AI-POWERED 3D VIRTUAL TRY-ON

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PROBLEM STATEMENT

Problem

How can online shoppers truly 'try on' clothes from home?

Flat product photos show nothing about:

- How fabric drapes on their body
- How sleeves wrinkle when moving
- Where seams sit on their proportions

How can we overcome this problem ?

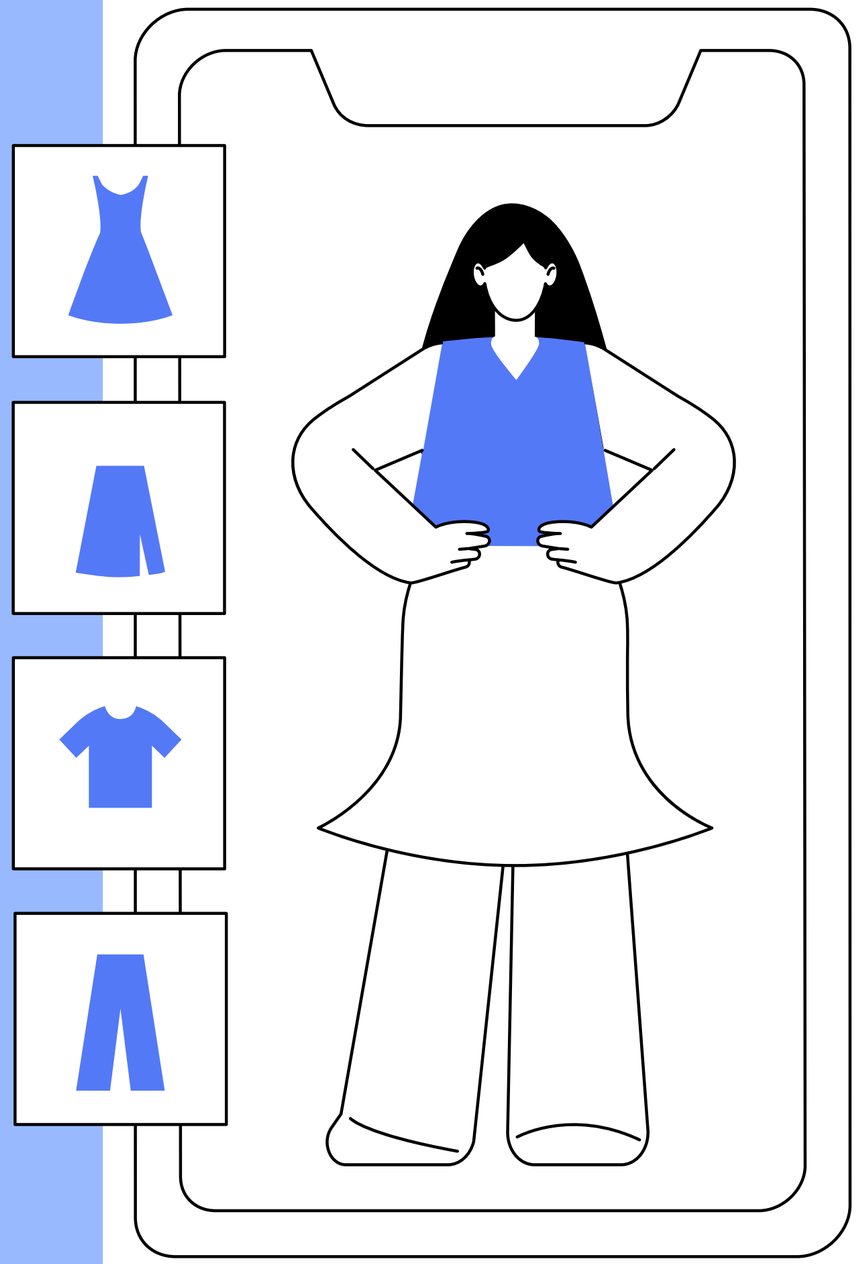
PROBLEM STATEMENT

Goal

AI- Powered 3D virtual dressing room

Using deep learning, we enable:

- Creation of YOUR 3D body model
- Realistic fit and movement
- Simulation of garment interactions with your shape



