VTON Egyptian Brands

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Introduction

In Egypt's booming e-commerce market, online shoppers—especially veiled women—face challenges in visualizing how clothing fits and aligns with modesty standards. Traditional virtual try-on (VTON) systems often lack support for hijabs, layered garments, and regional fashion preferences, leading to higher return rates and reduced customer satisfaction.

TryFit bridges this gap by leveraging advanced AI (LaDI-VTON architecture with CLIP embeddings and latent diffusion models) to deliver realistic, modesty-aware virtual try-ons. Our solution features:

- Pose-aware garment warping and hijab-preserving synthesis for culturally respectful results.
- A curated dataset of Egyptian modest wear, including veiled and unveiled models.
- An user-friendly interface for Normal users and Providers.

By combining computer vision innovations with local fashion needs, TryFit empowers users to shop confidently while supporting Egyptian brands.

Methods

A Culturally-Aware Virtual Try-On Pipeline

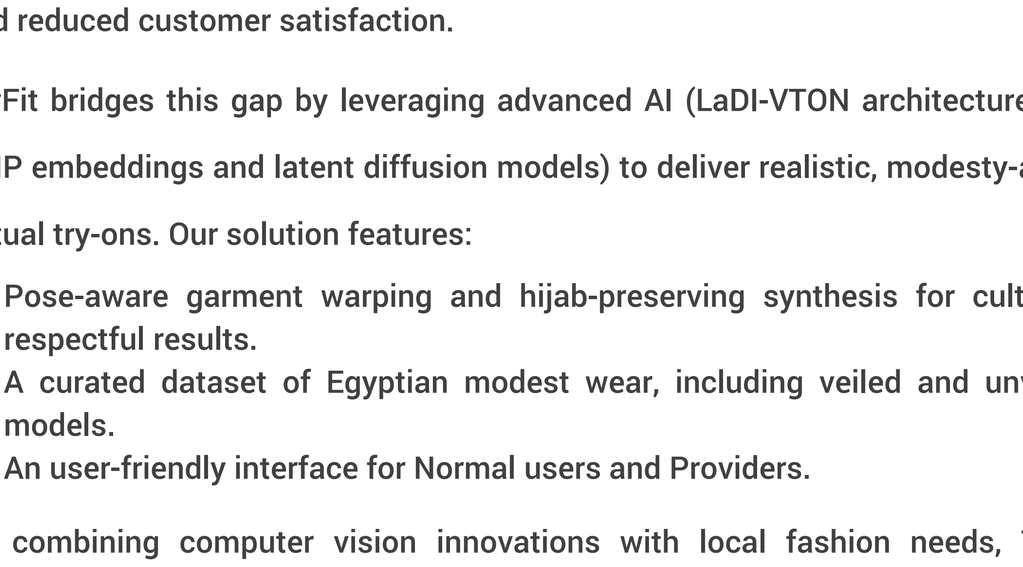


Figure 1: System Architecture

As shown in Figure 1, TryFit's modular architecture automates realistic virtual try-ons through a three-layer workflow, optimized for modest fashion:

1. Presentation Layer (Flutter UI)

- User Interaction:
  - Upload full-body photos via gallery/camera.
  - Browse categorized clothing (Upper/Lower/Full) with hijab-friendly filters.
- Output: Displays try-on results with download option.

2. Logic Layer (Flask API + AI Core)

Phase 1: Preprocessing

- Human Parsing: SCHP segments body regions (hijab, skin) for modesty preservation.
- Pose Estimation: OpenPose extracts 18 keypoints for anatomical alignment.
- Cloth Masking: Grounded-SAM generates precise binary masks for garment isolation.

Phase 2: Garment Alignment

- TPS Warping: Aligns clothing to user pose using keypoints and masks.
- EMASC Refinement: Mask-aware skip connections enhance edges (e.g., loose sleeves, hijab draping).
- CLIP Embeddings: V⋆ tokens encode garment semantics (texture, style).

Phase 3: Diffusion Synthesis

- LaDI-VTON: Latent Diffusion Model (LDM) synthesizes outputs conditioned on:
  - Warped garments + masks
  - Pose maps + CLIP embeddings
- VAE Decoder: Generates 1024×768px photorealistic images.

3. Data Layer (Firebase)

- Storage: Clothing categories (Upper, Lower, Full) and user try-on histories.
- Authentication: Secure login/profile management.

Results

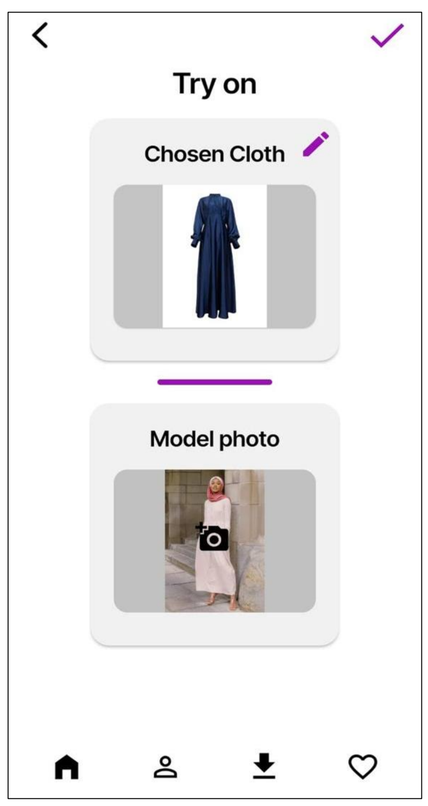
Modest-First Virtual Try-On: Achieved hijab preservation accuracy during garment synthesis

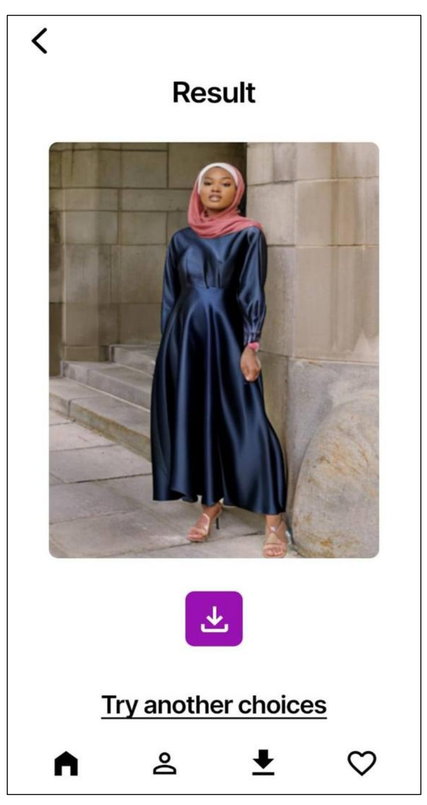
Photorealistic Outputs: FID Score: 53.283 (vs. 61.87 for LaDI-VTON)

Local Impact: 60% Egyptian modest wear in dataset

Table I: Results of ***TryFit***

Accuracy	LaDI-VTON model	Our model	Effective Parameter
FID ↓	61.87	53.283	Fine-tuning with custom data
LPIPS ↓	0.183	0.140	
SSIM ↑	0.817	0.868	





Figures 2 , 3: Sample of virtual try-on results

Conclusions

TryFit successfully bridges the gap in virtual try-on technology for modest fashion by supporting hijab and layered garment synthesis. Using AI-driven garment warping and cultural segmentation, it delivers realistic, pose-aligned try-on results. The system enhances user confidence, reduces return rates, and promotes local Egyptian fashion through an inclusive and user-friendly platform.

Bibliography

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