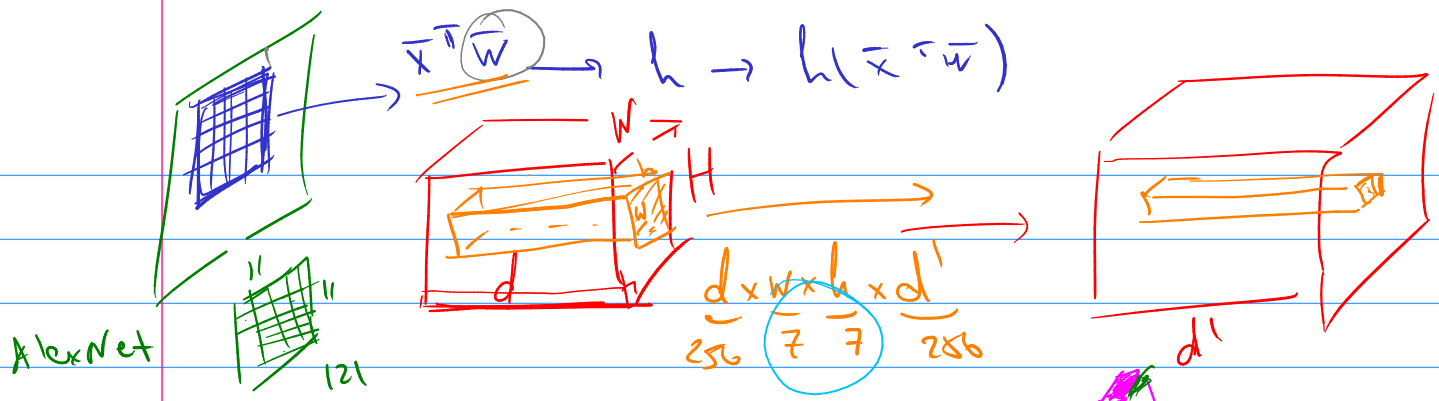
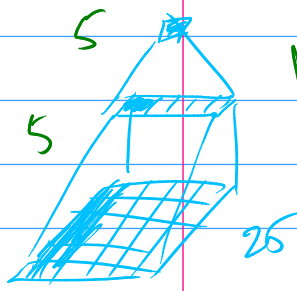
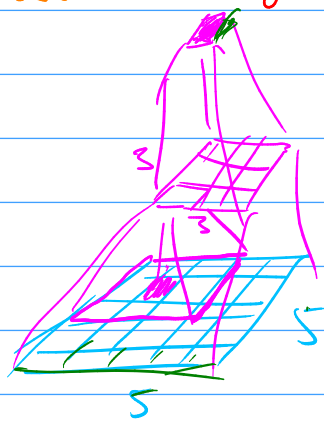
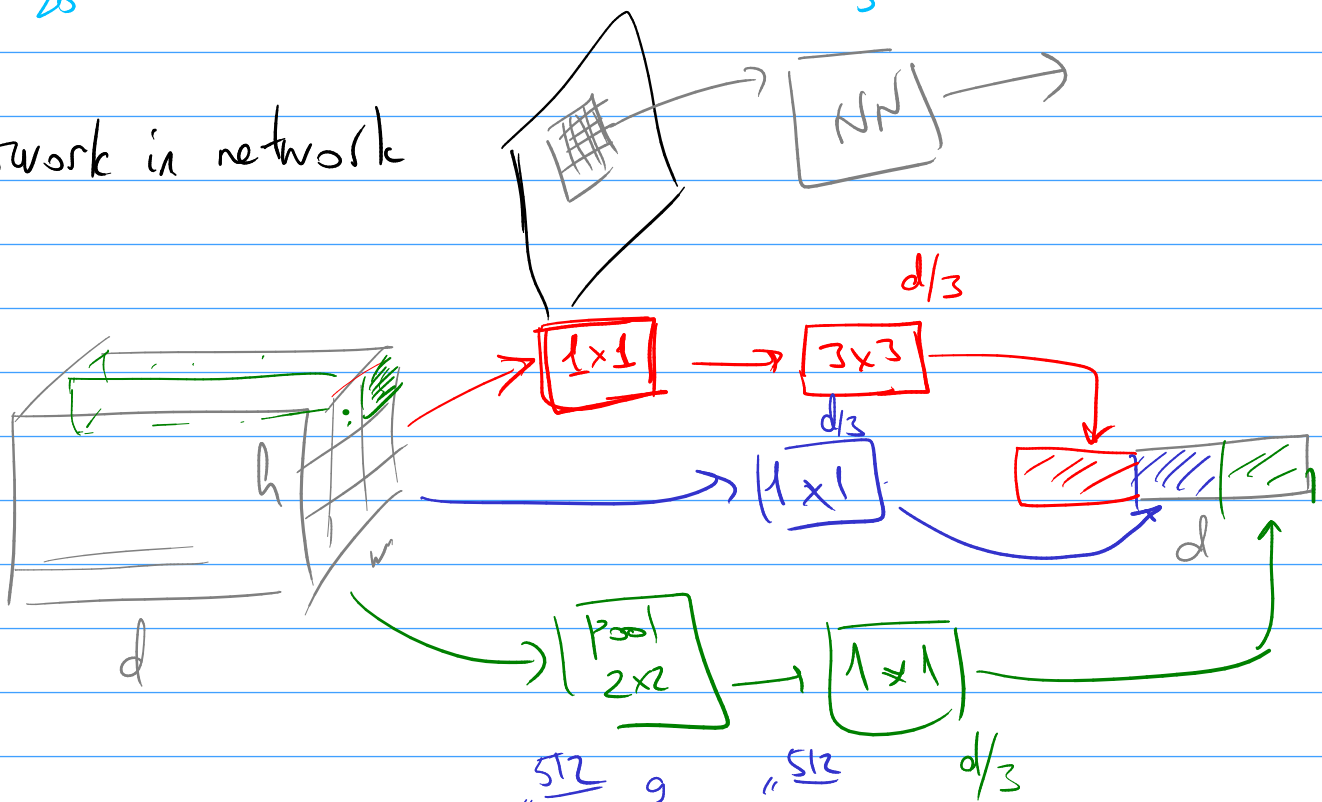


