Controllable Person Image Synthesis with Attribute-Decomposed GAN

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Visual Intelligence Lab.

Contents

- Introduction + Problems + Scope of this research
- Method
  - Observations
  - Proposed solutions to fill the research gap (Main contributions: Architecture + Attribute targetting)
  - Implementation details
- Results
- My thoughts + What we can learn from this paper

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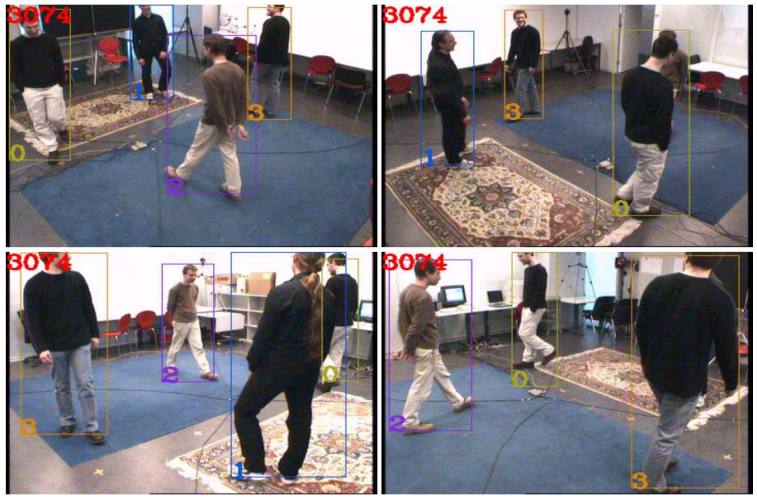

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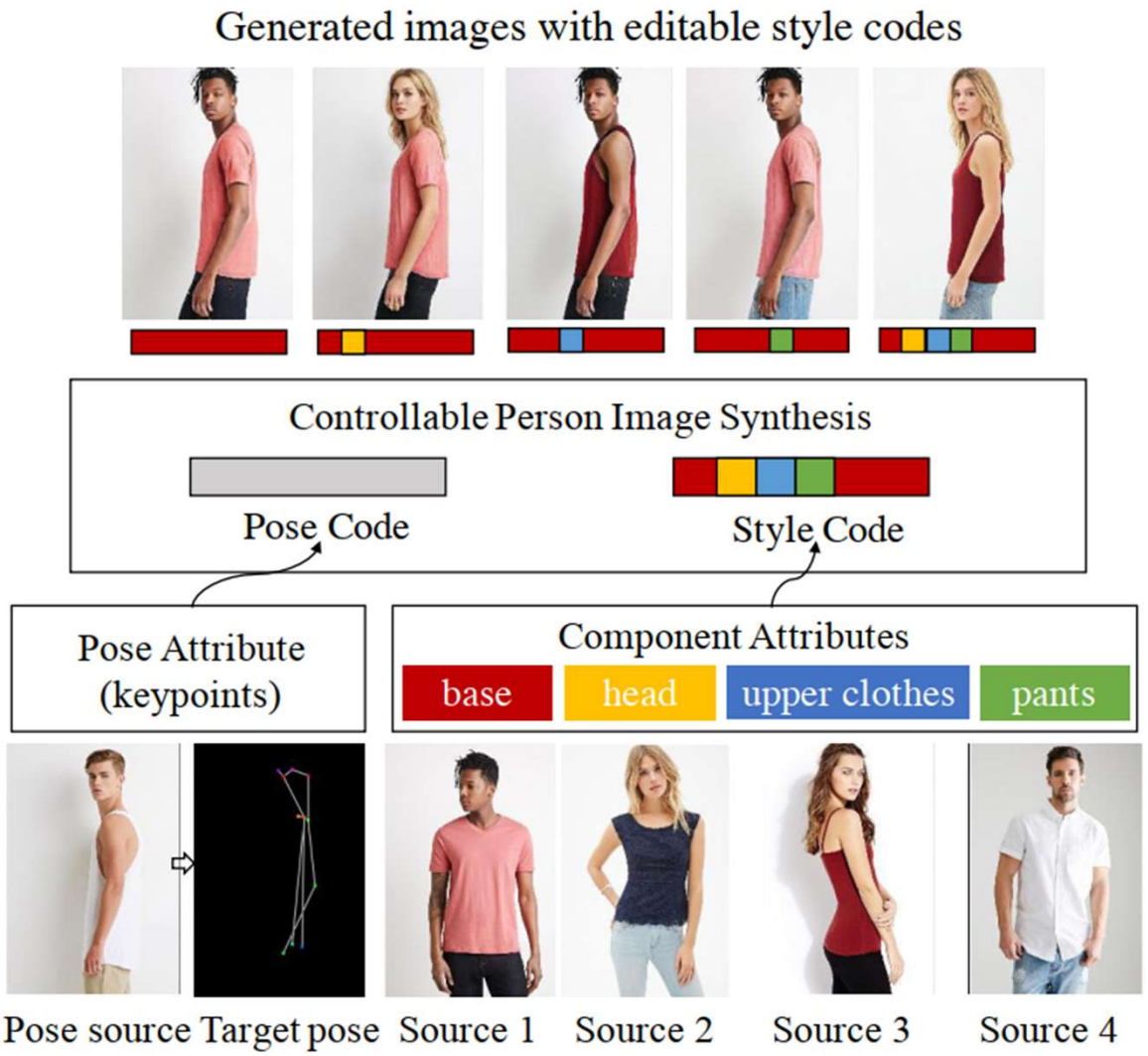

