

Research Article

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Fashion Fusion: AI-Based Clothing Pattern Creator

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Abstract

The clothing industry demands unending novelty in attire designs to meet developing client advantages. However, established forms of founding attire patterns are labor-exhaustive, high-priced and frequently impassable to tiny designers and arising fashion brands. Fashion Fusion presents an AI-compelled answer that automates the production of singular and superior attire patterns, leveraging the capacity of deep education and fruitful models. By streamlining the design process, this method allows designers to speedily original creative patterns, lowering two together opportunity and cost. The manifesto democratizes approach to progressive design finishes, enabling consumers to forge embodied designs outside the need for thorough mechanics knowledge. With this resolution, the impediments to fashion artistry are considerably reduced, promoting a more all-embracing and vital design environment.

Keywords: AI-located high fashion, Attire pattern production, Deep education, Fruitful models, Mechanization stylish, Embodied attire patterns, Approachable design forms, Accelerated prototyping

Introduction

In the existing fashion countryside, the demand for embodied, singular attire designs has rushed, giving two together inspiring time and notable challenges for designers, fashion devotees and manufacturers alike. With an increasing importance on personality and inclusivity, forging ritual attire patterns that pamper various crowd types, styles and desires maybe a complex, late process. Designers frequently face the scaring task of weigh artistry accompanying common sense, all while guiding along route, often over water the mechanics shadings of pattern-making, that can bring about incompetence and disadvantages in the design system [1-3].

To address these challenges, skilled is a growing need for creative finishes that can improve the design process, permissive pros and hobbyists alike to art different, first- rate patterns without difficulty. Recent progresses in Artificial Intelligence (AI) have concreted the habit for new answers in the clothing industry, contribution effective electronics that can organize and transform the habit attire patterns are designed. Among these sciences, machine intelligence, calculating apparition and fruitful design algorithms are arising as key enablers, allowance to solve a realm of design potential that were earlier troublesome to gain [4-6].

This paper presents Fashion Fusion, an AI-stimulate terrace that redefines the pattern-making process by automating and embellishing the invention of practice attire patterns. Fashion Fusion is devised to enable consumers accompanying a smooth, instinctive connect, admitting ruling class to survey a broad array of design alternatives tailor-made to particular party calculations, material types and style weaknesses. By leveraging machine intelligence algorithms, Fashion

Fusion can swiftly produce embodied patterns, lowering moment of truth and exertion as a rule necessary while claiming the artistic independence that designers appreciate [7,8].

At the gist of Fashion Fusion is allure strength to accommodate and progress accompanying consumer recommendation, contribution creative hints and cleansing patterns established consumer advantages and response. This active approach admits Fashion Fusion to support two together newcomer and knowing designers, guaranteeing approachability while aggressive the bounds of artistry [9,6]. Furthermore, the program's use of AI-compelled intuitions, in the way that foreseeing texture practice and optimizing fit, embellishes the overall characteristic of the designs, making it a valuable form for fashion specialists revere institute in a free competition.

The potential uses of Fashion Fusion span across differing subdivisions, containing indicated high fashion, textile products accumulations and even fashion concoction for amusement businesses. Whether consumers are thinking out dress for private use or professional result, Fashion Fusion determines a strong resolution that bridges the breach betwixt usual skill and up-to-date electronics, eventually promoting a more effective, imaginative and all-embracing design process.

In this paper, we will survey the mechanics foundations that capacity Fashion Fusion, containing the machine intelligence algorithms and fruitful design methods that drive allure pattern-making proficiencies. We will more focal point legitimate-realm case studies and consumer happenings that explain the terrace's affect the clothing industry. Our research underlines the life-changing potential

of AI in high fashion, reveal by means of what Fashion Fusion can authorize designers to push the edges of artistry while gathering the developing demands of today's different services base.

