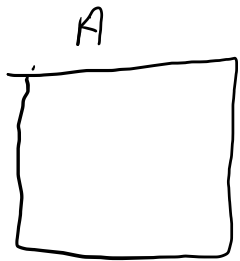


Cycle GAW

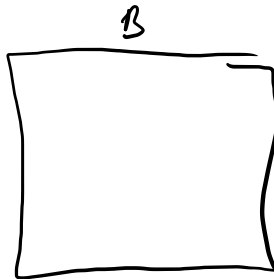


CycleGAN *or* *style transfer*

Domain A \longrightarrow Domain B



winter



summer

Image to Image
Translation!

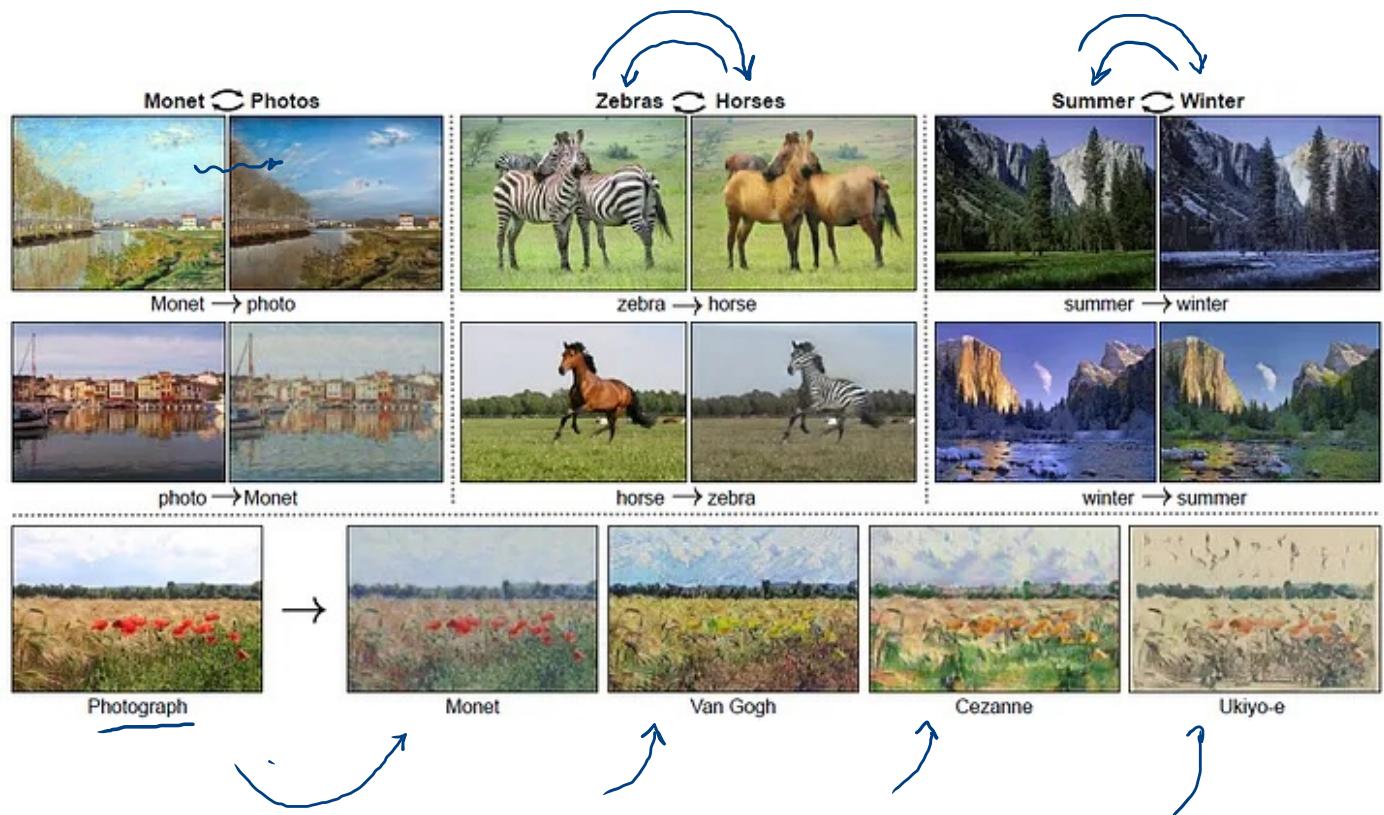
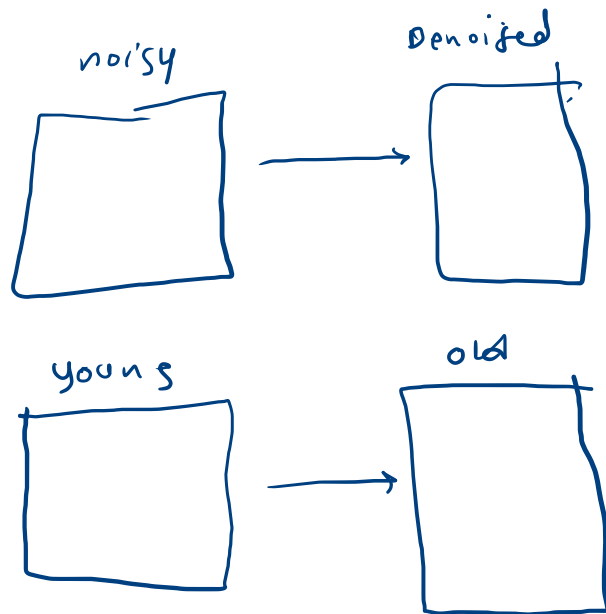
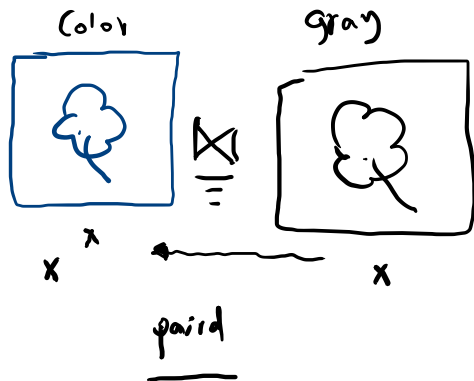
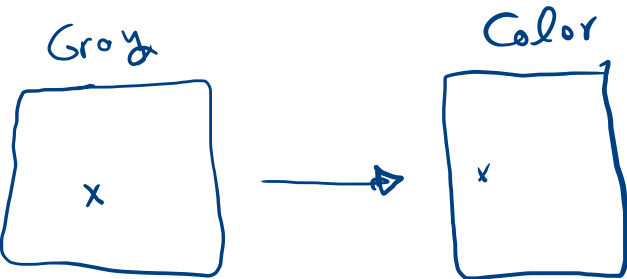
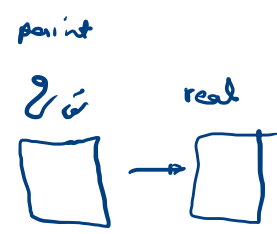
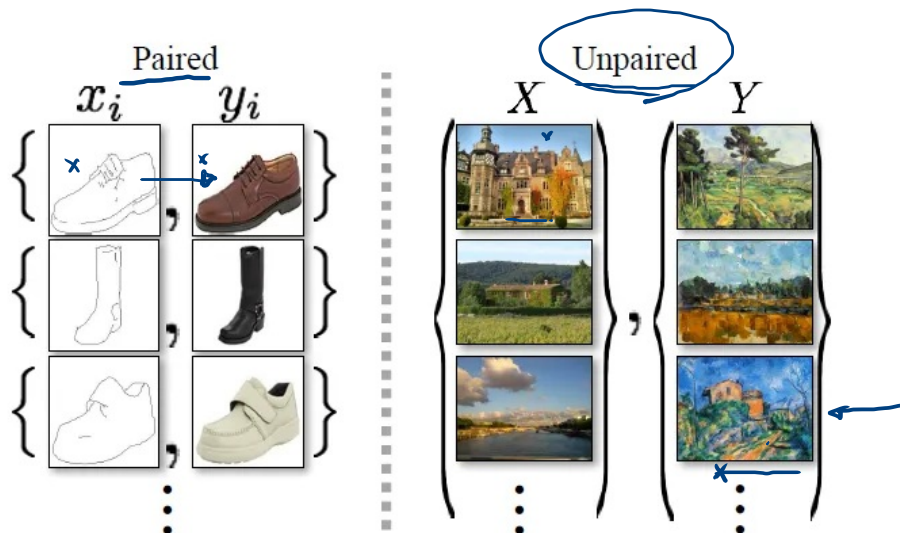


