3D Reconstruction of Clothes using a Human Body Model and its Application to Image-based Virtual Try-On

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Inherent limitations in image-based virtual try-on

Try-on cloth

Target human

VITON (Warped & Final result)

Han et al. 2018 (VITON)
Inherent limitations in image-based virtual try-on

Try-on cloth

Target human

CP-VTON (Warped & Final result)

Wang et al. 2018
(CP-VTON)
Our Method

Try-on cloth  Target human  3D Cloth  3D warped  Try-on result
Reference 3D SMPL template

Try-on Cloth

Target human

2D pose estimation

2D human segmentation

SMPLify

3) 3D Pose & Shape Estimation

Pose, shape

4) 3D Shape transfer and Re-posing

3D Warped cloth

Try-on network

5) Blending

Try-on result

Rendering

1) 2D Cloth Matching

2D aligned cloth

2) 3D Cloth Reconstruction

3D Warped cloth

Pipeline
VITON Dataset

Long-sleeve

Short-sleeve elbow

Short-sleeve half-elbow

Short-sleeve quarter-elbow

Sleeveless

Han et al. 2018 (VITON)
Reference SMPL body silhouette ➔ Shape prototyping based on cloth category ➔ Shape prototype/Reference mask for matching ➔ Shape-context matching + Thin-plate spline transform ➔ 2D overlaid cloth (matching) ➔ 2D matched Cloth output

Try-on cloth
Minar et al. 2020
(CP-VTON+)

Try-on network

Person Representation $p$

Warped Cloth $\hat{c}$ & Mask $\hat{c}_m$

Composition Mask $M_o$

Rendered person $I_R$

Cloth on Person Mask $c_{tm}$

Final result $I_O$

Ground truth $I_{GT}$

Down sample layers

Up sample layers

Mask composition

$L_1$ Loss

$L_1 + L_{VGG}$ Loss

Blending

Try-on network
Qualitative

Try-on cloth

Target human

CP-VTON (Warped & Final)

Ours (Warped & Final)
Qualitative

Try-on cloth  Target human  CP-VTON (Warped & Final)  Ours (Warped & Final)
Conclusion
3. Han et al. "Viton: An image-based virtual try-on network." CVPR. 2018