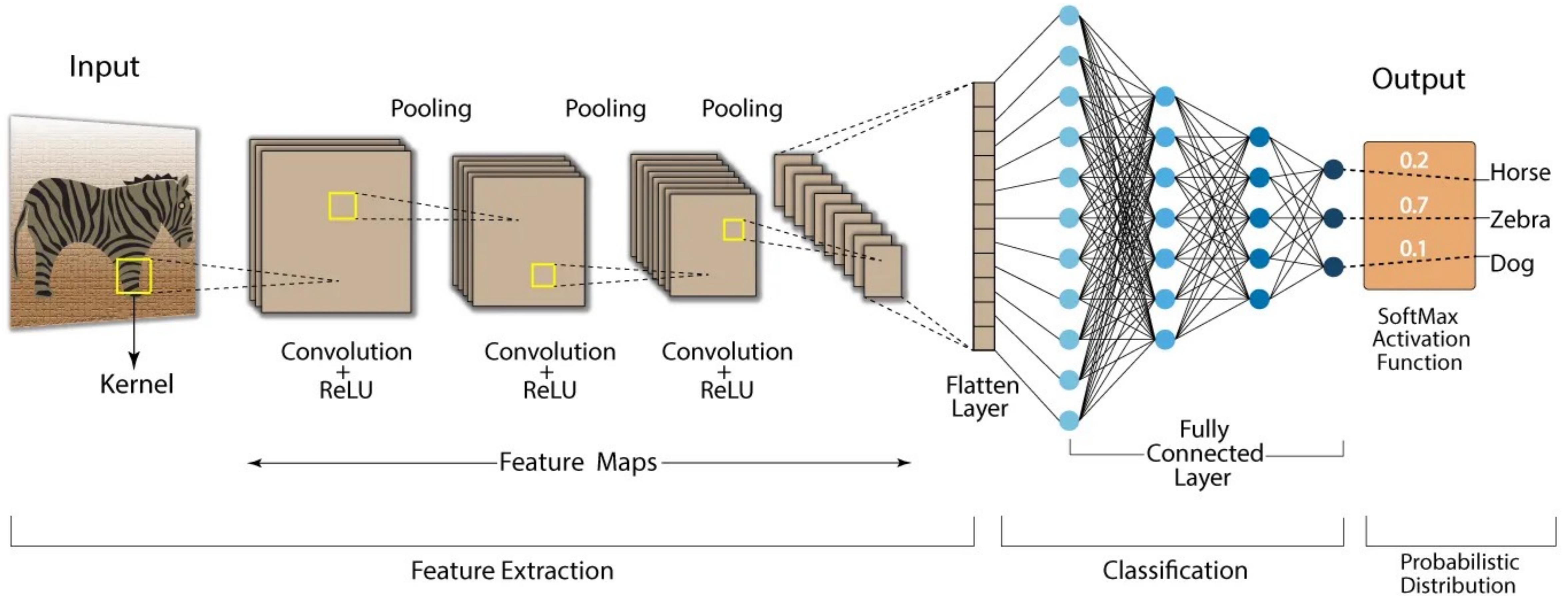
Arquitectura



Arquitectura



Arquitectura



Arquitectura Unet

