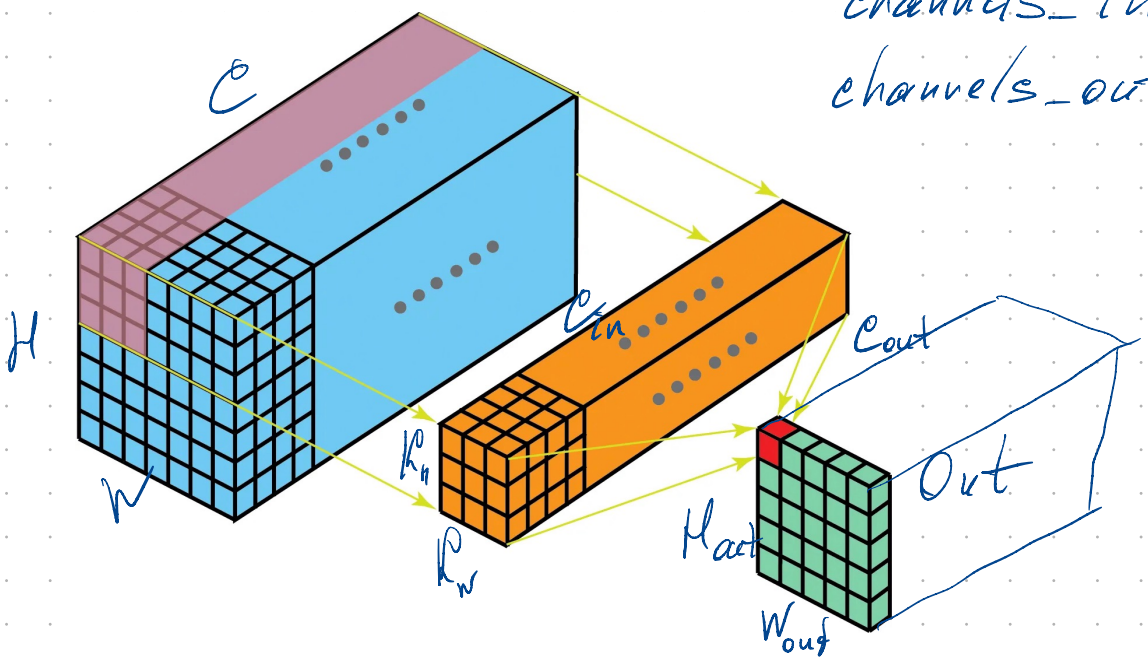
Виды свёрточных операций

Conv2D

torch.nn.Conv2D(C_{in}, C_{out}, (K_H, K_W), ...

