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Research Article

Personalize Fashion Design Based on Body Data and Consumer Preferences Using Artificial Intelligence Technology

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Abstract: The development of artificial intelligence technology is a great opportunity for the fashion industry, especially in designers based on personalization and consumer needs. This study aims to examine Midjourney's AI technology in the design personalization process by integrating solid data and consumer style preferences. This research is expected to support the concept of mass customization in the fashion industry and increase the relevance of design to user character. This research uses a mixed method method by combining quantitative data and qualitative data. The research stages include body data collection and style preferences, prompt formulation, data-driven prompt formulation, design generation using Midjourney, design validation by experts and consumers, and integrated data analysis.The results showed that the majority of the designs produced were considered feasible in terms of construction (83%) and in accordance with the character of the consumer's body (75%). The modest and minimalist style categories received the highest personalization scores. The qualitative findings reinforce the quantitative results, showing that consumers feel the fit of the style and proportions of the design with the character of their bodies.The study concludes that Midjourney's AI integration in the fashion design process is able to effectively support design personalization, although it still requires the role of designers in technical refinement. This approach has the potential to be an innovative solution in the development of data-driven fashion design.

Keywords: Artificial Intelligence Technology; Body Data; Design Personalization; Fashion; Style Preferences.

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1. Introduction

The ability of technology and software to produce in-depth, detailed visualizations that enable individuality and personalization drive future fashion trends. The faster and more competitive the fashion industry, the more changes in consumer behavior. Today, clothing is chosen not only from its original function, but also its ability to express a person's identity, personal style, comfort equal to the anatomical characteristics of the body (Goti, 2023) Therefore, the loss of the need for fashion design personalization is becoming more and more established. However, the process of creating personalization is usually manual and opaque, cost-intensive and highly time-dependent for designers. This creates a gap between consumers' need for satisfactory design results and what they actually get – a challenge that can only be overcome with innovations in design technology and better data integration (Selvi et al, 2024) (Donmezer, 2023).

Advances in Artificial Intelligence technology open up new opportunities to bridge this gap. Various studies show that AI can help the decision-making process in fashion design through the analysis of consumer preference data and market trends. Previous research has shown that AI can use big data to predict style trends more accurately, reducing uncertainty in the design process. Although many studies focus on AI as a visual recommendation system

or trend analysis tool, there are still two that link AI directly to the physical character of consumers' bodies and individual design preferences. Body data-driven approaches and consumer style preferences are starting to gain attention. Other research explains that the utilization of body morphological data can improve clothing fit, but it is still not fully integrated with subjective style preferences (Goti, 2023) This approach tends to think of consumers as a numerical data set, ignoring the emotional and aesthetic aspects of the shopping experience. Because of this, future research should develop a framework that incorporates various aspects of AI-driven design to achieve a more holistic consumer experience.

However, some studies also pay attention to the challenges or aspects faced. For example, research makes the case that increased access to body size data and fashion trends makes the consumer experience more varied when choosing clothes that are appropriate for them (Donmezer, 2023) However, while technology-based design innovation is key, McCormick and Livett Page et al. caution that all integration needs to be based on consumer wants and needs to produce relevant outcomes (Page M., 2021) Most importantly, as this work did in Indonesia, where AI adoption is largely centered on human empathy, consumer personalization innovations have not been used as a sustainable strategy. Therefore, the entire complexity described in this study provides a very promising opportunity to be further explored (Gundu L., 2025).

Realizing the need for innovation and personalization in fashion design, this approach could result in a new approach in the application of AI technology that not only processes consumer body data, but also lifestyle behaviors and preferences directly on the design process. Attempting to represent the consumer as the primary subject in a design personalization system, this approach can further enhance the understanding of style personalization and in turn, design satisfaction and efficiency. It is hoped that further research will make a clearer contribution to fashion design focused on consumer experience and sustainable innovation in the fashion industry.

2. Preliminaries or Related Work or Literature Review

2.1. Personalization of Fashion Design Based on Body Data

Personalizing fashion designs with body data results in the realization that individuals can have a variety of unique physical characteristics that are impossible to set to size with the same system. With the advancement of technology, particularly in terms of data and 3D data, fashion and other industries are starting to approach more individualistic models. The sizing system has been a reliable reference for the fashion industry so far. However, the tools highlighted sometimes fail to represent the diversity of parts of the human body and, therefore, fail to unite with the morphology and characteristics used (Lyu Y., 2025) As a result, comfort, visual power, and other user satisfaction are often forgotten. In any case, in this context, the adoption of personalized design fashion based on making more precise and more flexible data for the consumer experience becomes very important.