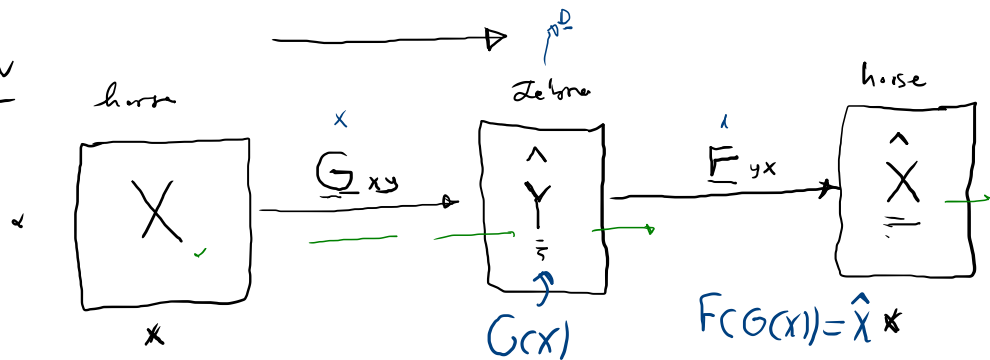
Image to Image translation $\xrightarrow{\text{prev.}}$ AE





Cycle GAN → unpaired

Cycle GAN

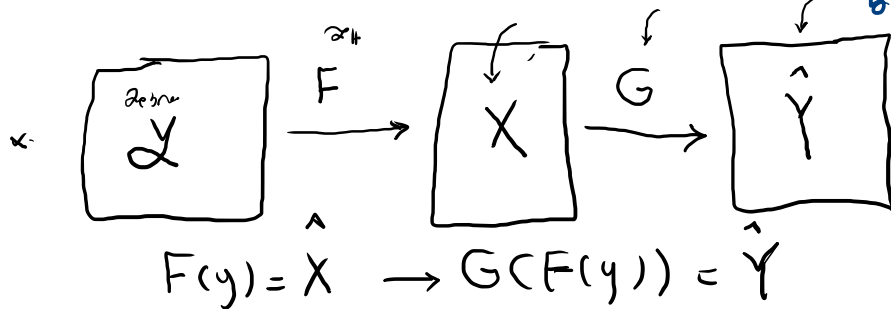


cycle consistency loss!