PROBLEM STATEMENT

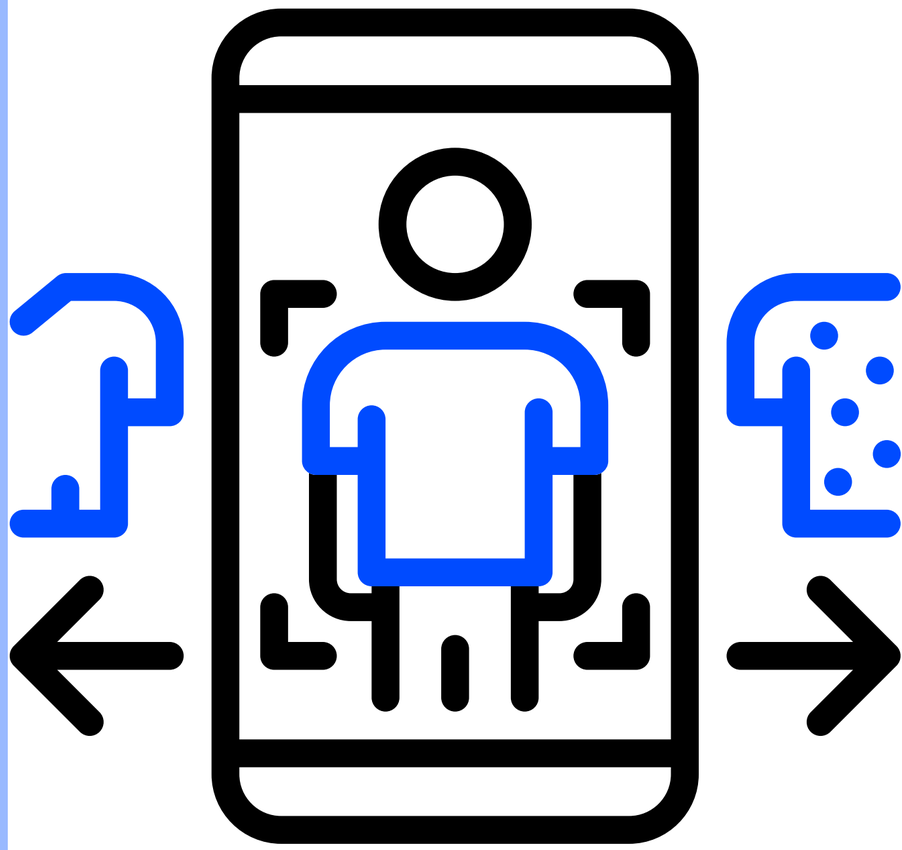
Gap

Incomplete Simulation

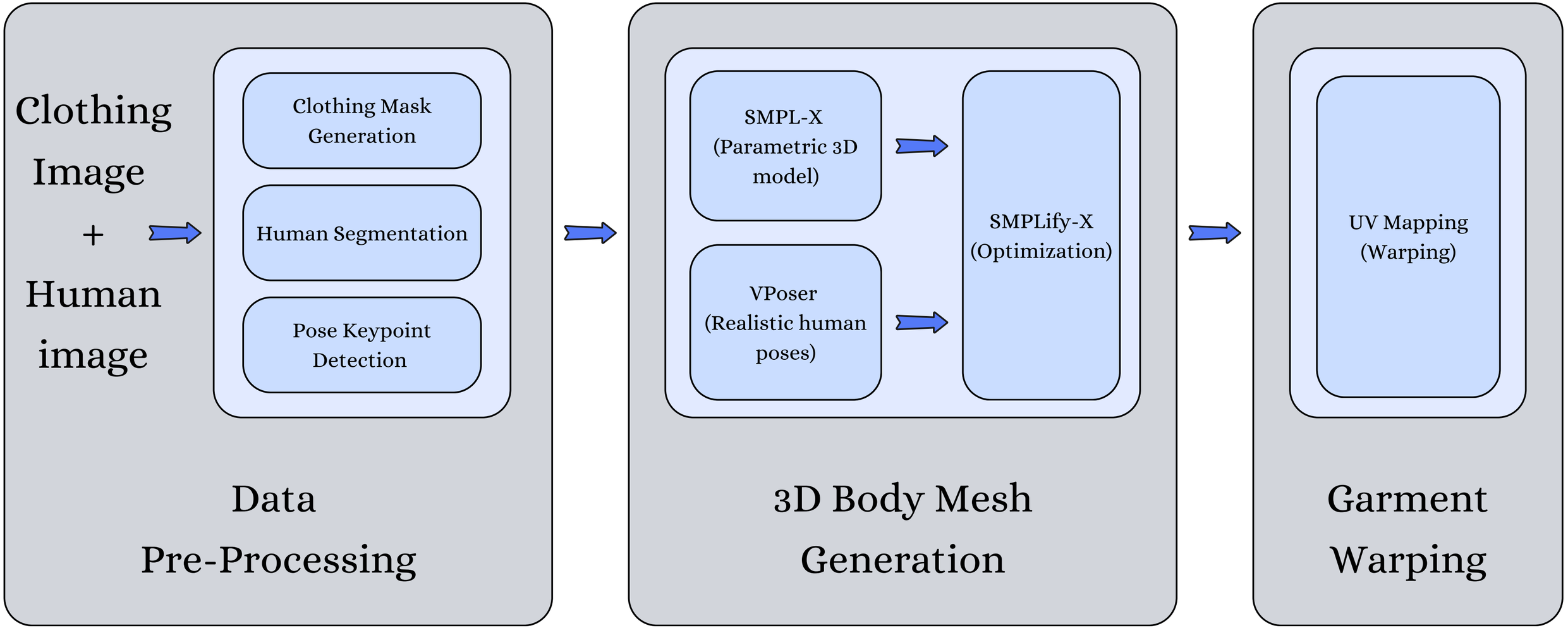
- Flat garment 2D overlays
- JUST 3D bodies (no clothes warping)

