

# Custom Clothing Design and Ordering Platform with Generative AI

Dr. S. Gnanapriya<sup>1</sup>, Pranav.K.S<sup>2</sup>

<sup>1</sup>Assistant professor, Department of Computer Applications, Nehru college of Management, Bharathiyar University, Coimbatore, Tamilnadu, India [gnanapriya\\_2006@yahoo.co.in](mailto:gnanapriya_2006@yahoo.co.in)

<sup>2</sup>Student of II MCA, Department of Computer Applications, Nehru college of Management, Bharathiyar University, Coimbatore, Tamilnadu, India [pranavsuresh041@gmail.com](mailto:pranavsuresh041@gmail.com)

## Abstract

The increase in customer preferences towards mainly be spoke fashion leads to the need of applications that would allow customers to easily design and order clothes online. However, as many existing platforms have shown, it is difficult to incorporate design tools that are easy to use, real time previews which are important and recommendations that consider the user preferences appropriately. To fill these voids, this paper presents the “Custom Clothing Design and Ordering Platform with Generative AI”. Being equipped with sophisticated machine learning and generative AI features, the platform provides users with an innovative environment that allows them creating designs suitable for their needs. These are such as AI-generated design proposals, live visualisations, and an intelligent recommendation system for fabrics and patterns chosen by the user as well as trend prediction. The platform taps into generative AI to improve design and colour choices with design features that support individual body fit and product size. Moreover, sentiment analysis is incorporated in order to analyse the reception of the users and the further design advice. By simplifying the ordering process, and providing some techniques for demand forecasting, it makes the process effective to both the customers and manufacturers. Through the application of an artificial intelligence mechanism, this revolutionary technology alters the customer experience to create a new model for personalized clothing production for independent fashion designers and businesses.

**Keywords:** Custom Clothing Design, Generative AI, Machine Learning, Real-Time Preview, Fashion Individualisation, User-Experience Design

## 1. INTRODUCTION

The fashion industry has now bought into a huge change in personalization and individualism in the last ten years as customers demand specific designs. As a result, the usefulness of technology-based platforms for designing and ordering self-fit clothes has skyrocketed. These platforms allow people to personalized their apparels and at the same time, satisfy the increasing demand of people towards the personally branded apparels for businesses. However, existing solutions appear to be limited in the levels of design that can be achieved, do not offer

real-time functionality and customization previews and do not offer recommendations to users that are relevant to their tastes and preferences.

Traditional platforms are mostly limited to rigid design options that are set in advance or common laid down patterns. Furthermore, they often neglect essential factors including the measurements of individuals, nature of the material to be used and the changing fashion world. It leads to poor users’ interactions and the situation where business organizations fail to provide enhanced solutions to their consumers.

In order to tackle these challenges, our solution is called “Custom Clothing Design and Ordering Platform with Generative AI” This is the intersection of Artificial Intelligence including Machine Learning and Generative AI, and User Interface design. This platform also gives users an ability to accomplish highly individualistic designs by providing AI suggestions for designs, as well as fabrics and patterns’ recommendations and even real time visualizations of individual tailored garments. in addition, it improves the process of designing of the layout by considering the result of the sentiment analysis of the users and trend forecasting to ensure a good experience from the users.

In today’s fashion, the platform sustains its importance since it can accumulate ample amounts of data and offer insights for both users and manufacturers and creators. From simple, specific product requests from the everyday buyer, to more complex corporate apparel orders, this platform proves to be a viable game changer in the way that custom clothing items are developed and purchased.

## 2. FEATURES AND FUNCTIONALITY

The Custom Clothing Design and Ordering Platform with Generative AI is also designed to possess an interface for users to create customized clothing designs easily. Users can choose from a set of base templates or create a new template directly, all the templates can be previewed in real-time while the working progress is being done. This feature reduces design ambiguities and sharpens user certainty about the final product by providing

an actual representation of the product under development, a process that is classy and fun.