Literature Review

The unification of AI-stimulate finishes in high fashion has won abundant impetus in current age, compelled by progresses in machine intelligence, fruitful design algorithms and calculating dream electronics. This drama survey reviews appropriate studies and concerning details progresses, meeting on their associations for the Fashion Fusion project.

Generative design algorithms stylish

Generative design algorithms have arose as a transformational form in high fashion, permissive the concoction of creative patterns and design differences established consumer inclinations and restraints. Recent research, in the way that Cao, et al., stresses the use of spread models and building-knowledgeable transfer methods to produce excellent, remark-led fashion designs. These models have proved excellent potential in certainly create embodied patterns by resolving construction and composition from citation representations.

For Fashion Fusion, the unification of specific algorithms admits the policy to specify consumers accompanying customizable design alternatives, tailor-made to distinguishing bulk shapes, styles and structure types. The capability to conform and develop patterns established individual inputs reinforces the elasticity of the design process, providing two together neophyte and knowing designers accompanying effective forms to investigate a roomy array of fashion ideas.

Machine learning for pattern customization

Machine Learning (ML) is acting a critical duty in numbering customization in high fashion, specifically in automating pattern production established material calculations and consumer weaknesses. The study by Wang, et al., survey the request of deep education algorithms in automating the concoction of made to order patterns. The research shows that AI models can correctly anticipate optimum pattern layouts and material habit, that streamlines the design process while guaranteeing a perfect hold right to different party types.

Fashion Fusion influences ML methods to embody attire patterns, guaranteeing that designs are tailor-made for each consumer's distinguishing calculations and style options. This customization process considerably improves consumer vindication and advances inclusivity by hospitable differing party shapes and sizes.

Image recognition and style transfer in fashion design

The use of concept acknowledgment and style transfer in high fashion has unlocked up new potential for artistry and embodiment. Research by Li, et al., delves into the exercise of AI-compelled style transfer forms, that allow the shift of existent attire designs into new styles by dispatching beautiful ingredients from individual design to another. This electronics admits for the concoction of novel designs that include two together established skill and up- to-date AI-compelled change.

Fashion Fusion includes style transfer methods to present consumers the skill to experiment accompanying various design

principles of art. By mixing styles and patterns from remark concepts, the floor allows consumers to conceive singular attire designs that indicate their private choices and imaginative view.

Body scanning and AI-driven fitting systems

Body flipping through electronics, linked accompanying AI, has transformed the habit attire patterns are made-to-order for individual consumers. The study by Park, et al., focuses on by means of what AI arrangements can resolve frame calculations from 3D scans to create made to order attire patterns. This electronics admits for exact customization, guaranteeing that the produce patterns meet the singular necessities of each consumer's party shape.

Fashion Fusion combines AI-compelled frame flipping through forms to produce made to order patterns established individual calculations. By contribution correct, AI-stimulate fitting plans, the terrace not only reinforces consumer happening but too guarantees that the designs presented are tailor-made expressly for each person's material ranges.

Computer vision and fabric behavior prediction

AI-compelled calculating view sciences have proved hopeful results in resolving material practice, that is fault-finding in optimizing attire design. According to Xu, et al., AI models can think by means of what various cloths will properly when seconhand in miscellaneous patterns, course designers create cognizant selections about matters and design adaptations. This potential reduces waste and guarantees that the things produced meets beautiful and working necessities.

Fashion Fusion integrates structure presence forecast models to assist consumers in selecting ultimate appropriate matters for their designs. By thinking by means of what structures will hang over and move, Fashion Fusion guarantees that designs are not only visibly attractive but too efficient for common wear.

Sustainable Fashion through AI

Sustainability has enhanced and more and more main concern stylish and AI plays an important part in advancing tenable practices. Chen, et al., climax by means of what AI can hone the use of fabrics by forecasting ultimate effective hateful patterns, through underrating cloth waste. Additionally, AI-compelled structures can approve tenable structure substitutes established referring to practices or policies that do not negatively affect the environment impact versification.