Various studies show that the application of anthropometric body data can improve the design accuracy and fit of clothing. A review of digital innovations in patterns revealed that the application of AI-based tools and multidimensional body data allows designers to take advantage of physical variations in more detail, not only of body circumference but also of proportions and posture (Min Shi., 2023) This approach directly provides adaptive design because it removes design decisions from intuition to measurable physical information (Yingying Wu, 2024) Despite the potential to be good, body data-driven design is usually based on positive processes and ignores the subjective experience of the user which is also difficult to solve (Donmezer, 2023).

In fact, one of the current challenges related to the personalization of fashion design based on body data is that numerical data models become aesthetically pleasing visual forms. Certain studies marked the integrality between size and body size data with style preferences and achieved a design that was not only appropriate but also preferred (Lyu Y., 2025) In fact, the physical aspects in ready-to-use size data will be limiting if they are not accompanied by a deep understanding of style preferences and self-appearance. Approaches that use the physical aspects of data and the individual cognitive aspects of the fashion experience should be further developed to achieve a better level of post-optimization. Due to developments in the use of digital technology, the integration of body data is not limited to subscription

feedback platforms but is extended to computer-aided design software and 3D simulation implementations. This approach facilitates a more realistic design visualization stage that facilitates faster adjustments before entering the production stage. However, the perfect circle has not yet achieved the use of body data that is integrated with preferences and style needs. Therefore, the conclusion is that a lot of design space must be developed in the integration of body data-data models. Thus, the dieses are not part of the original physical integration but the visual opinions and self-awareness generated by society.

2.2. Artificial Intelligence dalam Personalisasi Fesyen

The use of artificial intelligence AI in fashion is rooted in the growth of industries that require faster, adaptable, and consumer-centric design processes. In the case of personalization, AI is not a computing technology that works on its own but a tool that supports the designer's creative process of translating data into a meaningful visual format. The use of AI in fashion design allows for more innovative and precise solutions and allows designers to respond to an ever-changing market (Bieńkowska, 2024) This approach places AI as part of the design flow rather than a replacement of human roles, creating synergies between tools and creative abilities (Mao et al, 2023)The use of artificial intelligence in this study is visual generative AI using the Midjourney platform. Midjourney is used to generate initial fashion designs based on descriptive prompts compiled from body data and consumer preferences. Body data such as high proportions and shape characteristics are translated into visual descriptions, while style preferences are represented by elements of color, silhouette, and fashion character. This procedure allows AI to generate more personally relevant design visuals and supports the exploration of new ideas. Effectively, at this point, Midjourney acts as an idea exploration tool that accelerates the search for design concepts, allowing designers to quickly evaluate and select the most relevant visual solutions (W. Tsaiyi, 2025)

Unfortunately, what Midjourney presents as a visual result cannot be used as the final design. A human-in-the-loop approach should be followed to ensure designers continue to make design decisions (Mao et al, 2023). Mao et al., 2023). Keep in mind that the same designers are constantly demonstrating autonomy in the selection, adaptation, and penetration of AI designs to fit the functional, aesthetic, and construction needs of fashion. Thus, AI remains a creative partner for designers, facilitating rather than replacing design thinking itself (A. Hall, 2024). The integration of generative AI in fashion personalization has a real impact in terms of the efficiency and flexibility of the design process (Kusuma, A.A., 2025c) (Kusuma, A.A., 2025). It can be seen when designers can explore hundreds or even thousands of visual alternatives to each of their designs in minutes, while consumers get something they want to personalize according to their body character and their personal style. Therefore, the use of Midjourney in this research shows that Artificial Intelligence can play an effective role as a technology to support the personalization of fashion designs based on user experience and market needs (V. Bagnato, 2023).