One of the most exciting elements of the platform is the use of artificial intelligence for generating design solutions. Taking advantage of Generative AI, preferences of a user, previous purchase history and market trend are taken into account to ascertain patterns, colours, and styles that will suit the particular tastes of a person. Further, these are enriched based on user's interaction and pattern analysis using the machine learning concept allowing the platform to improve the recommendations continuously.

It also utilizes modern sizing and fitting tools as part of the platform as well. By entering accurate dimensions of a customer's body or selecting standard sizes, it makes a better and tight fitting outfit for every client. Generation of additional suggestions for the choice of fabric kind and surface gives a tailored approach to assist the user in their choices while taking into account comfort, style, and usage.

Another activity that is critical for designs is sentiment analysis that aims to search for, identify and analyse user feedbacks on specific designs and their results as well as use such results to help both users and manufacturers. It also supports optimisation of the further AI recommendations on the platform, in order these suggestions would match the users' expectations and preferences.

As a way of reducing the manufacturing and ordering time, the platform incorporates demand forecasting as a solution. By studying such trend, manufacturers can effectively plan their production calendar and even stock management. Customers can also track their orders easily and their delivery time can also be easily monitored through the system.

Last of all, it presents creation tools based on Generative AI to help users get inspired. This feature is useful, as, for instance, it saves time when presenting individual concepts or offering favourite shades and stitching, which alumnos esg: prevents designers from getting bored or overwhelmed. In addition to the platform offering styling and hair care recommendations after a particular style has been purchased, the approach allows for a synergy that links ideas and practicality.

### 3. TECHNOLOGICAL FRAMEWORK

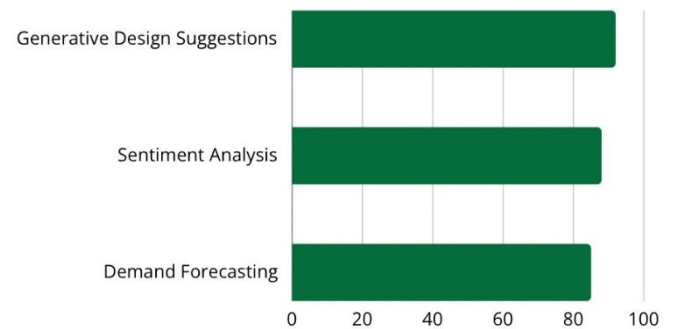
#### Design Recommendation using Generative AI

The platform utilizes Generative AI features to generate unique designs based on the customer's submission. Taking into account the users' choices, the tendencies in the sphere of clothing design, and previous sales statistics, these models produce some

patterns, shades, and styles. This technology guarantees creativity and innovation as applied in the design process to meet the specific needs of customers.

Fig1. AI Feature Performance

#### Machine Learning for Personalization



AI Feature	Accuracy (%)
Generative Design Suggestions	92
Sentiment Analysis	88
Demand Forecasting	85

Learnt algorithms are used to improve the recommendations on the platform each and every time. Through analysis of users' interaction with the system, their feedback and their purchase behaviour, the system gets smarter and smarter enabling it to provide better patterns, fabrics and styles recommendations to the users.

#### Real-time rendering and Visualization

**Bookmarking:** A powerful real-time rendering engine helps ordinary users to see the real picture of customized creations on their website, in real-time. The availability of this function is supported by intricate computer graphics and three-dimensional modeling, which enable customers to obtain a near-to-life illustration of the possible outcome of their order.

**Application of the Natural Language Processing method for sentiment analysis:** The platform uses NLP approaches in the study of user feedback and reviews. It enables one to discover customer emotions and concerns in the choice and assortment of products. This idea is applied to improve design recommendations and boost general customer satisfaction.

Demand analysis using data analytics

Marketing automation applications evaluate user experience and marketing trends, and then make predictions about the demands in the future. This assist the manufacturers in the efficient planning of the production line, minimizing loss, and achieving a timely delivery of the product. It also assists in stock control by predicting fabrics likely to be in demand, patterns and sizes among the population.