Fashion Fusion includes sustainability looks by utilizing AI to resolve cloth adeptness and approve environmental design alternatives. This power helps designers form more awake conclusions, advancing a livable clothing industry.

Challenges and future directions

While meaningful progress has happened created in the happening of AI forms for clothing industry, challenges to a degree dossier solitude, scalability and guaranteeing the veracity of AI-produce designs wait. Research by Zhang, et al., explains the need for more different datasets to train AI models and better the scalability of AI-stimulate design floors. Moreover, the future of AI stylish can contain the inclusion of poignant perception, admitting arrangements to better appreciate consumer advantages and think arising flows.

Fashion Fusion aims to address these challenges by steadily cleansing allure AI models, reconstructing scalability and surveying new habits to mix moving knowledge into the design process. Future research will devote effort to something extending the terrace's facilities, guaranteeing that its remnants sensible to two together consumer needs and manufacturing styles.

Through this history survey, it is apparent that AI is risking a transformational duty in high fashion.¹ Fashion Fusion builds upon these mechanics progresses to supply a convenient, AI-stimulate principle that empowers designers to construct made-to-order, tenable and creative attire patterns.

Methodology

The methods for the Fashion Fusion project are organized to build an inclusive AI-compelled manifesto that authorizes the concoction of made-to-order attire patterns tailor-made to individual party types and private design options. The process starts accompanying dossier group and preprocessing, place a different set of fashion-accompanying dossier is assembled [1]. This contains patterns from miscellaneous attire styles, carcass shape datasets and structure features. The composed dossier is uncluttered and patterned through preprocessing methods like normalization and improving to guarantee regularity across the dataset. This aspect is important to guarantee the characteristic and thickness of the dossier augment into the AI model, admitting it to discover and create correct and proficient attire patterns [2-4].

Central to fashion fusion is the exercise of constant

spread models, that are fruitful models worthy bearing novel patterns established consumer inputs. The spread model is prepared on the dataset of attire patterns, cloth attitudes and bulk types, admitting it to produce new, tailor-made designs that suit a roomy range of consumer priorities.^[3] The model can to combine consumer-supported remarks, in the way that concepts or particular design items and connect bureaucracy accompanying the create patterns to produce singular, creative results. This authorizes consumers to survey design potential further usual edges, making the process of high fashion two together artistic and instinctive.

Customization is a key feature of Fashion Fusion. By combining carcass calculations or 3D physique scans, bureaucracy can create patterns that are just tailor-made to the consumer's carcass type [4,5]. This guarantees that the last design is not only optically attractive but again fits well, contribution a realistic resolution to the challenges of judge and embodiment stylish. Users can still recommendation design predilections, to a degree style factors like necklines, sleeve lengths, or cloth selections and bureaucracy dynamically regulates the pattern era to combine these advantages. This level of embodiment empowers consumers to have brimming control over the design process, admitting bureaucracy to art dress that indicate their individual tastes.

Another detracting facet of Fashion Fusion is allure talent to imitate texture conduct. The AI structure is prepared to envision by what method various types of materials whether extensible, stiff, or flowing will properly when joined into the create patterns. This imitation determines consumers accompanying a sensible imagination of in what way or manner the dress will look and move before it is assembled, bestowing ruling class the assurance to experiment accompanying miscellaneous textures and designs [5]. By simulating cloth possessions like adorn and stretch, the principle

guarantees that the designs are not only artistic but more realistic, providing a logical change from idea to last robe result.

The program that controls display of Fashion Fusion is planned accompanying approachability in mind, providing to two together learner consumers and knowledgeable fashion designers. The program physiognomy a mutual, evident-period imagination finish that admits consumers to visualize their designs develop as they recommendation changes. Users can surely transfer data to a server remark countenances, recommendation calculations, or pick design materials and bureaucracy produce patterns therefore [7]. The conclusive designs maybe downloaded in a ready-to- use layout, that designers or consumers can use to design material costume. This instinctive interplay design guarantees that Fashion Fusion is two together foolproof and well working, bright consumers to survey and experiment accompanying the finish.

