The Interweaving of Piety and Fashion: Reinterpretation of Religious Symbols in Clothing Design

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Abstract: The production of Miao women's apparel is the focus of this study's investigation into the inventive applications of artificial intelligence (AI) and machine learning techniques. As a significant development in the sector, we provide an AI-powered strategy that smoothly combines cutting-edge technology with classic components. Customizing body forms, maximizing fabric selection, and creating advanced designs are the three main focuses of our study.We used AI-driven statistical techniques for accurate pattern recognition to adjust to the particular body traits of Miao women. Additionally, AI was utilized to evaluate fabric characteristics to balance comfort and aesthetics while choosing materials. To overcome this limitation, we propose Dynamic Random Frost (DRF) is used for analytical model.The Multimodal Uncontrolled Image-to-Image Translation (MUNIT) technology was used to create chic designs. We are increasing the uniqueness of ethnic clothing. The experimental findings of the proposed method are evaluated by precision (93%), accuracy (91%). This study focuses on the interaction between modern technology and traditional handicrafts, highlighting AI's role in the development of ethnic design that is environmentally conscious. We also stress the significance of Made-to-Measure (MTM) techniques, emphasizing the value of customization in contemporary clothes. This work is a ground-breaking investigation into how AI, pattern recognition, & ethnic fashion design relate to one another, which can potentially alter how the fashion industry functions in the future.
Keywords: AI, Ethnic Fashion Design, Miao Women's Apparel, Body Shape, Made-to-Measure (MTM) approaches, Dynamic Random Frost (DRF), Multimodal Uncontrolled Image-to-Image Translation (MUNIT)

1. INTRODUCTION

The fashion world has developed as a potent vehicle for self-expression, identity creation, and social commentary in a time of fast cultural globalization and the blending of conventional borders (Hassall & Amin, 2022). Far from being limited to aesthetics, fashion frequently goes beyond its surface-level components to express deeper societal, political, and spiritual facets. Integrating religious symbols into garment design, which creates a dynamic interaction between piety and fashion, is a fascinating juncture within this multidimensional world (Reiter, 2023). Fashion designers have always drawn inspiration from religion, a personal and

essential component of many people's lives. It is necessary to explore and comprehend the complicated and multidimensional phenomena of using religious symbols in garment design (Johnson & Koech, 2022). These emblems, whose cultural and spiritual significance dates back centuries, are finding a home in haute couture, street fashion, and everything in between. It is still being determined why this reinterpretation was made, what it means, and how it would affect the religious and fashion sectors in light of this juxtaposition of the sacred and the frivolous (Armitage, 2023). Our strategy culminates using cutting-edge AI methods, such as machine learning and image processing, to interpret the gathered data. In the end, crucial information is extracted. Insights that guide sensible fabric selections, individualized fit evaluations, and ground-breaking design techniques. Figure 1 depicts the AI structure and we focus on acquiring information on body measurements, fabric details, and design sensibility relevant to the target ethnic population.

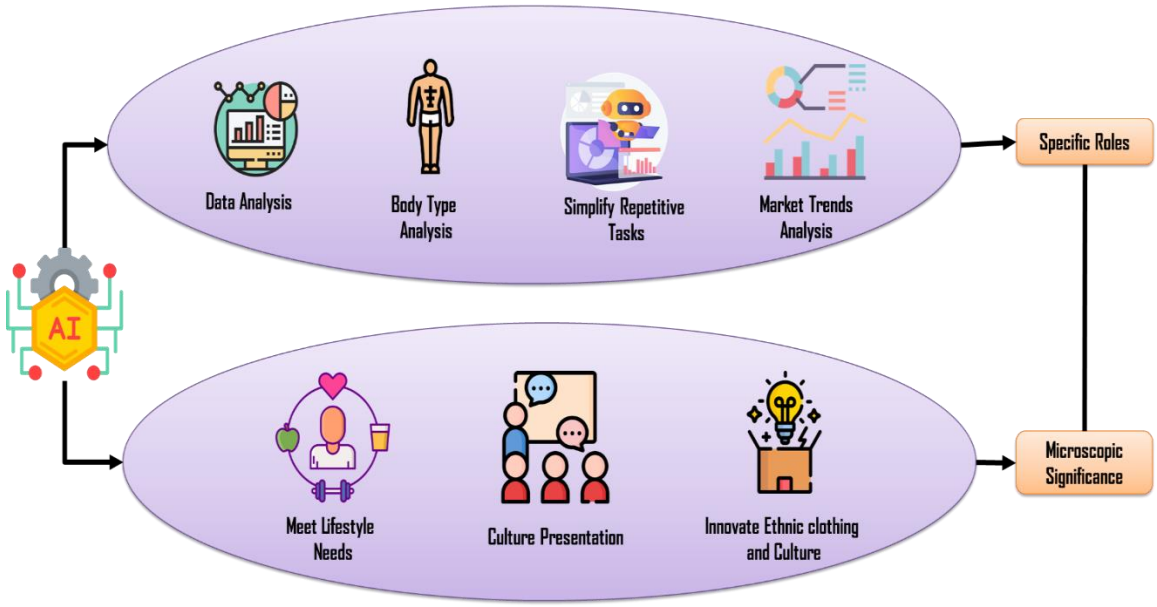

Figure 1: Overview of AI in clothing design

This phenomenon of coexisting piety and fashion deserves investigation for several reasons. It captures the morphing dynamics of today's society, where tradition and modernity frequently converge and clash (Farhang & Hashemi, 2023). It also emphasizes how spirituality and religious expression are constantly changing as people try to stay connected to their faith amid a world that is undergoing fast change. Additionally, it emphasizes the potency of fashion as a form of expression, challenging our preconceptions and broadening comprehension of religious symbols beyond their usual surroundings (Batmang, 2023; Becerik-Gerber et al., 2022; Hasan, 2023; Leventhal, 2023). The numerous facets of this

phenomenon as we examine the interaction between piety and fashion. The reasons behind designers who include religious imagery in their collections and the reactions of various religious groups to these reinterpretations. We will also consider the potential disputes, moral problems, and cultural effects of fashion incorporating religious motifs.To examine how these fashion statements fit into a larger conversation about diversity, identity, and religion (Becker et al., 2023).

