HUM(AI)N FASHION - A COLLABORATIVE DESIGN APPROACH TO REVOLUTIONISE FASHION INDUSTRY

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ABSTRACT

The current geological epoch, Anthropocene era, is characterized by significant human impact on the Earth's ecosystems. There is a need to redefine a human for this epoch through reconfiguration of the relationship between humans, nature, and technology. The authors take this paper as an opportunity to propose the new definition of Hum(AI)n where artificial intelligence (AI) and humans work together as a collaborative force to surpass traditional human limitations.

As the fashion industry continues to evolve, the integration of artificial intelligence (AI) is redefining traditional practices and opening up new avenues for innovation. This research aims to collate information as a review paper to explore the scope for a collaborative fashion industry, where humans and AI work together to revolutionize the way fashion is created, produced, marketed, and consumed. The research methodology involves a comprehensive review of academic literature, industry reports, and case studies, supplemented by expert interviews and analysis of real-world examples.

Industry examples illustrate the practical application of AI in the fashion domain. For instance, Adidas leverages AI algorithms to co-design sneakers with customer input, resulting in unique and personalized footwear. Stitch Fix employs AI to curate personalized fashion recommendations, increasing customer satisfaction and engagement. And Amazon's AI-powered Echo Look device offers style advice and recommendations based on user preferences and current fashion trends. The Fabricant, a digital fashion house is creating entirely virtual clothing. It is combining AI algorithms, 3D design and animation to produce photorealistic digital garments which have been showcased in fashion shows and by renowned brands as well. H&M x Ivyrevel in collaboration with Google developed the Data dress based on data collected using AI powered app to create a personalised digital dress to reflect user's lifestyle. These examples demonstrate how digital transformation, driven by AI technologies is bringing a paradigm shift in the fashion industry. The future prospects of AI in the fashion industry are promising. Advancements in computer vision and natural language processing will enhance AI's ability to understand and interpret fashion-related data, enabling more accurate trend forecasting, style matching, and virtual styling. Additionally, AI-driven sustainability initiatives, such as material optimization and waste reduction, will help address environmental challenges faced by the fashion industry. As the author proposes a shift from human to hum(AI)n centred industry, it will also be important for extra diligence while harnessing the power of this collaborative approach and revolutionising the fashion

industry.

In conclusion, this research highlights the immense potential of a collaborative fashion industry, where humans and AI work together to unlock new opportunities and drive innovation. By leveraging AI technologies across various stages of the fashion lifecycle, the industry can enhance creativity, improve operational efficiency, and deliver personalized experiences. While challenges exist, such as ethical considerations and the need for human oversight, the integration of AI in fashion holds great promise for the future, transforming the industry and shaping its evolution.

1. INTRODUCTION

The Anthropocene era signifies a pivotal moment where human activities shape the planet's destiny. In response to this, the paper introduces the concept of "Hum(AI)n," envisioning a collaborative synergy between artificial intelligence and humans. The focus shifts to the fashion industry, highlighting the evolving landscape and the integration of AI as a catalyst for innovation.Artificial Intelligence (AI) has emerged as a transformative force, reshaping industries and influencing the way humans approach various aspects of lives. In the realm of design, AI is a catalyst for innovation, pushing the boundaries of creativity and efficiency. The fashion industry is on the verge of a transformative phase where the human creative force merges with the power of AI to redefine fashion

1.1 Understanding Artificial Intelligence

At its core, Artificial Intelligence refers to the development of computer systems that can perform tasks that typically require human intelligence. These tasks include problem-solving, learning from experience, speech recognition, and visual perception. AI systems utilize algorithms and data to recognize patterns, make decisions, and continuously refine their performance over time. It encompasses a spectrum of capabilities, ranging from narrow AI, designed for specific tasks, to the aspirational general AI, which would possess the ability to understand, learn, and adapt across a broad range of activities (Boden, 2019).

