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Potentialities of AIGC: Digital Fashion

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Abstract. This paper explores the potentiality of generative AI (AIGC) in the video game business, fashion business and cultural perspective of digital fashion. By analyzing three contemporary cases-The Sims 4, Balenciaga x Fortnite, and Zepeto, the study investigates the differentiation from traditional customization to branded digital social experiences and fully AI powered personalization. Research reveals that technological sophistication is no longer the primary obstacle. AIGC have developed sufficiently to produce high-quality, visually impactful digital fashion assets. The true burden lies in construction and conveying market value for each piece, ensuring its scarcity and emotional resonance to drive user eagerness to pay. This paper proposed that integrating AI generators with blockchain technologies, NFTs, can offer validated ownership and user loyalties, transforming digital items into collectible, transactable digital assets that form a sustainable revenue stream. These findings contribute to understanding how digital fashion evolves from digital accessories into a profitable economic ecosystem, facilitates users' engagement, social presence and chronic platform profitability.

Keywords: AIGC, NFT, digital fashion, video game, avatar customization.

1. Introduction

The market for digital products is constantly growing as increased gen-z, begin to move into society as well as have their own consumption patterns [1]. Digital products have grown in variety as more people have begun to enter the digital world for entertainment, communication and socialization. Not only had in-game prop been turned into a profitable division, its avatar profile and digital fashion had also generated impressive revenues in recent years.

Accelerated by the development in technology, online communication has changed people's lives to a significant extent. Fashion is experiencing alteration from reality into digital form. With the breakthrough of 3D rendering and design software, 'fashion' has altered from a retail and design draft for physical fashion to a digital end-product sold to the users in digital form "digital fashion" [2]. From the experimental commercial collaborations of various brands, it can be seen that digital fashion has evolved into an independent division in the fashion industry without heavily relying on the original physical fashion.

Based on the technology development on 3D production, it brings more possibilities and feasibility to digital fashion. Increasingly, AI generators appeared in public eyes of fashion industry, it enhances the designers' productivity by completing their designs efficiently and by eliminating possible visual similarities between their designs and those of others.

Generative AI (AI generator or AIGC) are machine learning systems trained on large number of datasets of images, textures, styles, and user behavior [3]. They can generate new content based on user prompts or preferences, such as virtual outfits, fabric textures, or avatar outfits [4]. These tools have achieved remarkable sophistication in fashion: AI clothing generators, for instance, accept style descriptions and reference designs to output photorealistic garment blueprints, while the Prompt2Fashion project employs generative models to tailor personalized outfits based on occasion, style, and body type [5]. The idea of using AI generator in digital fashion is currently embryonic and unheralded, but based on AIGC's functionality and the ability customize, and self-analyze, it is possible to ameliorate the customization of virtual fashion and crafting digital fashion more personalized.

However, there are some technical and business marketing challenges regarding manipulating AI generator to create digital fashion: difficulty on business value, lack of brand story, and high repetition rate of the same design [6]. This article elucidates the crucial role of customization in digital fashion, current situation of digital fashion, possible marketing direction.

2. Overview of the case

Digital fashion, initially identified as a simple in-game accessory, which allowed users to customize their video game characters according to personal preferences. These elements are commonly referred to as skins, outfits, items, or appearance. As the gaming industry continues to evolve and thrive, these adornments have directly transcended monetary value and evolving into products that embody both cultural and commercial aspects. Digital fashion elements are not only the enhancer for the users to fully immerse the digital world but also provide game developers with an additional revenue stream. For example, by collaborating with celebrity fashion brands to create and then sell personalized virtual clothing, accessories, and other digital content. Game companies can generate sustainable income streams while simultaneously improving brand visibility. Furthermore, these elements contribute to user interaction and collaboration, strengthening the bond between members of the gaming community.

In this paper, author analyzes three modern representative cases to position and identify the role of AIGC in framing digital fashion. The first case, *Sims 4*, a well-known life simulation video game offering extensive character and outfits customization features, however primarily relying on pre-set assets and templates. This example underlines the limitations of personalization systems without using AIGC: visual content can become lackluster, leading to diminished long-term engagement and potentially lower player participation.

The second one is *Balenciaga x Fortnite* collaboration, which introduced digital fashion through seasonal in-game events. This example demonstrates how digital fashion can augment social presence and bolster brand exposure within multiplayer environments, incentivizing players to be more likely to spend time in-game to purchase items.

The third case is the social platform *Zepeto*, known for its AI infused avatar customization and recommendation system. By generating personalized digital fashion suggestions and auto-generated options through algorithms, it elucidates how AIGC enables large-scale personalization while fostering user interaction.