3. Proposed Method

This study uses a mixed methods approach, namely integrating quantitative and qualitative data. The reason for using this approach is because personalization has a measurable aspect of the i-dimension and an interpretive aspect of style. This method is a special research method that has steps and stages. First, is the collection of quantitative data: basic anthropometry, namely height, chest circumference, waist circumference, and hip circumference; and user ratings through Likert scale questionnaires. Qualitative data are obtained through open-ended questions and visual observation through image stimuli: what style preferences are preferred and the reasons for choosing those styles. This stage produces a consumer profile, which is the overall body parameters and aesthetic tendencies as the focus of personalization. Second, is the prompt designing and design generation through Midjourney: prompts based on a combination of body data and style preferences, high or low, and low-high; Third, is design validation through expert judgment and user Likert scale assessment. Fourth, is data analysis with data intelligence, especially integrated analysis (mixing) between qualitative and quantitative descriptive thematic. The entire stages of the research can be seen in Figure 1.

Figure 1. Research Stage Flow Diagram.

4. Results and Discussion

4.1. Consumer Data Results

The results of the initial data collection carried out on 30 respondents in the form of students and potential consumers of fashion products were in the form of fashion style preference data and body shape classification (basic anthropometry). These two data are the basis for the formation of consumer profiles in this study. The data in question in the form of preference data on fashion styles, namely Modest, Minimalist, Streetwear, and Active, shows that Modest and Streetwear styles are the two most dominant categories by 30% each. Meanwhile, two other categories, Minimalist and Active, were found to be fewer, with 20% each. This implies that there is a significant tendency towards modest styles that are modest and streetwear styles that are unfussy and urban, as well as fashion trends from millennials and earlier (Smith N.G., 2025) This cue will serve as a guide to the design prompt in the next section so that there is compatibility between the prompt and the consumer's aesthetic. The overall results of consumer style preference data can be seen in Figure 2.

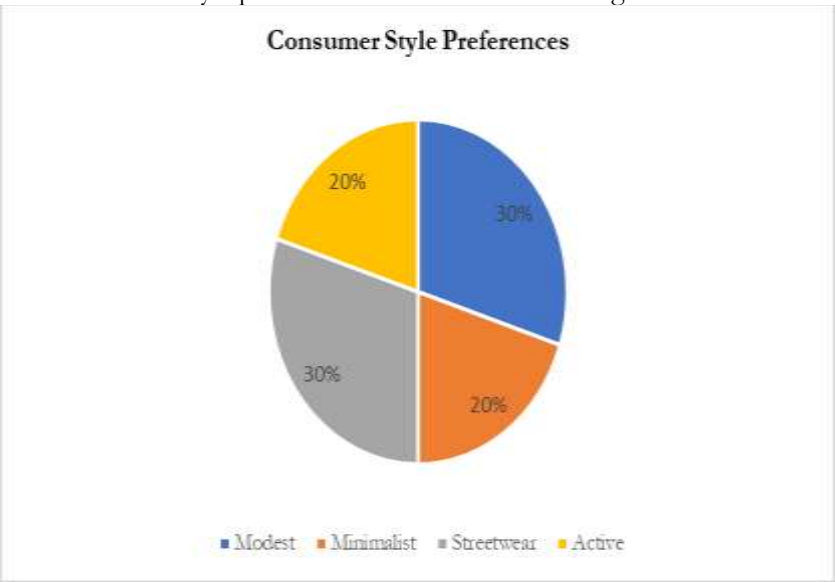

Figure 2. Consumer Style Preferences.

Data taken based on anthropometric aspects shows that body classification is divided into three categories, namely Petite, Regular, and Plus. Respondent data shows that respondents who have bodies that are included in the Petite category are 27% of the total research respondents. Respondents who are included in the Regular category are 43% and respondents who have bodies in the Plus category are 30%. The most categories are in the Regular body shape, this body shape classification is adjusted to the type of body silhouette, height and overall body proportions of the respondent which will later become the keyword or prompt of the design made in Artificial Intelligence. Style preferences and body shapes are integrated into a Consumer Profile that will be created for the fashion design approach using Midjourney (AI), during the visual generation stage. The overall results of the body shape classification data can be seen in Figure 3.

