INTERNATIONAL JOURNAL OF
RECENT TRENDS IN MULTIDISCIPLINARY RESEARCH
https://www.doi.org/10.59256/ijrtmr.20250502001
March-Aril 2025, Vol 5(02), 01-06.
ISSN No: 2583-0368

Tryfitai-Realtime Outfit Visualisation

S. Surya[1], Gayathri M[2], Ramya C[3], Komala R[4], Bhavya L[5]
[1]*Assistant Professor, Department of Information Technology Er.Perumal Manimekalai College of Engineering Hosur, Tamilnadu, India.*
[2, 3, 4, 5] *Department of Information Technology Er. Perumal Manimekalai College of Engineering Hosur, Tamil Nadu, India.*

OPEN ACCESS
Article Citation:
S. Surya[1], Gayathri M[2], Ramya C[3], Komala R[4], Bhavya L[5]", Tryfitai-Realtime Outfit Visualisation", International Journal of Recent Trends in Multidisciplinary Research, March-April 2025, Vol 5(02), 01-06.

Publishedby5thDimension Research Publication

Abstract: TryFit AI is an innovative digital platform designed to enhance the online fashion shopping experience through AI-powered virtual try-on technology. The system leverages artificial intelligence (AI) and augmented reality (AR) to allow users to visualize clothing and accessories on themselves in real time. This eliminates the uncertainty of online shopping, reduces return rates, and enhances customer confidence. The system features advanced computer vision and deep learning models, including Generative Adversarial Networks (GANs) and pose estimation, to map garments onto users' bodies with high precision. TryFit AI dynamically adjusts garments based on body structure, skin tone, and posture, ensuring an authentic fitting experience. The solution seamlessly integrates with ecommerce websites, retail applications, and social media platforms, providing personalized fashion recommendations based on user preferences, previous purchases, and body dimensions. Additionally, object detection techniques using AI-based image processing enhance the realism of virtual try-ons by accurately aligning digital clothing with user movements. This ensures a more lifelike and engaging shopping experience. Overall, TryFit AI has the potential to revolutionize the fashion e-commerce industry, making online shopping more interactive, efficient, and sustainable.
.

Key Words: Virtual Try-On, AI in Fashion, Augmented Reality, Computer Vision, Machine Learning, E-Commerce, GANs, Pose Estimation, Personalized Fashion Recommendations.

1. Introduction

TryFit AI is an innovative digital platform designed to enhance the online fashion shopping experience through AI-powered virtual try-on technology. The system leverages artificial intelligence (AI) and augmented reality (AR) to allow users to visualize clothing and accessories on themselves in real time. This eliminates the uncertainty of online shopping, reduces return rates, and enhances customer confidence.

The traditional online shopping experience often lacks accuracy in size, fit, and visual appeal, leading to frequent returns and customer dissatisfaction. TryFit AI addresses these challenges by integrating advanced computer vision and deep learning techniques, including Generative Adversarial Networks (GANs) and pose estimation, to precisely map garments onto users' bodies. Unlike conventional size charts and static images, TryFit AI dynamically adjusts garments based on individual body structure, skin tone, and posture, ensuring an authentic and personalized fitting experience.

The solution seamlessly integrates with e-commerce websites, retail applications, and social media platforms, allowing users to receive AI-driven fashion recommendations based on their preferences, past purchases, and body dimensions. Additionally, object detection techniques using AI-based image processing enhance the realism of virtual try-ons by accurately aligning digital clothing with user movements, making the experience more lifelike and engaging. By bridging the gap between physical and digital shopping, TryFit AI has the potential to revolutionize the fashion e-commerce industry, offering a more interactive, efficient, and sustainable alternative to traditional online shopping.

2. Literature Survey

TryFit AI is an innovative digital platform designed to enhance the online fashion shopping experience through AIpowered virtual try-on technology. The system leverages artificial intelligence (AI) and augmented reality (AR) to allow users to visualize clothing and accessories on themselves in real time. This eliminates the uncertainty of online shopping, reduces return rates, and enhances customer confidence.

