

White-box

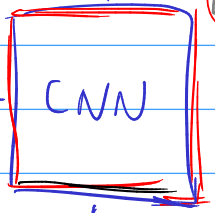
panda

gibbon

$$\epsilon \nabla_{\bar{x}} F(\bar{w}, \bar{x}) + \bar{x}$$

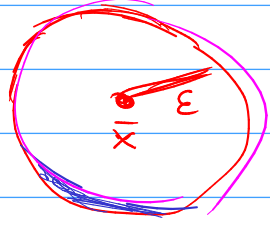
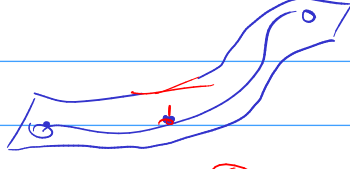
gibbon ↑

$\bar{w}$



gray-box

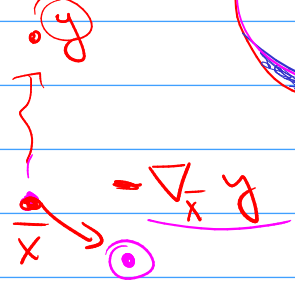
$x_1$   $x_2$



black-box

$\bar{x} \rightarrow y$

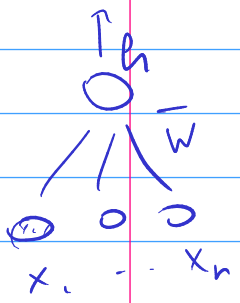
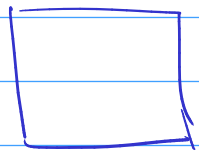
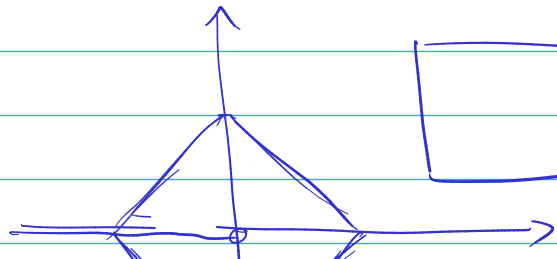
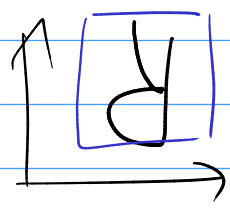
- 1) Augmentation
- 2)



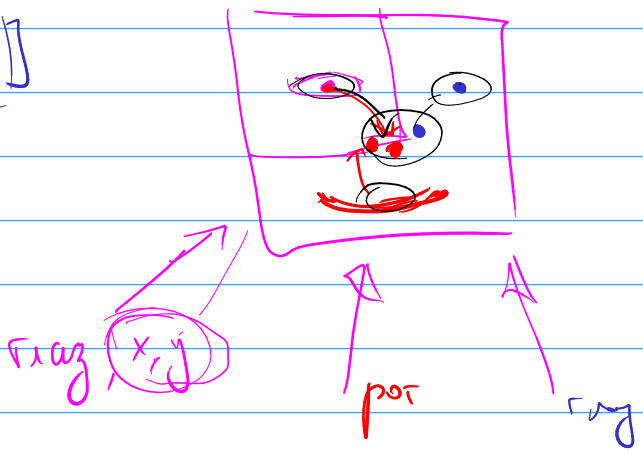
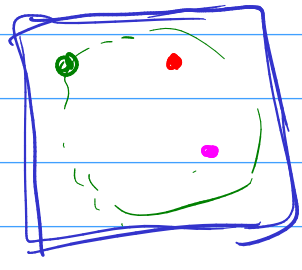
$$L(\bar{w}, \bar{x}, y) := \alpha L(\bar{w}, \bar{x}, y) + (1-\alpha) L(\bar{w}, \bar{x} - \epsilon \nabla_{\bar{x}} L_y(\bar{w}, \bar{x}, y), y)$$

Capsule networks

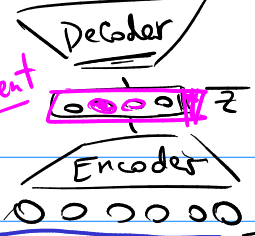
$h(\bar{w}, \bar{x})$



[conf, (x, y, w, h)]



Autoencoder  $0000000 \bar{x}$



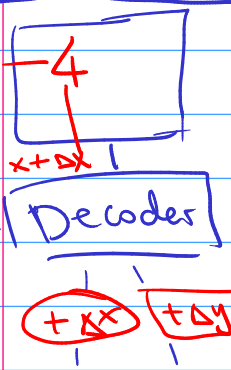
Differential

Densifying autoencoders

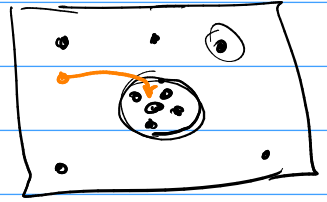
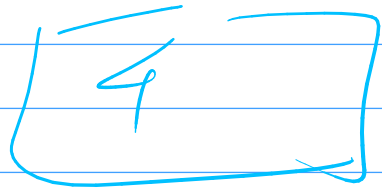
картинку



$y + \Delta y$



$\bar{x} + \bar{\epsilon}$



routing

cost  $x$   $y$

Encoder

