2021 ICCV OCTOBER 11-17 VIRTUAL

Disentangled Lifespan Face Synthesis

Sen He
University of Surrey

Wentong Liao
Leibniz University Hannover

Michael Yang
University of Twente

Yi-Zhe Song
University of Surrey

Bodo Rosenhahn
Leibniz University Hannover

Tao Xiang
University of Surrey

Lifespan Face Synthesis

1,2,3,⋯,68,69,70

Applications

- Entertainment on social media
  - TikTok aging filter
  - Snap chat time machine

- Cross-age face recognition/retrieval

- Finding lost children

Challenges

- Complex and non-linear changes of shape and texture

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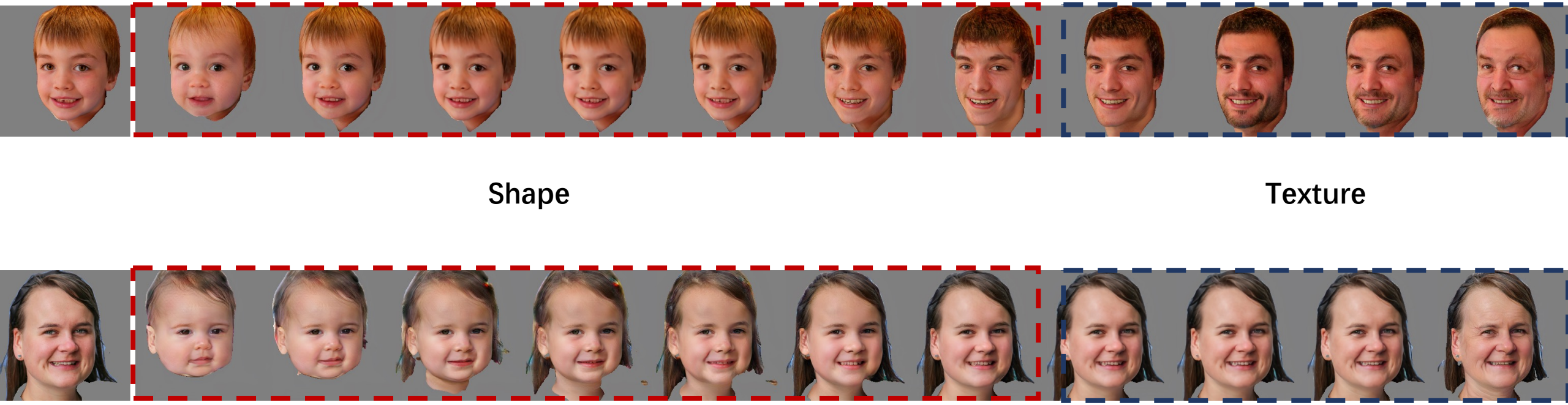
Shape