The online fashion industry faces significant challenges due to sizing mismatches, high return rates, and customer dissatisfaction caused by inaccurate fit predictions. Traditional shopping methods rely on static images and size charts, which fail to provide a realistic representation of how garments fit different body types. This lack of visualization often results in poor purchasing decisions, leading to increased product returns and financial losses for retailers. Moreover, the inability to try on clothes before purchasing affects customer trust and engagement with online fashion brands.

To address these challenges, TryFit AI integrates advanced computer vision, deep learning, and augmented reality technologies to create a seamless and accurate virtual try-on experience. The system dynamically adjusts virtual garments based on user posture, body structure, and realworld lighting conditions, ensuring anauthentic fitting experience. It utilizes Generative Adversarial Networks (GANs) and pose estimation techniques to precisely map clothing onto users, replicating fabric behavior and texture draping realistically. This results in an immersive and interactive shopping journey that closely resembles an instore trial.

Beyond just visualization, TryFit AI enhances personalization by leveraging AI-powered recommendations based on previous purchases, body measurements, and style preferences. The system continuously learns from user interactions to provide intelligent suggestions, improving overall shopping satisfaction. By eliminating guesswork and ensuring better-fitting purchases, it helps retailers boost conversion rates while significantly reducing return-related costs and environmental impact.

Beyond just visualization, TryFit AI enhances personalization by leveraging AI-powered recommendations based on previous purchases, body measurements, and style preferences. The system continuously learns from user interactions to provide intelligent suggestions, improving overall shopping satisfaction. By eliminating guesswork and ensuring better-fitting purchases, it helps retailers boost conversion rates while significantly reducing return-related costs and environmental impact Additionally, TryFit AI incorporates real-time analytics and feedback loops to refine its recommendation algorithms. By analyzing customer behavior, purchase history, and visual preferences, the system provides precise, data-driven insights that enhance shopping efficiency. These analytics also help fashion brands better understand consumer trends, leading to smarter inventory management and reduced overproduction.

This innovative solution seamlessly integrates with ecommerce platforms, retail applications, and social media, offering users a flexible and engaging shopping experience. Through its ability to adapt to various digital environments, TryFit AI creates an omnichannel shopping approach, bridging the gap between online and offline retail. Additionally, by reducing dependency on physical trials, it contributes to the sustainability of the fashion industry by minimizing excess production, waste, and carbon emissions associated with logistics and returns.

TryFit AI not only improves the customer shopping experience but also benefits retailers and manufacturers by reducing product returns and optimizing supply chains. The platform enables businesses to provide highly customized fashion recommendations, reducing customer frustration and increasing brand loyalty. Furthermore, the use of AR-based fabric simulations allows customers to see how different materials interact with light and movement, making informed purchasing decisions easier.

As technology advances, TryFit AI has the potential to set new standards in digital fashion retail, making online shopping more efficient, interactive, and environmentally responsible. With continuous improvements in AI accuracy, AR rendering, and customer analytics, TryFit AI aims to revolutionize the way people shop for fashion, ensuring convenience, confidence, and sustainability in the future of ecommerce. The future scope includes enhanced AI-drivensize predictions, virtual fashion shows, and integration with blockchain technology to provide transparent and secure digital transactions.

Keywords: Virtual Try-On, AI in Fashion, Augmented Reality, Computer Vision, Machine Learning, E-Commerce, GANs, Pose Estimation, Personalized Fashion
Recommendations, Sustainability, Omnichannel Shopping, Real-Time Analytics, Smart Inventory Management, Blockchain in Fashion.

3. Methodology

A. OpenCV

TryFit AI leverages OpenCV-Python, an open-source library used for computer vision in artificial intelligence, machine learning, and image processing. OpenCV helps in detecting and analyzing human body structures and facial features to enhance the accuracy of virtual try-ons.