Additionally, this study examines the commercial success of LVMH and *League of Legends*. This collaboration has pioneered new trajectories for fashion and video games while consolidating the position of digital fashion among users.

Together, these three cases are from a spectrum: from traditional non-AI customization (*Sim 4*) to brand-driven social experiences (*Balenciaga x Fortnite*) to fully AI-powered customization (*Zepeto*). They provide a comprehensive detail for subsequent analysis, supporting explore how AIGC transforms personalization, elevates social presence and drives the market value of digital fashion.

3. Digital Fashion Evolution

Digital fashion has evolved from its origins as an extension of physical fashion—essentially serving retail visualization and design prototyping—into an independent division of virtual products within games and virtual worlds [7]. Key factors of this evolution include user identification, social presence, and interaction with virtual environments.

First, user identification has been developed from traditional character selection and customization to advanced self-expression. Such changes in the digital world enables players to construct and experiment with diverse digital personas through clothing, hairstyles, and accessories. Second, social presence has become a core component: players increasingly use digital fashion to showcase social

status, follow cultural trends, and participate in brand collaborations like *Balenciaga* × *Fortnite*, transforming appearance items into tools for social visibility. Finally, interaction with virtual environments has morphed into real-time, immersive experiences—such as AI-driven fashion recommendations and interactive social spaces offered by *Zepeto*. Altogether, these transformations demonstrate how digital fashion has evolved from digital content into a robust and dynamic ecosystem.

3.1. User Identification

Sims 4 is known for its most comprehensive clothing customization systems in the videogame realm. This game provides limited space for the users to manually customize facial features, appearance, hair styles and outfits of their avatars. The customization of this game allows the users to control moderately, which level up user identification and emotional connection, additionally projecting their own real or fantasized traits onto the avatar [8]. However, this business model is comparatively simple -the game developer only needs to create one asset then it can be sold to thousands of users. Although this standardized digital fashion can be simple mass produced and generate considerable revenue through total sales turnover, it lacks engagement overtime as users are willing to build a unique self-representation and exclusivity [9]. Without using AIGC to enhance the design language or create distinctive looks, users' ability to innovate and stylize their digital avatar is limited, often becomes insipid after a period. This opens an opportunity for AIGC to fill the blank space.

3.2. Social Presence

Balenciaga, the first high fashion house into a digital gaming environment, collaborated with *Fortnite* in 2021 on their first digital luxury fashion collection. (*Vogue Business 2021*) This successful commercial collaboration has allowed us to redefine virtual fashion and unlock greater commercial value. *Balenciaga* showcased its design language through in-game items (parachutes, backpacks, weapon skins and harvesting tool) and player skins within the *Fortnite* Universe. Bespoke avatar fashion can reflect the self; however, human designer invented the design and product, the users' identities may reinforce coveted self-satisfaction. Such fashion item could enhance users worth and social community commitment. This partnership remarkably enhances social presence—the feeling of "being with others" in shared spaces—as branded digital fashion transcend meager cosmetic upgrades to become recognizable symbols of identity and status among peers [10]. According to social presence theory, shared fashion cues strengthen mutual perception among users, thereby boosting community identification and interaction frequency [11].

However, such collaborations currently rely on a limited number of presets templates, resulting in insufficient content freshness and personalization. Introducing generative AI can transform this business model by mass-producing personalized skin variants aligned with brand DNA, enabling players to co-create and craft unique looks. This approach not only preserves brand recognition but also deepens individualized expression, further elevating social presence. Through continuous limited-edition AI-generated drops, it delivers sustained commercial value and user engagement.

3.3. Interaction with Virtual Environment

ZEPETO is bringing AI personalization into a different level where it enables low entry and prompt-based creation of tailoring design, colors and silhouette. Such advanced form of digital fashion personalization tremendously lowers the entry level of making personalized cloth. Through the experience of creating their own avatar, the users will obtain strong identification, social presence, and high level of satisfaction. Most of the users tend to have eagerness and great willingness to share results on their social media. When a digital figure altered into a reflection or a visual representation of users themselves, the users become more self-aware and have a clearer vision of their personal preference. With this easy access of generating exclusive items, users interact with AI generators very often, almost like a personal wardrobe stylist.

These features enhance the interaction with virtual environment, since avatars are not only traditional display objects but can be used in virtual environment, social settings, photo booths, and events. Social presence is elevated because other users can see the highly personalized avatar, interact with it, engage in shared events, and recognize the avatar as an individual being [12]. However, the current implementation is fragmentary: many customizable items are still drawn from pre-designed data libraries, and generative AI assistance seems more limited to specific scenarios (avatars/photos, profile photos, creator tools) rather than fully automatic personalized dressing or outfit generation for all users.