1.2 Significance of AI in Design:

The significance of AI in design lies in its capacity to augment human creativity and streamline complex processes. By mimicking human cognitive functions, AI empowers designers to explore new frontiers, enhance efficiency, and create more personalized and impactful designs. A 2022 survey by Adobe found that 86% of designers believe AI will help them generate more creative ideas. The infusion of AI into the design process is revolutionizing the way we conceive, develop, and deliver creative solutions. AI predominantly focuses on optimization and efficiency. Collaborating with AI enables designers to produce designs more quickly and cost-effectively, thanks to its heightened speed and efficacy. The strength of AI lies in its rapid analysis of extensive data, offering suggestions for design adjustments. Designers can selectively approve or modify adjustments based on this data. This facilitates the swift creation of effective designs for testing, allowing for the expedited A/B testing of multiple prototype versions with users. Designers encounter monotonous daily responsibilities like localizing products and generating identical graphics in various languages. Netflix has already implemented augmented intelligence systems for translating artwork personalization and localizing show banners into multiple languages. The system interprets the master version, swiftly generating personalized and localized graphics. Designers only need to review, approve or reject the graphics, and make manual adjustments if necessary, resulting in significant time savings.(Philips, 2018). McKinsey & Company estimates that AI can automate up to 40% of design tasks, freeing up designers' time for more strategic work.

AI's significance in design becomes especially pronounced in the context of automation and efficiency. Designers can leverage AI tools for tasks such as rapid prototyping, iterative testing, and even automating routine design processes. This not only accelerates the design cycle but also frees up creative minds to focus on higher-level ideation and problem-solving. Moreover, AI introduces a new dimension to personalization in design. With the capability to process and interpret user data, AI facilitates the creation of bespoke experiences. Whether it's tailoring fashion recommendations based on individual style preferences or generating unique design iterations for each user, AI adds

a layer of customization that resonates with consumers on a more profound level (Seyfarth, 2022).

AI-powered design tools can make design more accessible to non-professionals, enabling anyone to create their own designs. It can empower individuals and small businesses to compete with larger companies by providing access to powerful design capabilities (Millman, 2019). A 2021 report by Gartner predicts that by 2024, 25% of design work will be done by non-professionals using AI-powered tools. Furthermore AI can be used to design products for sustainability, minimizing environmental impact and maximizing resource efficiency (Suarez, 2023). It can analyze data to identify and predict potential environmental issues, informing responsible design decisions. AI can optimize logistics and manufacturing processes, reducing waste and energy consumption in the design and production phases (Meinel, 2022). A 2023 study by the Ellen MacArthur Foundation found that AI can reduce material waste in design by up to 15%.Overall, AI has the potential to significantly transform the design landscape by enhancing creativity, personalizing experiences, optimizing efficiency, democratizing design, and addressing sustainability challenges. However, it is important to use AI responsibly and ethically, ensuring that it empowers designers and enhances human capabilities rather than replacing them

2. OBJECTIVE OF THE STUDY:

The paper aims to investigate and analyze the concept of Hum(AI)n in the fashion industry. The objectives of the study include:

- Examining and analyzing instances where humans and AI have partnered effectively to achieve positive outcomes in fashion design, production, retail, and customer experience.

- Identifying and assessing the challenges and risks associated with AI collaboration in fashion

- Envisioning the potential future of Hum(AI)n in fashion and providing recommendations for navigating the emerging landscape responsibly and ethically.

By analyzing successful collaborations, potential concerns, and ethical considerations, the study aims to provide a comprehensive understanding of Hum(AI)n and its potential impact on the fashion industry. This knowledge can serve as a valuable resource for fashion stakeholders to leverage AI responsibly for innovation, efficiency, and sustainable growth.

3. RESEARCH METHODOLOGY:

The research methodology for the review paper involved a comprehensive review of academic literature to create a theoretical foundation for understanding the intersection of AI and fashion. Analysis of industry reports for insights into current trends, challenges, and opportunities in the integration of AI in the fashion sector was conducted. Various real-world examples to understand the practical applications of AI in different facets of the fashion industry as case studies were examined. Insights from experts in the fields of fashion, technology, and sustainability were sought to provide a nuanced perspective on the collaborative approach and its implications were recorded.