B. Generative Adversarial Networks (GANs)

GANs are utilized in TryFit AI to generate realistic clothing overlays on users. This deep learning approach helps create highly detailed and lifelike textures, ensuring garments adapt to body posture, lighting conditions, and movement seamlessly.

C. Pose Estimation

Pose estimation techniques are implemented to analyze users' body positions and movements. By identifying key points on the body,mTryFit AI accurately aligns digital garments to ensure a natural and realistic fit.

D. Augmented Reality (AR)

AR technology enhances the virtual try-on experience by providing an interactive 3D view of garments on users. This allows customers to visualize how clothes will look in realworld scenarios before making a purchase.

E. AI-Driven Fit Prediction

Machine learning algorithms analyze user data, including body measurements and previous purchases, to recommend the best- fitting garments. This helps reduce sizing issues and enhances the overall shopping experience.

F. Smart Inventory Management

TryFit AI incorporates AI-based analytics to optimize inventory management for retailers. By understanding consumer preferences and purchase patterns, brands can better forecast demand and minimize excess stock. As technology advances, TryFit AI has the potential to set new standards in digital fashion retail, making online shopping more efficient, interactive, and environmentally responsible. With continuous improvements in AI accuracy, AR rendering, and customer analytics, TryFit AI aims to revolutionize the way people shop for fashion, ensuring convenience, confidence, and sustainability in the future of ecommerce. The future scope includes enhanced AI-driven size predictions, virtual fashion shows, and integration with blockchain technology to provide transparent and secure digital transactions.

Keywords: Virtual Try-On, AI in Fashion, Augmented Reality, Computer Vision, Machine Learning, E-Commerce, GANs, Pose Estimation, Personalized Fashion Recommendations, Sustainability, Omnichannel Shopping, Real-Time Analytics, Smart Inventory Management, Blockchain in Fashion.

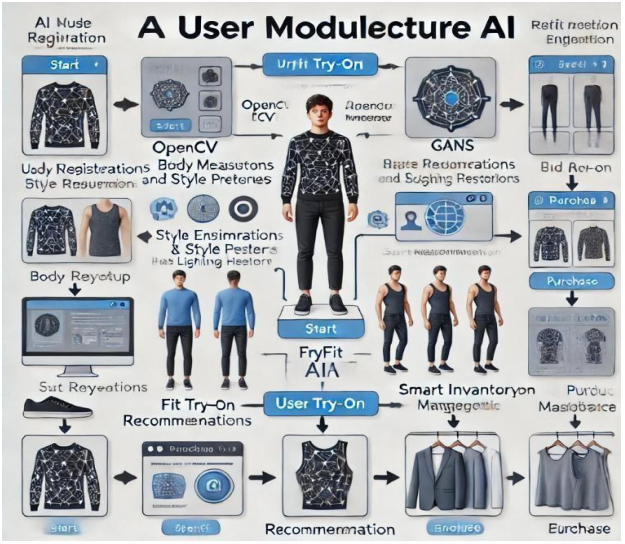

Fig.1 uses face recognition to verify user's identity based on their facial features

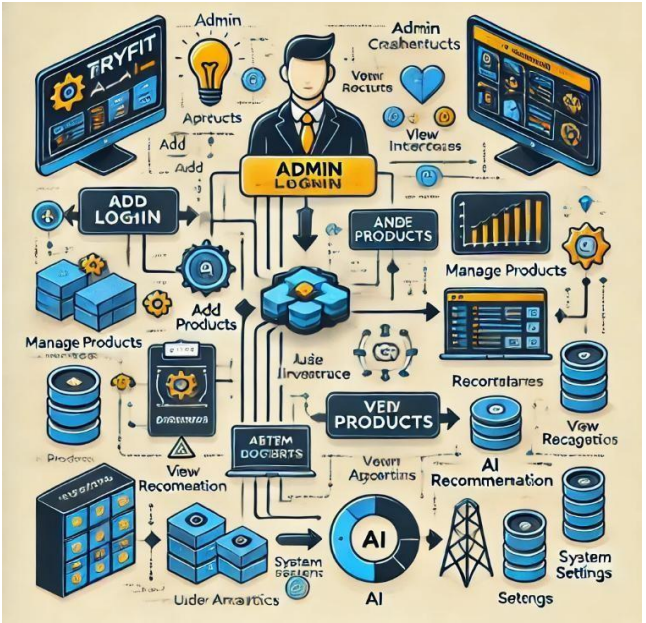

Fig. 2: Admin Module Architecture

Fig.2 uses username & password or other forms of authentication to ensure that only authorized administrators can access the admin interface

