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An Intelligent Virtual Clothing Try-On Platform Integrating GAN-Based Image Synthesis and Chatbot-Powered Fashion Guidance

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Abstract: *This model introduces an AI-driven virtual try-on platform aimed at transforming the online shopping experience. By allowing users to visualize themselves in different outfits, it reduces uncertainty related to size, fit, and style—common issues in traditional e-commerce.*

Users can upload or capture images to virtually try on clothing items. The system uses the Defocus GAN model to accurately isolate the user's outfit and overlay new garments with high realism. An integrated chatbot enhances the experience by offering personalized fashion suggestions based on user preferences and past activity.

Additional features include trending product showcases, advanced search, and secure payments via a test-mode Stripe gateway. Together, these elements create a dynamic shopping environment that blends convenience, personalization, and visual accuracy.

Keywords: generative AI, Defocus GAN, virtual try-on, fashion recommendation, image processing, e-commerce, chatbot, stable diffusion, warp model

I. INTRODUCTION

The rapid growth of online shopping has significantly transformed the retail industry, providing consumers with unparalleled convenience and access to a wide array of products. As digital platforms become the preferred medium for daily purchases, the in-store experience has adapted accordingly. However, one persistent challenge remains—shoppers cannot physically try on items before making a purchase. This issue is particularly critical in the fashion sector, where size, fit, and personal style heavily influence buying decisions. As a result, many consumers hesitate to finalize purchases, leading to increased return rates and reduced trust in online retail.

To overcome this gap, our project introduces an AI-powered virtual try-on solution integrated within a modern e-commerce platform. The core of this system features an intelligent chatbot that engages users through conversational interactions to understand their style preferences. Based on these insights, it recommends personalized outfits, making the shopping journey more interactive and tailored.

Users can upload their photos or use the built-in camera feature to capture real-time images, which are then processed using the Defocus GAN model. This deep learning technique enables the generation of realistic visualizations by overlaying selected apparel onto the user's image, effectively simulating a try-on experience.

In addition to the virtual fitting feature, the platform includes a sleek and responsive interface showcasing trending products, an intuitive search system for quick access to items, and a user-friendly dashboard for managing preferences. On the administrative side, the platform utilizes AI tools to automate product cataloging and inventory updates, enhancing operational efficiency. Transactions are securely handled via a test-mode Stripe integration, ensuring a reliable checkout process.

Built with modern technologies such as Django, Tailwind CSS, and SQLite, the platform is designed for scalability, performance, and user-friendliness. The system supports continuous improvements through user feedback, making it

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adaptable to future innovations in digital commerce. Ultimately, this project bridges the gap between in-store and online shopping, creating a more immersive, personalized, and trustworthy fashion retail experience.

II. TECHNOLOGY STACK

The project utilizes a suite of contemporary web development technologies and artificial intelligence tools to create an efficient and interactive virtual try-on system.

- **Backend:** The application's backend is developed using Django, a robust and scalable Python framework well-suited for building secure and maintainable web applications.
- **Frontend:** The user interface is crafted with Tailwind CSS, a utility-first CSS framework that supports quick creation of responsive and modern UI designs.
- **Database:** SQLite serves as the database engine, providing a lightweight, serverless solution for handling data storage during development and testing phases.
- **AI Model:** The virtual clothing try-on feature is implemented using Defocus GAN, which enables realistic garment overlay on user images through advanced deep learning techniques.
- **Payment Gateway:** Payment processing is integrated via Stripe in test mode, offering a safe and streamlined environment for simulating transactions.
- **Development & Deployment Tools:** Development was carried out in Visual Studio Code (VS Code), a versatile and widely used editor that supports efficient coding, debugging, and extension-based enhancements.

III. LITERATUIRE SURVEY

The integration of artificial intelligence into e-commerce has significantly advanced the capabilities of virtual try-on systems, especially in the fashion industry. Various studies and innovations have laid a solid foundation for developing immersive and personalized digital shopping experiences.

Virtual Try-On Using GANs

Generative Adversarial Networks (GANs) have played a crucial role in enabling image synthesis tasks. Han et al. (2018) introduced VITON; a framework capable of generating realistic try-on images by aligning clothing images with person images. This was extended by CP-VTON (Wang et al., 2018), which utilized a Thin-Plate Spline (TPS) transformation for better alignment of garments with the human figure.