channels_in = C_{in}

channels_out = C_{out}



Ядро свёртки: $C_{out} \times C_{in} \times K_H \times K_W$

Вход FM: $1 \times C \times H \times W$

$W_{out} = W - K_W + 1$

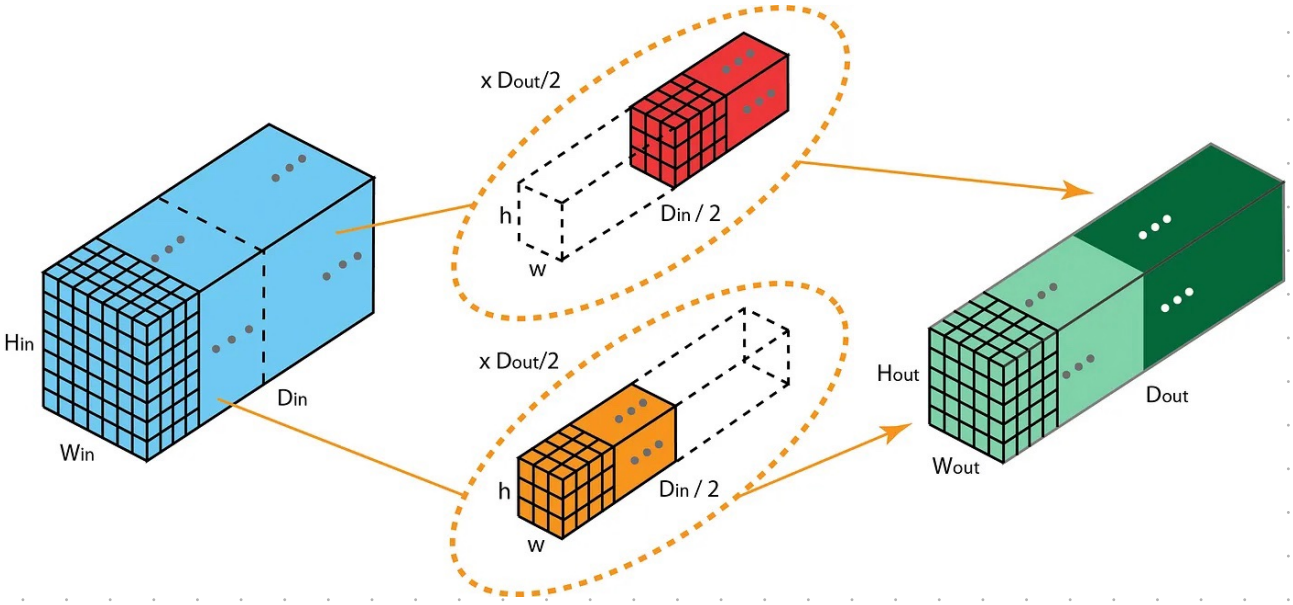
$(W + 2p_W) - K_W + 1$

$H_{out} = H - K_H + 1$

$(H + 2p_H) - K_H + 1$

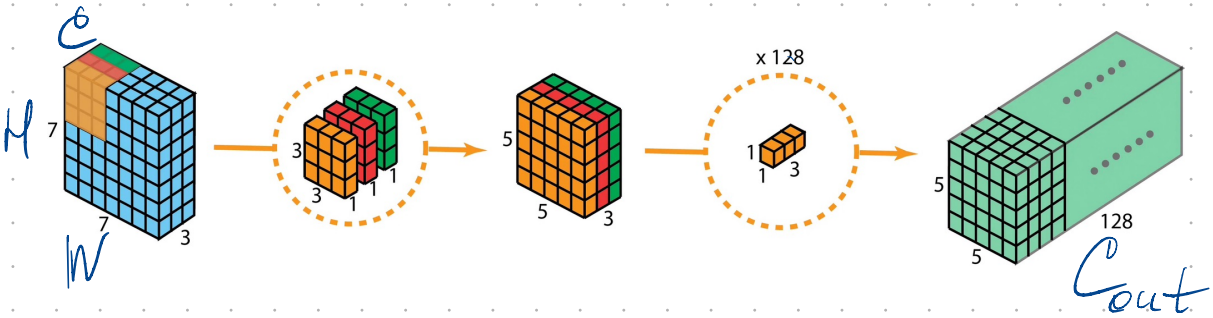
p_W, p_H – величина дополнения (padding)

Grouped Convolution

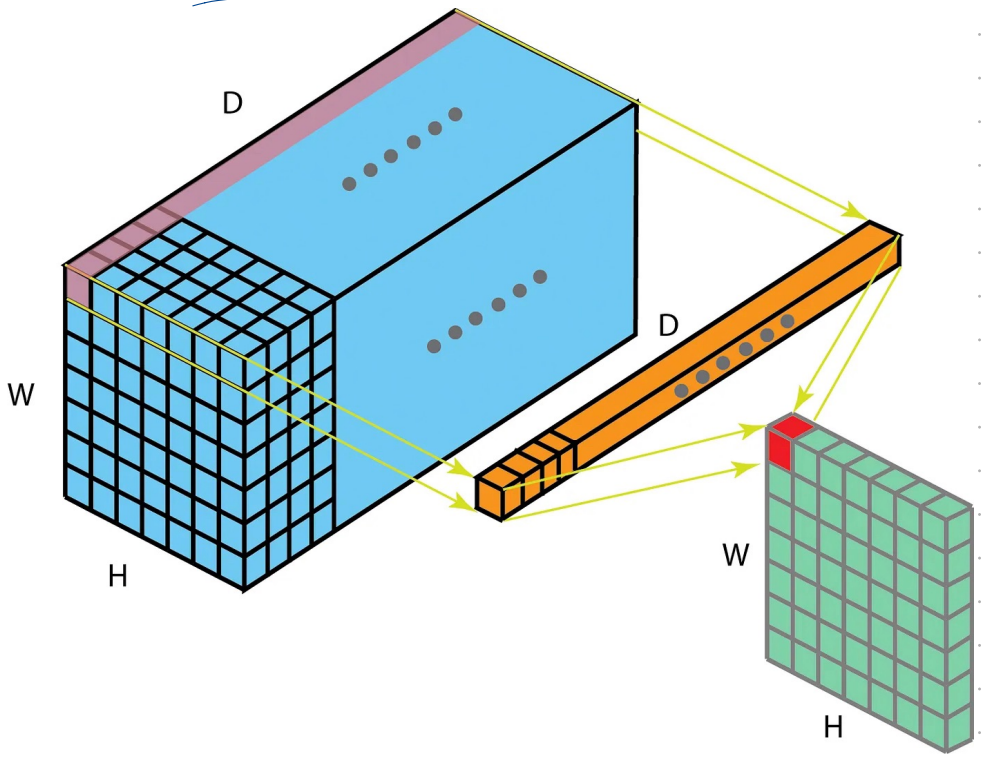


torch.nn.Conv2D(groups = 2)