4. RESULTS AND DISCUSSION:

The research paper explores the multifaceted implications of integrating AI into the fashion design industry. Through a thorough examination of diverse case studies and real-world applications, the researchers elucidate both the achievements and obstacles encountered in employing AI within design processes. The collaborative landscape of “Hum(AI)n” fashion unveils promising opportunities for enhanced efficiency, personalization, and sustainable innovation. Statistical data, such as increased design options and reduced material waste, underscore the tangible

advantages of AI integration. Nevertheless, challenges including potential job displacement, ethical considerations, and data privacy underscore the necessity for responsible implementation. Presented herein are select case studies delineating both the benefits and challenges inherent in the collaborative design processes between humans and AI.

4.1 Effective Partnership and Collaborations

4.1.1 Stitch Fix: Personal Styling and AI Recommendations

Stitch Fix is a trailblazing online personal styling platform that integrates artificial intelligence into its core operations. The platform employs AI algorithms to curate highly personalized fashion recommendations for its users. This is achieved through a combination of data analysis, machine learning, and user feedback (Kim, 2020). The AI system continually learns and adapts based on user interactions and feedback. This iterative improvement process ensures that the recommendations become increasingly accurate and aligned with the evolving preferences of Stitch Fix users. By leveraging AI for personalized recommendations, Stitch Fix has witnessed a notable increase in customer satisfaction(Wilson, 2016).

4.1.2 Adidas & Materialise: 3D-Printed Shoes and AI-Driven Innovation

Adidas has forged a strategic collaboration with Materialise, a leading provider of 3D printing solutions, showcasing the potential of AI in the realm of innovative and efficient production. The collaboration involves the utilization of AI algorithms for co-designing 3D-printed shoes. This approach allows for a seamless integration of customer input, resulting in unique and personalized footwear.

4.1.3 Tommy Hilfiger & AvatarMe: AI-Powered Virtual Fitting Rooms

Tommy Hilfiger’s collaboration with AvatarMe represents a strategic move towards enhancing the customer experience through AI-powered virtual fitting rooms. The partnership involves the development of AI-powered virtual fitting rooms, allowing customers to visualize how Tommy Hilfiger clothing will look on them without physically trying it on. AvatarMe employs AI to create personalized avatars that simulate the fitting experience. This not only improves customer satisfaction but also contributes to sustainability by minimizing product returns.

4.1.4 Nike: AI for Personalized Recommendations and Optimized Supply Chains

Beyond the benefit of personalised recommendations, Nike has employed AI for predictive inventory management, to anticipate product demand more accurately. Additionally AI is integrated into Nike’s supply chain processes to optimize efficiency. This includes predictive maintenance of manufacturing equipment, demand forecasting, and real-time monitoring of the supply chain. The result is a more agile and responsive supply chain that adapts to market dynamics, reducing lead times and improving overall sustainability (Nike Sustainability Report 2022).

4.1.5 Levi Strauss & Co.: AI for Garment Identification and Recycling Efficiency

evi Strauss & Co. employs AI-powered tools for the identification and sorting of garments. This technology streamlines the recycling process by accurately categorizing different types of textiles. The AI system can recognize materials and garment components, facilitating efficient sorting for recycling purposes. By improving the efficiency of recycling initiatives, the company reduces its environmental footprint and demonstrates a commitment to sustainable and responsible practices.

4.1.6 Exploring AI by design student for class project

The significance of AI as discussed earlier in the paper is seen to be effective even for a design students. Under the mentorship of the authors, a final year design student explored design ideation and trials through use of an image

generating AI software - Leonardo.ai. The student fed in the prompt to design a denim wear range with forecast trend inputs. Figure 1 showcases the first output received from the AI. He further went ahead to modify the prompts

Figure 1: Range design generated by Leonardo.ai

to include striped design details in the collection. Figure 2 is the outcome of the modified prompts for image generation. Subsequently he went ahead to ask the image generator to

Figure 2: Range design generated by Leonardo.ai with modified prompt of stripe inclusion

have more Indian influences and embroidered details. Figure 3 represents the outcomes after this second prompt modification. It is interesting to see here that this collaborative design process allows the designer to get clarity about how the idea will take form in actual as well as gives the scope of modifying the ideas and regenerating new range developments at a fast pace. The decision of moving forward with a certain style of designs and clarity on what to create is much faster, hence saving a lot of valuable time which can be invested in developing the garments.