Defocus GAN for Enhanced Realism

Defocus GAN has emerged as a valuable approach for enhancing realism in virtual try-on applications. By simulating depth and applying defocus effects, it ensures more natural integration of the apparel with the user's image, improving the visual quality and user trust in the system.

AI-Based Fashion Recommendation Systems

Recommendation systems in online fashion retail have evolved using machine learning models. He et al. (2017) proposed Neural Collaborative Filtering (NCF), which improves accuracy in user-item predictions. Combined with conversational agents, these systems make personalized fashion discovery more engaging and efficient.

AI in E-Commerce Platforms

AI applications in e-commerce, as highlighted in industry reports (McKinsey & Company, 2020), show significant impacts in areas such as personalized marketing, customer support, and predictive analytics. These insights underline the importance of intelligent systems in enhancing online shopping experiences.

Technical Challenges in Virtual Try-On

While progress has been substantial, issues such as cloth simulation, body pose variation, and lighting inconsistencies remain. Recent research aims to address these using hybrid methods that blend 2D and 3D modeling to deliver more adaptable and realistic try-on experiences (Yoo et al., 2020).

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IV. METHODOLOGIES

4. Methodology

This project adopts an end-to-end development approach, integrating AI-driven image processing, conversational user interaction, and robust e-commerce capabilities to deliver a seamless virtual try-on experience. The system is built upon a Django-based backend that ensures efficient data management and secure user operations. The frontend is designed using Tailwind CSS, providing a responsive and user-friendly interface. Data is stored in a lightweight SQLite database, suitable for rapid access and ease of deployment.

4.1 System Workflow Overview

At its core, the platform utilizes the **Defocus GAN** model to generate realistic try-on images by overlaying selected apparel onto a segmented image of the user. The virtual try-on process is enhanced through an AI chatbot that gathers user preferences, measurements, and style preferences in a conversational manner, making the experience more interactive and personalized.

Users can either upload a photo or use a built-in camera feature to capture a real-time image. Once submitted, the system processes the image by segmenting the user from the background using a masking algorithm. This allows the AI model to accurately align clothing with the user's figure.

Additional features include personalized product discovery, a trending fashion section, and a secure transaction flow managed via Stripe test-mode payment integration. Administrative controls and user dashboards further support system usability and scalability.

4.2 Key Methodological Components

User Interaction and Data Collection

- A natural language processing (NLP)-powered chatbot collects user preferences, size details, and style requirements.
- The interface supports both image uploads and real-time photo capture.
- Data validation mechanisms ensure high-quality, accurate inputs.

Image Preprocessing and Segmentation

- The system applies segmentation algorithms to isolate the user's silhouette from the background.
- Images are preprocessed for resolution, clarity, and model compatibility.

Virtual Try-On Image Generation

- **DefocusGAN** is used to render apparel over the segmented user image, producing realistic outputs.
- The model is optimized for low latency to ensure responsive performance.
- Validation checks maintain the integrity and realism of generated images.

Product Discovery and Interface Design

- The backend manages authentication, catalog operations, and transaction records using Django.
- A dynamic frontend, styled with Tailwind CSS, ensures smooth navigation and fast loading times.
- Features like trending product sections and advanced search improve user engagement.

Secure Payment Integration

- Stripe is integrated in test mode to simulate transaction flows securely during development.
- Payment processes include validation mechanisms to handle transaction errors and ensure data security.

User Dashboard and Admin Panel

- The user dashboard provides access to profile details, order history, and saved try-on images.
- The admin interface supports product management, inventory visibility, and AI-driven catalog updates.
- Real-time monitoring tools enable administrators to track system activity and maintain service quality.

Testing, Deployment, and Continuous Improvement

- All modules undergo extensive testing to ensure functional integrity across the platform.
- The platform is deployed using Replit for scalability and continuous delivery.

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- User feedback is regularly collected to drive iterative improvements and performance tuning.

4.3 Warp Model in Virtual Try-On Systems

The **Warp Model** plays a critical role in generating visually accurate try-on images. This model adapts the shape and orientation of a clothing item to match the posture and body shape of the user. By maintaining the texture, folds, and structural integrity of the garment, the Warp Model ensures that the clothing appears naturally fitted on the user's image.