1.1 Objective of this study

It is crucial to approach the topic with an open mind and a critical eye as we set out on this trip to uncover the complex relationship between holiness and fashion. By doing this, we can learn important lessons about how religion and fashion interact in the modern world, illuminating the intricate and dynamic nature of spirituality and human expression. This investigation will help us understand the significant influence of clothing design on how we perceive religion, culture, and personal identity. It's crucial to recognize the limits of this study, though. First, it might be challenging to generalize findings since the interpretation and significance of religious symbols in clothing can change among cultures and belief systems. Second, keeping the study current and relevant can be challenging due to the fast-changing nature of fashion trends and the sensitivity surrounding religious symbols.

The structure of this essay is as follows. We present a theoretical framework in Section 3. The following full case study on AI-driven MTM ethnic garment design technique is presented in Section 4, 5. In Section 6,7, the design process is reflected upon and discussed. Section 8illustrate the discussion. Section 9 concludes the paper.

2. RELATED WORKS

The paper explored (Becerik-Gerber et al., 2022) the complex interplay between piety, fashion, and celebration within a modest Istanbul fashion shopping center. The study examined how religious symbols are incorporated into contemporary style, emphasizing their importance in producing a distinctive sartorial experience. By investigating this setting, the research clarifies the developing nature of modest fashion and its societal ramifications.

The study (Neal, 2019) investigated the complex connection between Christianity and fashion in the American setting. The book explored how

piety and style had been knitted together through religious symbols, ideals, and aesthetics in clothing design. And how these relationships had changed, influencing how people express and perceive their faith in today's commercial society and how they dressed. The study examined the dynamic relationship between religion and fashion, revealing the cultural importance of religious symbols in the context of clothing.

The study (Makiah et al., 2022) examined how halal certification intersects with the commercialization of religion and the expression of piety. The study looked at commercializing religious rites and symbols while preserving a sense of righteousness. The authors examinedthe issue through the lens of halal certification, illuminating the complex interplay between materialism and religious piety. The paper explored the complicated relationship between market dynamics and religious identity, providing insights into the complexity of modern spiritual practices influenced by consumer culture.

The article (Kodžoman, 2019) explored the complex connection between psychology and clothing. It examined the meaning of colors and how they affect perception and emotional responses. The research also investigatedthe relationship between clothing preferences, body image, and self-perception, offering light on how people's ideas of themselves are influenced by fashion. It also looked at how clothing was used to express gender identity. The study provided insights into the complex interactions of clothes, psychology, and self-expression in fashion through a thorough analysis.

The paper (Barron, 2020) focused on fashion designer Julien Fournié'smetaverse research. The investigation focuses on Fournié's avant-garde approach to haute couture, notably in virtual spaces. Through a brief analysis, the study demonstrated how Fournié's work reflected a change in the fashion industry by fusing traditional craftsmanship with digital innovation. It looked at the effects of this confluence while highlighting how technology and online platforms are expanding in their significance for the direction of haute couture. The paper helped for the readers comprehend the complex interplay between culture, technology, and fashion.

The researcher (Mathews, 2022) provided in-depth investigation of how theological and cultural dynamics are reflected in early Christian art. The updated edition explored how artistic expressions and changing religious ideas interact, highlighting the subtleties of iconography, symbolism, and contextual effects. Mathews reexamines the visual language of the period, demonstrating how creative works participated in both broader socio-

religious discussions and theological narratives. The deep connections between faith, art, and society during the early years of Christianity are explored in detail in the updated edition. Princeton University Press is the publisher.

The article (Gereluk & Haggarty, 2023) examined examples of religious dress codes in educational contexts for Canada, France, Kenya, and Turkey. The research examined the complex relationship between religious expression and academic settings and showedthe instances where dress norms and religious identity collide. The authors examined current cases to highlight the complex difficulties of accommodating religious dress while managing cultural diversity in educational situations, focusing on the delicate balance between religious freedom and more general societal ideals. The Bloomsbury Handbook of Schools and Religion contains this chapter, which provided the insights into the complex interactions between religion, education, and secularism.

In the research (Shroff, 2021) covered in "Decolonising Gender in South Asia," the author explored the intricate connection between femininity, fashion, and financial independence. Through a critical lens, the research investigates how these factors affect women's pursuit of autonomy within society's norms and expectations. The study shown how women negotiate the conflict between religious ideals and modernity in their goal for economic independence by examining the dynamics of "pious capital." The study added to our understanding of how women negotiate their agency and identities within the setting of South Asian gender dynamics.

The study (Hickey-Moody, 2022) explored how religious communities, aesthetics, and thought are intertwined in the article published in Subjectivity. The study looked at immanence and how it affects religious societies' experiences. The research explores how aesthetic components aid in comprehending and expressing spiritual practices through analyzing figures. This research on immanence and aesthetics illuminated the complex dynamics within religious groups and provided insights into how figures and symbols contribute to forming Subjectivity.

The study (Peta, 2021) examined how the Shembe church's traditional religious settings has changed via an Afrocentric viewpoint emphasizing the female body. The project, which was conducted at the University of Johannesburg, examines how the Shembe church reimagines the place of women in their religious landscape while reflecting Afrocentric ideas of the female body. Insights into the changing character of spiritual activities and the reinterpretation of traditional settings within the context of the Shembe church in South Africa are provided by this inquiry, which included light

on the dynamic interaction between religion, gender, and culture.

The research (Ushie) investigated how locally made Ankara fabrics have become prominent in modern Nigerian fashion, representing a fusion of traditional heritage and contemporary style. The study explored the anthropological importance of Ankara fabrics and its historical and cultural foundations. It looked into the adoption and the adaptation of various materials within the changing Nigerian fashion scene. The study explained how Ankara fabrics has evolved beyond their traditional purpose to play a pivotal role in defining Nigerian fashion. The study emphasized blending regional artistry and international trends and developing a unique fashion culture.

