



Local-Global Interactive Network For Face Age Transformation

Jie Song, Ping Wei, Huan Li, Yongchi Zhang, Nanning Zheng

Xi'an Jiaotong University, Xi'an, China





Face Age Transformation:

- Preserve the face identity information.
- Age progression and regression of face images.



Fig. 1. Illustration of face age transformation. Our model takes a face image as input and outputs face images of different age groups.



Model



- We propose a local-global interactive network model for face age transformation.
- Through the designed local generative network and interactive network, the details of the face image can be better described.
- Age classifier makes age characteristics more vivid.



Fig. 2. Architecture of the local-global interactive network (LGIN).



Loss Function



- Adversarial loss L_A :
 - > Discriminator is designed to judge the authenticity of a face image.

$$L_d = \mathbb{E}_{x \sim P_{data(x)}} [(log(D(x, l))) + \mathbb{E}_{x \sim P_{data(x)}} (1 - log(D(T(x, l), l)))]$$

- > Age classifier *C* is introduced to judge the age groups of a face image. $L_c = \mathbb{E}_{a,z}[-logC(a,z)]$
- Identity loss L_I :

$$L_{I} = \sum_{s} \frac{1}{W_{s}H_{s}C_{s}} |G_{g}(x^{s}, l) - x^{s}| + \lambda |T(x, l) - x|$$



Loss Function



• Local loss L_{local} :

$$L_{local} = L_1(x_f - G_f(x_f, l)) + L_1(x_e - G_e(x_e, l)) + L_1(x_n - G_n(x_n, l)) + L_1(x_m - G_m(x_m, l)) + L_1(x_c - G_c(x_c, l)),$$

• Variation loss L_V :

 $L_V = TV(T(x,l))$









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Fig. 2. Face age transformation by LGIN model.



Comparison



• Comparison with other methods:





Ablation



• Effects of the interactive structure and the local generator:



• Ablation comparison for the age classifier:











Thanks for watching

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