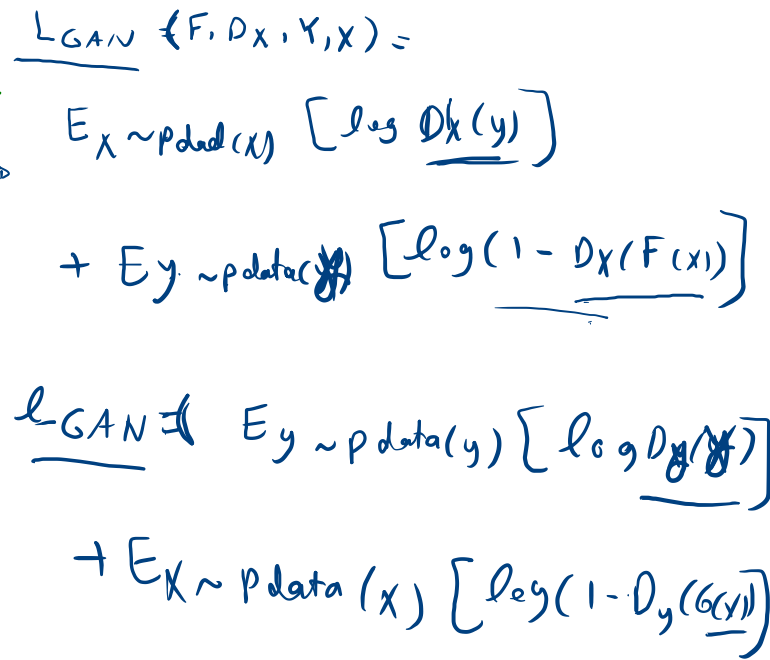
$$G(x) = \underline{Y}$$

$$F(y) = \underline{X}$$

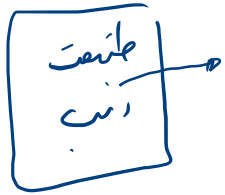
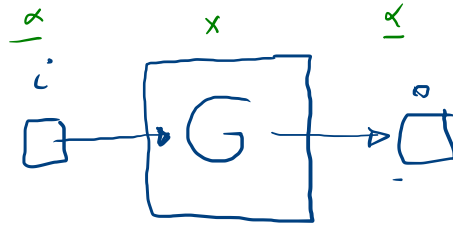
$$\text{loss} = \underbrace{E_{x \sim p_{\text{data}}(x)}}_{\text{forward}} \left[\left\| \overbrace{F}^{\uparrow}(\overbrace{G}^{\downarrow}(x)) - \underline{X} \right\| \right] + E_{y \sim p_{\text{data}}(y)} \left[\left\| \overbrace{G}^{\uparrow}(\overbrace{F}^{\downarrow}(y)) - \underline{Y} \right\| \right]_{\text{backward}}$$



$$F(y) = \hat{X} \rightarrow G(F(y)) = \hat{Y}$$

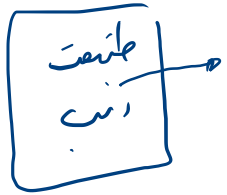
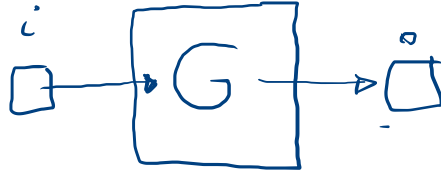


Identity loss

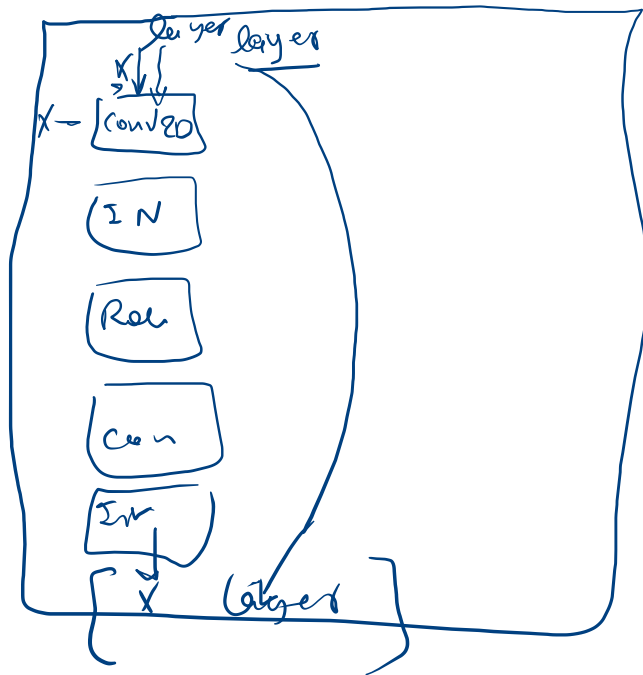


$$L_{\text{-identity}} = \|\underline{F(Y)} - \underline{Y}\| + \|\underline{G(X)} - \underline{X}\|$$