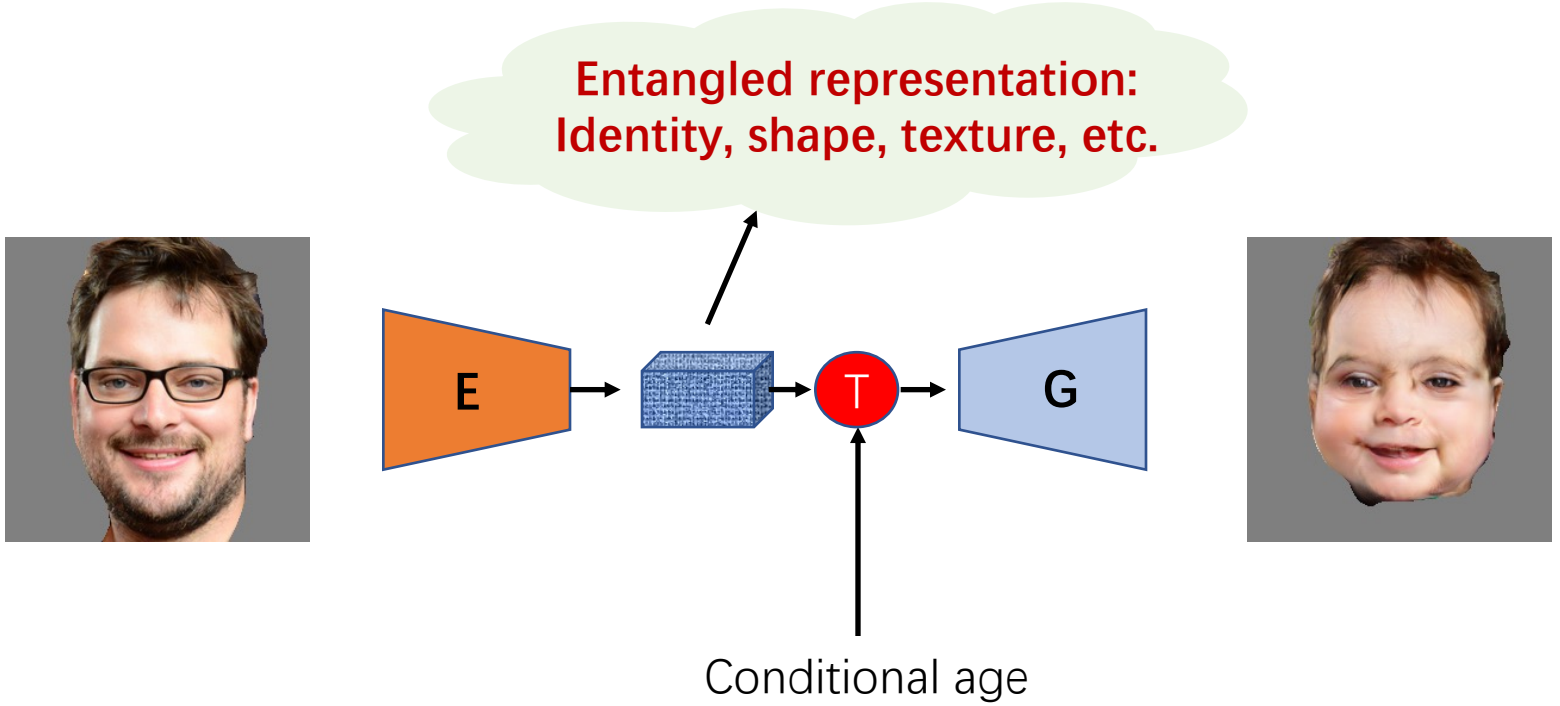
Challenges

- Complex and non-linear changes of shape and texture



Previous Methods

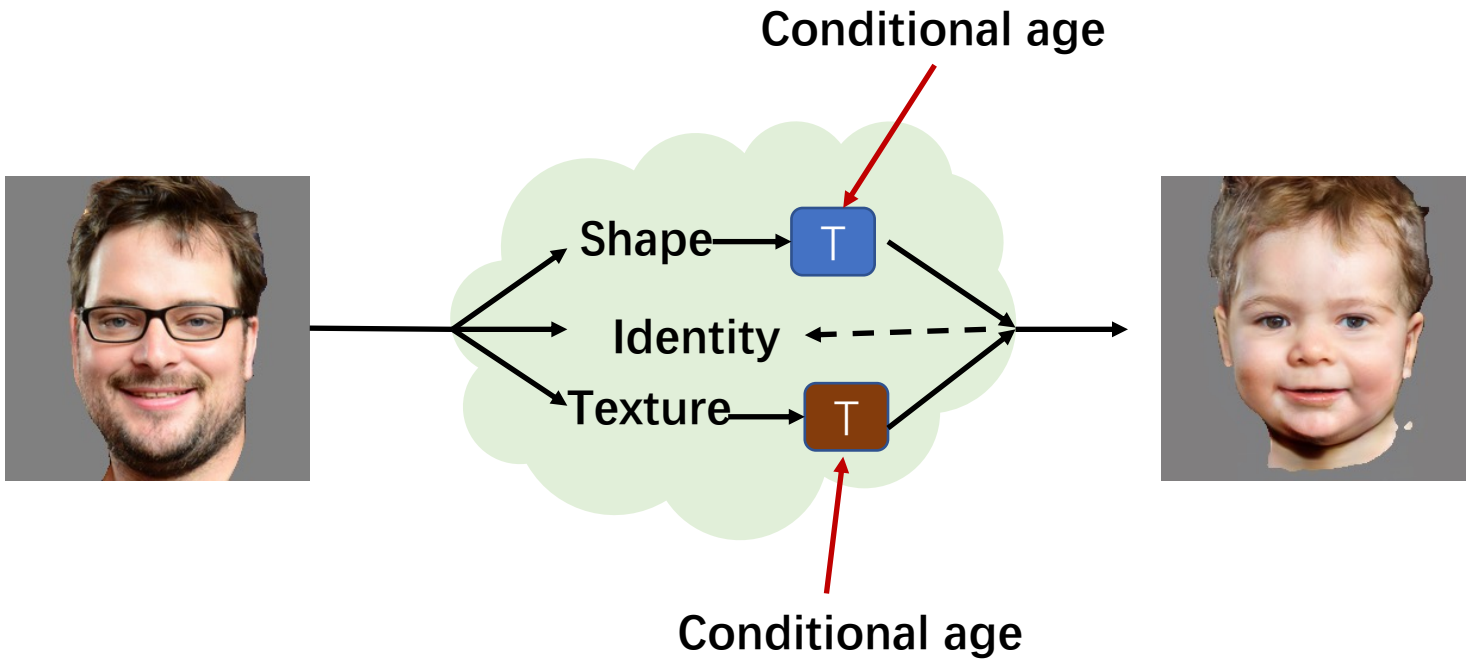
