GarmentGAN: Photo-realistic Adversarial Fashion Transfer

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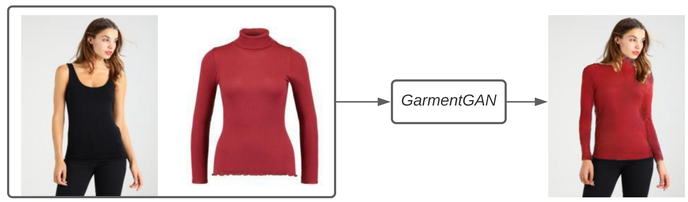
Problem Definition

Goal: We present GarmentGAN, a new algorithm that performs image-based garment transfer through generative adversarial methods.



Experiments

Results

Model	Inception Score	FID
CP-VTON [1]	2.636 ± 0.077	23.085
GarmentGAN (w/o TPS)	2.723 ± 0.083	17.408
GarmentGAN	$\mathbf{2.774 \pm 0.082}$	**16.578**

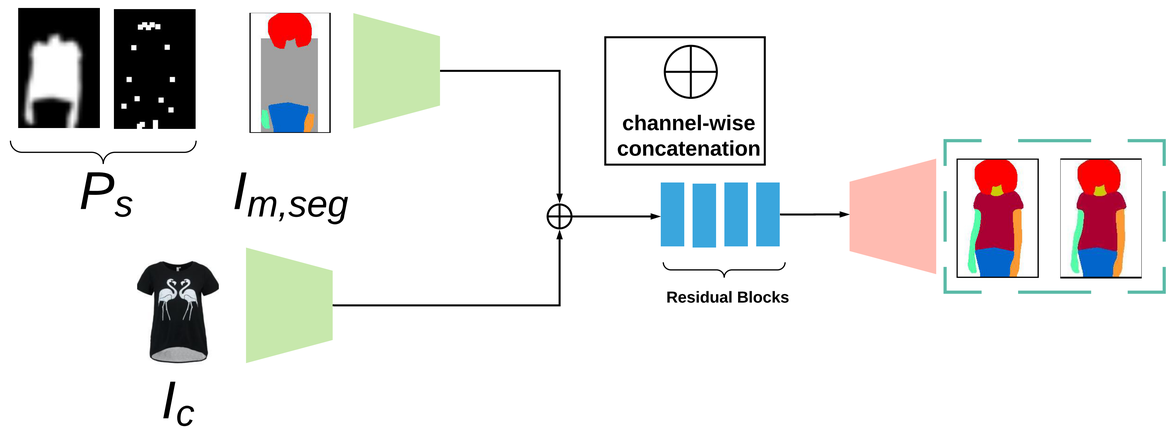
Reference

[1] Wang, Bochao, et al. "Toward characteristic-preserving image-based virtual try-on network." Proceedings of the European Conference on Computer Vision (ECCV). 2018.

[2] Park, Taesung, et al. "Semantic image synthesis with spatially-adaptive normalization." Proceedings of the IEEE Conference on Computer Vision and Pattern Recognition. 2019.

Method

Shape transfer network: Shape transfer network generates high-resolution semantic maps given an image of the person and a garment to be transferred. The proposed generator G_{shape} has an encoder-decoder architecture that synthesizes a new shape map $\hat{I}_{seg}$ conditioned on a person representation P_s, masked segmentation map $I_{m,seg}$, and the image of desired clothing I_c.



Appearance transfer network: Appearance transfer network synthesizes realistic RGB-colorspace images of a person wearing the garment while preserving finer semantic details. The appearance transfer network takes the generated segmentation maps, target clothing, and body shape information as inputs and generates an image $\hat{I}_{person}$ portraying the reference person wearing the target clothing. The input RGB-colorspace image $I_{m,person}$ is created by masking the regions corresponding to arms, torso and upper-body clothes on the reference image I_{person}. Geometric alignment module is utilized to warp the desired clothing item I_c using a TPS transformer such that it matches the pose of the reference person geometrically. This module extracts high-level information of person representation P_s and target clothing item I_c and uses the resulting feature maps to estimate the parameters of TPS transformer θ.