① VGG - Visual Geometry Group

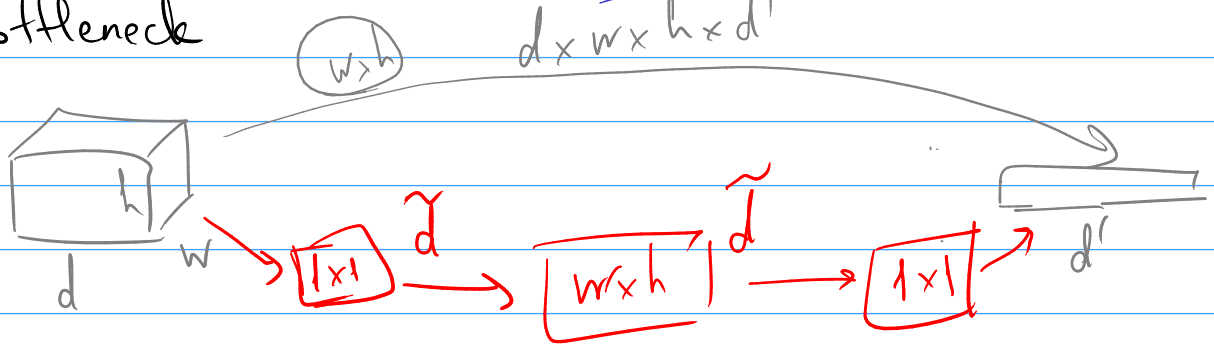




② Network in network



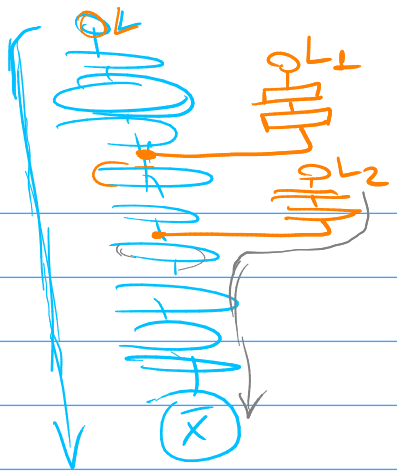
③ Bottleneck



$$\underbrace{d}_{512} \times 1 \times 1 \times \underbrace{\tilde{d}}_{32} + \underbrace{\tilde{d}}_{32} \times \underbrace{w}_{3} \times \underbrace{h}_{3} \times \underbrace{\tilde{d}}_{32} + \underbrace{\tilde{d}}_{32} \times 1 \times 1 \times \underbrace{d'}_{512}$$

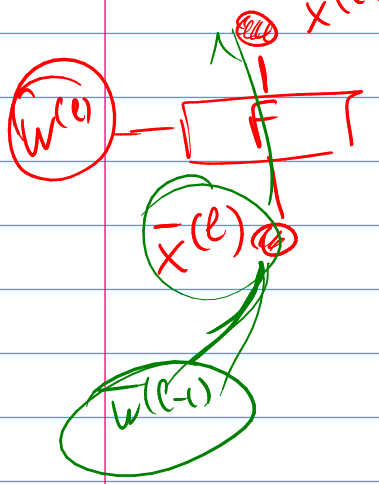
(4) Auxiliary Classifiers

$$L = L + \lambda_1 L_1 + \lambda_2 L_2$$



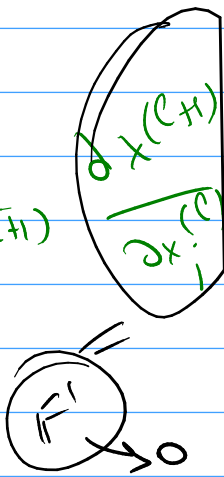