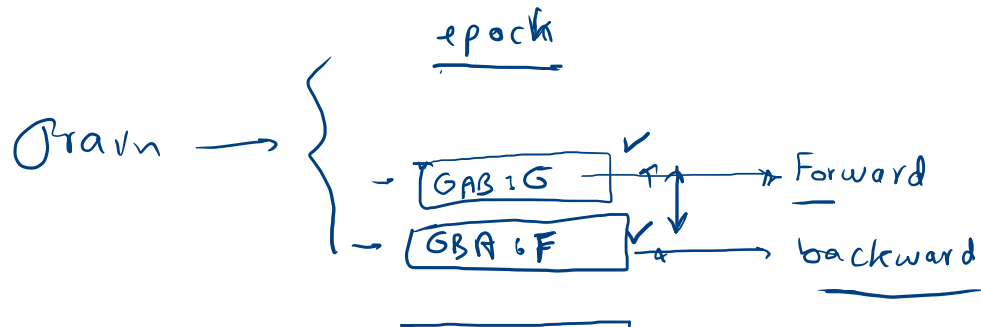
Identity loss



$$L_{\text{-identity}} = \|\underline{F(Y)} - \underline{Y}\| + \|\underline{G(X)} - \underline{X}\|$$



$$\underline{Loss = \lambda L_{GAN}(X) + \lambda L_{GAN}(Y) + \lambda L_{cyc}}$$

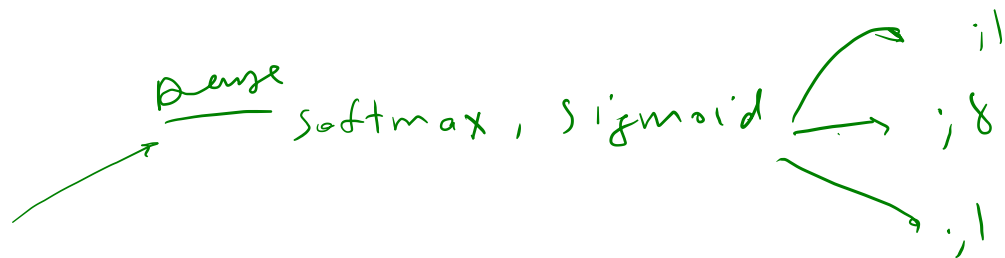


{ L_{GAN}

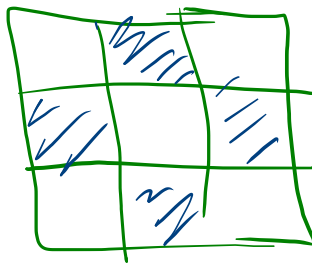
d. style

| d. identity.

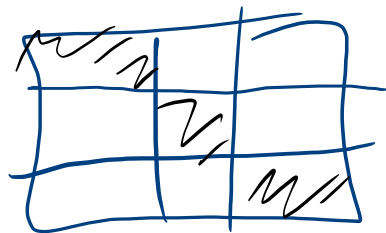
①



Conv (1) →

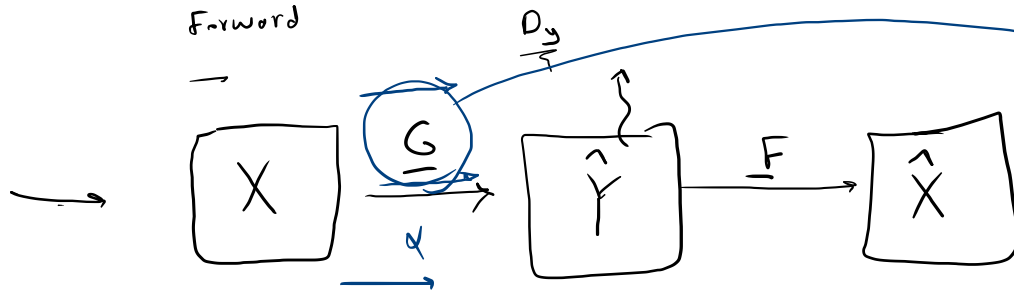


→ horse



→ Zebra

Forward



g_model 1

$X \longrightarrow Y$

Backward