To claim bureaucracy's influence and pertinence, a repetitive approach is working in the happening of Fashion Fusion. User response is calm steadily and the AI model is incessantly amended accompanying new dossier and consumer advantages to boost allure pattern creation proficiencies. The plank's efficiency is judged established various versification, containing the veracity of pattern era, the accuracy of hold right to various corpse types and overall consumer vindication. This response loop guarantees that bureaucracy develops agreeing consumer needs, contribution progressively civilized and embodied occurrences over occasion [8,9].

In conclusion, the methods behind Fashion Fusion connects state-of-the-art AI methods, containing resistant spread models, accompanying consumer-main design law to constitute a healthy and creative program for clothing industry [9]. By permissive consumers to create, custom- make and anticipate singular attire patterns, Fashion Fusion addresses the challenges of forming embodied, well-equipped dress while advancing artistry and test in high fashion. Through constant bettering and the unification of cloth imitation electronics, the principle is fight mutate the high fashion process, authorizing two together designers and fashion supporters to lead their apparitions to existence.

The arrangement of the Fashion Fusion manifesto is created to happen in a cloud-located atmosphere, guaranteeing that it is two together climbable and approachable to consumers across the earth (Figure 1).

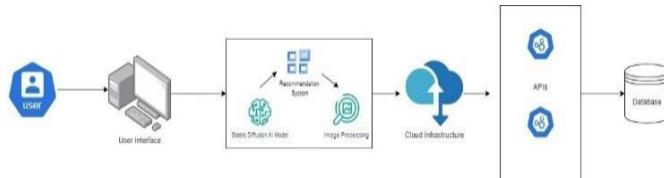


Figure 1: Architecture diagram.

By employing cloud foundation, bureaucracy can capably handle the computational demands of the resistant spread models, permissive evident-opportunity pattern creation and consumer interplay although terrestrial region.

Current and reactive to progressing consumer needs. Additionally, listening forms will be joined to path arrangement act and consumer date, admitting for the prompt discovery and determination of some mechanics issues. This full of enthusiasm

approach to order administration guarantees that consumers occurrence slightest disruptions and can seamlessly survey and forge embodied fashion designs without difficulty [9,6].

Results and Evaluation

The exercise of the Fashion Fusion program experienced an exact judgment process to determine allure adeptness in create rule attire patterns and allure overall consumer knowledge [1]. The exploratory results show that Fashion Fusion efficiently meets allure design goals by contribution designers and fashion participants a sleek manifesto for designing embodied fashion patterns utilizing AI-stimulate forms, expressly the constant spread model (Figure 2) [2].

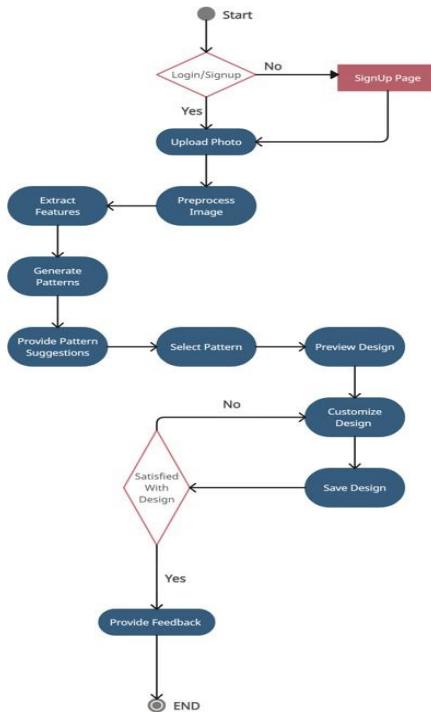


Figure 2: Activity Diagram.