(5) Residual connections – Kaiming He

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



$$\frac{\partial L}{\partial w_i^{(l-1)}} = \sum_j \frac{\partial x_j^{(l)}}{\partial w_i^{(l-1)}} \cdot \frac{\partial L}{\partial x_j^{(l)}}$$

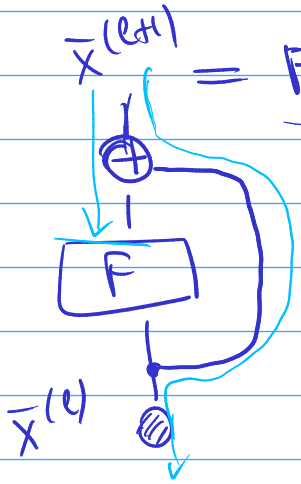
$$= \sum \frac{\partial L}{\partial x^{(l+1)}} \cdot \frac{\partial x^{(l+1)}}{\partial x_i^{(l)}}$$

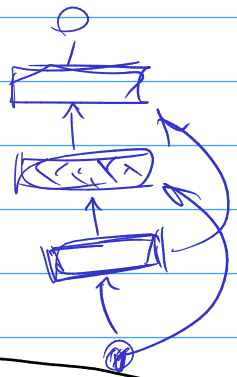


$$\bar{x}^{(l+1)} = F(\bar{x}^{(l)}) + \bar{x}^{(l)}$$

$F' \to 0$

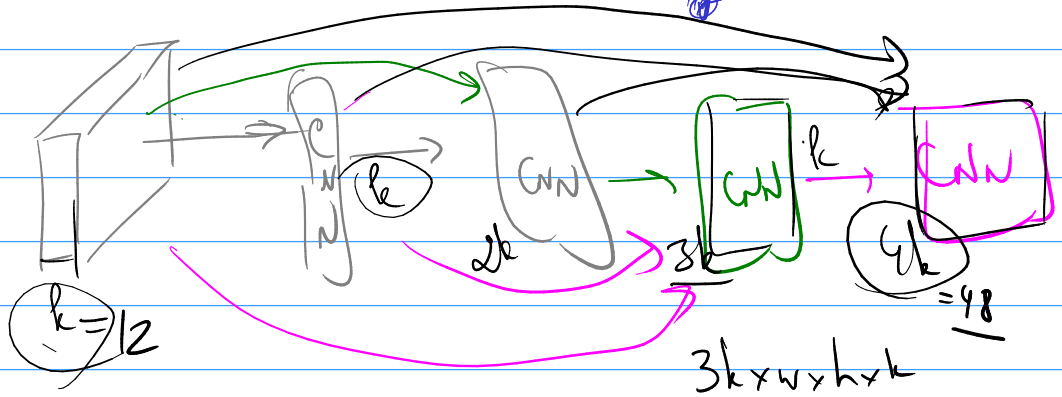
$$\frac{\partial x^{l+1}}{\partial x^l} \to 1$$