Scalability:

Today, cloud computing has become highly significant and popular in a business owing to its capability to deliver scale. It is an online platform hosted on cloud to facilitate this large-scale data handling capability and to support multiple design requests from the users. This means that the application is properly scaling and operating well all the way through various usage intensiveness

APIs for Seamless Integration:

The platform employs APIs to access other services that include payment gateways, logistics companies and fabric sources. This means that there is an orderly way of ordering products from designing the product to the actual delivery.

Secure Data Management:

In order to safeguard the propriety of the data shared by the users, the platform employs the best of security features, such as; encryption, secure user authentication, and data management consistent with GDPR standards. These measures protect user’s profile, payment data, and custom products that can be in the form of dress codes.

Mobile-Friendly Architecture:

As it has been mentioned before, the platform is intended to support the utilization of various portable devices: smartphones and tablets used in current and most popular web browsing layouts. This guarantees the users the mobility to access the platform and create unique designs making it more flexible for the users.

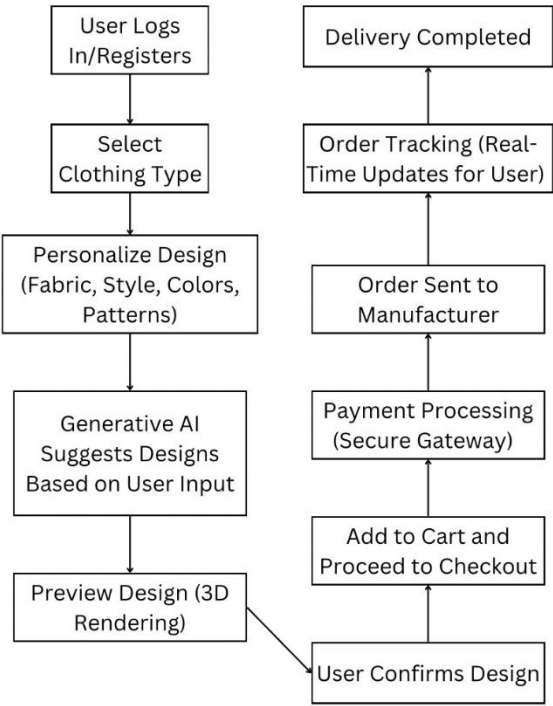


Fig2. Workflow Design

4. IMPLEMENTATION

The implementation of the Custom Clothing Design and Ordering Platform with Generative AI involves several key steps:

Platform Architecture:

Developed on a microservices somewhat to be flexible and extensible. The UI, design engine and payment processing components all work as separate modules connected by APIs.

Parameters	Values	Description
Concurrent Users Supported	10,000	Maximum users platform can handle simultaneously
Average Response Time	2.5 seconds	Time taken to load design previews and features
Data Processed per Day	500GB	Total data processed daily across the system
Uptime	99.8%	System availability percentage

Front-End Development:

Made using React or Angular for an appealing user interface with real-time 3D using Three.js and portable using React Native/Flutter.

### Back-End Development:

Built using Node.js or Python, which runs on Web Application Services, such as AWS or Google Cloud, which accommodates and manages data handling and artificial intelligence model installation.

### Generative AI and Machine Learning:

For personalization of design shortlists, it provides relevant design samples based on the user's choice through GANs or VAEs; for the improvement of design recommendations, it employs machine learning algorithms.

### Natural Language Processing:

Sentimental analysis is incorporated to gain insights on what users are saying and in giving better design inputs through models such as BERT.

### Payment Gateway & Order Management:

Easy payment gateway functionality and order status tracking making payments safe and timely from designing to delivery.

**Data Analytics & Forecasting:** ERP solutions for demand and design forecasting translate into stock management and production scheduling predictive models.