The study (Khadavi, 2023) strengthen the religious culture within the school community. The study used a qualitative methodology, including surveys and interviews with parents, teachers, and students. The findings showed that religious education has a good effect on building a better grasp of cultural values and customs, resulting in a more peaceful learning environment. Limitations, however, include the need for additional long-term research and the possibility of participant response bias. Although acknowledging certain methodological limitations, this study sheds light on religious instruction's importance in fostering a strong school community.

The paper (Kaur & Agrawal, 2019) examined how the saree has influenced fashion globally across cultural borders. The researchers used a qualitative methodology to examine historical evolution, design advances, and cross-cultural adaptability. The findings demonstrated the saree's continuing influence and developing modernizations in fashion. The study's prospective concentration on one cultural garment may only adequately represent part of the range of global fashion influences.

3. THEORETICAL STRUCTURE

3.1 Exposition of AI in clothing design

AI is revolutionizing the fashion design industry in many ways (Liu et al., 2023; Qi & Aliverti, 2019; Tian et al., 2023). Applications include size customization, creative generation, intelligent design assistants, and fashion style analysis, bringing efficiency and innovation to the field of clothing design (Bhagyalakshmi et al., 2023; Cui et al., 2018; Tao & Guo, 2022). Notably, our research explores the transformative function of AI in improving the suggestion process and producing individualized imagery for ethnic fashion within the realm of intelligent design assistants. Our AI-

powered design assistants have sped up the development of ground-breaking solutions that go beyond typical item suggestions by utilizing cutting-edge picture representation and training methodologies. This specialized attention to the particular requirements of ethnic apparel design highlights the possibilities of intelligent design support.In fashion style analysis, the study (Qi et al., 2021; Su et al., 2022; Wang et al., 2022) took on the challenging issue of interpreting apparel fashion styles. They developed the ground-breaking Bimodal Correlative Deep Autoencoder (BCDA) model and a Fashion Semantic Space (FSS) based on Kobayashi's aesthetics theory to fully represent the complex interplay between visual characteristics and fashion trends.

3.2 Uses of "Made-to-Measure" (MTM)

A production method called made-to-measure (MTM) allows products to be made specifically to the preferences and requirements of each consumer. This approach transforms numerous industries by skillfully fusing conventional craftsmanship with cutting-edge technology. MTM offers an advanced strategy in the field of ethnic apparel design that takes into account various cultural and individual fashion preferences.MTM is flexible enough to work in multiple industries, including the automotive, technological, furniture, and fashion. MTM allows clients to design cars according to their preferences in the automobile sector. They can create a unique driving experience by selecting interior components such as trims, color schemes, and upholstery materials. This degree of customization increases user engagement and pleasure.MTM is essential to creating gadgets like computers and cell phones in the technology industry. Customers can customize features like storage capacity, display size, and others to develop tech goods that suit their requirements. As a result, technology solutions are expertly crafted, maximizing usability and functionality and, ultimately, enhancing the user experience.MTM makes it possible to create custom sofas, chairs, and beds in the furniture sector. Customers can customize furniture's dimensions, materials, coatings, and other specifics to suit their tastes and available space. This extensive personalization improves the aesthetic appeal of living areas by combining design and practicality.MTM transforms the production of specialized clothing items like suits, dresses, shirts, and trousers within the fashion and apparel sector. To create clothing, that is precisely what the customer wants, designers use their specific measurements and their choice of fabrics, styles, and features. MTM in fashion results in an individualized wardrobe experience by increasing subscriber happiness and offering

improved fits compared to off-the-rack alternatives.MTM is an innovative production technique that prioritizes the customer's uniqueness while providing specialized solutions in various industries. This strategy effortlessly combines current technology with traditional craftsmanship, improving user experiences by supplying goods tailored to particular preferences and requirements. Figure 2 depict the MTM.