skip connections

(6) DenseNet



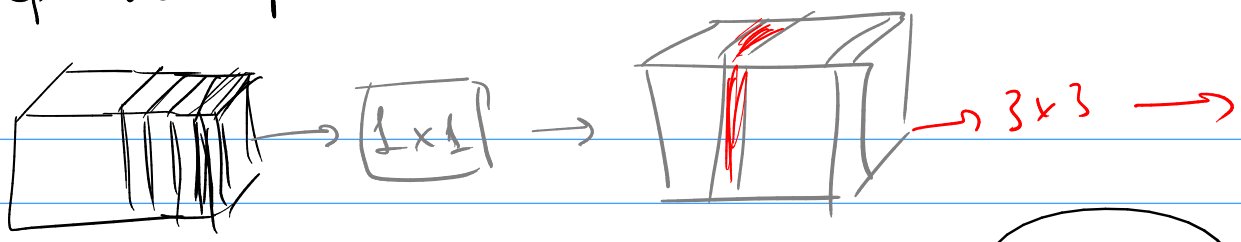
$3k \times w \times h \times k$

$4 \cdot (W \times h \times k^2)$

$(w \times h \times k^2) \cdot (1+2+3+4)$

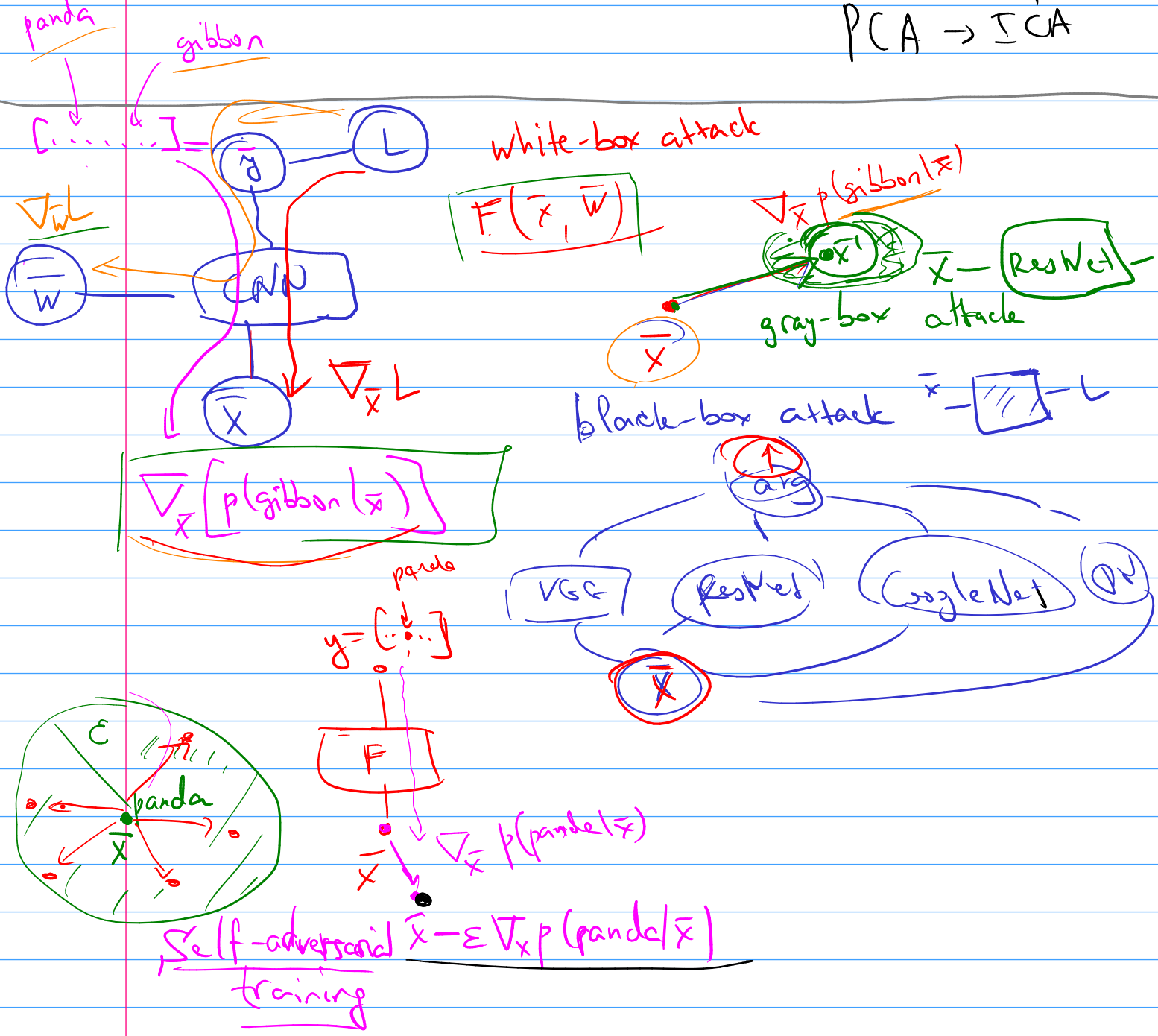
dense

(7) Depthwise separable convolutions



tSNE

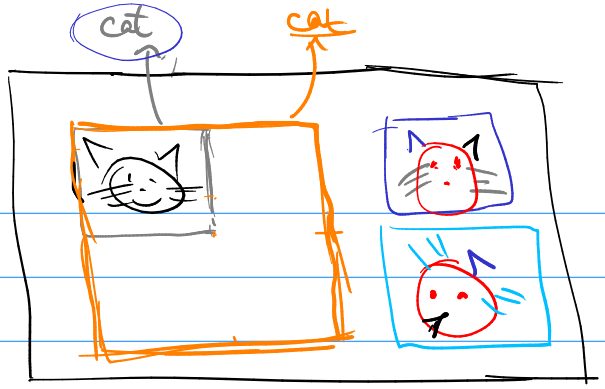
PCA → ICA