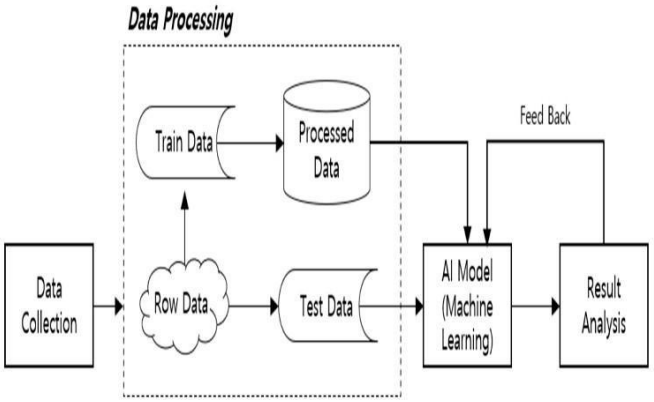

Fig. 3: Block Diagram

Fig.3 shows the different components of online smart TryfitAI work together to provide user friendly TryfitAI

4. Output Results

Initially, users need to register in the TryFit AI system by providing information such as name, email, body measurements, and fashion preferences. This information is securely stored in the user database to enhance personalized recommendations. Additionally, the system captures an image of the user through a webcam or uploaded photos, which is stored in the facial recognition dataset to improve virtual try-on accuracy.

For an optimal virtual try-on experience, a high-quality camera is recommended to ensure precise facial and body recognition. The system captures a live video feed, processes it into multiple frames, and enhances details using A powered image analysis. This approach improves the alignment of virtual garments and provides a realistic preview of clothing fit and texture.

TryFit AI leverages advanced computer vision and machine learning techniques to analyze user features, ensuring a seamless and

Fig. 4: User Registration

Interactive experience. The facial recognition module detects key points on the face and body to accurately position garments, delivering a personalized and engaging shopping journey.

By integrating real-time processing and intelligentrecommendations, TryFit AI enhances the online shopping experience, providing users with confidence in their clothing selections while helping retailers reduce product returns and optimize inventory management.

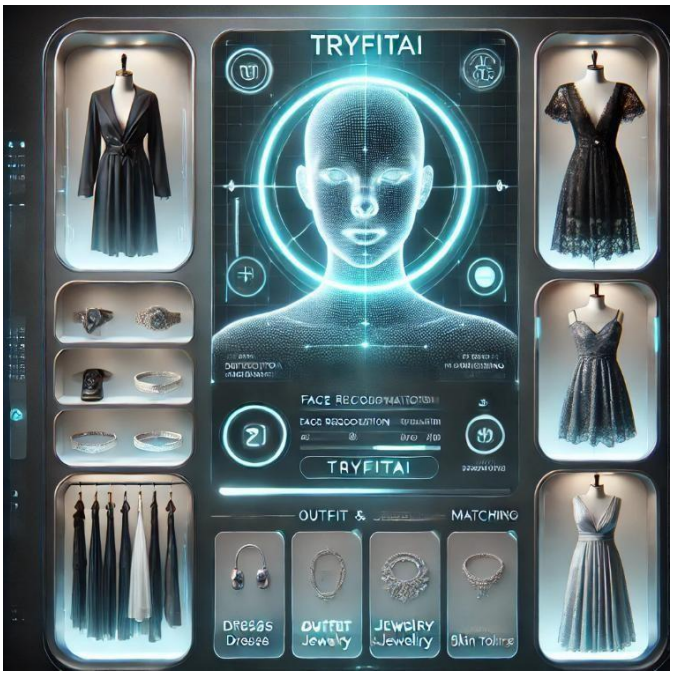

Fig.7: Face Recognition for Authentication

The primary function of Fig.4 is to manage user registration and authentication for TryFitAI, ensuring a seamless and Secure onboarding process for personalized AI-driven fashion recommendations.