- Domain translation problem



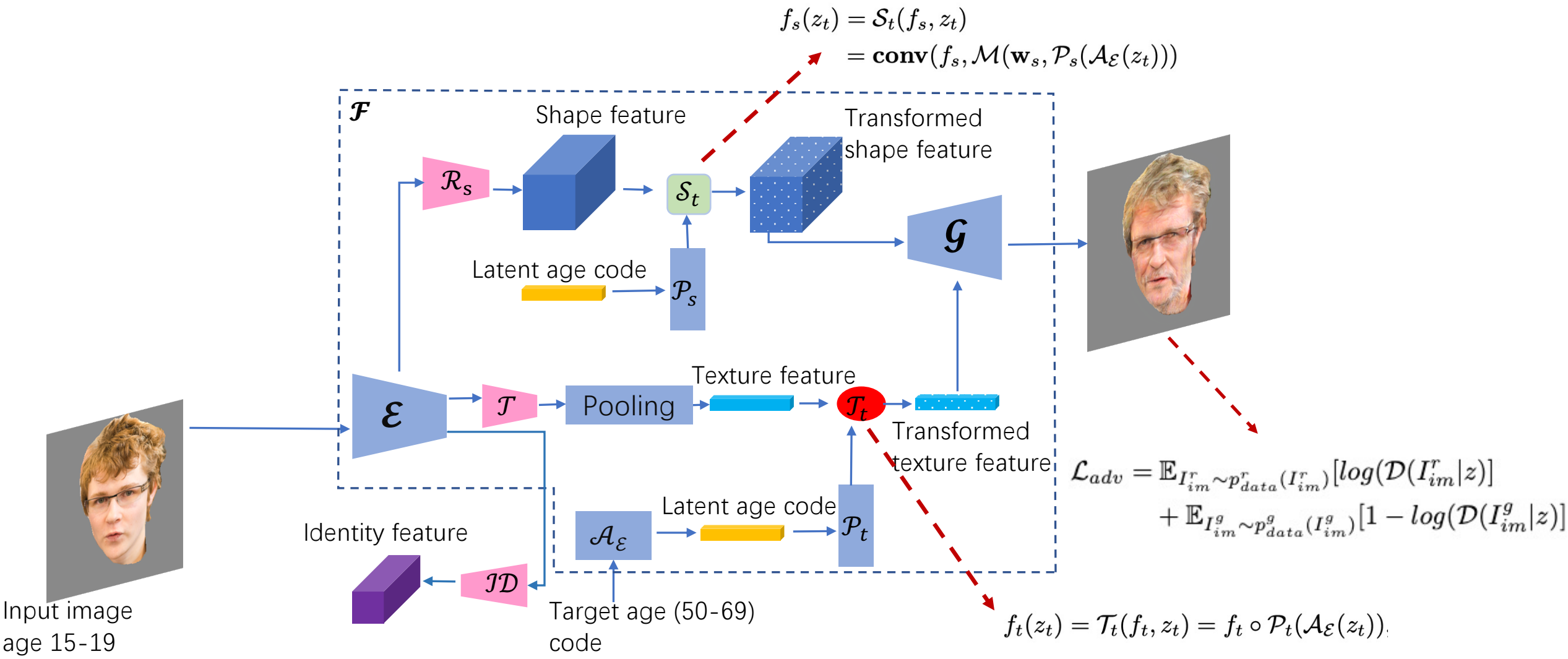
Lifespan Age Transformation Synthesis , Or-El et al. ECCV 2020