Depthwise Separable Convolution



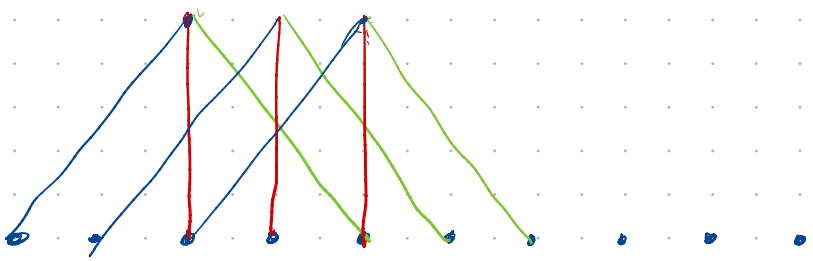
Conv 1x1



Jozek nn.Conv2D(D, C_{out}, (1,1),...)

Dilated Convolution

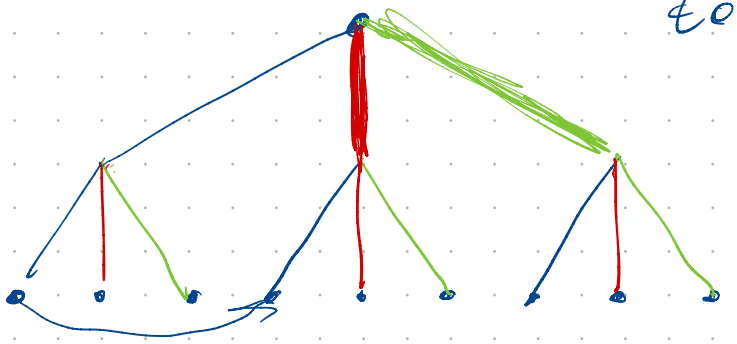
torch.nn.Conv1D()



torch.nn.Conv1D
(..., dilation=2)

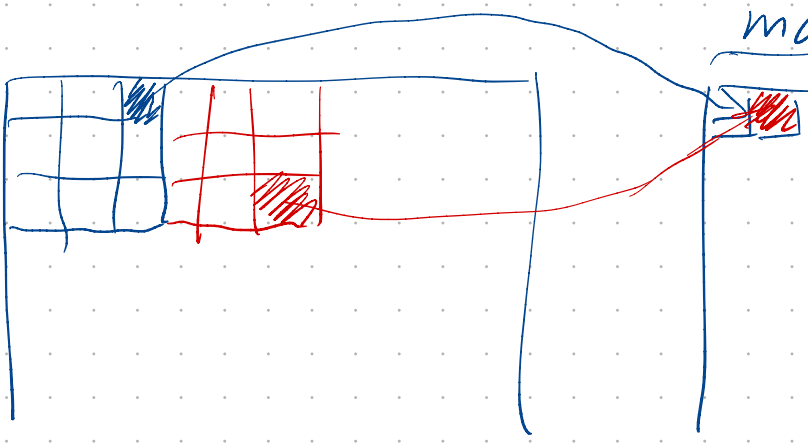
Strided Convolution

torch.nn.Conv1D(..., stride=3)