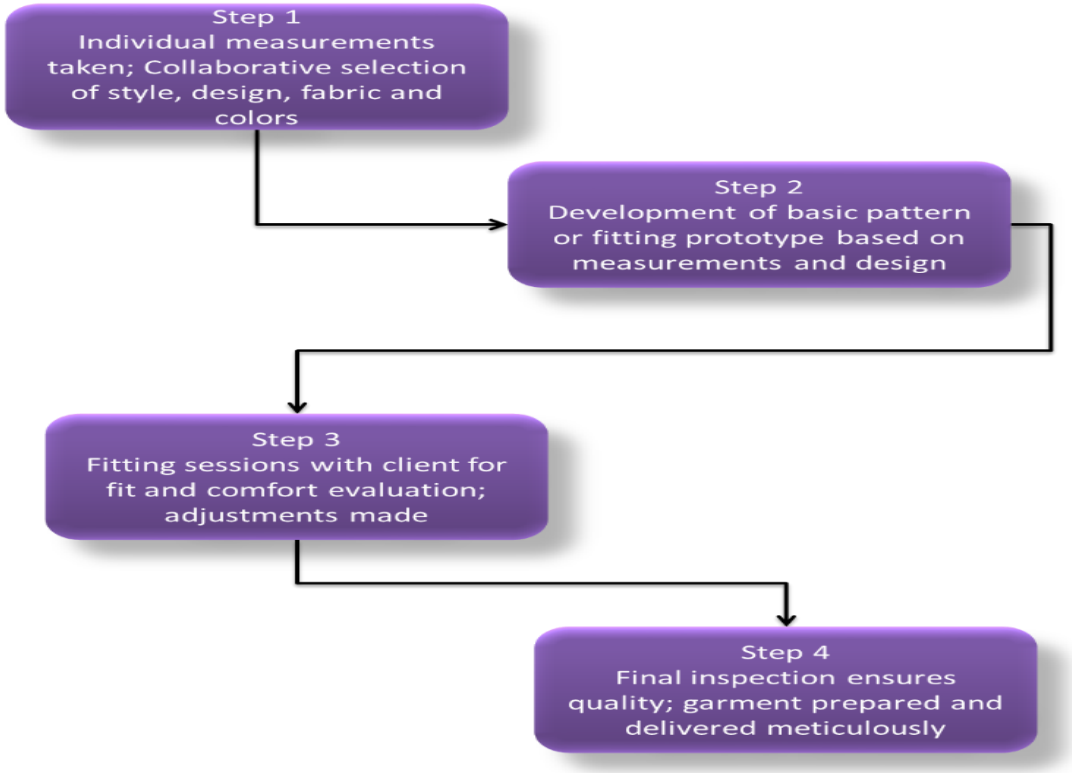

Figure 2: Visual of MTM ethic clothing

3.3 Using AI and MTM to design ethnic apparel

Custom apparel has undergone a radical metamorphosis due to the combination of AI and Made-to-Measure (MTM) methods. This synergy has dramatically improved client interactions and customized solutions in the fashion business. AI-driven developments have changed the game with accurate size recommendations, individualized style advice, and virtual try-on experiences.Customized style recommendations are an impressive area of AI use in MTM. AI systems examine clients' tastes, fashion choices, and historical data to provide suggestions for tailored clothes. AI, for instance, can research past purchases, browsing patterns, and customer feedback to suggest apparel trends that appeal to specific interests.

Additionally, AI speeds up the development of design blueprints and digital models for sample clothing when used with computer-aided design (CAD) technology, reducing production time and costs. Before beginning

physical production, designers can digitally adjust methods, picture the finished product, and create virtual prototypes.Despite the lack of specific studies in ethnic apparel design, incorporating AI into MTM in this area has enormous potential. By using its skills to assess vast collections of ethnic clothing patterns and styles, AI can provide customized designs that respect cultural heritage and personal tastes.By customizing apparel to each person's specific wants and preferences, the fashion industry is better able to deliver a superior and immersive client experience. Beyond its immediate uses, AI can be crucial in safeguarding cultural assets. The possibility of erasing cultural memory and conventional artistry looms as we enter the digital age. AI can assist in digitizing and preserving traditional motifs, patterns, and indigenous crafting methods to ensure future generations can access and adapt them. As a result, incorporating AI into ethnic fashion design goes beyond just being relevant and is essential for preserving our cultural history for future generations.

4. AI-DRIVEN MTM IN THE CREATION OF ETHNIC GARMENTS

4.1 Body analysis using AI for an individualized fit

With a focus on Miao women, we used AI-driven body analysis to create customized ethnic apparel designs. We classified their multidimensional body measures using K-means clustering to ensure customized fitting equation (1).

$$C = argmin \sum_{i=1}^{k} \sum_{M \epsilon C_i} |M = \mu_i|^2 \quad (1)$$

When C_i is the $i - th$ cluster, i is its centroid, C is the clusters, k is the number of $groups, and\ M$ stands for measurements.

We use image processing techniques to extract fine details of Miao women's physical traits to improve our comprehension of their distinctive physical characteristics. The Canny edge detection algorithm is used to help us outline the silhouettes in binary image I, equation (2). To detect the edges, the canny algorithm employs a Gaussian filter and gradient calculations, which can be summed up as follows:

$$E = Canny(I) \quad (2)$$

4.2 AI-aided fabric choice, section

In modern ethnic clothing design, fabric choice is crucial in evoking the spirit of tradition. Our research uses AI to extract fabric properties like texture, color, and pattern and forecast how well they will work with

particular designs.

Utilizing CNN's convolutional layer, feature maps are extracted from fabric photos. The convolution procedure can be represented as follows given an image I:

$$f_{ij} = \sum_m \sum_n I_{(i-m)(j-m)} \times K_{mn} \quad (3)$$

$I_{(i-m)(j-m)}$is the image, K_{mn} is the kernel, and $f_{ij}$is the feature map. An MLP model is then fed the derived feature maps $f_{ij}$to forecast the fabric's compatibility score S in a design. As an example, consider how the MLP operation is represented, equation (3):

$$S = \sigma(W \cdot F + b) \quad (4)$$

Where F is the input feature map, W is the weight matrix, is the activation function, and b is the bias, equation (4). By incorporating AI, we can offer knowledgeable fabric selection guidance that not only improves the aesthetic appeal of a design but also fits with its traditional components, protecting the design's cultural integrity.

4.3 AI-driven creative design

The unique design of Miao ethnic apparel is greatly influenced by AI, combining traditional aspects with contemporary aesthetics. Our design methodology uses dynamic random frost (DRF) and Natural Language Processing (NLP) as primary tools.A DRF is used to create original patterns and design components. A creator D produces a new data instance x_{new} from a noise vector z in the following mathematical form, equation (5):

$$x_{new} = D(z) \quad (5)$$

An identifier I, whose objective is to maximize its capacity to recognize actual samples from created ones, compares these novel patterns to current ethnic designs. The following is a representation of this:

$$\max_I V(I) = \varepsilon_{x\sim Pdata}[\log I(x)] + \varepsilon_{z\sim Pz(z)}\left[\log\left(1 - I\left(D(z)\right)\right)\right] \quad (6)$$

Wherex~Pdata represents Real $data\ samples$,noise samples are characterized by$z\sim Pz(z)$ and the value function that should be maximized is denoted by $V(I)$, equation (6).

On the other hand, NLP algorithms analyze text-based design briefs, interpreting and converting them into design attributes to direct the developing process. Using AI, we broaden the creative range and combine innovation with tradition. This method makes it possible to produce designs that are not only distinctive and marketable but also culturally appropriate—resonance, reinforcing AI's crucial role in creating ethnic

clothes.

5. AI-DRIVEN MTM ETHNIC CLOTHES DESIGN PRACTICE CASE STUDY

5.1 Miao women in Biasha have the following body types

5.1.1 Data gathering and preparation

The survey collected data on body shape from adult females in the Biasha Miao group between 18 and 45. A total of 132 samples, or 20.3% of the adult female population of the village, were gathered. Manual methods, including height-weight scales, rulers, protractors, and nylon ropes, were used to take precise and consistent measurements. These measures followed the GB/T16160-2008 "Body Measurement for Clothing Construction" standard, which considers 25 distinct body dimensions.