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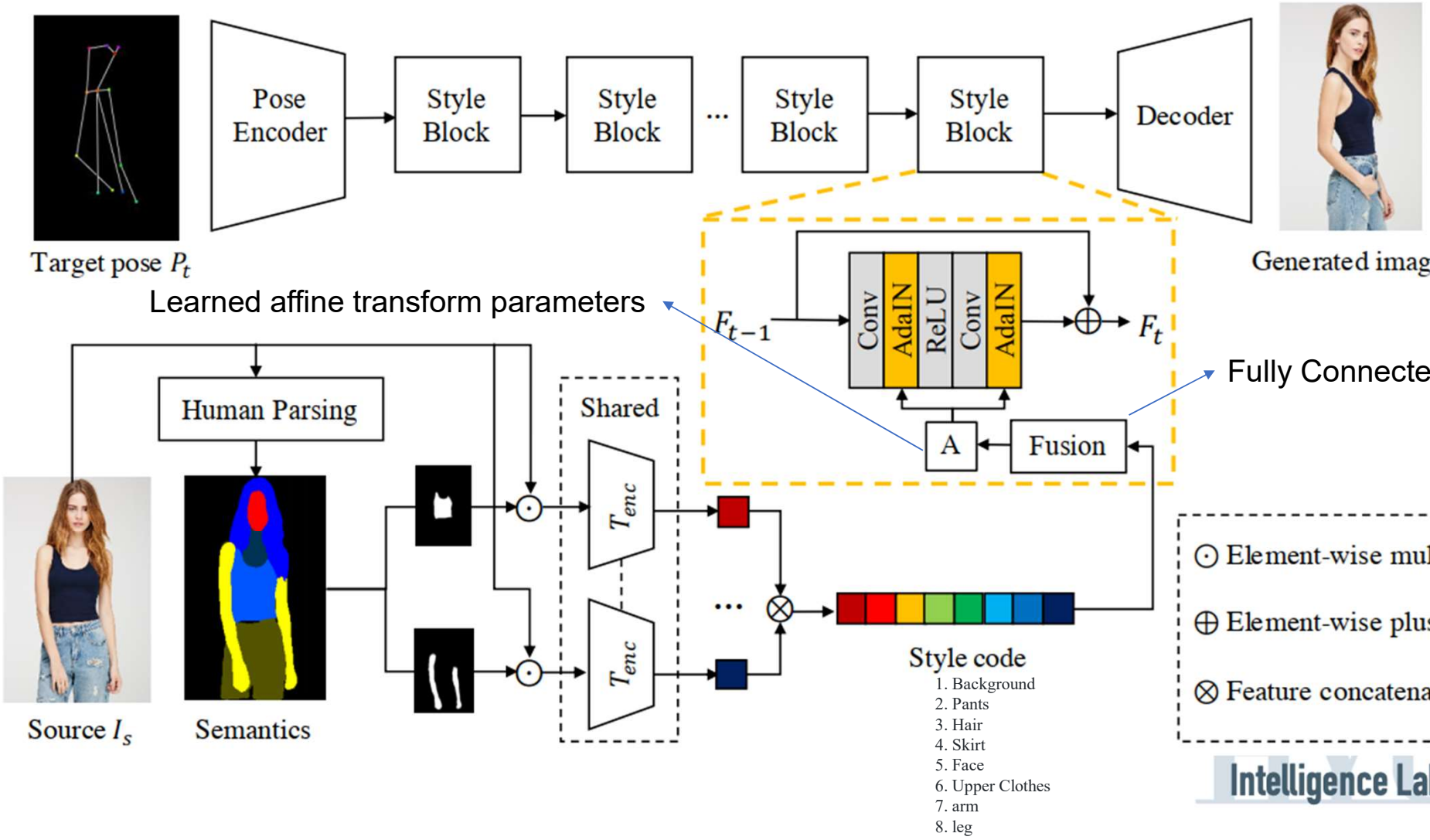
Target pose P_t
Pose Encoder
Style Block
Style Block
...
Style Block
Style Block
Decoder
Generated image I_g
Learned affine transform parameters
F_{t-1}
Conv
AdaIN
ReLU
Conv
AdaIN
F_t
A
Fusion
Fully Connected Layer
