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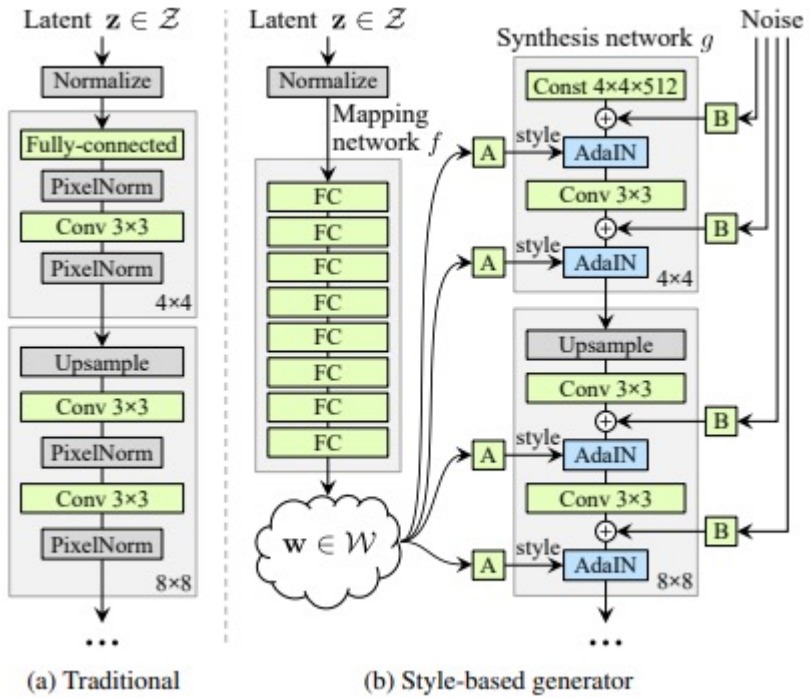
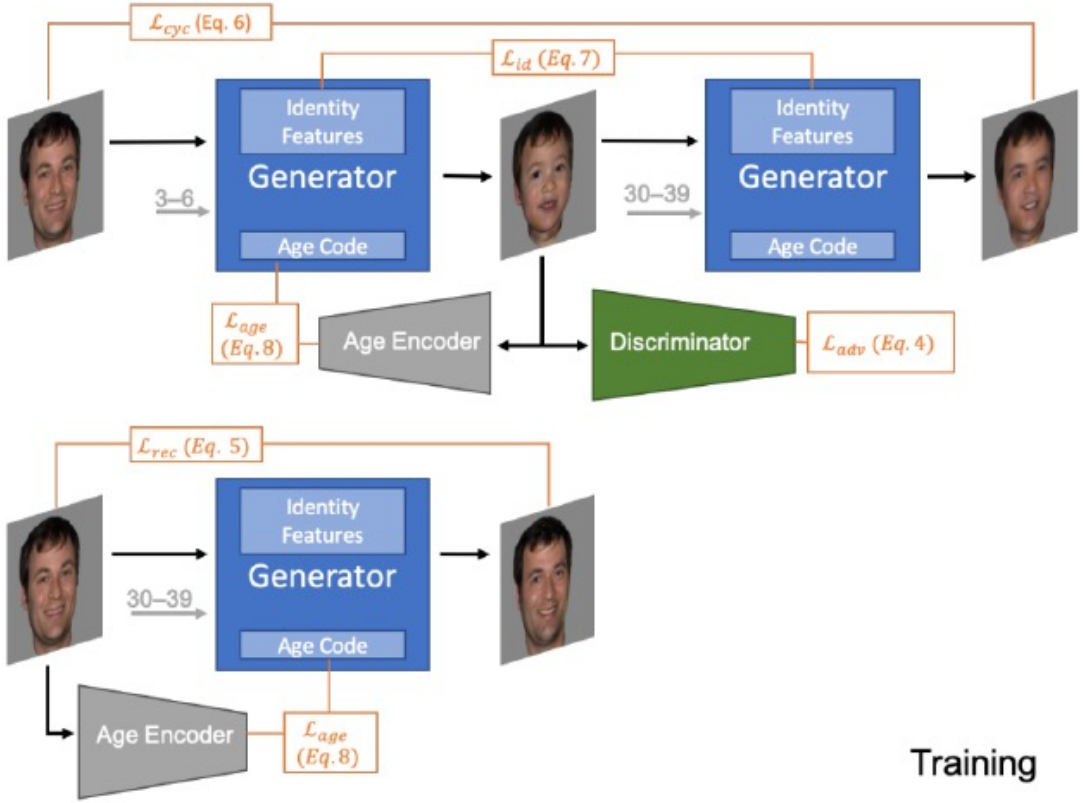
Baseline