5.1.2 Examination of body frequency

The height distribution of adult women of the Biasha Miao ethnic group in Southeast Guizhou Province was mainly expected, according to a frequency analysis, with 94 people, or 72.86% of the sample, falling most frequently within the range of 147.00 to 155.00 cm. With a minimum height of 139.00 cm, the average size was 150.07 cm. The Standard Sizing Systems for Garments Women (GB/T1335.2-2008) sets forth norms for size, and this average height was about 10.00 cm less than those guidelines.After additional data analysis, the height distribution's skewness value was determined to be -0.290, indicating a right-skewed distribution with a slight left tail. Additionally, the distribution curve's kurtosis was found to be -0.230, suggesting that it is less than the conventional normal distribution. Table 1 showsthe traditional ethnic clothes, it is crucial to consider the women's distinctive height characteristics. This factor guarantees that the designer clothing produces the desired visual appearance, lengthening the wearer.

Table 1: Outcome of body frequency

N	Mean	Standard Deviation	Variance	Skewness	Kurtosis
129	150.07	4.72	22.23	-0.29 0.21	-0.23 0.42

5.1.3 Bust value comparison using differences

The results of this study's measurements and statistical analysis (shown in figure 3) show that adult women exhibit larger values in bust height and

underbust circumference than those of the standard body despite having an average size typically lower than that of the normal body. A considerable majority of women, especially married and childbearing persons who do not frequently wear bras, engage in home tasks and lead a more relaxed lifestyle, according to research done through surveys and encounters with the local population. Breast sagging appears to be significantly influenced by this lifestyle decision.

Additionally, the initial more excellent bust girth values cause the bust's highest point to move and the bust height to expand, with the bulk of values between 25 and 29 cm. Additionally, underbust girth values increase and surpass those of the national standard body due to the participants' comparatively larger body weight and overweight figures. To shape women's bust curves to match current aesthetic preferences, particular consideration should be given while developing made-to-measure (MTM) ethnic clothes.

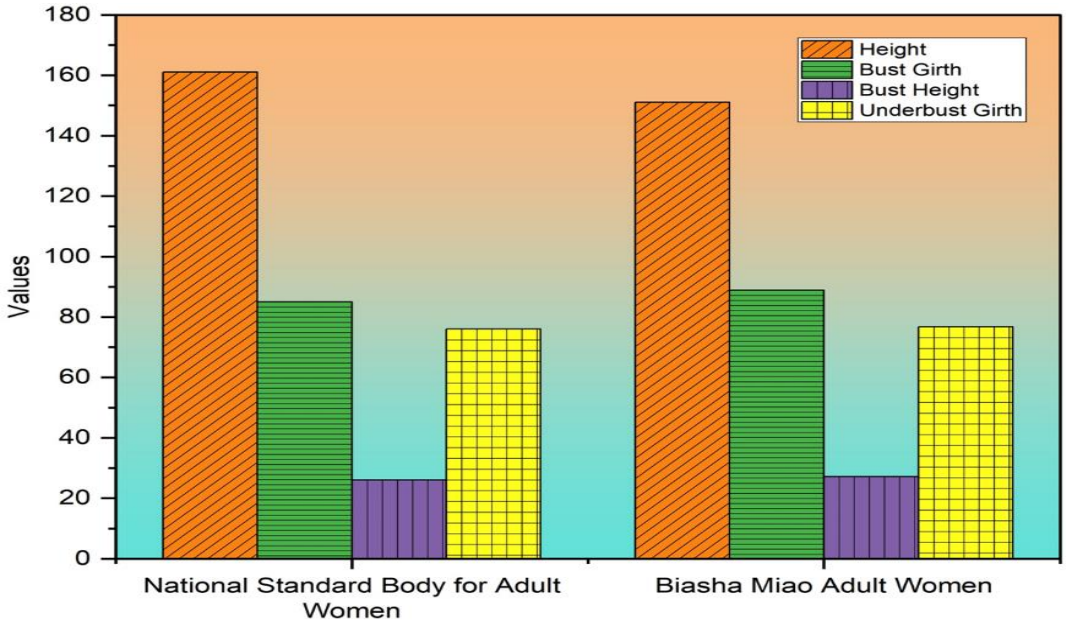

Figure 3: Mean variations in adult Biasha Miao women in Guizhou Province for the principal body measurements (in cm).

5.1.4 Analyzing the mean values for comparison measurement points

Key body dimensions of adult females were compared with national standard body measurements (figure 4), which revealed considerable differences. Significant differences from the national average can be seen in several variables among women. Notably, their average height is noticeably smaller, with a noticeable reduction in shoulder breadth of about 0.66 cm.

Contrarily, measures of the bust, waist, and hip circumferences show

startling differences, with all three values above national averages. The waist circumference varies between 5.00 and 7.00 cm, whereas the hip girth varies by about 3.00 cm. According to these results, adult female BiashaMiaos have bigger average body sizes and a tendency toward curvier body shapes than the national average. This variation in body measurements emphasizes how particular their anthropometric traits are in a broader demographic context.