Human Parsing
Shared
T_{enc}
T_{enc}
Source I_s
Semantics
Style code
1. Background
2. Pants
3. Hair
4. Skirt
5. Face
6. Upper Clothes
7. arm
8. leg
⊙ Element-wise multiply
⊕ Element-wise plus
⊗ Feature concatenation
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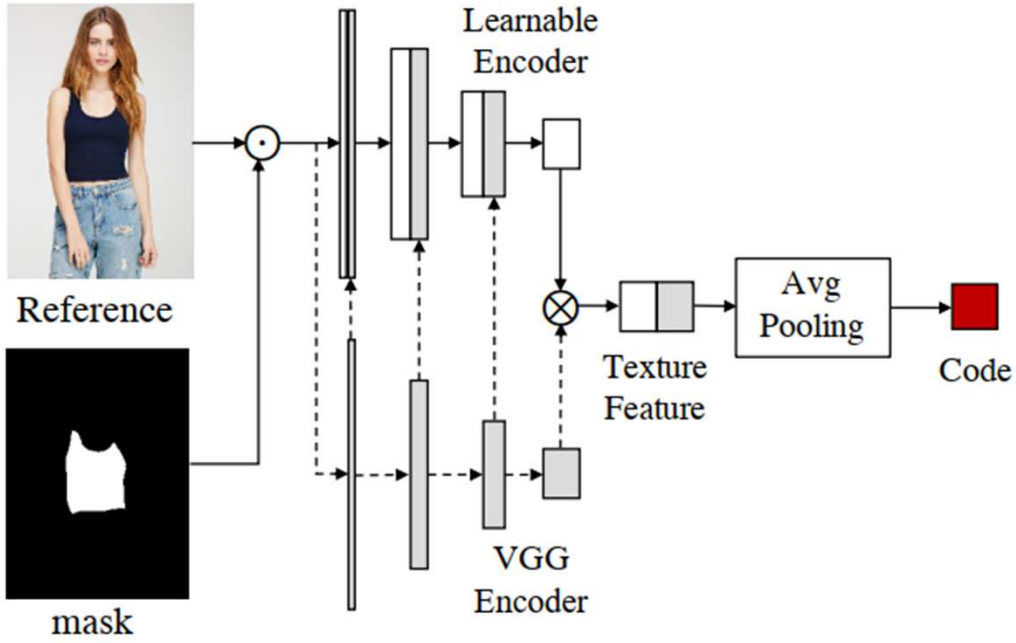