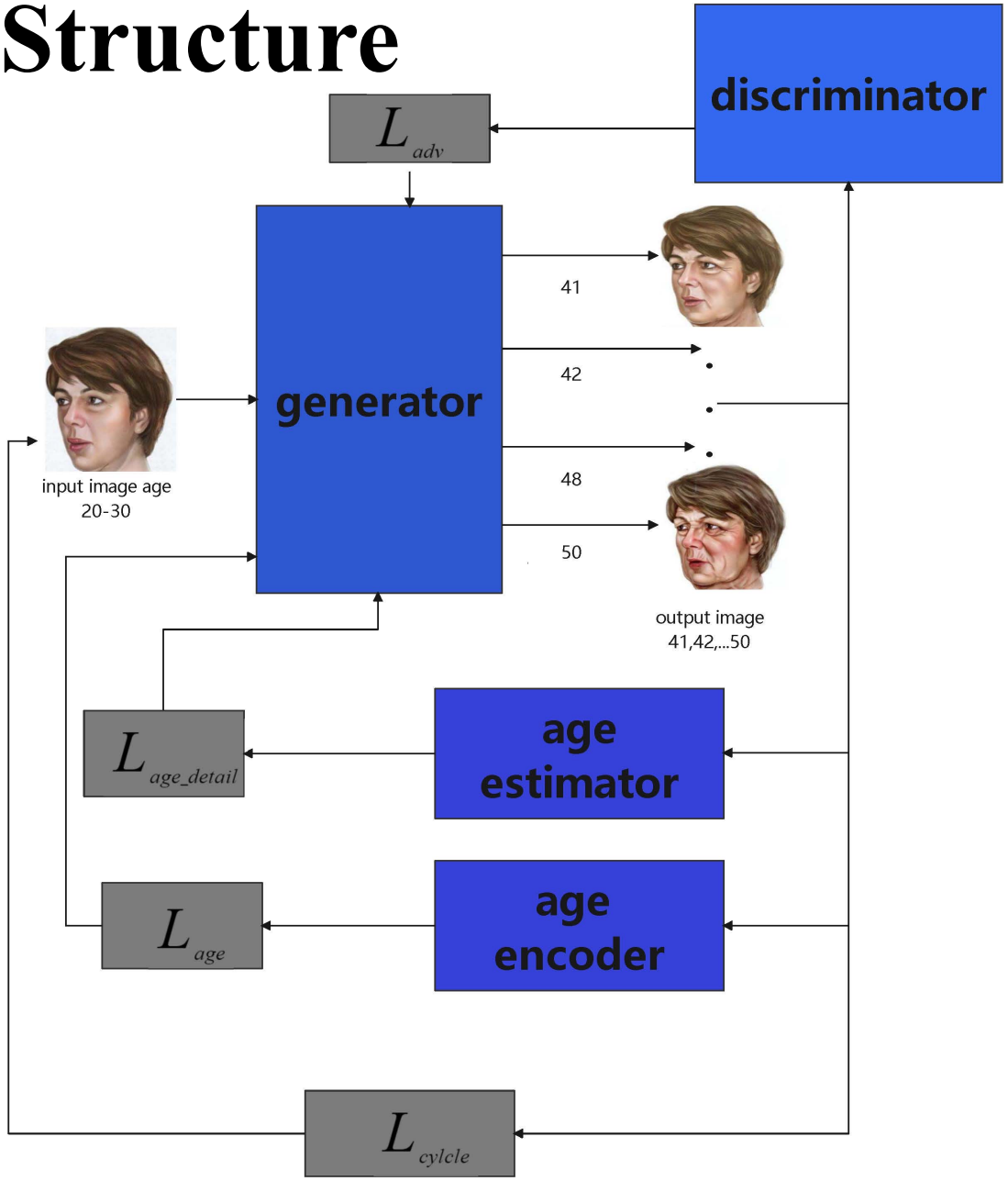


(a) Traditional (b) Style-based generator

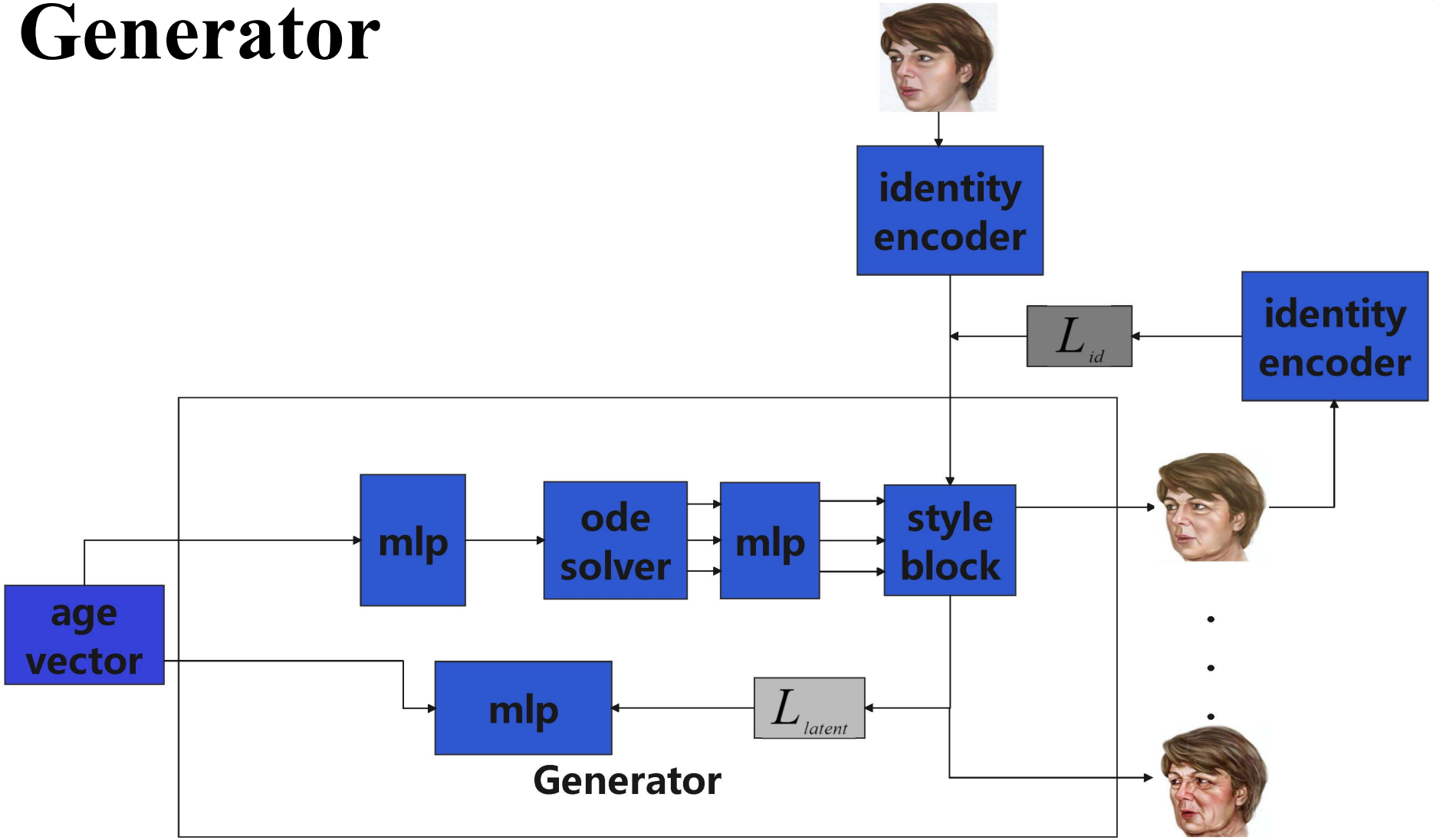


Training

Whole Structure



Generator


identity encoder
L_{id}
identity encoder
mlp
ode solver
mlp
style block
age vector
mlp
L_{latent}
Generator

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Losses

- Self reconstruction loss

$$\mathcal{L}_{rec}(G) = \|x - y_{rec}\|_1$$

- Cycle loss

$$\mathcal{L}_{\text{cyc}}(G) = \|x - y_{\text{cyc}}\|_1$$

- Overall loss

- Age vector loss

$$\mathcal{L}_{\text{age}}(G) = \|E_{\text{age}}(x) - z_s\|_1 + \|E_{\text{age}}(y_{\text{gen}}) - z_t\|_1$$

- Identity feature loss

$$\mathcal{L}_{id}(G) = \|E_{id}(x) - E_{id}(y_{gen})\|_1$$

- Age detail loss

$$\mathcal{L}_{\text{age\_detail}}(G) = \|(E_{\text{aging}}(x_t, x_b, x_e) - E_{\text{aging}}(\hat{x}_t, \hat{x}_b, \hat{x}_e))\|_1$$

$$\min_G \max_D \mathcal{L}_{adv}(G, D) + \lambda_{rec}\mathcal{L}_{rec}(G) + \lambda_{cyc}\mathcal{L}_{cyc}(G)$$
$$+ \lambda_{id}\mathcal{L}_{id}(G) + \lambda_{age}\mathcal{L}_{age}(G) + \lambda_{age\_detail}\mathcal{L}_{age\_detail}(G) + \lambda_{latent}\mathcal{L}_{latent}(G)$$

Result