Motivations

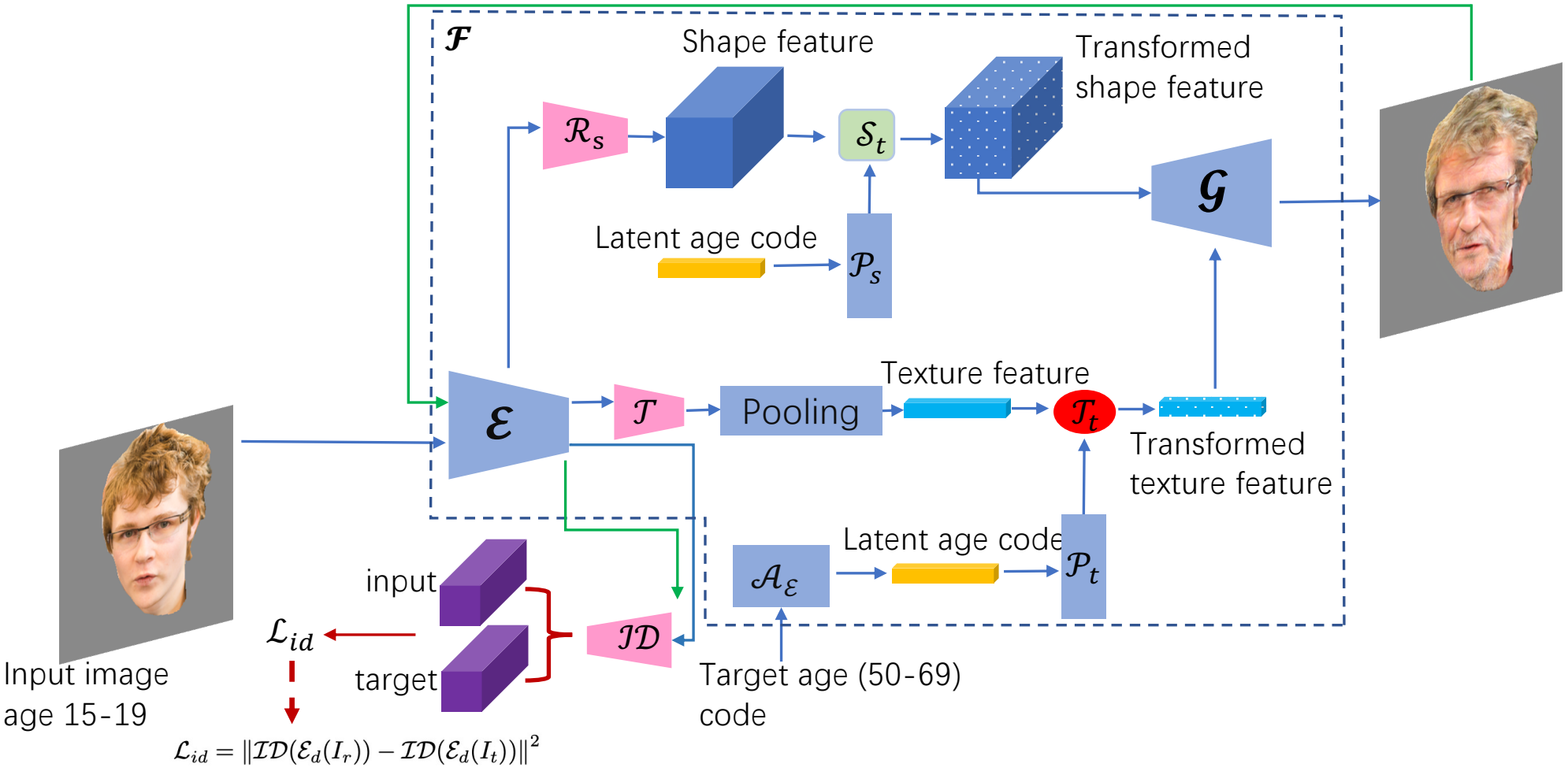
- Disentanglement



Disentangled Lifespan Face Synthesis

