AI-Powered Virtual Try-On System for Personalized Fashion Visualization

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Abstract

The integration of advanced generative AI techniques in fashion retail represents a transformative paradigm shift, offering unprecedented possibilities for personalized shopping experiences. This research paper explores the development and implementation of a novel virtual try-on system that leverages controllable diffusion models and ControlNet architectures to create photorealistic clothing visualization on diverse body types. Our system enables users to visualize garments through natural language prompts or by uploading custom clothing images from their local devices, all integrated within a unified and intuitive user interface. By investigating the complementary capabilities of state-of-the-art image generation technologies and conditional image synthesis methods, we propose a comprehensive framework that demonstrates how these technologies can revolutionize online shopping experiences, reduce return rates, and enhance customer satisfaction. The study synthesizes interdisciplinary research from computer vision, generative modeling, human-computer interaction, and fashion retail to provide a nuanced understanding of how AI-powered virtual try-on systems can bridge the gap between physical and digital shopping experiences.

Keywords

Virtual Try-On, Diffusion Models, ControlNet, Generative AI, Fashion Visualization, Personalized Shopping, Human-Centered Computing, Conditional Image Generation, Deep Learning, E-commerce Technologies.