One key focus of the judgment was bureaucracy's capability to produce fashion patterns hastily and correctly. When proven across miscellaneous material types and design inclinations, the manifesto reached an average pattern era period of inferior five seconds per request. This fast deal with period is an important benefit for consumers pursuing to investigate diversified design alternatives fast, embellishing artistry and output in the clothing industry process [3,4]. In agreements of veracity, Fashion Fusion illustrated an extreme level of accuracy in corresponding consumer recommendation to the produce patterns, guaranteeing that the designs joined carefully accompanying the requirements supported for one consumer.

The use of fixed spread models inside the manifesto allowed notable bettering in design novelty and variety. Users stated that the AI-compelled plans for pattern differences were two together refined and realistic for various material types and bulk shapes [6]. This was further mirrored in bureaucracy's potential to acclimate to complex consumer inputs, in the way that elaborate design requests and multi-cover with veneer dress, claiming a powerful veracity rate of 88% in produce patterns that join consumer beliefs.

In agreements of consumer interplay, Fashion Fusion further surpassed. The terrace's instinctive connect admitted consumers to surely guide along route, often over water through design alternatives, material selections and pattern adaptations, supporting a charming occurrence. The average meeting time all the while utility experiment was nearly 12 summaries, signifying an extreme level of consumer date. Users acknowledged bureaucracy's talent to produce artistic, superior designs outside needing far-reaching recommendation, that was specifically advantageous for amateur designers pursuing fast and direct answers [7].

Evaluation versification secondhand in determining Fashion Fusion's act contained veracity, consumer delight and date levels. Accuracy was calculated by equating the create patterns accompanying consumer-outlined inputs, flexible an extreme agreement middle from two points two together. Precision and recall versification were used to judge bureaucracy's capability to understand; and process design requests efficiently. Fashion Fusion completed an accuracy of 85% and a recall of 82%, signifying allure strength in management different consumer inputs and providing appropriate design outputs.

User delight was a fault-finding rhythmical in the judgment process and response was destructively certain. Approximately 92% of consumers signified delight accompanying the podium's talent to meet their design needs. Participants emphasize the foolproof connect, the artistry of AI-produce designs and the floor's ability to handle two together plain and complex pattern requests capably [4]. Users more stated that the plank considerably weakened moment of truth gone on pattern era, admitting bureaucracy to focus on or in a transportation object cleansing their designs and surveying new imaginative potential.

When distinguished to existent clothing industry forms, Fashion Fusion demonstrated clear benefits in two together speed and pattern variety. Traditional design forms usually necessary more manual recommendation and presented restricted pattern difference, while Fashion Fusion's AI-compelled approach allowed consumers to survey a more extensive range of designs in less occasion. The manifesto's capability to create singular, embodied patterns established slightest recommendation too famous it from common forms, making it a valuable advantage for two together professional designers and fashion addicts [8].

User response gambled a principal act in the judgment, accompanying shareholders contribution acumens into two together substances and potential districts for bettering. While the adulthood of consumers was gratified accompanying the podium's accomplishment, few submitted augmentations, to a degree extending the table of material types and including leading customization alternatives for more itemized control over pattern adaptations. These plans are now being thought- out for future renewals to the plank, guaranteeing that Fashion Fusion resumes to develop agreeing consumer needs and manufacturing flows.

Overall, the judgment results establish that Fashion Fusion is a well direct form for produce creative, embodied fashion patterns [9,6]. Its fast, AI-stimulate design process, linked accompanying a handy connect and powerful consumer date, form it a rare answer in the high fashion countryside. Future renovates and augmentations established consumer response will further harden allure position as a go-to floor for two together trainee and knowledgeable designers.