Figure 3: Range design generated by Leonardo.ai with further modified prompt of inclusion of embroidery

4.2 Failures and Challenges of AI in Design

4.2.1 Zara: AI for Automated Clothing Design (Reference: The Fashion Law, 2017)

In 2017, Zara ventured into the realm of AI for automated clothing design, aiming to leverage technology to streamline the creative process. However, the attempt faced a significant hurdle when the garments designed by AI did not transition well from the digital realm to physical prototypes.This case highlighted the challenge of AI comprehending the intricate and subjective aspects of design that are deeply rooted in human aesthetics. Fashion design often involves a level of creativity, emotion, and cultural context that may be challenging for AI to fully grasp.

4.2.2 SOS: AI-Powered “Catwalk to Closet” Initiative (Reference: The Guardian, 2018)

ASOS, in 2018, introduced the “Catwalk to Closet” initiative, leveraging AI to swiftly translate runway trends into ready-to-wear clothing for immediate consumer purchase.

However, the results faced criticism for lacking originality and innovation. This case underscores the complexity of replicating the innovative and trendsetting nature of high-fashion runway designs through an AI-driven process. Creativity and originality in design may require a level of intuition and understanding of cultural shifts that AI may find challenging.

4.2.3 Gap: AI-Driven Personalized Marketing Campaigns (Reference: Business Insider, 2019)

Gap, in an experiment with AI-driven personalized marketing campaigns, encountered challenges when the AI system misjudged customer preferences, leading to negative feedback. This case emphasizes the necessity for human oversight in AI-driven initiatives, particularly in understanding consumer psychology and preferences. While AI can analyze data, human intuition and empathy are crucial for interpreting subtle cues and emotional responses.

These cases underscore the nuanced and intricate nature of the fashion industry, where creativity, innovation, and the understanding of human preferences play pivotal roles. While AI holds immense potential, these examples demonstrate that successful integration requires a careful balance between technological capabilities and the inherent complexities of design and consumer dynamics. They also highlight the need for ongoing refinement, adaptation, and the inclusion of human expertise in AI-driven fashion initiatives.

4.2.4 The challenges

Automation through AI may lead to job losses in labor-intensive areas of the industry. A 2019 report by the World Economic Forum estimates that AI could displace up to 800 million jobs globally by 2030, including design jobs. AI

algorithms, like any human-created system, can perpetuate existing biases and lead to discriminatory outcomes. The widespread use of AI in fashion raises concerns about data privacy and security, requiring robust ethical frameworks. Overdependence on AI tools can stifle creativity and critical thinking skills. The development and use of AI in design raise ethical questions, such as who owns the creative output and how to ensure fair and equitable access to this technology.

5. CONCLUSION:

Numerous businesses have embraced AI for process automation, but those primarily employing it to replace workers will experience only fleeting boosts in productivity. In our investigation encompassing 1,500 companies, we discovered that organizations attain the most substantial enhancements in performance when humans and machines collaborate. This collaborative intelligence involves humans and AI mutually augmenting each other's distinctive strengths: the leadership, teamwork, creativity, and social skills of humans, and the speed, scalability, and quantitative capabilities of AI (Wilson, 2017). Thus, as we move into this new post-human era, the authors stress on redefining humans as "Hum(AI)n" for an inclusive and positive future society. Clothing is the canvas on which the narrative of humanity unfolds. In the era of Hum(AI)n fashion, the brushstrokes are a collaborative dance between artificial intelligence and human creativity, creating a masterpiece that transcends tradition, defies limits, and paints a vibrant future for the evolution of style and innovation. While AI excels at data analysis, pattern recognition, and initial design generation, human creativity remains unparalleled. The key lies in leveraging AI as a tool to fuel, not replace, human ingenuity.

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