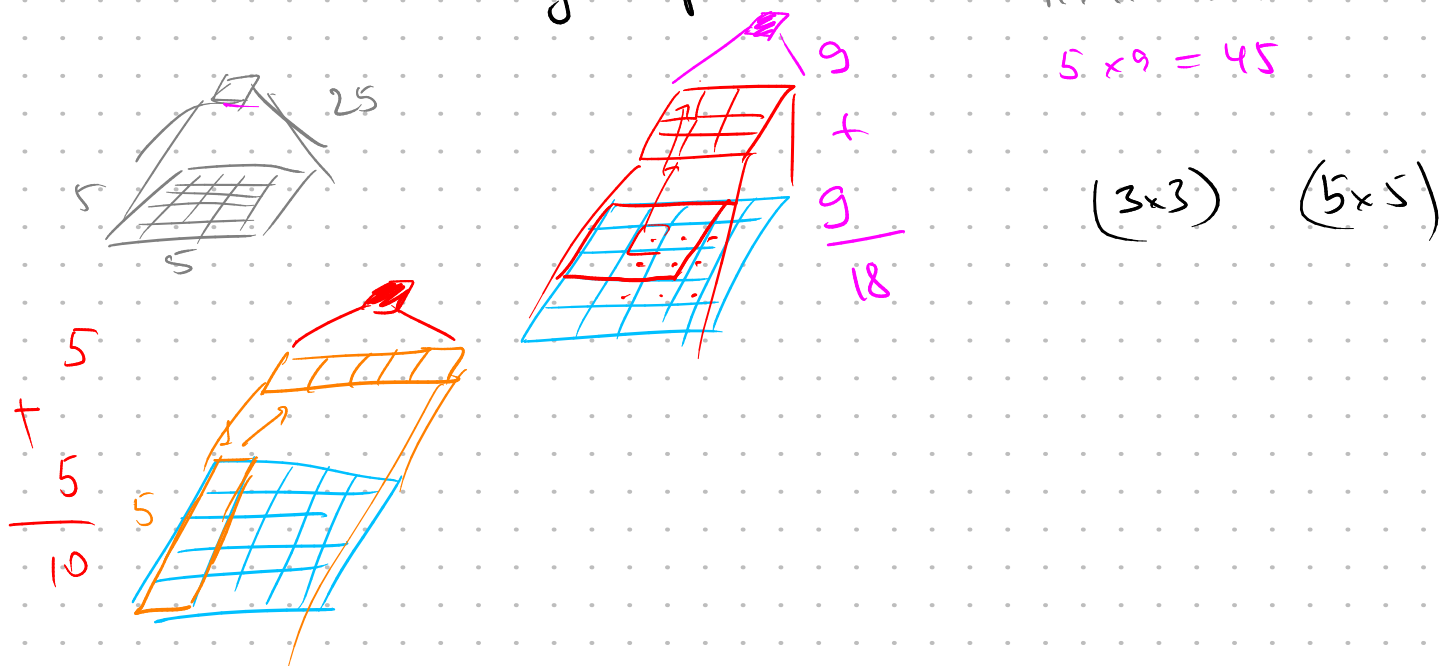


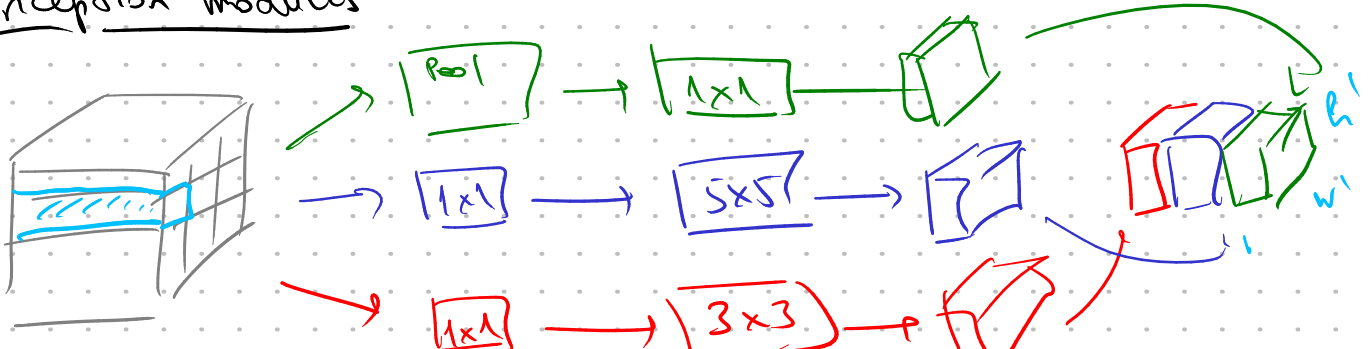
① VGG - Visual Geometry Group



② Network in network

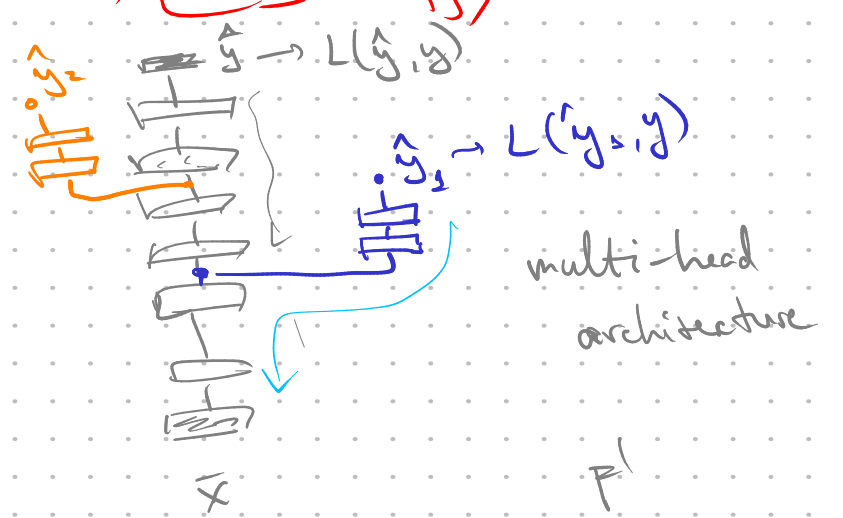


Inception modules



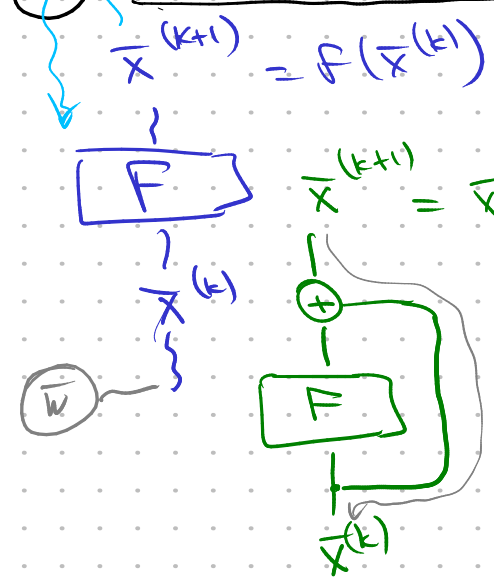
③ Auxiliary classifiers Google Net

$$L = L(\hat{y}, y) + \lambda_1 L(\hat{y}_1, y) + \lambda_2 L(\hat{y}_2, y)$$



④ Residual connections

Kaiming He



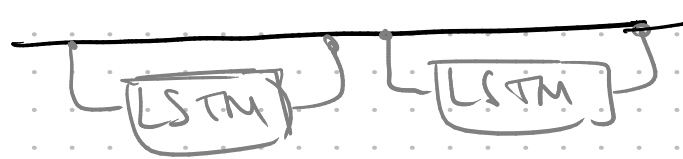
$$\bar{x}^{(k+1)} = F(\bar{x}^{(k)})$$

$$x^{(k+1)} = \bar{x}^{(k)} + F(\bar{x}^{(k)})$$

$$\frac{\partial L}{\partial \bar{w}} = \frac{\partial L}{\partial \bar{x}^{(k)}} \frac{\partial \bar{x}^{(k)}}{\partial \bar{w}} = \frac{\partial L}{\partial \bar{x}^{(k+1)}} \frac{\partial \bar{x}^{(k+1)}}{\partial \bar{x}^{(k)}} \frac{\partial \bar{x}^{(k)}}{\partial \bar{w}}$$