Disconnected Components

- Pose estimation systems operate independently
- Clothing simulation lacks body-aware initialization



PIPELINE


Clothing Image
+
Human image
Clothing Mask Generation
Human Segmentation
Pose Keypoint Detection
Data Pre-Processing
SMPL-X (Parametric 3D model)
VPoser (Realistic human poses)
SMPLify-X (Optimization)
3D Body Mesh Generation
UV Mapping (Warping)
Garment Warping
Stage 1
Stage 2
Stage 3

METHODOLOGY - PREPROCESSING

Stage 1

Dataset used: MVP3D

Clothing Mask Generation:

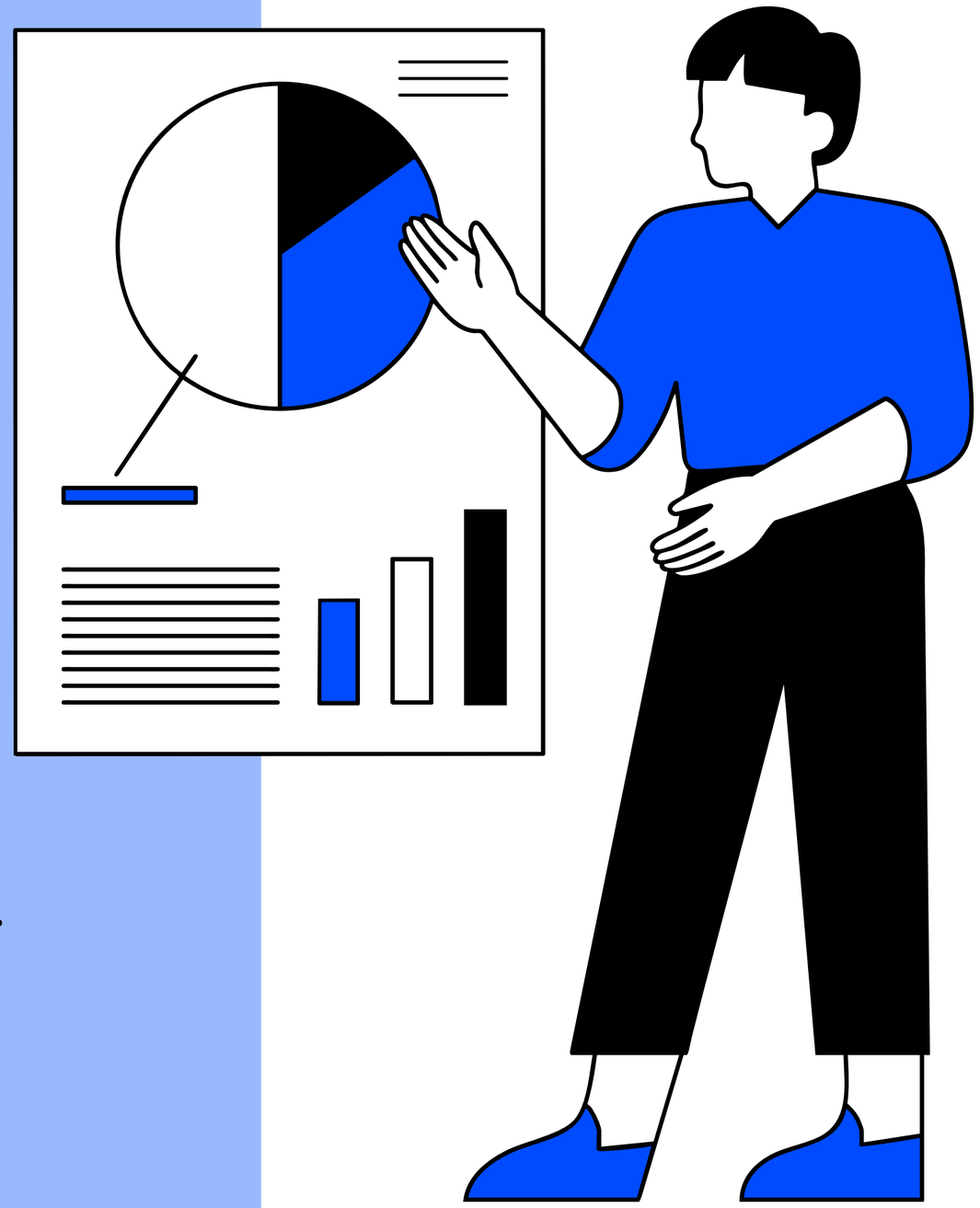
- Extract garment mask via thresholding or background removal script.