Pooling Субдискретизация

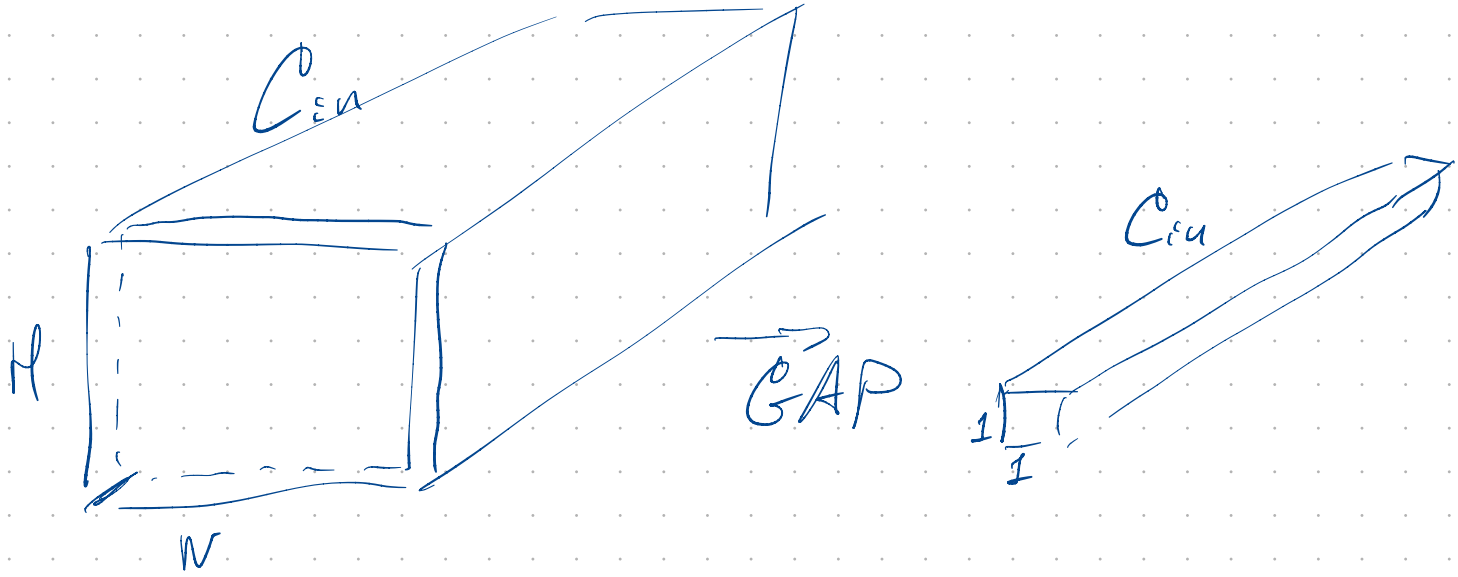
max-pooling



torch.nn.MaxPool2D( )

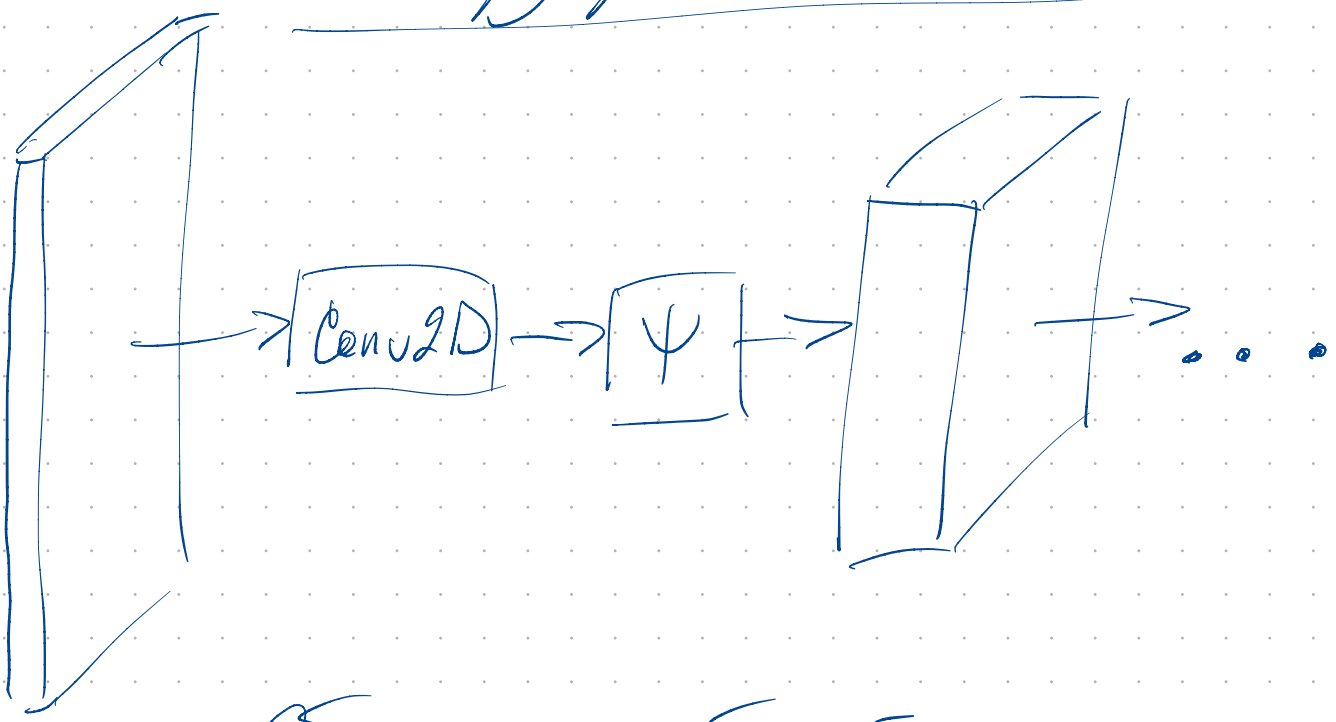
torch.nn.AvgPool2D( )

Global Average Pooling



torch.nn.AvgPool2D((H, W))

Конструирование CNN



Обычно с глубиной слоя:

повышают кол-во каналов (признаков одеж свёртки)

снижают пространственное разрешение (кол-во активаций)