Virtual Try-On: Revolutionizing Online Shopping

Introduction

- Online shopping lacks the "try before you buy" experience.
- Virtual Try-On uses deep learning and generative AI to let users visualize garments on themselves.
- Reduces uncertainty and returns, boosts engagement.

Problem Statement Proposed Solution

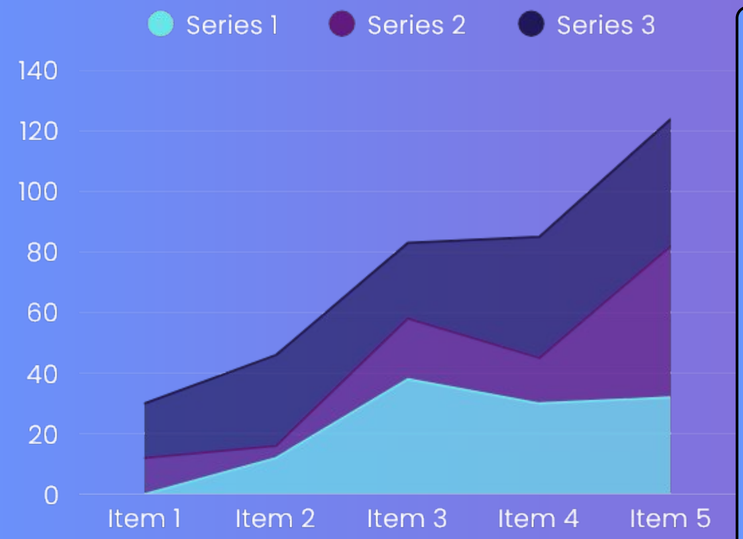
PROBLEM

- Customers cannot physically try garments online, leading to hesitation and high return rates.
- Decreases user confidence and increases operational costs.

Proposed Solution

- Garment Segmentation: Facebook’s Detectron2 extracts garment masks from product images.
- Image Inpainting: Stable Diffusion overlays garments on user photos, matching posture and lighting.
- Streamlit App: Easy-to-use interface for photo upload, processing, and result visualization.

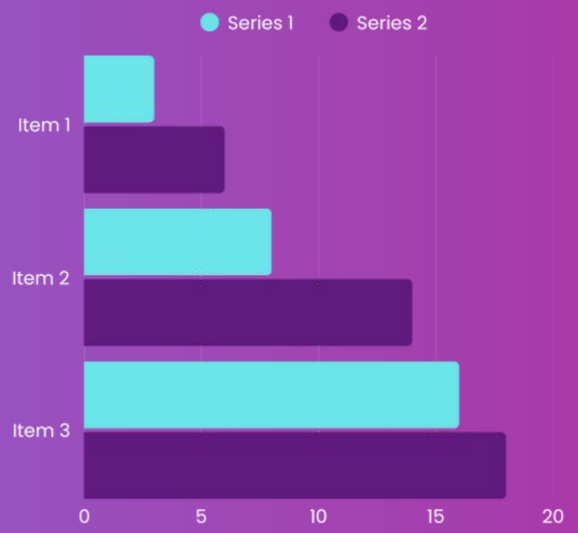
Use Case & Practical Implementation



- For Online Retailers: Integrate the widget on product pages.
- Steps: Upload photo ➔ Select garment ➔ AI processes ➔ Preview ➔ Share or Buy.
- Other Applications: Virtual makeup, home decor previews, automotive wraps.

Technical Highlights

- Average Inference Time: 0.8s (segmentation), 4-6s (inpainting) on NVIDIA A6000 GPU.
- Batch Processing: Up to 4 concurrent GPU requests.
- Deployment: Dockerized microservices with Kubernetes orchestration. (Future Scope)



CHALLENGES

- Issues with loose garments (scarves, flowing dresses) and occluded body parts.
- Future Improvements: Enhanced edge smoothing and advanced mask refinement.
- Dynamic Background Handling: Improving background blending for varied lighting conditions.

Future Work

- Real-time video try-ons.
- Mobile-optimized inference using ONNX models.
- WebGL-powered Augmented Reality (AR) experiences.
- Multi-garment try-on in a single session.
- Personalization with AI-based size recommendations

Conclusion

- Virtual Try-On transforms online retail by merging segmentation and generative AI.
- Enhances user satisfaction and reduces return rates.
- Represents a major step toward interactive and personalized shopping experiences.
- Positions brands at the forefront of AI-driven e-commerce innovations.