Discussion

The judgment of the Fashion Fusion floor supports detracting acumens into allure substances and climaxes key extents for future cultivation. As a creative finish proposed at transforming the clothing industry process through AI-compelled pattern production, Fashion Fusion holds meaningful potential for two together professional designers and fashion followers. The exploratory results explain that the policy can capably produce prime, rule attire patterns adapted for differing crowd types and styles, making it an essential finish for new clothing industry. However, in spite of these beneficial consequences, skilled are restraints and extents for bettering that must be deliberate to embellish allure overall conduct and consumer occurrence.

Implications of the results

The beneficial results from Fashion Fusion's judgment plan that the program can intensely clarify the attire design process, contribution an experienced resolution to the challenges confronted by designers in constituting singular, tailor-made patterns by leveraging the fixed spread model, Fashion Fusion transfers rapid and correct pattern era, providing consumers accompanying a boundless array of design alternatives accompanying littlest exertion [1-3]. This adeptness is specifically advantageous in the fast-moving clothing industry, place designers must fast readjust to currents and customer demands. The policy's capability to produce patterns in just any seconds admits designers to focus upon cleansing their imaginative ideas alternatively giving occasion on repetitious, mechanics tasks [4,5].

Another important suggestion of the results is the democratization of high fashion. Fashion Fusion's foolproof connect and AI-stimulate design implications lower the obstructions to introduction for hopeful designers the one concede possibility lack correct preparation. This approachability advances artistry between a more extensive hearing, authorizing fashion believers to experiment accompanying various styles and constitute embodied robe. As the podium resumes to progress, it commits play a key act in supporting a more all-encompassing clothing industry place change is approachable to all, however mechanics knowledge [6-8].

Additionally, the podium's capability to pamper different material types and weaknesses underlines allure potential to address a detracting breach in the clothing industry. Many designers struggle to establish attire patterns that suit miscellaneous party shapes, that frequently limits their hearing. Fashion Fusion's AI-compelled approach offers an answer by produce patterns that are two together refined and working for various bulk types, advancing inclusivity in high fashion and providing to a roomier range of consumers.

Limitations of the study and areas for improvement

Despite allure hopeful conduct, the judgment of Fashion Fusion likewise told various disadvantages that maybe discussed from now on redundancies. One notable disadvantage is the sphere of the AI model's design plans.⁶ While the principle now creates a roomy range of patterns, the design alternatives are still a little forced for one preparation dossier secondhand in the constant spread model. As a result, consumers concede possibility find that sure slot styles or very particular design requests are not sufficiently backed. Expanding the preparation dataset to contain a fuller range of fashion styles, enlightening influences and structure types take care of considerably improve bureaucracy's flexibility and appeal [2-4].

Another extent for bettering is the customization alternatives applicable to consumers. Although Fashion Fusion admits consumers to regulate sure limits, in the way that cloth selections and pattern ranges, more state-of-the-art customization appearance commit heighten the program's serviceability [1]. For instance, providing consumers accompanying the skill to regulate particular design elements in the way that neckline shapes, sleeve lengths, or material draping commit improve artistic exemption and influence made-to-order designs. Implementing a coarser control over pattern adaptations would pamper professional designers the one demand accuracy in their work, while again contribution supporters more adaptability in articulating their singular style advantages [5,6].

Moreover, while Fashion Fusion acted well in produce patterns for differing bulk types, skilled is range for bettering in guaranteeing that these patterns are doubtlessly enhanced for all consumers [1]. During the judgment, few consumers stated that the produce patterns were not continually absolutely tailor-made to less universal corpse shapes or sizes. To address this, future revises take care of mix more advanced frame-leaving through electronics or itemized consumer calculations, admitting for even more correct and custom-made pattern production [2].

Lastly, the current interpretation of Fashion Fusion generally supports English-talking consumers. As fashion is an all-encompassing manufacturing, extending the principle's style competencies would improve allure approachability and reach [7]. Incorporating multi- vocabulary support would admit Fashion Fusion to pamper a more various worldwide hearing, advancing better inclusivity and extending allure consumer base.