From a commercial perspective, this puts *ZEPETO* in a strong position: the blend of manual customization plus generative AI tool assistance allows both user engagement and content variety, while managing development cost. *ZEPETO*'s use of AI for avatar images and prompt-assisted item creation enables more frequent content drops, user content generation, and sustained interactions, which can lead to higher retention, microtransaction revenues, and brand partnerships.

3.4. The Leap of Digital Fashion Market

The large majority of digital fashion consumers intend to purchase merchandized digital fashion items, while a small fraction of users stay on the low budget cost on micro-transaction. In the past few years alone, numerous fashion companies collaborated with game developers. In 2019, LVMH, the juggernaut syndicate in the fashion industry, collaborated with Riot Games to produce digital fashion for the characters in the game *League of Legends*. "To be able to dress in virtual reality as you wish-that's a possibility now." Ghesquière, the creative director of Louis Vuitton said. With the synergy between *Louis Vuitton* and Riot Games, an increasing number of people have begun to pay attention to the appearance of their game characters and start to be aware that might indirectly represent their real-life identities and social symbols. Users letting their avatar wearing branded outfit become more visible in social and competitive contexts, which encourages both status signaling and peer recognition [13]. By combining luxury fashion branding and in-game customization, Riot Games maintains interest through novelty, limited-edition drops, and cross-media content (capsule clothing, music video) — all of which contribute to sustained user engagement and enhanced commercial value. The digital fashion designed by Louis Vuitton grasps users' attention and fulfilled with engagement with monetizable transactions, turning the acquisition of digital fashion into a reward for participation rather than a simple transaction. It also creates a sense of achievement in the user identification and social presence, which increases emotional attachment to both the game and the brand.

4. The Impact of AIGC

Generative AI (AIGC) could extend this model by positively generating personalized challenges, ongoing unlock systems, and outfit variations precisely tailored to individual players' behavior [14]. For example, AI could analyze the users' style and generate exclusive outfit searches, making the process of earning or unlocking outfits feel unique to each user. This would not only extend the amount of time of engagement but also increase the perceived value of the final transaction, since the digital fashion becomes the summit of a personalized journey. Commercially, this creates opportunities for data-driven engagement loops, where AIGC ceaselessly refreshes the challenge and reward in-game system, mirroring the "alive" feeling Ghesquière described [15].

Discovery from Having digital outfits in the Game [16] demonstrates that while users are motivated to purchase digital fashion principally for their visual attractiveness, they often feel overly regulated by the limited selection of available templates and options for true self-representation. For platform developers and fashion brands, this suggests a potential opportunity:

Generative AI can synthesize innovative outfits, color, appearances and accessories in real time based on player preferences or play history, giving every user a sense of uniqueness and exclusiveness. This personalization not only deepens user identification with their avatars but also drives repeat engagement, as users are motivated to return and voraciously explore new AI-generated items. From

a business perspective, offering personalized microtransactions—such as limited AI-generated drops or dynamic bundles—can convert this engagement into sustainable revenue streams, addressing the current limitations pointed by Reza [17]. With the power of AIGC, the gaming systems will easily fulfill users' demand for greater diversity and authenticity in digital fashion.

The commercial impact of generative AI in digital fashion extends far beyond only personalization. The FashionSD-X model has demonstrated that by combining latent diffusion with multimodal inputs like text and sketches, virtual fashion brands can significantly reduce design time and costs while generating high-fidelity, highly appealing garment visuals. This enables accelerated collection refresh cycles and increased content release frequency [18]. Simultaneously, platforms like DRESSX demonstrate that "digital-only wearables" can serve as new revenue streams with lower operational costs [19]. Especially when integrated with features like AR virtual try-on and AI style recommendations, these functionalities enhance user engagement, boost conversion rates, and increase repeat purchases. Furthermore, virtual fashion and AI-driven content support sustainability claims—reducing waste and lowering transportation carbon pollution—which resonate strongly with younger consumers and those prioritizing eco-conscious branding, positively elevating brand image.

Potentiality of AIGC

From a business perspective, AIGC unlocks new revenue opportunities. It enables high-frequency, continuous content releases—whether daily updates or seasonal content—keeping the game world perpetually "alive." This strategy mirrors Riot Games' approach in League of Legends, where players "engage, level up, and unlock Louis Vuitton collaboration skins" (Vogue, 2019). When integrated with achievement systems, developers can dynamically generate personalized missions or challenges for each player, rewarding them with unique AI-generated outfits. This design gamifies the purchasing process, extending player engagement while boosting conversion rates and willingness to pay.