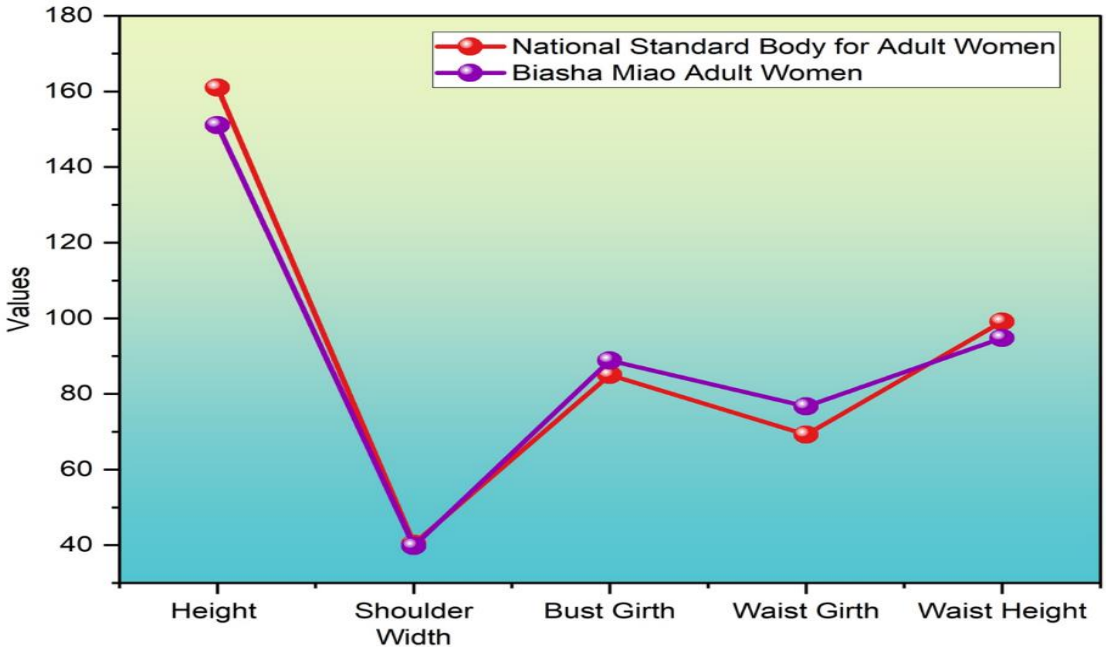

Figure 4: Comparison of the reference measurement points between the Biasha Miao adult women of Guizhou Province and the national standard body form for adult women (measured in cm)

6. DISTRIBUTION AND CLASSIFICATION OF BODY SHAPES

6.1 Analysis of the prevalence of various forms of body obesity based on the bust-to-height ratio

Adult women of the ethnic group don't differ much in height, according to preliminary data analysis. We examined the distribution of body fat types based on the ratio of bust circumference to size, as shown in figure 5, to identify variations in body fat distribution among people with comparable heights.

It becomes clear that most adult women fall into categories that indicate body fat levels that are moderate, slightly overweight, or obese. However, a significant 18.6% of the population in the survey has bust-to-height ratios that fall outside of these classification categories. A closer look at the raw data shows that these outliers have a distinct body type with shorter stature

and broader busts.

The adult women of the Biasha Miao ethnic group exhibit a vast variation of body shapes, underscoring the significance of considering height when researching their physical traits.

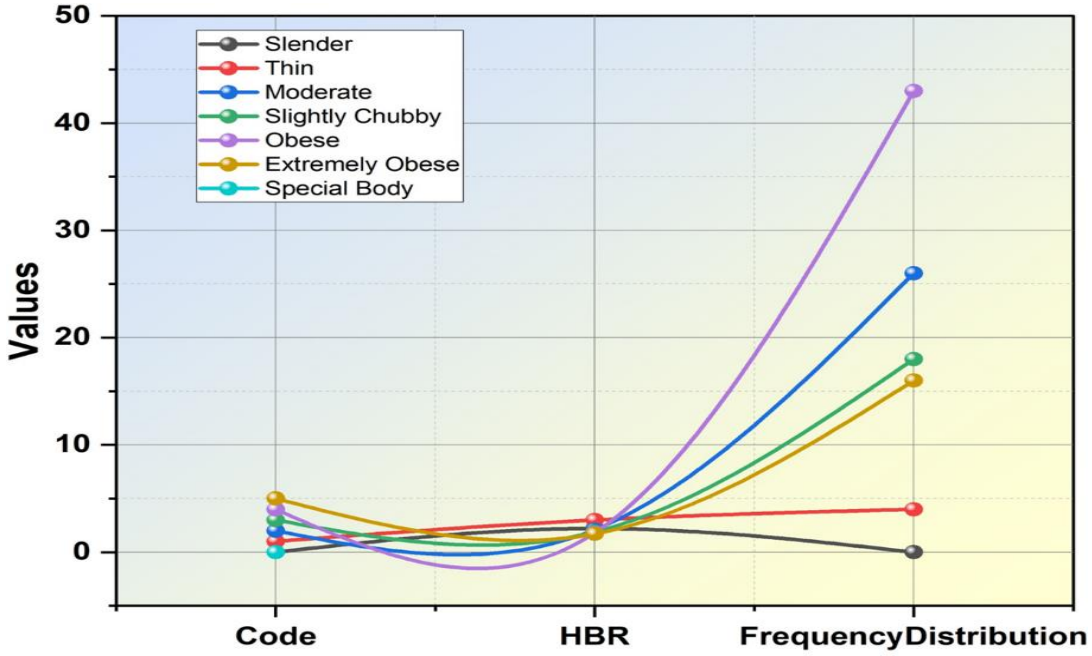

Figure 5: Frequency value of distribution of body fat classes based on bust-to-height ratios.

6.2 Patterns of body form variation

A comprehensive classification of body shapes is necessary to develop an inclusive size system for adult female Biasha Miao members. This base has been built by identifying important reference measurement spots.

Our strategy takes cues from the Standard Sizing Systems for Garments for Women while taking into account the distinct bodily traits of the Biasha Miao population and current production techniques. The dimensions we've identified as references are shoulder width, neck girth, breast girth, bust height, waist circumference, abdominal girdle, hip girdle, arm length, and leg length.

These measurements provide a representative average for each reference point, considering the variety of body types in the community. (Table 2 and 3) As a result of the extensive range of body types, our analysis indicates significant differences in reference measurements. However, the intermediate values for the four fundamental body types show less variance, indicating more stable patterns in body shape variation. Table 6 provides an accessible summary of these results.