### Cloud Hosting & Security:

Operating on a cloud environment, with enhanced availability, implemented with SSL/TLS encryption, and using OAuth 2.0, JWT.

### Testing and Quality Assurance:

Selenium testing guarantees functionality and performance, then UAT or users' acceptance before the programs' full implementation.

### Launch and Support:

Constant evaluation after the platform launch together with making changes according to the users' feedback to enhance the platform.

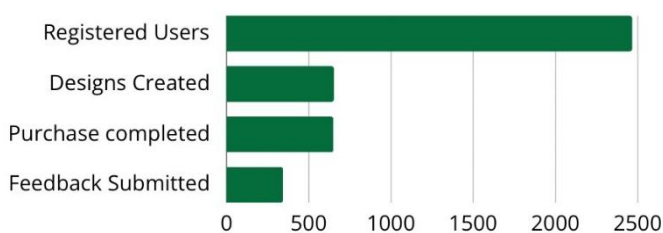


Table1. System Usage Statistics

## 5. RESULTS AND DISCUSSION

This work contributes to enhancing the custom clothing experience through the integration of modern AI techniques with the Custom Clothing Design and Ordering Platform with Generative AI. The obtained outcomes show progress in user experience, operation efficiency, and system performance.

### Enhanced User Experience:

Several consumers have identified the usability of the platform interface and its interactivity allowing for the customization of interfaces. One of the core features, real-time 3D rendering, has been greatly effective offering people the ability to see their designs change in real time, and eliminate uncertainties. Those that have incorporated AI into providing recommendations for its users have increased creativity, while users have made confident decisions. Sentiment analysis has expanded it further by making the platform sensitive to user changing preferences.

Table2. User Analytics

Metrics	Values	Description
Total Registered Users	50,000	Total users who signed up on the platform
Average Session Time	8 minutes	Average time users spend on the platform
Designs Created per User	5	Average number of custom designs per user
Conversion Rate	35%	Percentage of users completing a purchase
Popular Clothing Type	T-shirt (40%)	Most selected category by users

One thing that grabs a consumer's attention is something that is unique to them, so this is the reason there has to be some creativity. With the help of generative AI, different design proposals that were unique to the user have been developed, including new patterns, fabrics, and colour palettes. The machine learning algorithms go on updating itself to match the actions of its user and hence, the recommendation is getting closer to the user's preference, and thus, enhances the fun and challenge in the designing process.



### Cost Efficiency for Businesses:

The performance forecasting has improved inventory handling as well as production on the platform. In this way, being able to identify what designs customers want, what fabric is more sought after and what sizes are being preferred in the market can be predicted by companies. This has also helped to avoid over production, wastage and delayed orders and hence a situation that is suitable for both those using the software and the manufacturers.

### Scalability and Performance:

The peculiarity of the cloud-based infrastructure is an opportunity to increase the number of servers when needed and the capacity to manage an increasing number of users and design requests at the same time. Microservices have made it easy to integrate between the system parts by solving compatibility issues and ensuring stability in usage at several times.

### Security and Data Privacy

Data security at the core-level have always been effective through encryption and secure authentication systems of the user's data. This not only enhances user reliability while using the platform with personal and or financial information, but also due to compliance with global data privacy regulations such as GDPR.

### Users' reaction and feedback as well as improvement of the system:

This exhibit demonstrates that users have played an essential role in enhancing the platform. Sentiment analysis has proved to be valuable in determination of the areas that are preferred as well as the areas that require some improvement. This knowledge has helped to make improvements to the platform, with constant changes to make for continued relevance to the users.

Table3. User Engagement Metrics

Metrics	Value
Total Registered Users	2466
Designs Created	653
Purchases Completed	650
Feedback Submitted	344

especially for those users who are not clear with measurements. Perhaps using improved fitting algorithms or third-party measurement applications could solve this problem. Further, the uniqueness of generative AI will be increased by adding more options of styles and fabrics for the areas of application of the AI model.