Texture Encoder Network

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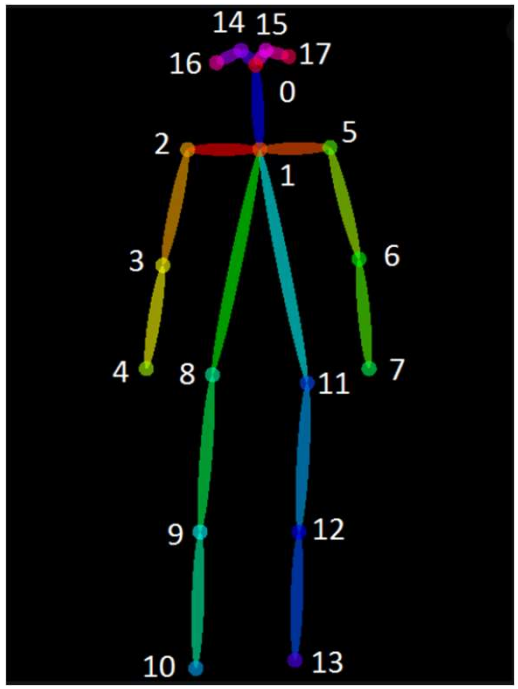

Open-pose for target pose estimation

Cut down version of a human parser limited to 8 categories

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$$\mathcal{L}_{total} = \mathcal{L}_{adv} + \lambda_{rec}\mathcal{L}_{rec} + \lambda_{per}\mathcal{L}_{per} + \lambda_{CX}\mathcal{L}_{CX}$$

$$\begin{aligned} L_{adv} =& \mathbb{E}_{I_s,P_t,I_t}[log(D_t(I_s, I_t) \cdot D_p(P_t, I_t))] + \\ & \mathbb{E}_{I_s,P_t}[log((1 - D_t(I_s, G(I_s, P_t))) \\ & \cdot (1 - D_p(P_t, G(I_s, P_t))))]. \end{aligned}$$

$$L_{rec} = ||G(I_s, P_t) - I_t||_1$$

$$\mathcal{L}_{per} = \frac{1}{W_l H_l C_l} \sum_{x=1}^{W_l} \sum_{y=1}^{H_l} \sum_{z=1}^{C_l} \parallel \phi_l(I_g)_{x,y,z} - \phi_l(I_t)_{x,y,z} \parallel_1$$

$$\mathcal{L}_{CX} = -log(CX(\mathcal{F}^l(I_g), \mathcal{F}^l(I_t)))$$

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Results

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(a) Source (b) Target pose (c) Ground-truth (d) w/o CX (e) w/ CX