Table 2: Intermediate values of MA and MB

Body Type	**MA**		**MB**	
Classification	RV	Intermediate Value	RV	Intermediate Value
SW	36-41	39	36-42	39
NG	29-34	32	29-37	32
BG	74-95	87	71-101	88
BH	22-29	26	22-34	26
WG	60-87	75	63-93	76
AL	46-54	49	43-54	49
AG	61-95	82	64-100	83
HG	80-97	92	82-106	93
LL	58-68	63	60-71	64

Table 3: Intermediate values of MC and MD

Body Type	**MC**		**MD**	
Classification	RV	Intermediate Value	RV	Intermediate Value
SW	37-40	39	34-42	39
NG	31-35	32	30-35	32
BG	77-95	87	80-103	88
BH	23-28	26	25-29	29
WG	60-82	75	70-97	76
AL	44-54	49	45-51	49
AG	70-93	83	76-105	83
HG	86-100	93	87-107	93
LL	59-66	63	56-68	63

7. AI-MTM DESIGN PROCEDURE

7.1 Fabric selection and modifications

A handwoven textile defined by its glossy finish and sturdy texture has long been the customary fabric of choice in creating Biasha Miao clothes. Despite having a sleek and sturdy appearance, this fabric has some flaws, including a propensity to wrinkle easily and color fading when exposed to dampness.

The appropriate use of artificial intelligence technology shows promise for overcoming these constraints.

AI can proactively suggest substitute materials by being trained to recognize and comprehend these flaws.In our particular case study, we used spacer fabric, also known as "spacer cotton," as the main component of our apparel design (as shown in Figure 6).

This option is chosen for its exceptional flexibility, vivid visual saturation, and perfect balance of glossiness and softness, which dramatically improves overall comfort in the garment. While embracing

modernity in our fabric selection, we pay tribute to tradition by using traditional Miao cloth for chest adornment.

This enables us to create patterns that harmoniously integrate tradition and innovation.Future developments in AI might make it possible to forecast the best textiles based on body measurements and Environment, transforming the fabric choices used in ethnic clothing designs.

7.2 Creativity design practice

A powerful unsupervised generative model for apparel design is MUNIT. It generates numerous distinct image translations by combining style and content-encoding. The translated image I is produced using an input L from domain X and a random style code from environment Y, equation (7).

$$I = D_{X \to Y}(L, z_y) \qquad (7)$$

Where is$D_{X \to Y}$ the Developer and z_y is a randomly selected style taken from a distribution of style codes in domain y.

Using input photographs of typical Miao women's attire, we apply several style codes (z_y) that symbolize various artistic movements, patterns, and colors to create original designs (I). With this strategy, the cultural essence of the Miao people is preserved while obtaining a modern appearance. By incorporating cutting-edge AI algorithms, we improve creative originality and help ethnic apparel design transition to the digital age.

7.3 AI algorithm selection and implementation

Two primary types of algorithms were taken into consideration in our AI-driven MTM design process: CNN (Ma et al., 2017) for body shape analysis and DRF for creative design development.This algorithm comparison of accuracy and precision metric are utilized.

Accuracy is how well a measurement or estimate reflects the genuine or actual value. Accuracy may be vital when developing designs to judge how closely the resulting designs adhere to your intended objectives or requirements.

Figure 6 depict the accuracy value. A DFR, in comparison to CNN, has better values of accuracy. It was chosen because of its capacity to produce creative and realistic designs, both essential for creating unique ideas (Liu et al., 2019).

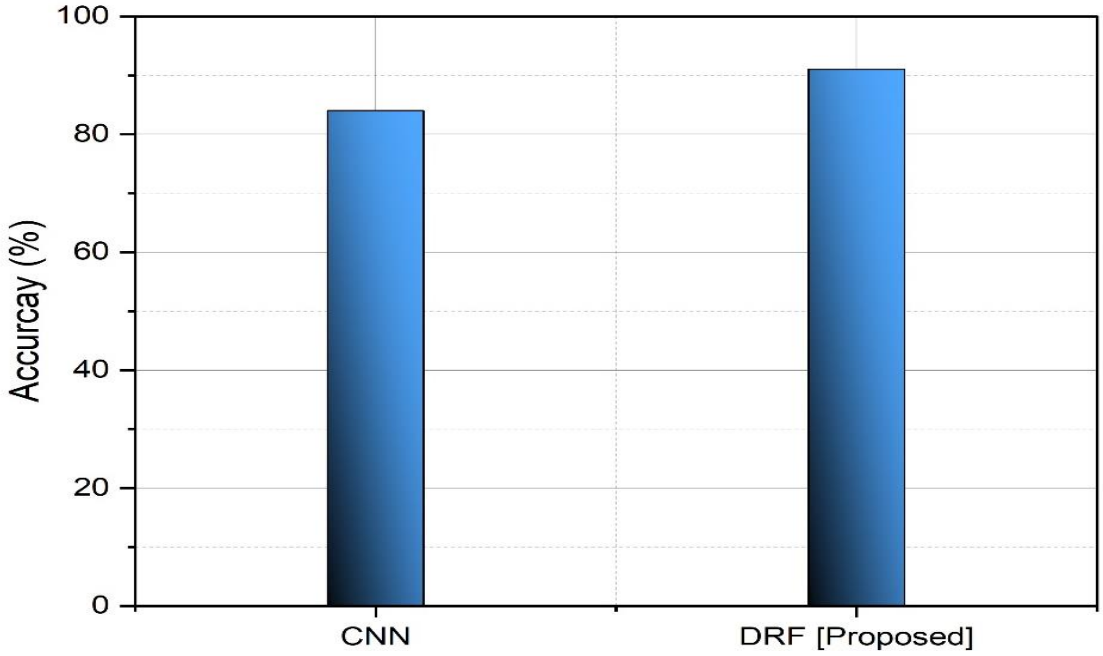

Figure 6: outcome of accuracy

The degree of consistency or repeatability in measurements is referred as precision. It concerns how closely different sizes of the same thing agree. Figure 7 depict the precision values. Accuracy in design generation may refer to a tool's capacity to produce comparable designs under the same input or circumstances reliably.

Because of its ability to create imaginative and realistic scenarios necessary for generating original ideas, a DFR was chosen compared to CNN because it offers greater precision values.