Non-fungible tokens (NFTs) are "cryptographic assets containing unique identifying information and code on a blockchain, enabling them to be distinguished from one another" [20]. This uniqueness allows NFTs to serve as certificates of authenticity and ownership for virtual items. In virtual gaming fashion, minting AI-generated skins as NFTs ensures scarcity and verifiability, motivating players to pay premiums for them as collectible, tradable digital assets. Research indicates NFTs also support programmable royalties and secondary market transactions, generating recurring revenue for developers and brands while preserving long-term asset value [21]. When AIGC's mass-generation capabilities merge with NFTs' ownership and circulation functions, virtual fashion transforms from disposable consumables into the core of a value-accumulating, recyclable digital economy.

4.1. Potential Drawback

It is crucial to note that AIGC does not automatically generate market value. Research indicates that AI-generated works are often perceived as having lower value and collectability than human-created pieces [22]. Furthermore, the NFT market has experienced periods of volatility marked by sharp declines in trading volume and numerous assets remaining unsold [23]. Therefore, without brand endorsement, scarcity, and clear social utility, AI-generated virtual fashion may struggle to justify premium pricing or sustain long-term user interest.

Despite AIGC's compelling potential, market value does not always follow. Many AI-generated assets may be perceived as generic and low-differentiation in the marketplace, especially when they proliferate across multiple platforms and numerous creators produce similar outputs. If users perceive designs as lacking uniqueness or emotional resonance, their willingness to pay diminishes. Furthermore, AIGC tools sometimes struggle to produce work that perfectly aligns with brand identity or possesses artistic quality, diminishing perceived value in high-end or luxury sectors. Studies like AIGC Technology... highlight shortcomings in emotional expression, privacy, and ethical considerations.

5. Suggestion

At the brand partnership, AIGC enabled cross-industry collaborations to transcend the limitations of single-template skins. Instead, it dynamically generated personalized variants aligned with brand aesthetics and tailored to individual players. This personalization heightened players' sense of uniqueness and social presence, driving increased social interaction and community engagement. For instance, in Fortnite's Balenciaga collaboration, integrating AIGC could enable each player to unlock "slightly different" branded skins. This approach maintains design consistency while granting unique identity expressions, thereby strengthening immersion within multiplayer spaces [24].

To further secure commercial value, NFTs can be integrated into the process: each AI-generated item is labeled as a verifiable digital asset, ensuring scarcity and supporting secondary market circulation. Smart contracts can lock brand-approved parameters (color, logos, silhouettes) to guarantee compliance with brand guidelines and automatically distribute revenue, ensuring transparent profit-sharing among developers, brands, and even player-creators. Thus, brand collaborations transform from one-off marketing transaction into long-term revenue cycles and community management tools, sustaining ongoing engagement and player participation.

Finally, AIGC significantly reduces digital graphic production costs and accelerates asset pipelines [25], enabling game developers to release new items at higher frequencies without proportionally scaling human resources. This scalability empowers developers to explore diverse monetization models: dynamic pricing, limited-edition drops, subscription-based "fashion passes," and even player-co-created collaborative content—cultivating a "living" virtual fashion economy. Overall, AIGC not only elevates player entertainment and identity expression but also builds a sustainable commercial ecosystem. It transforms virtual fashion from mere cosmetic adornment into a core engine driving user engagement and platform profitability.

6. Conclusion

This study demonstrates the progression of generative AI(AIGC) within digital fashion across gaming through three cases: *The Sims 4*, *Balenciaga x Fortnite*, and *Zepeto*. The transformation from limited preset personalization and high fashion brand-driven social experiences to AI-powered dynamic customization reveals that the primary stumbling block for digital fashion is no longer technical limitations, however, rather, how to generate market value for each digital fashion piece. Without scarcity and emotional resonance, AI-generated digital fashion piece being perceived as generic, fungible decorations, failing to meet high willingness-to-pay thresholds.

This paper argues that integrating AIGC with blockchain technologies (such as NFTs) and fashion brands offers a viable solution to overcome this limitation. NFTs provide authenticated ownership and scarcity, while smart contracts enable transparent revenue distribution. This transforms cosmetic items from disposable consumables into collectible, tradable digital assets that generate sustainable income streams. Simultaneously, integrating AIGC with in-game rewarding systems, brand collaborations, and social presence gamifies the purchasing process. This enhances player identity and retention, particularly appealing to deeply engaged Gen Z users immersed in digital fashion.

In summary, AIGC not only propels digital fashion from virtual adornment toward a "living" economic ecosystem but also strengthens player engagement, social interaction, and platform monetization capabilities. Future research should further explore player psychology, payment willingness models, and ethical issues such as data usage and algorithmic bias to ensure the AI-driven digital fashion ecosystem develops in a sustainable and inclusive manner.

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