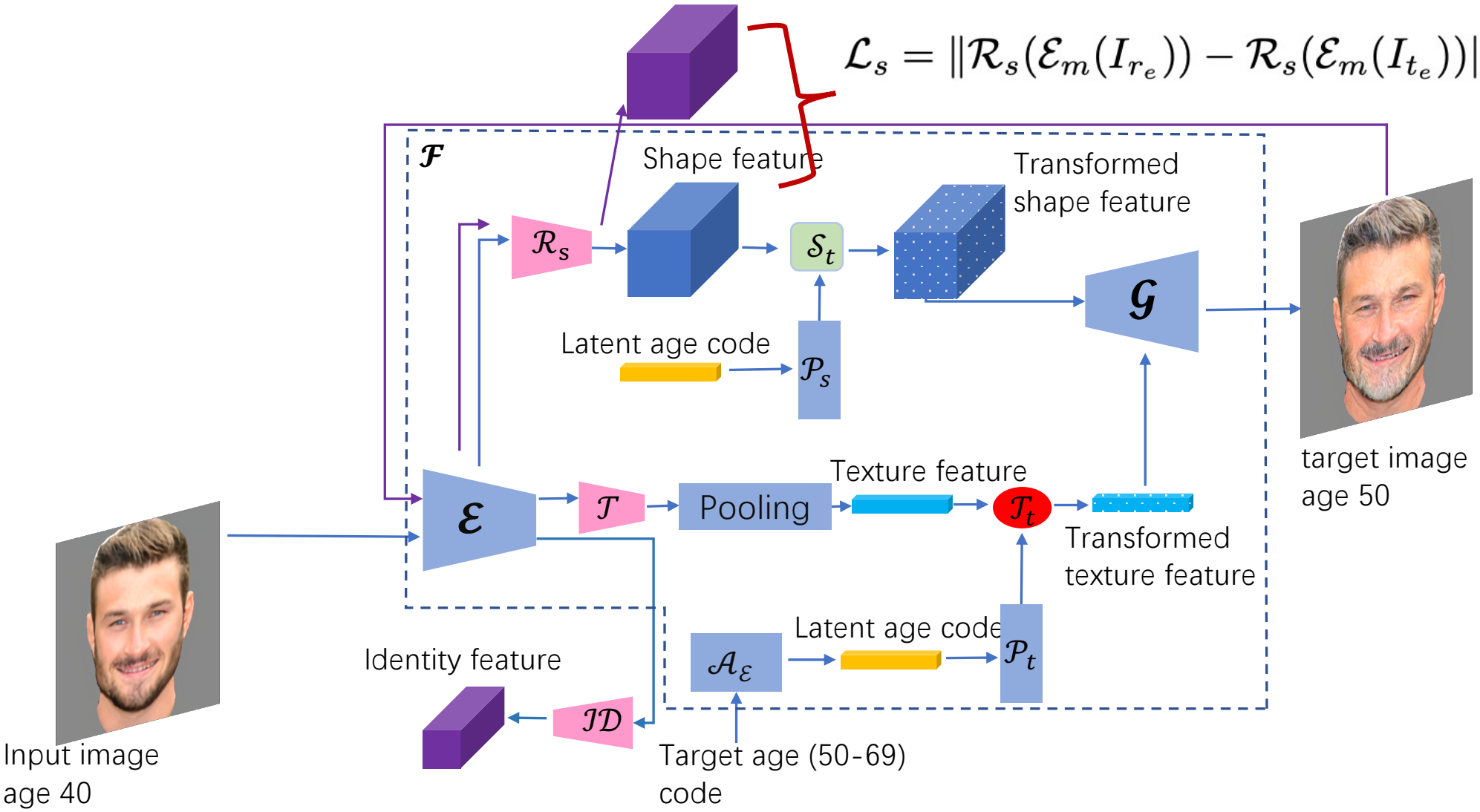


Disentangled Lifespan Face Synthesis



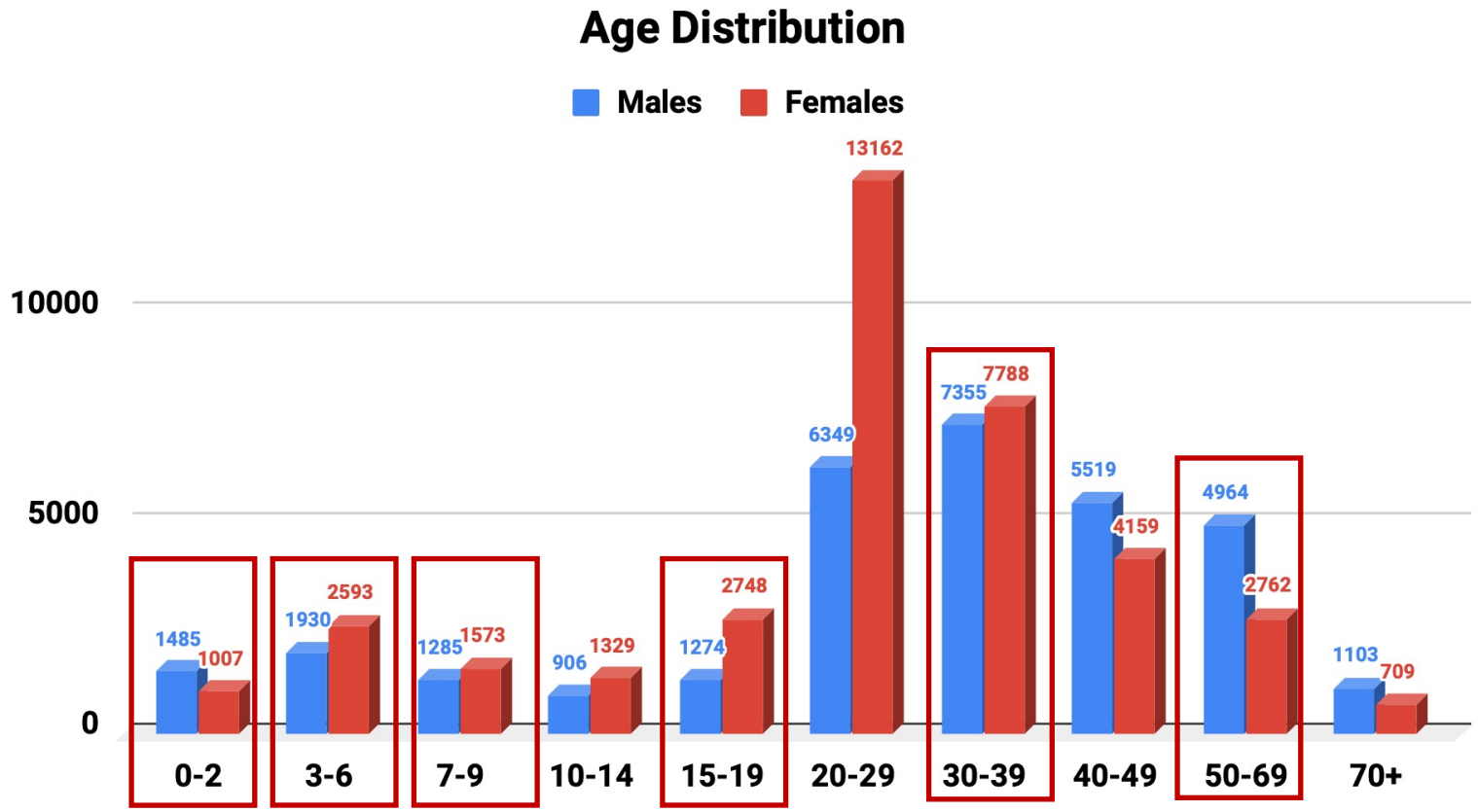
Disentangled Lifespan Face Synthesis

$$\mathcal{L}_s = \|\mathcal{R}_s(\mathcal{E}_m(I_{r_e})) - \mathcal{R}_s(\mathcal{E}_m(I_{t_e}))\|^2$$



