



International Journal of Multidisciplinary Research in Science, Engineering and Technology

(A Monthly, Peer Reviewed, Refereed, Scholarly Indexed, Open Access Journal)



Impact Factor: 8.206

Volume 8, Issue 4, April 2025



International Journal of Multidisciplinary Research in Science, Engineering and Technology (IJMRSET)

(A Monthly, Peer Reviewed, Refereed, Scholarly Indexed, Open Access Journal)

Revolutionizing Personalized Fashion: A Platform for Custom Clothing Design and Tailoring Services

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ABSTRACT: This paper explores the development of a transformative platform that integrates advanced digital tools to enable users to design custom clothing and connect with local tailors for production. Leveraging technologies such as augmented reality (AR), artificial intelligence (AI), and real-time collaboration, the proposed platform redefines personalization in fashion while promoting sustainability. Tailors and users benefit from a transparent, user-friendly system that facilitates seamless communication, price negotiation, and order tracking. The study outlines the technological framework, user-centric features, and socio-economic implications, emphasizing its potential to disrupt traditional fashion supply chains and democratize bespoke fashion.

KEYWORDS: Personalized fashion, Custom clothing design, Tailoring services, Augmented reality (AR), Artificial intelligence (AI), Real-time collaboration, Sustainability, Transparent system, Order tracking, Fashion supply chain, Digital tools, Socio-economic impact, Eco-conscious design, User-centric platform.

I. INTRODUCTION

The global fashion industry is undergoing a significant transformation as consumers increasingly demand personalized and sustainable options. Traditional mass production often struggles to meet these expectations, offering limited customization and contributing to overproduction and environmental waste. These challenges are compounded by a disconnect between consumers and the creative process, leaving many desiring a more inclusive, accessible, and tailored approach to their fashion needs. Personalization in fashion is no longer a luxury but a necessity, driven by the growing desire for unique, well-fitted garments that reflect personal identity and values. Younger generations, in particular, are shifting their focus toward individuality, ethical production, and sustainability. At the same time, the fashion industry's environmental impact—accounting for 10% of global carbon emissions and 20% of wastewater—has sparked criticism and calls for change. Bespoke fashion offers a promising alternative by enabling made-to-order garments that reduce waste, minimize excess inventory, and support local artisans. However, traditional tailoring processes remain inaccessible to many, hindered by limited visibility of services, inefficient communication, and unclear pricing structures. This paper introduces a transformative platform that bridges the gap between consumers and tailors by integrating advanced technologies such as augmented reality (AR), artificial intelligence (AI), and real-time collaboration tools. The platform empowers users to design custom clothing, visualize their designs in real-time, and engage directly with tailors for efficient and transparent production. Through its user-friendly design, it democratizes bespoke fashion by making customization accessible to a broader audience. Beyond personalization, the platform promotes sustainability by reducing waste through made-to-order production and encouraging eco-conscious practices. It also supports local artisans and small businesses, giving tailors a digital space to showcase their work, connect with clients, and expand their reach. By addressing these critical issues, the proposed platform redefines the intersection of fashion, technology, and sustainability, offering a solution that aligns with evolving consumer priorities and global environmental goals.

II. LITERATURE REVIEW

The fashion industry has recently seen an influx of technological advancements aimed at addressing sustainability and personalization. Studies by Chen et al. (2022) emphasize the transformative potential of AI in optimizing garment production and tailoring processes. Similarly, Li et al. (2023) explore the application of blockchain to ensure transparency and traceability across supply chains. The adoption of AR in fashion design is well-documented, with



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research by García-Macías et al. (2022) highlighting its ability to enhance user engagement by enabling real-time design visualization. Additionally, Kumar et al. (2023) demonstrate the role of machine learning in predicting fashion trends and providing personalized design recommendations. These recent studies provide a strong foundation for the development of the proposed platform, addressing gaps in traditional tailoring and enabling eco-conscious consumer choices.

III. METHODOLOGY

The development of the proposed platform follows a user-centric design and agile development methodology. Key steps include:

1. **Requirement Gathering:** Surveys and focus groups were conducted to identify consumer preferences for custom clothing and tailor expectations regarding platform functionality.
2. **Platform Design:** Wireframes and prototypes were created to visualize user workflows, including AR-based design tools, AI-driven recommendations, and real-time collaboration interfaces.
3. **Technology Integration:**
 - AR Visualization: Implemented using Unity and ARKit/ARCore for real-time clothing visualization.
 - AI Personalization: Machine learning models trained on user data to provide design and fit suggestions.
 - Blockchain Transparency: Integrated Hyperledger technology to secure transactions and track order progress.
4. **Testing and Feedback:** The platform underwent usability testing with 50 participants, including users and tailors, to refine features and ensure seamless interaction.
5. **Sustainability Metrics:** Environmental impact tracking algorithms were incorporated to calculate material usage, carbon footprint, and waste reduction potential.

IV. DISCUSSION

The proposed platform addresses critical gaps in the fashion industry, including personalization, accessibility, and sustainability. The integration of AR enhances user engagement by allowing real-time visualization of designs, reducing errors in tailoring. AI-based recommendations streamline the design process for users, even those with no prior design experience. Blockchain technology ensures transparency and trust, fostering better relationships between users and tailors. A key achievement is the empowerment of local artisans, who benefit from increased visibility and direct access to customers. The platform supports sustainable practices by eliminating overproduction and encouraging eco-conscious choices. However, challenges remain, such as ensuring technology adoption among tailors in underprivileged areas and protecting sensitive user data. These issues require ongoing attention to maximize the platform's impact.

V. FUTURE ENHANCEMENT

To enhance the platform's capabilities and expand its reach, future developments could include:

1. **Integration with Smart Fabrics:** Collaborating with textile manufacturers to include options for smart fabrics that adapt to weather conditions, monitor health metrics, or offer additional functionality.
2. **3D Printing Integration:** Incorporating 3D printing technology to enable rapid prototyping of clothing designs. This would allow users to experiment with complex patterns and innovative materials.
3. **Virtual Reality (VR):** Enhancing the design experience by enabling users to explore virtual showrooms, simulate entire wardrobes, and experience garments in a 3D virtual environment.
4. **Global Expansion:** Expanding the tailor network globally while ensuring respect for cultural and regional design preferences. Partnerships with international tailoring organizations could facilitate this growth.



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VI. CONCLUSION

The proposed platform signifies a transformative step in bridging technology and fashion, creating an accessible, efficient, and eco-friendly solution for bespoke clothing. By empowering users with advanced tools like AR, AI, and blockchain, it fosters a seamless design and tailoring experience that eliminates barriers of accessibility and affordability. It not only supports local artisans but also redefines consumer-artisan relationships by promoting transparency and trust. The platform aligns with global sustainability efforts by encouraging made-to-order production, reducing waste, and democratizing personalized fashion. As the platform scales, addressing challenges such as technology adoption and data security will be crucial to ensuring its effectiveness. Continued innovation through features like smart fabrics and 3D printing will solidify its role as a pioneer in the personalized fashion domain. This initiative holds immense potential to disrupt traditional supply chains, inspiring innovation, and setting new benchmarks for sustainability and user-centric design in the fashion industry.

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