Human Segmentation:

- Apply 2D human parsing to segment body .

Pose Keypoint Detection:

- Detect 25 joint keypoints using OpenPose.



METHODOLOGY - 3D BODY MESH GENERATION

Stage 2

Input: Human image (with 2D keypoints)

Initialize SMPL-X Model

- Load 3D parametric model defining parameters (β: shape, θ: pose, ψ: expression)

Load VPoser Prior

- Ensures realistic human poses during fitting.

Run SMPLify-X Optimization

- Adjusts (Fits) the 3D body to match the 2D keypoints from the image.

METHODOLOGY - GARMENT WARPING

Stage 3

Input: Clothing image (Masked) + SMPL-X

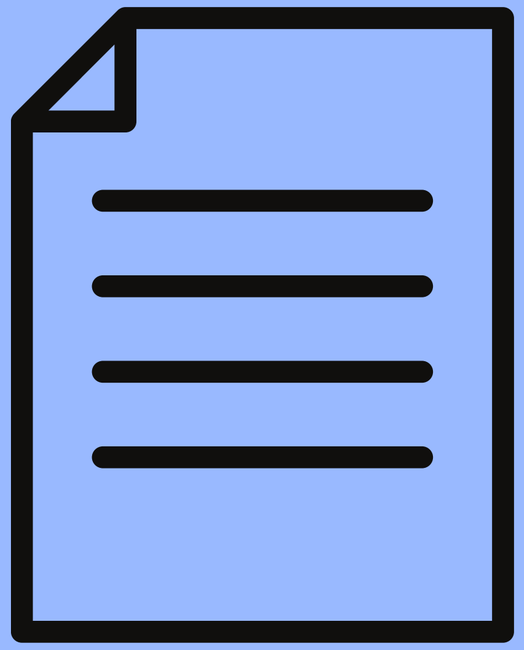
Warping Method: UV Mapping

- Unwrap 3D SMPL-X mesh into 2D UV space
- Project garment texture onto UV layout
- Map texture back onto posed 3D mesh

Fit & Appearance

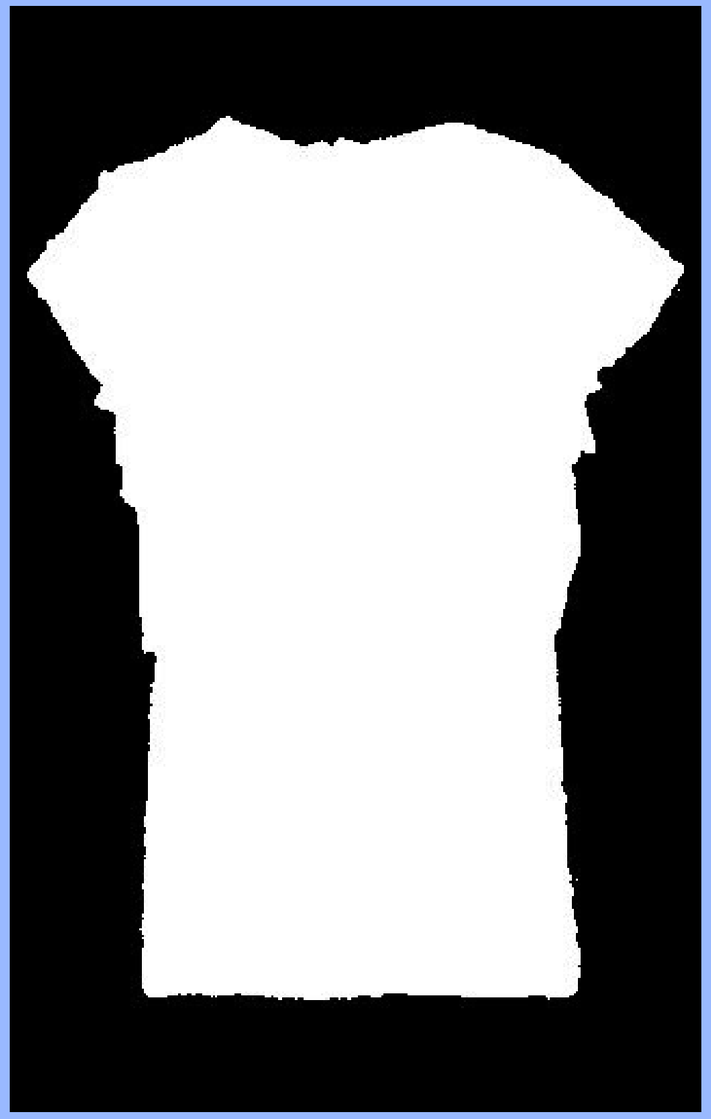
- Preserves garment appearance on body
- Fast and visually plausible overlay