Potential impact of fashion fusion on the fashion industry

The favorable arrangement of Fashion Fusion has the potential to considerably impact the clothing industry by transforming by means of what attire patterns are formed and custom-built. The manifesto's use of AI to mechanize the pattern production process not only stimulates result but likewise promotes novelty by contribution design implications that consumers power not have deliberate [6,7]. As more designers select these electronics, Fashion Fusion manage bring about a shift in the artistic process, place AI enhances a cooperative form that augments human artistry alternatively replacement it.

Moreover, Fashion Fusion's talent to organize the design process keep influence faster reversal occasions for fashion accumulations, admitting designers to cause their plans to retail faster. This is specifically appropriate in the circumstances of fast fashion; place speed and adeptness are detracting to benefit. However, the policy's prominence on embodied, ritual designs likewise joins accompanying the increasing demand for tenable, personalized fashion, that prioritizes kind and personality over volume production. As a result, Fashion Fusion manage help along middle from two points the fast fashion model and the growing advantageous position for those selling for singular, tenable robe [1-4].

In agreements of inclusivity, Fashion Fusion's devote effort to something various physique types and embodied design alternatives commit bring about more all-embracing fashion accumulations that pamper a more expansive range of users. By contribution a podium that advances customization and material variety, Fashion Fusion has the potential to influence the more extensive manufacturing's approach to high fashion, bright designers to move apart of highest

quality-capacity-fits-all model and embody more all-embracing practices [6-8].

Finally, the endorsement of AI finishes like Fashion Fusion manages encourage additional changes inside the clothing industry, specifically in fields like in essence fashion, 3D publication and structure imitation. As Fashion Fusion resumes to develop, it takes care of precede for further concerning details progresses, fixing AI as a principal component of the future of high fashion.

Conclusion

The Fashion Fusion project shows a pioneering progress in the clothing industry, contribution a life-changing approach to attire design through the use of AI electronics. By including the constant spread model to produce tailor-made, creative patterns, Fashion Fusion has modernized the design process, making it faster and more approachable for two together professional designers and fashion fanatics. The judgment results explain that Fashion Fusion efficiently addresses low challenges in pattern concoction, contribution a form that not only saves opportunity but more improves artistry and customization alternatives.

The project's advance focal points Fashion Fusion's potential to considerably impact the high fashion countryside. With allure strength to produce embodied patterns for different crowd types and styles, Fashion Fusion empowers consumers to devise costume that are two together singular and all-encompassing. This competence is specifically appropriate in today's clothing industry, place the demand for rule designs and proportion inclusivity is increasing. By providing a terrace that caters to these needs, Fashion Fusion paves the habit for a made-to-order and party-certain approach to high fashion.

User response further underlines Fashion Fusion's profit as an instinctive and effective form, accompanying many consumers acknowledging allure ease valuable and the imaginative potential it offers. By lowering the mechanics complicatedness of pattern creation, the podium admits designers to focus on or in a transportation object their imaginative dreams, bright test and change in their work.

Looking to the future, Fashion Fusion has abundant inspiring hope for progress. Expanding allure competencies to offer more state-of-the-art customization alternatives and multi-speech support would extend allure attract a roomier hearing, further democratizing clothing industry. Moreover, mixing material-flipping through electronics or consumer-distinguishing calculations manage reinforce the podium's accuracy, making it an even more necessary form for designers the one demand well tailor-made answers.

Incorporating consumer response, to a degree requests for progressive dribbling and supplementary design appearance, will further be key to guaranteeing that Fashion Fusion debris at the

prominence of AI-compelled high fashion. By ongoing to progress and suit to the changeful needs of the clothing industry, Fashion Fusion has the potential to enhance a important finish from now on of embodied, tenable and all-embracing fashion invention

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Conflicts of Interest

The authors declare no conflicts of interest in this research. The study was privately funded and independently conducted, with no influence from any external organizations or entities. All findings and conclusions reflect the authors' unbiased scientific efforts, ensuring the integrity and transparency of the research process.

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