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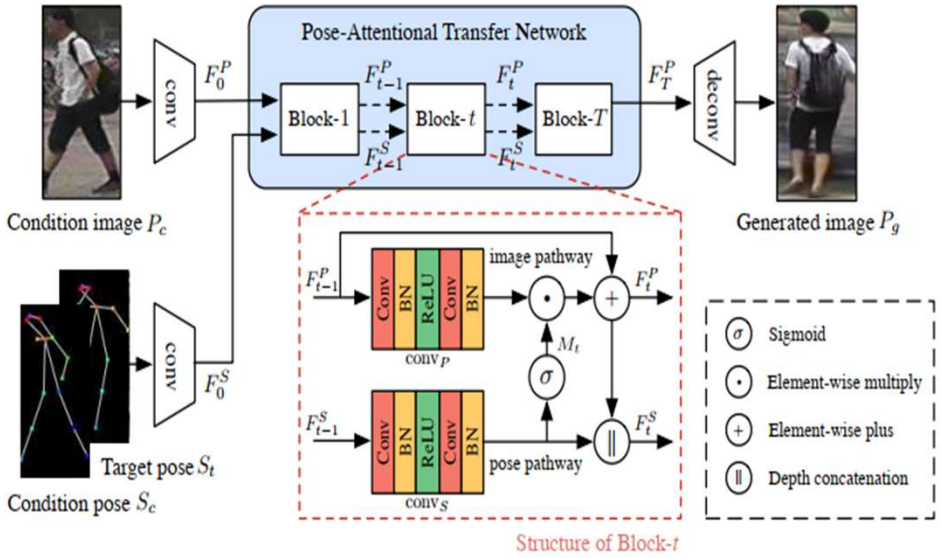
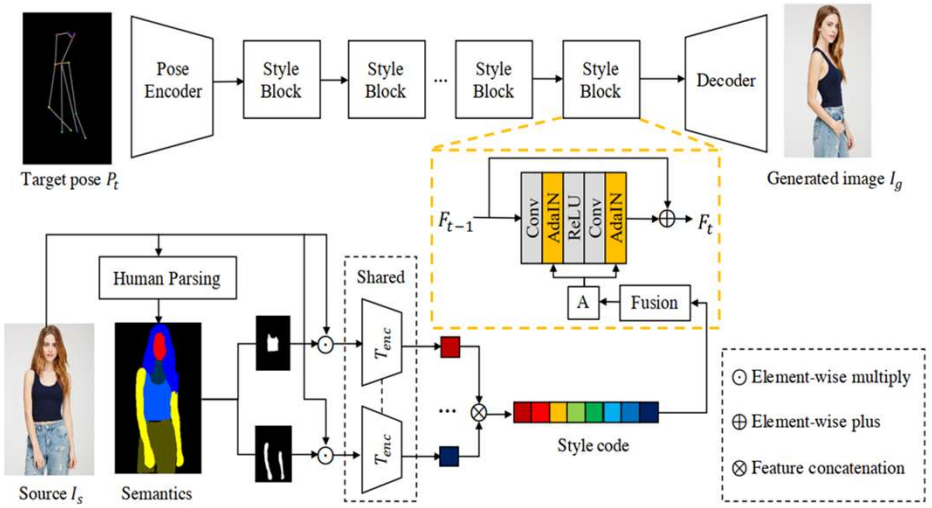
My Thoughts





Zhen Zhu, Tengteng Huang, Baoguang Shi, Miao Yu, Bofei Wang, and Xiang Bai. Progressive pose attention transfer for person image generation. In *Proceedings of the IEEE Conference on Computer Vision and Pattern Recognition*, pages 2347–2356, **2019**.

This paper

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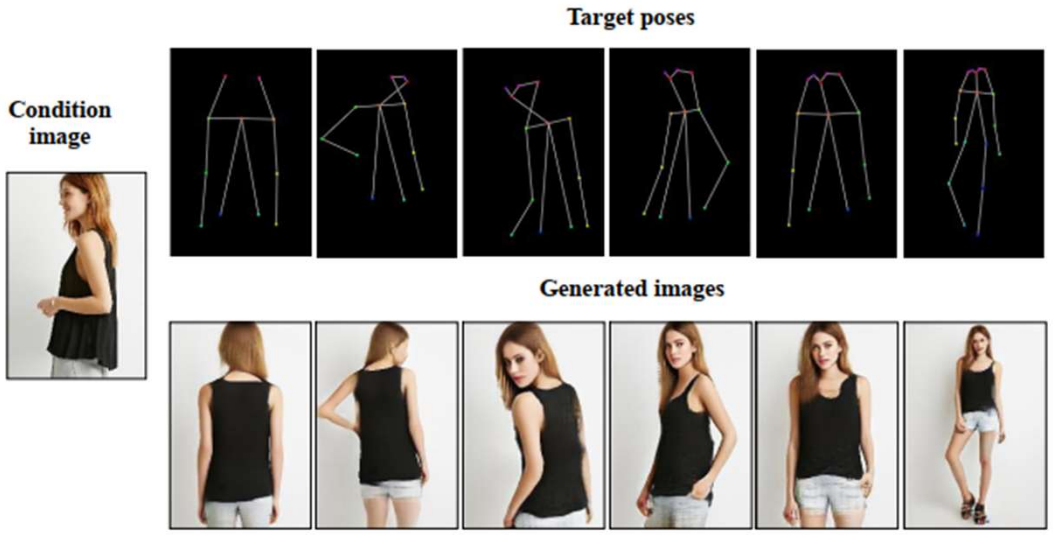

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Q & A