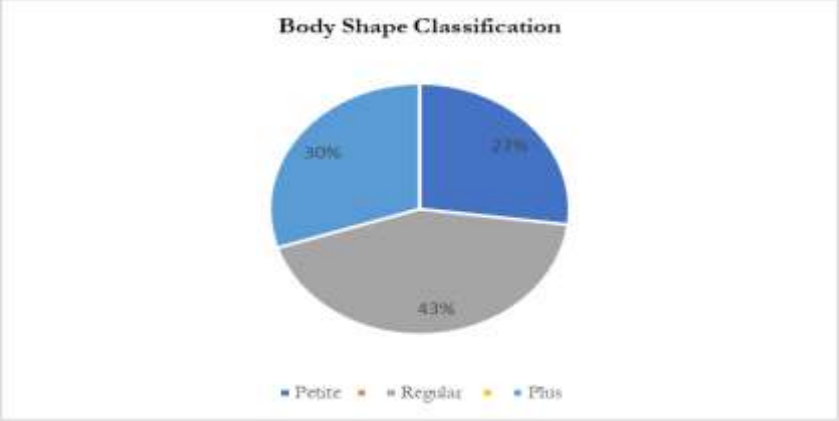

Figure 3. Body Shape Classification.

4.2. Results of Prompt Formulation and Design Generation (Midjourney)

The prompt formulation of this research is to translate the consumer profile consisting of body shape data and style preferences into textual instructions processed by the generative AI system, Midjourney. In this stage, each body shape and style category was combined to produce more directed prompt variations. For example, in the Petite + Minimalist category, a prompt was created with minimalist aesthetics characteristics, the need for appropriate petite body-conscious silhouettes, and the appropriate dress length. An example of a used prompt is "Minimalist modest wear dress, ankle length, long sleeves, A-line silhouette suitable for petite body, clean lines, fashion design sketch." The visual generation results show that Midjourney successfully generates designs with silhouette, proportion, and line details variations consistent with prompt parameters. These design variations were then selected and used in the expert and user evaluation stages to assess the technical feasibility and perceivable sentimentality. Figure 4 is an example of a prompt result developed based on being formulated by taking into account the aesthetic characteristics of minimalism, the need for a silhouette that suits the petite's body, and the proportional length of the dress.

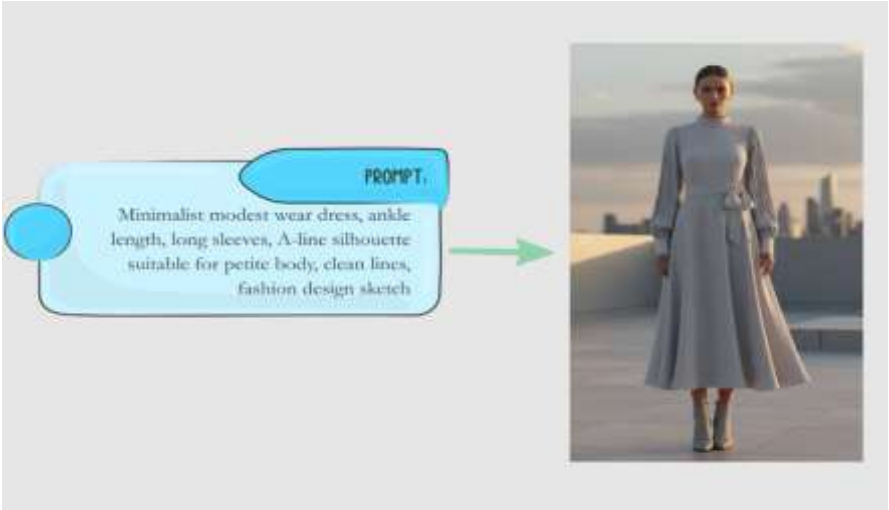

Figure 4. Example of Prompt Development Results.

4.3. Design Validation Results

The design validation in this study was carried out in two ways. First, the technical evaluation of the design by experts and the second is the evaluation of the consumer's economy. The technical evaluation itself was carried out by three fashion designer and construction experts. They are pattern makers and fashion designers. Each expert assessed a total of 12 designs made in this study, looking at 3 indicators, namely construction in true size, relevance or suitability of the character of the consumer's body, and design concept. From the results of the evaluation, 83% of the designs are feasible in construction, which means that most of the designs can be realized into the actual book creation without any obstacles of technical problems. 75% of the design is in accordance with the personality of the consumer model, especially in terms of proportional silhouette and the location of the construction line. However, qualitative information from experts also enriched the findings when researchers found the following findings such as "the silhouette A-line fits the petite body but needs to be adjusted the length of the arms", this according to the researcher is an indication that some of the technical problems need to be adjusted.