$$\frac{\partial \bar{x}^{(k+1)}}{\partial \bar{x}^{(k)}} = \mathbf{I} + \frac{\partial F}{\partial \bar{x}^{(k)}}$$

constant error carousel

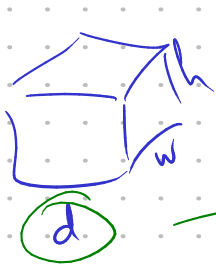
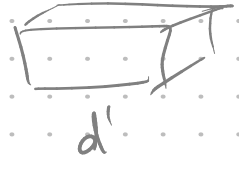
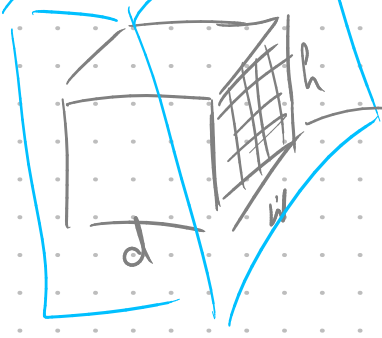


5

Bottleneck

$$128 \times 3 \times 3 \times 128 = 2^{14} \cdot 9 \approx 150k$$

$d \times w \times h \times d'$



1x1

compress

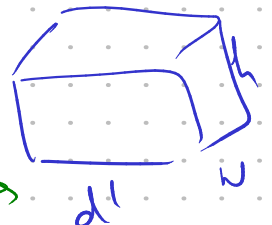


3x3xh



1x1

decompress



$$d \times 1 \times 1 \times d'' + d'' \times w \times h \times d'' + d'' \times 1 \times 1 \times d'$$

128

16

16

3

3

16

128

$$128 \cdot 16 \cdot 2 + 128 \cdot 2 \cdot 27 = 128 \cdot 2 \cdot 43 \approx 10k$$