

# Conv 3D

Stride = S

(m x m x n)  
voxel

n-dim bias vector

(k x k x k)

filter 1

$\frac{m-k+1}{S+1}, \frac{m-k+1}{S+1}, \frac{m-k+1}{S+1}$

infection

A single unit of the output is dependant on a large chunk of the input volume.

$(\frac{m-k+1}{S+1}, \dots, \frac{m-k+1}{S+1}, n)$



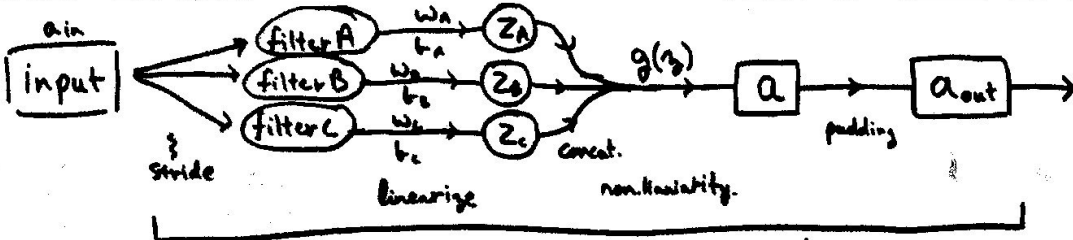
$(\frac{m-k+1+2p}{S+1}, \frac{m-k+1+2p}{S+1}, \frac{(m-k+1+2p)n}{S+1})$

Concatenate + Padding (P)

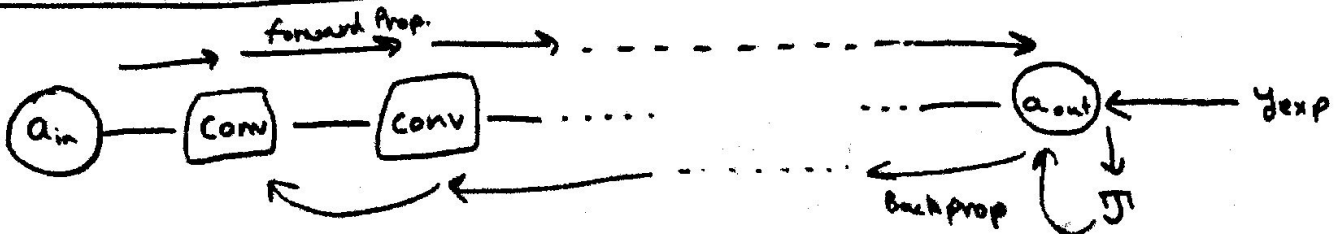
generally,  $\text{dim} = (\frac{m-k+2p}{S+1})$

- m = dim of original voxel (m x m x n)
- k = dim of single filter (k x k x k)
- P = # of padding
- S = stride of filter on original voxel.

resultant voxel  $\rightarrow (\text{dim}, \text{dim}, n_f \cdot \text{dim})$



CONV-BLOCK / CONV



Conv-net optimization idea.