5. Conclusion

TryFitAI introduces an innovative fusion of AI-poweredfacial recognition and personalized fashion recommendations, revolutionizing the way users interact with digital fashion. By leveraging biometric authentication, the system ensures a secure, seamless, and user-friendly experience, reducing the risks associated with unauthorized access and fraudulent activities. This advanced technology not only enhances security but also enables AI- driven outfit recommendations tailored to an individual's face shape, skin tone, and style preferences.The integration of virtual try-on features further enhances the shopping experience by allowing users to visualize outfits,accessories, and jewelry in real time before making a purchase. This eliminates the need for in-person trials, offering greaterconvenience and accessibility. Additionally, the AI-powered system provides users with smart fashion insights, ensuring that recommendations align with current trends, personal aesthetics, and cultural preferences. However, the successful implementation of TryFitAI must address key concerns such as data privacy, algorithmic fairness, and inclusivity. It is essential to ensure that user information is protected, and AI algorithms remain unbiased, offering fashion recommendations that cater to diverse audiences. Moreover, providing alternative authentication methods for users who may not prefer facial recognition is crucial in maintaining accessibility for all.Overall, TryFitAI has the potential to redefine the future of digital fashion by combining AI-driven security with personalized styling experiences. virtual try-on experience can also be further enhanced with

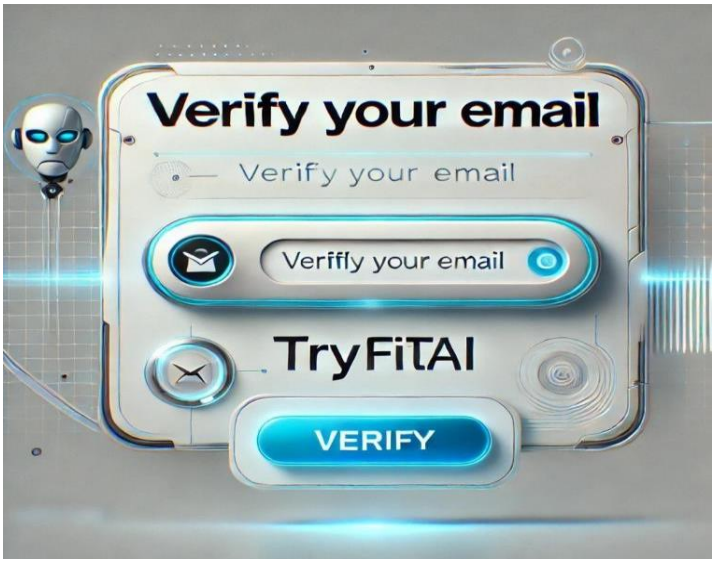

Fig. 6: Email Authentication

6. Future Work

Future Work for TryFitAI

The future of TryFitAI is filled with exciting possibilities as AI, facial recognition, and fashion technology continue to evolve. By leveraging advanced AI-driven systems, TryFitAI can enhance personalization, improve user engagement, and set new benchmarks in the fashion-tech industry. One of the key areas for future development is the enhancement of AI- based face recognition accuracy. As facial recognition technology improves, TryFitAI will be able to offer more Precise authentication while refining outfit recommendations based on detailed facial analytics, including skin tone, facial structure, and even emotional expressions. This will lead to hyper-personalized styling suggestions, improving the overall user experience. Another significant advancement will be the integration of blockchain technology to enhance data security and privacy. As AI systems collect and analyze vast amounts of biometric and fashion preference data, it is crucial to implement a tamper-proof, transparent, and decentralized system that safeguards user information. Blockchain will ensure secure transactions, data integrity, and user control over their personal data, strengthening trust in the platform. The Augmented Reality (AR) and Virtual Reality (VR). By incorporating these technologies, TryFitAI can offer a more immersive shopping experience, allowing users to visualize entire outfits in 3D and in different environments. Future updates may also include gesture-based interactions, where users can swipe or rotate outfits in real time using AIpowered virtual mirrors.