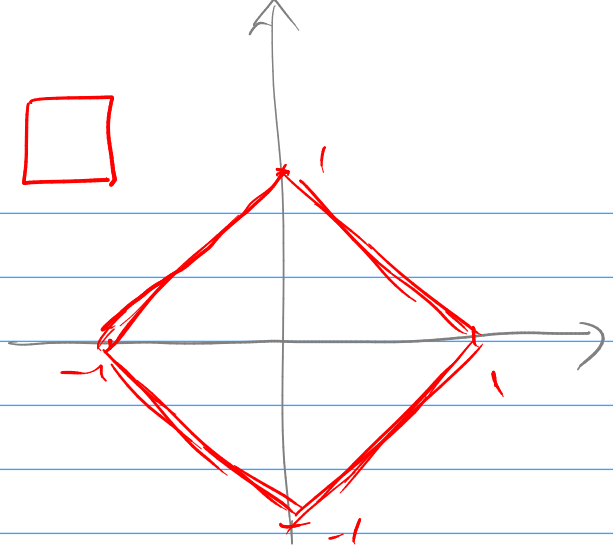


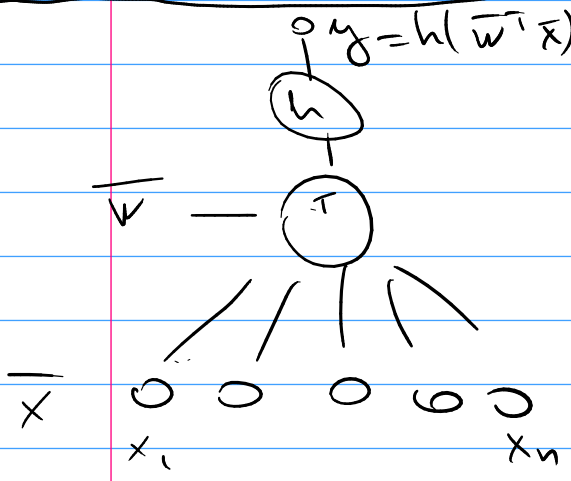
Self-adversarial training

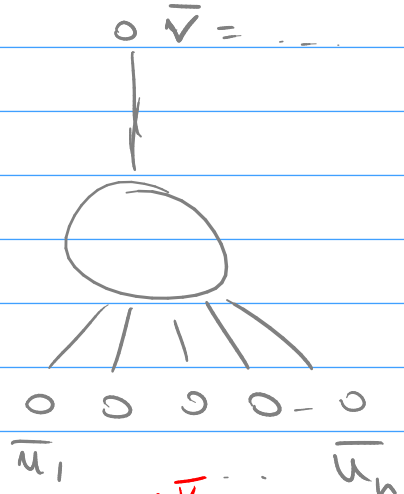
$$\bar{x} - \varepsilon \nabla_x p(\text{panda} \mid \bar{x})$$

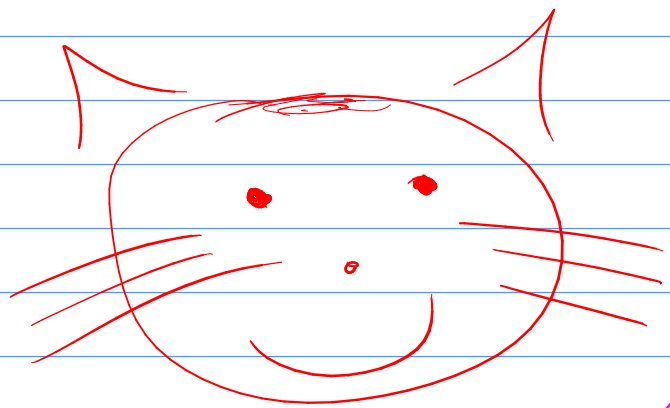
$$L(\bar{x}, y) = L(\bar{x}, y) + \alpha L(\bar{x} + \varepsilon \nabla_{\bar{x}} L(\bar{x}, y), y)$$