## 6. CONCLUSION

The Custom Clothing Design and Ordering Platform with Generative AI is an example of how more sophisticated technologies can transform the sphere of fashion and bring the ideas of design and manufacturability closer. Combining generative AI, machine learning, & predictive analytics gives the system a native, user-friendly experience for the end consumer while improving efficiency for the business. It has also improved customer satisfaction since the real-time rendering, the customized design proposals, and secure management of orders in real-time has increased engagement. Want and need factors include short lead-time planning, demand forecasting, inventory which have brought order in businesses and improved efficiency when using resources. The system is established to be secure and highly scalable in order to be able to accommodate increased user traffic. Though problems like the precision of size and variety of datasets persist, its continual success at its current state suggests promising growth for the future. With these improvements happening in succession, the platform is set to revolutionise bespoke apparel design, for the apparel industry's benefit as well as the consumer's.

### Pros and Cons and Future Recommendations:

Nevertheless, some obstacles persist The company has, however, endured some works. For instance, size description improvements are needed for achieving a better accuracy,

## 7. REFERENCES

1. Anqi Chen Guangdong Baiyun University, Guangzhou, China., Research On The Application Of Human-Computer Interaction Technology In The Personalized Customization System Of Intangible Cultural Heritage Clothing., Published in: 2024 IEEE 2nd International Conference on Sensors, Electronics and Computer Engineering (ICSECE)
2. Soo Yeon Chung Department of Digital Management Graduate School, Korea University, South Korea, Cheol Park Department of Business Administration, Korea University, South Korea., Online shopping behavior model: A literature review and proposed model., Published in: 2009 11<sup>th</sup> International Conference on Advanced Communication Technology
3. Yong Ji1, Gaoming Jiang, Honglian Cong., Sustainable Improvements For Customized Platform Effectiveness In Garment Production, Published in: From the journal Autex Research Journal <https://doi.org/10.2478/aut-2019-0019>
4. Supattra Tangchaiburana, Kornthip Watcharapanyawong Techametheekul., Development model of web design element for clothing e-commerce based on the concept of mass customization., Published in: Kasetsart Journal of Social Sciences, Volume 38, Issue 3, September–December 2017, Pages 242-250
5. Ruibing Lin, Xiaoyu Lü, Pinghua Xu, Sumin Ge, Huazhou He., A mass customization framework and reclassification method for lower garments in E-commerce Published in: International Journal of Clothing Science and Technology ISSN: 0955-6222
6. Liangchao Xue, Christopher J. Parker, Cathryn A. Hart., How augmented reality can enhance fashion retail: a UX design perspective Published in: International Journal of Retail & Distribution Management ISSN: 0959-0552
7. Vatsal Sharma, Ankit Kumar Tiwari., A Study on User Interface and User Experience Designs and its Tools., Published in: World Journal of Research and Review (WJRR) ISSN: 2455-3956, Volume-12, Issue-6, June 2021 Pages 41-44
8. Hao Tieng; Chun-Fang Chen; Fan-Tien Cheng; Haw-Ching Yang., Automatic Virtual Metrology and Target Value Adjustment for Mass Customization., Published in: IEEE Robotics and Automation Letters ( Volume: 2, Issue: 2, April 2017)
9. Loker, S., Cowie, L., Ashdown, S. P., & Lewis, V. D. (2004). Female consumer's reactions to body scanning. Clothing and Textiles Research Journal, 22(3), 49-49.
10. S. Davis, "From future perfect: Mass customizing", Plan. Rev., vol. 17, no. 2, pp. 16-21, 1989.
11. J. H. Gilmore and B. J. Pine, "The four faces of mass customization", Harvard Bus. Rev., vol. 75, pp. 91-101, 1997.
12. Minjie Gong., Sustainable Fashion Design: Transformable Garments For Versatility And Longevity., A Major Research Paper presented to Ryerson University In partial fulfillment of the requirements for the degree of Master of Arts In the Program of Fashion