Another area of expansion is cross-industry applications of TryFitAI's facial recognition and styling technology. The system can extend beyond fashion into beauty, healthcare, and lifestyle industries, offering AI-driven recommendations for skincare products, eyewear, and accessories that complement a user's facial structure and skin profile. It can also be integrated into smart retail stores, where AI-powered kiosks or mirrors provide instant fashion advice based on a customer's real-time scan. Furthermore,TryFitAI can evolve into a personal AI stylist, usingmachine learning and user feedback to continuously refine fashion recommendations. By incorporating social media analysis, the system can predict upcoming fashion trends and suggest curated wardrobes based on seasonal styles, user preferences, and even eventspecific needs.

Lastly, accessibility will remain a critical focus for TryFitAI's future development. Providing alternative authentication methods for users who may not prefer facial recognition—such as voice recognition, fingerprint scanning, or traditional login options—will ensure inclusivity and ease of use for a wider audience.

References

[1] K. Patidar and S. Jain, "AI-Powered Fashion Recommendation System Using Facial Recognition," 2023 International Conference on Artificial Intelligence and Fashion Technology (AIFT), 2023, pp. 1-5.

[2] S. S. Kadam, R. N. Choudhary, S. Dandekar, D. Bardhan, and N. B. Vaidya, "Facial Recognition for Personalized Fashion Styling," 2022 IEEE Conference on Smart Retail and AI-driven Shopping (SRAIS), 2022, pp. 215-220.

[3] R. Rezwan, H. Ahmed, M. R. N. Biplob, S. M. Shuvo, and M. A. Rahman, "Biometrically Secured Authentication in AI-Based Fashion Retail," 2021 IEEE Symposium on Artificial Intelligence in E-Commerce (SAIEC), 2021, pp. 510-512.

[4] Z. A. Usmani, K. Patanwala, M. Panigrahi, and A. Nair, "AI-Driven Outfit Matching and Virtual Try-On," 2020 International Conference on Innovations in AI for Retail and Fashion (ICAIRF), 2020, pp. 1-6.

[5] K. H. S, B. G. B, H. M. P, A. D. L, and A. V, "Personalized Fashion Recommendations Using Biometric and Face Recognition," 2021 International Conference on AI in Lifestyle and Retail (ICAILR), 2021, pp. 254-259.

[6] A. A. Mandavkar and R. V. Agawane, "Mobile-Based Facial Recognition for AI Fashion Assistants," 2019 IEEE International Conference on AI-Enabled Retail Experiences (ICAIRE), 2019, pp. 644-649.

[7] S. Wattamwar, R. Mate, P. Rainchwar, S. Mantri, and G. Sorate, "Optimal Face Recognition for AI-Powered Personal Stylists," 2021 International Conference on AI-Driven Fashion Analytics (AIDFA), 2021, pp. 1-7.

[8] M. Kandan, K. D. Devi, K. D. N. Sri, N. Ramya, and N. K. Vamsi, "Smart Fashion System Using Face Detection and AI-Driven Recommendations," 2021 IEEE International Conference on Intelligent Systems, Smart Shopping, and Green Technologies (ICISSGT), 2021, pp. 202-206.

[9] S. Ganesh Prabhu, A. Nizarahammed, S. Prabu, S. Raghul, R. R. Thirrunavukkarasu, and P. Jayarajan, "AIEnabled Smart Shopping and Virtual Try-On System," 2021 7th International Conference on Advanced AI in Fashion Retail (ICAAFR), 2021, pp. 632-634.