Figure 5 shows the level of design satisfaction based on the fashion style chosen by the respondents. It can be seen that modest and minimalist styles obtain the highest satisfaction scores with a score of 5 each. This indicates that the resulting design is considered to be very suitable for the preferences and character of users in both categories. Meanwhile, streetwear styles are at a medium satisfaction level with a score of 4, which shows that the design is quite acceptable although there is still room for improvement. The active style received the lowest score, which was 3, which indicates that the design in this category has not fully met consumer expectations, especially regarding function and comfort.

Gambar 5. Desain Satisfaction Based on Fashion Style.

The data is also strengthened by the results of interviews with respondents who mostly stated that: "I feel that the design is in accordance with my style and the length of the shirt is suitable for the petite body." And "The colors are minimalist, exactly the same as my preferences so far." Both of these facts show that the personalization of the design from the integration of color and body size data and style preferences has achieved a design result that is comfortable for other users. Thus, the total conclusion through the validation process shows that the artificial intelligence system is able to produce a design that is well received in terms of technical and also user experience as the end recipient.

4.4. Discussion

Based on the results of the research that has been obtained, it can be seen that the combination of consumer body data, style preferences, and the use of Midjourney-based Artificial Intelligence technology is able to produce fashion designs that feel more personalized, both from a technical perspective and from a user's point of view. These findings suggest that data-driven design approaches are not only relevant, but also increasingly needed, especially as the fashion industry is faced with an increasingly complex diversity of

body shapes and consumer tastes (Wen Y., 2025). In this context, personalization is no longer understood as something exclusive, but rather as part of an effort towards more realistic and efficient mass customization.

Interestingly, the validation results showed a difference in emphasis between experts and consumers. Experts tend to focus on the feasibility of construction and the suitability of the design with the character of the body, since this aspect is directly related to the possibility of production. On the other hand, consumers judge design more by the fit of style and personal impression they feel. These differences are actually not contradictory, but complementary. This actually shows that a good fashion design process does need to bridge technical interests and user experience at the same time.

In this process, Midjourney acts as a fairly effective tool, especially at the visual exploration stage. This technology is able to speed up the process of finding ideas, present various design alternatives, and adjust the style based on the data entered. However, the results of this study also show that the visual output produced still has limitations, especially in the technical details of construction. Some designs require further adjustment before they can be realized into a garment that is ready to be produced. Overall, this study shows that the use of AI in fashion design is not intended to replace the role of designers, but rather as a support tool that helps the process of thinking, exploration, and decision-making. With the right approach, AI can be an important part of developing fashion designs that are more adaptive, relevant, and oriented to consumer needs. The use of Artificial Intelligence is indeed very significant in the fashion industry, starting from the design process, production to the quality control process, AI is able to play a positive and effective role (Kusuma, A.A., 2025b) (Sunandar A, 2025)].

5. Conclusions

Through this study, the most important thing that can be concluded is that the integration of body data, consumer style preferences, Artificial Intelligence technology based on Midjourney can result in more personalized fashion designs compared to conventional approaches. Key results from the study show that anthropometry-based ratio prompts and style parameters respectively result in technically-friendly design visuals, according to experts, in addition to consumer satisfaction levels and personalization perceptions. These findings are supported by the results of a technical evaluation showing that most seam designs meet the feasibility of construction and consumer evaluation, where satisfaction and personalization scores indicate a high category.

From the description above, it can be concluded that the research findings meet the purpose of the study, which is to test the effectiveness of generative AI on the personalization of fashion designs. The conclusion of this study states that AI technology can be the first solution to bridge consumer-based design with the concept of mass customization in the fashion industry. The AI framework generates integrated body data and style preferences so that designs can be automatically shaped and adjusted in different genders, body shapes, and style preferences. This research contributes to the study of fashion technology by enriching the AI Design Assistant approach which is expected to be a future design tool that includes all kinds of body data and style preferences. However, this study has a limitation that AI is not able to produce technical details of making clothes that are ready for production. The six resulting modes still include humans manually in defining garment patterns and structures. Therefore, subsequent studies are recommended to investigate the integration of generative AI with digital pattern making systems or 3D simulations to improve the technical accuracy and production readiness of data-driven designs.

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