Disentangled Lifespan Face Synthesis

- Benchmark
  - FFHQ-Aging dataset



Link to the dataset: https://github.com/royorel/FFHQ-Aging-Dataset

Disentangled Lifespan Face Synthesis

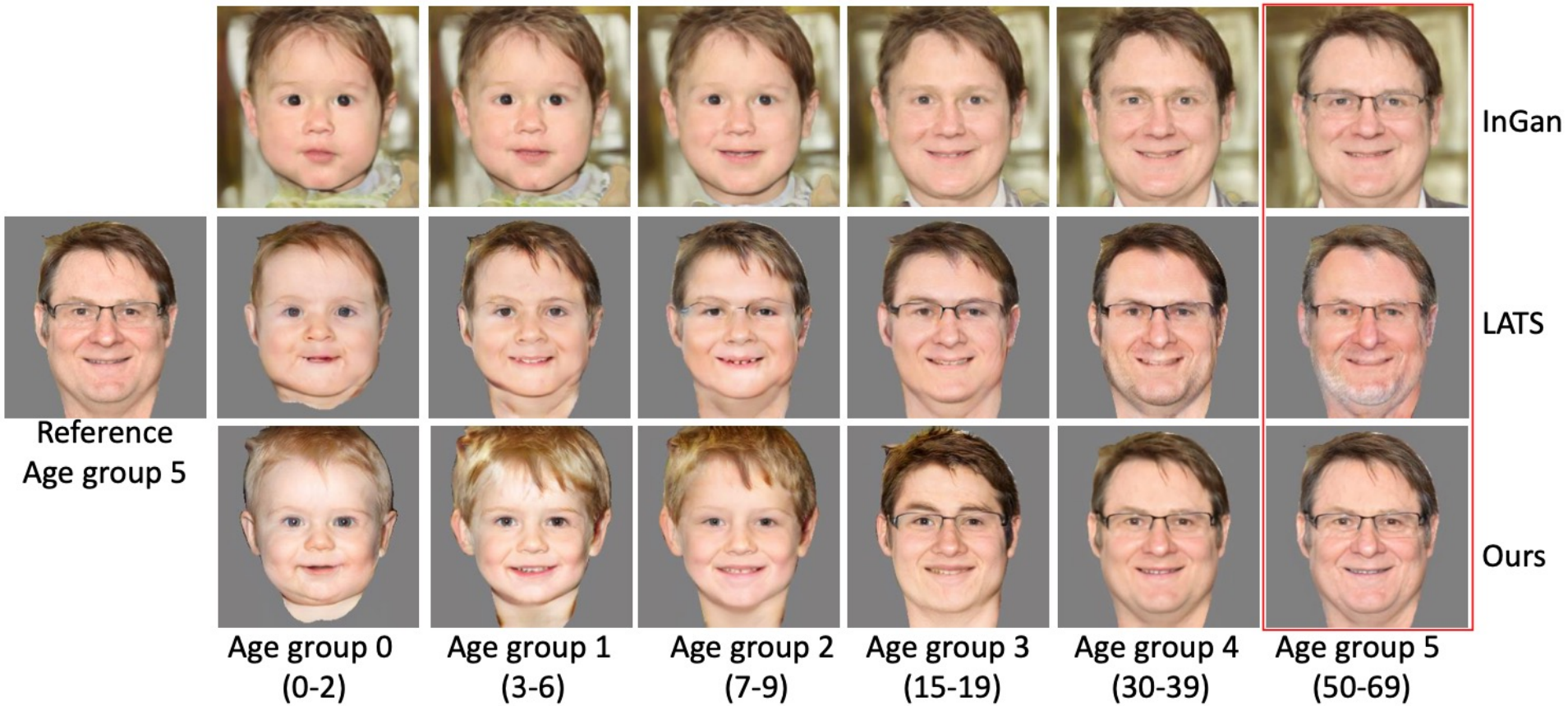
- Quantitative results

Methods	Identity preservation↑	Shape transformation↑	Texture transformation↑	Reconfiguration↑	Age error↓	Age accuracy↑
IPGAN [37]	**3.92±0.17**	2.38±0.42	2.50±0.12	3.93±0.01	11.33±0.89	27.0%
InGAN [43]	2.74±0.17	2.51±0.22	2.37±0.16	3.56±0.35	8.64±2.80	39.4%
LATS [24]	3.18±0.13	2.89±0.44	3.22±0.17	3.49±0.25	5.67±3.61	60.0%
Ours	3.07±0.19	**3.18±0.35**	**3.30±0.21**	**4.07±0.27**	**3.53±2.81**	**65.6%**