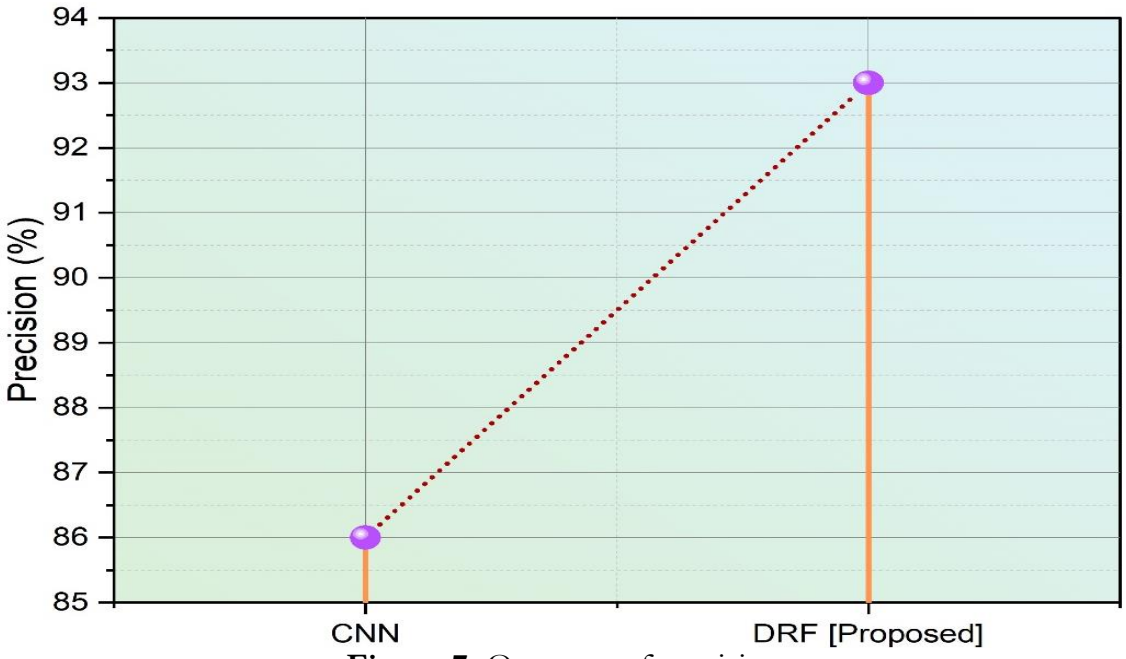

Figure 7: Outcome of precision

8. DISCUSSION AND REFLECTION ON THE CREATION PROCESS

8.1 Development of a "Life + Aesthetics" design philosophy

Zedong Mao, the founder of the People's Republic of China, emphasized the need to use daily life as inspiration for creating ethnic clothing. In Southeast Guizhou, traditional Miao ethnic dress originally served practical functions since evolved with social and technical advancements. Miao costume design must balance tradition and current aesthetics to reflect contemporary religion. By fusing "life + aesthetics" and modern trends, the incorporation of AI offers a novel strategy for rejuvenating Miao ethnic fashion. This development, which has its roots in everyday life, is crucial to the present development of Miao ethnic costume design.

8.2 Highlighting the significance of physical traits in ethnic apparel design

Previous studies on Miao ethnic clothing have mainly concentrated on its shapes, patterns, and colors, focusing little on the Miao people's physical characteristics. This omission is significant since clothing design depends on the correct fit for aesthetics and utility. Miao women in the Biasha region of Southeast Guizhou Province display distinctive physique traits, such as shorter stature with bigger busts, wider waists, and rounder hips compared to the national standard, notwithstanding minor modifications brought on by economic development. Because traditional styles might not fit them, AI is a crucial tool for creating apparel specifically for Miao, providing comfort and style while honoring their particular physique through machine learning and data analysis.

8.3 Prospects for AI in clothes design in the future

Ethnic costume and apparel design has a lot of potential due to the ongoing advancements in AI technology. An innovative AI technology called Dynamic Random Frost (DRF) is influential in creating ethnic apparel designs. By teaching DRF to comprehend and incorporate the distinctive designs, patterns, and colors of ethnic clothing, it may conceive brand-new, culturally-informed costume concepts, acting as a priceless source of creative inspiration. AI can also choose materials, streamline production, and guarantee garment quality, improving the effectiveness and caliber of clothes design and production. A wide range of options for innovation and creativity are opened up by the use of AI in designing ethnic

costumes and clothes.It provides designers with essential tools for artistic expression, cultural understanding, and design skills, ultimately fostering innovation and originality in ethnic clothing. A future filled with numerous individualized and culturally significant ethnic apparel items is promised by embracing AI.

8.4 AI's ethical implications for designing ethnic apparel

When AI algorithms create designs from datasets without cultural knowledge, there is a risk that they would reflect ethnic themes, patterns, or symbols superficially or erroneously, weakening the rich Miao legacy. Our study prioritized continued engagement with Miao artisans and cultural authorities to alleviate this worry and ensure that AI algorithms were taught correctly with respect for and knowledge of the Miao religion. A legitimate concern is that artificial intelligence will supplant traditional craftsmanship, a key component of ethnic dress. Our strategyaims to enhance rather than replace these time-honored methods. AI-driven designs seek to preserve the inherent worth of handcrafted ethnic clothing for future generations by improving tradition with modern insights.

9. CONCLUSION

The incorporation of AI technology into Miao women's clothing design signifies a paradigm leap toward sophisticated and unique fashion production. This study provided a comprehensive strategy that uses algorithms for body shape adaptation, material choice, and creative design. The study achieved precise and comfortable fits customized to the particular body characteristics of Miao women by integrating AI with made-to-measure (MTM) procedures. The process was streamlined by AI-driven fabric selection, which examines fabric characteristics to suggest the best fabrics for comfort and aesthetics.Notably, using the MUNIT algorithm redefines design possibilities, producing various unique and current fashions. This demonstrated how AI help ethnic clothes to become more distinctive and contemporary. The study also highlighted the need to combine traditional craft components with modern materials to maintain cultural heritage while enhancing comfort and aesthetic appeal. This thoughtful approach highlighted AI's ability to support sustainable growth in creating ethnic costumes.These findings promise to transform the fashion industry's landscape and open up exciting possibilities for future study at the interface between fashion design and artificial intelligence.

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