cat
cat

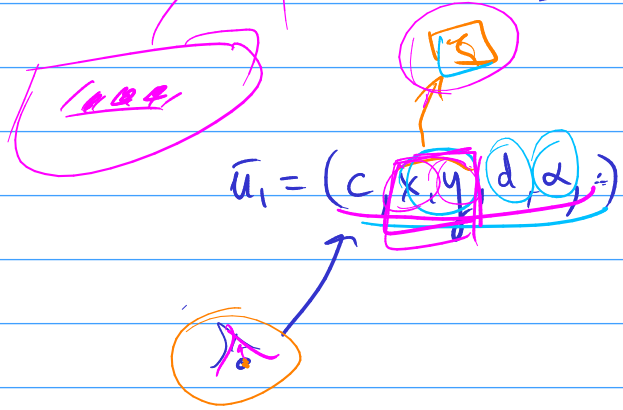


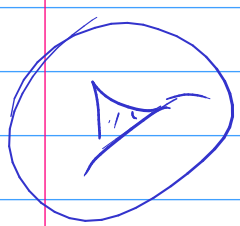

$y = h(\bar{w}^T \bar{x})$
h
T
$\bar{w}$
$\bar{x}$
x_1
x_n

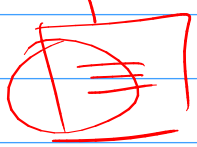

$\bar{v} =$
$\bar{u}_1$
$\bar{u}_n$




$\bar{v}$


$\bar{u}_1 = (c, x, y, d, \alpha, \ldots)$
$\bar{u}_2 = (c, \ldots)$





Autoencoders