RESULTS - STAGE 1



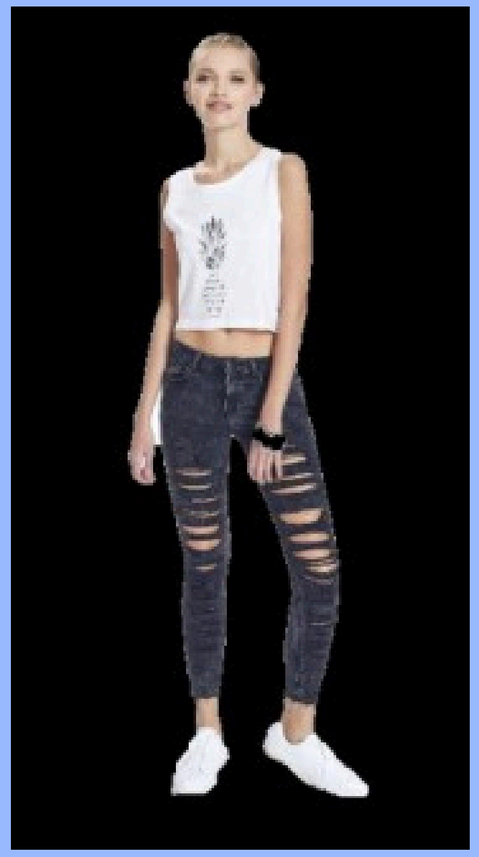
2D Keypoints (.JSON)

Segmented body image



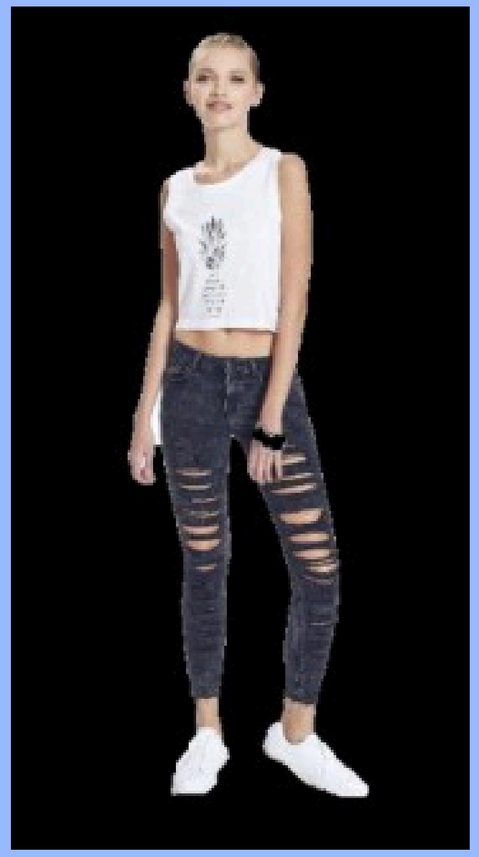
Masked clothing image

RESULTS - STAGE 2



Generated 3D SMPL Mesh

RESULTS - STAGE 3



Final Human Body Warped by the Garment

WHAT IS OUR CONTRIBUTION ?

Traditional methods: High computation OR Low quality

Our Solution:

- Unified Pipeline: Single system replacing 3+ separate tools
- 50% Faster + 20% More Accurate
- Real-Time 3D virtual try-on from keypoints

Impact:

Transformed research problem into practical, deployable solution

THANK YOU FOR LISTENING!