IPGAN: Face aging with identity-preserved conditional generative adversarial networks, Wang et al, CVPR 2018
InGAN: In-domain GAN inversion for real image editing , Zhu et al, ECCV 2020
LATS: Lifespan age transformation synthesis , Or-El et al, ECCV 2020

Disentangled Lifespan Face Synthesis

- Qualitative results



InGAN: In-domain GAN inversion for real image editing , Zhu et al, ECCV 2020
LATS: Lifespan age transformation synthesis , Or-El et al, ECCV 2020

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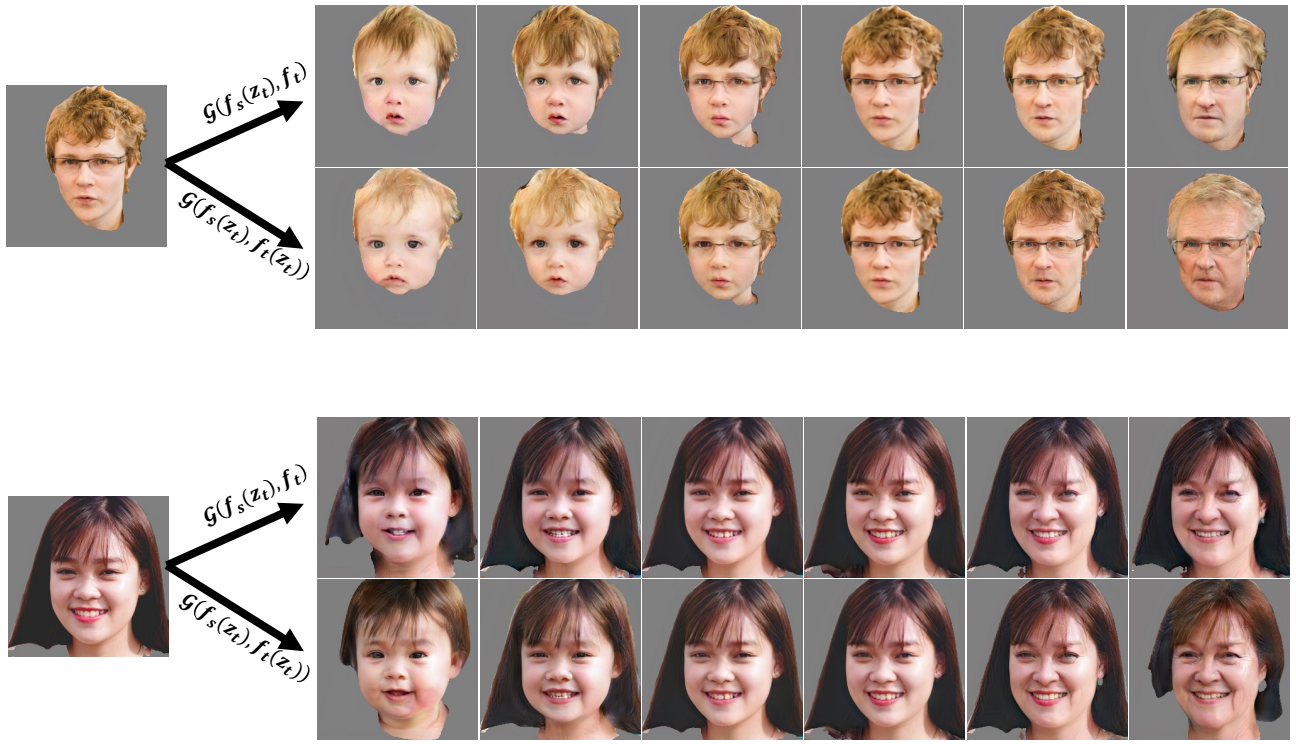
- Analysis



Conclusion

- Disentanglement of shape, texture and identity
- Age modulated convolution for shape transformation
- Age controlled channel attention for texture transformation
- Superior results

Thank For Your Watching!

Email: sen.he@surrey.ac.uk

Github: https://github.com/SenHe/DLFS