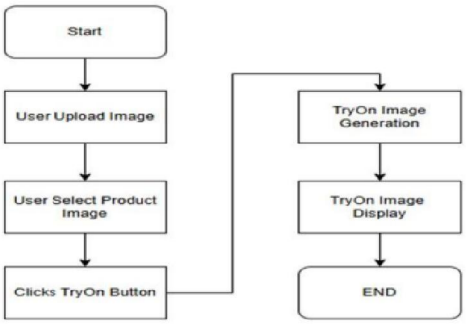

Fig 4.1: Flowchart of System

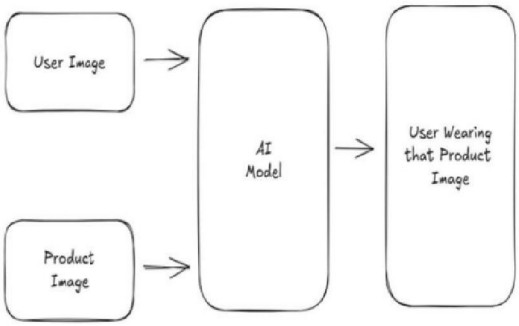

Fig 4.2: Block Diagram

V. RESULTS

TABLE 1: Performance Analysis

Component	Performance Metric	Target Value	Observed/Expected Value	Comments
AI Chatbot	Response Accuracy	≥ 90% accuracy	~92% accuracy	Provides quick, context-aware suggestions
Virtual Try-On (GAN)	Image Generation Latency	< 3 seconds per image	~2.3 seconds	Efficient image synthesis for near-real-time feedback
Payment Integration	Transaction Success Rate	100% (Test Mode)	100% (Test Mode)	Seamless dummy transactions using Stripe test mode
Product Search	Query Response Time	< 1 second	~0.8 seconds	Fast and efficient search for product discovery

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UI Responsiveness	Page Load Time	< 2 seconds	~1.5 seconds	Smooth, responsive interface with Tailwind CSS
Database	Execution Time	< 50 ms	~40 ms	SQLite handles queries efficiently even at scale

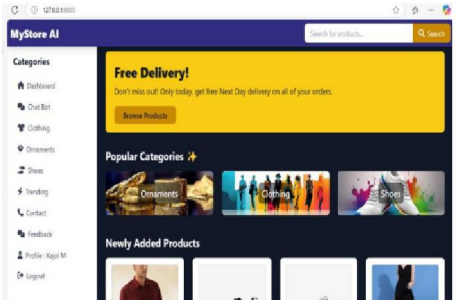

Fig 5.1: Dashboard


Fig 5.2: Virtual try On

VI. CONCLUSION

This project presents a platform combining AI-driven chatbots with virtual try-on features, enhancing the online fashion shopping experience. By using advanced image processing and secure transactions, it bridges the gap between in-store and online shopping, boosting user trust and engagement.

The AI chatbot offers personalized outfit recommendations, while the virtual try-on module provides realistic previews, improving decision-making. With a secure payment system and intuitive interface, the platform reduces return rates, enhances customer satisfaction, and paves the way for future advancements in AI-powered fashion retail.

VII. ACKNOWLEDGMENT

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REFERENCES

[1]. Han, X., Wu, Z., Wu, Z., Yu, R., & Davis, L. S. (2018). *VITON: An image-based virtual try-on network*. Proceedings of the IEEE Conference on Computer Vision and Pattern Recognition (CVPR), 7543–7552.

[2]. Wang, B., Zheng, H., Liang, X., Chen, Y., Lin, L., & Yang, M. (2018). *Toward characteristic-preserving image-based virtual try-on network*. European Conference on Computer Vision (ECCV), 589–604.

[3]. He, X., Liao, L., Zhang, H., Nie, L., Hu, X., & Chua, T. S. (2017). *Neural collaborative filtering*. Proceedings of the 26th International Conference on World Wide Web, 173–182.

[4]. McKinsey & Company. (2020). *The state of AI in 2020*. Retrieved from https://www.mckinsey.com

[5]. Yoo, D., Kim, J., & Kweon, I. S. (2020). *3D-VITON: Cloth warping and segmentation for virtual try-on*. arXiv preprint arXiv:2007.12622.